Drainage Study

TARGET
SOUTHWEST DISTRIBUTION CENTER, PHOENIX, ARIZONA

Prepared For:
Target Corporation
7101 W. Van Buren St.
Phoenix, Arizona 85003

Submitted To:
City of Phoenix
Flood Control
211 W. Washington St.
Phoenix, Arizona 85003

Prepared By:
WRG Design, Inc.
4808 N. 22nd St.
Phoenix, Arizona 85016
Office (602) 977-8000
Fax (602) 977-8099

April 22, 2002
WRG# 4001574.00

THE FACE OF THIS DOCUMENT HAS A COLORED BACKGROUND - NOT A WHITE BACKGROUND • SPECIAL SECURITY PAPER WITH WHITE WATERMARK

Nielsen Dillingham BUILDERS

NIELSEN DILLINGHAM BUILDERS
3127 Jefferson - P.O. Box 80367
San Diego, California 92138

UBOC DISBURSEMENT SERVICES
BOSTON, MA 02108

53-292
113

CHECK DATE	CHECK NO.
04/22/02	617930

CHECK AMOUNT
$ ******3,400.00

PAY Three Thousand Four Hundred Dollars and 00 Cents

TO THE ORDER OF
NATIONAL FLOOD INSURANCE
PRGRM/FED EMER MGNT AGNCY
P.O. BOX 3173
MERRIFIELD, VA 22116

TWO SIGNATURES REQUIRED IF OVER $10,000.00

SIGNATURE HAS A COLORED BACKGROUND • BORDER CONTAINS MICROPRINTING

⑈617930⑈ ⑆011302920⑆ ⑈9080006036⑈960000

Property of Flood Control District Library
Please Return to
2801 W. Durango
Phoenix, AZ 85009

Property of
Flood Control District of MC Library
Please Return to
2801 W. Durango
Phoenix, AZ 85009

Drainage Study

TARGET
SOUTHWEST DISTRIBUTION CENTER, PHOENIX, AZ

Prepared For:
Target Corporation
7101 W. Van Buren St.
Phoenix, AZ 85043

Prepared By:
WRG DESIGN, INC
4808 N 22nd Street
Suite 150
Phoenix, Arizona 85016
Office (602)-977-8000
Fax: (602-977-8099

Registered Professional Engineer (Civil)
CERTIFICATE NO. 35241
JEFFREY A. CURRAN
Date Signed 4.22.02
ARIZONA, U.S.A.

April 22, 2002
WRG# 401574.00

TABLE OF CONTENTS

1.0 INTRODUCTION 1

2.0 EXISTING CONDITIONS 1

3.0 PROPOSED CONDITIONS 2

4.0 OFFSITE DRAINAGE 2

5.0 ONSITE DRAINAGE 3

5.1 Hydrology 3
5.2 Hydraulics 4
5.21 Conveyance 4
5.22 Retention 5

6.0 FLOOD INSURANCE RATE MAP 7

7.0 CONCLUSIONS 8

8.0 REFERENCES 9

9.0 AS-BUILT CONDITION 10

APPENDIX

Appendix I – Hydrology
- Existing HEC-1 Data 100-year, 6-hour
- Onsite Hydrology – Rational Method
- City of Phoenix IDF Curve
- Average Velocity for Estimating Travel Time for Shallow Concentrated Flow

Appendix II – Hydraulics
- Curb Opening Design – Sump Condition
- Curb Opening Design – On-Grade Condition
- Catch Basin Design – Sump Inlet
- Channel Analysis
- Culvert Analysis – HEC-5
- Storm Drain Analysis - StormCad

Appendix III - Summary Table – Stormwater Retention Calculations

Registered Professional Engineer (Civil)
CERTIFICATE NO. 35241
JEFFREY A. CURRAN
Date Signed 4-22-02
ARIZONA, U.S.A.

LIST OF EXHIBITS

EXHIBIT 1	Vicinity Map
EXHIBIT 2	Watershed Map (Insert)
EXHIBIT 3	Drainage Basin Map (Insert)
EXHIBIT 4	Flood Insurance Rate Map

1.0 INTRODUCTION

The purpose of this report is to provide an onsite drainage analysis for the proposed Target Southwest Distribution Center located in the southeast corner of 75th Avenue and Van Buren Street. This report will specifically address the onsite drainage and retention criteria as specified by the City of Phoenix *Storm Drain Design Manual*.

This project involves the development of a proposed 1.5 million square foot warehouse that will serve as the Target Southwest Distribution Center. The site is located within the northwest quarter of Section 12, Township 1 North, Range 1 East of the Gila and Salt River Meridian, Maricopa County, Arizona (Refer to Exhibit 1, Vicinity Map). Currently, the site is a plowed farm field producing crop on approximately 144 acres. The general topography of the subject property is from the northeast to the southwest at an average, approximate slope of 0.28 percent (Refer to Exhibit 2, Watershed Map). All drainage measures within the proposed project shall be designed to meet the requirements as established by the City of Phoenix and Volumes I and II of the *Drainage Design Manual for Maricopa County, Arizona* dated January 1, 1995 and January 28, 1996, respectively.

2.0 EXISTING CONDITIONS

The site itself is surrounded by the following:

- Van Buren Street on the north side of the property.
- 75th Avenue along the west property line
- Farm fields bordering the east property line (71st Avenue alignment)
- Roosevelt Irrigation District Canals and the Southern Pacific Railroad to the south

The high point of the site is at the northeast corner at an elevation of approximately 1036. The low point is in the southwest corner at an approximate elevation of 1027. The southern portion of the site, adjacent to the Roosevelt Irrigation District (RID) Canal and railroad tracks, slopes from east to west at a grade of 0.10%. As previously mentioned, the site is currently used for agricultural purposes. Concrete lined irrigation canals are present throughout the site and are used to irrigate the existing farm fields.

3.0 PROPOSED CONDITIONS

The proposed project includes a 1.5 million square foot facility that will serve as the Southwest Distribution center for Target Corporation. A truck entrance and guard station shall be located on the north side of the property with access to the site from 71st Avenue and Van Buren Street. Truck trailer parking shall be located on the north side of the site with some additional trailer parking on the east side of the building. Loading docks shall be situated along the north and east side of the building for shipping and receiving of Target products. An employee access entrance will be off of 75th Avenue with employee parking on the south side of the building. Site lighting and perimeter fencing shall also be installed for security reasons. A concrete pad situated just north and west of the proposed building shall also be constructed for pallet storage. A water reservoir and booster pump station are also planned to be constructed on the south side of the building. This facility shall provide additional fire protection for the distribution center.

4.0 OFFSITE DRAINAGE

The offsite drainage that impacts the Target Southwest Distribution Center is addressed in two reports prepared by Hoskin Engineering Consultants, Inc. entitled *Off-Site Drainage Report for Target Southwest Distribution Center, Phoenix, Arizona* (Ref. 8) and *Addendum to the Off-Site Drainage Report for Target Southwest Distribution Center* (Ref. 9), both dated December 8, 2000. These reports also address the conveyance of offsite flows through the subject property in proposed channels located along the perimeter of the site. These reports can be found in the appropriate sections of this Drainage Study.

5.0 ONSITE DRAINAGE

5.1 HYDROLOGY

Runoff generated by the proposed development shall sheet flow within the parking lot and collect at various points of concentration (Refer to Exhibit 2, Watershed Map). The Rational Method has been used to estimate peak flows for the design event storm based on City of Phoenix criteria. At these collection points, stormwater flows shall be intercepted by a catch basin and storm drain or curb opening and channel that will direct flows to each of the onsite retention facilities. Drainage sub-basins have been delineated based on the proposed grading of the site. Times of

concentration are based on flow within the parking lots where applicable with a minimum time of concentration of ten (10) minutes. Rainfall intensities are based on the City of Phoenix Rainfall Intensity-Duration-Frequency (IDF) Curve for the Phoenix Metro Area. A coefficient of runoff (C-value) of 0.95 was used for all parking lot, street and building areas. A weighted coefficient has been used for areas with a mixture of paved area and landscape. Hydrologic data and flows are listed in Appendix I.

5.2 HYDRAULICS

5.21 Conveyance

As previously mentioned, onsite flows shall be conveyed via catch basin, storm drain, curb opening and channel to each of the onsite retention facilities. The system shall be designed to convey the 10-year storm per City of Phoenix requirements with the 100-year high-water elevation below the finished floor elevation of the building (Refer to Appendix II for hydraulic calculations). The locations of the onsite retention basins, drainage areas, flow patterns and particular concentration points are indicated in Exhibits 2 and 3.

Offsite flows that enter the site shall also be conveyed through the property. The conveyance system for the offsite flows shall be in channels along the north, south, east and west property lines. Each channel shall be sized to convey the 100-year storm event. As previously mentioned an analysis of these channels can be found the reports prepared by Hoskin (Ref. 8 and 9). A culvert crossing at the employee entrance off of 75th Avenue has also been sized with three (3) 10' x 3' box culverts to pass the flows under the access drive. The 100-year discharge has been referenced from the *Off-Site Drainage Report and Addendum* (Ref. 8 and 9) for design of the culvert crossing. This information is provided in Appendix II of this report. The extreme outfall of the site is at an approximate elevation of 1029 and is in the southwest corner at 75th Avenue. The proposed finished floor elevation of the Target Southwest Distribution Center will be set significantly higher than the extreme outfall elevation.

The *Off-Site Drainage Report* and *Addendum to the Off-Site Drainage Report* (Ref. 8 and 9) include HEC-1 data for routing of proposed onsite flows during the 100-year, 24-hour and 6-hour storm events. This data will show that, through the use of onsite retention facilities, the

developed 100-year discharge from the site will not exceed existing conditions. These reports shall also include detailed calculations to include HEC-RAS modeling to evaluate flow depths through the proposed channel south of the building. Floodplain alteration shall also require coordination with the City of Phoenix Floodplain Management Department and with the Federal Emergency Management Agency for amendments and revisions to the existing Flood Insurance Rate Map and LOMR, dated February 23, 2000.

5.22 Retention

The City of Phoenix requires that all retention facilities be sized to retain 100% of the 100-year, 2-hour storm falling over the entire project. The Rational Method shall be used for estimation of onsite retention. All onsite flows shall be retained by proposed facilities onsite. Refer to Exhibit 3, Drainage Basin Map for the location of the proposed retention facilities. The adjacent half rights-of-way of 75th Avenue and Van Buren Street shall also be collected in proposed catch basin inlets/curb openings and conveyed to the proposed retention facilities via onsite channels. These facilities shall accommodate the 100-year, 2-hour runoff generated by each half right-of-way.

As indicated by the Stormwater Retention Summary Table in Appendix III, all basins have been sized to retain the design event storm. All retained water shall be disposed of within a 36-hour period. Each basin shall be bled-off by drywells. Preliminary calculations used to determine the proposed number of drywells for each basin can be found in the appendix. The final number of drywells required will be dependant on actual percolation tests performed at the proposed drywell locations.

Due to the size of the building and overall site, multiple retention basins will be required to accommodate the anticipated grading and drainage flow patterns. Since the site is so large and surface drainage routes long, the basins will be quite deep in some areas of the site. Although the effective volume will not exceed a depth of three feet in most cases, we anticipate basins that could be 8 to 10 feet below existing grade. This will require fencing and/or other protective measures to restrict access while enabling ingress and egress from the basin(s) for maintenance purposes.

Each retention facility shall contain an overflow spillway that will convey flows in excess of the 100-year, 2-hour event storm away from the proposed building. These flows will be directed south and west towards 75th Avenue. The overflow elevation shall be set well below the finished floor elevation of the building. A summary table of stormwater retention calculations is provided in Appendix III of this report.

5.23 Compensating Storage

In accordance with the Flood Control District of Maricopa County criteria, the site should provide compensating storage volume for any displaced ponding areas within the floodplain. The volumes of storm water stored within the site are summarized as follows:

Table: Summary of Storage Volumes

Existing Floodplain Vol. El. 29* (AF)	Proposed Floodplain Vol. El. 29 (AF)	Onsite 100-year, 2-hour Storage (AF)	Excess Volume for Compensating Storage (AF)
6.5	30.5	15.49	15.01

* From Dibble HEC-1 Model

6.0 FLOOD INSURANCE RATE MAP

The Maricopa County, Arizona and Incorporated Areas Flood Insurance Rate Map (FIRM) Panel Number 04013C2105D dated April 15, 1988 and revised to reflect the LOMR dated February 23, 2000 indicates the site falls within Zone "X" and Zone "AE". Refer to Exhibit 3 for the site location.

Zone "X" is defined by FEMA as follows:

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.

Zone "AE" is defined by FEMA as follows:

Special flood hazard areas inundated by 100-year flood; Base flood elevations determined

7.0 CONCLUSIONS

Based on the analysis of this Drainage Report, the following conclusions are drawn:

1. This Drainage Report is prepared in accordance with the recommendations and design parameters from the City of Phoenix, *Storm Drain Design Manual* (Ref. 1).

2. Onsite hydrology was calculated using the Rational Method, in accordance with City of Phoenix guidelines.

3. Retention for the 100-year, 2-hour storm has been provided within a number of onsite retention basins.

4. The 10-year flow is adequately transmitted in the onsite conveyance system to each of the retention basins.

5. The finished floor elevation of the building has been designed to be above the expected 100-year high water elevation.

6. The design of hydraulic structures has been based on generally accepted engineering practices and in accordance with City of Phoenix requirements.

7. The ultimate site outfall is to the southwest.

8.0 REFERENCES

1. **Storm Drain Design Manual, Subdivision Drainage Design**, City of Phoenix Development Services Infrastructure Review, July 1988.

2. **The City of Phoenix Code**, Chapters 32A, 32B and 32C.

3. **Drainage Design Manual for Maricopa County Volume I, Hydrology**, Flood Control District of Maricopa County, January 1, 1995.

4. **Drainage Design Manual for Maricopa County Volume II, Hydraulics**, Flood Control District of Maricopa County, January 28, 1996.

5. **Floodplain Delineation of the Tolleson Area Project FCD 95-26 – Hydrology Report**, Dibble & Associates Consulting Engineers, May 14, 1999

6. **Floodplain Delineation of the Tolleson Area Final Report and Technical Data Notebook FCDMC Contract No. 95-26**, Dibble & Associates Consulting Engineers and JE Fuller/Hydrology & Geomorphology, Inc., May 1999

7. **National Flood Insurance Program**, Flood Insurance Rate Map 1190 of 4350, dated December 3, 1993

8. **Off-Site Drainage Report for Target Southwest Distribution Center, Phoenix, Arizona**, Hoskin Engineering Consultants, Inc., December 8, 2000.

9. **Addendum to the Off-Site Drainage Report for Target Southwest Distribution Center, Phoenix, Arizona**, Hoskin Engineering Consultants, Inc. December 8, 2000.

APPENDIX

APPENDIX I - HYDROLOGY

Onsite Hydrology – Rational Method

City of Phoenix IDF Curve

Average Velocity for Estimating Travel Time for Shallow Concentrated Flow

Target SW Distribution Center
Onsite Hydrology
Rational Method

Concentration Point/Watershed	Area ac	Length ft	Avg. Slope (%)	Ave. velocity fps	Tc(1) min	Coefficient	I_{10} in/hr	I_{100} in/hr	Q_{10} cfs	Q_{100} cfs
1	2.06	766	0.5	1.5	10	0.95	4.5	7.0	9	14
2	1.96	1008	0.5	1.5	11	0.95	4.3	6.8	8	13
3	1.94	1160	0.5	1.5	13	0.95	4.0	6.5	7	12
4	2.13	1330	0.5	1.1	20	0.95	3.2	5.0	7	10
5	1.84	1384	0.5	1.5	15	0.95	3.7	6.0	7	10
6	0.80	430	0.5	1.5	10	0.95	4.5	7.0	3	5
7	1.90	1280	0.5	1.5	14	0.95	3.9	6.4	7	11
8	2.12	1280	0.5	1.5	14	0.95	3.9	6.4	8	13
9	2.12	1280	0.5	1.5	14	0.95	3.9	6.4	8	13
10	2.06	1280	0.5	1.5	14	0.95	3.9	6.4	8	12
11	4.69	1323	0.5	1.5	15	0.95	3.8	6.3	17	28
12	3.18	1250	0.5	1.5	14	0.95	3.9	6.4	12	19
13	6.73	1339	0.5	1.5	15	0.95	3.8	6.3	24	40
14	3.31	1311	0.5	1.5	15	0.95	3.8	6.3	12	20
15	2.09	1288	0.5	1.5	14	0.95	3.9	6.4	8	13
16	1.33	1280	0.5	1.5	14	0.95	3.9	6.4	5	8
17	17.15	1414	0.5	1.5	16	0.95	3.7	5.9	60	96
18	0.50	670	0.6	1.6	10	0.95	4.5	7.0	2	3
19	1.33	680	0.6	1.6	10	0.68	4.5	7.0	4	6
20	0.95	425	1.3	2.3	10	0.95	4.5	7.0	4	6
21	0.62	340	0.6	1.6	10	0.95	4.5	7.0	3	4
22	0.19	134	0.5	1.5	10	0.95	4.5	7.0	1	1
23	5.07	710	0.4	1.4	10	0.95	4.5	7.0	22	34
24	5.45	707	0.4	1.4	10	0.95	4.5	7.0	23	36
25	0.38	500	0.7	1.7	10	0.95	4.5	7.0	2	3
26	1.03	708	0.2	1.0	12	0.95	4.2	6.7	4	7
27	0.32	500	0.3	1.4	10	0.95	4.5	7.0	1	2
28	1.23	780	0.2	1.0	13	0.95	4.0	6.5	5	8
29A	0.29	500	0.3	1.4	10	0.95	4.5	7.0	1	2
29B	0.24	278	0.3	1.4	10	0.95	4.5	7.0	1	2
29C	1.06	567	1.5	2.4	10	0.95	4.5	7.0	5	7
30	3.20	620	0.8	1.8	10	0.95	4.5	7.0	14	21
31	3.16	598	0.8	1.8	10	0.95	4.5	7.0	14	21
32	4.08	630	0.8	1.8	10	0.95	4.5	7.0	17	27
33	3.53	598	0.8	1.8	10	0.95	4.5	7.0	15	23
34	0.05	79	1.0	2.0	10	0.95	4.5	7.0	0.2	0.3
35	0.96	570	1.5	2.4	10	0.95	4.5	7.0	4	6
36	3.55	760	0.5	1.5	10	0.95	4.5	7.0	15	24
37	3.20	546	0.5	1.5	10	0.95	4.5	7.0	14	21
38	1.15	456	0.5	1.5	10	0.95	4.5	7.0	5	8
39	0.36	217	0.5	1.5	10	0.95	4.5	7.0	2	2
40	1.73	729	1.5	2.0	10	0.40	4.5	7.0	3	5

STORM	**6**	**10-YEAR EVENT**	**Based on City of Phoenix Rainfall-Intensity-Duration-Frequency Curve**
STORM	**7**	**100-YEAR EVENT**	**Based on City of Phoenix Rainfall-Intensity-Duration-Frequency Curve**

Notes

(1) Based on a minimum 10-minute time of concentration

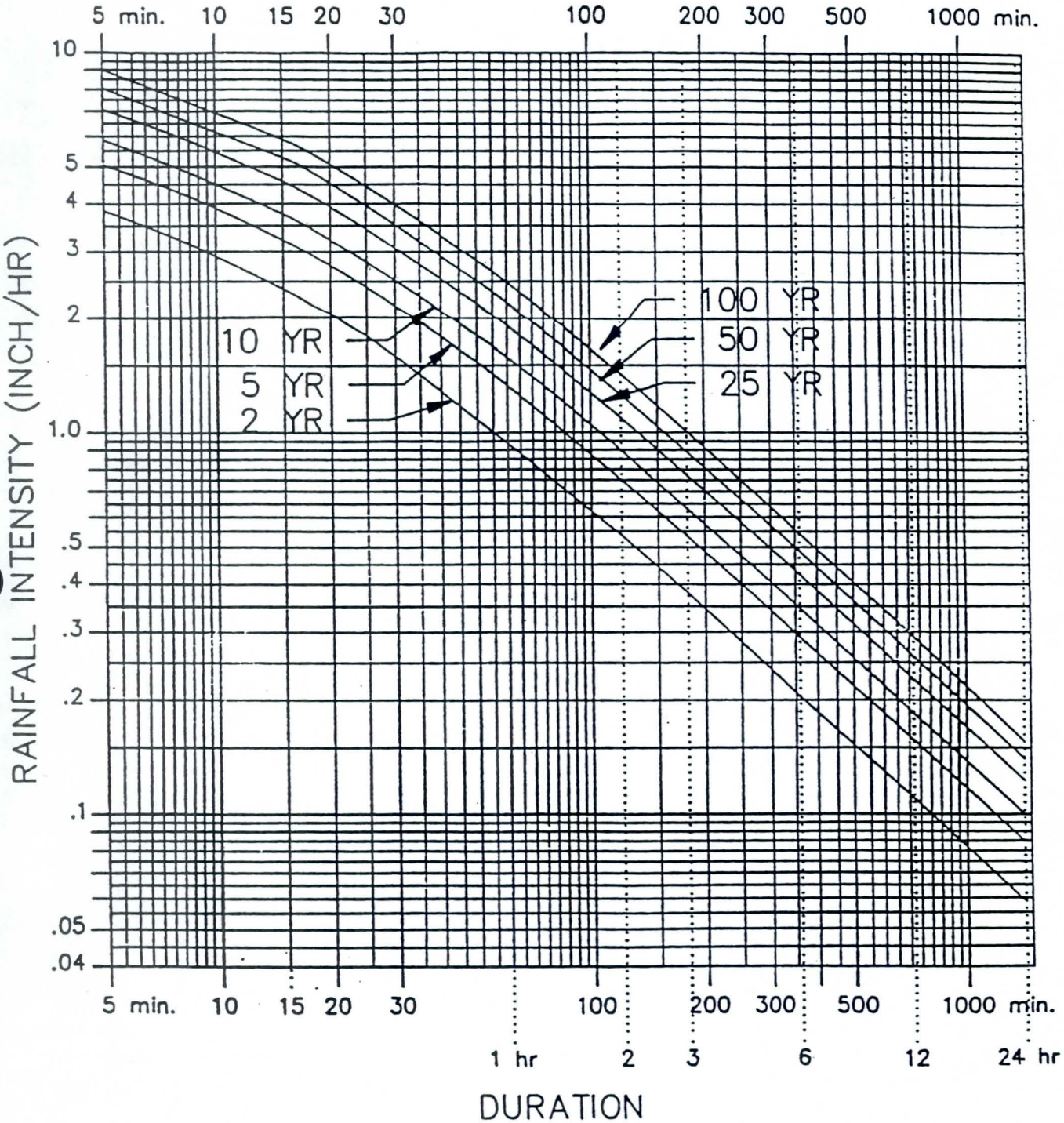
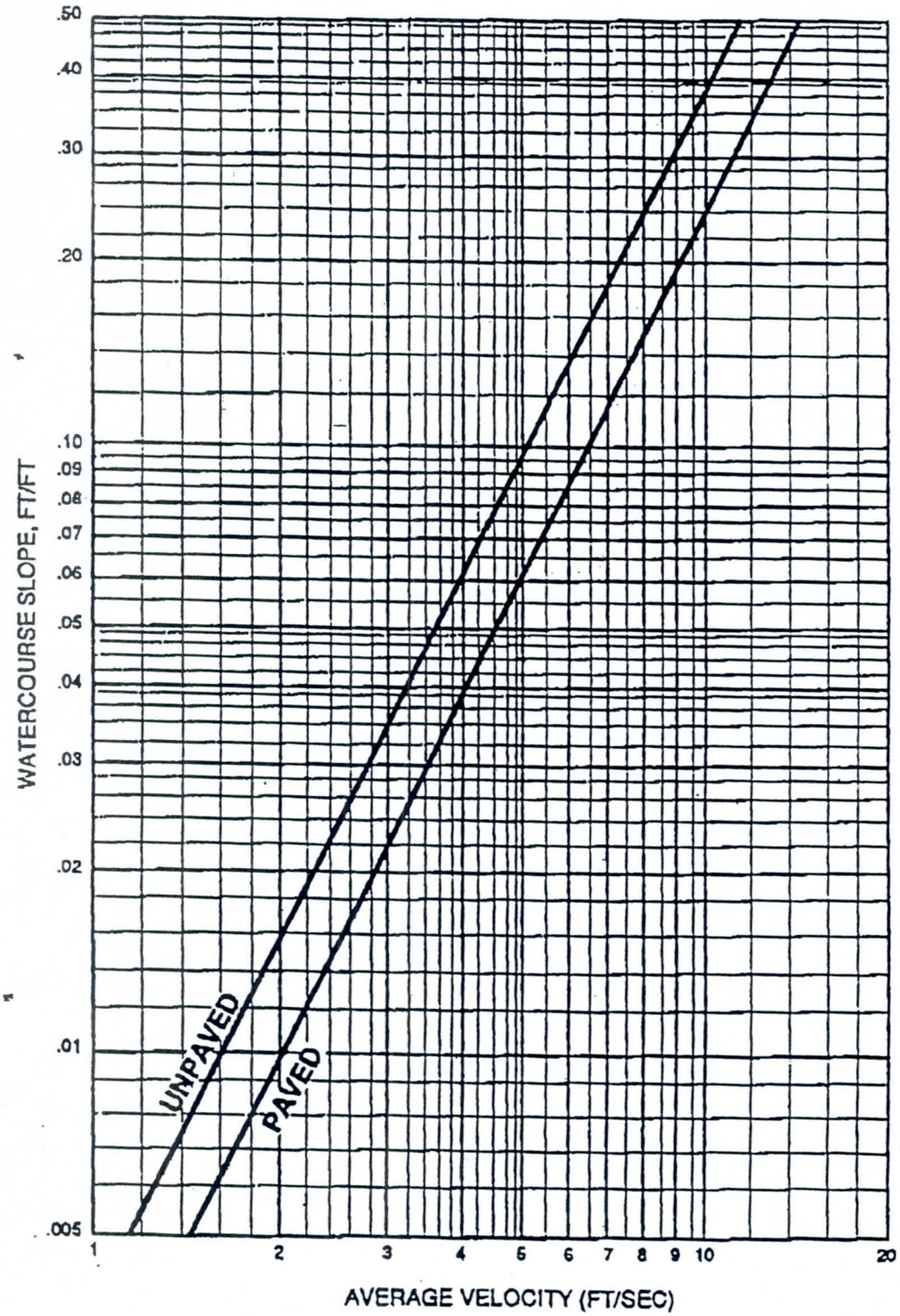


Figure 3.2
Rainfall Intensity-Duration-Frequency Relation
(Phoenix Metro Area)

APPENDIX B

Figure B-1
Average Velocity for Estimating Travel Time for shallow Concentrated Flow
Sheet 2 of 4



Source: TR-55, Fig. 3-1

APPENDIX II- HYDRAULICS

Curb Opening Design – Sump Condition
Curb Opening – On-Grade Condition
Catch Basin Design – Sump Inlet
Channel Analysis – Manning's Equation
Culvert Analysis- HEC-5
Storm Drain Analysis - StormCad

Target SW Distribution Center Curb Opening Design
(Sump Condition)

Known Values and Equations				
	Q [1](cfs)=	$CwL(d)^{1.5}$	**d_l (ft)=**	0.50
	Cw=	3.00		
Curb Opening location (C.P.)	Q_{10} [2]	Number of Openings	Required Opening length[3]	Curb Opening length used
	cfs		ft	ft
4	41	1	48.0	180.0
9	30	1	35.4	40.0
15	25	1	29.0	172.0
17	60	1	70.7	72.0
20	4	1	4.8	5.0
21	3	1	3.1	5.0
22	1	1	1.0	5.0
23	22	1	25.5	26.0
24	23	1	27.5	28.0
30	14	1	16.1	20.0
31	14	1	15.9	20.0
32	17	1	20.6	25.0
33	15	1	17.8	20.0
34	0	1	0.3	5.0
35	4	1	4.8	5.0
36	15	1	17.9	38.0
37	14	1	16.1	20
38	5	1	5.8	10
39	3	1	3.7	5
Notes				
(1) Per FCDMC Drainage Design Manual, Volume II, Hydraulics, equation 3.9				
(2) Curb Opening design based on the 10-year peak discharge.				
(3) Curb Opening design includes a 20% clogging factor.				

Target SW Distribution Center Curb Opening Design
(On-Grade Condition)

Known Values and Equations						
	L_t =	$0.6Q_{10}^{0.42}S^{0.3}(1/nS_e)^{0.6}$	S_e = Equivalent Cross Slope			
	Q_{10} =	10 year flow	S = Longitudinal Slope			
	n=Mannings Roughness Coefficient =		0.016	A.C.		
Curb Opening location	Q_{10}(2)	Number of Openings	S_e	S	Required Opening length (L_t)(1)	Curb Opening length used
	cfs		ft/ft	ft/ft	ft	ft
18	2	3	0.053	0.005	3.9	5.0
19	4	3	0.053	0.005	5.1	5.0
25	2	1	0.053	0.003	8.5	10.0
27	1	1	0.053	0.003	7.9	10.0
29A	1	1	0.053	0.003	7.6	10.0
Notes						
(1) Per FCDMC Drainage Design Manual, Volume II, Hydraulics, equation 3.7						
(2) Curb Opening design based on the 10-year peak discharge.						
(3) Equivalent cross slope obtained using Figure 3.23 of Drainage Design Manual						

Chaparral Estates West
Catch Basin Design
Sump Inlet

Known Values and Equations					
	Q [1](cfs)=	$C_ohL(2gd_0)^{1/2}$	**d_i (ft)=**	0.67	
	C_o=	0.67	**d_o (ft)=**	d_i-h/2	
	h (ft)=	0.46	**d_o (ft)=**	0.44	
Catch basin inlet location (Concentration Point)	Q_{10} [2]	Number of catch basins	Required catch basin length[3]	Catch basin type & length[4]	
	cfs		ft	ft	
11	17.0	1	13.9	M-2, L=6	
12	11.8	1	9.6	M-1, L=6[5]	
13	24.2	1	19.8	M-2, L=10	
Notes					
(1) Per FCDMC Drainage Design Manual, Volume II, Hydraulics, equation 3.10.					
(2) Catch basin design based on the 10-year peak discharge.					
(3) Catch basin design includes a 25% clogging factor.					
(4) Catch basin design per COP Std. Det. P1569-2.					
(5) Use a 4' wide maint. basin					

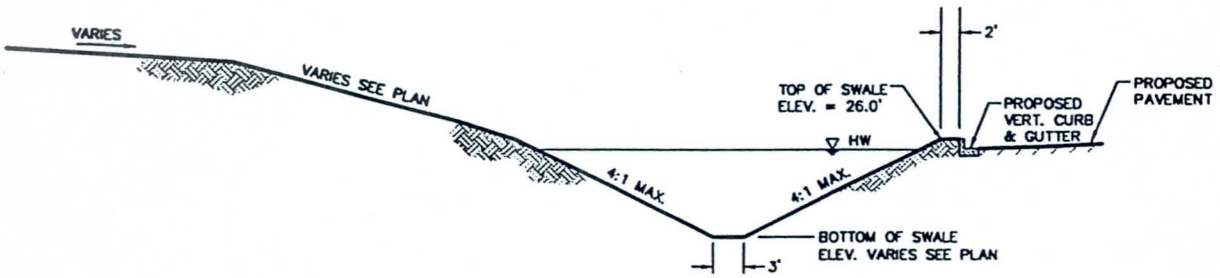
Watershed 40 Channel
Worksheet for Trapezoidal Channel

Project Description	
Project File	j:\data\ndc002\phoenix 3\drainage\fld-ch.fm2
Worksheet	Watershed 40 (Flows from Areas 14-18,20)
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.022	
Channel Slope	0.002000	ft/ft
Left Side Slope	4.000000	H : V
Right Side Slope	4.000000	H : V
Bottom Width	3.00	ft
Discharge	91.00	cfs

10 YEAR EVENT

Results		
Depth	2.21	ft
Flow Area	26.19	ft²
Wetted Perimeter	21.23	ft
Top Width	20.69	ft
Critical Depth	1.67	ft
Critical Slope	0.007321	ft/ft
Velocity	3.47	ft/s
Velocity Head	0.19	ft
Specific Energy	2.40	ft
Froude Number	0.54	
Flow is subcritical.		



SECTION A-A

PROJECT: TARGET S.W. D.C.

DESIGNER: RJH

DATE: 11/13/00

HYDROLOGIC AND CHANNEL INFORMATION

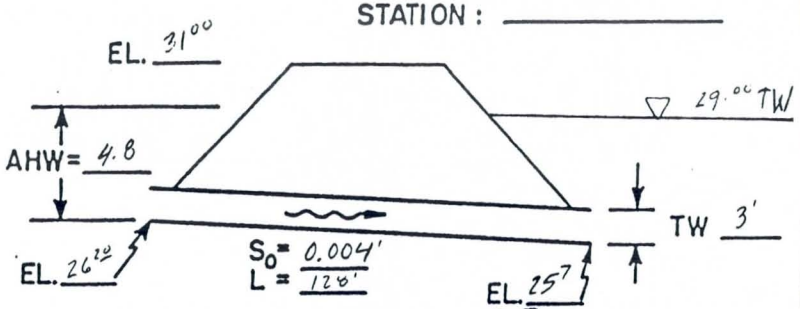
Q_1 = 758 100 yr-6 hr. TW_1 = 3'

Q_2 = _____ TW_2 = _____

(Q_1 = DESIGN DISCHARGE, SAY Q_{25}
Q_2 = CHECK DISCHARGE, SAY Q_{50} OR Q_{100})

SKETCH

STATION : _____



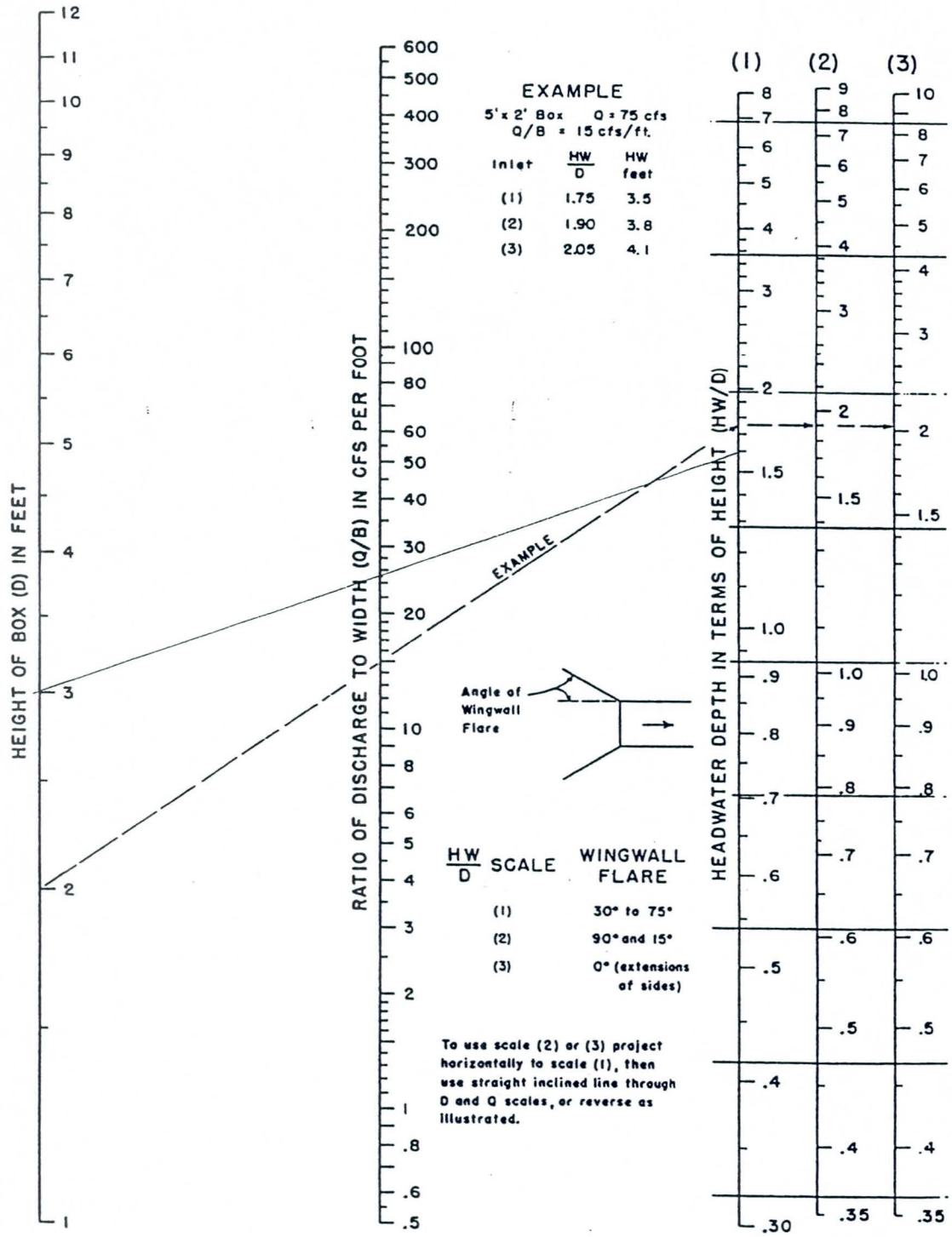
MEAN STREAM VELOCITY = ~4 fps
MAX. STREAM VELOCITY = 5 fps

CULVERT DESCRIPTION (ENTRANCE TYPE)	Q*	SIZE	HEADWATER COMPUTATION: INLET CONT. HW/D	INLET CONT. HW	OUTLET CONTROL HW=H+h_o−LS_o: K_e	H	d_c	$\frac{d_c+D}{2}$	TW	h_o	LS_o	HW	CONTROLLING HW	OUTLET VELOCITY	COST	COMMENTS
BOX CULVERTS 45° Flared Wingwall	253	Assum. 10'x3'	1.6	4.8	0.5	2.0	2.7	2.9	3.3'	3.3	0.5'	4.8	4.8	8 fps.		Use 3-10'x3' Box Culverts
														↳	Full Flow	Velocity

SUMMARY & RECOMMENDATIONS: * 3-10'x3' Box Culverts will pass the 100 yr-6 hr Storm

Figure 7

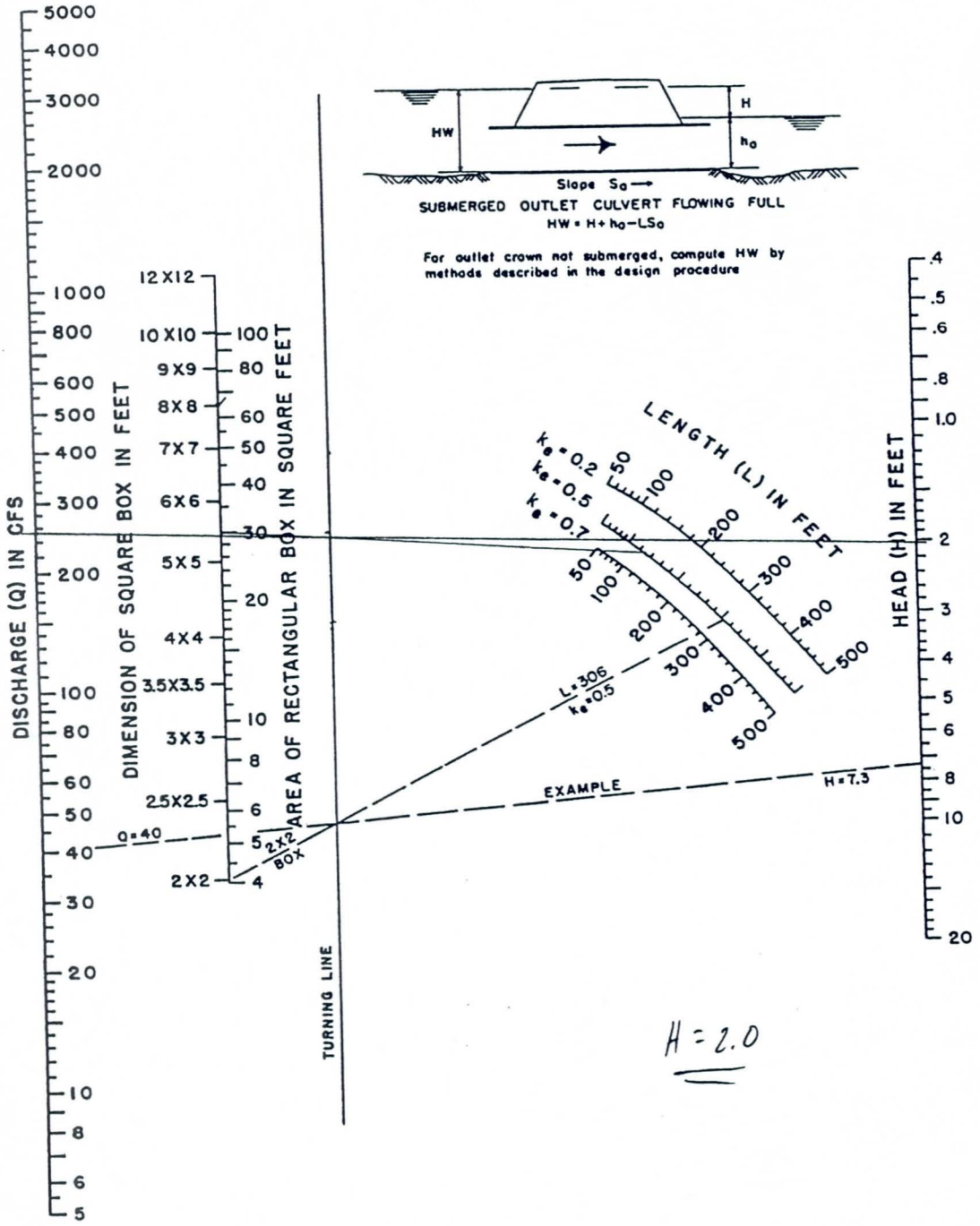
CHART I



HEADWATER DEPTH FOR BOX CULVERTS WITH INLET CONTROL

BUREAU OF PUBLIC ROADS JAN. 1963

CHART 8

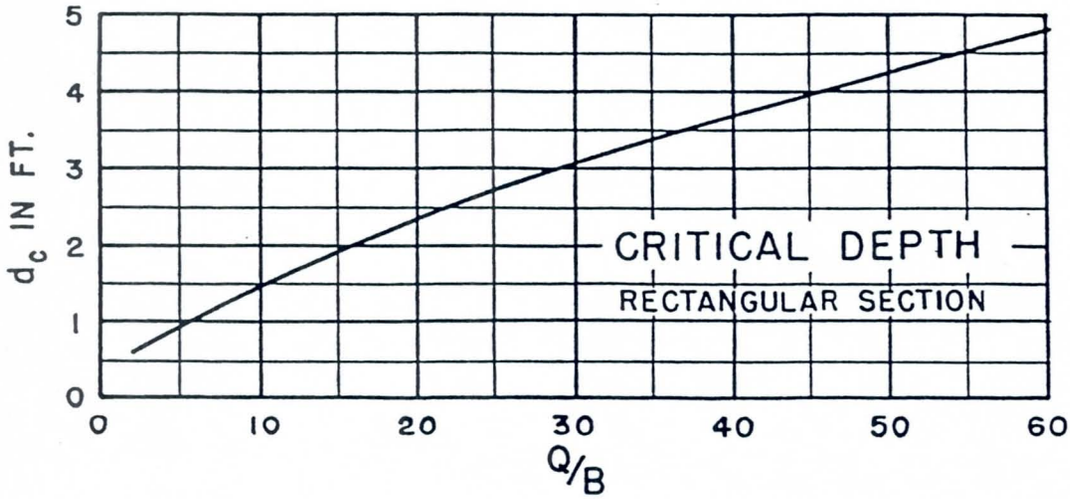


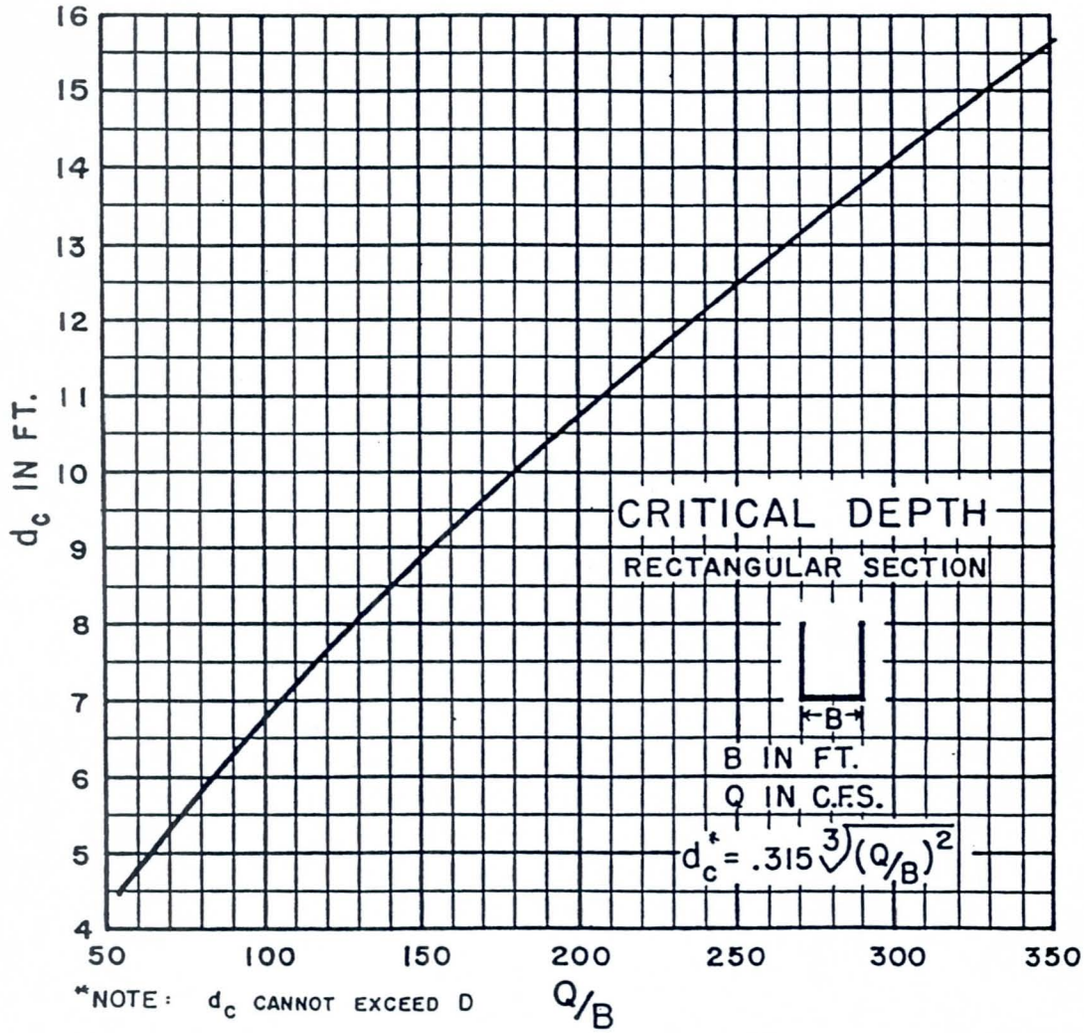
H = 2.0

HEAD FOR
CONCRETE BOX CULVERTS
FLOWING FULL
n = 0.012

BUREAU OF PUBLIC ROADS JAN. 1963

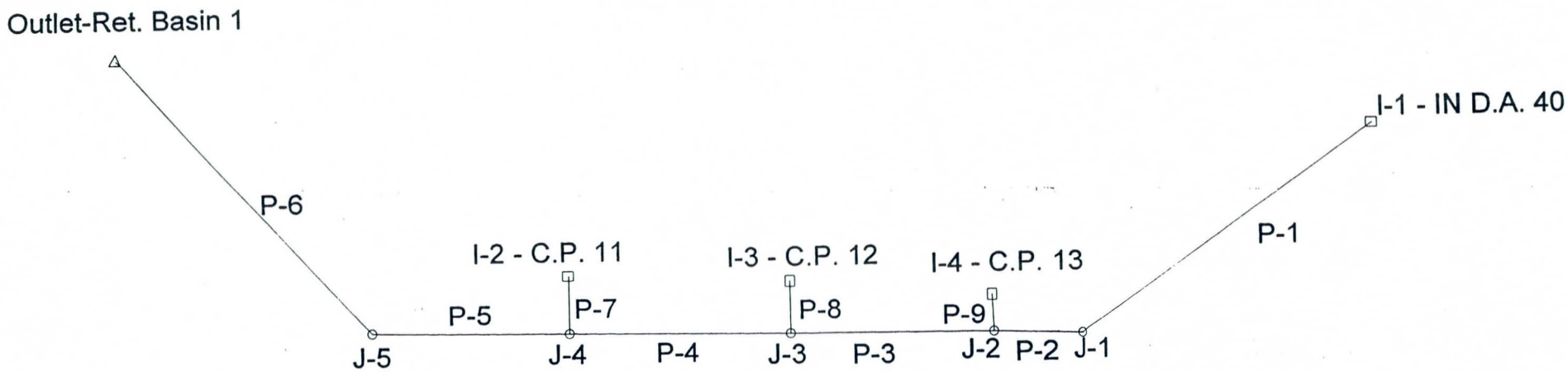
CHART 15





*NOTE: d_c CANNOT EXCEED D

BUREAU OF PUBLIC ROADS JAN. 1963



Project Title: Target SW D.C.
j:\data\ndc002\phoenix 3\drainage\targetsd.stm
11/12/00 02:11:02 PM

WRG Desgin Inc.
Haestad Methods, Inc. 37 Brookside Road Waterbury, CT 06708 (203) 755-1666

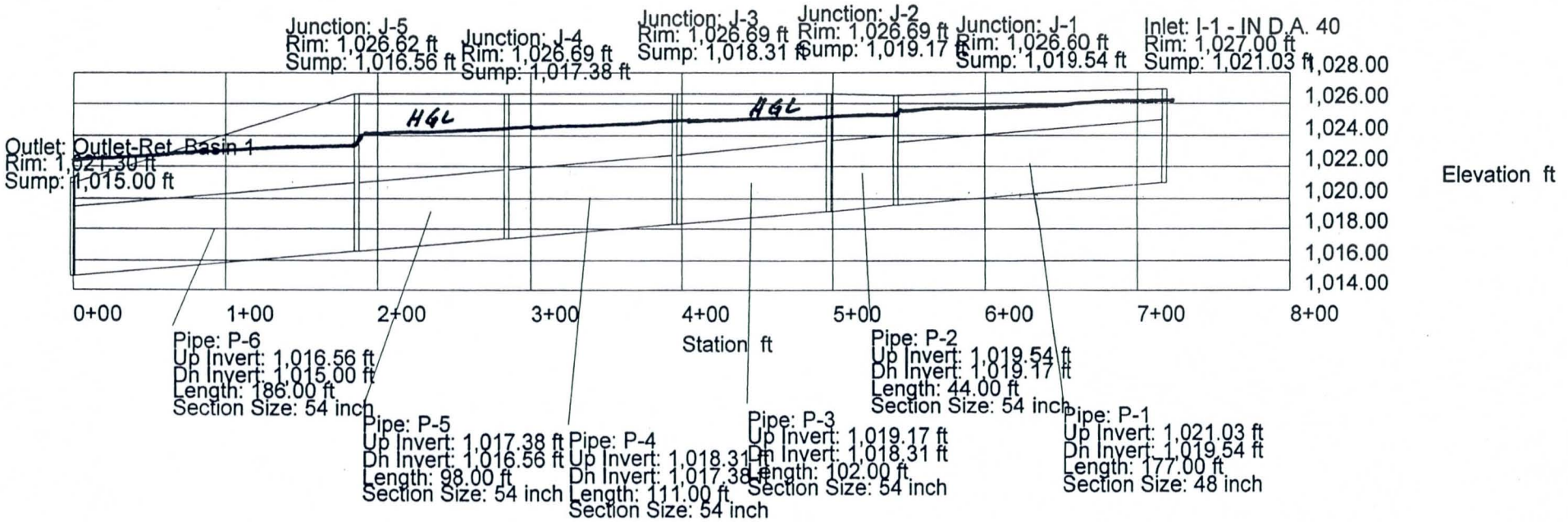
Project Engineer: R. Hedrick
StormCAD v1.0
Page 1 of 1

Node Report

Node	Known Flow (cfs)	Discharge (cfs)	Ground Elevation (ft)	Rim Elevation (ft)	HGL In (ft)	HGL Out (ft)	Description
I-2 - C.P. 11	17.00	17.00	1,026.10	1,026.10	1,024.66	1,024.66	
I-3 - C.P. 12	11.80	11.80	1,026.10	1,026.10	1,024.99	1,024.99	
I-4 - C.P. 13	24.20	24.20	1,026.10	1,026.10	1,025.43	1,025.43	
I-1 - IN D.A. 40	94.00	94.00	1,027.00	1,027.00	1,026.25	1,026.25	
J-1	N/A	94.00	1,026.60	1,026.60	1,025.60	1,025.33	
J-2	N/A	118.20	1,026.69	1,026.69	1,025.24	1,025.24	
J-3	N/A	130.00	1,026.69	1,026.69	1,024.93	1,024.93	
J-4	N/A	147.00	1,026.69	1,026.69	1,024.52	1,024.52	
J-5	N/A	147.00	1,026.62	1,026.62	1,024.05	1,023.39	
Outlet-Ret. Basin	N/A	N/A	1,021.00	1,021.30	1,022.50	1,022.50	Tailwater Elevation assumed to be 1/2 the 100 year, 2 hour design depth of 3' in the basin.

Pipe Report

Pipe	Up Node	Dn Node	Q (cfs)	Length (ft)	S (ft/ft)	Section Size	Roughness	Cap (cfs)	Up Invert (ft)	Dn Invert (ft)	Up Gr Elev (ft)	Dn Gr Elev (ft)	Up Cover (ft)	Dn Cover (ft)	Up HGL (ft)	Dn HGL (ft)
P-7	I-2 - C.P. 11	J-4	17.00	29.00	0.162759	24 inch	0.012	98.87	1,022.10	1,017.38	1,026.10	1,026.69	2.00	7.31	1,024.66	1,024.52
P-8	I-3 - C.P. 12	J-3	11.80	26.00	0.145769	24 inch	0.012	93.56	1,022.10	1,018.31	1,026.10	1,026.69	2.00	6.38	1,024.99	1,024.93
P-9	I-4 - C.P. 13	J-2	24.20	19.00	0.154211	24 inch	0.012	96.24	1,022.10	1,019.17	1,026.10	1,026.69	2.00	5.52	1,025.43	1,025.24
P-1	I-1 - IN D.A. 40	J-1	94.00	77.00	0.008418	48 inch	0.012	42.77	1,021.03	1,019.54	1,027.00	1,026.60	1.97	3.06	1,026.25	1,025.60
P-2	J-1	J-2	94.00	44.00	0.008409	54 inch	0.012	95.35	1,019.54	1,019.17	1,026.60	1,026.69	2.56	3.02	1,025.33	1,025.24
P-3	J-2	J-3	18.20	02.00	0.008431	54 inch	0.012	95.60	1,019.17	1,018.31	1,026.69	1,026.69	3.02	3.88	1,025.24	1,024.93
P-4	J-3	J-4	30.00	11.00	0.008378	54 inch	0.012	94.99	1,018.31	1,017.38	1,026.69	1,026.69	3.88	4.81	1,024.93	1,024.52
P-5	J-4	J-5	47.00	98.00	0.008367	54 inch	0.012	94.86	1,017.38	1,016.56	1,026.69	1,026.62	4.81	5.56	1,024.52	1,024.05
P-6	J-5	Outlet-Ret. Bas	47.00	86.00	0.008387	54 inch	0.012	95.09	1,016.56	1,015.00	1,026.62	1,021.00	5.56	1.50	1,023.39	1,022.50


Junction: J-5
Rim: 1,026.62 ft
Sump: 1,016.56 ft
Junction: J-4
Rim: 1,026.69 ft
Sump: 1,017.38 ft
Junction: J-3
Rim: 1,026.69 ft
Sump: 1,018.31 ft
Junction: J-2
Rim: 1,026.69 ft
Sump: 1,019.17 ft
Junction: J-1
Rim: 1,026.60 ft
Sump: 1,019.54 ft
Inlet: I-1 - IN D.A. 40
Rim: 1,027.00 ft
Sump: 1,021.03 ft
HGL
HGL
Outlet: Outlet-Ret. Basin 1
Rim: 1,021.30 ft
Sump: 1,015.00 ft
1,028.00
1,026.00
1,024.00
1,022.00
1,020.00
1,018.00
1,016.00
1,014.00
Elevation ft
0+00
1+00
2+00
3+00
4+00
5+00
6+00
7+00
8+00
Station ft
Pipe: P-6
Up Invert: 1,016.56 ft
Dn Invert: 1,015.00 ft
Length: 186.00 ft
Section Size: 54 inch
Pipe: P-5
Up Invert: 1,017.38 ft
Dn Invert: 1,016.56 ft
Length: 98.00 ft
Section Size: 54 inch
Pipe: P-4
Up Invert: 1,018.31 ft
Dn Invert: 1,017.38 ft
Length: 111.00 ft
Section Size: 54 inch
Pipe: P-3
Up Invert: 1,019.17 ft
Dn Invert: 1,018.31 ft
Length: 102.00 ft
Section Size: 54 inch
Pipe: P-2
Up Invert: 1,019.54 ft
Dn Invert: 1,019.17 ft
Length: 44.00 ft
Section Size: 54 inch
Pipe: P-1
Up Invert: 1,021.03 ft
Dn Invert: 1,019.54 ft
Length: 177.00 ft
Section Size: 48 inch

APPENDIX III – RETENTION

Onsite Storm Water Retention

TARGET SOUTHWEST DISTRIBUTION CENTER
PHOENIX, ARIZONA

WRG# ndc002

ON-SITE STORMWATER RETENTION

BASIN*	TRIBUTARY AREA (ACRES)	RUNOFF COEFFICIENT (C)	VOLUME REQUIRED (C.F.)	BASIN DEPTH	BOTTOM AREA	TOP AREA	VOLUME PROVIDED (C.F.)	RETENTION SHORTAGE (-) EXCESS (+)	PROPOSED DRYWELLS**
1	73.66	0.90	596,646.00	3	182,267	217,523	599,685.00	+3039.00	46
2	3.36	0.90	27,216.00	3	7,883	15,161	34,565.36	+7349.36	2
3	59.46	0.90	481,626.00	2	216,929	666,904	883,832.40	+402206.40	37

* Retention Basin/ Drainage Area
**The final number of drywells required will be dependant on actual percolation tests at the proposed drywell locations.
(1) The excess runoff shall overtop this basin and flow into Basin 4, where additional capacity is provided.
City of Phoenix Criteria:

Volume Required (V_r) = 7200 *C*(I)*(A_a) where:

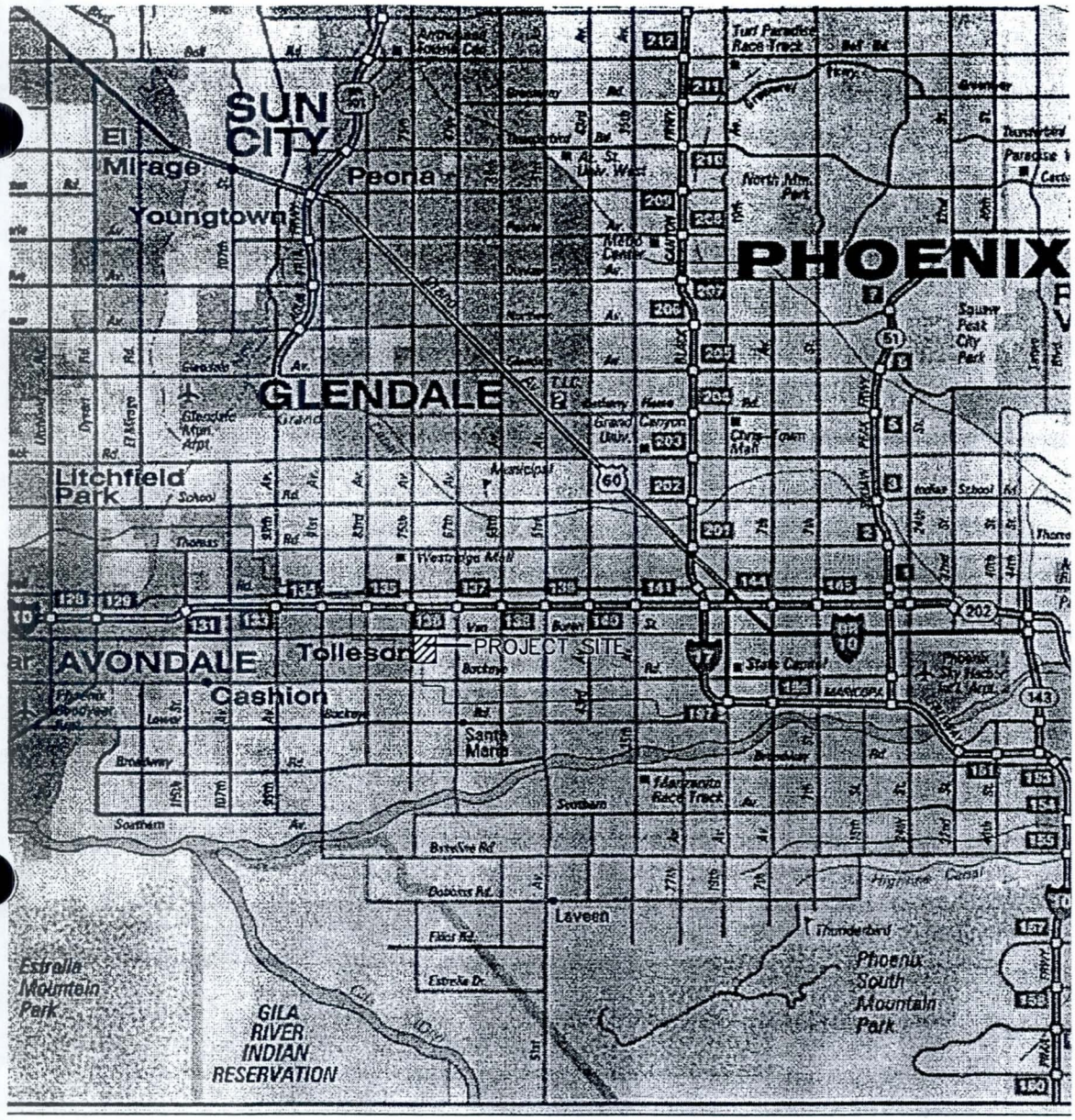
C = coefficient of runoff = 0.90
I = rainfall intensity (Use 1.25 in/hr) 1.25
Aa = area in acres (Tributary Area)

Proposed Number of Drywells (N) = V / (36hr*60min./hr.*60sec./hr.*R) where:

V = Volume provided in retention basin
R = Approved discharge rate per drywell (Assumed 0.1cfs)

NOTE: All basins will be dewatered by drywells. The extreme outfall for the site is at the southwest corner out of Basin 4

LIST OF EXHIBITS



VICINITY MAP
EXHIBIT 1

N.T.S.

PROJECT NO. NDC002

REFERENCE –

DATE – 8/14/00

W R G DESIGN INC.
4808 N. 22nd Street, Phoenix, Arizona
602|977-8000 FAX: 602|977-8099
PLANNERS ▪ ENGINEERS ▪ LANDSCAPE ARCHITECTS ▪ SURVEYORS

TARGET SOUTHWEST DISTRIBUTION CENTER

PHOENIX, ARIZONA

SHEET

EX-1

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA AND INCORPORATED AREAS

PANEL 2105 OF 4350

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MARICOPA COUNTY, UNINCORPORATED AREAS	040037	2105	E
PHOENIX, CITY OF	040051	2105	E
TOLLESON, CITY OF	040055	2105	E

RECORD SET

MAP NUMBER 04013C2105 E

MAP REVISED: JULY 19, 2001

Federal Emergency Management Agency

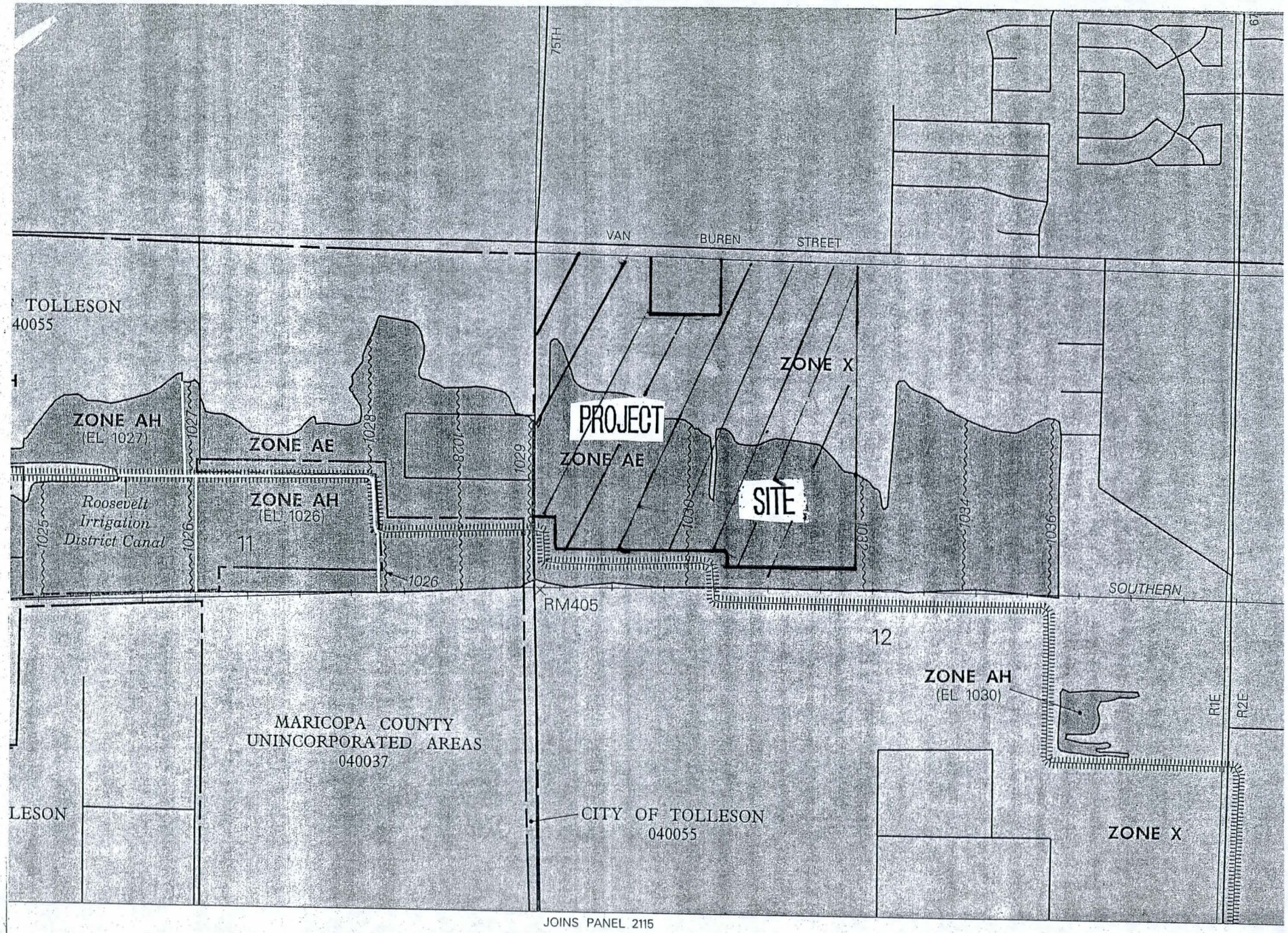


EXHIBIT 4
FIRM MAP

Off-Site Drainage Report
for
Target Southwest Distribution Center

Phoenix, Arizona

December 7, 2000

Prepared for:
WRG Design, Inc.
4808 N. 22nd Street, Suite 150
Phoenix, AZ 85016
(602) 977-8000

REGISTERED PROFESSIONAL ENGINEER (CIVIL)
CERTIFICATE NO.
19690
PAUL W.R.
HOSKIN
Date Signed 12/7/00
ARIZONA, U.S.A.

HEC creative engineering solutions

Prepared by:
Hoskin Engineering
Consultants, Inc.

323 W. Roosevelt Street, Suite 200
Phoenix, AZ 85003
(602) 252-8384

HEC 00-043

Off-Site Drainage Report
for
Target Southwest Distribution Center
Phoenix, Arizona

Table of Contents

1 Introduction 1

2 Project Description 1

3 Flood Insurance Rate Map 2

4 Hydrology 2

5 Hydraulics 4

6 HEC-RAS Analysis 5

7 Conclusions 7

8 References 8

List of Figures

1. Location and Vicinity Map
2. Flood Insurance Rate Map
3. HEC-1 Schematic
4. On-Site Drainage Map
5. Effective FIRM
6. Annotated FIRM

List of Tables

1. Summary of Off-Site Flows Impacting the Site
2. HEC-RAS Water Surface Elevation Summary
3. Summary of Storage Volumes

Appendix

Site Visit Photos
Appendix A: Hydrology
100-Year, 24-Hour Effective HEC-1 Model
100-Year, 24-Hour Revised Effective HEC-1 Model
Appendix B: Hydraulics
Channel and Culvert Hydraulic Calculations
100-Year, 24-Hour Effective HEC-RAS Model
100-Year, 24-Hour Revised Effective HEC-RAS Model
100-Year, 24-Hour Proposed Conditions HEC-RAS Model

REGISTERED PROFESSIONAL ENGINEER (CIVIL)
CERTIFICATE NO.
19690
PAUL W.R.
HOSKIN
Date Signed 7/00
ARIZONA, U.S.A.

1 Introduction

Hoskin Engineering Consultants, Inc. (HEC) has been contracted by WRG Design, Inc., to perform a hydrologic and hydraulic analysis for off-site flows which impact the proposed Southwest Distribution Center for Target Corporation, to be located at the southeast corner of 75th Avenue and Van Buren Street in Phoenix, Arizona (Figure 1). The on-site drainage is addressed in a report prepared by WRG (Ref. 12). The purpose of this report is to document the results of a hydrologic and floodplain analysis for the off-site drainage contributing to the site.

2 Project Description

The approximately 144-acre site is located within the NW ¼ of Section 12, Township 1 North, Range 1 East, of the Gila and Salt River Base and Meridian, Maricopa County, Arizona. The site is bounded by Van Buren Street to the north, the Roosevelt Irrigation District canal and the Southern Pacific Railroad to the south, 75th Avenue to the west, and approximately 71st Avenue to the east. The site is currently farm field with crops, generally sloping to the southwest at a 0.28 percent slope.

The proposed site plan includes a 1.5 million square foot warehouse and distribution center, truck trailer parking, and employee parking. The design of on-site drainage facilities is addressed in a report prepared by WRG, entitled *Drainage Study, Target Southwest Distribution Center* (Ref. 12). Proposed on-site drainage facilities include retention basins which have been designed to retain the 100-year, 2-hour developed conditions runoff, per the City of Phoenix requirements (Ref. 1). The retention basin located along the southern boundary of the site has been designed to convey off-site flows through the site such that the 100-year storm event will overtop 75th Avenue at an elevation of 1029, and not cause an increase in the current weir flow at that location. New channels along the north, west, and east sides of the site have been sized to pass the 100-year, 6-hour off-site flow through the site, to the southwest corner.

3 Flood Insurance Rate Map

The Flood Insurance Rate Maps (FIRM) for Maricopa County, Arizona and Incorporated Areas issued by the Federal Emergency Management Agency (FEMA) (Ref. 5), Map Number 04013C2105D, dated April 15, 1988, was revised to reflect a Letter of Map Revision prepared by the Flood Control District of Maricopa County and dated February 23,2000. The revised FIRM indicates that the site lies partially within Zone "X" and partially within Zone "AE" described as:

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.

Zone "AE": Special flood hazard areas inundated by 100-year flood; base flood elevations determined.

4 Hydrology

The site is located within the watershed modeled as part of the *Floodplain Delineation of the Tolleson Area*, prepared by Dibble & Associates, on behalf of the Flood Control District of Maricopa County, in May 1999 (Refs. 2 and 3). The general direction of flow within the watershed is to the southwest, and is impacted by the Roosevelt Irrigation District (RID) canal and Southern Pacific Railroad which run in an east-west direction. A HEC-1 (Ref. 10) hydrologic model for the 100-year, 24-hour storm was prepared as part of the floodplain delineation study, referred to as the "effective" model in this report. A copy of the contributing drainage sub-basin map and the 100-year, 24-hour effective model output summary from the Tolleson Floodplain Delineation are included in Appendix A.

<u>Revised Effective Model (TGT24E)</u>

The off-site drainage extends north to Interstate 10 and east to Interstate 17, as shown in Figure 3, and includes agricultural, residential, commercial, and industrial areas. The HEC-1 hydrologic model prepared as part of the Tolleson Floodplain Delineation (Ref. 3) was modified

to represent only the areas contributing flow to the site. The model was also modified as follows, to reflect the existing conditions surrounding the site:

1. Drainage areas TB and SF were subdivided in order to reflect drainage conditions directly affecting the site. Runoff parameters and unit hydrographs for the subdivided areas were based upon land usage and precipitation values presented in the Tolleson study (Ref. 3), and were generated using the Flood Control District's *Drainage Design Menu System* (Ref. 8).
2. A flow divert was added to model the existing 60-inch drainage pipe located along the south side of Van Buren. The pipe diverts approximately the first 100 cfs reaching it, into an existing channel along the south side of the Van Buren Street. In addition, it is estimated that Van Buren Street can convey an additional 20 cfs in the north half of the right-of-way. The remaining flow is shown to flow southwest across vacant property toward the RID canal. This differs from the effective model which shows all of the flow diverted west along Van Buren Street to 75th Avenue.
3. Unit hydrographs for each sub-basin were developed for the 100-year 24-hour storm using the Flood Control District's *Drainage Design Menu System* (Ref. 8).

Proposed Conditions Model (TGT24P)

The revised effective model was modified as follows to reflect the proposed grading plan for the site:

1. Drainage sub-basin SF2 was divided into two basins, SF2A and SF2B. Unit hydrographs for SF2A and SF2B were developed for the 100-year 24-hour storm using the Flood Control District's *Drainage Design Menu System* (Ref. 8).
2. Retention storage routing within the site was also divided into two areas, RSSF2A and RSSF2B. RSSF2A represents the retention storage provided in the basins within the north half of the site, and RSSF2B represents the retention provided in the basins within the south half of the site.

The revised effective and proposed conditions HEC-1 models were run for the 100-year 24-hour storm event. See Figure 3 for the revised effective HEC-1 schematic. The existing and proposed models are included in Appendix A. Results from the two models are summarized in the Table 1.

Table 1: Summary of Off-Site Flows Impacting the Site

HEC-1 I.D.	Description	100-yr, 24-hr Effective Model Q (cfs)	100-yr, 24-hr Revised Effective Model Q (cfs)	100-yr, 24-hr Proposed Model Q (cfs)
DITB2	Flow in pipe and street, Van Buren	128 (DITB)	120	120
CPSF1	Entering southeast corner of site	1020 (CPUB1)	1099	1099
CPTB2	Entering northwest corner of site	504	477	477
SF2	Runoff from the site area	297 (SUBSF)*	220	604 (SF2A+SF2B)
RSSF2	Exiting southwest corner of site	1490 (RSSF)	1451	1432 (RSSF2B)

* Includes both subbasins SF1 and SF2
Note: HEC I.D. in parenthesis if different from Revised Effective Model

5 Hydraulics

The capacities of existing drainage structures surrounding the site were computed to aid in hydrologic modeling and site design recommendations. See Figure 4 for the location of existing drainage structures, and Appendix B for all hydraulic calculations.

Normal depth computations using *FlowMaster* software (Ref. 9) were performed to determine the capacity of the existing channels along the north and south sides of Van Buren Street. The existing channel along the south side of Van Buren has a capacity of approximately 330 cfs. The existing channel along the north side of Van Buren has a capacity of approximately 70 cfs. The capacity of the pipe along the south side of Van Buren was computed using *Hydrocalc* software (Ref. 4). The capacity of the existing pipe, which outlets to the existing channel north of the site, is approximately 100 cfs.

A proposed channel along the northern boundary of the site conveys flow from the existing pipe, as well as intercepts runoff from the area north of Van Buren. Since the existing channel has a capacity of approximately 330 cfs and the existing pipe will handle approximately 100 cfs, it is proposed to provide a minimum capacity of 230 cfs within a new channel. Flow

within this channel would increase from 230 cfs at the eastern end of the site, to 758 cfs at 75th Avenue. Included in Appendix B are hydraulic calculations for the proposed channel cross-section.

A proposed channel along the eastern boundary of the site intercepts off-site flows form the northeast. The channel will be sized to handle at least the 100-year, 24-hour peak flow of 171 cfs. Backwater calculations were performed using HydroCalc (Ref. 4) software and are included in the appendix. The calculations were run using a downstream starting water surface elevation of 1032.45 from the proposed conditions HEC-RAS model.

6 HEC-RAS Analysis

A HEC-RAS hydraulic analysis was performed by Dibble and Associates, on behalf of the Flood Control District of Maricopa County, as part of the *Floodplain Delineation of the Tolleson Area* (Refs. 2 and 3). The Tolleson FIS model was used as the basis for the HEC-RAS models prepared for this drainage report. Three models were prepared as part of this study, and are described as follows.

Effective Model (TOL_RASS)

The Tolleson Area FIS (Refs. 2 and 3) HEC-RAS model prepared by Dibble and Associates, covers a long reach along the north side of the Roosevelt Canal and Southern Pacific railroad. The model was shortened, retaining only the reach that flows through the site. Boundary conditions for the shortened model were set according to the downstream water surface presented in the complete model, and results were compared to the complete model. The resulting 100-year, 24-hour floodplain delineation is shown on the effective FIRM (Figure 2), as well as in Figure 5. A copy of the effective HEC-RAS model is included in Appendix B.

Revised Effective Model (TGT24E)

The effective model was shortened to include only the portion of the model that impacts the site, and revised to reflect the current conditions surrounding the site. Revisions to the effective model include the addition of a flow change location at river mile 7.074, a correction in the reach length for section 6.549, and revision of section 6.532 to reflect a recent survey of 75th

Avenue. Flow values used in the revised effective HEC-RAS model are 100-year, 24-hour peak flows from the revised effective HEC-1 model. Results from the revised effective model are shown in Table 2, and a copy of the model is included in Appendix B.

Proposed Conditions Model (TGT24P)

Flow values used in the proposed conditions model are 100-year, 24-hour peak flows from the proposed conditions HEC-1 model. Cross-sections within the property boundary were modified to reflect the proposed grading conditions. Additional cross-sections were added within the property limits (See Figure 4). Due to a low weir elevation of 1029 at 75th Avenue, the cross-sectional area below elevation 1029, was not used in the conveyance calculations. Results from the proposed conditions model are shown in Table 2, the resulting 100-year, 24-hour floodplain boundary is shown on Figure 6, and a copy of the model is included in Appendix B.

The results indicate that the 100-year, 24-hour water surface elevations match within 0.5 feet at the upstream and downstream ends of the site (RM 7.033 and Rm 6.532). Within the site, the water surface elevation rises, but is still contained at the south side of the site, adjacent to the RID canal.

Table 2: HEC-RAS Water Surface Elevation Summary

RM	Effective (TOL_RASS)	Revised Effective (TGT24E)	Revised Effective - Effective	Proposed (TGT24P)	Proposed – Revised Effective
7.033	1032.89	1032.93	0.04	1032.79	-0.14
6.980	1031.83	1031.88	0.05	1031.90	0.02
6.885	1031.49	1031.54	0.05	1031.70	0.16
6.782	1030.58	1030.57	-0.01	1031.25	0.68
6.723	1029.89	1030.33	0.44	1030.86	0.53
6.696	1029.76	1030.29	0.53	1030.78	0.49
6.601	1029.62	1030.25	0.63	1030.42	0.17
6.549	1029.57	1030.24	0.67	1030.26	0.02
6.532	1029.46	1030.02	0.56	1030.01	-0.01

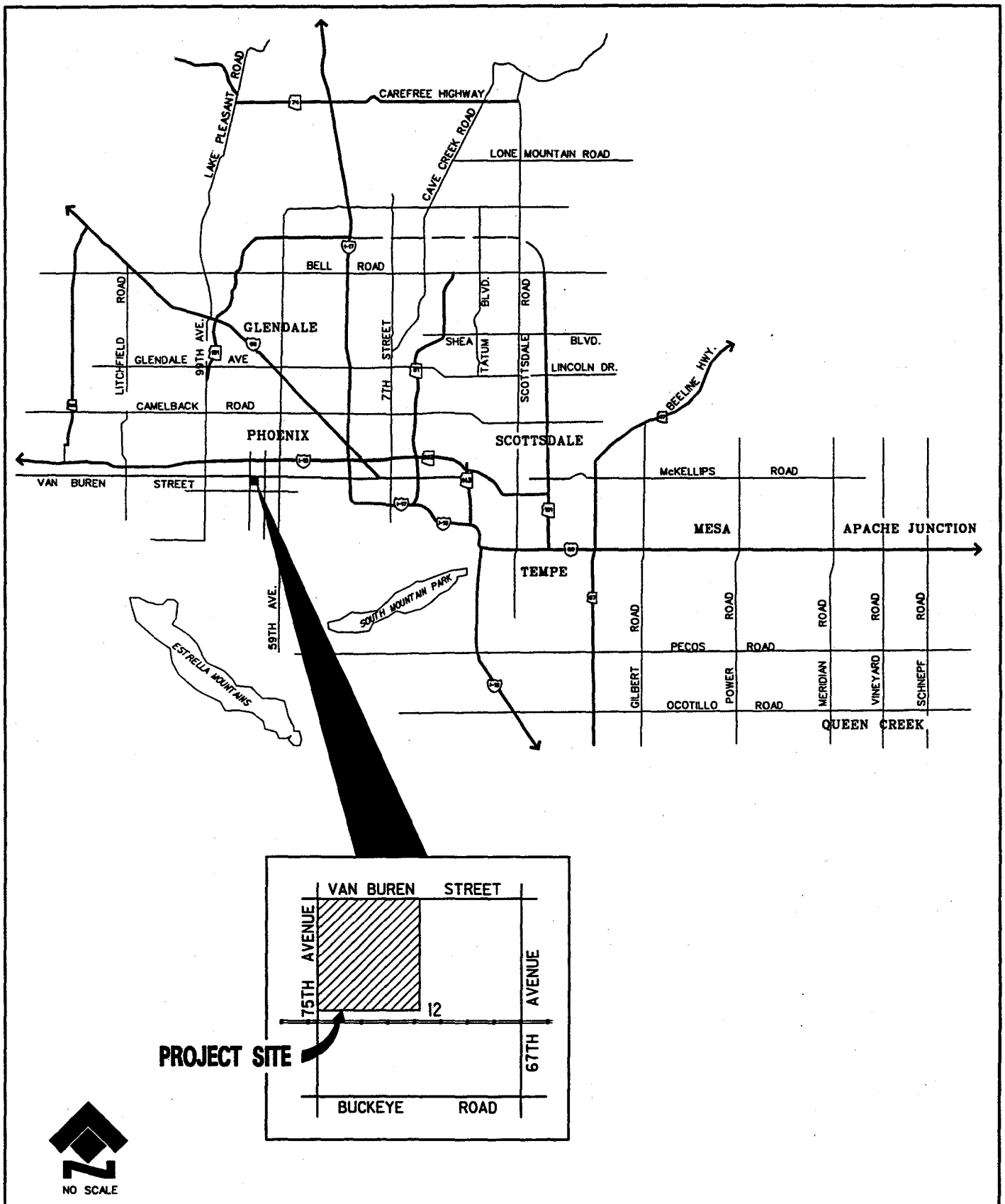
Note: All models reflect the 100-year 24-hour storm.

7 Conclusions

1. The finished floor elevation for the warehouse is set at an elevation of 1035, which is 3.1 feet above the 100-year, 24-hour water surface elevation.
2. Off-site drainage should be allowed to pass through the site and should exit the property in a manner similar to existing conditions.
3. New channels along the north, west, and sides of the site will pass off-site flows through the site.
4. The hydrologic model (HEC-1) which was prepared for the Tolleson Area study was modified to allow better definition of the flows which impact the site along its north and east boundary lines. The result is an increase in discharge which approaches the southeast corner of the site.
5. The proposed conditions HEC-1 model indicates that the total discharge which exits the site at 75th Avenue will decrease as a result of the on-site retention storage provided.
6. The hydraulic model (HEC-RAS) indicates that the water surface elevations match at the upstream and downstream boundaries of site within 0.5 feet.

8 References

1. City of Phoenix, *Storm Drain Design Manual, Subdivision Drainage Design*, July 1988.
2. Dibble & Associates, *Floodplain Delineation of the Tolleson Area, Final Report and Technical Data Notebook*, FCDMC Contract No. 95-26, May 1999.
3. Dibble & Associates, *Floodplain Delineation of the Tolleson Area, Hydrology Report*, FCD 95-26, May 14, 1999.
4. Dodson & Associates, Inc., *Hydrocalc Hydraulics for Windows*, Version 1.0, Copyright 1996.
5. Federal Emergency Management Agency, *Flood Insurance Rate Map (FIRM) for Maricopa County, Arizona and Incorporated Areas, Map Number 04013C2105D*, revised date February 23, 2000.
6. Flood Control District of Maricopa County, Arizona, *Drainage Design Manual for Maricopa County, Arizona, Volume I - Hydrology*, Revised January 1,1995.
7. Flood Control District of Maricopa County, Arizona, *Drainage Design Manual for Maricopa County, Arizona – Volume II Hydraulics*, January 28, 1996.
8. Flood Control District of Maricopa County, *Drainage Design Menu System, Version 1.0.*
9. Haestad Methods, Inc., *FlowMaster*, Version 5.17, 1995.
10. United States Army Corps of Engineers, Hydrologic Engineering Center, *HEC-1 Flood Hydrograph Package, Version 4.1*, June 1998.
11. Unites States Army Corps of Engineers, *Hydrologic Engineering Center, HEC-RAS River Analysis System, Version 2.2*, September 1998.
12. WRG Design, Inc., *Drainage Study, Target Southwest Distribution Center, Phoenix, Arizona*, November 13, 2000.

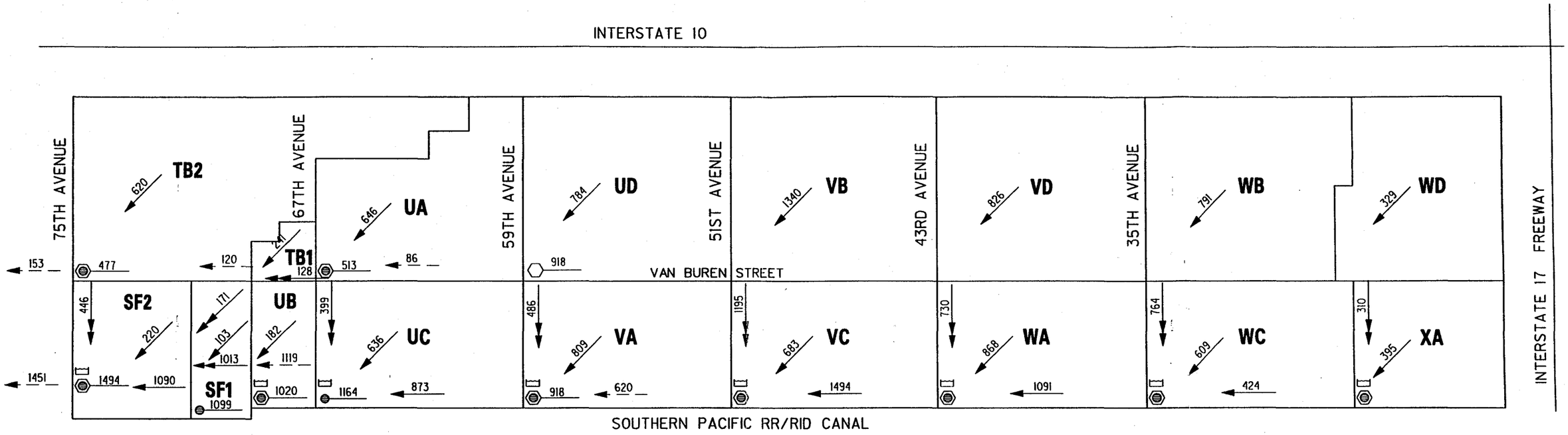


Hoskin Engineering Consultants, Inc.
323 West Roosevelt Street
Suite 200
Phoenix, Arizona 85003-1136
Tel: (602) 252-8384
Fax: (602) 252-8385

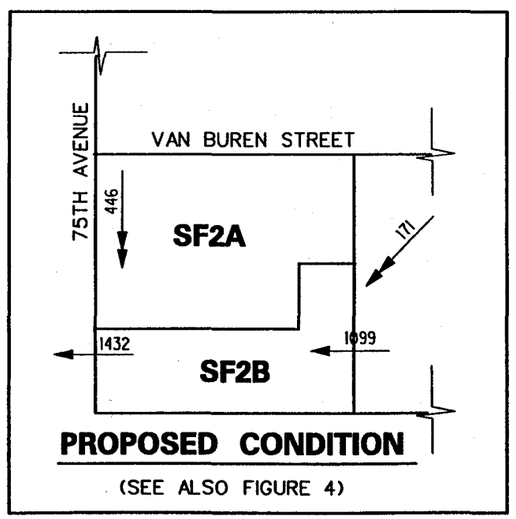
TARGET S.W DIST. CENTER
LOCATION & VICINITY MAP

FIGURE 1

G:\Filedir\00\00-043 Target S.W. Dist.Center\hydro\EHFIG1 LOCATION.dgn
12/07/2000



EXISTING CONDITION



PROPOSED CONDITION

(SEE ALSO FIGURE 4)

LEGEND

- DRAINAGE AREA BOUNDARY
- UC — DRAINAGE AREA IDENTIFICATION
- 1494 — SUB-BASIN RUNOFF
- 730 — FLOW ROUTING
- 620 — DIVERT ROUTING
- 1164 — 100YR, 24HR REVISED EFFECTIVE Q (CFS)
- HYDROGRAPH COMBINE POINT
- FLOW DIVERSION
- HYDOGRAPH COMBINE & DIVERSION POINT
- RESERVOIR

N.T.S.

NOTE: HEC-1 MODEL BASED UPON "TOLLESON AREA FLOODPLAIN DELINEATION STUDY",DIBBLE & ASSOCIATES, MAY 1999

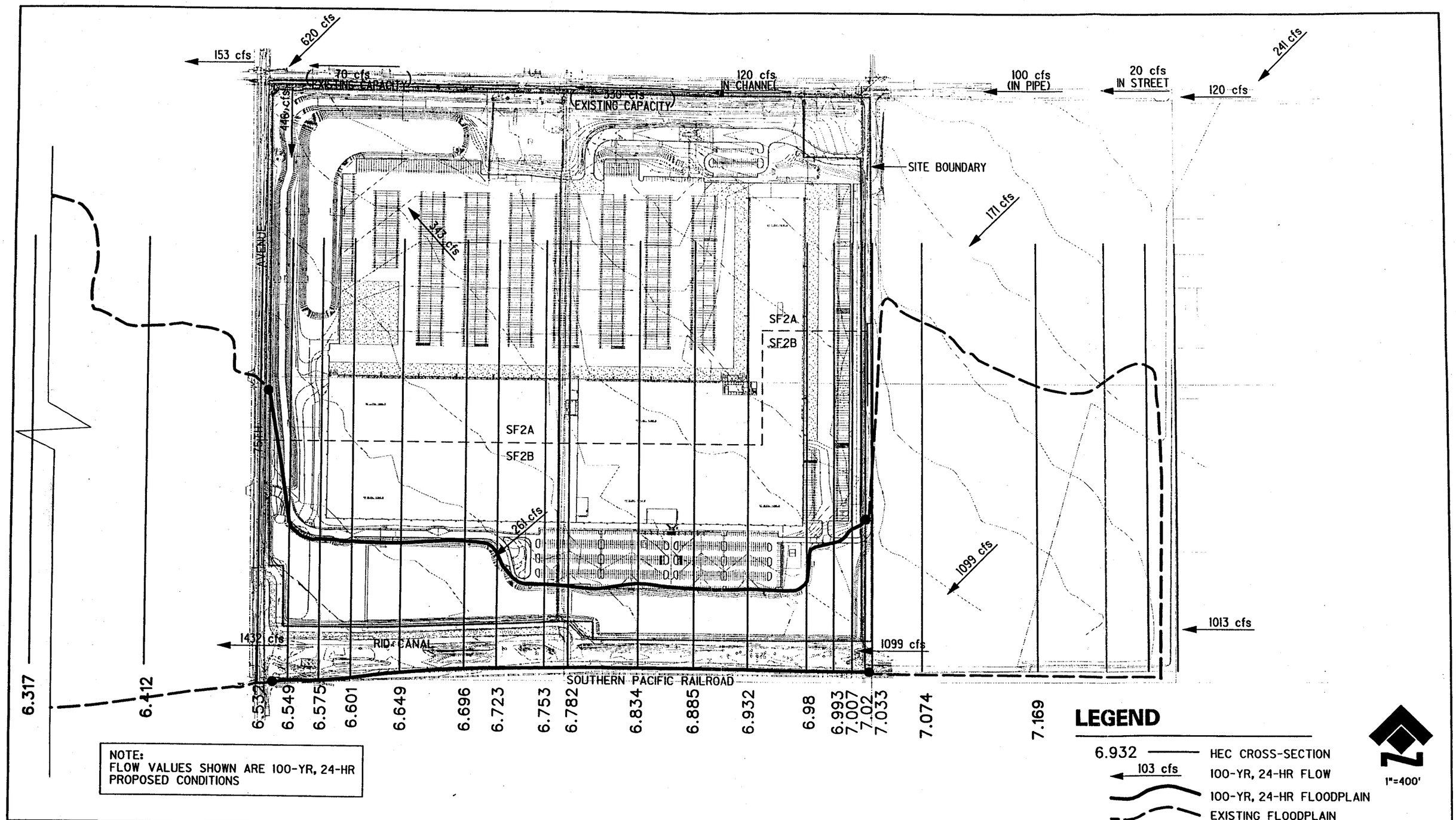
Hoskin Engineering Consultants, Inc.
325 West Roosevelt Street
Suite 200
Phoenix, Arizona 85003-1136
Tel: (602) 252-8384
Fax: (602) 252-8385

TARGET S.W. DIST. CENTER

HEC-1 SCHEMATIC

100 YEAR, 24 HOUR

FIGURE 3



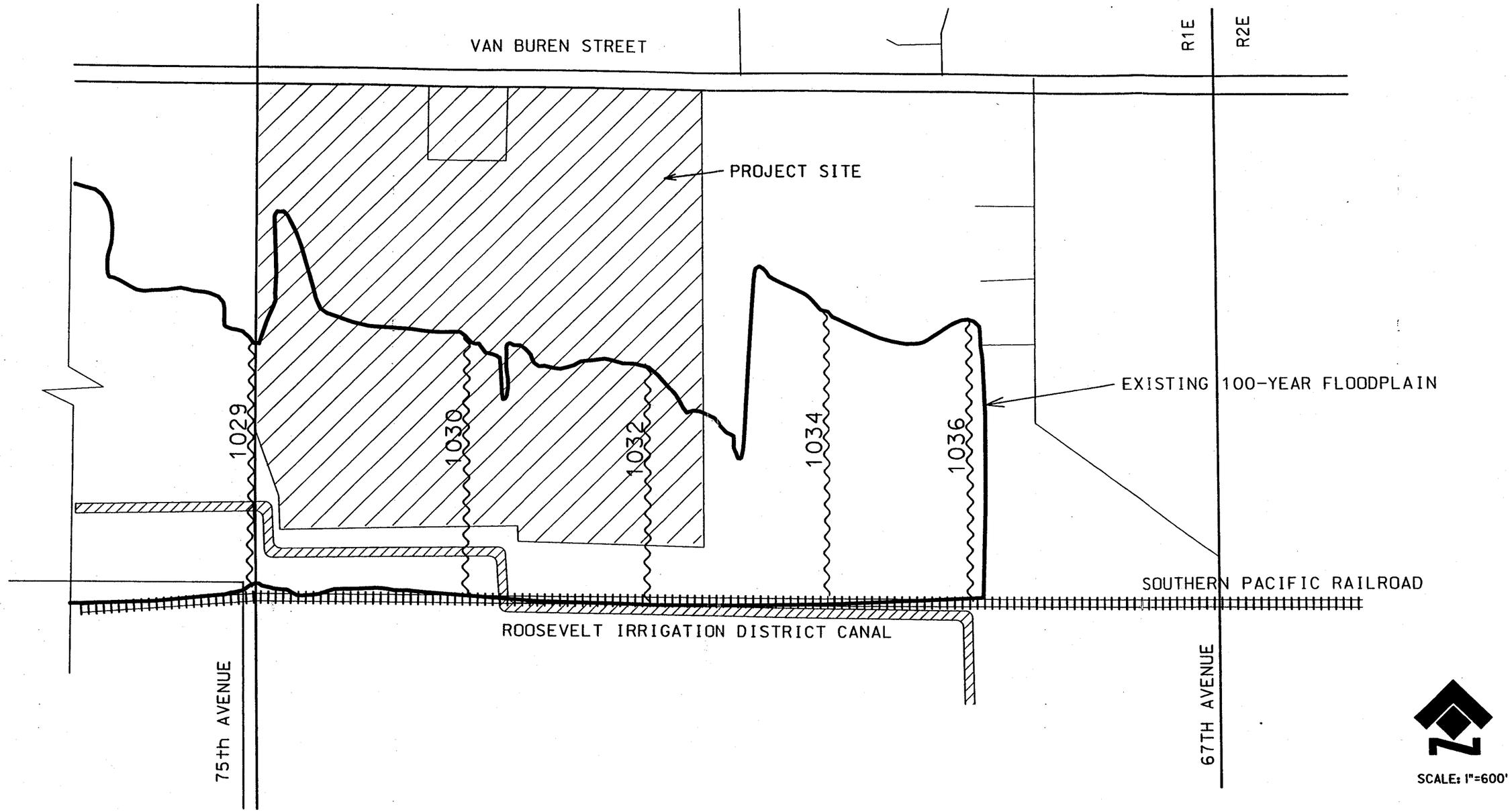
Hoskin Engineering Consultants, Inc.
323 West Roosevelt Street
Suite 200
Phoenix, Arizona 85003-1136
Tel: (602) 252-8384
Fax: (602) 252-8385

TARGET S.W. DIST. CENTER

ON-SITE DRAINAGE MAP

100 YEAR, 24 HOUR

FIGURE 4

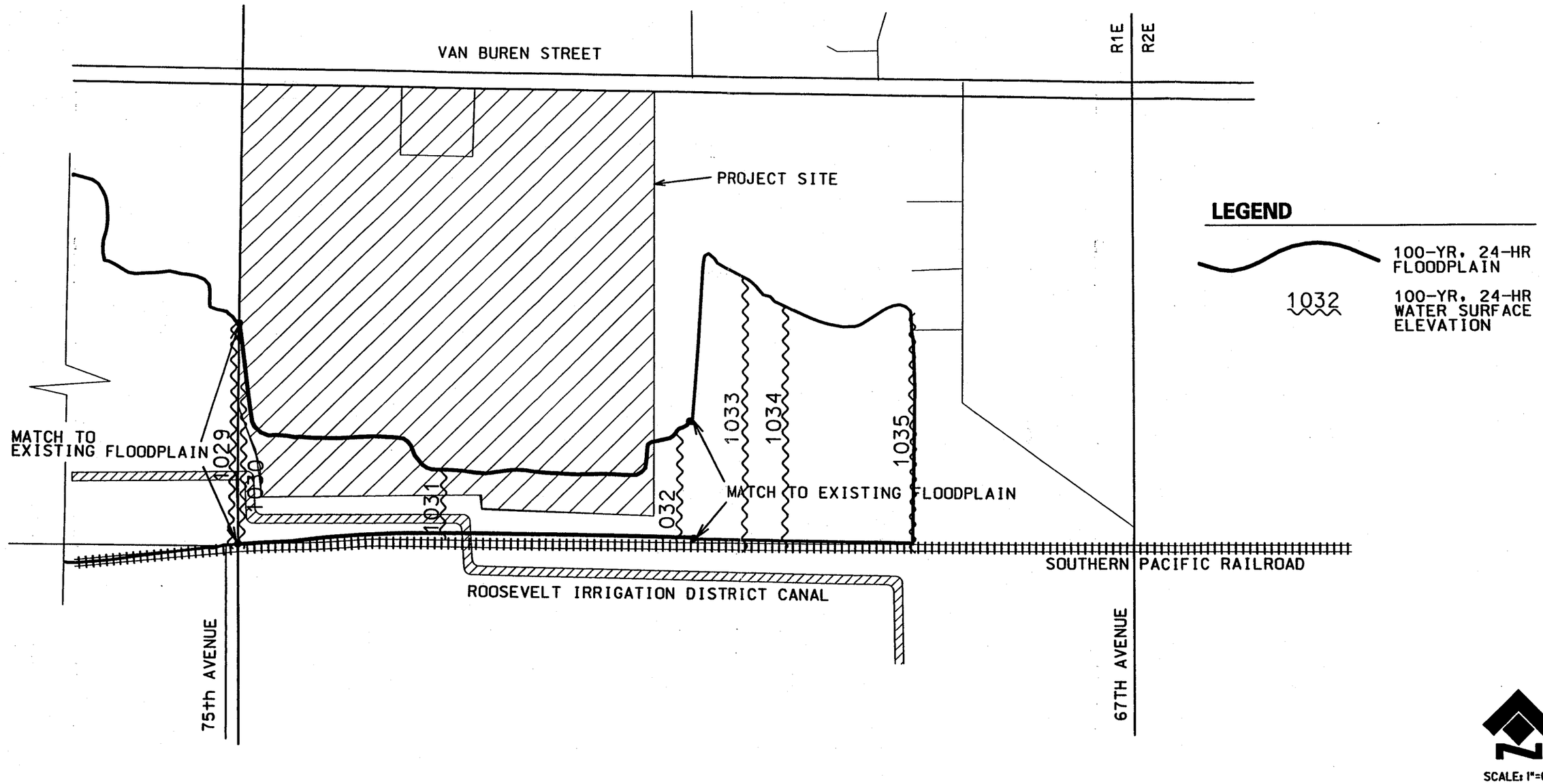


Hoskin Engineering Consultants, Inc.
323 West Roosevelt Street
Suite 200
Phoenix, Arizona 85003-1136
Tel: (602) 252-8384
Fax: (602) 252-8385

TARGET S.W. DIST. CENTER

EFFECTIVE FIRM

FIGURE 5



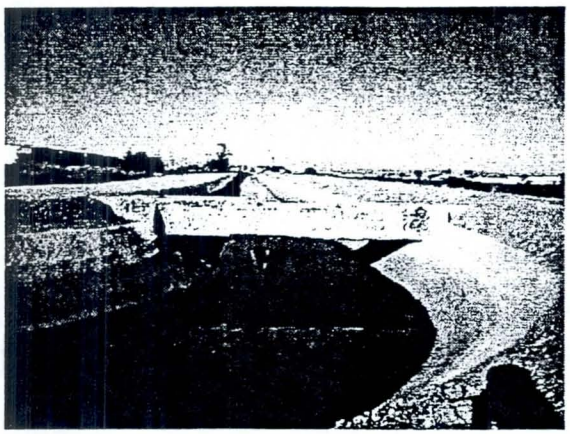
Hoskin Engineering Consultants, Inc.
323 West Roosevelt Street
Suite 200
Phoenix, Arizona 85003-1136
Tel: (602) 252-8384
Fax: (602) 252-8385

TARGET S.W. DIST. CENTER

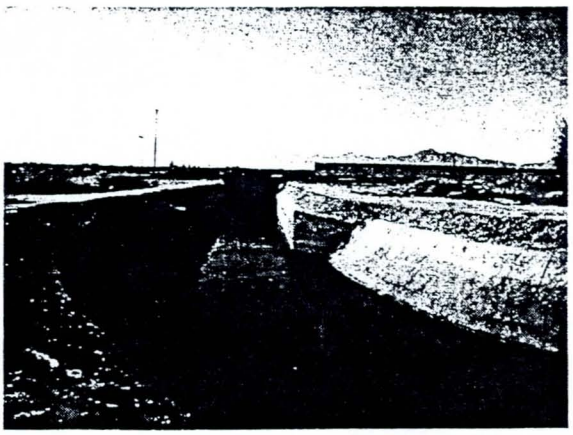
ANNOTATED FIRM

FIGURE 6

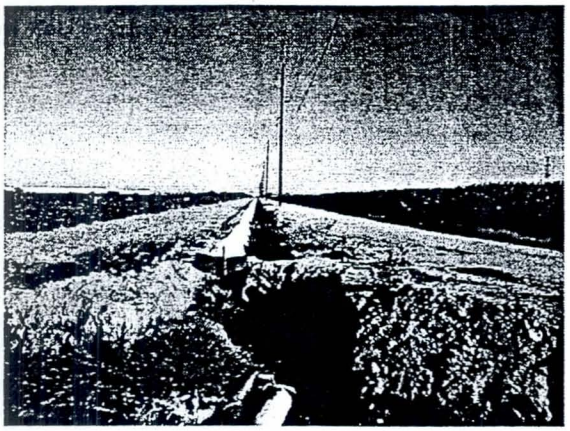
APPENDICES



1 - Roosevelt Irrigation District canal along south side of the site, looking west

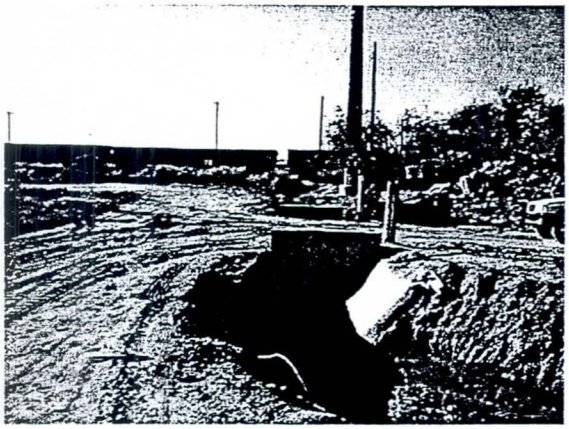


2 - Roosevelt Irrigation District canal along south side of the site, looking south



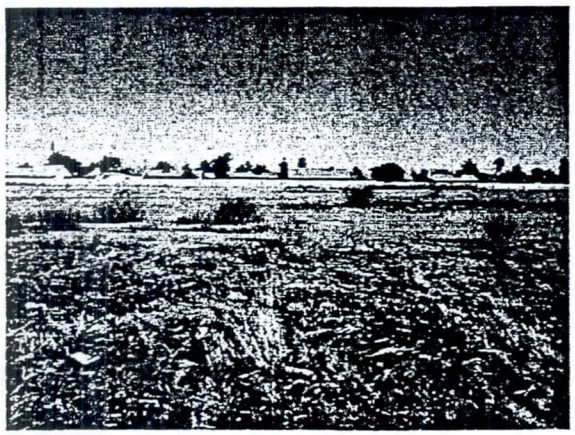
3 - Irrigation ditch along east side of the site, looking north

4 - Irrigation ditch along south side of the site, looking west

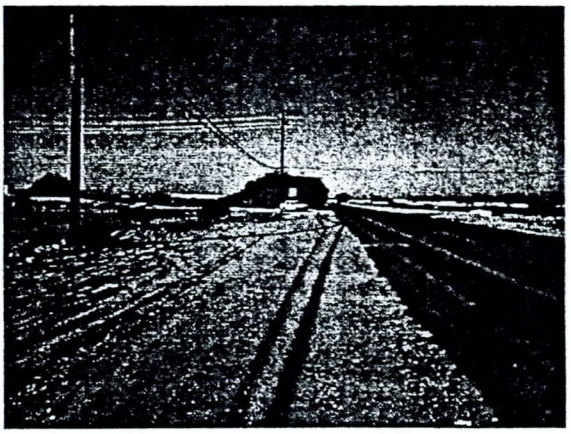


5 - Irrigation ditch along east side of the site, looking south toward the Southern Pacific Railroad

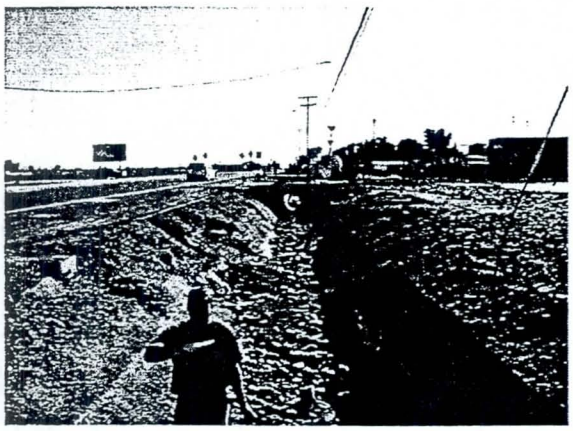
6 - View south across Van Buren at the field east of the site



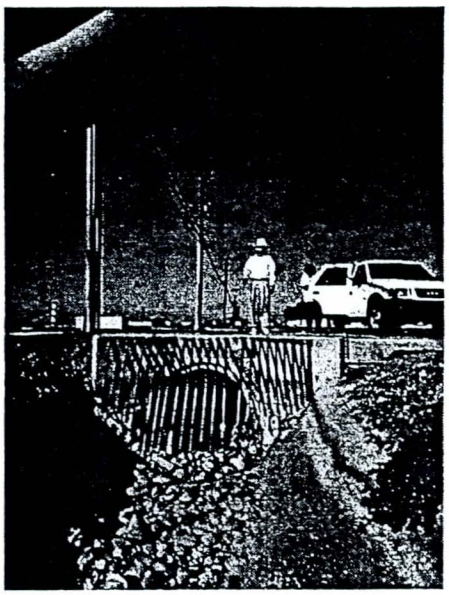
7 - Looking north of Van Buren from the northeast corner of the site



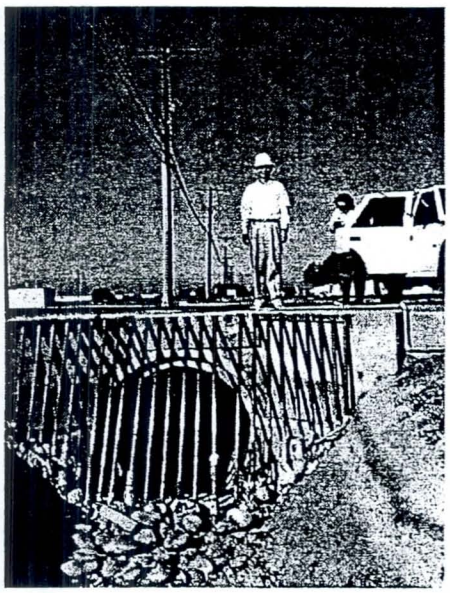
8 - Looking west at northeast corner of the site



9 - Apppox. 54" pipe and channel along south side of Van Buren, looking east



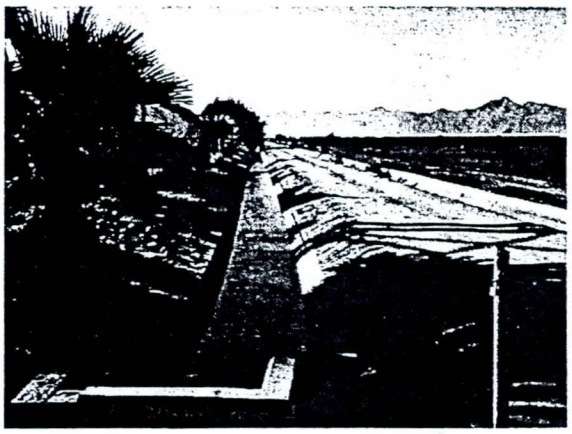
10



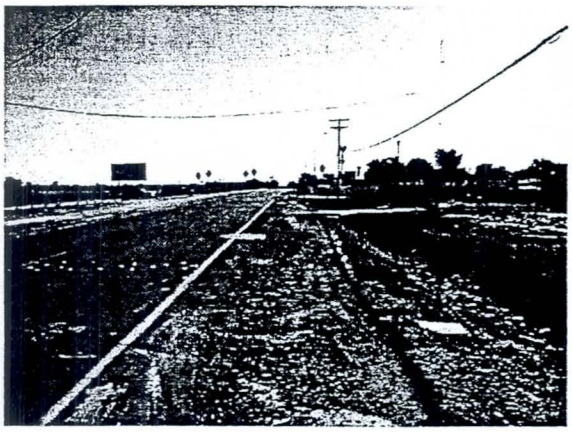
11

10 and 11 - Inlet to approx. 54" pipe south of Van Buren, looking west

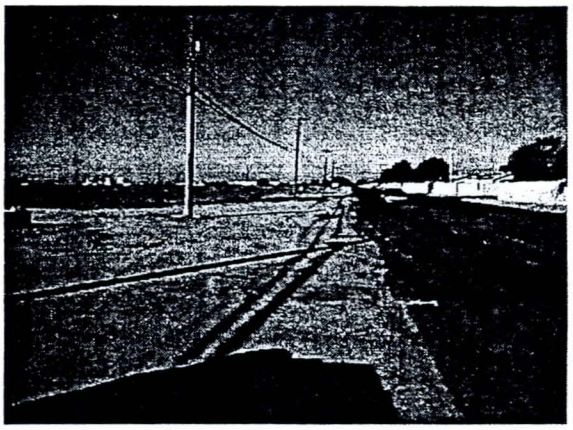
12 - Apppox. 54" pipe and channel along south side of Van Buren, looking east



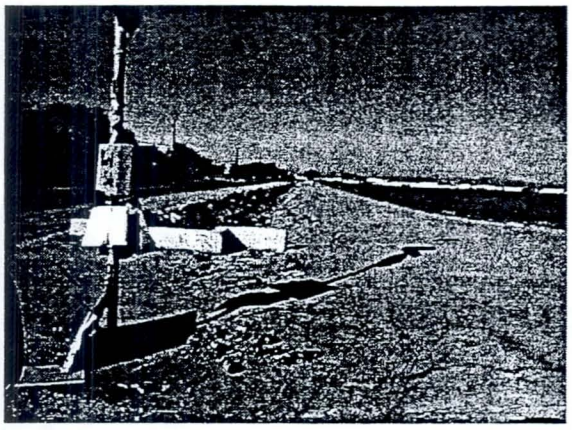
13 - View south from approx. 71st Avenue and Van Buren



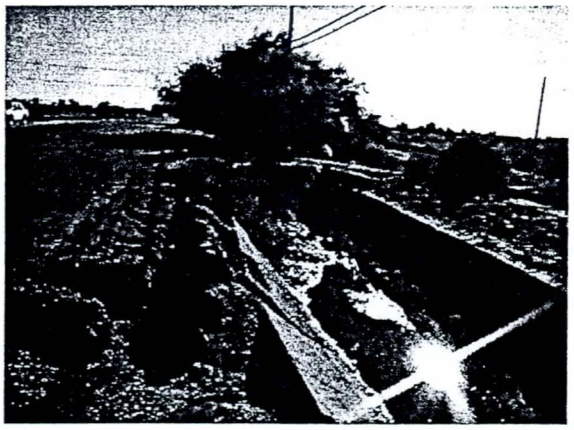
14 - View east along Van Buren



15 - View west along Van Buren



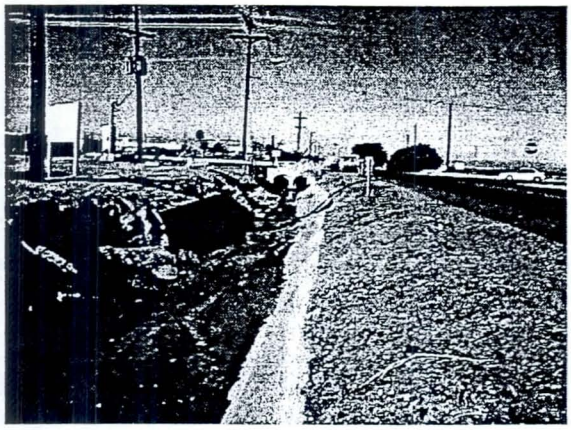
16 - Channel along north side of Van Buren, looking west



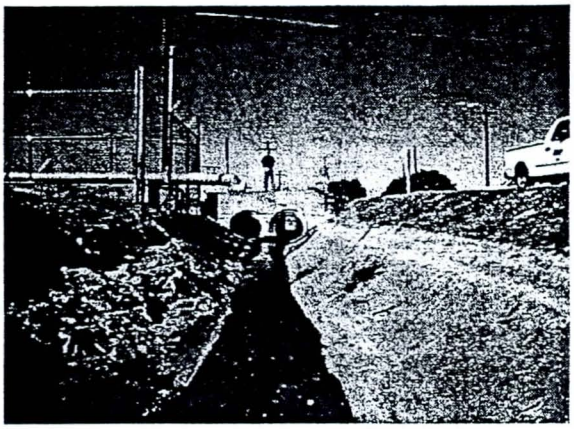
17 - Pipe outlet and channel along north side of the site, looking east

18 - Channel along north side of the site, looking west

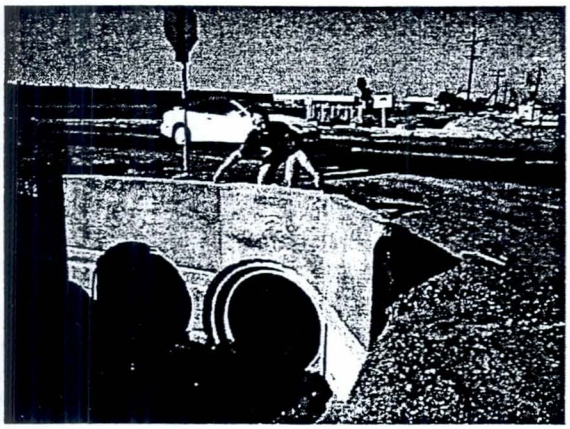
19 - Channel along north side of the site, looking east



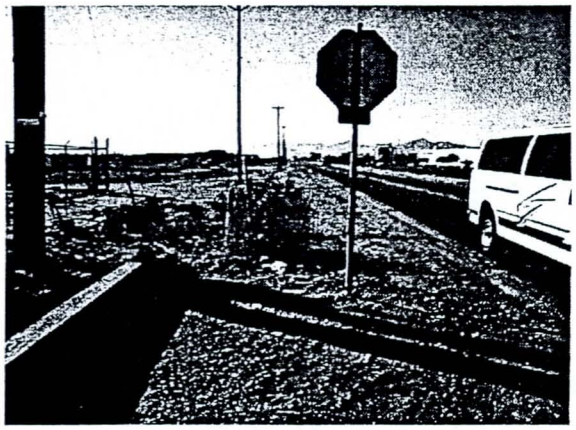
20 - Channel along north side of the site, looking west at the Van Buren/75th Ave intersection



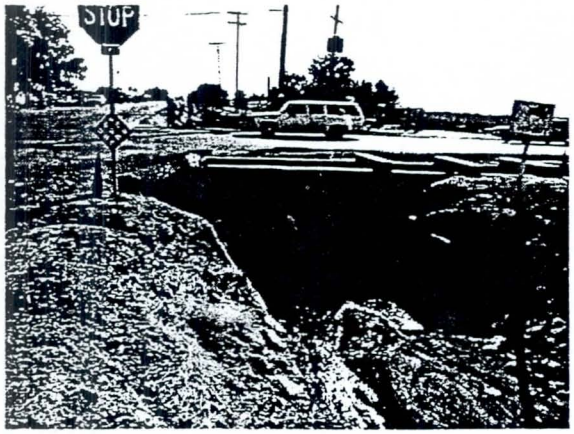
21 - Channel and culverts at northwest corner of the site, looking west



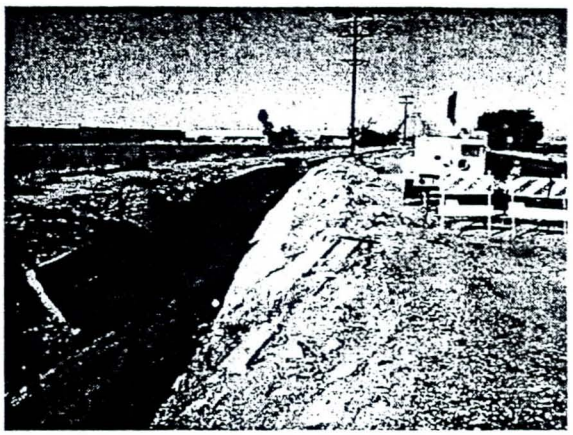
22 - Inlet to approx. 42" culverts under 75th Avenue at northwest corner of the site, looking west



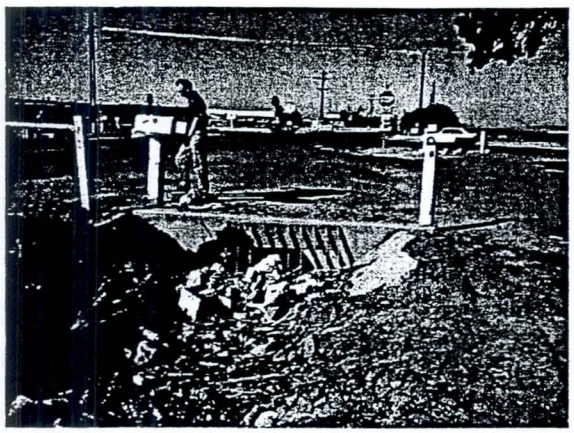
23 - View south along 75th Avenue from the northwest corner of the site



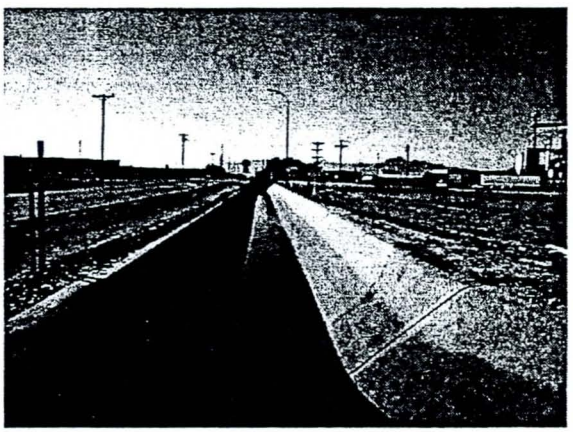
24 - Outlet of approx. 42" culverts under 75th Avenue at northwest corner of the site, looking east



25 - Channel south of Van Buren, west of 75th Avenue, looking west

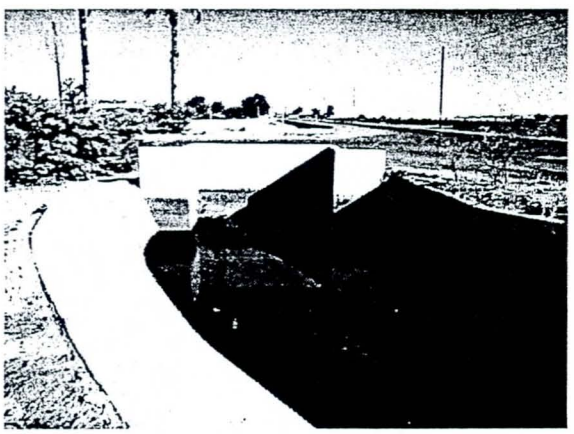


26 - Channel and inlet of approx. 36" pipe north of Van Buren, looking west

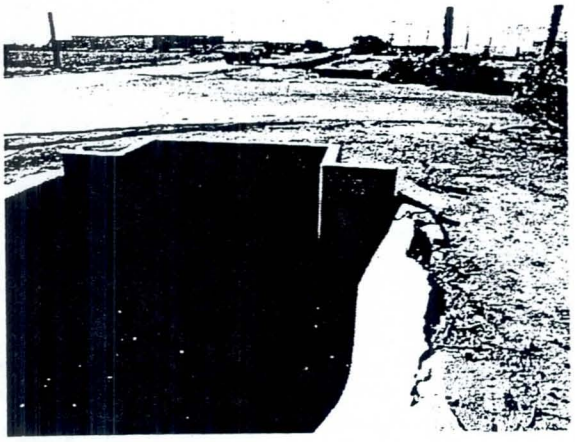


27 - Channel along west side of 75th Avenue, looking south

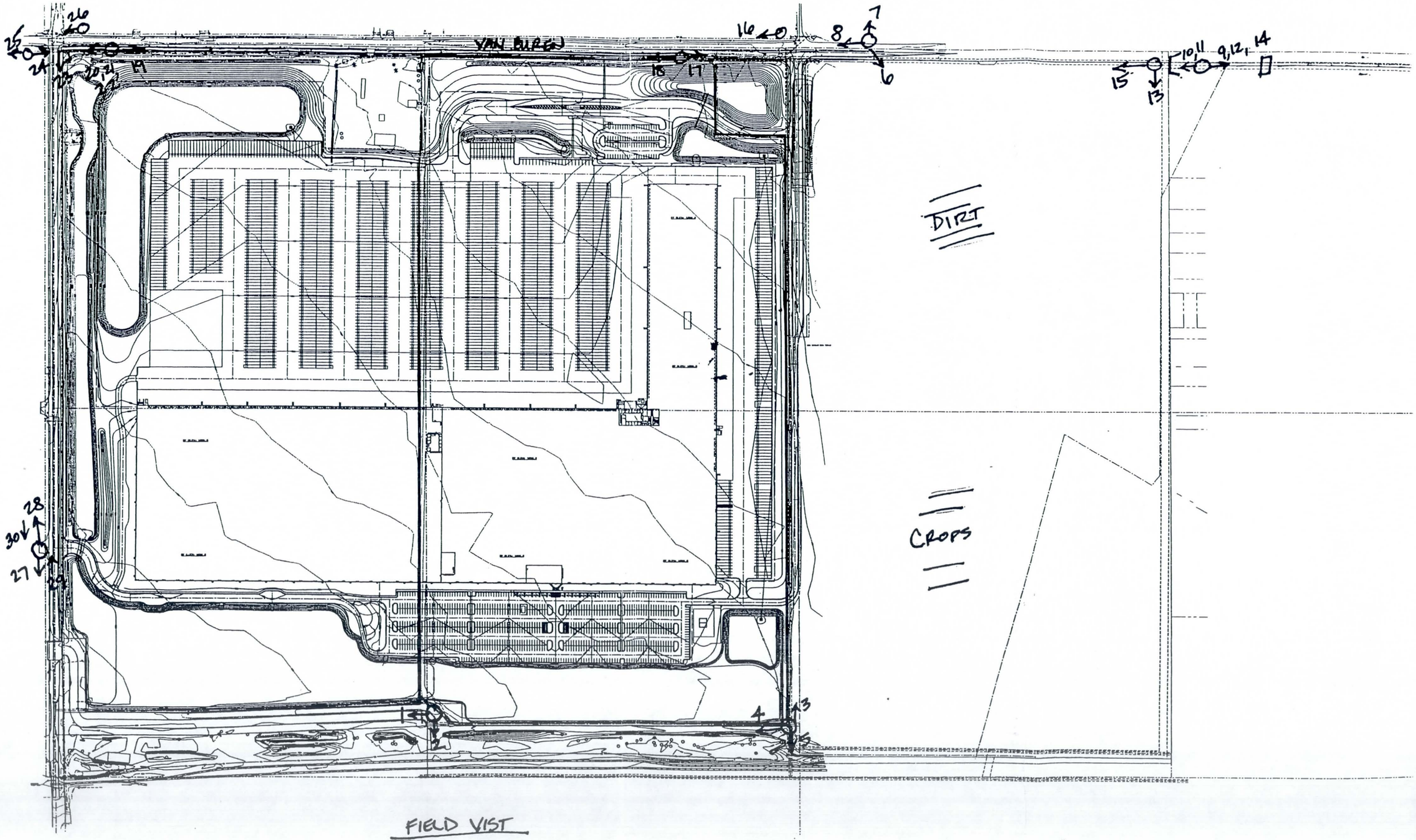
28 - Channel along west side of 75th Avenue, looking north



29 - Channel along west side of 75th Avenue, looking north



30 - Channel along west side of 75th Avenue, looking south



FIELD VIST
PHOTO LOCATION MAP
10-17-00

APPENDIX A: HYDROLOGY

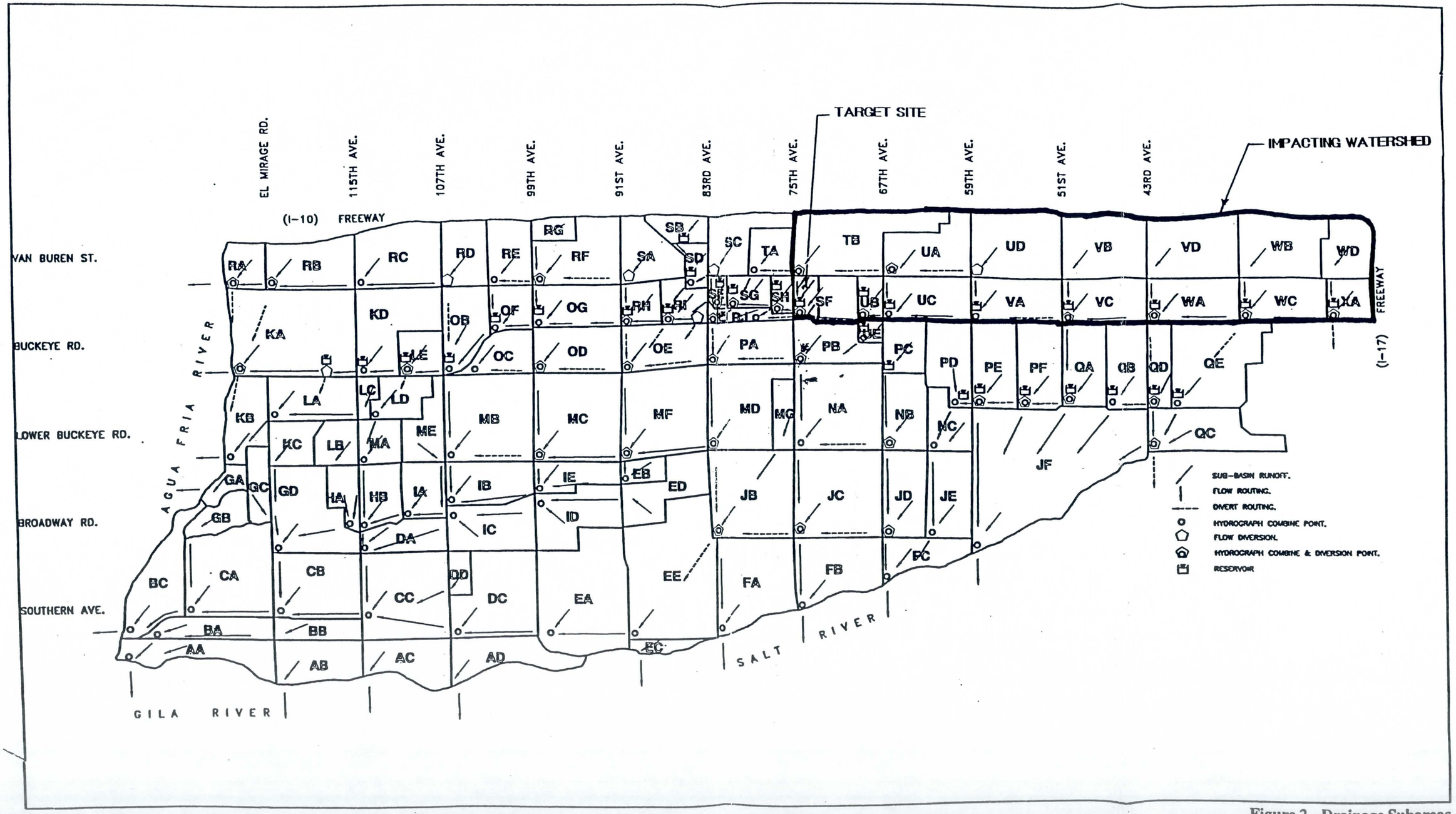


Figure 2 - Drainage Subareas

```
1*****************************************
 *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
 *             JUN   1998                *
 *           VERSION 4.1                 *
 *                                       *
 *  RUN DATE   27NOV00  TIME  11:22:04   *
 *                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

```
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
```

REVISED EFFECTIVE

24 - HOUR

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


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

  1           ID   FILENAME:    TGT24E.DAT      WITH ADDITION OF DIVERT AT PIPE
  2           ID   DATE:        11-13-00        WITH MODIFICATION TO RSSF2
  3           ID
  4           ID   TARGET SW DISTRIBUTION CENTER WATERSHED RAINFALL-RUNOFF MODEL.
  5           ID   HOSKIN ENGINEERING CONSULTANTS, INC. JOB NO.   00-043
  6           ID   OCTOBER 19, 2000
  7           ID   100-YR 24-HOUR PRECIPITATION.
              *DIAGRAM
  8           IT       5            1200     300
  9           IO       5
              * ******************************************************************
 10           IN      15
 11           JD    3.99    0.01
 12           PC    .000    .002    .005    .008    .011    .014    .017    .020    .023    .026
 13           PC    .029    .032    .035    .038    .041    .044    .048    .052    .056    .060
 14           PC    .064    .068    .072    .076    .080    .085    .090    .095    .100    .105
 15           PC    .110    .115    .120    .126    .133    .140    .147    .155    .163    .172
 16           PC    .181    .191    .203    .218    .236    .257    .283    .387    .663    .707
 17           PC    .735    .758    .776    .791    .804    .815    .825    .834    .842    .849
 18           PC    .856    .863    .869    .875    .881    .887    .893    .898    .903    .908
 19           PC    .913    .918    .922    .926    .930    .934    .938    .942    .946    .950
 20           PC    .953    .956    .959    .962    .965    .968    .971    .974    .977    .980
 21           PC    .983    .986    .989    .992    .995    .998   1.000
 22           JD    3.75      10
 23           JD    3.63      20
 24           JD    3.59      30
 25           JD    3.51      40
 26           JD    3.47      50
 27           JD    3.43      60
              * ******************************************************************

 28           KK   SUBWD
 29           KM   BASIN SUBWD
 30           KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 31           KM    L=        .7  Lca=        .4   S=   11.1  Kn= .079  LAG=  43.1
 32           KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
 33           BA     .37
 34           LG     .21     .19    6.80     .19    9.00
 35           UI     31.     38.     80.    161.    182.    237.    264.    264.    247.    224.
 36           UI    213.    172.    143.    110.     91.     78.     54.     45.     38.     29.
 37           UI     28.     18.     18.     18.      6.      4.      4.      4.      4.      4.
 38           UI      4.      4.      4.      4.      4.      4.      4.      4.      0.      0.
 39           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 40           KK  RTWDXA
 41           KM        ROUTE FLOW FROM CPWD TO CPXA (ALONG 27TH AVENUE).
 42           KM        TYPE A CHANNEL
 43           RS       4              -1       0
 44           RC    .025    .025    .025    2500   .0016
 45           RX       0     100     400     500   500.1     600     900    1000
 46           RY       5       4       1      -0       0       1       4       5
```

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

 47           KK   SUBXA
 48           KM   BASIN SUBXA
 49           KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 50           KM    L=        .8  Lca=        .4   S=   10.5  Kn= .041  LAG=  23.6
 51           KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
 52           BA     .25
 53           LG     .12      .15     9.70      .06   45.00
 54           UI     39.     128.     247.     312.    310.     271.     200.     129.      94.      56.
 55           UI     40.      28.      22.       9.      5.       5.       5.       5.       5.       5.
 56           UI      5.       0.       0.       0.      0.       0.       0.       0.       0.       0.
 57           UI      0.       0.       0.       0.      0.       0.       0.       0.       0.       0.

 58           KK   CPXA1
 59           KM        ADD HYDROGRAPHS AT CPXA
 60           HC       2

 61           KK    RSXA
 62           KM   MODIFIED PULS ROUTING THROUGH PONDING BEHIND SPRR.
 63           KO       3
 64           RS       1    STOR       0       0
 65           SV     .01      .07     1.0     5.1    14.0    28.5    50.0    79.1   117.4   165.0
 66           SE  1063.3  1063.5  1063.6  1064.1  1064.6  1065.1  1065.6  1066.1  1066.6  1067.1
 67           SQ       0       15      43     455    1751    3879    6999   11192   17236   25382

 68           KK   CPZZ1
 69           KM        DIVERT FLOW FROM CPXA SOUTHWARD OVER SPRR
 70           DT   DIZZ1
 71           DI       0       0      43     455    1751    3879    6999   11192   17236   25382
 72           DQ       0       0       0       0       0       0       0      44     960    3141
              * SUB-BASIN ZZ1 DOES NOT EXIST

 73           KK  RTXAWC
 74           KM        ROUTE FLOW FROM CPXA TO CPWC (ALONG SPRR).
 75           KM        TYPE C CHANNEL
 76           RS       9              -1       0
 77           RC    .035    .035    .035    5100   .0016
 78           RX       0      20      35      50    50.1     250     450     550
 79           RY       5       5     2.5       0       0       2       4       5

 80           KK   SUBWB
 81           KM   BASIN SUBWB
 82           KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 83           KM    L=       1.2  Lca=       .6   S=   12.0  Kn= .048  LAG=  37.2
 84           KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
 85           BA     .67
 86           LG     .16      .15     9.70      .06   36.00
 87           UI     67.      99.     234.     377.    467.     558.     561.     509.     488.     383.
 88           UI    345.     242.     196.     156.    111.      85.      69.      61.      40.      38.
 89           UI     33.       8.       8.       8.      8.       8.       8.       8.       8.       8.
 90           UI      8.       8.       8.       0.      0.       0.       0.       0.       0.       0.
 91           UI      0.       0.       0.       0.      0.       0.       0.       0.       0.       0.
```



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

 92           KK  RTWBWC
 93           KM        ROUTE FLOW FROM CPWB TO CPWC (ALONG 35TH AVENUE).
 94           KM        TYPE A CHANNEL
 95           RS       3              -1       0
 96           RC    .025    .025    .025    2000   .0020
 97           RX       0     100     400     500   500.1     600     900    1000
 98           RY       5       4       1       0       0       1       4       5

 99           KK   SUBWC
100           KM   BASIN SUBWC
101           KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
102           KM    L=       1.2  Lca=       .6   S=    6.0  Kn= .037  LAG=  32.9
103           KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
104           BA     .47
105           LG     .15      .16     9.70      .06   45.00
106           UI     53.      89.     237.     320.    422.     443.     412.     386.     296.     248.
107           UI    174.     147.      93.      72.     56.      48.      30.      30.      16.       7.
108           UI      7.       7.       7.       7.      7.       7.       7.       7.       7.       0.
109           UI      0.       0.       0.       0.      0.       0.       0.       0.       0.       0.
110           UI      0.       0.       0.       0.      0.       0.       0.       0.       0.       0.

111           KK    CPWC
112           KM        ADD HYDROGRAPHS AT CPWC.
113           HC       3

114           KK    RSWC
115           KM   MODIFIED PULS ROUTING THROUGH PONDING BEHIND SPRR.
116           KO       3
117           RS       1    STOR       0       0
118           SV    16.1    27.6    44.0    65.2    90.7   121.5   159.6   206.8   263.7   329.5
```

```
119          SE  1057.1  1057.6  1058.1  1058.6  1059.1  1059.6  1060.1  1060.6  1061.1  1061.6
120          SQ       0     115     608    1579    3086    5253    8972   15024   23745   35057

121          KK   CPWC2
122          KM        DIVERT FLOW FROM CPWC TO CPQE
123          DT    DIQE
124          DI       0     115     608    1579    3086    5253    8972   15024   23745   35057
125          DQ       0       0       0       0       0      40     951    3350    7104   12173

126          KK  RTWCWA
127          KM        ROUTE FLOW FROM CPWC TO CPWA (ALONG SPRR).
128          KM        TYPE C CHANNEL
129          RS       9              -1       0
130          RC    .035    .035    .035    5200   .0012
131          RX       0      20      35      50    50.1     250     450     550
132          RY       5       5     2.5       0       0       2       4       5

133          KK   SUBVD
134          KM   BASIN SUBVD
135          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
136          KM    L=       1.2  Lca=       .6   S=    9.9  Kn= .044  LAG=  36.5
137          KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
138          BA     .70
139          LG     .15     .16    9.70     .06   38.00
```



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

140          UI     70.    106.    257.    396.    506.    591.    591.    522.    526.    375.
141          UI    336.    242.    210.    138.    109.     87.     66.     58.     40.     40.
142          UI     22.      9.      9.      9.      9.      9.      9.      9.      9.      9.
143          UI      9.      9.      0.      0.      0.      0.      0.      0.      0.      0.
144          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

145          KK  RTVDWA
146          KM        ROUTE FLOW FROM CPVD TO CPWA (ALONG 43RD AVENUE).
147          KM        TYPE B CHANNEL
148          RS       3              -1       0
149          RC      .1     .02      .1    2000   .0030
150          RX       0     470     476     480     520     524     530    1000
151          RY     4.7       0       0       1       1       0       0     4.7

152          KK   SUBWA
153          KM   BASIN SUBWA
154          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
155          KM    L=       1.1  Lca=       .6   S=    9.1  Kn= .025  LAG=  19.6
156          KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
157          BA     .49
158          LG     .22     .17   10.10     .04   28.00
159          UI    110.    403.    674.    766.    643.    454.    291.    162.    103.     69.
160          UI     51.     12.     12.     12.     12.     12.     12.      0.      0.      0.
161          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

162          KK    CPWA
163          KM        ADD HYDROGRAPHS AT CPWA.
164          HC       3

165          KK    RSWA
166          KM   MODIFIED PULS ROUTING THROUGH PONDING BEHIND SPRR.
167          KO       3
168          RS       1    STOR       0       0
169          SV     1.3     1.9     2.4     3.1     4.0     8.5    16.7    29.9    48.5    74.4
170          SE  1050.7  1050.9  1051.1  1051.3  1051.4  1051.9  1052.4  1052.9  1053.4  1053.9
171          SQ       0       6      35     111     167     810    2025    3817    6199    9237

172          KK   CPWA2
173          KM        DIVERT FLOW FROM CPWA TO CPQD OVER SPRR
174          DT    DIQD
175          DI       0     810    9237   10710
176          DQ       0       0       0      63

177          KK  RTWAVC
178          KM        ROUTE FLOW FROM CPWA TO CPVC (ALONG SPRR).
179          KM        TYPE C CHANNEL
180          RS       8              -1       0
181          RC    .035    .035    .035    5000   .0028
182          RX       0      20      35      50    50.1     250     450     550
183          RY       5       5     2.5       0       0       2       4       5
```



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

184          KK   SUBVB
185          KM   BASIN SUBVB
186          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
187          KM    L=       1.1  Lca=       .6   S=   11.8  Kn= .067  LAG=  49.9
188          KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
189          BA    0.72
190          LG     .37     .09    9.70     .07   17.00
```

```
191        UI    106.    106.    212.    414.    612.    633.    818.    891.    891.    888.
192        UI    742.    779.    645.    595.    468.    385.    307.    314.    201.    171.
193        UI    141.    129.     97.     97.     69.     60.     60.     58.     13.     13.
194        UI     13.     13.     13.     13.     13.     13.     13.     13.     13.     13.
195        UI     13.     13.     13.     13.      0.      0.      0.      0.      0.      0.
196        UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

197        KK  RTVBVC
198        KM        ROUTE FLOW FROM CPVB TO CPVC (ALONG 51ST AVENUE).
199        KM        TYPE B CHANNEL
200        RS       4              -1       0
201        RC      .1     .02      .1    2400   .0017
202        RX       0     470     476     480     520     524     530    1000
203        RY     4.7       0       0       1       1       0       0     4.7

204        KK   SUBVC
205        KM   BASIN SUBVC
206        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
207        KM    L=      1.1  Lca=       .5   S=    8.5  Kn= .028  LAG=  21.6
208        KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
209        BA     .49
210        LG     .15     .17    8.80     .07   44.00
211        UI     77.    268.    466.    588.    524.    431.    285.    190.    111.     75.
212        UI     52.     40.     12.      9.      9.      9.      9.      9.      9.      0.
213        UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
214        UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

215        KK    CPVC
216        KM        ADD HYDROGRAPHS AT CPVC.
217        HC       3

218        KK    RSVC
219        KM   MODIFIED PULS ROUTING THROUGH PONDING BEHIND SPRR.
220        KO       3
221        RS       1    STOR       0       0
222        SV      49      59      70      83      97     113     149     170     192     216
223        SE  1051.0  1051.2  1051.4  1051.6  1051.8  1052.0  1052.4  1052.6  1052.8  1053.0
224        SQ       9     129     425     944    1729    2822    6117    8287   10832   13747

225        KK   CPVC2
226        KM        DIVERT FLOW FROM CPVC TO CPVA OVER 51st AVE.
227        DT    DIVA
228        DI       0       9     654    2822    7159
229        DQ       0       4     214     753    1814
                                      HEC-1 INPUT                                          PAGE  6

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

230        KK  RTVCQA
231        KM        ROUTE FLOW FROM CPVC TO CPQA (ALONG SPRR).
232        KM        TYPE B CHANNEL
233        RS       3              -1       0
234        RC      .1     .02      .1    2000    .003
235        RX       0     470     476     480     520     524     530    1000
236        RY     4.7       0       0       1       1       0       0     4.7
           * ***********************************************************************

237        KK   SUBUD
238        KM   BASIN SUBUD
239        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
240        KM    L=      1.3  Lca=       .6   S=   20.0  Kn= .060  LAG=  44.7
241        KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
242        BA     .78
243        LG     .37     .11    9.70     .06   11.00
244        UI     64.     73.    155.    302.    366.    470.    532.    538.    532.    448.
245        UI    488.    336.    346.    248.    195.    195.    122.    103.     83.     72.
246        UI     58.     52.     36.     36.     36.      9.      8.      8.      8.      8.
247        UI      8.      8.      8.      8.      8.      8.      8.      8.      8.      8.
248        UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
249        UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

250        KK    CPUD
251        KM        DIVERT 25% OF FLOW FROM CPUD TO CPUA.
252        DT    DIUA
253        DI       0      25      50      75     100     150     200
254        DQ       0       6      13      19      25      38      50

255        KK  RTUDVA
256        KM        ROUTE FLOW FROM CPUD TO CPVA (ALONG 59TH AVENUE).
257        KM        TYPE B CHANNEL
258        RS       4              -1       0
259        RC      .1     .02      .1    2600   .0019
260        RX       0     470     476     480     520     524     530    1000
261        RY     4.7       0       0       1       1       0       0     4.7

262        KK   SUBVA
263        KM   BASIN SUBVA
264        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
265        KM    L=      1.1  Lca=       .5   S=    8.5  Kn= .029  LAG=  22.3
```

```
266          KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
267          BA     .49
268          LG     .09      .15     8.40      .10    60.00
269          UI     87.     291.     531.     681.     622.     522.     375.     246.     143.      97.
270          UI     70.      46.      28.      10.      10.      10.      10.      10.      10.       0.
271          UI      0.       0.       0.       0.       0.       0.       0.       0.       0.       0.
272          UI      0.       0.       0.       0.       0.       0.       0.       0.       0.       0.
```



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

273          KK    CPVA
274          KM        RETURN DIVERT FROM CPVC
275          DR    DIVA

276          KK  RTDIVA
277          KM        ROUTE DIVERT TO CPVA
278          KM        TYPE C CHANNEL
279          RS       9               -1        0
280          RC    .035     .035     .035     5200    .0015
281          RX       0       20       35       50     50.1      250      450      550
282          RY       5        5      2.5        0        0        2        4        5

283          KK   CPVA2
284          KM        ADD HYDROGRAPHS AT CPVA.
285          HC       3                                                                    HC

286          KK    RSVA
287          KM   MODIFIED PULS ROUTING THROUGH PONDING BEHIND SPRR.
288          KO       3
289          RS       1     STOR        0        0
290          SV    10.3     13.3     15.6     23.9     34.6     48.9     67.7     90.8    118.6    140.8
291          SE  1044.2   1044.3   1044.5   1045.0   1045.5   1046.0   1046.5   1047.0   1047.5   1047.8
292          SQ       0        4       70      593     1618     3189     6809    12640    20432    26055

293          KK  RTVAUC
294          KM        ROUTE FLOW FROM CPVA TO CPUC
295          KM        TYPE C FLOW
296          RS       9               -1        0
297          RC    .035     .035     .035     5200    .0012
298          RX       0       20       35       50     50.1      250      450      550
299          RY       5        5      2.5        0        0        2        4        5
             * ***********************************************************************

300          KK   SUBUA
301          KM   BASIN SUBUA
302          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
303          KM    L=       1.2  Lca=        .6    S=    14.9  Kn= .049  LAG=  36.7
304          KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
305          BA     .56
306          LG     .24      .16     9.70      .06    20.00
307          UI     56.      84.     203.     316.     400.     471.     471.     419.     419.     302.
308          UI    275.     196.     166.     116.      88.      69.      54.      48.      32.      32.
309          UI     21.       7.       7.       7.       7.       7.       7.       7.       7.       7.
310          UI      7.       7.       0.       0.       0.       0.       0.       0.       0.       0.
311          UI      0.       0.       0.       0.       0.       0.       0.       0.       0.       0.

312          KK    CPUA
313          KM        RETURN DIVERT FROM CPUD
314          DR    DIUA
```



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

315          KK  RTDIUA
316          KM        ROUTE DIVERT TO CPUA
317          KM        TYPE B CHANNEL
318          RS       8               -1        0
319          RC      .1      .02       .1     5000    .0014
320          RX       0     470      476      480      520      524      530     1000
321          RY     4.7       0        0        1        1        0        0      4.7

322          KK   CPUA1
323          KM        ADD HYDROGRAPHS AT CPUA
324          HC       2    1.334

325          KK   CPUA2
326          KM        DIVERT 20% OF FLOW FROM CPUA TO CPTB
327          DT   DITB1
328          DI       0       25       50       75      100      150      200
329          DQ       0        5       10       15       20       30       40

330          KK  RTUAUC
331          KM        ROUTE FLOW FROM CPUA TO CPUC (ALONG 67TH AVENUE).
332          KM        TYPE B CHANNEL
333          RS       4               -1        0
334          RC      .1      .02       .1     2400    .0017
335          RX       0     470      476      480      520      524      530     1000
```

```
336          RY     4.7       0       0       1       1       0       0     4.7

337          KK   SUBUC
338          KM   BASIN SUBUC
339          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
340          KM    L=       1.0  Lca=        .5   S=   12.7  Kn= .044  LAG=  30.5
341          KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
342          BA     .48
343          LG     .26      .15     9.70      .06   22.00
344          UI     59.     114.     300.     386.    475.    492.    418.    384.    304.    206.
345          UI    170.     105.      81.      61.     50.     33.     33.      9.      7.      7.
346          UI      7.       7.       7.       7.      7.      7.      7.      0.      0.      0.
347          UI      0.       0.       0.       0.      0.      0.      0.      0.      0.      0.

348          KK    CPUC
349          KM        ADDHYDROGRAPHS AT CPUC
350          HC       3   7.101

351          KK    RSUC
352          KM        ROUTE FLOW FROM CPUC TO CPUB OVER 67th AVE.
353          KO       3
354          RS       1    STOR       0       0
355          SV     4.8     6.9     9.9    19.0    33.0    52.6    77.4   108.7   148.6   172.0
356          SE  1036.2  1036.3  1036.5  1037.0  1037.5  1038.0  1038.5  1039.0  1039.5  1040.0
357          SQ       0       5      77     789    2369    4778    8161   12516   18033   23378
```



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

358          KK  RTUCUB
359          KM        ROUTE FLOW FROM CPUC TO CPUB
360          KM        TYPE C CHANNEL
361          RS       2              -1       0
362          RC    .035    .035    .035    1400   .0043
363          RX       0      20      35      50    50.1     250     450     550
364          RY       5       5     2.5       0       0       2       4       5

365          KK   SUBUB
366          KM   BASIN SUBUB
367          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
368          KM    L=        .8  Lca=        .4   S=   16.2  Kn= .048  LAG=  30.3
369          KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
370          BA     .14
371          LG     .22      .14     8.80      .08   23.00
372          UI     17.      33.      86.     110.    136.    140.    119.    107.     85.     58.
373          UI     47.      29.      23.      17.     14.      9.      9.      2.      2.      2.
374          UI      2.       2.       2.       2.      2.      2.      2.      0.      0.      0.
375          UI      0.       0.       0.       0.      0.      0.      0.      0.      0.      0.

376          KK    CPUB
377          KM        ADD HYDROGRAPHS AT CPUB
378          HC       2

379          KK    RSUB
380          KM        STORAGE ROUTING AT CPUB (69TH AVE.)
381          KO       3
382          RS       1    STOR       0       0
383          SV      18      28      41      59      82     108
384          SE  1035.5  1036.0  1036.5  1037.0  1037.5    1038
385          SQ       1      85     494    1710    4700    9466

386          KK   CPUB1
387          KM        DIVERT FLOW FROM CPUB TO CPUE OVER SPRR.
388          DT    DIUE
389          DI       0     1.2    85.4   493.7  1710.3  4699.8  9465.7
390          DQ       0       0       0       0   101.6   887.6  2402.3

391          KK  RUBSF1
392          KM        ROUTE FLOW FROM CPUB TO CPSF1
393          KM        TYPE C CHANNEL
394          RS       5              -1       0
395          RC    .035    .035    .035    1373   .0007
396          RX       0      20      35      50    50.1     250     450     550
397          RY       5       5     2.5       0       0       2       4       5

398          KK   DITB1
399          KM   RETRIEVE FLOW ALONG VAN BUREN
400          DR   DITB1
```



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

401          KK  DITB1A
402          KM   FIRST 120 CFS FLOWS WEST WITHIN PIPE AND STREET
403          DT   DITB2
404          DI       0     120    1000    5000
405          DQ       0     120     120     120
```

```
406          KK     TB1
407          KM   BASIN TB1
408          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
409          KM    L=       0.7  Lca=        .4   S=   10.2  Kn= .046  LAG=  27.2
410          KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
411          BA     .17
412          LG     .21      .19     8.80      .07   28.00
413          UI     23.      54.     126.     172.    191.     173.     156.     119.      79.      62.
414          UI     39.      28.      21.      15.     13.       5.       3.       3.       3.       3.
415          UI      3.       3.       3.       3.      0.       0.       0.       0.       0.       0.
416          UI      0.       0.       0.       0.      0.       0.       0.       0.       0.       0.

417          KK   COTB1
418          KM  COMBINE TB1 AND EXCESS FLOW ALONG VAN BUREN
419          HC       2

420          KK  RTBSF1
421          KM        ROUTE FLOW FROM CPTB1 TO CPSF1
422          KM        TYPE C CHANNEL
423          RS       5                -1        0
424          RC    .035     .035     .035     2814    .0007
425          RX       0       20       35       50     50.1      250      450      550
426          RY       5        5      2.5        0        0        2        4        5
             * ****************************************

427          KK     SF1
428          KM   BASIN SF1
429          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
430          KM    L=       0.5  Lca=        .   S=    9.2  Kn= .100  LAG=  46.9
431          KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
432          BA     .13
433          LG     .50      .15     9.70      .07     .00
434          UI     10.      10.      22.      44.     57.      71.      75.      83.      83.      75.
435          UI     11.       9.       8.       6.      6.       6.       2.       1.       1.       1.
436          UI      1.       1.       1.       1.      1.       1.       1.       1.       1.       1.
437          UI      1.       1.       0.       0.      0.       0.       0.       0.       0.       0.
438          UI      0.       0.       0.       0.      0.       0.       0.       0.       0.       0.

439          KK   CPSF1
440          KM        ADD HYDROGRAPH AT CPSF1
441          HC       3

442          KK  RSFSF1
443          KM        ROUTE FLOW FROM CPSF1 TO CPSF2
444          KM        TYPE C CHANNEL
445          RS       5                -1        0
446          RC    .035     .035     .035     1427    .0007
447          RX       0       20       35       50     50.1      250      450      550
```



```
1                                        HEC-1 INPUT

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

448          RY       5        5      2.5        0        0        2        4        5

449          KK     TB2
450          KM   BASIN TB2
451          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
452          KM    L=       2.0  Lca=     0.9   S=   10.2  Kn= .046  LAG=  53.4
453          KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
454          BA     .72
455          LG     .25      .18     8.80      .08    28.0
456          UI     50.      50.      91.     156.    277.     273.     376.     392.     416.     416.
457          UI    394.     347.     375.     282.    281.     219.     184.     145.     151.     102.
458          UI     84.      74.      61.      53.     45.      44.      28.      28.      28.      26.
459          UI      6.       6.       6.       6.      6.       6.       6.       6.       6.       6.
460          UI      6.       6.       6.       6.      6.       0.       0.       0.       0.       0.
461          UI      0.       0.       0.       0.      0.       0.       0.       0.       0.       0.

462          KK   DITB2
463          KM   RETRIEVE FLOW WEST ALONG VAN BUREN
464          DR   DITB2

465          KK  RTDITB
466          KM        ROUTE DIVERT TO CPTB2, THROUGH PIPE AND CHANNEL TO 75TH & VAN BUREN
467          KM        TYPE A CHANNEL
468          RS       9                -1        0
469          RC    .025     .025     .025     5200    .0019
470          RX       0      100      400      500    500.1      600      900     1000
471          RY       5        4        1        0        0        1        4        5

472          KK   CPTB2
473          KM        ADD HYDROGRAPH AT CPTB2 = COMBINE FLOW AT 75TH & VAN BUREN
474          HC       2    2.192

475          KK   CPTB2
476          KM        DIVERT 25% OF FLOW TO CPTA
477          DT    DITA
478          DI       0       25       50       75      100      150      200
479          DQ       0        6       13       19       25       38       50
```

```
480          KK  RTBSF2
481          KM        ROUTE FLOW FROM CPTB2 TO CPSF2 (ALONG 75TH AVENUE).
482          KM        TYPE B CHANNEL
483          RS       4              -1       0
484          RC      .1      .02      .1    2160   .0023
485          RX       0      470     476     480     520     524     530    1000
486          RY     4.7        0       0       1       1       0       0     4.7

487          KK     SF2
488          KM   BASIN SF2
489          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
490          KM    L=        .7  Lca=        .3   S=     9.2  Kn= .092  LAG=  49.2
491          KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
492          BA     .25
493          LG     .49     .16    9.70     .07     .00
494          UI     19.     19.     38.     76.    108.    114.    146.    157.    157.    153.
495          UI    131.    141.    104.    107.     75.     64.     53.     51.     34.     30.
```



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

496          UI     23.     21.     17.     16.     11.     11.     11.      7.      2.      2.
497          UI      2.      2.      2.      2.      2.      2.      2.      2.      2.      2.
498          UI      2.      2.      2.      2.      0.      0.      0.      0.      0.      0.
499          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

500          KK   CPSF2
501          KM        ADD HYDROGRAPHS AT CPSF2.
502          HC       3   8.464

503          KK   RSSF2
504          KM       STORAGE ROUTING AT CPSF2
505          KO       3
506          RS       1    STOR       0       0
507          SV     6.5     9.6    13.8    18.0    34.2    56.1    84.8
508          SE  1029.1 1029.37 1029.57 1029.77 1030.27 1030.77 1031.27
509          SQ       0   28.58  140.46  364.83 1847.07 4303.63 7628.27
510          ZZ
```

1

```
        SCHEMATIC DIAGRAM OF STREAM NETWORK

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

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

  28       SUBWD
              V
              V
  40      RTWDXA
              .
              .
  47          .        SUBXA
              .            .
              .            .
  58       CPXA1............
              V
              V
  61        RSXA
              .
              .
  70          .-------->   DIZZ1
  68       CPZZ1
              V
              V
  73      RTXAWC
              .
              .
  80          .       SUBWB
              .           V
              .           V
  92          .      RTWBWC
              .            .
              .            .
  99          .            .        SUBWC
              .            .            .
              .            .            .
 111        CPWC........................
              V
              V
 114        RSWC
              .
              .
 123          .-------->    DIQE
 121       CPWC2
              V
              V
 126      RTWCWA
              .
              .
 133          .        SUBVD
```

```
                .          V
                .          V
145             .      RTVDWA
                .          .
                .          .
152             .          .        SUBWA
                .          .          .
                .          .          .
162          CPWA.........................
                V
                V
165          RSWA
                .
                .
174             .-------->    DIQD
172         CPWA2
                V
                V
177        RTWAVC
                .
                .
184             .      SUBVB
                .          V
                .          V
197             .      RTVBVC
                .          .
                .          .
204             .          .        SUBVC
                .          .          .
                .          .          .
215          CPVC........................
                V
                V
218          RSVC
                .
                .
227             .-------->    DIVA
225         CPVC2
                V
                V
230        RTVCQA
                .
                .
237             .      SUBUD
                .          .
                .          .
252             .          .-------->    DIUA
250             .       CPUD
                .          V
                .          V
255             .      RTUDVA
                .          .
                .          .
262             .          .        SUBVA
                .          .          .
                .          .          .
275             .          .          .          .<-------    DIVA
273             .          .          .       CPVA
                .          .          .          V
                .          .          .          V
276             .          .          .     RTDIVA
                .          .          .          .
                .          .          .          .
283             .      CPVA2........................
                .          V
                .          V
286             .       RSVA
                .          V
                .          V
293             .      RTVAUC
                .          .
                .          .
300             .          .        SUBUA
                .          .          .
                .          .          .
314             .          .          .          .<-------    DIUA
312             .          .          .       CPUA
                .          .          .          V
                .          .          .          V
315             .          .          .     RTDIUA
                .          .          .          .
                .          .          .          .
322             .          .        CPUA1............
                .          .          .
                .          .          .
327             .          .          .-------->   DITB1
325             .          .        CPUA2
                .          .          V
                .          .          V
330             .          .      RTUAUC
```

```
                .          .
                .          .
337             .          .        SUBUC
                .          .          .
                .          .          .
348             .     CPUC.......................
                .       V
                .       V
351             .     RSUC
                .       V
                .       V
358             .   RTUCUB
                .       .
                .       .
365             .       .      SUBUB
                .       .        .
                .       .        .
376             .     CPUB............
                .       V
                .       V
379             .     RSUB
                .       .
                .       .
388             .       .-------->   DIUE
386             .   CPUB1
                .       V
                .       V
391             .  RUBSF1
                .       .
                .       .
400             .       .        .<-------   DITB1
398             .       .     DITB1
                .       .        .
                .       .        .
403             .       .        .-------->  DITB2
401             .       .    DITB1A
                .       .        .
                .       .        .
406             .       .        .        TB1
                .       .        .          .
                .       .        .          .
417             .       .     COTB1............
                .       .        V
                .       .        V
420             .       .    RTBSF1
                .       .        .
                .       .        .
427             .       .        .        SF1
                .       .        .          .
                .       .        .          .
439             .     CPSF1.......................
                .       V
                .       V
442             .   RSFSF1
                .       .
                .       .
449             .       .      TB2
                .       .        .
                .       .        .
464             .       .        .          .<-------   DITB2
462             .       .        .      DITB2
                .       .        .          V
                .       .        .          V
465             .       .        .     RTDITB
                .       .        .          .
                .       .        .          .
472             .       .     CPTB2............
                .       .        .
                .       .        .
477             .       .        .-------->   DITA
475             .       .     CPTB2
                .       .        V
                .       .        V
480             .       .    RTBSF2
                .       .        .
                .       .        .
487             .       .        .        SF2
                .       .        .          .
                .       .        .          .
500             .     CPSF2.......................
                .       V
                .       V
503             .     RSSF2
```

***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN   1998                *
*           VERSION 4.1                 *
*                                       *
*  RUN DATE   27NOV00  TIME  11:22:04   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

```
                    FILENAME:    TGT24E.DAT      WITH ADDITION OF DIVERT AT PIPE
                    DATE:        11-13-00        WITH MODIFICATION TO RSSF2

                    TARGET SW DISTRIBUTION CENTER WATERSHED RAINFALL-RUNOFF MODEL.
                    HOSKIN ENGINEERING CONSULTANTS, INC. JOB NO.   00-043
                    OCTOBER 19, 2000
                    100-YR 24-HOUR PRECIPITATION.

  9 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        1200  STARTING TIME
                         NQ         300  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      2    0  ENDING DATE
                     NDTIME        1255  ENDING TIME
                      ICENT          19  CENTURY MARK

                  COMPUTATION INTERVAL     .08 HOURS
                       TOTAL TIME BASE   24.92 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


            **************
            *            *
503 KK      *     RSSF2  *
            *            *
            **************

505 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           3  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

               HYDROGRAPH ROUTING DATA

506 RS          STORAGE ROUTING
                      NSTPS           1  NUMBER OF SUBREACHES
                       ITYP        STOR  TYPE OF INITIAL CONDITION
                     RSVRIC         .00  INITIAL CONDITION
                          X         .00 WORKING R AND D COEFFICIENT

507 SV            STORAGE         6.5       9.6      13.8      18.0      34.2      56.1      84.8

508 SE          ELEVATION     1029.10   1029.37   1029.57   1029.77   1030.27   1030.77   1031.27

509 SQ          DISCHARGE          0.       29.      140.      365.     1847.     4304.     7628.
                                                                ***

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

                       HYDROGRAPH AT STATION    RSSF2
                     TRANSPOSITION AREA       .0 SQ MI

  PEAK FLOW    TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.92-HR
   (CFS)       (HR)
                              (CFS)
+   1617.     13.58            866.        258.        249.        249.
                        (INCHES)        .951       1.134       1.134       1.134
                         (AC-FT)        429.        512.        512.        512.
```

PEAK STORAGE (AC-FT)	TIME (HR)	MAXIMUM AVERAGE STORAGE 6-HR	24-HR	72-HR	24.92-HR
32.	13.58	23.	11.	11.	11.

PEAK STAGE (FEET)	TIME (HR)	MAXIMUM AVERAGE STAGE 6-HR	24-HR	72-HR	24.92-HR
1030.19	13.58	1029.94	1029.44	1029.43	1029.43

CUMULATIVE AREA = 8.46 SQ MI

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

HYDROGRAPH AT STATION RSSF2
TRANSPOSITION AREA 10.0 SQ MI

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW	6-HR	24-HR	72-HR	24.92-HR
1447.	13.67	(CFS)	788.	237.	228.	228.
		(INCHES)	.865	1.040	1.040	1.040
		(AC-FT)	391.	469.	469.	469.

PEAK STORAGE (AC-FT)	TIME (HR)	MAXIMUM AVERAGE STORAGE 6-HR	24-HR	72-HR	24.92-HR
30.	13.67	23.	11.	10.	10.

PEAK STAGE (FEET)	TIME (HR)	MAXIMUM AVERAGE STAGE 6-HR	24-HR	72-HR	24.92-HR
1030.14	13.67	1029.91	1029.43	1029.42	1029.42

CUMULATIVE AREA = 8.46 SQ MI

1

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	SUBWD	329.	12.50	57.	15.	15.	.37		
ROUTED TO	RTWDXA	310.	12.75	57.	15.	15.	.37		
HYDROGRAPH AT	SUBXA	395.	12.17	60.	18.	18.	.25		
2 COMBINED AT	CPXA1	452.	12.50	117.	34.	32.	.62		
ROUTED TO	RSXA	445.	12.58	117.	34.	32.	.62		
DIVERSION TO	DIZZ1	0.	.00	0.	0.	0.	.62		
HYDROGRAPH AT	CPZZ1	445.	12.58	117.	34.	32.	.62		
ROUTED TO	RTXAWC	424.	13.17	116.	33.	32.	.62		
HYDROGRAPH AT	SUBWB	791.	12.42	156.	46.	45.	.67		
ROUTED TO	RTWBWC	764.	12.58	156.	46.	45.	.67		
HYDROGRAPH AT	SUBWC	609.	12.33	113.	35.	33.	.47		
3 COMBINED AT	CPWC	1325.	12.50	379.	113.	109.	1.76		
ROUTED TO	RSWC	1126.	12.83	372.	104.	100.	1.76		
DIVERSION TO	DIQE	0.	.00	0.	0.	0.	1.76		

HYDROGRAPH AT	CPWC2	1126.	12.83	372.	104.	100.	1.76
ROUTED TO	RTWCWA	1091.	13.33	371.	102.	99.	1.76
HYDROGRAPH AT	SUBVD	826.	12.33	162.	48.	47.	.70
ROUTED TO	RTVDWA	730.	12.67	161.	48.	46.	.70
HYDROGRAPH AT	SUBWA	868.	12.17	115.	33.	32.	.49
3 COMBINED AT	CPWA	1540.	13.17	623.	181.	174.	2.95
ROUTED TO	RSWA	1520.	13.25	623.	180.	173.	2.95
DIVERSION TO	DIQD	0.	.00	0.	0.	0.	2.95
HYDROGRAPH AT	CPWA2	1520.	13.25	623.	180.	173.	2.95
ROUTED TO	RTWAVC	1494.	13.58	622.	178.	172.	2.95
HYDROGRAPH AT	SUBVB	1340.	12.58	305.	84.	81.	.72
ROUTED TO	RTVBVC	1195.	13.00	304.	83.	80.	.72
HYDROGRAPH AT	SUBVC	683.	12.17	96.	30.	28.	.49
3 COMBINED AT	CPVC	2369.	13.42	1000.	288.	277.	4.16
ROUTED TO	RSVC	2328.	13.50	935.	262.	252.	4.16
DIVERSION TO	DIVA	630.	13.50	271.	78.	75.	4.16
HYDROGRAPH AT	CPVC2	1698.	13.50	664.	184.	177.	4.16
ROUTED TO	RTVCQA	1671.	13.75	656.	183.	176.	4.16
HYDROGRAPH AT	SUBUD	784.	12.50	162.	43.	41.	.78
DIVERSION TO	DIUA	190.	12.50	40.	11.	10.	.78
HYDROGRAPH AT	CPUD	594.	12.50	122.	32.	31.	.78
ROUTED TO	RTUDVA	486.	13.08	122.	32.	31.	.78
HYDROGRAPH AT	SUBVA	809.	12.17	121.	39.	38.	.49
HYDROGRAPH AT	CPVA	630.	13.50	271.	78.	75.	4.16
ROUTED TO	RTDIVA	620.	14.00	266.	77.	74.	4.16
3 COMBINED AT	CPVA2	918.	13.67	485.	148.	143.	1.27
ROUTED TO	RSVA	897.	13.83	483.	142.	136.	1.27
ROUTED TO	RTVAUC	873.	14.42	479.	139.	134.	1.27
HYDROGRAPH AT	SUBUA	646.	12.42	119.	33.	32.	.56
HYDROGRAPH AT	CPUA	190.	12.50	40.	11.	10.	.78

ROUTED TO	RTDIUA	86.	14.67	38.	10.	10.	.78
2 COMBINED AT	CPUA1	646.	12.42	150.	43.	42.	1.33
DIVERSION TO	DITB1	128.	12.42	30.	9.	8.	1.33
HYDROGRAPH AT	CPUA2	513.	12.42	119.	34.	33.	1.33
ROUTED TO	RTUAUC	399.	12.92	117.	34.	33.	1.33
HYDROGRAPH AT	SUBUC	636.	12.25	105.	29.	28.	.48
3 COMBINED AT	CPUC	1164.	12.92	663.	198.	191.	7.10
ROUTED TO	RSUC	1126.	13.00	660.	194.	187.	7.10
ROUTED TO	RTUCUB	1119.	13.08	659.	193.	186.	7.10
HYDROGRAPH AT	SUBUB	182.	12.25	29.	8.	8.	.14
2 COMBINED AT	CPUB	1153.	13.08	681.	201.	194.	7.24
ROUTED TO	RSUB	1068.	13.33	642.	189.	182.	7.24
DIVERSION TO	DIUE	48.	13.33	17.	4.	4.	7.24
HYDROGRAPH AT	CPUB1	1020.	13.33	625.	184.	178.	7.24
ROUTED TO	RUBSF1	1013.	13.50	623.	183.	176.	7.24
HYDROGRAPH AT	DITB1	128.	12.42	30.	9.	8.	1.33
DIVERSION TO	DITB2	120.	12.33	30.	8.	8.	1.33
HYDROGRAPH AT	DITB1A	8.	12.42	0.	0.	0.	1.33
HYDROGRAPH AT	TB1	241.	12.25	36.	11.	10.	.17
2 COMBINED AT	COTB1	238.	12.25	36.	10.	10.	1.50
ROUTED TO	RTBSF1	171.	12.83	36.	10.	10.	1.50
HYDROGRAPH AT	SF1	103.	12.42	14.	3.	3.	.13
3 COMBINED AT	CPSF1	1099.	13.42	648.	196.	189.	8.88
ROUTED TO	RSFSF1	1090.	13.58	647.	195.	188.	8.88
HYDROGRAPH AT	TB2	620.	12.58	149.	43.	42.	.72
HYDROGRAPH AT	DITB2	120.	12.33	30.	8.	8.	1.33
ROUTED TO	RTDITB	99.	13.17	29.	8.	8.	1.33
2 COMBINED AT	CPTB2	630.	12.67	174.	51.	49.	2.19
DIVERSION TO	DITA	153.	12.67	43.	13.	12.	2.19
HYDROGRAPH AT	CPTB2	477.	12.67	131.	39.	37.	2.19

+	ROUTED TO	RTBSF2	446.	13.17	130.	38.	37.	2.19
	HYDROGRAPH AT	SF2	220.	12.58	44.	11.	11.	.25
+	3 COMBINED AT	CPSF2	1494.	13.50	795.	243.	234.	8.46
+	ROUTED TO	RSSF2	1451.	13.67	790.	237.	228.	8.46

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

```
1*************************************
 *                                   *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)*
 *             JUN   1998            *
 *           VERSION 4.1             *
 *                                   *
 * RUN DATE   27NOV00  TIME  14:30:00 *
 *                                   *
 *************************************
```

```
*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*          (916) 756-1104           *
*                                   *
*************************************
```

```
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
```

PROPOSED CONDITIONS

24-HOUR

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


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

  1           ID   FILENAME:    TGT24P.DAT      PROPOSED CONDITIONS
  2           ID                                WITH ADDITION OF DIVERT AT PIPE
  3           ID                                WITH MODIFICATION TO RSSF2
  4           ID   TARGET SW DISTRIBUTION CENTER WATERSHED RAINFALL-RUNOFF MODEL.
  5           ID   HOSKIN ENGINEERING CONSULTANTS, INC. JOB NO.   00-043
  6           ID   NOVEMBER 22, 2000
  7           ID   100-YR 24-HOUR PRECIPITATION.
              *DIAGRAM
  8           IT       5            1200     300
  9           IO       5
              * ****************************************************************
 10           IN      15
 11           JD    3.99    0.01
 12           PC    .000    .002    .005    .008    .011    .014    .017    .020    .023    .026
 13           PC    .029    .032    .035    .038    .041    .044    .048    .052    .056    .060
 14           PC    .064    .068    .072    .076    .080    .085    .090    .095    .100    .105
 15           PC    .110    .115    .120    .126    .133    .140    .147    .155    .163    .172
 16           PC    .181    .191    .203    .218    .236    .257    .283    .387    .663    .707
 17           PC    .735    .758    .776    .791    .804    .815    .825    .834    .842    .849
 18           PC    .856    .863    .869    .875    .881    .887    .893    .898    .903    .908
 19           PC    .913    .918    .922    .926    .930    .934    .938    .942    .946    .950
 20           PC    .953    .956    .959    .962    .965    .968    .971    .974    .977    .980
 21           PC    .983    .986    .989    .992    .995    .998   1.000
 22           JD    3.75      10
 23           JD    3.63      20
 24           JD    3.59      30
 25           JD    3.51      40
 26           JD    3.47      50
 27           JD    3.43      60
              * ****************************************************************

 28           KK   SUBWD
 29           KM   BASIN SUBWD
 30           KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 31           KM    L=        .7  Lca=        .4   S=   11.1  Kn= .079  LAG=  43.1
 32           KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
 33           BA     .37
 34           LG     .21     .19    6.80     .19    9.00
 35           UI     31.     38.     80.    161.    182.    237.    264.    264.    247.    224.
 36           UI    213.    172.    143.    110.     91.     78.     54.     45.     38.     29.
 37           UI     28.     18.     18.     18.      6.      4.      4.      4.      4.      4.
 38           UI      4.      4.      4.      4.      4.      4.      4.      4.      0.      0.
 39           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 40           KK  RTWDXA
 41           KM        ROUTE FLOW FROM CPWD TO CPXA (ALONG 27TH AVENUE).
 42           KM        TYPE A CHANNEL
 43           RS       4              -1       0
 44           RC    .025    .025    .025    2500   .0016
 45           RX       0     100     400     500   500.1     600     900    1000
 46           RY       5       4       1      -0       0       1       4       5
```

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

 47           KK   SUBXA
 48           KM   BASIN SUBXA
 49           KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 50           KM    L=        .8  Lca=        .4   S=   10.5  Kn= .041  LAG=  23.6
 51           KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
 52           BA     .25
 53           LG     .12      .15     9.70      .06   45.00
 54           UI     39.     128.     247.     312.    310.     271.     200.     129.      94.      56.
 55           UI     40.      28.      22.       9.      5.       5.       5.       5.       5.       5.
 56           UI      5.       0.       0.       0.      0.       0.       0.       0.       0.       0.
 57           UI      0.       0.       0.       0.      0.       0.       0.       0.       0.       0.

 58           KK   CPXA1
 59           KM        ADD HYDROGRAPHS AT CPXA
 60           HC       2

 61           KK    RSXA
 62           KM   MODIFIED PULS ROUTING THROUGH PONDING BEHIND SPRR.
 63           KO       5
 64           RS       1    STOR       0       0
 65           SV     .01      .07     1.0     5.1    14.0    28.5    50.0    79.1   117.4   165.0
 66           SE  1063.3  1063.5  1063.6  1064.1  1064.6  1065.1  1065.6  1066.1  1066.6  1067.1
 67           SQ       0       15      43     455    1751    3879    6999   11192   17236   25382

 68           KK   CPZZ1
 69           KM        DIVERT FLOW FROM CPXA SOUTHWARD OVER SPRR
 70           DT   DIZZ1
 71           DI       0       0      43     455    1751    3879    6999   11192   17236   25382
 72           DQ       0       0       0       0       0       0       0      44     960    3141
              * SUB-BASIN ZZ1 DOES NOT EXIST

 73           KK  RTXAWC
 74           KM        ROUTE FLOW FROM CPXA TO CPWC (ALONG SPRR).
 75           KM        TYPE C CHANNEL
 76           RS       9              -1       0
 77           RC    .035    .035    .035    5100   .0016
 78           RX       0      20      35      50    50.1     250     450     550
 79           RY       5       5     2.5       0       0       2       4       5

 80           KK   SUBWB
 81           KM   BASIN SUBWB
 82           KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 83           KM    L=       1.2  Lca=        .6   S=   12.0  Kn= .048  LAG=  37.2
 84           KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
 85           BA     .67
 86           LG     .16      .15     9.70      .06   36.00
 87           UI     67.      99.     234.     377.    467.     558.     561.     509.     488.     383.
 88           UI    345.     242.     196.     156.    111.      85.      69.      61.      40.      38.
 89           UI     33.       8.       8.       8.      8.       8.       8.       8.       8.       8.
 90           UI      8.       8.       8.       0.      0.       0.       0.       0.       0.       0.
 91           UI      0.       0.       0.       0.      0.       0.       0.       0.       0.       0.
                                             HEC-1 INPUT                                                    PAGE  3
1

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

 92           KK  RTWBWC
 93           KM        ROUTE FLOW FROM CPWB TO CPWC (ALONG 35TH AVENUE).
 94           KM        TYPE A CHANNEL
 95           RS       3              -1       0
 96           RC    .025    .025    .025    2000   .0020
 97           RX       0     100     400     500   500.1     600     900    1000
 98           RY       5       4       1       0       0       1       4       5

 99           KK   SUBWC
100           KM   BASIN SUBWC
101           KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
102           KM    L=       1.2  Lca=        .6   S=    6.0  Kn= .037  LAG=  32.9
103           KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
104           BA     .47
105           LG     .15      .16     9.70      .06   45.00
106           UI     53.      89.     237.     320.    422.     443.     412.     386.     296.     248.
107           UI    174.     147.      93.      72.     56.      48.      30.      30.      16.       7.
108           UI      7.       7.       7.       7.      7.       7.       7.       7.       7.       0.
109           UI      0.       0.       0.       0.      0.       0.       0.       0.       0.       0.
110           UI      0.       0.       0.       0.      0.       0.       0.       0.       0.       0.

111           KK    CPWC
112           KM        ADD HYDROGRAPHS AT CPWC.
113           HC       3

114           KK    RSWC
115           KM   MODIFIED PULS ROUTING THROUGH PONDING BEHIND SPRR.
116           KO       5
117           RS       1    STOR       0       0
118           SV    16.1    27.6    44.0    65.2    90.7   121.5   159.6   206.8   263.7   329.5
```

```
119        SE  1057.1  1057.6  1058.1  1058.6  1059.1  1059.6  1060.1  1060.6  1061.1  1061.6
120        SQ       0     115     608    1579    3086    5253    8972   15024   23745   35057

121        KK   CPWC2
122        KM        DIVERT FLOW FROM CPWC TO CPQE
123        DT    DIQE
124        DI       0     115     608    1579    3086    5253    8972   15024   23745   35057
125        DQ       0       0       0       0       0      40     951    3350    7104   12173

126        KK  RTWCWA
127        KM        ROUTE FLOW FROM CPWC TO CPWA (ALONG SPRR).
128        KM        TYPE C CHANNEL
129        RS       9              -1       0
130        RC    .035    .035    .035    5200   .0012
131        RX       0      20      35      50    50.1     250     450     550
132        RY       5       5     2.5       0       0       2       4       5

133        KK   SUBVD
134        KM   BASIN SUBVD
135        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
136        KM    L=      1.2  Lca=       .6   S=    9.9  Kn= .044  LAG=  36.5
137        KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
138        BA     .70
139        LG     .15     .16    9.70     .06   38.00
```



```
1                                   HEC-1 INPUT

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

140        UI     70.    106.    257.    396.    506.    591.    591.    522.    526.    375.
141        UI    336.    242.    210.    138.    109.     87.     66.     58.     40.     40.
142        UI     22.      9.      9.      9.      9.      9.      9.      9.      9.      9.
143        UI      9.      9.      0.      0.      0.      0.      0.      0.      0.      0.
144        UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

145        KK  RTVDWA
146        KM        ROUTE FLOW FROM CPVD TO CPWA (ALONG 43RD AVENUE).
147        KM        TYPE B CHANNEL
148        RS       3              -1       0
149        RC      .1     .02      .1    2000   .0030
150        RX       0     470     476     480     520     524     530    1000
151        RY     4.7       0       0       1       1       0       0     4.7

152        KK   SUBWA
153        KM   BASIN SUBWA
154        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
155        KM    L=      1.1  Lca=       .6   S=    9.1  Kn= .025  LAG=  19.6
156        KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
157        BA     .49
158        LG     .22     .17   10.10     .04   28.00
159        UI    110.    403.    674.    766.    643.    454.    291.    162.    103.     69.
160        UI     51.     12.     12.     12.     12.     12.     12.      0.      0.      0.
161        UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

162        KK    CPWA
163        KM        ADD HYDROGRAPHS AT CPWA.
164        HC       3

165        KK    RSWA
166        KM   MODIFIED PULS ROUTING THROUGH PONDING BEHIND SPRR.
167        KO       5
168        RS       1    STOR       0       0
169        SV     1.3     1.9     2.4     3.1     4.0     8.5    16.7    29.9    48.5    74.4
170        SE  1050.7  1050.9  1051.1  1051.3  1051.4  1051.9  1052.4  1052.9  1053.4  1053.9
171        SQ       0       6      35     111     167     810    2025    3817    6199    9237

172        KK   CPWA2
173        KM        DIVERT FLOW FROM CPWA TO CPQD OVER SPRR
174        DT    DIQD
175        DI       0     810    9237   10710
176        DQ       0       0       0      63

177        KK  RTWAVC
178        KM        ROUTE FLOW FROM CPWA TO CPVC (ALONG SPRR).
179        KM        TYPE C CHANNEL
180        RS       8              -1       0
181        RC    .035    .035    .035    5000   .0028
182        RX       0      20      35      50    50.1     250     450     550
183        RY       5       5     2.5       0       0       2       4       5
```



```
1                                   HEC-1 INPUT

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

184        KK   SUBVB
185        KM   BASIN SUBVB
186        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
187        KM    L=      1.1  Lca=       .6   S=   11.8  Kn= .067  LAG=  49.9
188        KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
189        BA    0.72
190        LG     .37     .09    9.70     .07   17.00
```

```
191          UI    106.    106.    212.    414.    612.    633.    818.    891.    891.    888.
192          UI    742.    779.    645.    595.    468.    385.    307.    314.    201.    171.
193          UI    141.    129.     97.     97.     69.     60.     60.     58.     13.     13.
194          UI     13.     13.     13.     13.     13.     13.     13.     13.     13.     13.
195          UI     13.     13.     13.     13.      0.      0.      0.      0.      0.      0.
196          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

197          KK  RTVBVC
198          KM        ROUTE FLOW FROM CPVB TO CPVC (ALONG 51ST AVENUE).
199          KM        TYPE B CHANNEL
200          RS       4              -1       0
201          RC      .1     .02      .1    2400   .0017
202          RX       0     470     476     480     520     524     530    1000
203          RY     4.7       0       0       1       1       0       0     4.7

204          KK   SUBVC
205          KM   BASIN SUBVC
206          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
207          KM    L=      1.1  Lca=       .5   S=    8.5  Kn= .028  LAG=  21.6
208          KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
209          BA     .49
210          LG     .15     .17    8.80     .07   44.00
211          UI     77.    268.    466.    588.    524.    431.    285.    190.    111.     75.
212          UI     52.     40.     12.      9.      9.      9.      9.      9.      9.      0.
213          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
214          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

215          KK    CPVC
216          KM        ADD HYDROGRAPHS AT CPVC.
217          HC       3

218          KK    RSVC
219          KM   MODIFIED PULS ROUTING THROUGH PONDING BEHIND SPRR.
220          KO       5
221          RS       1    STOR       0       0
222          SV      49      59      70      83      97     113     149     170     192     216
223          SE  1051.0  1051.2  1051.4  1051.6  1051.8  1052.0  1052.4  1052.6  1052.8  1053.0
224          SQ       9     129     425     944    1729    2822    6117    8287   10832   13747

225          KK   CPVC2
226          KM        DIVERT FLOW FROM CPVC TO CPVA OVER 51st AVE.
227          DT    DIVA
228          DI       0       9     654    2822    7159
229          DQ       0       4     214     753    1814
                                          HEC-1 INPUT                                          PAGE  6

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

230          KK  RTVCQA
231          KM        ROUTE FLOW FROM CPVC TO CPQA (ALONG SPRR).
232          KM        TYPE B CHANNEL
233          RS       3              -1       0
234          RC      .1     .02      .1    2000    .003
235          RX       0     470     476     480     520     524     530    1000
236          RY     4.7       0       0       1       1       0       0     4.7
             * ************************************************************************

237          KK   SUBUD
238          KM   BASIN SUBUD
239          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
240          KM    L=      1.3  Lca=       .6   S=   20.0  Kn= .060  LAG=  44.7
241          KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
242          BA     .78
243          LG     .37     .11    9.70     .06   11.00
244          UI     64.     73.    155.    302.    366.    470.    532.    538.    532.    448.
245          UI    488.    336.    346.    248.    195.    195.    122.    103.     83.     72.
246          UI     58.     52.     36.     36.     36.      9.      8.      8.      8.      8.
247          UI      8.      8.      8.      8.      8.      8.      8.      8.      8.      8.
248          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
249          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

250          KK    CPUD
251          KM        DIVERT 25% OF FLOW FROM CPUD TO CPUA.
252          DT    DIUA
253          DI       0      25      50      75     100     150     200
254          DQ       0       6      13      19      25      38      50

255          KK  RTUDVA
256          KM        ROUTE FLOW FROM CPUD TO CPVA (ALONG 59TH AVENUE).
257          KM        TYPE B CHANNEL
258          RS       4              -1       0
259          RC      .1     .02      .1    2600   .0019
260          RX       0     470     476     480     520     524     530    1000
261          RY     4.7       0       0       1       1       0       0     4.7

262          KK   SUBVA
263          KM   BASIN SUBVA
264          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
265          KM    L=      1.1  Lca=       .5   S=    8.5  Kn= .029  LAG=  22.3
```

```
266        KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
267        BA     .49
268        LG     .09     .15    8.40     .10   60.00
269        UI     87.    291.    531.    681.    622.    522.    375.    246.    143.     97.
270        UI     70.     46.     28.     10.     10.     10.     10.     10.     10.      0.
271        UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
272        UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
                                        HEC-1 INPUT                                          PAGE  7

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


273        KK    CPVA
274        KM        RETURN DIVERT FROM CPVC
275        DR    DIVA

276        KK  RTDIVA
277        KM        ROUTE DIVERT TO CPVA
278        KM        TYPE C CHANNEL
279        RS       9              -1       0
280        RC    .035    .035    .035    5200   .0015
281        RX       0      20      35      50    50.1     250     450     550
282        RY       5       5     2.5       0       0       2       4       5

283        KK   CPVA2
284        KM        ADD HYDROGRAPHS AT CPVA.                                              HC
285        HC       3

286        KK    RSVA
287        KM   MODIFIED PULS ROUTING THROUGH PONDING BEHIND SPRR.
288        KO       5
289        RS       1    STOR       0       0
290        SV    10.3    13.3    15.6    23.9    34.6    48.9    67.7    90.8   118.6   140.8
291        SE  1044.2  1044.3  1044.5  1045.0  1045.5  1046.0  1046.5  1047.0  1047.5  1047.8
292        SQ       0       4      70     593    1618    3189    6809   12640   20432   26055

293        KK  RTVAUC
294        KM        ROUTE FLOW FROM CPVA TO CPUC
295        KM        TYPE C FLOW
296        RS       9              -1       0
297        RC    .035    .035    .035    5200   .0012
298        RX       0      20      35      50    50.1     250     450     550
299        RY       5       5     2.5       0       0       2       4       5
           * ***********************************************************************

300        KK   SUBUA
301        KM   BASIN SUBUA
302        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
303        KM    L=      1.2  Lca=       .6   S=   14.9  Kn= .049  LAG=  36.7
304        KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
305        BA     .56
306        LG     .24     .16    9.70     .06   20.00
307        UI     56.     84.    203.    316.    400.    471.    471.    419.    419.    302.
308        UI    275.    196.    166.    116.     88.     69.     54.     48.     32.     32.
309        UI     21.      7.      7.      7.      7.      7.      7.      7.      7.      7.
310        UI      7.      7.      0.      0.      0.      0.      0.      0.      0.      0.
311        UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

312        KK    CPUA
313        KM        RETURN DIVERT FROM CPUD
314        DR    DIUA
                                        HEC-1 INPUT                                          PAGE  8
1
LINE       ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


315        KK  RTDIUA
316        KM        ROUTE DIVERT TO CPUA
317        KM        TYPE B CHANNEL
318        RS       8              -1       0
319        RC      .1     .02      .1    5000   .0014
320        RX       0     470     476     480     520     524     530    1000
321        RY     4.7       0       0       1       1       0       0     4.7

322        KK   CPUA1
323        KM        ADD HYDROGRAPHS AT CPUA
324        HC       2   1.334

325        KK   CPUA2
326        KM        DIVERT 20% OF FLOW FROM CPUA TO CPTB
327        DT   DITB1
328        DI       0      25      50      75     100     150     200
329        DQ       0       5      10      15      20      30      40

330        KK  RTUAUC
331        KM        ROUTE FLOW FROM CPUA TO CPUC (ALONG 67TH AVENUE).
332        KM        TYPE B CHANNEL
333        RS       4              -1       0
334        RC      .1     .02      .1    2400   .0017
335        RX       0     470     476     480     520     524     530    1000
```

```
336          RY     4.7       0       0       1       1       0       0     4.7

337          KK   SUBUC
338          KM   BASIN SUBUC
339          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
340          KM    L=       1.0  Lca=        .5   S=   12.7  Kn= .044  LAG=  30.5
341          KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
342          BA     .48
343          LG     .26      .15     9.70      .06   22.00
344          UI     59.     114.     300.     386.    475.    492.    418.    384.    304.    206.
345          UI    170.     105.      81.      61.     50.     33.     33.      9.      7.      7.
346          UI      7.       7.       7.       7.      7.      7.      7.      0.      0.      0.
347          UI      0.       0.       0.       0.      0.      0.      0.      0.      0.      0.

348          KK    CPUC
349          KM        ADDHYDROGRAPHS AT CPUC
350          HC       3   7.101

351          KK    RSUC
352          KM        ROUTE FLOW FROM CPUC TO CPUB OVER 67th AVE.
353          KO       5
354          RS       1    STOR       0       0
355          SV     4.8     6.9     9.9    19.0    33.0    52.6    77.4   108.7   148.6   172.0
356          SE  1036.2  1036.3  1036.5  1037.0  1037.5  1038.0  1038.5  1039.0  1039.5  1040.0
357          SQ       0       5      77     789    2369    4778    8161   12516   18033   23378
```



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

358          KK  RTUCUB
359          KM        ROUTE FLOW FROM CPUC TO CPUB
360          KM        TYPE C CHANNEL
361          RS       2              -1       0
362          RC    .035    .035    .035    .1400   .0043
363          RX       0      20      35      50    50.1     250     450     550
364          RY       5       5     2.5       0       0       2       4       5

365          KK   SUBUB
366          KM   BASIN SUBUB
367          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
368          KM    L=        .8  Lca=        .4   S=   16.2  Kn= .048  LAG=  30.3
369          KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
370          BA     .14
371          LG     .22      .14     8.80      .08   23.00
372          UI     17.      33.      86.     110.    136.    140.    119.    107.     85.     58.
373          UI     47.      29.      23.      17.     14.      9.      9.      2.      2.      2.
374          UI      2.       2.       2.       2.      2.      2.      2.      0.      0.      0.
375          UI      0.       0.       0.       0.      0.      0.      0.      0.      0.      0.

376          KK    CPUB
377          KM        ADD HYDROGRAPHS AT CPUB
378          HC       2

379          KK    RSUB
380          KM        STORAGE ROUTING AT CPUB (69TH AVE.)
381          KO       5
382          RS       1    STOR       0       0
383          SV      18      28      41      59      82     108
384          SE  1035.5  1036.0  1036.5  1037.0  1037.5    1038
385          SQ       1      85     494    1710    4700    9466

386          KK   CPUB1
387          KM        DIVERT FLOW FROM CPUB TO CPUE OVER SPRR.
388          DT    DIUE
389          DI       0     1.2    85.4   493.7  1710.3  4699.8  9465.7
390          DQ       0       0       0       0   101.6   887.6  2402.3

391          KK  RUBSF1
392          KM        ROUTE FLOW FROM CPUB TO CPSF1
393          KM        TYPE C CHANNEL
394          RS       5              -1       0
395          RC    .035    .035    .035    1373   .0007
396          RX       0      20      35      50    50.1     250     450     550
397          RY       5       5     2.5       0       0       2       4       5

398          KK   DITB1
399          KM   RETRIEVE FLOW ALONG VAN BUREN
400          DR   DITB1
```



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

401          KK  DITB1A
402          KM   FIRST 120 CFS FLOWS WEST WITHIN PIPE AND STREET
403          DT   DITB2
404          DI       0     120    1000    5000
405          DQ       0     120     120     120
```

```
406          KK     TB1
407          KM   BASIN TB1
408          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
409          KM    L=       0.7  Lca=        .4   S=   10.2  Kn= .046  LAG=  27.2
410          KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
411          BA     .17
412          LG     .21      .19     8.80      .07    28.00
413          UI     23.      54.     126.     172.     191.     173.     156.     119.      79.      62.
414          UI     39.      28.      21.      15.      13.       5.       3.       3.       3.       3.
415          UI      3.       3.       3.       3.       0.       0.       0.       0.       0.       0.
416          UI      0.       0.       0.       0.       0.       0.       0.       0.       0.       0.

417          KK   COTB1
418          KM  COMBINE TB1 AND EXCESS FLOW ALONG VAN BUREN
419          HC       2

420          KK  RTBSF1
421          KM        ROUTE FLOW FROM CPTB1 TO CPSF1
422          KM        TYPE C CHANNEL
423          RS       5              -1        0
424          RC    .035     .035     .035    2814    .0007
425          RX       0       20       35      50     50.1      250      450      550
426          RY       5        5      2.5       0        0        2        4        5
             * ****************************************

427          KK     SF1
428          KM   BASIN SF1
429          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
430          KM    L=       0.5  Lca=        .   S=    9.2  Kn= .100  LAG=  46.9
431          KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
432          BA     .13
433          LG     .50      .15     9.70      .07      .00
434          UI     10.      10.      22.      44.      57.      71.      75.      83.      83.      75.
435          UI     11.       9.       8.       6.       6.       6.       2.       1.       1.       1.
436          UI      1.       1.       1.       1.       1.       1.       1.       1.       1.       1.
437          UI      1.       1.       0.       0.       0.       0.       0.       0.       0.       0.
438          UI      0.       0.       0.       0.       0.       0.       0.       0.       0.       0.

439          KK   CPSF1
440          KM        ADD HYDROGRAPH AT CPSF1
441          HC       3

442          KK  RSFSF1
443          KM        ROUTE FLOW FROM CPSF1 TO CPSF2
444          KM        TYPE C CHANNEL
445          RS       5              -1        0
446          RC    .035     .035     .035    1427    .0007
447          RX       0       20       35      50     50.1      250      450      550
```



```
1                                   HEC-1 INPUT

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

448          RY       5        5      2.5       0        0        2        4        5

449          KK     TB2
450          KM   BASIN TB2
451          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
452          KM    L=       2.0  Lca=     0.9   S=   10.2  Kn= .046  LAG=  53.4
453          KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
454          BA     .72
455          LG     .25      .18     8.80      .08    28.0
456          UI     50.      50.      91.     156.     277.     273.     376.     392.     416.     416.
457          UI    394.     347.     375.     282.     281.     219.     184.     145.     151.     102.
458          UI     84.      74.      61.      53.      45.      44.      28.      28.      28.      26.
459          UI      6.       6.       6.       6.       6.       6.       6.       6.       6.       6.
460          UI      6.       6.       6.       6.       6.       0.       0.       0.       0.       0.
461          UI      0.       0.       0.       0.       0.       0.       0.       0.       0.       0.

462          KK   DITB2
463          KM   RETRIEVE FLOW WEST ALONG VAN BUREN
464          DR   DITB2

465          KK  RTDITB
466          KM        ROUTE DIVERT TO CPTB2, THROUGH PIPE AND CHANNEL TO 75TH & VAN BUREN
467          KM        TYPE A CHANNEL
468          RS       9              -1        0
469          RC    .025     .025     .025    5200    .0019
470          RX       0      100      400     500     500.1      600      900     1000
471          RY       5        4        1       0        0        1        4        5

472          KK   CPTB2
473          KM        ADD HYDROGRAPH AT CPTB2 = COMBINE FLOW AT 75TH & VAN BUREN
474          HC       2    2.192

475          KK   CPTB2
476          KM        DIVERT 25% OF FLOW TO CPTA
477          DT    DITA
478          DI       0       25       50       75      100      150      200
479          DQ       0        6       13       19       25       38       50
```

```
480          KK  RTBSF2
481          KM        ROUTE FLOW FROM CPTB2 TO CPSF2 (ALONG 75TH AVENUE).
482          KM        TYPE B CHANNEL
483          RS       4              -1        0
484          RC      .1      .02      .1     2160    .0023
485          RX       0      470     476      480      520      524      530     1000
486          RY     4.7        0       0        1        1        0        0      4.7
             *   BEGIN CHANGES 11-21-00

487          KK    SF2B
488          KM    BASIN SF2B
489          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
490          KM    L=        .5  Lca=        .3   S=     5.9  Kn= .020  LAG=  9.3
491          KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
492          BA    0.11
493          LG    0.15    0.15    9.70    0.07   50.00
494          UI     124     336     234      88      33       9       5       5       0       0
```



```
1                                          HEC-1 INPUT

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

495          UI       0       0       0       0       0       0       0       0       0       0
             *

496          KK    SF2A
497          KM    BASIN SF2A
498          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
499          KM    L=        .6  Lca=        .2   S=     5.9  Kn= .020  LAG=  9.6
500          KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
501          BA    0.14
502          LG    0.15    0.15    9.70    0.07   80.00
503          UI     154     426     314     124      47      16       7       7       0       0
504          UI       0       0       0       0       0       0       0       0       0       0
             *

505          KK  RSSF2A
506          KM    RETENTION STORAGE AT SF2A, RETENTION BASINS 1,2,3
507          KO       3
508          RS       1    STOR       0       0
509          SA    5.57    6.03    6.50    6.98    6.56    8.03   12.56   20.42   28.51   37.89
510          SE       0       1       2       3       4       5       6       7       8       9
511          SQ       0       0       0       0       0       0       0       0       0     300
             *

512          KK  CPSF2B
513          KM        ADD HYDROGRAPHS AT CPSF2B
514          HC       4   8.464
             *

515          KK  RSSF2B
516          KM    RETENTION STORAGE AT CPSF2B, RETENTION BASIN 4
517          KO       3
518          RS       1    STOR       0       0
519          SA    1.10    8.75   14.39   15.08   26.14   28.46   37.36
520          SE      26      27      28      29      30      31      32
521          SQ       0       0       0       0  861.51 5728.16 14050.2
             *   END CHANGES 11-21-00
522          ZZ
```

```
1
        SCHEMATIC DIAGRAM OF STREAM NETWORK

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

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

   28      SUBWD
              V
              V
   40     RTWDXA
              .
              .
   47          .        SUBXA
               .           .
               .           .
   58      CPXA1............
              V
              V
   61       RSXA
              .
              .
   70          .-------->   DIZZ1
   68      CPZZ1
              V
              V
   73     RTXAWC
              .
              .
   80          .        SUBWB
               .           V
               .           V
```

```
92          .      RTWBWC
            .          .
            .          .
99          .          .       SUBWC
            .          .          .
            .          .          .
111       CPWC.......................
            V
            V
114       RSWC
            .
            .
123         .------->    DIQE
121     CPWC2
            V
            V
126    RTWCWA
            .
            .
133         .      SUBVD
            .          V
            .          V
145         .     RTVDWA
            .          .
            .          .
152         .          .       SUBWA
            .          .          .
            .          .          .
162       CPWA.......................
            V
            V
165       RSWA
            .
            .
174         .------->    DIQD
172     CPWA2
            V
            V
177    RTWAVC
            .
            .
184         .      SUBVB
            .          V
            .          V
197         .     RTVBVC
            .          .
            .          .
204         .          .       SUBVC
            .          .          .
            .          .          .
215       CPVC.......................
            V
            V
218       RSVC
            .
            .
227         .------->    DIVA
225     CPVC2
            V
            V
230    RTVCQA
            .
            .
237         .      SUBUD
            .          .
            .          .
252         .          .------->    DIUA
250         .      CPUD
            .          V
            .          V
255         .     RTUDVA
            .          .
            .          .
262         .          .       SUBVA
            .          .          .
            .          .          .
275         .          .          .          .<-------    DIVA
273         .          .          .       CPVA
            .          .          .          V
            .          .          .          V
276         .          .          .     RTDIVA
            .          .          .          .
            .          .          .          .
283         .      CPVA2.......................
            .          V
            .          V
286         .      RSVA
            .          V
            .          V
293         .     RTVAUC
```

```
300          SUBUA
                 .
                 .
314              .<-------    DIUA
312              .       CPUA
                 .          V
                 .          V
315              .     RTDIUA
                 .          .
                 .          .
322          CPUA1............
                 .
                 .
327              .-------->   DITB1
325          CPUA2
                 V
                 V
330         RTUAUC
                 .
                 .
337              .       SUBUC
                 .          .
                 .          .
348       CPUC........................
             V
             V
351       RSUC
             V
             V
358      RTUCUB
             .
             .
365          SUBUB
                 .
                 .
376       CPUB............
             V
             V
379       RSUB
             .
             .
388          .-------->    DIUE
386       CPUB1
             V
             V
391      RUBSF1
             .
             .
400              .<-------   DITB1
398          DITB1
                 .
                 .
403              .-------->   DITB2
401          DITB1A
                 .
                 .
406              .         TB1
                 .          .
                 .          .
417          COTB1............
                 V
                 V
420          RTBSF1
                 .
                 .
427              .         SF1
                 .          .
                 .          .
439       CPSF1........................
             V
             V
442      RSFSF1
             .
             .
449              TB2
                 .
                 .
464              .           .<-------   DITB2
462              .       DITB2
                 .          V
                 .          V
465              .      RTDITB
                 .          .
                 .          .
472          CPTB2............
                 .
                 .
477              .-------->    DITA
```

```
475          .          .        CPTB2
             .          .           V
             .          .           V
480          .          .       RTBSF2
             .          .           .
             .          .           .
487          .          .           .        SF2B
             .          .           .          .
             .          .           .          .
496          .          .           .          .        SF2A
             .          .           .          .           V
             .          .           .          .           V
505          .          .           .          .       RSSF2A
             .          .           .          .           .
             .          .           .          .           .
512          .      CPSF2B.......................................
             .          V
             .          V
515          .      RSSF2B
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                        *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)    *
*              JUN   1998                *
*           VERSION 4.1                  *
*                                        *
*  RUN DATE   27NOV00  TIME  14:30:00    *
*                                        *
******************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

```
                    FILENAME:    TGT24P.DAT      PROPOSED CONDITIONS
                                                 WITH ADDITION OF DIVERT AT PIPE
                                                 WITH MODIFICATION TO RSSF2
                    TARGET SW DISTRIBUTION CENTER WATERSHED RAINFALL-RUNOFF MODEL.
                    HOSKIN ENGINEERING CONSULTANTS, INC. JOB NO.   00-043
                    NOVEMBER 22, 2000
                    100-YR 24-HOUR PRECIPITATION.

  9 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       1200  STARTING TIME
                       NQ        300  NUMBER OF HYDROGRAPH ORDINATES
                   NDDATE      2   0  ENDING DATE
                   NDTIME       1255  ENDING TIME
                    ICENT         19  CENTURY MARK

                COMPUTATION INTERVAL     .08 HOURS
                     TOTAL TIME BASE   24.92 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

             **************
             *            *
505 KK       *    RSSF2A  *
             *            *
             **************

507 KO        OUTPUT CONTROL VARIABLES
                    IPRNT          3  PRINT CONTROL
                    IPLOT          0  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE

             HYDROGRAPH ROUTING DATA

508 RS        STORAGE ROUTING
                    NSTPS          1  NUMBER OF SUBREACHES
                     ITYP       STOR  TYPE OF INITIAL CONDITION
                   RSVRIC        .00  INITIAL CONDITION
                        X        .00 WORKING R AND D COEFFICIENT

509 SA              AREA        5.6       6.0       6.5       7.0       6.6       8.0      12.6      20.4      28.5
 37.9
```

510 SE	ELEVATION	.00	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00
9.00										
511 SQ	DISCHARGE	0.	0.	0.	0.	0.	0.	0.	0.	0.
.00.										

***

COMPUTED STORAGE-ELEVATION DATA

STORAGE	.00	5.80	12.06	18.80	25.57	32.85	43.06	59.39	83.75	116.84
ELEVATION	.00	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00

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

HYDROGRAPH AT STATION RSSF2A
TRANSPOSITION AREA .0 SQ MI

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)	(CFS)				
+ 0.	.00		0.	0.	0.	0.
		(INCHES)	.000	.000	.000	.000
		(AC-FT)	0.	0.	0.	0.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE 6-HR	24-HR	72-HR	24.92-HR
+ (AC-FT)	(HR)				
27.	24.50	26.	14.	14.	14.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE 6-HR	24-HR	72-HR	24.92-HR
+ (FEET)	(HR)				
4.18	24.67	4.09	2.27	2.19	2.19

CUMULATIVE AREA = .14 SQ MI

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

HYDROGRAPH AT STATION RSSF2A
TRANSPOSITION AREA 10.0 SQ MI

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)	(CFS)				
+ 0.	.00		0.	0.	0.	0.
		(INCHES)	.000	.000	.000	.000
		(AC-FT)	0.	0.	0.	0.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE 6-HR	24-HR	72-HR	24.92-HR
+ (AC-FT)	(HR)				
25.	24.50	25.	13.	13.	13.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE 6-HR	24-HR	72-HR	24.92-HR
+ (FEET)	(HR)				
3.94	24.67	3.85	2.14	2.06	2.06

CUMULATIVE AREA = .14 SQ MI

```
**************
*            *
*   RSSF2B   *
*            *
**************
```

517 KO OUTPUT CONTROL VARIABLES

IPRNT	3	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

HYDROGRAPH ROUTING DATA

518 RS STORAGE ROUTING

NSTPS	1	NUMBER OF SUBREACHES
ITYP	STOR	TYPE OF INITIAL CONDITION
RSVRIC	.00	INITIAL CONDITION
X	.00	WORKING R AND D COEFFICIENT

519 SA	AREA	1.1	8.8	14.4	15.1	26.1	28.5	37.4

520 SE	ELEVATION	26.00	27.00	28.00	29.00	30.00	31.00	32.00
521 SQ	DISCHARGE	0.	0.	0.	0.	862.	5728.	14050.

***

COMPUTED STORAGE-ELEVATION DATA

STORAGE	.00	4.32	15.77	30.50	50.86	78.15	110.96
ELEVATION	26.00	27.00	28.00	29.00	30.00	31.00	32.00

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

HYDROGRAPH AT STATION RSSF2B
TRANSPOSITION AREA .0 SQ MI

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+ 1594.	13.58	(CFS)	832.	245.	236.	236.
		(INCHES)	.914	1.075	1.075	1.075
		(AC-FT)	413.	485.	485.	485.

PEAK STORAGE (AC-FT)	TIME (HR)	MAXIMUM AVERAGE STORAGE 6-HR	24-HR	72-HR	24.92-HR
+ 55.	13.58	48.	23.	22.	22.

PEAK STAGE (FEET)	TIME (HR)	MAXIMUM AVERAGE STAGE 6-HR	24-HR	72-HR	24.92-HR
+ 30.15	13.58	29.83	28.20	28.12	28.12

CUMULATIVE AREA = 8.46 SQ MI

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

HYDROGRAPH AT STATION RSSF2B
TRANSPOSITION AREA 10.0 SQ MI

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+ 1428.	13.58	(CFS)	756.	224.	215.	215.
		(INCHES)	.831	.982	.982	.982
		(AC-FT)	375.	443.	443.	443.

PEAK STORAGE (AC-FT)	TIME (HR)	MAXIMUM AVERAGE STORAGE 6-HR	24-HR	72-HR	24.92-HR
+ 54.	13.58	47.	23.	22.	22.

PEAK STAGE (FEET)	TIME (HR)	MAXIMUM AVERAGE STAGE 6-HR	24-HR	72-HR	24.92-HR
+ 30.12	13.58	29.79	28.17	28.09	28.09

CUMULATIVE AREA = 8.46 SQ MI

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	SUBWD	329.	12.50	57.	15.	15.	.37		
+	ROUTED TO	RTWDXA	310.	12.75	57.	15.	15.	.37		
+	HYDROGRAPH AT	SUBXA	395.	12.17	60.	18.	18.	.25		
+	2 COMBINED AT	CPXA1	452.	12.50	117.	34.	32.	.62		
+	ROUTED TO	RSXA	445.	12.58	117.	34.	32.	.62		
+	DIVERSION TO	DIZZ1	0.	.00	0.	0.	0.	.62		

HYDROGRAPH AT	CPZZ1	445.	12.58	117.	34.	32.	.62
ROUTED TO	RTXAWC	424.	13.17	116.	33.	32.	.62
HYDROGRAPH AT	SUBWB	791.	12.42	156.	46.	45.	.67
ROUTED TO	RTWBWC	764.	12.58	156.	46.	45.	.67
HYDROGRAPH AT	SUBWC	609.	12.33	113.	35.	33.	.47
3 COMBINED AT	CPWC	1325.	12.50	379.	113.	109.	1.76
ROUTED TO	RSWC	1126.	12.83	372.	104.	100.	1.76
DIVERSION TO	DIQE	0.	.00	0.	0.	0.	1.76
HYDROGRAPH AT	CPWC2	1126.	12.83	372.	104.	100.	1.76
ROUTED TO	RTWCWA	1091.	13.33	371.	102.	99.	1.76
HYDROGRAPH AT	SUBVD	826.	12.33	162.	48.	47.	.70
ROUTED TO	RTVDWA	730.	12.67	161.	48.	46.	.70
HYDROGRAPH AT	SUBWA	868.	12.17	115.	33.	32.	.49
3 COMBINED AT	CPWA	1540.	13.17	623.	181.	174.	2.95
ROUTED TO	RSWA	1520.	13.25	623.	180.	173.	2.95
DIVERSION TO	DIQD	0.	.00	0.	0.	0.	2.95
HYDROGRAPH AT	CPWA2	1520.	13.25	623.	180.	173.	2.95
ROUTED TO	RTWAVC	1494.	13.58	622.	178.	172.	2.95
HYDROGRAPH AT	SUBVB	1340.	12.58	305.	84.	81.	.72
ROUTED TO	RTVBVC	1195.	13.00	304.	83.	80.	.72
HYDROGRAPH AT	SUBVC	683.	12.17	96.	30.	28.	.49
3 COMBINED AT	CPVC	2369.	13.42	1000.	288.	277.	4.16
ROUTED TO	RSVC	2328.	13.50	935.	262.	252.	4.16
DIVERSION TO	DIVA	630.	13.50	271.	78.	75.	4.16
HYDROGRAPH AT	CPVC2	1698.	13.50	664.	184.	177.	4.16
ROUTED TO	RTVCQA	1671.	13.75	656.	183.	176.	4.16
HYDROGRAPH AT	SUBUD	784.	12.50	162.	43.	41.	.78
DIVERSION TO	DIUA	190.	12.50	40.	11.	10.	.78
HYDROGRAPH AT	CPUD	594.	12.50	122.	32.	31.	.78
ROUTED TO	RTUDVA	486.	13.08	122.	32.	31.	.78

HYDROGRAPH AT	SUBVA	809.	12.17	121.	39.	38.	.49
HYDROGRAPH AT	CPVA	630.	13.50	271.	78.	75.	4.16
ROUTED TO	RTDIVA	620.	14.00	266.	77.	74.	4.16
3 COMBINED AT	CPVA2	918.	13.67	485.	148.	143.	1.27
ROUTED TO	RSVA	897.	13.83	483.	142.	136.	1.27
ROUTED TO	RTVAUC	873.	14.42	479.	139.	134.	1.27
HYDROGRAPH AT	SUBUA	646.	12.42	119.	33.	32.	.56
HYDROGRAPH AT	CPUA	190.	12.50	40.	11.	10.	.78
ROUTED TO	RTDIUA	86.	14.67	38.	10.	10.	.78
2 COMBINED AT	CPUA1	646.	12.42	150.	43.	42.	1.33
DIVERSION TO	DITB1	128.	12.42	30.	9.	8.	1.33
HYDROGRAPH AT	CPUA2	513.	12.42	119.	34.	33.	1.33
ROUTED TO	RTUAUC	399.	12.92	117.	34.	33.	1.33
HYDROGRAPH AT	SUBUC	636.	12.25	105.	29.	28.	.48
3 COMBINED AT	CPUC	1164.	12.92	663.	198.	191.	7.10
ROUTED TO	RSUC	1126.	13.00	660.	194.	187.	7.10
ROUTED TO	RTUCUB	1119.	13.08	659.	193.	186.	7.10
HYDROGRAPH AT	SUBUB	182.	12.25	29.	8.	8.	.14
2 COMBINED AT	CPUB	1153.	13.08	681.	201.	194.	7.24
ROUTED TO	RSUB	1068.	13.33	642.	189.	182.	7.24
DIVERSION TO	DIUE	48.	13.33	17.	4.	4.	7.24
HYDROGRAPH AT	CPUB1	1020.	13.33	625.	184.	178.	7.24
ROUTED TO	RUBSF1	1013.	13.50	623.	183.	176.	7.24
HYDROGRAPH AT	DITB1	128.	12.42	30.	9.	8.	1.33
DIVERSION TO	DITB2	120.	12.33	30.	8.	8.	1.33
HYDROGRAPH AT	DITB1A	8.	12.42	0.	0.	0.	1.33
HYDROGRAPH AT	TB1	241.	12.25	36.	11.	10.	.17
2 COMBINED AT	COTB1	238.	12.25	36.	10.	10.	1.50
ROUTED TO	RTBSF1	171.	12.83	36.	10.	10.	1.50
HYDROGRAPH AT	SF1	103.	12.42	14.	3.	3.	.13

3 COMBINED AT	CPSF1	1099.	13.42	648.	196.	189.	8.88
ROUTED TO	RSFSF1	1090.	13.58	647.	195.	188.	8.88
HYDROGRAPH AT	TB2	620.	12.58	149.	43.	42.	.72
HYDROGRAPH AT	DITB2	120.	12.33	30.	8.	8.	1.33
ROUTED TO	RTDITB	99.	13.17	29.	8.	8.	1.33
2 COMBINED AT	CPTB2	630.	12.67	174.	51.	49.	2.19
DIVERSION TO	DITA	153.	12.67	43.	13.	12.	2.19
HYDROGRAPH AT	CPTB2	477.	12.67	131.	39.	37.	2.19
ROUTED TO	RTBSF2	446.	13.17	130.	38.	37.	2.19
HYDROGRAPH AT	SF2B	261.	12.00	27.	8.	8.	.11
HYDROGRAPH AT	SF2A	343.	12.00	39.	13.	13.	.14
ROUTED TO	RSSF2A	0.	.00	0.	0.	0.	.14
4 COMBINED AT	CPSF2B	1448.	13.50	772.	240.	231.	8.46
ROUTED TO	RSSF2B	1432.	13.58	758.	224.	216.	8.46

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

APPENDIX B: HYDRAULICS

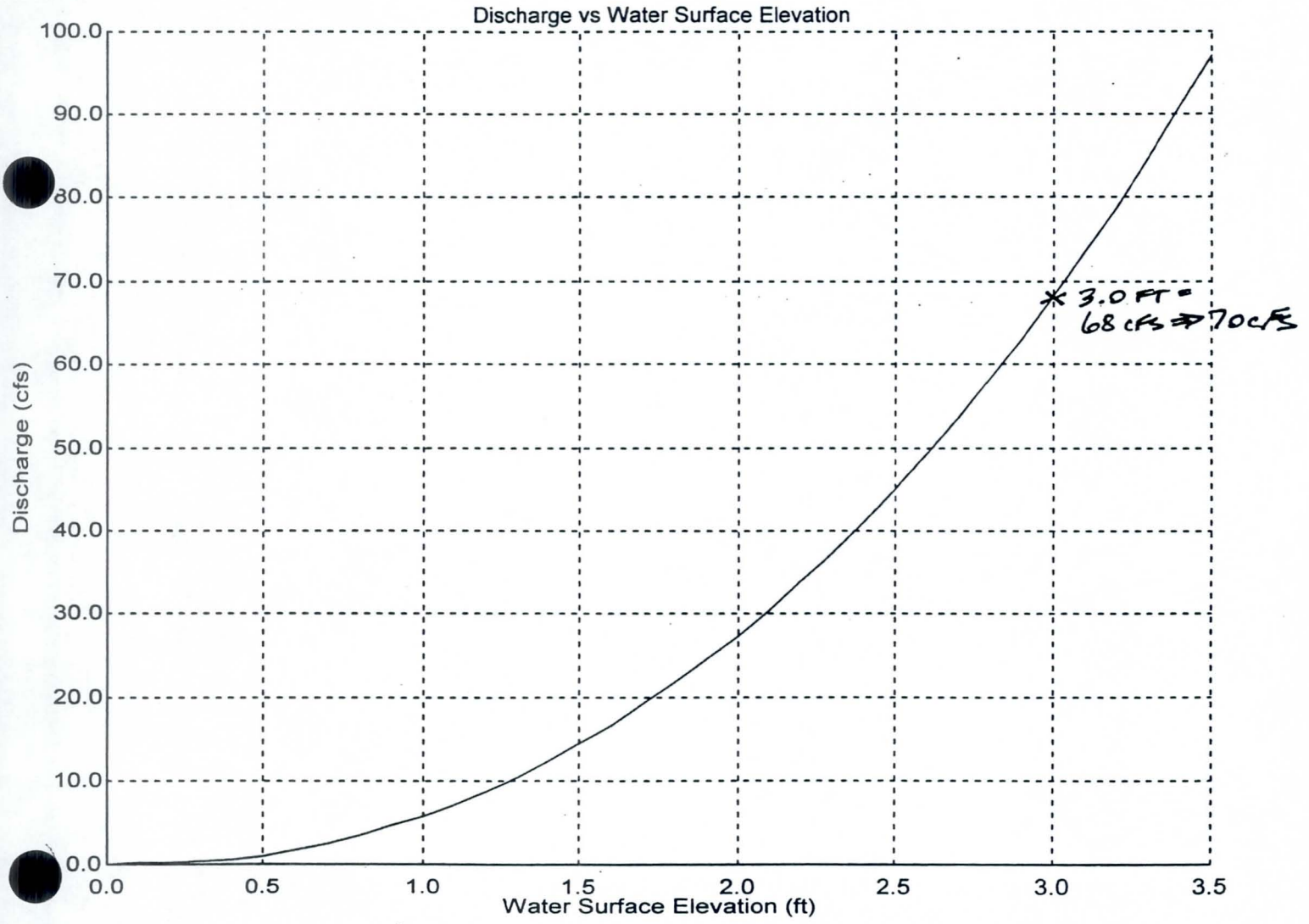
EXISTING STRUCTURES

Existing Channel North of Van Buren
Plotted Curves for Irregular Channel

Project Description	
Project File	g:\filedir\00\00-043 target s.w. dist.center\hydro\flowmaster\existnvb.fm2
Worksheet	Channel A - North of Van Buren
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Constant Data	
Channel Slope	0.001000 ft/ft

Input Data			
	Minimum	Maximum	Increment
Water Surface Elevation	0.00	3.50	0.10 ft

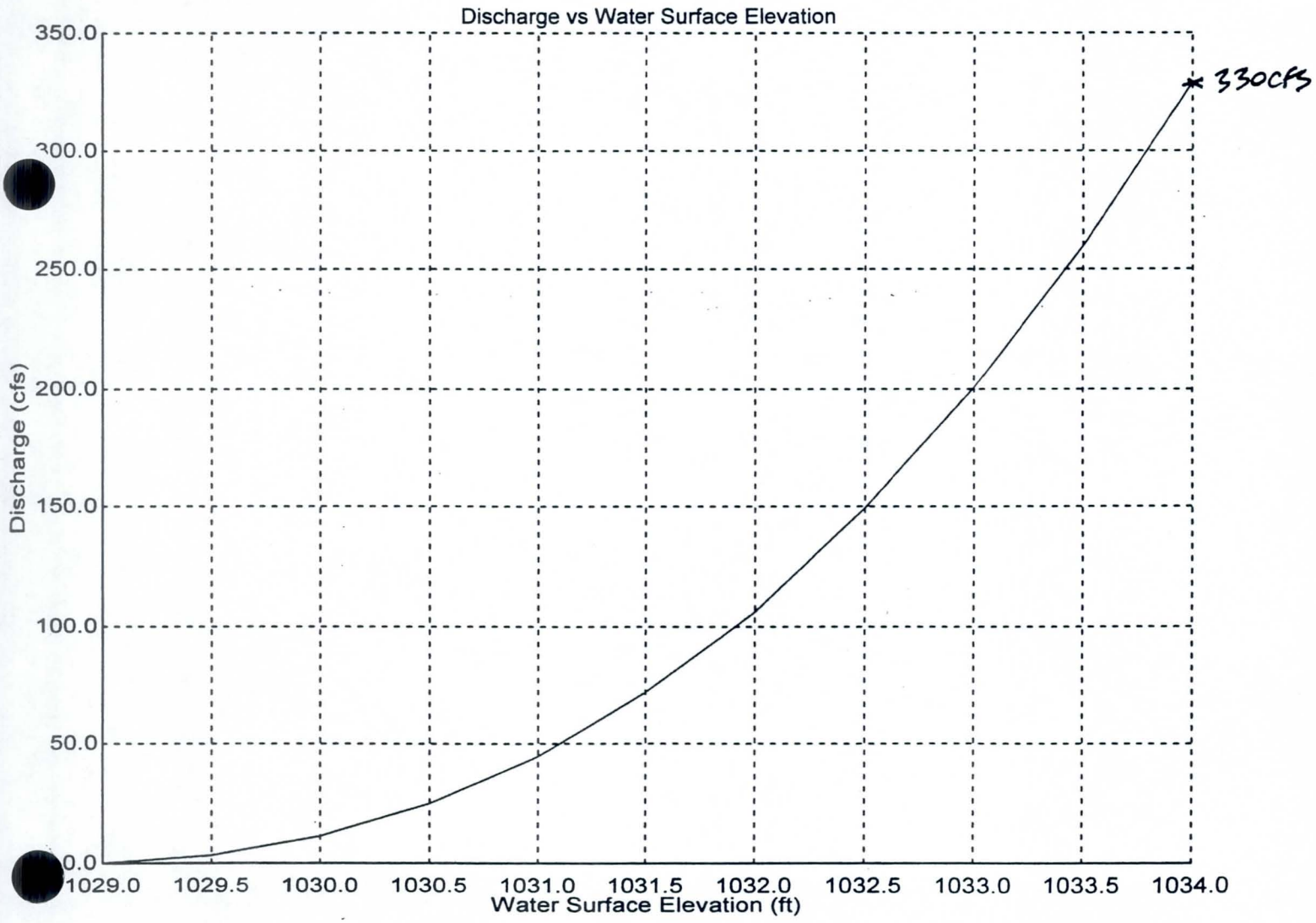


Existing Channel South of Van Buren
Plotted Curves for Irregular Channel

Project Description	
Project File	g:\filedir\00\00-043 target s.w. dist.center\hydro\flowmaster\existsvb.fm2
Worksheet	Channel B - South of Van Buren
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Constant Data	
Channel Slope	0.002000 ft/ft

Input Data			
	Minimum	Maximum	Increment
Water Surface Elevation	1,029.00	1,034.00	0.50 ft



PIPE CULVERT ANALYSIS
COMPUTATION OF CULVERT PERFORMANCE CURVE

October 19, 2000

PIPES S. OF VAN BUREN, EAST OF PROPERTY

PROGRAM INPUT DATA

DESCRIPTION	VALUE
Culvert Diameter (ft)	5.0
FHWA Chart Number	1
FHWA Scale Number (Type of Culvert Entrance)	1
Manning's Roughness Coefficient (n-value)	0.011
Entrance Loss Coefficient of Culvert Opening	0.5
Culvert Length (ft)	437.0
Invert Elevation at Downstream end of Culvert (ft)	1,029.5
Invert Elevation at Upstream end of Culvert (ft)	1,030.5
Culvert Slope (ft/ft)	0.0023
Starting Flow Rate (cfs)	1.0
Incremental Flow Rate (cfs)	11.0
Ending Flow Rate (cfs)	221.0
Starting Tailwater Depth (ft)	0.27
Incremental Tailwater Depth (ft)	0.68
Ending Tailwater Depth (ft)	13.87

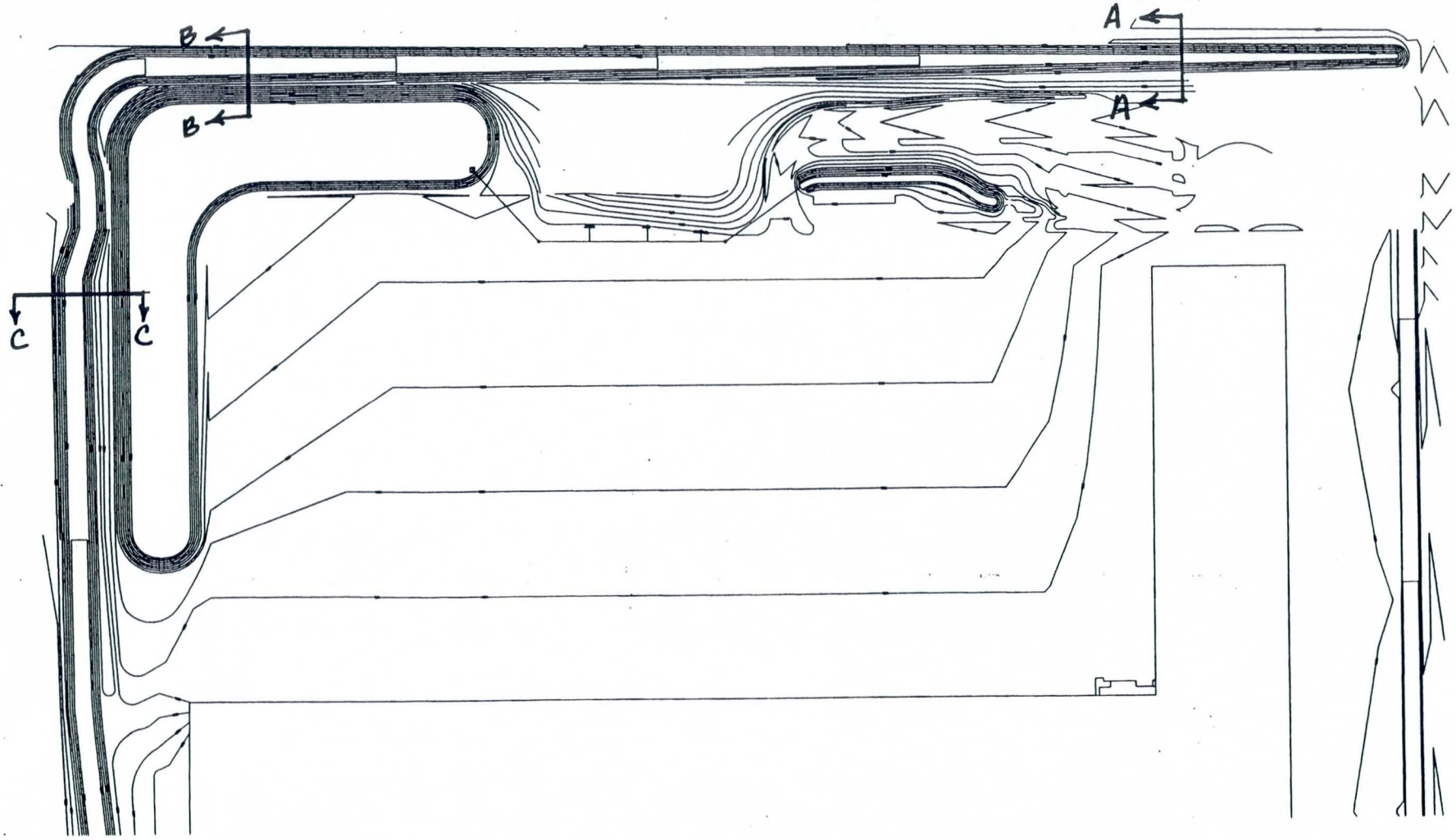
COMPUTATION RESULTS

Flow Rate (cfs)	Tailwater Depth (ft)	Headwater (ft) Inlet Control	Outlet Control	Normal Depth (ft)	Critical Depth (ft)	Depth at Outlet (ft)	Outlet Velocity (fps)
1.0	0.27	0.36	0.4	0.29	0.27	0.27	2.42
12.0	0.95	1.28	1.44	0.96	0.95	0.95	4.62
23.0	1.63	1.81	2.03	1.34	1.33	1.63	4.14
34.0	2.31	2.24	2.5	1.63	1.62	2.31	3.83
45.0	2.99	2.62	2.87	1.9	1.88	2.99	3.67
56.0	3.67	2.97	3.35	2.14	2.1	3.67	3.63
67.0	4.35	3.31	3.96	2.37	2.31	4.35	3.69
78.0	5.03	3.63	4.68	2.59	2.5	5.0	3.97
89.0	5.71	3.95	5.55	2.8	2.68	5.0	4.53
→ 100.0	6.39	4.26	6.46	3.02	2.85	5.0	5.09 ←
111.0	7.07	4.57	7.38	3.24	3.01	5.0	5.65
122.0	7.75	4.88	8.34	3.47	3.16	5.0	6.21
133.0	8.43	5.2	9.32	3.72	3.3	5.0	6.77
144.0	9.11	5.51	10.32	4.0	3.44	5.0	7.33
155.0	9.79	5.87	11.35	4.39	3.57	5.0	7.89
166.0	10.47	6.32	12.41	5.0	3.69	5.0	8.45
177.0	11.15	6.58	13.49	5.0	3.81	5.0	9.01
188.0	11.83	6.99	14.6	5.0	3.92	5.0	9.57
199.0	12.51	7.43	15.73	5.0	4.03	5.0	10.13
210.0	13.19	7.9	16.89	5.0	4.13	5.0	10.7
221.0	13.87	8.39	18.08	5.0	4.22	5.0	11.26

HYDROCALC Hydraulics for Windows, Version 1.0 Copyright (c) 1996
Dodson & Associates, Inc., 5629 FM 1960 West, Suite 314, Houston, TX 77069
Phone:(281)440-3787, Fax:(281)440-4742, Email:software@dodson-hydro.com
All Rights Reserved.

UP INVERT = 1030.5
+ HEAD = 6.46
HW INLET = 1036.96 < GROUND ELEV = 1037

PROPOSED CHANNELS



TARGET 00-043

HYDRAULIC CROSS-SECTION LOCATIONS

N

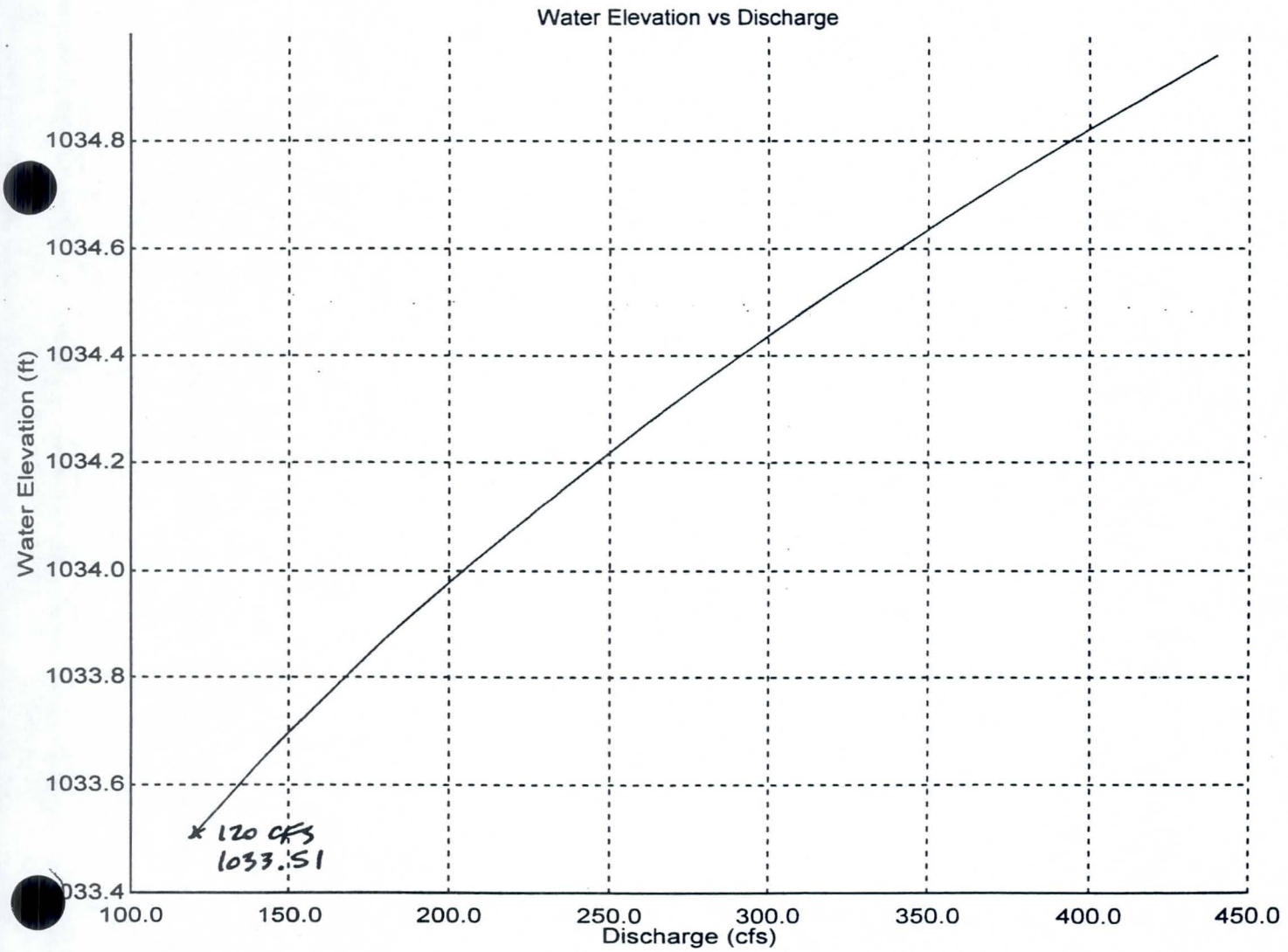
1" = 300'

100-Year, 24-Hour
Plotted Curves for Irregular Channel

Project Description	
Project File	g:\filedir\00\00-043~1.cen\hydro\flowma~1\propchnl.fm2
Worksheet	North Proposed Channel, Section A-A
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Constant Data	
Channel Slope	0.002400 ft/ft

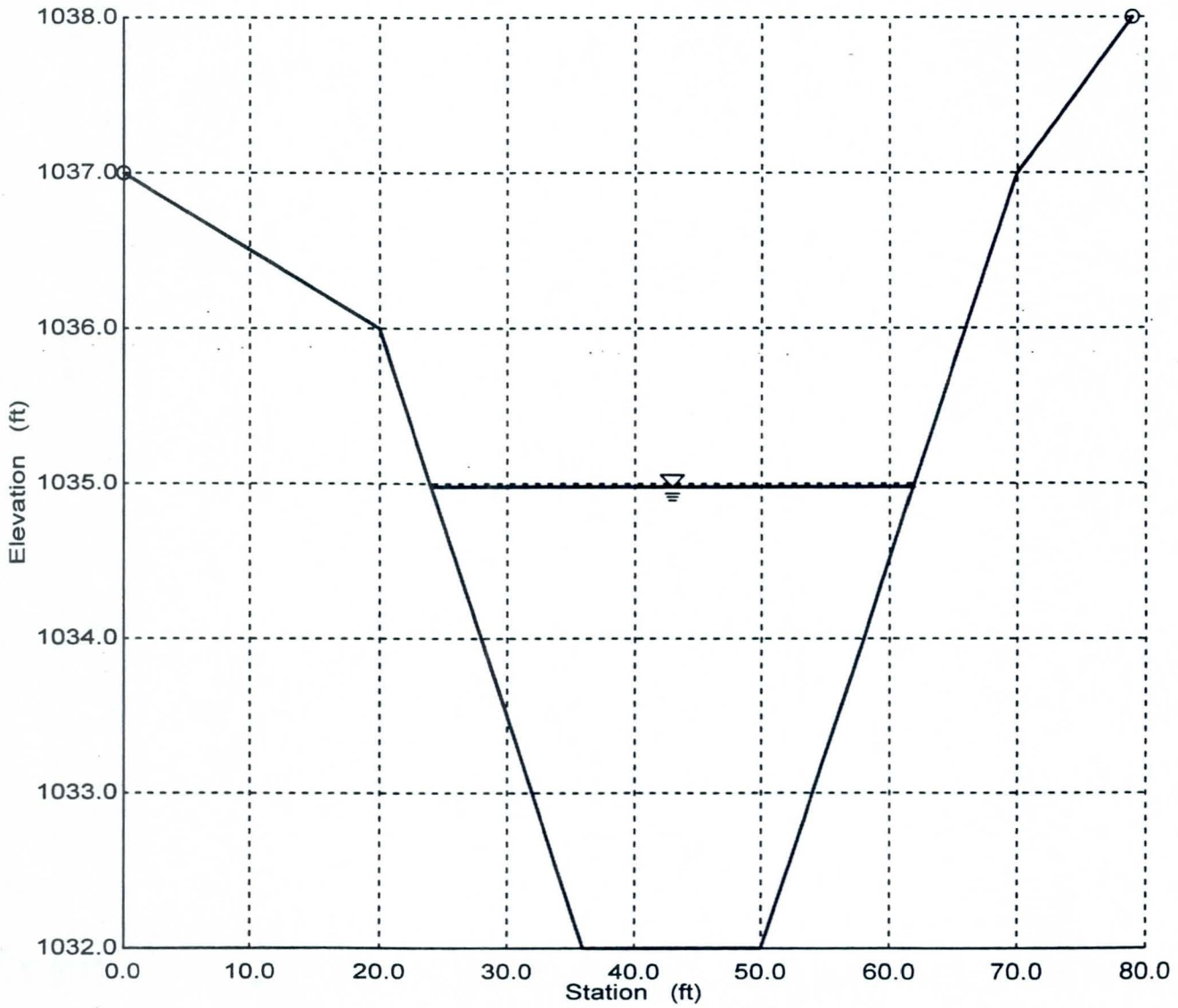
Input Data			
	Minimum	Maximum	Increment
Discharge	120.00	446.00	20.00 cfs



100-Year, 24-Hour
Cross Section for Irregular Channel

Project Description	
Project File	g:\filedir\00\00-043~1.cen\hydro\flowma~1\propchnl.fm2
Worksheet	North Proposed Channel, Section A-A
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data		
Wtd. Mannings Coefficient	0.020	
Channel Slope	0.002400	ft/ft
Water Surface Elevation	1,034.98	ft
Discharge	446.00	cfs

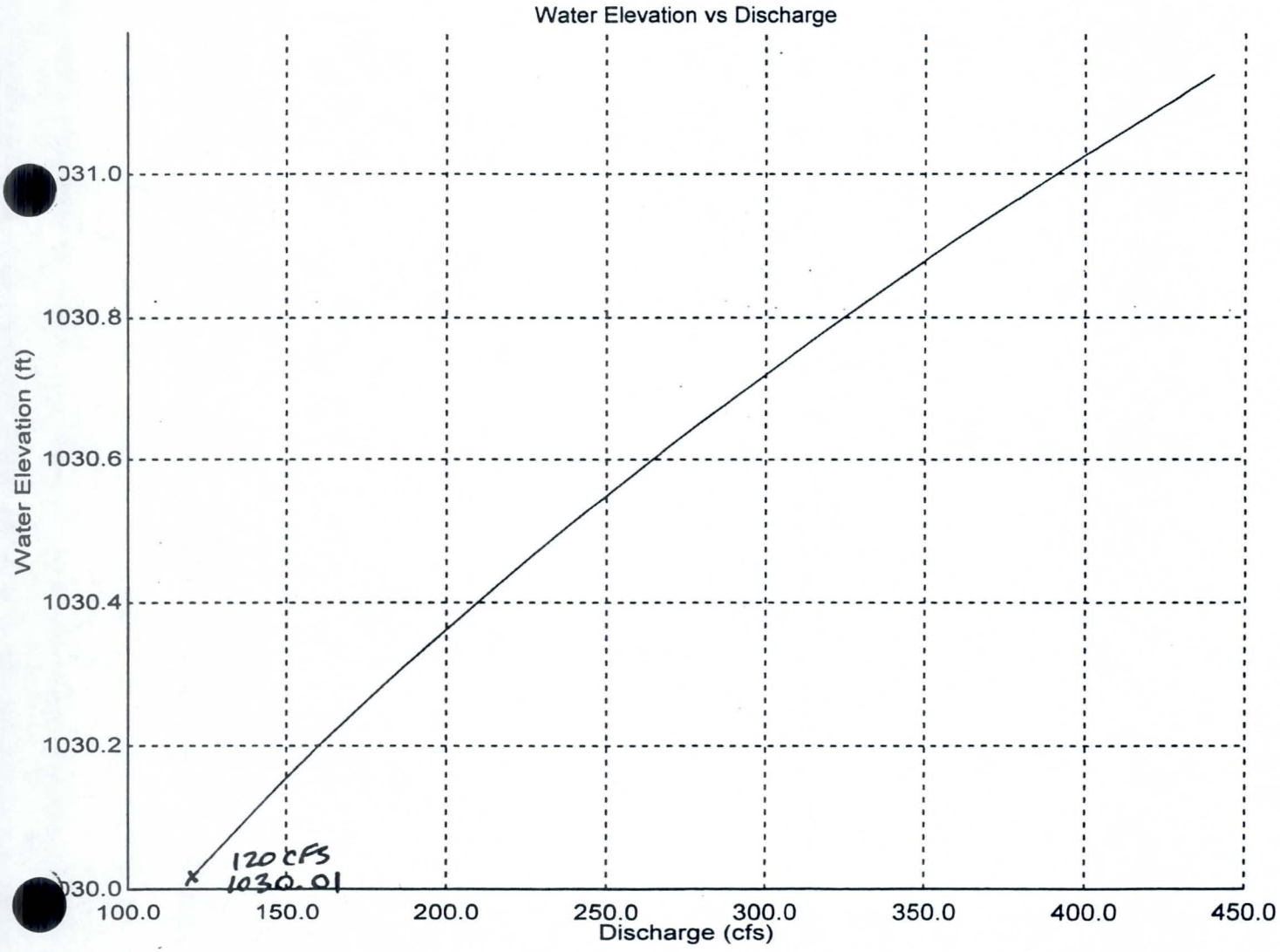


100-Year, 24-Hour
Plotted Curves for Irregular Channel

Project Description	
Project File	g:\filedir\00\00-043~1.cen\hydro\flowma~1\propchnl.fm2
Worksheet	North Proposed Channel, Section B-B
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Constant Data	
Channel Slope	0.002100 ft/ft

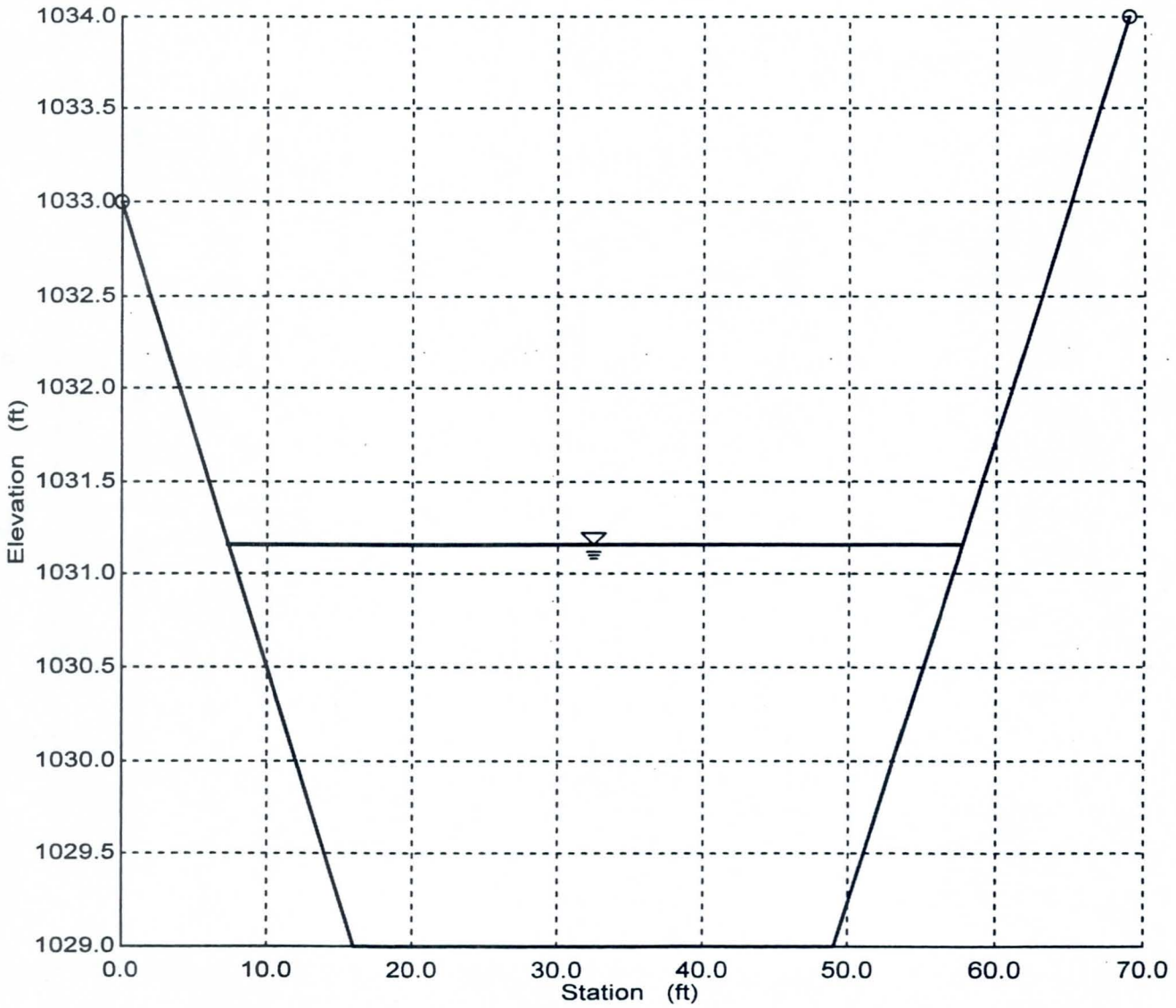
Input Data			
	Minimum	Maximum	Increment
Discharge	120.00	446.00	20.00 cfs



100-Year, 24-Hour
Cross Section for Irregular Channel

Project Description	
Project File	g:\filedir\00\00-043~1.cen\hydro\flowma~1\propchnl.fm2
Worksheet	North Proposed Channel, Section B-B
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

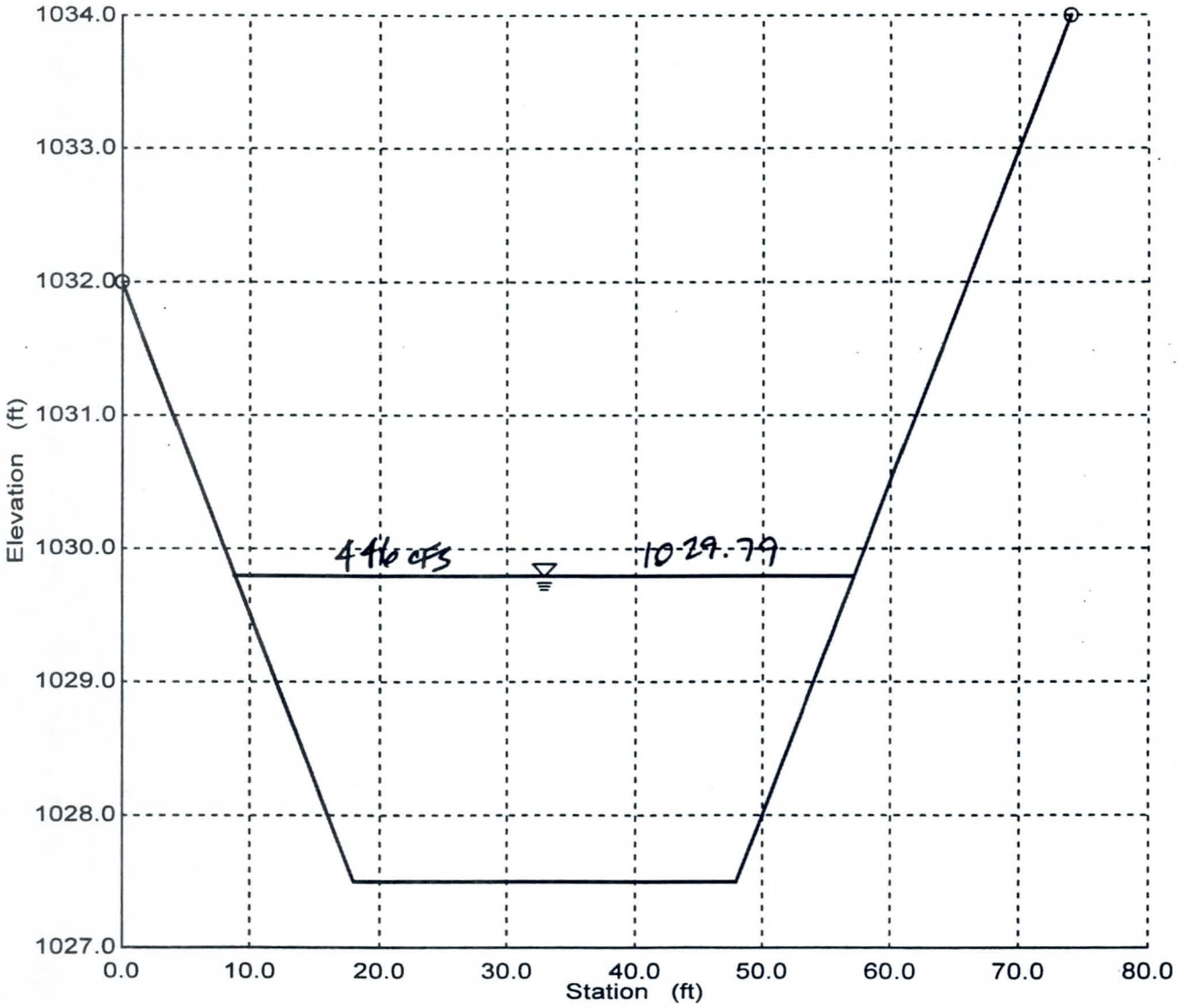
Section Data		
Wtd. Mannings Coefficient	0.020	
Channel Slope	0.002100	ft/ft
Water Surface Elevation	1,031.15	ft
Discharge	446.00	cfs

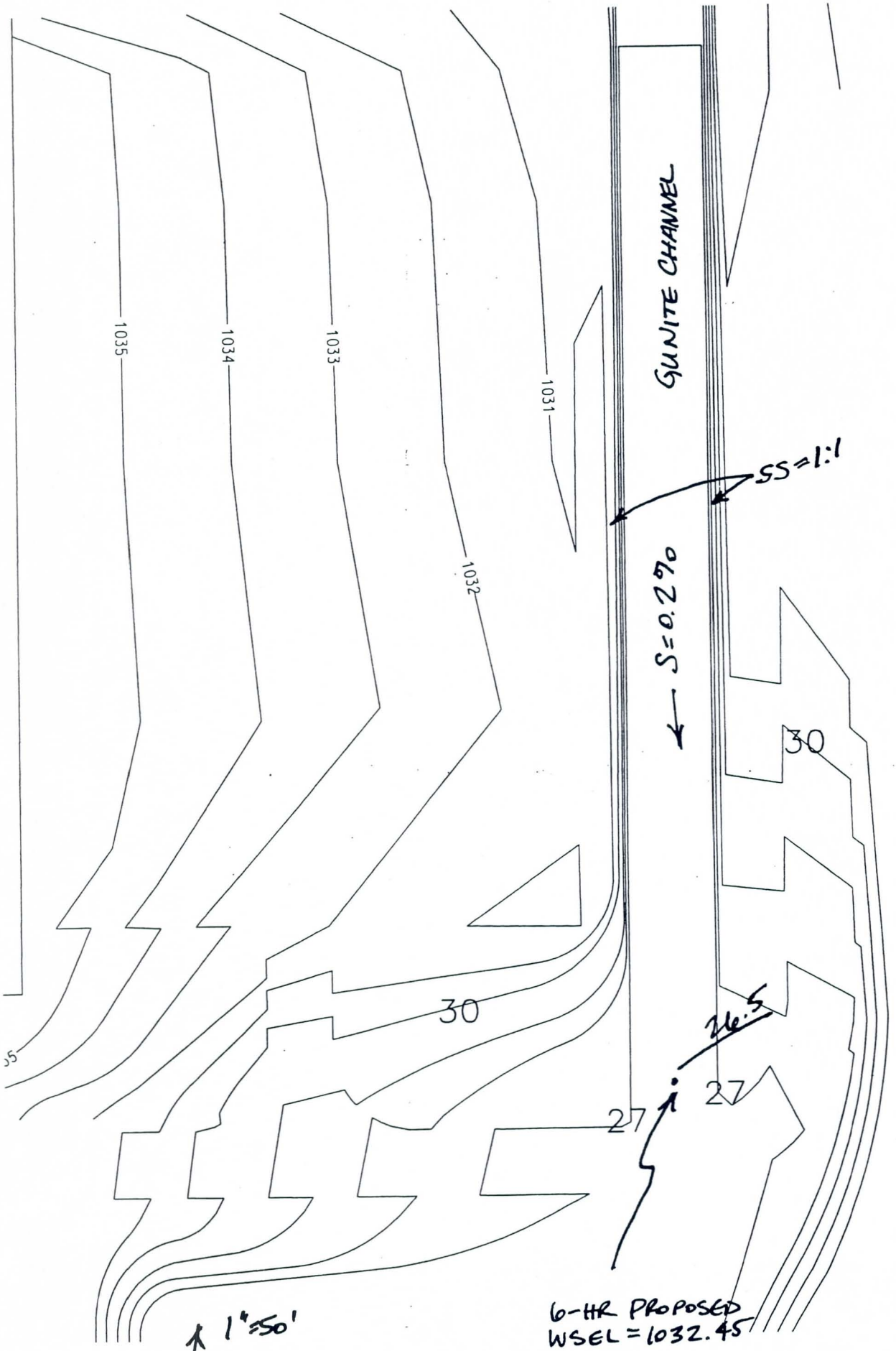


100-Year, 24-Hour
Cross Section for Irregular Channel

Project Description	
Project File	g:\filedir\00\00-043~1.cen\hydro\flowma~1\propchnl.fm2
Worksheet	West Proposed Channel, Section C-C
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data		
Wtd. Mannings Coefficient	0.020	
Channel Slope	0.002000	ft/ft
Water Surface Elevation	1,029.79	ft
Discharge	446.00	cfs





EAST CHANNEL

PROPOSED
EAST CHANNEL

TRAPEZOIDAL CHANNEL ANALYSIS
STANDARD STEP WATER SURFACE PROFILE COMPUTATION

December 7, 2000

PROGRAM INPUT DATA

DESCRIPTION	VALUE
Flow Rate (cfs)	450.0
Channel Bottom Slope (ft/ft)	0.002
Manning's Roughness Coefficient (n-value)	0.016
Channel Left Side Slope (horizontal/vertical)	1.0
Channel Right Side Slope (horizontal/vertical)	1.0
Channel Bottom Width (ft)	30.0
Flow-Line Elevation at Starting Station (ft)	1,026.5
Water Surface Elevation at Starting Station (ft)	1,032.45
Starting Channel Station (ft)	0.0
Ending Channel station (ft)	1,500.0
Channel Length (ft)	100.0

COMPUTATION RESULTS

Normal Depth (ft)	2.17
Critical Depth (ft)	1.87

Channel Station (ft)	Flow-Line Elevation (ft)	WS Elevation (ft)	Channel Depth (ft)	Flow Area (sq ft)	Flow Velocity (fps)	Velocity Head (ft)	EGL Slope (ft/ft)
0.0	1,026.5	1,032.45	5.95	213.9	2.1	0.069	0.000068
100.0	1,026.7	1,032.45	5.75	205.63	2.19	0.074	0.000076
200.0	1,026.9	1,032.45	5.55	197.44	2.28	0.081	0.000086
300.0	1,027.1	1,032.46	5.36	189.35	2.38	0.088	0.000097
400.0	1,027.3	1,032.46	5.16	181.35	2.48	0.096	0.00011
500.0	1,027.5	1,032.46	4.96	173.44	2.59	0.105	0.000125
600.0	1,027.7	1,032.46	4.76	165.63	2.72	0.115	0.000144
700.0	1,027.9	1,032.47	4.57	157.93	2.85	0.126	0.000166
800.0	1,028.1	1,032.47	4.37	150.33	2.99	0.139	0.000192
900.0	1,028.3	1,032.48	4.18	142.85	3.15	0.154	0.000224
1,000.0	1,028.5	1,032.49	3.99	135.49	3.32	0.171	0.000262
1,100.0	1,028.7	1,032.5	3.8	128.26	3.51	0.191	0.000309
1,200.0	1,028.9	1,032.51	3.61	121.19	3.71	0.214	0.000367
1,300.0	1,029.1	1,032.52	3.42	114.29	3.94	0.241	0.000438
1,400.0	1,029.3	1,032.54	3.24	107.6	4.18	0.272	0.000527
1,500.0	1,029.5	1,032.56	3.06	101.16	4.45	0.308	0.000636

HYDROCALC Hydraulics for Windows, Version 1.0 Copyright (c) 1996
Dodson & Associates, Inc., 5629 FM 1960 West, Suite 314, Houston, TX 77069
Phone:(281)440-3787, Fax:(281)440-4742, Email:software@dodson-hydro.com
All Rights Reserved.

HEC-RAS September 1998 Version 2.2
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

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

EFFECTIVE
24 - HOUR

PROJECT DATA
Project Title: Tolleson FIS Short
Project File : TOL_RASS.prj
Run Date and Time: 12/01/2000 11:21:38 AM

Project in English units

Project Description:
Effective Model
Prepared By: Hoskin Engineering Consultants, Inc.
HEC Project
No.: 00-043
Date: 11-30-00
Description: Shortened version of the original
Tolleson FIS prepared by Dibble & Associates. Only the Tolleson 1 reach is
preserved.

Original Model Info.:
Tolleson FIS, Project FCD 95-26, El
Mirage Road to 69th Avenue Alignment. August 17, 1998
Dibble & Associates,
Inc., with JE Fuller/Hydrology & Geomorphology, Inc.

The Cross-section data
were generated by ROADCALC from March 28, 1994 Topo flown by Kenney Aerial
Mapping, Inc., NGVD 1929. Top-of-rail elevations and roadway/canal profile
data were added to most cross-sections based on subsequent survey by Urban
Engineering. Some cross sections were edited or added by hand.

Discharge
data are from HEC-1 model for Tolleson Area dated December 1998 unless
otherwise noted.

Hydrologic concentration points are noted in cross-section
descriptions using the corresponding HEC-1 IDs. The flow rates have been
rounded to the nearest 10 cubic feet per second (cfs).

The floodplain was
mapped utilizing HEC-RAS Version 2.1, dated October 1997.

PLAN DATA

Plan Title: Tolleson FIS Short
Plan File : g:\Filedir\00\00-043 Target S.W. Dist.Center\hydro\hec-ras\TOL_RASS.p02

Geometry Title: Existing Geometry
Geometry File : g:\Filedir\00\00-043 Target S.W. Dist.Center\hydro\hec-ras\TOL_RASS.g01

Flow Title : Flow from Existing HEC-1 Model
Flow File : g:\Filedir\00\00-043 Target S.W. Dist.Center\hydro\hec-ras\TOL_RASS.f01

Plan Summary Information:

Number of:	Cross Sections	= 16	Mulitple Openings	=	0
	Culverts	= 0	Inline Weirs	=	0
	Bridges	= 0			

Computational Information

Water surface calculation tolerance	=	0.01
Critical depth calculaton tolerance	=	0.01
Maximum number of interations	=	20
Maximum difference tolerance	=	0.3
Flow tolerance factor	=	0.001

Computation Options
Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only

Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: Flow from Existing HEC-1 Model
Flow File : g:\Filedir\00\00-043 Target S.W. Dist.Center\hydro\hec-ras\TOL_RASS.f01

Flow Data (cfs)

River	Reach	RS	PF#1
Southern Pacific	Tolleson 1	7.287	1020
Southern Pacific	Tolleson 1	6.549	1490

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Southern Pacific	Tolleson 1	PF#1		Known WS = 1028.02

Changes in WS and EG

River	Reach	RS	Profile	Type	Value
Southern Pacific	Tolleson 1	6.532	PF#1	Known WS	1029.46
Southern Pacific	Tolleson 2	5.539	PF#1	Known WS	1024.18
Southern Pacific	Tolleson 2	5.054	PF#1	Known WS	1015.2
Southern Pacific	Tolleson 2	3.568	PF#1	Known WS	1003.1
Southern Pacific	Tolleson 2	1.771	PF#1	Known WS	992
Southern Pacific	Tolleson 2	1.138	PF#1	Known WS	986.3
Canal	Canal Split	5.798	PF#1	Known WS	1026.92
Canal	Canal Split	5.578	PF#1	Known WS	1026.3

GEOMETRY DATA

Geometry Title: Existing Geometry
Geometry File : g:\Filedir\00\00-043 Target S.W. Dist.Center\hydro\hec-ras\TOL_RASS.g01

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 7.287

INPUT
Description: RM 7.287, HEC-1 CPUB1-1020 CFS, Begin Detailed Study By Dibble & JEF, 69th Avenue Alignment.

Station Elevation Data num= 65

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1037.2	5001.6	1037.2	5010.1	1036.8	5010.2	1036.8	5010.5	1036.8
5010.7	1036.8	5016	1035.8	5023	1033.4	5025.2	1032.8	5027.8	1032.9
5032	1032.6	5038.3	1032.3	5048.1	1034.7	5051.9	1035.5	5053.3	1035.7
5053.5	1035.8	5053.6	1035.8	5054	1035.9	5054.1	1035.8	5054.3	1035.8
5055	1035.5	5055.6	1035.3	5056.5	1035	5059.4	1034.1	5059.9	1034
5060.7	1033.8	5062.5	1034.5	5065.5	1035.9	5066.5	1035.8	5072.1	1035.8
5076.6	1035.8	5081	1035.8	5082.8	1035.9	5087.3	1035.8	5089.7	1035.7
5094.2	1035.7	5115.9	1035.6	5167.7	1035.8	5241.4	1036.1	5312.7	1036.2
5457.9	1036.2	5481.4	1036.3	5510.7	1036.2	5668.1	1036.6	5695.3	1036.6
5701.3	1036.6	5854.7	1036.7	5862	1036.7	5867.4	1036.7	5870.3	1036.8
5879.9	1036.8	5891	1036.8	6062.7	1037.2	6066	1037.2	6067	1037.2
6070.1	1037.2	6075.3	1037.2	6124.6	1037.2	6240.6	1037.4	6398.7	1037.6
6423.9	1037.6	6465.8	1037.7	6502.5	1037.7	6567.4	1037.8	6600	1037.9

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.08	5059.9	.035	5668.1	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6600	124	124	124	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
5000	5055	1035.5

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
E.G. Elev (ft)	1036.71	Element			
Vel Head (ft)	0.24	Wt. n-Val.		0.042	
W.S. Elev (ft)	1036.46	Reach Len. (ft)	124.00	124.00	124.00
Crit W.S. (ft)	1036.46	Flow Area (sq ft)		257.00	
E.G. Slope (ft/ft)	0.034066	Area (sq ft)		257.00	
Q Total (cfs)	1020.00	Flow (cfs)		1020.00	
Top Width (ft)	602.26	Top Width (ft)		602.26	
Vel Total (ft/s)	3.97	Avg. Vel. (ft/s)		3.97	
Max Chl Dpth (ft)	2.66	Hydr. Depth (ft)		0.43	
Conv. Total (cfs)	5526.4	Conv. (cfs)		5526.4	
Length Wtd. (ft)	124.00	Wetted Per. (ft)		603.23	
Min Ch El (ft)	1033.80	Shear (lb/sq ft)		0.91	

Alpha	1.00	Stream Power (lb/ft s)	3.60
Frctn Loss (ft)	0.78	Cum Volume (acre-ft)	99.02
C & E Loss (ft)	0.06	Cum SA (acres)	115.46

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 7.264

INPUT
Description: RM 7.264
Station Elevation Data num= 56

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1037.2	5003.1	1037.1	5007.3	1037.2	5016.5	1037	5018.1	1036.9
5020.1	1036.7	5023.8	1035.9	5033.2	1034.1	5034	1033.9	5034.5	1033.8
5038.9	1032.9	5041.7	1033.5	5054.9	1035.1	5058.4	1034.2	5059.5	1033.5
5064.3	1034.8	5065.3	1035.1	5070.4	1035.1	5076.9	1035	5077.2	1035.1
5080.2	1034.7	5083.7	1034.1	5084	1034	5088.1	1034	5110.4	1034.1
5193.6	1034.2	5306.8	1034.4	5336	1034.4	5419.5	1034.7	5427.6	1034.9
5451.5	1034.9	5575.5	1035.1	5595.7	1035.2	5678.4	1035.3	5704.2	1035.4
5853.6	1035.6	5869.4	1035.6	6249.8	1035.6	6254.3	1035.6	6258.8	1035.6
6263.3	1035.6	6363.5	1035.6	6367.8	1035.6	6372.1	1035.6	6390.1	1035.8
6415.5	1036.1	6419.7	1036.1	6451.5	1036.4	6475.9	1036.7	6480.1	1036.7
6484.3	1036.7	6491.3	1036.8	6500.9	1036.8	6505.1	1036.8	6509.3	1036.8
6600	1036.9								

Manning's n Values num= 2

Sta	n Val	Sta	n Val
5000	.08	5076.9	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6600	192	192	192	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
6035	6600	1036

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
E.G. Elev (ft)	1035.65	Element			
Vel Head (ft)	0.04	Wt. n-Val.		0.038	
W.S. Elev (ft)	1035.61	Reach Len. (ft)	192.00	192.00	192.00
Crit W.S. (ft)	1034.91	Flow Area (sq ft)		667.97	
E.G. Slope (ft/ft)	0.002537	Area (sq ft)		671.84	
Q Total (cfs)	1020.00	Flow (cfs)		1020.00	
Top Width (ft)	1347.83	Top Width (ft)		1347.83	
Vel Total (ft/s)	1.53	Avg. Vel. (ft/s)		1.53	
Max Chl Dpth (ft)	2.71	Hydr. Depth (ft)		0.66	
Conv. Total (cfs)	20250.7	Conv. (cfs)		20250.7	
Length Wtd. (ft)	192.00	Wetted Per. (ft)		1010.77	
Min Ch El (ft)	1032.90	Shear (lb/sq ft)		0.10	
Alpha	1.00	Stream Power (lb/ft s)		0.16	
Frctn Loss (ft)	0.43	Cum Volume (acre-ft)		97.70	
C & E Loss (ft)	0.00	Cum SA (acres)		112.68	

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 7.227

INPUT
Description: RM 7.227
Station Elevation Data num= 57

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1037.3	5007.8	1037.2	5010.5	1037.1	5018.1	1037.1	5022.2	1036.3
5025.9	1035.9	5026.7	1035.8	5027.9	1035.6	5038.2	1034.3	5041.1	1033.9
5042	1034	5043.2	1034.1	5054.9	1034.6	5058.8	1033.9	5058.9	1033.9
5060	1033.4	5060.5	1033.7	5062	1034.4	5063.2	1034.9	5066	1034.8
5071.6	1034.4	5073.9	1034.3	5075.3	1034.3	5081.1	1034.2	5082.6	1033.9
5083	1033.7	5083.1	1033.7	5106	1033.7	5190.3	1033.8	5225.9	1033.9
5229.3	1034	5298.7	1034.2	5371.1	1034.3	5429.3	1034.4	5667.9	1034.8
5742	1034.9	5867.6	1034.8	5909.9	1034.8	6227.9	1035.1	6239.9	1035.1
6251.9	1035.2	6263.9	1035.2	6347.7	1035.3	6359.4	1035.3	6371.2	1035.4
6386.3	1035.5	6407.5	1035.6	6419.2	1035.7	6445.8	1035.8	6466.2	1036
6477.9	1036	6489.5	1036.1	6495.4	1036.2	6503.5	1036.1	6515.2	1036.2
6526.8	1036.2	6600	1036.3						

Manning's n Values num= 2

Sta	n Val	Sta	n Val
5000	.08	5075.3	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

5000	6600	308	308	308	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
6082	6600	1036

CROSS SECTION OUTPUT Profile #PF#1

E.G. Elev (ft)	1035.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.036	
W.S. Elev (ft)	1035.19	Reach Len. (ft)	308.00	308.00	308.00
Crit W.S. (ft)	1034.68	Flow Area (sq ft)		718.78	
E.G. Slope (ft/ft)	0.001968	Area (sq ft)		743.18	
Q Total (cfs)	1020.00	Flow (cfs)		1020.00	
Top Width (ft)	1219.30	Top Width (ft)		1219.30	
Vel Total (ft/s)	1.42	Avg. Vel. (ft/s)		1.42	
Max Chl Dpth (ft)	1.79	Hydr. Depth (ft)		0.68	
Conv. Total (cfs)	22992.5	Conv. (cfs)		22992.5	
Length Wtd. (ft)	308.00	Wetted Per. (ft)		1051.55	
Min Ch El (ft)	1033.40	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)		0.12	
Frctn Loss (ft)	0.90	Cum Volume (acre-ft)		94.58	
C & E Loss (ft)	0.00	Cum SA (acres)		107.03	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 7.169

INPUT
Description: RM 7.169
Station Elevation Data num= 58

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1037.5	5004.8	1037.5	5007.2	1037.6	5016.1	1037.7	5017.4	1037.7
5020.7	1036.9	5021.1	1036.8	5022.3	1036.5	5023	1035.7	5024.2	1035.9
5025.5	1035.8	5028.4	1035.8	5031.1	1035.9	5042	1036.6	5042.6	1036.6
5045.2	1036.7	5045.3	1036.7	5052.3	1036.6	5053.8	1035.8	5056	1034.6
5057.3	1033.9	5059.6	1032.6	5060.5	1032	5061.3	1031.6	5062	1031.7
5062.8	1032.2	5067	1034	5067.4	1034	5068.1	1034.1	5077.7	1034.1
5078.9	1034.1	5081.3	1034.1	5082.3	1033.8	5085.2	1033	5162.5	1033.2
5651.1	1034	5803.1	1034.2	5890.3	1034	5975.4	1034	6192.9	1034
6216.9	1034.1	6240.9	1034.1	6264.9	1034.2	6322.3	1034.3	6346.1	1034.4
6369.9	1034.4	6380.3	1034.5	6394.8	1034.7	6418.6	1034.6	6436.8	1034.8
6450.8	1034.9	6474.5	1035	6498.2	1035.1	6502.2	1035.1	6507.8	1035.1
6531.5	1035.1	6555.2	1035.2	6600	1035.2				

Manning's n Values num= 2

Sta	n Val	Sta	n Val
5000	.08	5077.7	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6600	500	500	500	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
6160	6600	1035

CROSS SECTION OUTPUT Profile #PF#1

E.G. Elev (ft)	1034.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.036	
W.S. Elev (ft)	1034.27	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)	1034.02	Flow Area (sq ft)		547.73	
E.G. Slope (ft/ft)	0.005102	Area (sq ft)		569.77	
Q Total (cfs)	1020.00	Flow (cfs)		1020.00	
Top Width (ft)	1246.50	Top Width (ft)		1246.50	
Vel Total (ft/s)	1.86	Avg. Vel. (ft/s)		1.86	
Max Chl Dpth (ft)	2.67	Hydr. Depth (ft)		0.50	
Conv. Total (cfs)	14280.0	Conv. (cfs)		14280.0	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		1104.77	
Min Ch El (ft)	1031.60	Shear (lb/sq ft)		0.16	
Alpha	1.00	Stream Power (lb/ft s)		0.29	
Frctn Loss (ft)	0.74	Cum Volume (acre-ft)		89.94	
C & E Loss (ft)	0.01	Cum SA (acres)		98.31	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 7.074

INPUT
Description: RM 7.074
Station Elevation Data num= 54

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1036	5002.5	1036	5007.2	1036.2	5014.7	1036.1	5017.9	1035.9
5019.1	1035.7	5019.8	1035.4	5020	1035.4	5021.2	1035	5032.5	1032.4
5042.9	1029.6	5047	1030.8	5047.7	1030.8	5052.2	1032.4	5055.4	1031.1
5058.3	1029.8	5063.3	1031.4	5066.2	1032.6	5069.5	1032.7	5069.8	1032.7

5071.4	1032.6	5077.9	1032.3	5082.7	1031.9	5087.6	1031.6	5098	1031.7
5112.2	1032	5181	1032	5294.6	1032.3	5380.6	1032.4	5399.6	1032.3
5408.8	1032.4	5440.5	1032.4	5624.1	1032.8	5902.3	1033	5927.3	1033.2
6081.5	1032.7	6136.7	1032.8	6180.1	1033	6223.5	1033	6266.9	1033.1
6281.5	1032.9	6324.9	1033.1	6368.1	1033.1	6370.8	1033.2	6374.6	1033.2
6417.8	1033.1	6422.5	1033.1	6426.1	1033.1	6469.3	1033.3	6512.5	1033.4
6513.6	1033.4	6515	1033.4	6558.1	1033.5	6600	1033.6		

Manning's n Values num= 2

Sta	n Val	Sta	n Val
5000	.08	5077.9	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6600	218	218	218	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
5800	6600	1034

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
E.G. Elev (ft)	1033.57	Element			
Vel Head (ft)	0.02	Wt. n-Val.		0.038	
W.S. Elev (ft)	1033.55	Reach Len. (ft)	218.00	218.00	218.00
Crit W.S. (ft)	1032.64	Flow Area (sq ft)		892.32	
E.G. Slope (ft/ft)	0.000696	Area (sq ft)		1276.40	
Q Total (cfs)	1020.00	Flow (cfs)		1020.00	
Top Width (ft)	1550.80	Top Width (ft)		1550.80	
Vel Total (ft/s)	1.14	Avg. Vel. (ft/s)		1.14	
Max Chl Dpth (ft)	3.95	Hydr. Depth (ft)		1.16	
Conv. Total (cfs)	38654.6	Conv. (cfs)		38654.6	
Length Wtd. (ft)	218.00	Wetted Per. (ft)		774.50	
Min Ch El (ft)	1029.60	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)		0.06	
Frctn Loss (ft)	0.44	Cum Volume (acre-ft)		79.34	
C & E Loss (ft)	0.02	Cum SA (acres)		82.25	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 7.033

INPUT
Description: RM 7.033
Station Elevation Data num= 94

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1035	5003.7	1035.2	5007.5	1035.4	5011.1	1035.2	5016.5	1035
5020.3	1034	5020.7	1033.9	5021.2	1033.8	5022.4	1033.7	5022.6	1033.7
5023.1	1033.7	5023.5	1033.7	5042.6	1032.2	5042.9	1032.2	5044.3	1032.1
5046.9	1032	5049.5	1032	5054.4	1033	5059.5	1033.7	5062	1034.2
5063.5	1034.5	5064.4	1034.6	5064.5	1034.6	5067.1	1034.8	5067.3	1034.8
5069.9	1034.2	5084.7	1033.8	5088.7	1034	5098.2	1033.6	5105.6	1033.2
5107.9	1033	5109.3	1032.8	5110.7	1032.7	5111.5	1032.5	5123.1	1031.8
5124.1	1032.2	5126.7	1032.2	5130.3	1032.1	5135.8	1032.4	5138.9	1032.7
5139.4	1032.9	5141.4	1032.9	5143.2	1032.7	5148	1032.7	5152	1032.5
5159.4	1029	5159.9	1028.9	5161.3	1029.2	5163.6	1030	5169.7	1032.1
5172.7	1033	5176.4	1033.1	5178.4	1033	5188.6	1032.3	5189.2	1032.3
5232.8	1032.3	5235.5	1032.2	5238.7	1032.3	5243.7	1032.2	5348.4	1032.3
5370.5	1032.4	5415.1	1032.5	5506	1032.4	5551.3	1032.5	5657.2	1033
5703.9	1033	5779.2	1033	5834.5	1033.1	5876.7	1033.2	5909	1033.5
5915.8	1033.5	5963.8	1033.4	5998.1	1033.2	6002.1	1033.2	6005.5	1033.2
6005.9	1033.2	6006.1	1033.2	6020.1	1033.2	6061	1033.5	6112.7	1033.4
6135	1033.4	6141.9	1033.6	6147.5	1033.6	6168.1	1033.6	6214.5	1033.8
6218.6	1033.8	6378.9	1033.5	6388.6	1033.6	6453	1033.9	6464.7	1033.8
6573.5	1033.8	6584.3	1033.9	6589.6	1033.9	6600	1033.9		

Manning's n Values num= 2

Sta	n Val	Sta	n Val
5000	.08	5189.2	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6600	282	282	282	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
5000	5067.1	1034.8

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
E.G. Elev (ft)	1033.10	Element			
Vel Head (ft)	0.22	Wt. n-Val.		0.043	
W.S. Elev (ft)	1032.89	Reach Len. (ft)	282.00	282.00	282.00
Crit W.S. (ft)	1032.85	Flow Area (sq ft)		273.76	
E.G. Slope (ft/ft)	0.024994	Area (sq ft)		284.44	
Q Total (cfs)	1020.00	Flow (cfs)		1020.00	
Top Width (ft)	535.14	Top Width (ft)		535.14	
Vel Total (ft/s)	3.73	Avg. Vel. (ft/s)		3.73	
Max Chl Dpth (ft)	3.99	Hydr. Depth (ft)		0.53	
Conv. Total (cfs)	6451.8	Conv. (cfs)		6451.8	
Length Wtd. (ft)	282.00	Wetted Per. (ft)		516.78	

Min Ch El (ft)	1028.90	Shear (lb/sq ft)	0.83
Alpha	1.00	Stream Power (lb/ft s)	3.08
Frctn Loss (ft)	1.18	Cum Volume (acre-ft)	75.43
C & E Loss (ft)	0.05	Cum SA (acres)	77.04

arning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.980

INPUT
Description: RM 6:980
Station Elevation Data num= 95

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1033.9	5006.3	1034.2	5008	1034.3	5009.1	1034.2	5011.8	1034.3
5020.8	1032.8	5023.5	1032.5	5026.8	1032	5039.1	1029.6	5056.3	1030.2
5063.9	1030.6	5066.9	1030.8	5078.3	1030.7	5089.7	1030.3	5106.3	1030.9
5108.9	1030.9	5113.4	1030.7	5115.8	1030.8	5116	1030.9	5127.5	1033.9
5129.7	1033.2	5130.9	1033.2	5131.3	1033.3	5136.1	1031.6	5149.6	1032.2
5152.5	1032.2	5153.3	1031.9	5161	1028.5	5162.7	1028.5	5162.9	1028.5
5166.2	1030.8	5166.5	1031.1	5166.8	1031.1	5171.5	1031.4	5176.7	1031
5180.9	1030.6	5187	1030.7	5201.8	1030.6	5212.9	1030.6	5254.9	1030.2
5262.9	1030.1	5304.2	1030.3	5312.9	1030.4	5353.6	1030.6	5362.9	1030.7
5372.6	1030.7	5412.9	1030.7	5452.2	1030.7	5463	1030.7	5474	1030.8
5513	1031	5524.7	1031	5563	1031	5600.1	1031.1	5613	1031.2
5626.2	1031.1	5663	1031	5698.8	1031.3	5713	1031.4	5727.6	1031.5
5763	1031.6	5797.4	1031.7	5813	1031.7	5846.7	1031.6	5863	1031.5
5896	1031.7	5913	1031.8	5930.4	1031.9	5963	1032	5994.6	1032
6013	1032	6043.9	1032.1	6063	1032.2	6082.6	1032.2	6113	1032.2
6133.3	1032.1	6163	1032.1	6184	1032.2	6213	1032.5	6241.2	1032.4
6263	1032.6	6285.5	1032.6	6313	1032.6	6336.2	1032.6	6363	1032.6
6386.9	1032.7	6413	1032.8	6438.5	1032.9	6463.1	1033	6488.3	1033
6513.1	1032.9	6537.1	1032.9	6563.1	1033	6586.4	1033.1	6600	1033.1

Manning's n Values num= 2

Sta	n Val	Sta	n Val
5000	.07	5176.7	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6600	500	500	500	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5127.5	1033.9	5660	6600	1034

CROSS SECTION OUTPUT Profile #PF#1

E.G. Elev (ft)	1031.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.036	
W.S. Elev (ft)	1031.83	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)	1031.17	Flow Area (sq ft)		569.90	
E.G. Slope (ft/ft)	0.001641	Area (sq ft)		766.15	
Q Total (cfs)	1020.00	Flow (cfs)		1020.00	
Top Width (ft)	862.28	Top Width (ft)		862.28	
Vel Total (ft/s)	1.79	Avg. Vel. (ft/s)		1.79	
Max Chl Dpth (ft)	3.33	Hydr. Depth (ft)		1.11	
Conv. Total (cfs)	25176.1	Conv. (cfs)		25176.1	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		513.99	
Min Ch El (ft)	1028.50	Shear (lb/sq ft)		0.11	
Alpha	1.00	Stream Power (lb/ft s)		0.20	
Frctn Loss (ft)	0.37	Cum Volume (acre-ft)		72.03	
C & E Loss (ft)	0.01	Cum SA (acres)		72.51	

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.885

INPUT
Description: RM 6.885
Station Elevation Data num= 96

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1032.5	5005.5	1032.5	5005.8	1032.5	5006.4	1032.5	5006.8	1032.5
5013.4	1031.4	5013.9	1031.3	5014.3	1031.4	5022.6	1032	5029.8	1031.5
5034.5	1031.1	5048.1	1031.2	5050.9	1031.2	5055.2	1030.9	5074.7	1030.2
5087.9	1029.7	5096.4	1029.9	5101.8	1029.9	5103.3	1029.8	5104	1029.9
5108.8	1030.4	5113	1029.5	5127.2	1032.2	5130.1	1031.5	5134.4	1030.5
5141.6	1030.7	5149.7	1031	5155.1	1028.5	5156	1028.1	5156.7	1027.7
5159.6	1028.9	5162.8	1030.4	5168.8	1030.4	5173.3	1030.5	5176.7	1030
5181.4	1029.4	5190.4	1029.6	5194.4	1029.7	5203.6	1029.9	5205.9	1029.9
5213.1	1029.9	5255.9	1029.7	5263.8	1029.6	5305.9	1029.4	5347.1	1029.6
5356	1029.7	5396.4	1030	5406	1030.1	5445.8	1030	5456	1029.9
5466.4	1030	5506	1030.1	5544.6	1030.1	5556	1030.1	5593.9	1030.2

5606	1030.2	5643.3	1030.2	5656	1030.2	5669	1030.3	5706	1030.5
5719.6	1030.5	5756	1030.6	5770.3	1030.6	5806	1030.7	5820.9	1030.7
5856	1030.6	5871.6	1030.6	5906	1030.8	5922.2	1030.9	5956	1031.1
5988.9	1031.1	6006	1031.1	6023.5	1031.1	6056	1031.2	6087.7	1031.2
6106	1031.2	6124.8	1031.2	6156	1031.4	6186.4	1031.7	6206	1031.8
6226.1	1031.8	6256	1031.7	6285.1	1031.8	6306	1032	6334.5	1032.1
6356	1032.1	6378.1	1032	6406	1032	6433.3	1032.1	6456	1032.2
6479.4	1032.2	6506	1032.3	6530	1032.3	6556	1032.2	6580.7	1032.1
6600	1032.1								

Manning's n Values num= 2

Sta	n Val	Sta	n Val
5000	.06	5176.7	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6600	545	545	545	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
5000	5127.2	1032.2

CROSS SECTION OUTPUT Profile #PF#1

E.G. Elev (ft)	1031.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.036	
W.S. Elev (ft)	1031.49	Reach Len. (ft)	545.00	545.00	545.00
Crit W.S. (ft)	1030.39	Flow Area (sq ft)		1135.41	
E.G. Slope (ft/ft)	0.000415	Area (sq ft)		1232.07	
Q Total (cfs)	1020.00	Flow (cfs)		1020.00	
Top Width (ft)	1130.76	Top Width (ft)		1130.76	
Vel Total (ft/s)	0.90	Avg. Vel. (ft/s)		0.90	
Max Chl Dpth (ft)	3.79	Hydr. Depth (ft)		1.10	
Conv. Total (cfs)	50060.1	Conv. (cfs)		50060.1	
Length Wtd. (ft)	545.00	Wetted Per. (ft)		1036.17	
Min Ch El (ft)	1027.70	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)		0.03	
Frctn Loss (ft)	0.65	Cum Volume (acre-ft)		60.56	
C & E Loss (ft)	0.02	Cum SA (acres)		61.07	

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.782

INPUT
Description: RM 6.782
Station Elevation Data num= 112

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1032	5003.5	1032	5004.7	1032	5005.2	1032	5008.3	1031.7
5015.3	1031	5019.5	1030.5	5019.8	1030.5	5024.4	1030.9	5028.6	1030.7
5035.6	1030.3	5038.5	1030.2	5038.9	1030.2	5041.6	1029.9	5043.1	1029.9
5051.3	1029.8	5052.2	1029.9	5054.1	1029.8	5057.9	1029.6	5063	1029.7
5064.5	1029.6	5066.7	1029.6	5069.2	1029.6	5069.4	1029.6	5074.5	1029.6
5075.5	1029.6	5078.1	1029.5	5078.8	1029.6	5079.9	1029.6	5092.6	1029.4
5093	1029.3	5093.4	1029.3	5095.6	1029.3	5104.9	1029	5106.2	1028.9
5109.4	1028.9	5113.6	1028.9	5120	1028.9	5125.6	1029.2	5126.6	1029.2
5128.4	1029.2	5133.7	1029.5	5136.5	1029.6	5143.7	1029.8	5150	1030
5152.9	1030.3	5155.8	1030.3	5161.5	1030.6	5162.2	1030.7	5171.5	1031
5172.8	1031	5173.3	1031	5176.3	1028.6	5179	1025.9	5179.6	1025.3
5180.3	1024.6	5180.4	1024.4	5181	1024.5	5185.8	1025.2	5196.9	1026.9
5203	1027.8	5203.2	1027.8	5205.7	1028.5	5212.3	1031.3	5213.4	1031.2
5219.2	1031.2	5224.7	1031	5233.3	1030.8	5236.7	1030.4	5238.2	1030.3
5244.7	1030.2	5248.9	1030.1	5254.5	1030.1	5261.2	1030.1	5267.8	1030.1
5274.9	1030.2	5281.3	1030.1	5289.7	1030	5295.6	1029.8	5306.1	1029.6
5314.1	1029.5	5336.1	1029.5	5347.2	1029.5	5362.8	1029.5	5427.5	1029.6
5446.1	1030.1	5475.3	1030.1	5511.3	1030.1	5552.6	1030.3	5589.7	1030.2
5633.7	1030.3	5677.5	1030.7	5725.2	1030.7	5785.4	1030.8	5857.6	1030.7
5895.3	1030.9	5972.1	1030.9	6001.9	1030.9	6072.8	1031.1	6159	1031.3
6187.1	1031.3	6265.9	1031.6	6273	1031.6	6368.7	1031.7	6392.4	1031.8
6482	1031.8	6555.2	1031.7	6565.3	1031.6	6566.2	1031.7	6567.7	1031.7
6572.1	1031.8	6600	1031.8						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.035	5176.3	.03	5224.7	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6600	312	312	312	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
5000	5212.3	1031.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
5171.5	5212.3	1031.3

CROSS SECTION OUTPUT Profile #PF#1

E.G. Elev (ft)	1030.83	Element	Left OB	Channel	Right OB

Vel Head (ft)	0.25	Wt. n-Val.		0.030	
W.S. Elev (ft)	1030.58	Reach Len. (ft)	312.00	312.00	312.00
Crit W.S. (ft)	1030.54	Flow Area (sq ft)		255.94	
E.G. Slope (ft/ft)	0.012897	Area (sq ft)		384.39	
Q Total (cfs)	1020.00	Flow (cfs)		1020.00	
Top Width (ft)	561.43	Top Width (ft)		561.43	
Vel Total (ft/s)	3.99	Avg. Vel. (ft/s)		3.99	
Max Chl Dpth (ft)	1.68	Hydr. Depth (ft)		0.60	
Conv. Total (cfs)	8981.6	Conv. (cfs)		8981.6	
Length Wtd. (ft)	312.00	Wetted Per. (ft)		429.18	
Min Ch El (ft)	1028.90	Shear (lb/sq ft)		0.48	
Alpha	1.00	Stream Power (lb/ft s)		1.91	
Frctn Loss (ft)	0.84	Cum Volume (acre-ft)		50.45	
C & E Loss (ft)	0.06	Cum SA (acres)		50.49	

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.723 F

INPUT
Description: RM 6.723
Station Elevation Data num= 105

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1030.9	5006.5	1031	5008.6	1031.2	5008.9	1031.2	5010.9	1031.1
5013.5	1030.6	5016.5	1030.2	5017.3	1030.2	5017.7	1030.1	5018.4	1030.2
5022.2	1030.6	5028.5	1030.3	5034.2	1030	5048.4	1029.8	5056.6	1030
5059.1	1029.6	5069	1028.7	5071.3	1028.5	5079.7	1029.1	5095.1	1030.2
5101.4	1031.4	5103.2	1031.7	5103.8	1031.8	5104.2	1031.8	5107.3	1032.4
5109.7	1032	5112	1031.7	5113.9	1031.2	5114.9	1030.3	5118.3	1027.4
5125.9	1028.9	5131.5	1028.8	5132.7	1029.9	5134.7	1029.9	5137.4	1029.8
5143.6	1030.1	5147.6	1030.4	5158.3	1030.8	5162.9	1030.9	5169	1030.9
5171	1029.7	5174.4	1027.6	5175.7	1027	5177	1026.3	5180	1024.6
5184.6	1025.1	5195.8	1026.1	5199.6	1026.5	5209.8	1031.3	5210.9	1031.9
5211.4	1031.9	5211.8	1031.9	5217.8	1031.8	5225.5	1031.7	5233.1	1027.3
5234.7	1026.5	5235.6	1026.8	5236.4	1027.2	5238	1027.9	5241.9	1030
5242.1	1030.2	5248.6	1029.9	5255.3	1029.5	5260.1	1028.8	5261.3	1028.7
5263.9	1028.5	5265.2	1028.5	5265.9	1028.3	5391.5	1028.6	5419.9	1028.4
5467.1	1028.5	5497.6	1028.5	5503.6	1028.8	5519.5	1028.7	5861.3	1029.4
5898.5	1029.2	5911.3	1029.2	5948.4	1029.4	5961.7	1029.4	5974.5	1029.5
6011.6	1029.2	6048.7	1029.3	6061.1	1029.2	6074.6	1029.3	6111.6	1029.6
6148.5	1029.9	6161.6	1029.9	6198.5	1029.8	6211.3	1029.8	6224.2	1029.8
6261.1	1030	6274.7	1030	6311.6	1029.8	6348.3	1030.9	6361.6	1030.9
6374.8	1031	6411.6	1030.2	6448.3	1030.4	6461.6	1030.5	6498.2	1030.4
6511.6	1030.5	6525	1030.6	6561.6	1031	6598.2	1031	6600	1031

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.035	5147.6	.03	5225.5	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6600	143	143	143	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5210.9	1031.9	5861.3	6600	1032

Blocked Obstructions num= 1

Sta L	Sta R	Elev
5162.9	5210.9	1031

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
E.G. Elev (ft)	1029.92	Element			
Vel Head (ft)	0.04	Wt. n-Val.		0.035	
W.S. Elev (ft)	1029.89	Reach Len. (ft)	143.00	143.00	143.00
Crit W.S. (ft)	1029.17	Flow Area (sq ft)		678.86	
E.G. Slope (ft/ft)	0.001128	Area (sq ft)		878.88	
Q Total (cfs)	1020.00	Flow (cfs)		1020.00	
Top Width (ft)	1071.56	Top Width (ft)		1071.56	
Vel Total (ft/s)	1.50	Avg. Vel. (ft/s)		1.50	
Max Chl Dpth (ft)	3.39	Hydr. Depth (ft)		1.09	
Conv. Total (cfs)	30376.8	Conv. (cfs)		30376.8	
Length Wtd. (ft)	143.00	Wetted Per. (ft)		627.38	
Min Ch El (ft)	1026.50	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)		0.11	
Frctn Loss (ft)	0.14	Cum Volume (acre-ft)		45.93	
C & E Loss (ft)	0.00	Cum SA (acres)		44.64	

Warning: Divided flow computed for this cross-section.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.696 E

INPUT
Description: RM 6.696
Station Elevation Data num= 102

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

5000	1030.7	5005.9	1030.7	5007	1030.7	5007.4	1030.6	5008.1	1030.6
5015.3	1030.1	5017.7	1030.1	5018.2	1029.9	5020.7	1030.2	5022.5	1030.3
5033	1029.4	5035.9	1029.4	5053.7	1029.7	5058.9	1029.8	5061	1029.9
5065.7	1029.2	5085.8	1026.8	5088.1	1026.5	5089.3	1026.4	5089.9	1026.3
5090.4	1026.5	5094	1028.1	5103.9	1031.4	5114.5	1031.3	5115.7	1031.3
5117	1027.4	5117.5	1027.3	5124.2	1026.5	5125.1	1026.8	5130.5	1028.2
5132.3	1028.8	5135.2	1029.5	5136.2	1029.5	5144.8	1028.9	5149.9	1029
5151	1029.1	5153.2	1029.2	5158	1029.4	5164.3	1029.7	5167.2	1029.8
5172.1	1029.9	5176.7	1027.3	5181.1	1024.6	5195.9	1025.4	5197.6	1025.4
5200.9	1025.6	5205.6	1028.6	5209.8	1031	5211.5	1031	5216	1030.9
5217	1030.9	5224.8	1031	5225.9	1031.1	5226.8	1031.1	5227.1	1030.9
5235.6	1026.4	5241	1028.5	5243.5	1029.6	5250.7	1029.6	5256.2	1029.6
5259.1	1029.3	5260.6	1029.1	5265.7	1028.5	5266.8	1028.1	5266.9	1028.3
5267.1	1028.3	5302.8	1028.1	5313.3	1028.1	5357.2	1028.2	5359.4	1028.3
5365.4	1028.2	5867.4	1029.2	5898.2	1029.1	5917.3	1029	5948	1029.2
5968.1	1029.1	5987.3	1029.3	6017.9	1029	6048.5	1029.1	6067.2	1029
6087.5	1029.1	6117.9	1029.4	6148.3	1029.6	6168	1029.6	6198.3	1029.5
6217.5	1029.6	6237	1029.5	6267.2	1029.7	6287.8	1029.7	6318	1029.5
6348	1030.4	6368	1030.5	6388.1	1030.6	6418	1030	6447.9	1030.1
6468.1	1030.2	6497.9	1030.2	6518.1	1030.2	6538.4	1030.4	6568.1	1030.7
6597.8	1030.7	6600	1030.7						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.035	5149.9	.03	5224.8	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6600	500	500	500	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5209.8	1031	6000	6600	1031

Blocked Obstructions num= 1

Sta L	Sta R	Elev
5167.2	5205.6	1030

CROSS SECTION OUTPUT Profile #PF#1

E.G. Elev (ft)	1029.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.035	
W.S. Elev (ft)	1029.76	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)	1028.99	Flow Area (sq ft)		804.82	
E.G. Slope (ft/ft)	0.000844	Area (sq ft)		1043.69	
Q Total (cfs)	1020.00	Flow (cfs)		1020.00	
Top Width (ft)	1212.05	Top Width (ft)		1212.05	
Vel Total (ft/s)	1.27	Avg. Vel. (ft/s)		1.27	
Max Chl Dpth (ft)	3.46	Hydr. Depth (ft)		1.04	
Conv. Total (cfs)	35115.7	Conv. (cfs)		35115.7	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		772.47	
Min Ch El (ft)	1026.30	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)		0.07	
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)		42.77	
C & E Loss (ft)	0.01	Cum SA (acres)		40.89	

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.601

INPUT
Description: RM 6.601
Station Elevation Data num= 93

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1030.5	5002.7	1030.6	5005.6	1030.8	5013.7	1030.2	5014.4	1030.2
5017	1030.1	5031.2	1029.9	5036.3	1029	5036.9	1028.9	5038	1028.7
5041.9	1028.1	5045.6	1028	5058.3	1026.9	5058.7	1026.9	5076.6	1026
5082.7	1025.8	5086.7	1025.6	5087.4	1026.3	5094.8	1028.1	5105.5	1030.7
5114.9	1031.1	5115.1	1031.1	5116.3	1031.1	5136.7	1030.8	5139.5	1030.8
5140.6	1030.6	5141.6	1030.4	5148.7	1028.9	5148.9	1028.9	5149	1028.9
5159.1	1029	5164.5	1029	5181.9	1029	5186.4	1027.3	5188.9	1024.9
5189.2	1024.7	5190.1	1024.7	5192.3	1024.7	5203.2	1025.1	5210.7	1025.2
5213.8	1026.9	5217.6	1029.1	5221.2	1029.2	5236	1029.5	5236.7	1029.1
5236.9	1029	5245.1	1026.2	5251.6	1028.3	5253.4	1028.7	5257.2	1028.4
5265.6	1027.9	5271.3	1027.6	5275.1	1027.5	5276.6	1027.4	5396.2	1027.7
5401.5	1027.7	5494.2	1027.6	5547.9	1027.9	5576	1027.8	5602.7	1028
5619.1	1028.1	5645.6	1028.1	5886.8	1028.6	5897.7	1028.5	5936.6	1028.4
5947.4	1028.5	5988.1	1028.3	6027.1	1028.6	6037.7	1028.6	6048.4	1028.6
6086.2	1028.5	6127.1	1028.6	6137.6	1028.7	6148.2	1028.8	6187.8	1028.8
6198.2	1028.7	6236.8	1028.9	6275.7	1028.8	6286.1	1028.9	6327.2	1028.8
6337.5	1028.8	6347.7	1029.1	6387.5	1029.3	6427.5	1029.5	6437.6	1029.3
6447.6	1029.3	6487.6	1029.4	6497.6	1029.4	6537.6	1029.5	6577.8	1029.8
6587.7	1029.9	6597.5	1029.9	6600	1029.9				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.035	5149	.03	5236	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.

5000	6600	273	273	273	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5114.9	1031.1	6300	6600	1030

Blocked Obstructions num= 1

Sta L	Sta R	Elev
5181.9	5217.6	1029

CROSS SECTION OUTPUT Profile #PF#1

E.G. Elev (ft)	1029.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.035	
W.S. Elev (ft)	1029.62	Reach Len. (ft)	273.00	273.00	273.00
Crit W.S. (ft)	1028.31	Flow Area (sq ft)		1537.65	
E.G. Slope (ft/ft)	0.000160	Area (sq ft)		1786.41	
Q Total (cfs)	1020.00	Flow (cfs)		1020.00	
Top Width (ft)	1475.93	Top Width (ft)		1475.93	
Vel Total (ft/s)	0.66	Avg. Vel. (ft/s)		0.66	
Max Chl Dpth (ft)	4.02	Hydr. Depth (ft)		1.33	
Conv. Total (cfs)	80592.8	Conv. (cfs)		80592.8	
Length Wtd. (ft)	273.00	Wetted Per. (ft)		1155.81	
Min Ch El (ft)	1025.60	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)		0.01	
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)		26.53	
C & E Loss (ft)	0.00	Cum SA (acres)		25.46	

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.549

INPUT
Description: RM 6.549, HEC-1 RSSF, Q=1490 CFS, 75th Avenue.
Station Elevation Data num= 121

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1030.6	5007.3	1029.5	5022.3	1026.1	5024.5	1025.5	5024.7	1025.5
5026	1025.4	5048.2	1025.7	5049.4	1025.7	5063.1	1026.2	5065.7	1026.4
5068.3	1026.5	5079.5	1026	5088.9	1025.5	5093	1026.3	5095	1026.5
5098.1	1026.9	5101.4	1027.5	5105.6	1027.4	5110.1	1027.3	5116.7	1027.4
5132.6	1027.8	5134.8	1027.9	5141.2	1028.1	5145.3	1028.1	5147.9	1028.3
5148.7	1028.4	5154.6	1029	5157.8	1029.3	5161.8	1028.6	5168.4	1027.4
5171.7	1027.3	5173.7	1027.3	5177.8	1027.6	5185.6	1028.2	5199.1	1029.1
5202.6	1026.6	5204	1025.7	5207.2	1025.7	5220	1025.7	5230.2	1025.7
5232.9	1026.5	5244.9	1029	5246.3	1028.9	5252.3	1028.8	5256.63	1028.8
5261.1	1028.6	5264	1028.6	5270.8	1028.5	5272.5	1028.5	5286	1028.5
5287.4	1028.4	5298.7	1028.4	5301.1	1028.3	5317.4	1028.2	5320.8	1028.2
5329.5	1028.3	5342.1	1028.3	5350.5	1028.3	5366.6	1028.4	5372.6	1028.5
5386.6	1028.6	5390.4	1028.6	5409.8	1028.6	5414.8	1028.7	5431.1	1028.7
5432.3	1028.7	5444.2	1028.5	5446.3	1028.5	5454.5	1028.6	5457.1	1028.6
5470.6	1028.5	5471.7	1028.5	5477.6	1028.5	5478.1	1028.5	5483.6	1028.6
5484.5	1028.6	5486.9	1029.2	5487.7	1029	5490.3	1028.3	5491.2	1028.3
5493.4	1027.8	5495.2	1027.7	5500.5	1027.2	5502.4	1026.8	5507.2	1027.2
5515.9	1028.1	5518.3	1027.4	5529.8	1027.5	5531.2	1027.6	5563.5	1027.5
5586	1027.6	5676.2	1027.5	5770.6	1028	5819.4	1028	5865.5	1028.2
5867.2	1028.2	5870	1028.2	5896.2	1028.2	5897.4	1028.2	5945.9	1028.1
5947.1	1028.1	5997.7	1027.9	6046	1028.3	6047.2	1028.3	6048.4	1028.3
6095.3	1028.2	6145.8	1028.4	6147	1028.4	6148.2	1028.4	6197.2	1028.4
6198.4	1028.4	6245.9	1028.6	6293.8	1028.5	6295	1028.5	6345.5	1028.4
6346.7	1028.4	6347.9	1028.5	6396.7	1028.8	6445.5	1029	6446.7	1028.9
7050	1030								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.035	5177.8	.03	5252.3	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	7050	0	0	0	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
6495	7050	1030

Blocked Obstructions num= 1

Sta L	Sta R	Elev
5199.1	5244.9	1029

CROSS SECTION OUTPUT Profile #PF#1

E.G. Elev (ft)	1029.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.035	
W.S. Elev (ft)	1029.57	Reach Len. (ft)	0.00	0.00	0.00
Crit W.S. (ft)	1028.05	Flow Area (sq ft)		2177.18	
E.G. Slope (ft/ft)	0.000143	Area (sq ft)		2271.25	
Q Total (cfs)	1490.00	Flow (cfs)		1490.00	
Top Width (ft)	1809.40	Top Width (ft)		1809.40	
Vel Total (ft/s)	0.68	Avg. Vel. (ft/s)		0.68	
Max Chl Dpth (ft)	4.17	Hydr. Depth (ft)		1.46	
Conv. Total (cfs)	124602.2	Conv. (cfs)		124602.2	
Length Wtd. (ft)	0.00	Wetted Per. (ft)		1489.73	

Min Ch El (ft)	1025.40	Shear (lb/sq ft)	0.01
Alpha	1.00	Stream Power (lb/ft s)	0.01
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	13.82
C & E Loss (ft)	0.01	Cum SA (acres)	15.17

arning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.532

INPUT
Description: RM 6.532,HEC-1 RSSF Q=1490 CFS, 75th Ave.
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1030.95	5105	1028.8	5204	1028.29	5308	1028.61	5404	1029.56
5441	1029.87	5511	1029.77	5615	1028.99	5717	1028.63	5833	1028.73
5938	1028.94	6453	1029.83	7170	1033				

Manning's n Values num= 1

Sta	n Val
5000	.02

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	7170	135	135	135	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

E.G. Elev (ft)	1029.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.		0.020	
W.S. Elev (ft)	1029.46	Reach Len. (ft)	135.00	135.00	135.00
Crit W.S. (ft)		Flow Area (sq ft)		558.11	
E.G. Slope (ft/ft)	0.002839	Area (sq ft)		558.11	
Q Total (cfs)	1490.00	Flow (cfs)		1490.00	
Top Width (ft)	1007.68	Top Width (ft)		1007.68	
Vel Total (ft/s)	2.67	Avg. Vel. (ft/s)		2.67	
Max Chl Dpth (ft)	1.17	Hydr. Depth (ft)		0.55	
Conv. Total (cfs)	27964.5	Conv. (cfs)		27964.5	
Length Wtd. (ft)		Wetted Per. (ft)		1007.70	
Min Ch El (ft)	1028.29	Shear (lb/sq ft)		0.10	
Alpha	1.00	Stream Power (lb/ft s)		0.26	
Frctn Loss (ft)		Cum Volume (acre-ft)		13.82	
C & E Loss (ft)		Cum SA (acres)		15.17	

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: The user has entered a known water surface elevation at this cross section.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.506

INPUT
Description: RM 6.506
Station Elevation Data num= 120

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1030.2	5002.5	1030.2	5003.3	1030.7	5005.1	1031.4	5010.7	1029.8
5011.6	1029.7	5039.2	1028	5051.6	1029.1	5055.7	1029.4	5059.1	1029.1
5098.8	1029.3	5105	1029.3	5109.3	1029.2	5154.5	1028.2	5159.5	1027.4
5160.6	1027.6	5173.3	1027.7	5205.4	1028	5205.9	1028	5211.4	1028.2
5245.5	1028.7	5266.7	1028.9	5301.2	1028.2	5305.6	1028	5308.3	1027.8
5315.3	1026.5	5319.8	1025.8	5326	1027.3	5331.5	1028.6	5332.6	1028.6
5340.7	1028.7	5350.3	1028.8	5355.1	1028.9	5357.2	1028.9	5373.4	1029.5
5384.6	1029.5	5390.9	1029.6	5400.7	1029.2	5405	1029.1	5405.2	1029.1
5410.9	1029.1	5429.8	1029.2	5434	1029.2	5447.7	1028.7	5454.3	1028.6
5457.3	1028.5	5464.4	1028.6	5467.8	1026.3	5468	1026.1	5469.1	1026.1
5491.6	1024.9	5492.8	1025.4	5500.2	1028.9	5502.7	1028.8	5520.9	1029.3
5521.7	1029.4	5522.3	1029.4	5531.4	1029	5534.5	1028.6	5551.9	1027.3
5554.4	1027	5593.9	1027.4	5605	1027.4	5609.2	1027.4	5655	1027.7
5659.1	1027.7	5705	1027.5	5709.1	1027.5	5755	1027.3	5767.8	1027.6
5807	1027.8	5814.7	1028.4	5834.8	1027.6	5838.3	1027.5	5849.8	1027.5
5855.7	1027.4	5856.7	1027.5	5860.4	1027.4	5874.4	1027.1	5895.9	1027.5
5905.1	1027.7	5951.5	1027.9	5955.1	1027.9	5958.6	1028	6005.1	1028
6008.5	1028	6055	1027.9	6058.4	1027.9	6105	1028	6151.9	1028
6155	1028	6202	1027.9	6205	1027.9	6208.1	1027.9	6255.1	1028
6302.3	1028.3	6305.1	1028.3	6333.6	1028.4	6341.3	1028.5	6344	1028.5
6355.1	1028.6	6355.4	1028.6	6360	1029.1	6371.8	1029.1	6377.9	1029.2
6383.9	1028.4	6393.2	1027.5	6403.5	1026.2	6407.1	1025.9	6420.1	1025.3
6426.5	1024.9	6434.2	1024.8	6452.5	1024.6	6453.9	1024.5	6454.5	1024.5
6457	1024.5	6504.5	1024.5	6506.2	1024.5	6545.1	1024.9	6546.7	1024.8

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.04	5390.9	.03	5534.5	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.

5000	6546.7	500	500	500	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
6260	6546.7	1030

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5464.4	5500.2	1028.5	6377.9	6546.7	1030

CROSS SECTION OUTPUT Profile #PF#1

E.G. Elev (ft)	1028.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.036	
W.S. Elev (ft)	1028.44	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)	1028.17	Flow Area (sq ft)		592.34	
E.G. Slope (ft/ft)	0.005927	Area (sq ft)		606.93	
Q Total (cfs)	1490.00	Flow (cfs)		1490.00	
Top Width (ft)	937.56	Top Width (ft)		937.56	
Vel Total (ft/s)	2.52	Avg. Vel. (ft/s)		2.52	
Max Chl Dpth (ft)	2.64	Hydr. Depth (ft)		0.69	
Conv. Total (cfs)	19354.6	Conv. (cfs)		19354.6	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		861.68	
Min Ch El (ft)	1025.80	Shear (lb/sq ft)		0.25	
Alpha	1.00	Stream Power (lb/ft s)		0.64	
Frctn Loss (ft)	0.48	Cum Volume (acre-ft)		12.01	
C & E Loss (ft)	0.02	Cum SA (acres)		12.15	

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.412

INPUT
Description: RM 6.412, Q=1490 CFS, END OF REACH TOLLESON 1
Station Elevation Data num= 103

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1028.7	5006.5	1028.8	5017.7	1027.3	5018.5	1027.2	5022.4	1028.4
5024.8	1029.2	5025.4	1029.2	5031.8	1029.6	5044	1029.8	5060.9	1029.8
5095.5	1029.7	5128.8	1029.6	5136.6	1026.5	5138.1	1026	5170.4	1026
5173.9	1026	5174.9	1026	5189.2	1025.9	5200.2	1025.8	5224.1	1026.3
5224.9	1026.3	5366.1	1025.4	5384.4	1025.4	5410.6	1025.2	5435.5	1025.1
5445.6	1026.5	5446.1	1026.5	5447.6	1026.7	5453.1	1027.1	5465.9	1027.8
5467.9	1026.6	5469.5	1025.9	5474.7	1025.7	5490.6	1025.3	5492.6	1025.9
5496.4	1027.1	5503.5	1027.1	5518.3	1027.1	5521.9	1027.1	5549.6	1026.6
5575.2	1026.3	5606.9	1026.8	5625.3	1026.9	5645.1	1026.9	5675.3	1026.8
5703.2	1026.8	5725.3	1026.5	5751.3	1026.5	5775.4	1026.5	5799.4	1026.2
5825.4	1026.4	5837.2	1026.1	5846.5	1026.1	5862	1025.9	5867.9	1026.2
5871.1	1026.3	5875.4	1026.4	5879.4	1026.4	5880.1	1026.4	5880.6	1026.4
5881.6	1026.4	5898.2	1026.1	5918.5	1026.5	5925.5	1026.9	5957.8	1026.7
5975.5	1026.8	6009.9	1026.9	6025.6	1026.9	6062.1	1026.6	6075.6	1026.5
6114.2	1027	6125.7	1027.1	6166.3	1027.3	6175.7	1027.4	6218.4	1026.8
6225.7	1026.8	6270.6	1027.2	6275.8	1027.2	6280.6	1027.2	6325.8	1027.3
6327.2	1027.3	6366.4	1026.9	6375.7	1027.1	6375.8	1027.1	6376.7	1027.1
6382.3	1027.4	6383.4	1027.4	6386	1027.3	6394	1027.3	6402.3	1027.3
6410.1	1027.2	6413.8	1027.3	6425.4	1027.4	6425.9	1027.4	6433.9	1026.9
6446.9	1027.4	6450.7	1027.7	6459.4	1027.9	6521.2	1028.4	6526	1028.4
6569.3	1028.4	6576	1028.5	6600	1028.9				

Manning's n Values num= 2

Sta	n Val	Sta	n Val
5000	.03	5521.9	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6600	500	500	500	.1	.3

Left Levee Station= 5006.5 Elevation= 1028.8
Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
5050	5130	1035	5260	5430	1035	5465.9	5496.4	1027.1

CROSS SECTION OUTPUT Profile #PF#1

E.G. Elev (ft)	1028.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.033	
W.S. Elev (ft)	1028.02	Reach Len. (ft)			
Crit W.S. (ft)	1026.99	Flow Area (sq ft)		1485.69	
E.G. Slope (ft/ft)	0.000374	Area (sq ft)		1485.69	
Q Total (cfs)	1490.00	Flow (cfs)		1490.00	
Top Width (ft)	1180.30	Top Width (ft)		1180.30	
Vel Total (ft/s)	1.00	Avg. Vel. (ft/s)		1.00	
Max Chl Dpth (ft)	2.92	Hydr. Depth (ft)		1.26	
Conv. Total (cfs)	77074.0	Conv. (cfs)		77074.0	
Length Wtd. (ft)		Wetted Per. (ft)		1186.15	
Min Ch El (ft)	1025.10	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)		0.03	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Warning: Divided flow computed for this cross-section.

SUMMARY OF MANNING'S N VALUES

ver:Southern Pacific

Reach	River Sta.	n1	n2	n3
Tolleson 1	7.287	.08	.035	.04
Tolleson 1	7.264	.08	.035	
Tolleson 1	7.227	.08	.035	
Tolleson 1	7.169	.08	.035	
Tolleson 1	7.074	.08	.035	
Tolleson 1	7.033	.08	.035	
Tolleson 1	6.980	.07	.035	
Tolleson 1	6.885	.06	.035	
Tolleson 1	6.782	.035	.03	.03
Tolleson 1	6.723	.035	.03	.035
Tolleson 1	6.696	.035	.03	.035
Tolleson 1	6.601	.035	.03	.035
Tolleson 1	6.549	.035	.03	.035
Tolleson 1	6.532	.02		
Tolleson 1	6.506	.04	.03	.035
Tolleson 1	6.412	.03	.035	

SUMMARY OF REACH LENGTHS

River: Southern Pacific

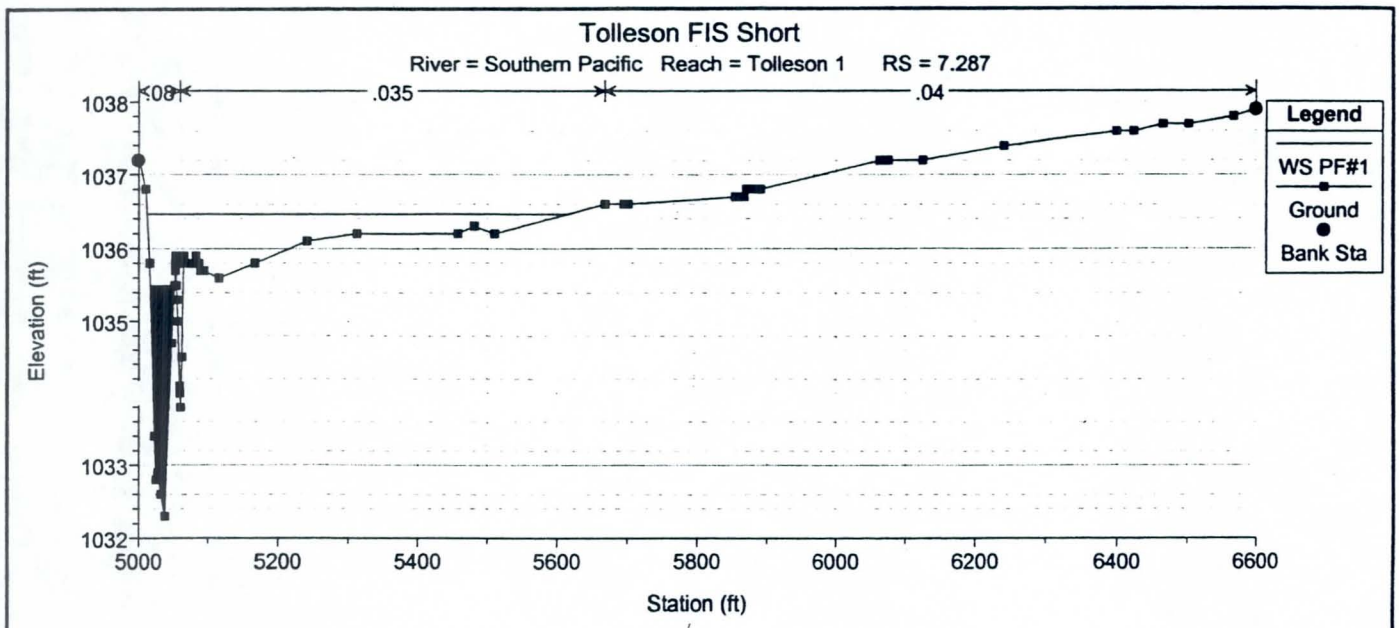
Reach	River Sta.	Left	Channel	Right
Tolleson 1	7.287	124	124	124
Tolleson 1	7.264	192	192	192
Tolleson 1	7.227	308	308	308
Tolleson 1	7.169	500	500	500
Tolleson 1	7.074	218	218	218
Tolleson 1	7.033	282	282	282
Tolleson 1	6.980	500	500	500
Tolleson 1	6.885	545	545	545
Tolleson 1	6.782	312	312	312
Tolleson 1	6.723	143	143	143
Tolleson 1	6.696	500	500	500
Tolleson 1	6.601	273	273	273
Tolleson 1	6.549	0	0	0
Tolleson 1	6.532	135	135	135
Tolleson 1	6.506	500	500	500
Tolleson 1	6.412	500	500	500

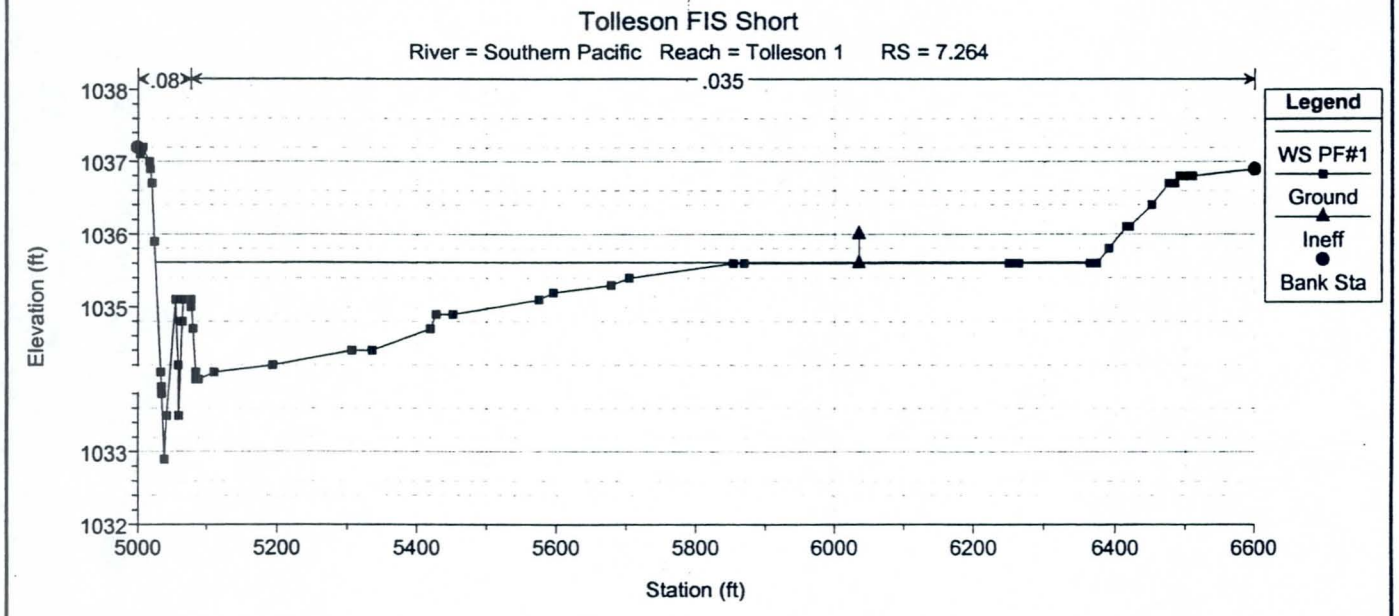
SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Southern Pacific

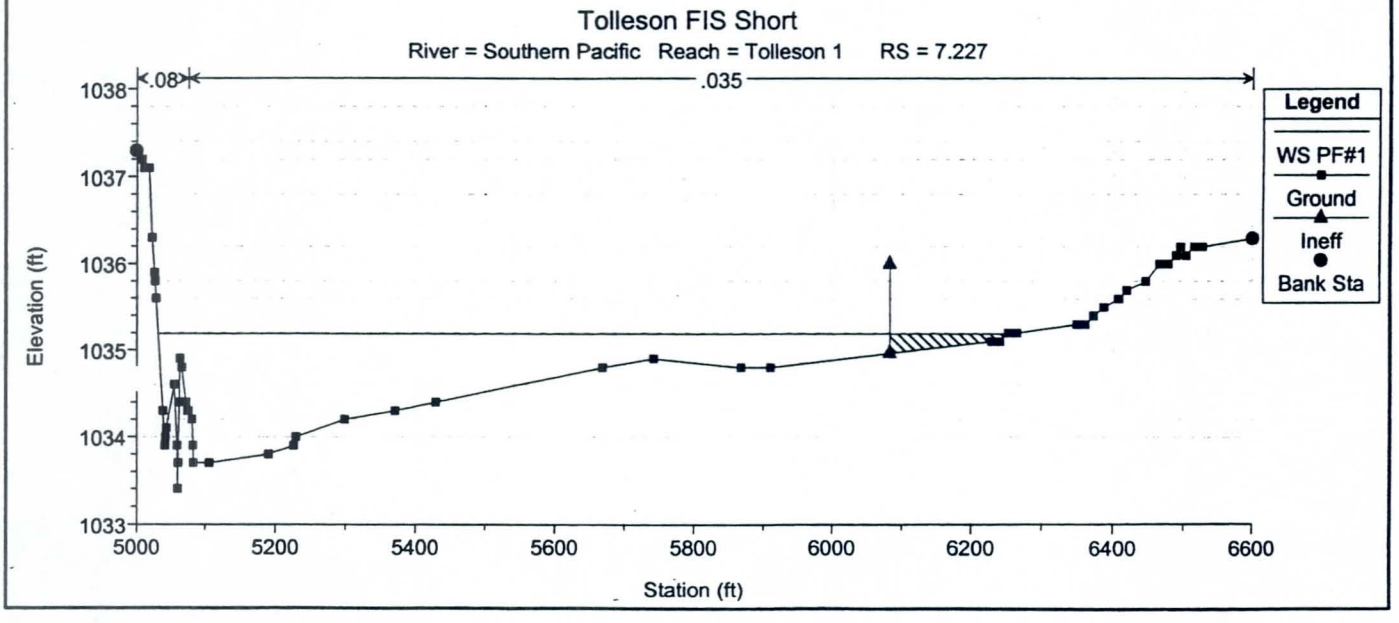
Reach	River Sta.	Contr.	Expan.
Tolleson 1	7.287	.1	.3
Tolleson 1	7.264	.1	.3
Tolleson 1	7.227	.1	.3
Tolleson 1	7.169	.1	.3
Tolleson 1	7.074	.1	.3
Tolleson 1	7.033	.1	.3
Tolleson 1	6.980	.1	.3
Tolleson 1	6.885	.1	.3
Tolleson 1	6.782	.1	.3
Tolleson 1	6.723	.1	.3
Tolleson 1	6.696	.1	.3
Tolleson 1	6.601	.1	.3
Tolleson 1	6.549	.1	.3
Tolleson 1	6.532	.1	.3
Tolleson 1	6.506	.1	.3
Tolleson 1	6.412	.1	.3

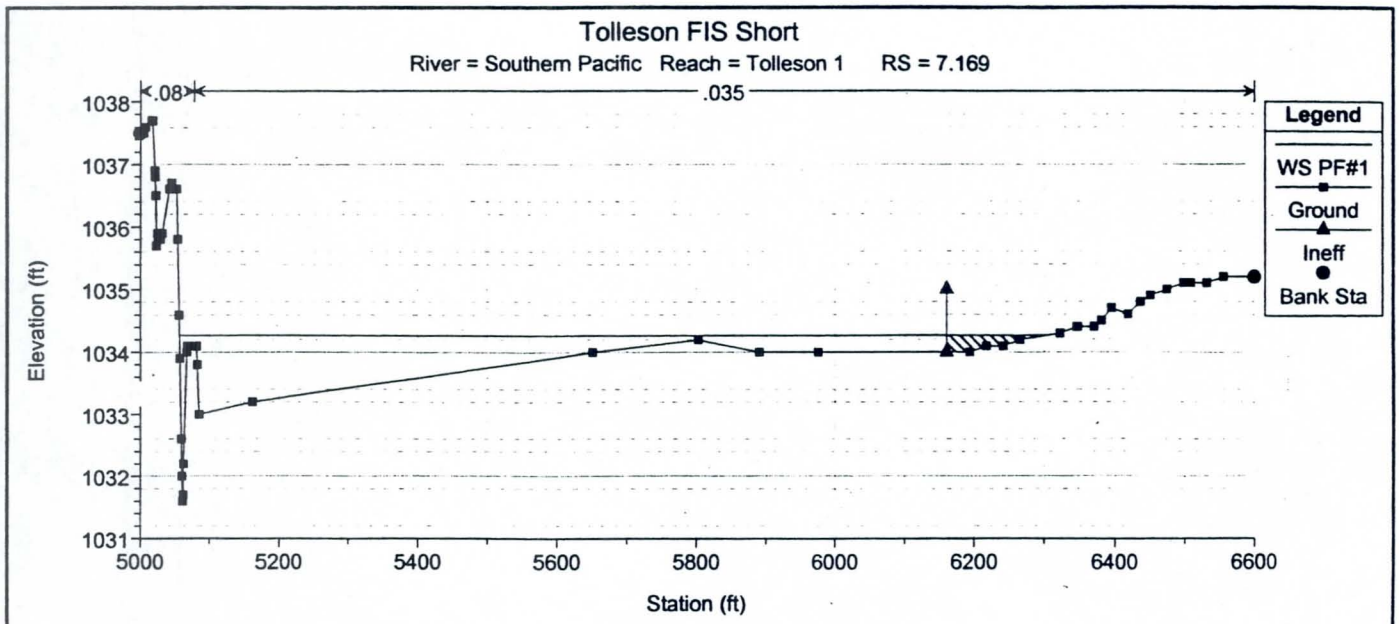
HEC-RAS Plan: Exist. Cond. River: Southern Pacific Reach: Tolleson 1

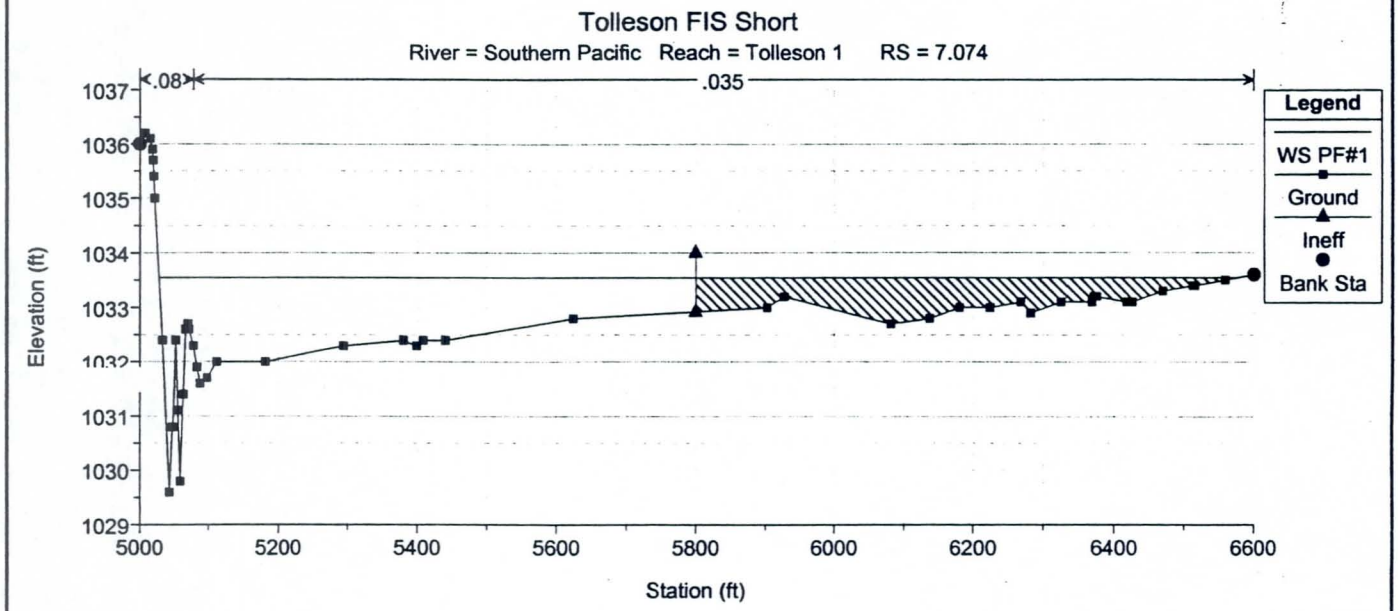
Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Tolleson 1	7.287	1020.00	1033.80	1036.46	1036.46	1036.71	0.034066	3.97	257.00	602.26	1.07
Tolleson 1	7.284	1020.00	1032.90	1035.61	1034.91	1035.65	0.002537	1.53	667.97	1347.83	0.33
Tolleson 1	7.227	1020.00	1033.40	1035.19	1034.68	1035.22	0.001968	1.42	718.78	1219.30	0.30
Tolleson 1	7.169	1020.00	1031.60	1034.27	1034.02	1034.32	0.005102	1.86	547.73	1246.50	0.47
Tolleson 1	7.074	1020.00	1029.60	1033.55	1032.64	1033.57	0.000696	1.14	892.32	1550.80	0.19
Tolleson 1	7.033	1020.00	1028.90	1032.89	1032.85	1033.10	0.024994	3.73	273.76	535.14	0.90
Tolleson 1	6.980	1020.00	1028.50	1031.83	1031.17	1031.88	0.001641	1.79	569.90	862.28	0.30
Tolleson 1	6.885	1020.00	1027.70	1031.49	1030.39	1031.50	0.000415	0.90	1135.41	1130.76	0.15
Tolleson 1	6.782	1020.00	1028.90	1030.58	1030.54	1030.83	0.012897	3.99	255.94	561.43	0.91
Tolleson 1	6.723	1020.00	1026.50	1029.89	1029.17	1029.92	0.001128	1.50	678.86	1071.56	0.25
Tolleson 1	6.696	1020.00	1026.30	1029.76	1028.99	1029.78	0.000844	1.27	804.82	1212.05	0.22
Tolleson 1	6.601	1020.00	1025.60	1029.62	1028.31	1029.62	0.000160	0.66	1537.65	1475.93	0.10
Tolleson 1	6.549	1490.00	1025.40	1029.57	1028.05	1029.58	0.000143	0.68	2177.18	1809.40	0.10
Tolleson 1	6.532	1490.00	1028.29	1029.46		1029.57	0.002839	2.67	558.11	1007.68	0.63
Tolleson 1	6.506	1490.00	1025.80	1028.44	1028.17	1028.54	0.005927	2.52	592.34	937.56	0.53
Tolleson 1	6.412	1490.00	1025.10	1028.02	1026.99	1028.04	0.000374	1.00	1485.69	1180.30	0.16

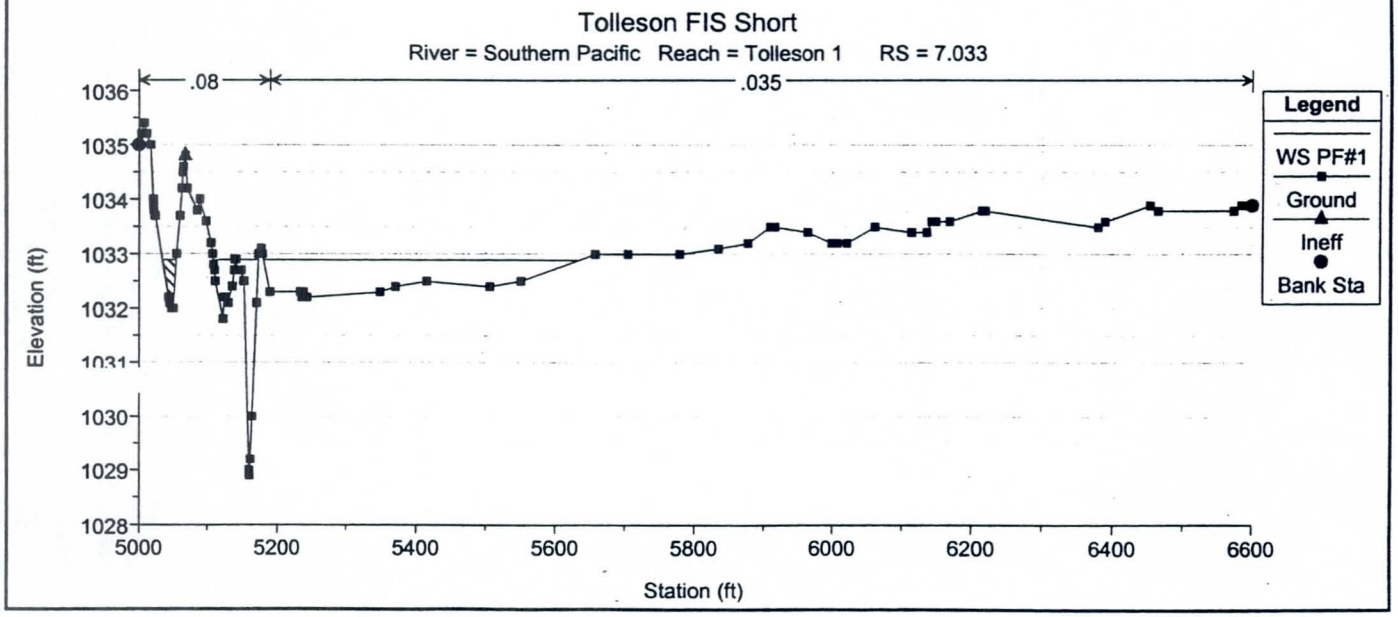

Tolleson FIS Short
River = Southern Pacific Reach = Tolleson 1 RS = 7.287
.08
.035
.04
Legend
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)

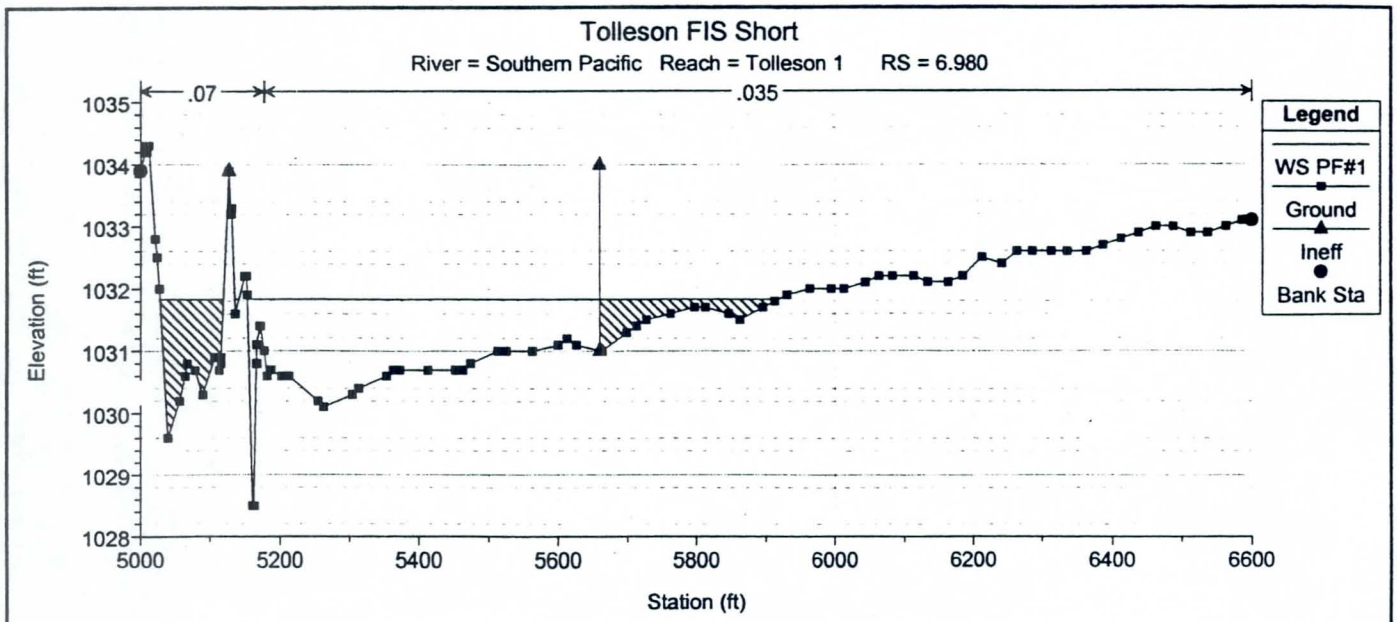

Tolleson FIS Short
River = Southern Pacific Reach = Tolleson 1 RS = 7.264
.08
.035
Legend
WS PF#1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

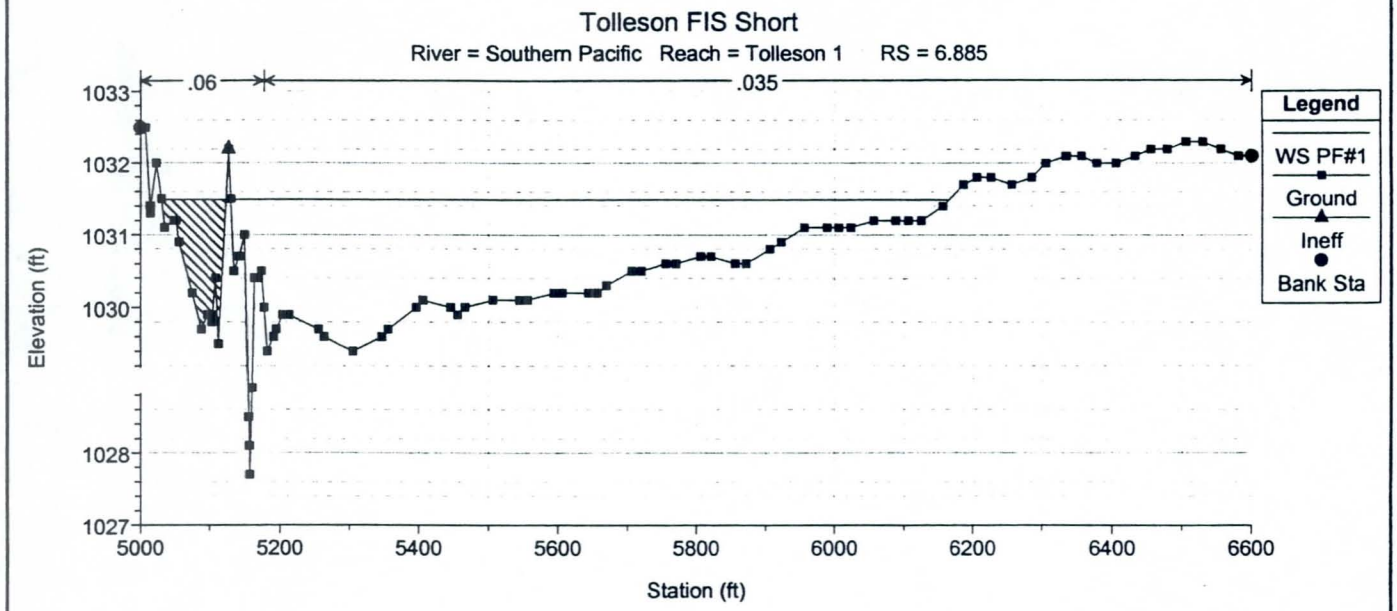

Tolleson FIS Short
River = Southern Pacific Reach = Tolleson 1 RS = 7.227
.08
.035
Legend
WS PF#1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

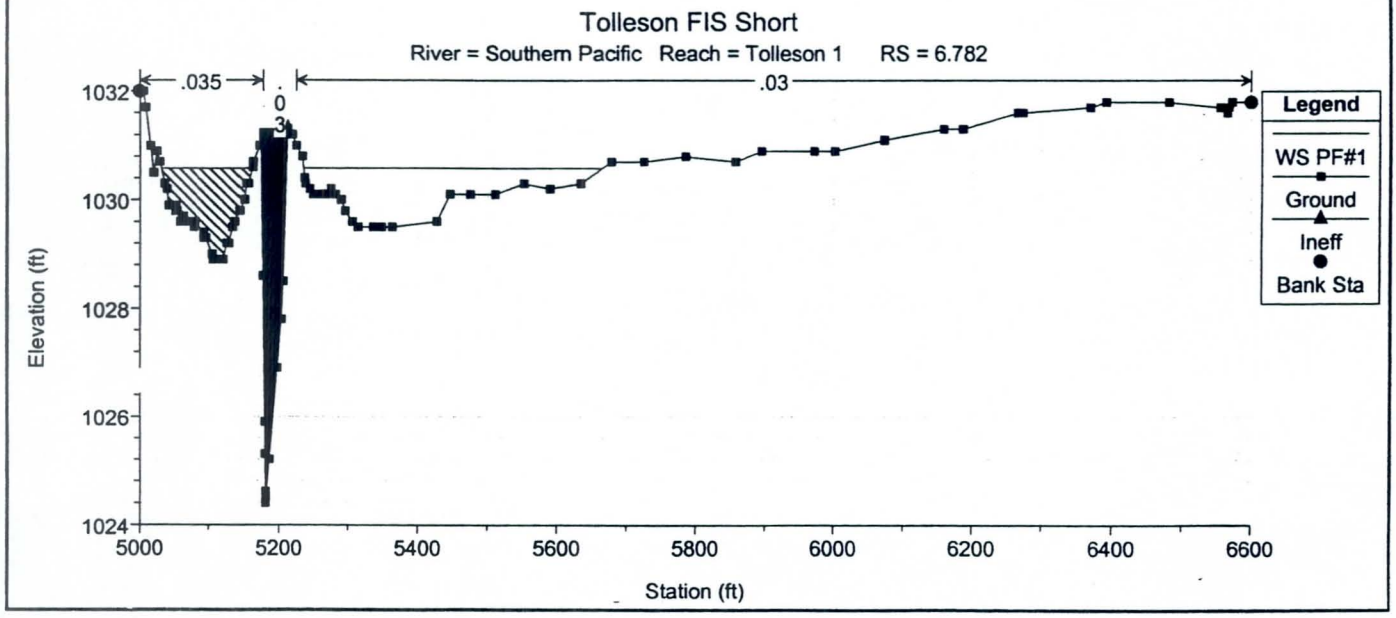

Tolleson FIS Short
River = Southern Pacific Reach = Tolleson 1 RS = 7.169
.08
.035
Legend
WS PF#1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

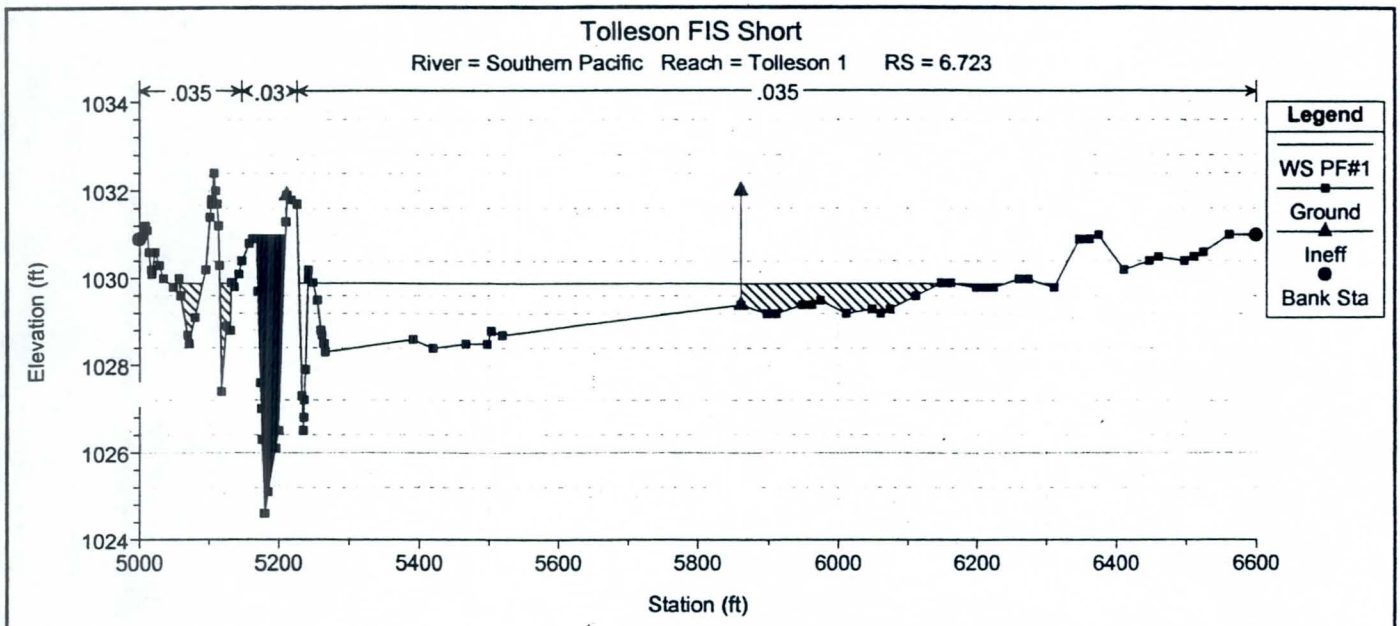

Tolleson FIS Short
River = Southern Pacific Reach = Tolleson 1 RS = 7.074
.08
.035
Legend
WS PF#1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

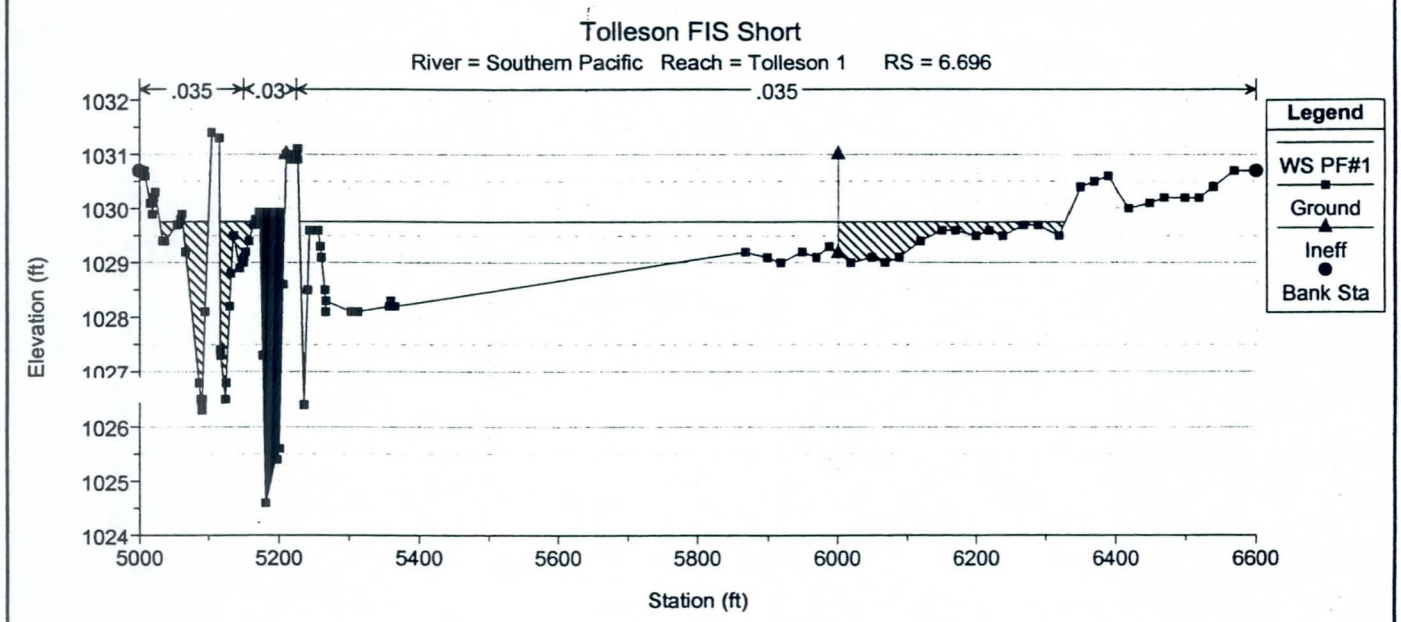

Tolleson FIS Short
River = Southern Pacific Reach = Tolleson 1 RS = 7.033
.08
.035
Legend
WS PF#1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

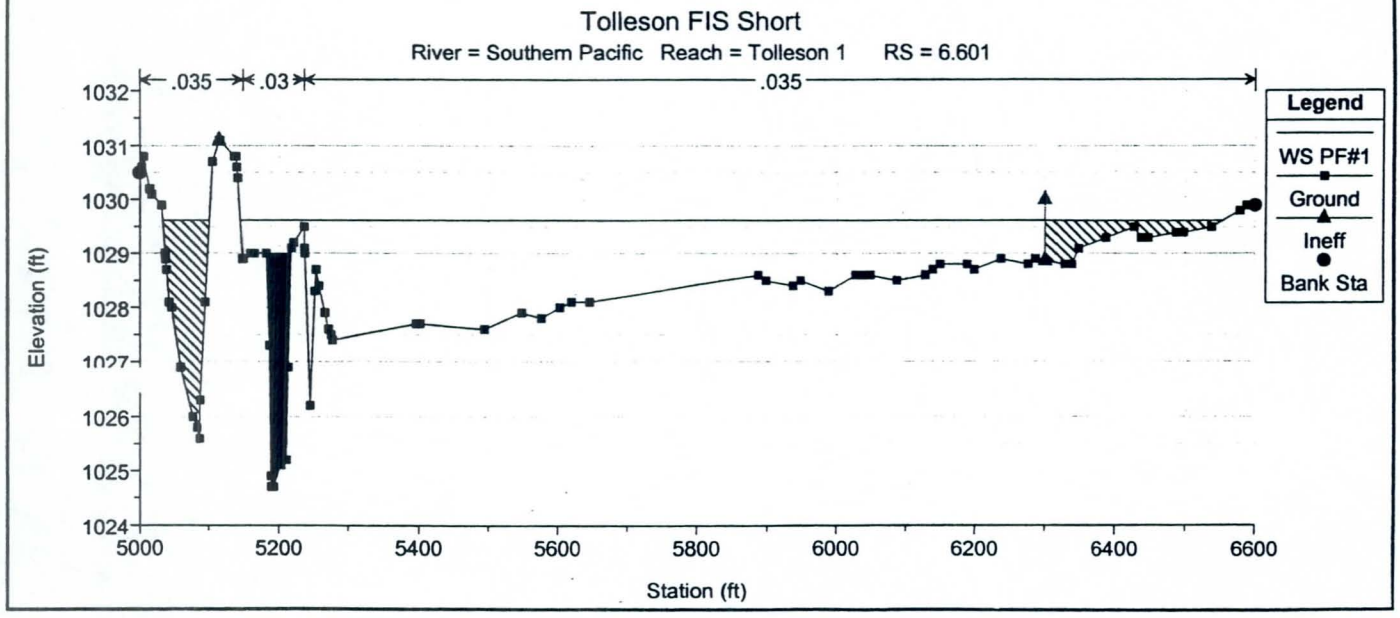

Tolleson FIS Short
River = Southern Pacific Reach = Tolleson 1 RS = 6.980
.07
.035
Legend
WS PF#1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

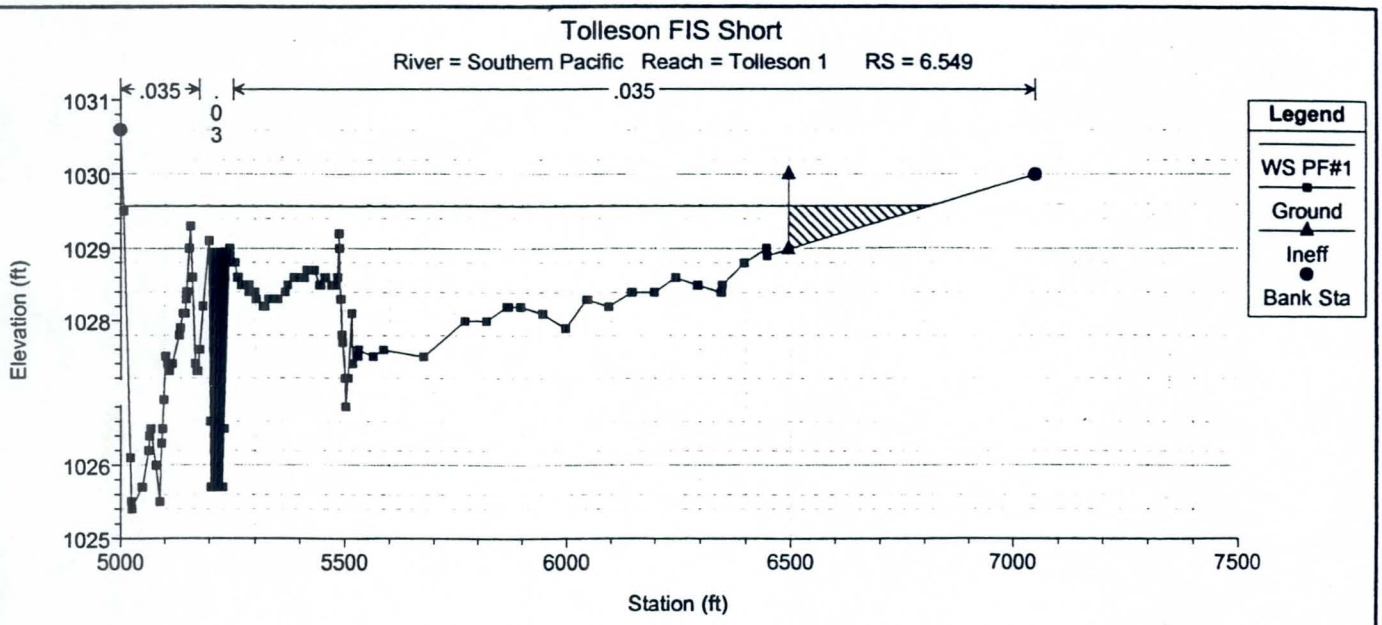

Tolleson FIS Short
River = Southern Pacific Reach = Tolleson 1 RS = 6.885
.06
.035
Legend
WS PF#1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

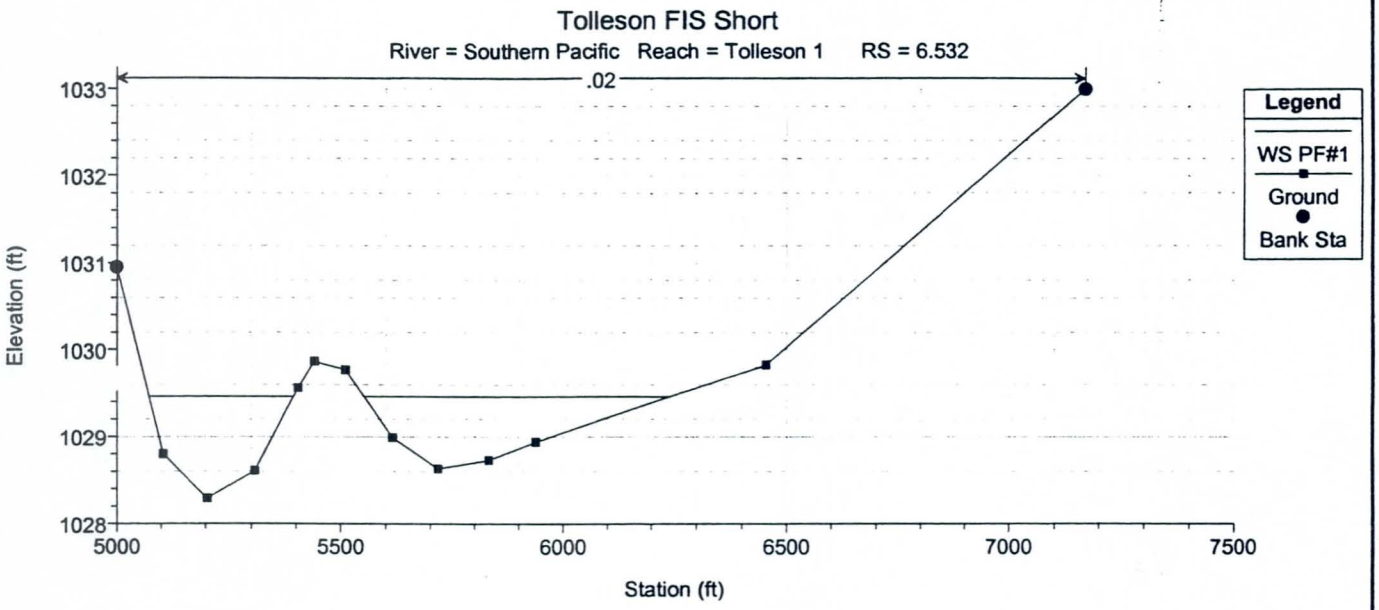

Tolleson FIS Short
River = Southern Pacific Reach = Tolleson 1 RS = 6.782
.035
.03
Legend
WS PF#1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

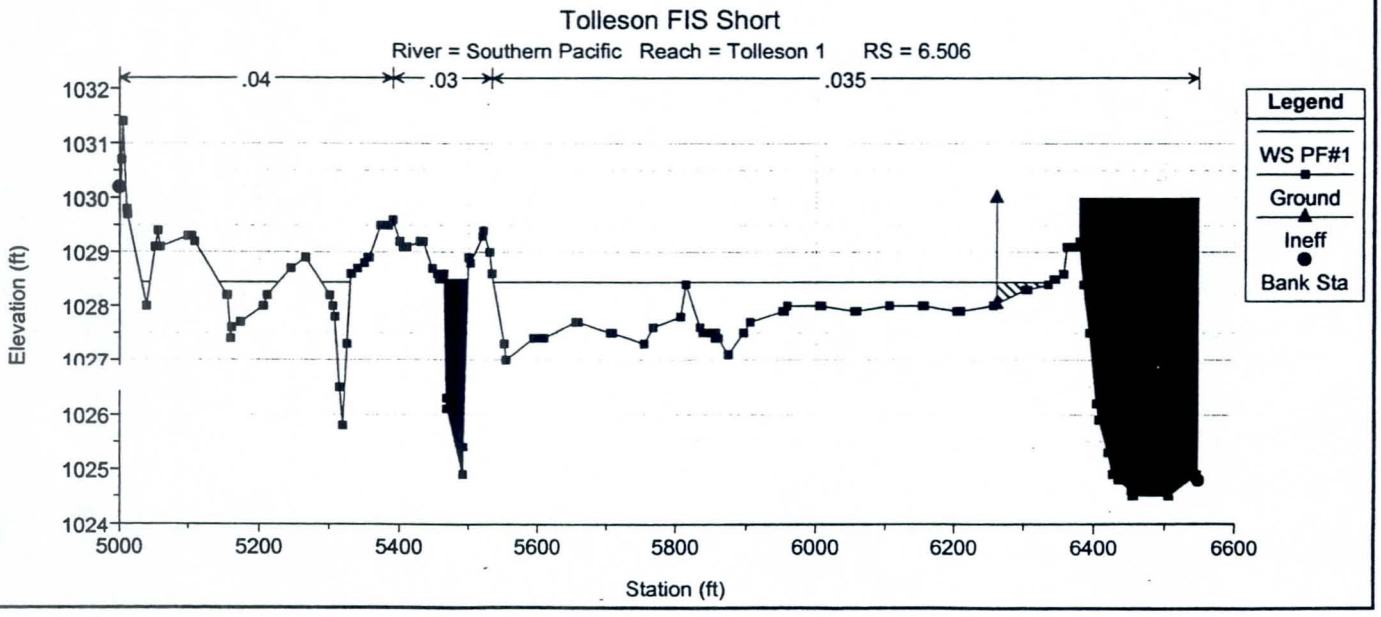

Tolleson FIS Short
River = Southern Pacific Reach = Tolleson 1 RS = 6.723
.035
.03
.035
Legend
WS PF#1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

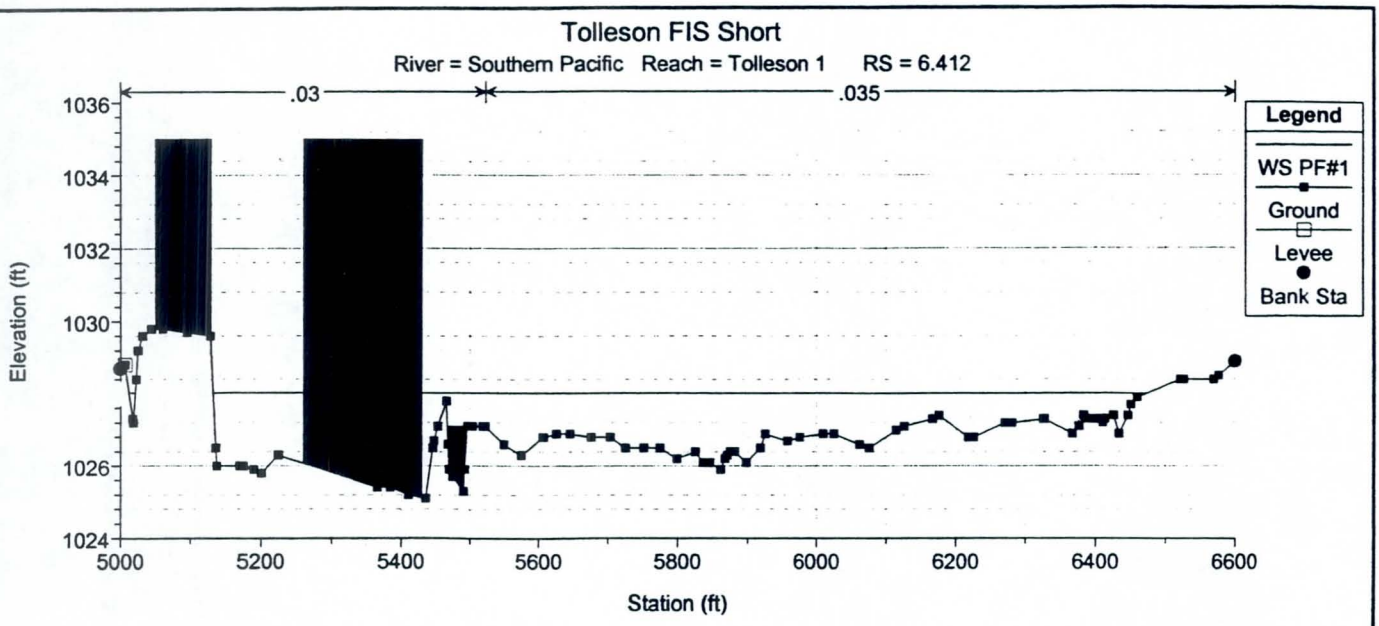

Tolleson FIS Short
River = Southern Pacific Reach = Tolleson 1 RS = 6.696
.035
.03
.035
Legend
WS PF#1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Tolleson FIS Short
River = Southern Pacific Reach = Tolleson 1 RS = 6.601
.035
.03
.035
Legend
WS PF#1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Tolleson FIS Short
River = Southern Pacific Reach = Tolleson 1 RS = 6.549
.035
.035
Legend
WS PF#1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Tolleson FIS Short
River = Southern Pacific Reach = Tolleson 1 RS = 6.532
.02
Legend
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)


Tolleson FIS Short
River = Southern Pacific Reach = Tolleson 1 RS = 6.506
.04
.03
.035
Legend
WS PF#1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Tolleson FIS Short
River = Southern Pacific Reach = Tolleson 1 RS = 6.412
.03
.035
Legend
WS PF#1
Ground
Levee
Bank Sta
Elevation (ft)
1036
1034
1032
1030
1026
1024
5000
5200
5400
5600
5800
6000
6200
6400
6600
Station (ft)

HEC-RAS September 1998 Version 2.2
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

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

REVISED EFFECTIVE
24-HOUR

PROJECT DATA
Project Title: Target Revised Effective, 24-hour
Project File : TGT24E.prj
Run Date and Time: 12/04/2000 9:40:30 AM

Project in English units

Project Description:
Target Revised Effective Model, 24-hour
Prepared By: Hoskin Engineering
Consultants, Inc.
HEC Project No.: 00-043
Date: 11-30-00
Description:
Original Tolleson Area floodplain study modified to the revised effective conditions. Flow change location added at cross-section 7.074. 100-year, 24-hour flows from revised effective HEC-1 model. Downstream reach length for section 6.549 corrected.

Original Model Info.:
Tolleson FIS, Project
FCD 95-26, El Mirage Road to 69th Avenue Alignment. August 17, 1998
Dibble &
Associates, Inc., with JE Fuller/Hydrology & Geomorphology, Inc.

The
Cross-section data were generated by ROADCALC from March 28, 1994 Topo flown by Kenney Aerial Mapping, Inc., NGVD 1929. Top-of-rail elevations and roadway/canal profile data were added to most cross-sections based on subsequent survey by Urban Engineering. Some cross sections were edited or added by hand.

Discharge data are from HEC-1 model for Tolleson Area dated December 1998 unless otherwise noted.

Hydrologic concentration points are
noted in cross-section descriptions using the corresponding HEC-1 IDs. The flow rates have been rounded to the nearest 10 cubic feet per second (cfs).

The floodplain was mapped utilizing HEC-RAS Version 2.1, dated October 1997.

PLAN DATA

Plan Title: Target Revised Effective, 24-hour
Plan File : g:\Filedir\00\00-043 Target S.W. Dist.Center\hydro\hec-ras\TGT24E.p02

Geometry Title: Existing Geometry
Geometry File : g:\Filedir\00\00-043 Target S.W. Dist.Center\hydro\hec-ras\TGT24E.g01

Flow Title : Flow from HEC-1 24-hr Model
Flow File : g:\Filedir\00\00-043 Target S.W. Dist.Center\hydro\hec-ras\TGT24E.f01

Plan Summary Information:

Number of:	Cross Sections	= 16	Mulitple Openings	=	0
	Culverts	= 0	Inline Weirs	=	0
	Bridges	= 0			

Computational Information

Water surface calculation tolerance	=	0.01
Critical depth calculaton tolerance	=	0.01
Maximum number of interations	=	20
Maximum difference tolerance	=	0.3
Flow tolerance factor	=	0.001

Computation Options
Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: Flow from HEC-1 24-hr Model
Flow File : g:\Filedir\00\00-043 Target S.W. Dist.Center\hydro\hec-ras\TGT24E.f01

Flow Data (cfs)

River	Reach	RS	PF#1
Southern Pacific	Tolleson 1	7.287	1020
Southern Pacific	Tolleson 1	7.074	1099
Southern Pacific	Tolleson 1	6.549	1451

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Southern Pacific	Tolleson 1	PF#1		Known WS = 1028.02

Changes in WS and EG

River	Reach	RS	Profile		Type	Value
Southern Pacific	Tolleson 1	6.532	PF#1	Known WS	1029.46	
Southern Pacific	Tolleson 2	5.539	PF#1	Known WS	1024.18	
Southern Pacific	Tolleson 2	5.054	PF#1	Known WS	1015.2	
Southern Pacific	Tolleson 2	3.568	PF#1	Known WS	1003.1	
Southern Pacific	Tolleson 2	1.771	PF#1	Known WS	992	
Southern Pacific	Tolleson 2	1.138	PF#1	Known WS	986.3	
Canal	Canal Split	5.798	PF#1	Known WS	1026.92	
Canal	Canal Split	5.578	PF#1	Known WS	1026.3	

GEOMETRY DATA

Geometry Title: Existing Geometry
Geometry File : g:\Filedir\00\00-043 Target S.W. Dist.Center\hydro\hec-ras\TGT24E.g01

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 7.287

INPUT
Description: RM 7.287, HEC-1 CPUB1 Q=1020 CFS, Begin Detailed Study By Dibble & JEF, 69th Avenue Alignment.

Station Elevation Data num= 65

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1037.2	5001.6	1037.2	5010.1	1036.8	5010.2	1036.8	5010.5	1036.8
5010.7	1036.8	5016	1035.8	5023	1033.4	5025.2	1032.8	5027.8	1032.9
5032	1032.6	5038.3	1032.3	5048.1	1034.7	5051.9	1035.5	5053.3	1035.7
5053.5	1035.8	5053.6	1035.8	5054	1035.9	5054.1	1035.8	5054.3	1035.8
5055	1035.5	5055.6	1035.3	5056.5	1035	5059.4	1034.1	5059.9	1034
5060.7	1033.8	5062.5	1034.5	5065.5	1035.9	5066.5	1035.8	5072.1	1035.8
5076.6	1035.8	5081	1035.8	5082.8	1035.9	5087.3	1035.8	5089.7	1035.7
5094.2	1035.7	5115.9	1035.6	5167.7	1035.8	5241.4	1036.1	5312.7	1036.2
5457.9	1036.2	5481.4	1036.3	5510.7	1036.2	5668.1	1036.6	5695.3	1036.6
5701.3	1036.6	5854.7	1036.7	5862	1036.7	5867.4	1036.7	5870.3	1036.8
5879.9	1036.8	5891	1036.8	6062.7	1037.2	6066	1037.2	6067	1037.2
6070.1	1037.2	6075.3	1037.2	6124.6	1037.2	6240.6	1037.4	6398.7	1037.6
6423.9	1037.6	6465.8	1037.7	6502.5	1037.7	6567.4	1037.8	6600	1037.9

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.08	5059.9	.035	5668.1	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6600	124	124	124	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
5000	5055	1035.5

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
E.G. Elev (ft)	1036.71	Element			
Vel Head (ft)	0.24	Wt. n-Val.		0.042	
W.S. Elev (ft)	1036.46	Reach Len. (ft)	124.00	124.00	124.00
Crit W.S. (ft)	1036.46	Flow Area (sq ft)		257.00	
E.G. Slope (ft/ft)	0.034066	Area (sq ft)		257.00	
Q Total (cfs)	1020.00	Flow (cfs)		1020.00	
Top Width (ft)	602.26	Top Width (ft)		602.26	
Vel Total (ft/s)	3.97	Avg. Vel. (ft/s)		3.97	

Max Chl Dpth (ft)	2.66	Hydr. Depth (ft)	0.43
Conv. Total (cfs)	5526.4	Conv. (cfs)	5526.4
Length Wtd. (ft)	124.00	Wetted Per. (ft)	603.23
Min Ch El (ft)	1033.80	Shear (lb/sq ft)	0.91
Alpha	1.00	Stream Power (lb/ft s)	3.60
Frctn Loss (ft)	0.78	Cum Volume (acre-ft)	125.16
C & E Loss (ft)	0.06	Cum SA (acres)	123.09

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 7.264

INPUT
Description: RM 7.264
Station Elevation Data num= 56

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1037.2	5003.1	1037.1	5007.3	1037.2	5016.5	1037	5018.1	1036.9
5020.1	1036.7	5023.8	1035.9	5033.2	1034.1	5034	1033.9	5034.5	1033.8
5038.9	1032.9	5041.7	1033.5	5054.9	1035.1	5058.4	1034.2	5059.5	1033.5
5064.3	1034.8	5065.3	1035.1	5070.4	1035.1	5076.9	1035	5077.2	1035.1
5080.2	1034.7	5083.7	1034.1	5084	1034	5088.1	1034	5110.4	1034.1
5193.6	1034.2	5306.8	1034.4	5336	1034.4	5419.5	1034.7	5427.6	1034.9
5451.5	1034.9	5575.5	1035.1	5595.7	1035.2	5678.4	1035.3	5704.2	1035.4
5853.6	1035.6	5869.4	1035.6	6249.8	1035.6	6254.3	1035.6	6258.8	1035.6
6263.3	1035.6	6363.5	1035.6	6367.8	1035.6	6372.1	1035.6	6390.1	1035.8
6415.5	1036.1	6419.7	1036.1	6451.5	1036.4	6475.9	1036.7	6480.1	1036.7
6484.3	1036.7	6491.3	1036.8	6500.9	1036.8	6505.1	1036.8	6509.3	1036.8
6600	1036.9								

Manning's n Values num= 2

Sta	n Val	Sta	n Val
5000	.08	5076.9	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6600	192	192	192	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
6035	6600	1036

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
E.G. Elev (ft)	1035.65	Element			
Vel Head (ft)	0.04	Wt. n-Val.		0.038	
W.S. Elev (ft)	1035.61	Reach Len. (ft)	192.00	192.00	192.00
Crit W.S. (ft)	1034.91	Flow Area (sq ft)		668.34	
E.G. Slope (ft/ft)	0.002532	Area (sq ft)		672.34	
Q Total (cfs)	1020.00	Flow (cfs)		1020.00	
Top Width (ft)	1347.86	Top Width (ft)		1347.86	
Vel Total (ft/s)	1.53	Avg. Vel. (ft/s)		1.53	
Max Chl Dpth (ft)	2.71	Hydr. Depth (ft)		0.66	
Conv. Total (cfs)	20269.6	Conv. (cfs)		20269.6	
Length Wtd. (ft)	192.00	Wetted Per. (ft)		1010.77	
Min Ch El (ft)	1032.90	Shear (lb/sq ft)		0.10	
Alpha	1.00	Stream Power (lb/ft s)		0.16	
Frctn Loss (ft)	0.43	Cum Volume (acre-ft)		123.83	
C & E Loss (ft)	0.00	Cum SA (acres)		120.31	

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 7.227

INPUT
Description: RM 7.227
Station Elevation Data num= 57

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1037.3	5007.8	1037.2	5010.5	1037.1	5018.1	1037.1	5022.2	1036.3
5025.9	1035.9	5026.7	1035.8	5027.9	1035.6	5038.2	1034.3	5041.1	1033.9
5042	1034	5043.2	1034.1	5054.9	1034.6	5058.8	1033.9	5058.9	1033.9
5060	1033.4	5060.5	1033.7	5062	1034.4	5063.2	1034.9	5066	1034.8
5071.6	1034.4	5073.9	1034.3	5075.3	1034.3	5081.1	1034.2	5082.6	1033.9
5083	1033.7	5083.1	1033.7	5106	1033.7	5190.3	1033.8	5225.9	1033.9
5229.3	1034	5298.7	1034.2	5371.1	1034.3	5429.3	1034.4	5667.9	1034.8
5742	1034.9	5867.6	1034.8	5909.9	1034.8	6227.9	1035.1	6239.9	1035.1
6251.9	1035.2	6263.9	1035.2	6347.7	1035.3	6359.4	1035.3	6371.2	1035.4
6386.3	1035.5	6407.5	1035.6	6419.2	1035.7	6445.8	1035.8	6466.2	1036
6477.9	1036	6489.5	1036.1	6495.4	1036.2	6503.5	1036.1	6515.2	1036.2
6526.8	1036.2	6600	1036.3						

Manning's n Values num= 2

Sta	n Val	Sta	n Val
5000	.08	5075.3	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6600	308	308	308	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
6082	6600	1036

CROSS SECTION OUTPUT Profile #PF#1

E.G. Elev (ft)	1035.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.036	
W.S. Elev (ft)	1035.18	Reach Len. (ft)	308.00	308.00	308.00
Crit W.S. (ft)	1034.68	Flow Area (sq ft)		714.54	
E.G. Slope (ft/ft)	0.002007	Area (sq ft)		738.27	
Q Total (cfs)	1020.00	Flow (cfs)		1020.00	
Top Width (ft)	1218.78	Top Width (ft)		1218.78	
Vel Total (ft/s)	1.43	Avg. Vel. (ft/s)		1.43	
Max Chl Dpth (ft)	1.78	Hydr. Depth (ft)		0.68	
Conv. Total (cfs)	22766.7	Conv. (cfs)		22766.7	
Length Wtd. (ft)	308.00	Wetted Per. (ft)		1051.51	
Min Ch El (ft)	1033.40	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)		0.12	
Frctn Loss (ft)	0.88	Cum Volume (acre-ft)		120.73	
C & E Loss (ft)	0.00	Cum SA (acres)		114.66	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 7.169

INPUT
Description: RM 7.169
Station Elevation Data num= 58

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1037.5	5004.8	1037.5	5007.2	1037.6	5016.1	1037.7	5017.4	1037.7
5020.7	1036.9	5021.1	1036.8	5022.3	1036.5	5023	1035.7	5024.2	1035.9
5025.5	1035.8	5028.4	1035.8	5031.1	1035.9	5042	1036.6	5042.6	1036.6
5045.2	1036.7	5045.3	1036.7	5052.3	1036.6	5053.8	1035.8	5056	1034.6
5057.3	1033.9	5059.6	1032.6	5060.5	1032	5061.3	1031.6	5062	1031.7
5062.8	1032.2	5067	1034	5067.4	1034	5068.1	1034.1	5077.7	1034.1
5078.9	1034.1	5081.3	1034.1	5082.3	1033.8	5085.2	1033	5162.5	1033.2
5651.1	1034	5803.1	1034.2	5890.3	1034	5975.4	1034	6192.9	1034
6216.9	1034.1	6240.9	1034.1	6264.9	1034.2	6322.3	1034.3	6346.1	1034.4
6369.9	1034.4	6380.3	1034.5	6394.8	1034.7	6418.6	1034.6	6436.8	1034.8
6450.8	1034.9	6474.5	1035	6498.2	1035.1	6502.2	1035.1	6507.8	1035.1
6531.5	1035.1	6555.2	1035.2	6600	1035.2				

Manning's n Values num= 2

Sta	n Val	Sta	n Val
5000	.08	5077.7	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6600	500	500	500	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
6160	6600	1035

CROSS SECTION OUTPUT Profile #PF#1

E.G. Elev (ft)	1034.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.036	
W.S. Elev (ft)	1034.28	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)	1034.02	Flow Area (sq ft)		565.11	
E.G. Slope (ft/ft)	0.004595	Area (sq ft)		589.47	
Q Total (cfs)	1020.00	Flow (cfs)		1020.00	
Top Width (ft)	1255.56	Top Width (ft)		1255.56	
Vel Total (ft/s)	1.80	Avg. Vel. (ft/s)		1.80	
Max Chl Dpth (ft)	2.68	Hydr. Depth (ft)		0.51	
Conv. Total (cfs)	15046.5	Conv. (cfs)		15046.5	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		1104.81	
Min Ch El (ft)	1031.60	Shear (lb/sq ft)		0.15	
Alpha	1.00	Stream Power (lb/ft s)		0.26	
Frctn Loss (ft)	0.71	Cum Volume (acre-ft)		116.03	
C & E Loss (ft)	0.01	Cum SA (acres)		105.91	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 7.074

INPUT
Description: RM 7.074, HEC-1 CPSF1 Q=1099 CFS
Station Elevation Data num= 54

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

5000	1036	5002.5	1036	5007.2	1036.2	5014.7	1036.1	5017.9	1035.9
5019.1	1035.7	5019.8	1035.4	5020	1035.4	5021.2	1035	5032.5	1032.4
5042.9	1029.6	5047	1030.8	5047.7	1030.8	5052.2	1032.4	5055.4	1031.1
5058.3	1029.8	5063.3	1031.4	5066.2	1032.6	5069.5	1032.7	5069.8	1032.7
5071.4	1032.6	5077.9	1032.3	5082.7	1031.9	5087.6	1031.6	5098	1031.7
5112.2	1032	5181	1032	5294.6	1032.3	5380.6	1032.4	5399.6	1032.3
5408.8	1032.4	5440.5	1032.4	5624.1	1032.8	5902.3	1033	5927.3	1033.2
6081.5	1032.7	6136.7	1032.8	6180.1	1033	6223.5	1033	6266.9	1033.1
6281.5	1032.9	6324.9	1033.1	6368.1	1033.1	6370.8	1033.2	6374.6	1033.2
6417.8	1033.1	6422.5	1033.1	6426.1	1033.1	6469.3	1033.3	6512.5	1033.4
6513.6	1033.4	6515	1033.4	6558.1	1033.5	6600	1033.6		

Manning's n Values num= 2

Sta	n Val	Sta	n Val
5000	.08	5077.9	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6600	218	218	218	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
5800	6600	1034

CROSS SECTION OUTPUT Profile #PF#1

E.G. Elev (ft)	1033.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.038	
W.S. Elev (ft)	1033.59	Reach Len. (ft)	218.00	218.00	218.00
Crit W.S. (ft)	1032.69	Flow Area (sq ft)		925.99	
E.G. Slope (ft/ft)	0.000713	Area (sq ft)		1344.39	
Q Total (cfs)	1099.00	Flow (cfs)		1099.00	
Top Width (ft)	1569.25	Top Width (ft)		1569.25	
Vel Total (ft/s)	1.19	Avg. Vel. (ft/s)		1.19	
Max Chl Dpth (ft)	3.99	Hydr. Depth (ft)		1.20	
Conv. Total (cfs)	41153.5	Conv. (cfs)		41153.5	
Length Wtd. (ft)	218.00	Wetted Per. (ft)		774.70	
Min Ch El (ft)	1029.60	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)		0.06	
Frctn Loss (ft)	0.45	Cum Volume (acre-ft)		104.93	
C & E Loss (ft)	0.02	Cum SA (acres)		89.70	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 7.033

INPUT
Description: RM 7.033
Station Elevation Data num= 94

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1035	5003.7	1035.2	5007.5	1035.4	5011.1	1035.2	5016.5	1035
5020.3	1034	5020.7	1033.9	5021.2	1033.8	5022.4	1033.7	5022.6	1033.7
5023.1	1033.7	5023.5	1033.7	5042.6	1032.2	5042.9	1032.2	5044.3	1032.1
5046.9	1032	5049.5	1032	5054.4	1033	5059.5	1033.7	5062	1034.2
5063.5	1034.5	5064.4	1034.6	5064.5	1034.6	5067.1	1034.8	5067.3	1034.8
5069.9	1034.2	5084.7	1033.8	5088.7	1034	5098.2	1033.6	5105.6	1033.2
5107.9	1033	5109.3	1032.8	5110.7	1032.7	5111.5	1032.5	5123.1	1031.8
5124.1	1032.2	5126.7	1032.2	5130.3	1032.1	5135.8	1032.4	5138.9	1032.7
5139.4	1032.9	5141.4	1032.9	5143.2	1032.7	5148	1032.7	5152	1032.5
5159.4	1029	5159.9	1028.9	5161.3	1029.2	5163.6	1030	5169.7	1032.1
5172.7	1033	5176.4	1033.1	5178.4	1033	5188.6	1032.3	5189.2	1032.3
5232.8	1032.3	5235.5	1032.2	5238.7	1032.3	5243.7	1032.2	5348.4	1032.3
5370.5	1032.4	5415.1	1032.5	5506	1032.4	5551.3	1032.5	5657.2	1033
5703.9	1033	5779.2	1033	5834.5	1033.1	5876.7	1033.2	5909	1033.5
5915.8	1033.5	5963.8	1033.4	5998.1	1033.2	6002.1	1033.2	6005.5	1033.2
6005.9	1033.2	6006.1	1033.2	6020.1	1033.2	6061	1033.5	6112.7	1033.4
6135	1033.4	6141.9	1033.6	6147.5	1033.6	6168.1	1033.6	6214.5	1033.8
6218.6	1033.8	6378.9	1033.5	6388.6	1033.6	6453	1033.9	6464.7	1033.8
6573.5	1033.8	6584.3	1033.9	6589.6	1033.9	6600	1033.9		

Manning's n Values num= 2

Sta	n Val	Sta	n Val
5000	.08	5189.2	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6600	282	282	282	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
5000	5067.1	1034.8

CROSS SECTION OUTPUT Profile #PF#1

E.G. Elev (ft)	1033.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.22	Wt. n-Val.		0.043	
W.S. Elev (ft)	1032.93	Reach Len. (ft)	282.00	282.00	282.00
Crit W.S. (ft)	1032.85	Flow Area (sq ft)		294.44	
E.G. Slope (ft/ft)	0.023266	Area (sq ft)		305.94	
Q Total (cfs)	1099.00	Flow (cfs)		1099.00	
Top Width (ft)	547.36	Top Width (ft)		547.36	

Vel Total (ft/s)	3.73	Avg. Vel. (ft/s)	3.73
Max Chl Dpth (ft)	4.03	Hydr. Depth (ft)	0.56
Conv. Total (cfs)	7205.0	Conv. (cfs)	7205.0
Length Wtd. (ft)	282.00	Wetted Per. (ft)	528.32
Min Ch El (ft)	1028.90	Shear (lb/sq ft)	0.81
Alpha	1.00	Stream Power (lb/ft s)	3.02
Frctn Loss (ft)	1.17	Cum Volume (acre-ft)	100.80
C & E Loss (ft)	0.05	Cum SA (acres)	84.40

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.980

INPUT
Description: RM 6.980
Station Elevation Data num= 95

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1033.9	5006.3	1034.2	5008	1034.3	5009.1	1034.2	5011.8	1034.3
5020.8	1032.8	5023.5	1032.5	5026.8	1032	5039.1	1029.6	5056.3	1030.2
5063.9	1030.6	5066.9	1030.8	5078.3	1030.7	5089.7	1030.3	5106.3	1030.9
5108.9	1030.9	5113.4	1030.7	5115.8	1030.8	5116	1030.9	5127.5	1033.9
5129.7	1033.2	5130.9	1033.2	5131.3	1033.3	5136.1	1031.6	5149.6	1032.2
5152.5	1032.2	5153.3	1031.9	5161	1028.5	5162.7	1028.5	5162.9	1028.5
5166.2	1030.8	5166.5	1031.1	5166.8	1031.1	5171.5	1031.4	5176.7	1031
5180.9	1030.6	5187	1030.7	5201.8	1030.6	5212.9	1030.6	5254.9	1030.2
5262.9	1030.1	5304.2	1030.3	5312.9	1030.4	5353.6	1030.6	5362.9	1030.7
5372.6	1030.7	5412.9	1030.7	5452.2	1030.7	5463	1030.7	5474	1030.8
5513	1031	5524.7	1031	5563	1031	5600.1	1031.1	5613	1031.2
5626.2	1031.1	5663	1031	5698.8	1031.3	5713	1031.4	5727.6	1031.5
5763	1031.6	5797.4	1031.7	5813	1031.7	5846.7	1031.6	5863	1031.5
5896	1031.7	5913	1031.8	5930.4	1031.9	5963	1032	5994.6	1032
6013	1032	6043.9	1032.1	6063	1032.2	6082.6	1032.2	6113	1032.2
6133.3	1032.1	6163	1032.1	6184	1032.2	6213	1032.5	6241.2	1032.4
6263	1032.6	6285.5	1032.6	6313	1032.6	6336.2	1032.6	6363	1032.6
6386.9	1032.7	6413	1032.8	6438.5	1032.9	6463.1	1033	6488.3	1033
6513.1	1032.9	6537.1	1032.9	6563.1	1033	6586.4	1033.1	6600	1033.1

Manning's n Values num= 2

Sta	n Val	Sta	n Val
5000	.07	5176.7	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6600	500	500	500	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5127.5	1033.9	5660	6600	1034

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
E.G. Elev (ft)	1031.93	Element			
Vel Head (ft)	0.05	Wt. n-Val.		0.036	
W.S. Elev (ft)	1031.88	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)	1031.20	Flow Area (sq ft)		596.51	
E.G. Slope (ft/ft)	0.001639	Area (sq ft)		811.17	
Q Total (cfs)	1099.00	Flow (cfs)		1099.00	
Top Width (ft)	873.21	Top Width (ft)		873.21	
Vel Total (ft/s)	1.84	Avg. Vel. (ft/s)		1.84	
Max Chl Dpth (ft)	3.38	Hydr. Depth (ft)		1.16	
Conv. Total (cfs)	27142.2	Conv. (cfs)		27142.2	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		515.44	
Min Ch El (ft)	1028.50	Shear (lb/sq ft)		0.12	
Alpha	1.00	Stream Power (lb/ft s)		0.22	
Frctn Loss (ft)	0.37	Cum Volume (acre-ft)		97.19	
C & E Loss (ft)	0.01	Cum SA (acres)		79.80	

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.885

INPUT
Description: RM 6.885
Station Elevation Data num= 96

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1032.5	5005.5	1032.5	5005.8	1032.5	5006.4	1032.5	5006.8	1032.5
5013.4	1031.4	5013.9	1031.3	5014.3	1031.4	5022.6	1032	5029.8	1031.5
5034.5	1031.1	5048.1	1031.2	5050.9	1031.2	5055.2	1030.9	5074.7	1030.2
5087.9	1029.7	5096.4	1029.9	5101.8	1029.9	5103.3	1029.8	5104	1029.9
5108.8	1030.4	5113	1029.5	5127.2	1032.2	5130.1	1031.5	5134.4	1030.5
5141.6	1030.7	5149.7	1031	5155.1	1028.5	5156	1028.1	5156.7	1027.7
5159.6	1028.9	5162.8	1030.4	5168.8	1030.4	5173.3	1030.5	5176.7	1030

5181.4	1029.4	5190.4	1029.6	5194.4	1029.7	5203.6	1029.9	5205.9	1029.9
5213.1	1029.9	5255.9	1029.7	5263.8	1029.6	5305.9	1029.4	5347.1	1029.6
5356	1029.7	5396.4	1030	5406	1030.1	5445.8	1030	5456	1029.9
5466.4	1030	5506	1030.1	5544.6	1030.1	5556	1030.1	5593.9	1030.2
5606	1030.2	5643.3	1030.2	5656	1030.2	5669	1030.3	5706	1030.5
5719.6	1030.5	5756	1030.6	5770.3	1030.6	5806	1030.7	5820.9	1030.7
5856	1030.6	5871.6	1030.6	5906	1030.8	5922.2	1030.9	5956	1031.1
5988.9	1031.1	6006	1031.1	6023.5	1031.1	6056	1031.2	6087.7	1031.2
6106	1031.2	6124.8	1031.2	6156	1031.4	6186.4	1031.7	6206	1031.8
6226.1	1031.8	6256	1031.7	6285.1	1031.8	6306	1032	6334.5	1032.1
6356	1032.1	6378.1	1032	6406	1032	6433.3	1032.1	6456	1032.2
6479.4	1032.2	6506	1032.3	6530	1032.3	6556	1032.2	6580.7	1032.1
6600	1032.1								

Manning's n Values num= 2

Sta	n Val	Sta	n Val
5000	.06	5176.7	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6600	545	545	545	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
5000	5127.2	1032.2

CROSS SECTION OUTPUT Profile #PF#1

E.G. Elev (ft)	1031.56	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.036	
W.S. Elev (ft)	1031.54	Reach Len. (ft)	545.00	545.00	545.00
Crit W.S. (ft)	1030.40	Flow Area (sq ft)		1193.81	
E.G. Slope (ft/ft)	0.000411	Area (sq ft)		1295.93	
Q Total (cfs)	1099.00	Flow (cfs)		1099.00	
Top Width (ft)	1138.88	Top Width (ft)		1138.88	
Vel Total (ft/s)	0.92	Avg. Vel. (ft/s)		0.92	
Max Chl Dpth (ft)	3.84	Hydr. Depth (ft)		1.15	
Conv. Total (cfs)	54228.0	Conv. (cfs)		54228.0	
Length Wtd. (ft)	545.00	Wetted Per. (ft)		1042.11	
Min Ch El (ft)	1027.70	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)		0.03	
Frctn Loss (ft)	0.66	Cum Volume (acre-ft)		85.09	
C & E Loss (ft)	0.03	Cum SA (acres)		68.26	

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.782

INPUT
Description: RM 6.782
Station Elevation Data num= 112

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1032	5003.5	1032	5004.7	1032	5005.2	1032	5008.3	1031.7
5015.3	1031	5019.5	1030.5	5019.8	1030.5	5024.4	1030.9	5028.6	1030.7
5035.6	1030.3	5038.5	1030.2	5038.9	1030.2	5041.6	1029.9	5043.1	1029.9
5051.3	1029.8	5052.2	1029.9	5054.1	1029.8	5057.9	1029.6	5063	1029.7
5064.5	1029.6	5066.7	1029.6	5069.2	1029.6	5069.4	1029.6	5074.5	1029.6
5075.5	1029.6	5078.1	1029.5	5078.8	1029.6	5079.9	1029.6	5092.6	1029.4
5093	1029.3	5093.4	1029.3	5095.6	1029.3	5104.9	1029	5106.2	1028.9
5109.4	1028.9	5113.6	1028.9	5120	1028.9	5125.6	1029.2	5126.6	1029.2
5128.4	1029.2	5133.7	1029.5	5136.5	1029.6	5143.7	1029.8	5150	1030
5152.9	1030.3	5155.8	1030.3	5161.5	1030.6	5162.2	1030.7	5171.5	1031
5172.8	1031	5173.3	1031	5176.3	1028.6	5179	1025.9	5179.6	1025.3
5180.3	1024.6	5180.4	1024.4	5181	1024.5	5185.8	1025.2	5196.9	1026.9
5203	1027.8	5203.2	1027.8	5205.7	1028.5	5212.3	1031.3	5213.4	1031.2
5219.2	1031.2	5224.7	1031	5233.3	1030.8	5236.7	1030.4	5238.2	1030.3
5244.7	1030.2	5248.9	1030.1	5254.5	1030.1	5261.2	1030.1	5267.8	1030.1
5274.9	1030.2	5281.3	1030.1	5289.7	1030	5295.6	1029.8	5306.1	1029.6
5314.1	1029.5	5336.1	1029.5	5347.2	1029.5	5362.8	1029.5	5427.5	1029.6
5446.1	1030.1	5475.3	1030.1	5511.3	1030.1	5552.6	1030.3	5589.7	1030.2
5633.7	1030.3	5677.5	1030.7	5725.2	1030.7	5785.4	1030.8	5857.6	1030.7
5895.3	1030.9	5972.1	1030.9	6001.9	1030.9	6072.8	1031.1	6159	1031.3
6187.1	1031.3	6265.9	1031.6	6273	1031.6	6368.7	1031.7	6392.4	1031.8
6482	1031.8	6555.2	1031.7	6565.3	1031.6	6566.2	1031.7	6567.7	1031.7
6572.1	1031.8	6600	1031.8						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.035	5176.3	.03	5224.7	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6600	312	312	312	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
5000	5212.3	1031.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
5171.5	5212.3	1031.3

CROSS SECTION OUTPUT Profile #PF#1

E.G. Elev (ft)	1030.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.29	Wt. n-Val.		0.030	
W.S. Elev (ft)	1030.57	Reach Len. (ft)	312.00	312.00	312.00
Crit W.S. (ft)	1030.57	Flow Area (sq ft)		252.38	
E.G. Slope (ft/ft)	0.015640	Area (sq ft)		379.73	
Q Total (cfs)	1099.00	Flow (cfs)		1099.00	
Top Width (ft)	559.98	Top Width (ft)		559.98	
Vel Total (ft/s)	4.35	Avg. Vel. (ft/s)		4.35	
Max Chl Dpth (ft)	1.67	Hydr. Depth (ft)		0.59	
Conv. Total (cfs)	8787.8	Conv. (cfs)		8787.8	
Length Wtd. (ft)	312.00	Wetted Per. (ft)		428.20	
Min Ch El (ft)	1028.90	Shear (lb/sq ft)		0.58	
Alpha	1.00	Stream Power (lb/ft s)		2.51	
Frctn Loss (ft)	0.39	Cum Volume (acre-ft)		74.61	
C & E Loss (ft)	0.08	Cum SA (acres)		57.63	

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.723

INPUT
Description: RM 6.723
Station Elevation Data num= 105

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1030.9	5006.5	1031	5008.6	1031.2	5008.9	1031.2	5010.9	1031.1
5013.5	1030.6	5016.5	1030.2	5017.3	1030.2	5017.7	1030.1	5018.4	1030.2
5022.2	1030.6	5028.5	1030.3	5034.2	1030	5048.4	1029.8	5056.6	1030
5059.1	1029.6	5069	1028.7	5071.3	1028.5	5079.7	1029.1	5095.1	1030.2
5101.4	1031.4	5103.2	1031.7	5103.8	1031.8	5104.2	1031.8	5107.3	1032.4
5109.7	1032	5112	1031.7	5113.9	1031.2	5114.9	1030.3	5118.3	1027.4
5125.9	1028.9	5131.5	1028.8	5132.7	1029.9	5134.7	1029.9	5137.4	1029.8
5143.6	1030.1	5147.6	1030.4	5158.3	1030.8	5162.9	1030.9	5169	1030.9
5171	1029.7	5174.4	1027.6	5175.7	1027	5177	1026.3	5180	1024.6
5184.6	1025.1	5195.8	1026.1	5199.6	1026.5	5209.8	1031.3	5210.9	1031.9
5211.4	1031.9	5211.8	1031.9	5217.8	1031.8	5225.5	1031.7	5233.1	1027.3
5234.7	1026.5	5235.6	1026.8	5236.4	1027.2	5238	1027.9	5241.9	1030
5242.1	1030.2	5248.6	1029.9	5255.3	1029.5	5260.1	1028.8	5261.3	1028.7
5263.9	1028.5	5265.2	1028.5	5265.9	1028.3	5391.5	1028.6	5419.9	1028.4
5467.1	1028.5	5497.6	1028.5	5503.6	1028.8	5519.5	1028.7	5861.3	1029.4
5898.5	1029.2	5911.3	1029.2	5948.4	1029.4	5961.7	1029.4	5974.5	1029.5
6011.6	1029.2	6048.7	1029.3	6061.1	1029.2	6074.6	1029.3	6111.6	1029.6
6148.5	1029.9	6161.6	1029.9	6198.5	1029.8	6211.3	1029.8	6224.2	1029.8
6261.1	1030	6274.7	1030	6311.6	1029.8	6348.3	1030.9	6361.6	1030.9
6374.8	1031	6411.6	1030.2	6448.3	1030.4	6461.6	1030.5	6498.2	1030.4
6511.6	1030.5	6525	1030.6	6561.6	1031	6598.2	1031	6600	1031

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.035	5147.6	.03	5225.5	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6600	143	143	143	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5210.9	1031.9	5861.3	6600	1032

Blocked Obstructions num= 1

Sta L	Sta R	Elev
5162.9	5210.9	1031

CROSS SECTION OUTPUT Profile #PF#1

E.G. Elev (ft)	1030.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.035	
W.S. Elev (ft)	1030.33	Reach Len. (ft)	143.00	143.00	143.00
Crit W.S. (ft)	1029.21	Flow Area (sq ft)		956.04	
E.G. Slope (ft/ft)	0.000425	Area (sq ft)		1395.84	
Q Total (cfs)	1099.00	Flow (cfs)		1099.00	
Top Width (ft)	1234.86	Top Width (ft)		1234.86	
Vel Total (ft/s)	1.15	Avg. Vel. (ft/s)		1.15	
Max Chl Dpth (ft)	3.83	Hydr. Depth (ft)		1.51	
Conv. Total (cfs)	53292.4	Conv. (cfs)		53292.4	
Length Wtd. (ft)	143.00	Wetted Per. (ft)		635.46	
Min Ch El (ft)	1026.50	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)		0.05	
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)		68.25	

C & E Loss (ft) 0.00 Cum SA (acres) 51.20

Warning: Divided flow computed for this cross-section.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.696

INPUT
Description: RM 6.696
Station Elevation Data num= 102

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1030.7	5005.9	1030.7	5007	1030.7	5007.4	1030.6	5008.1	1030.6
5015.3	1030.1	5017.7	1030.1	5018.2	1029.9	5020.7	1030.2	5022.5	1030.3
5033	1029.4	5035.9	1029.4	5053.7	1029.7	5058.9	1029.8	5061	1029.9
5065.7	1029.2	5085.8	1026.8	5088.1	1026.5	5089.3	1026.4	5089.9	1026.3
5090.4	1026.5	5094	1028.1	5103.9	1031.4	5114.5	1031.3	5115.7	1031.3
5117	1027.4	5117.5	1027.3	5124.2	1026.5	5125.1	1026.8	5130.5	1028.2
5132.3	1028.8	5135.2	1029.5	5136.2	1029.5	5144.8	1028.9	5149.9	1029
5151	1029.1	5153.2	1029.2	5158	1029.4	5164.3	1029.7	5167.2	1029.8
5172.1	1029.9	5176.7	1027.3	5181.1	1024.6	5195.9	1025.4	5197.6	1025.4
5200.9	1025.6	5205.6	1028.6	5209.8	1031	5211.5	1031	5216	1030.9
5217	1030.9	5224.8	1031	5225.9	1031.1	5226.8	1031.1	5227.1	1030.9
5235.6	1026.4	5241	1028.5	5243.5	1029.6	5250.7	1029.6	5256.2	1029.6
5259.1	1029.3	5260.6	1029.1	5265.7	1028.5	5266.8	1028.1	5266.9	1028.3
5267.1	1028.3	5302.8	1028.1	5313.3	1028.1	5357.2	1028.2	5359.4	1028.3
5365.4	1028.2	5867.4	1029.2	5898.2	1029.1	5917.3	1029	5948	1029.2
5968.1	1029.1	5987.3	1029.3	6017.9	1029	6048.5	1029.1	6067.2	1029
6087.5	1029.1	6117.9	1029.4	6148.3	1029.6	6168	1029.6	6198.3	1029.5
6217.5	1029.6	6237	1029.5	6267.2	1029.7	6287.8	1029.7	6318	1029.5
6348	1030.4	6368	1030.5	6388.1	1030.6	6418	1030	6447.9	1030.1
6468.1	1030.2	6497.9	1030.2	6518.1	1030.2	6538.4	1030.4	6568.1	1030.7
6597.8	1030.7	6600	1030.7						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.035	5149.9	.03	5224.8	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6600	500	500	500	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5209.8	1031	6000	6600	1031

Blocked Obstructions num= 1

Sta L	Sta R	Elev
5167.2	5205.6	1030

CROSS SECTION OUTPUT Profile #PF#1

E.G. Elev (ft)	1030.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.035	
W.S. Elev (ft)	1030.29	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)	1029.02	Flow Area (sq ft)		1214.26	
E.G. Slope (ft/ft)	0.000249	Area (sq ft)		1727.01	
Q Total (cfs)	1099.00	Flow (cfs)		1099.00	
Top Width (ft)	1418.04	Top Width (ft)		1418.04	
Vel Total (ft/s)	0.91	Avg. Vel. (ft/s)		0.91	
Max Chl Dpth (ft)	3.99	Hydr. Depth (ft)		1.57	
Conv. Total (cfs)	69625.2	Conv. (cfs)		69625.2	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		773.60	
Min Ch El (ft)	1026.30	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)		0.02	
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)		63.13	
C & E Loss (ft)	0.00	Cum SA (acres)		46.85	

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.601

INPUT
Description: RM 6.601
Station Elevation Data num= 93

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1030.5	5002.7	1030.6	5005.6	1030.8	5013.7	1030.2	5014.4	1030.2
5017	1030.1	5031.2	1029.9	5036.3	1029	5036.9	1028.9	5038	1028.7
5041.9	1028.1	5045.6	1028	5058.3	1026.9	5058.7	1026.9	5076.6	1026
5082.7	1025.8	5086.7	1025.6	5087.4	1026.3	5094.8	1028.1	5105.5	1030.7
5114.9	1031.1	5115.1	1031.1	5116.3	1031.1	5136.7	1030.8	5139.5	1030.8
5140.6	1030.6	5141.6	1030.4	5148.7	1028.9	5148.9	1028.9	5149	1028.9
5159.1	1029	5164.5	1029	5181.9	1029	5186.4	1027.3	5188.9	1024.9
5189.2	1024.7	5190.1	1024.7	5192.3	1024.7	5203.2	1025.1	5210.7	1025.2
5213.8	1026.9	5217.6	1029.1	5221.2	1029.2	5236	1029.5	5236.7	1029.1
5236.9	1029	5245.1	1026.2	5251.6	1028.3	5253.4	1028.7	5257.2	1028.4
5265.6	1027.9	5271.3	1027.6	5275.1	1027.5	5276.6	1027.4	5396.2	1027.7
5401.5	1027.7	5494.2	1027.6	5547.9	1027.9	5576	1027.8	5602.7	1028
5619.1	1028.1	5645.6	1028.1	5886.8	1028.6	5897.7	1028.5	5936.6	1028.4

5947.4	1028.5	5988.1	1028.3	6027.1	1028.6	6037.7	1028.6	6048.4	1028.6
6086.2	1028.5	6127.1	1028.6	6137.6	1028.7	6148.2	1028.8	6187.8	1028.8
6198.2	1028.7	6236.8	1028.9	6275.7	1028.8	6286.1	1028.9	6327.2	1028.8
6337.5	1028.8	6347.7	1029.1	6387.5	1029.3	6427.5	1029.5	6437.6	1029.3
6447.6	1029.3	6487.6	1029.4	6497.6	1029.4	6537.6	1029.5	6577.8	1029.8
6587.7	1029.9	6597.5	1029.9	6600	1029.9				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.035	5149	.03	5236	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6600	273	273	273	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5114.9	1031.1	6300	6600	1030

Blocked Obstructions num= 1

Sta L	Sta R	Elev
5181.9	5217.6	1029

CROSS SECTION OUTPUT Profile #PF#1

E.G. Elev (ft)	1030.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.035	
W.S. Elev (ft)	1030.25	Reach Len. (ft)	273.00	273.00	273.00
Crit W.S. (ft)	1028.35	Flow Area (sq ft)		2539.77	
E.G. Slope (ft/ft)	0.000049	Area (sq ft)		2750.09	
Q Total (cfs)	1099.00	Flow (cfs)		1099.00	
Top Width (ft)	1548.29	Top Width (ft)		1548.29	
Vel Total (ft/s)	0.43	Avg. Vel. (ft/s)		0.43	
Max Chl Dpth (ft)	4.65	Hydr. Depth (ft)		1.74	
Conv. Total (cfs)	157580.8	Conv. (cfs)		157580.8	
Length Wtd. (ft)	273.00	Wetted Per. (ft)		1459.23	
Min Ch El (ft)	1025.60	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)		0.00	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		37.43	
C & E Loss (ft)	0.00	Cum SA (acres)		29.82	

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.549

INPUT
Description: RM 6.549, HEC-1 RSSF2 Q=1451 CFS
Station Elevation Data num= 121

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1030.6	5007.3	1029.5	5022.3	1026.1	5024.5	1025.5	5024.7	1025.5
5026	1025.4	5048.2	1025.7	5049.4	1025.7	5063.1	1026.2	5065.7	1026.4
5068.3	1026.5	5079.5	1026	5088.9	1025.5	5093	1026.3	5095	1026.5
5098.1	1026.9	5101.4	1027.5	5105.6	1027.4	5110.1	1027.3	5116.7	1027.4
5132.6	1027.8	5134.8	1027.9	5141.2	1028.1	5145.3	1028.1	5147.9	1028.3
5148.7	1028.4	5154.6	1029	5157.8	1029.3	5161.8	1028.6	5168.4	1027.4
5171.7	1027.3	5173.7	1027.3	5177.8	1027.6	5185.6	1028.2	5199.1	1029.1
5202.6	1026.6	5204	1025.7	5207.2	1025.7	5220	1025.7	5230.2	1025.7
5232.9	1026.5	5244.9	1029	5246.3	1028.9	5252.3	1028.8	5256.63	1028.8
5261.1	1028.6	5264	1028.6	5270.8	1028.5	5272.5	1028.5	5286	1028.5
5287.4	1028.4	5298.7	1028.4	5301.1	1028.3	5317.4	1028.2	5320.8	1028.2
5329.5	1028.3	5342.1	1028.3	5350.5	1028.3	5366.6	1028.4	5372.6	1028.5
5386.6	1028.6	5390.4	1028.6	5409.8	1028.6	5414.8	1028.7	5431.1	1028.7
5432.3	1028.7	5444.2	1028.5	5446.3	1028.5	5454.5	1028.6	5457.1	1028.6
5470.6	1028.5	5471.7	1028.5	5477.6	1028.5	5478.1	1028.5	5483.6	1028.6
5484.5	1028.6	5486.9	1029.2	5487.7	1029	5490.3	1028.3	5491.2	1028.3
5493.4	1027.8	5495.2	1027.7	5500.5	1027.2	5502.4	1026.8	5507.2	1027.2
5515.9	1028.1	5518.3	1027.4	5529.8	1027.5	5531.2	1027.6	5563.5	1027.5
5586	1027.6	5676.2	1027.5	5770.6	1028	5819.4	1028	5865.5	1028.2
5867.2	1028.2	5870	1028.2	5896.2	1028.2	5897.4	1028.2	5945.9	1028.1
5947.1	1028.1	5997.7	1027.9	6046	1028.3	6047.2	1028.3	6048.4	1028.3
6095.3	1028.2	6145.8	1028.4	6147	1028.4	6148.2	1028.4	6197.2	1028.4
6198.4	1028.4	6245.9	1028.6	6293.8	1028.5	6295	1028.5	6345.5	1028.4
6346.7	1028.4	6347.9	1028.5	6396.7	1028.8	6445.5	1029	6446.7	1028.9
7050	1030								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.035	5177.8	.03	5252.3	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	7050	90	90	90	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
6495	7050	1030

Blocked Obstructions num= 1

Sta L	Sta R	Elev
5199.1	5244.9	1029

CROSS SECTION OUTPUT Profile #PF#1

E.G. Elev (ft)	1030.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.035	
W.S. Elev (ft)	1030.24	Reach Len. (ft)	90.00	90.00	90.00
Crit W.S. (ft)	1028.03	Flow Area (sq ft)		3578.93	
E.G. Slope (ft/ft)	0.000040	Area (sq ft)		3578.93	
Q Total (cfs)	1451.00	Flow (cfs)		1451.00	
Top Width (ft)	2047.59	Top Width (ft)		2047.59	
Vel Total (ft/s)	0.41	Avg. Vel. (ft/s)		0.41	
Max Chl Dpth (ft)	4.84	Hydr. Depth (ft)		1.75	
Conv. Total (cfs)	228395.4	Conv. (cfs)		228395.4	
Length Wtd. (ft)	90.00	Wetted Per. (ft)		2049.42	
Min Ch El (ft)	1025.40	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)		0.00	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		17.60	
C & E Loss (ft)	0.02	Cum SA (acres)		18.55	

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.532

INPUT
Description: RM 6.532, 75th Avenue
Station Elevation Data num= 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1031.47	5011.81	1031.25	5025.42	1031	5038.8	1030.75	5052.52	1030.5
5065.81	1030.25	5076.53	1030	5092.08	1029.75	5117.39	1029.5	5175.92	1029.25
5206.36	1029.07	5274.03	1029.25	5322.19	1029.5	5364.83	1029.75	5443.48	1030.13
5536.49	1030	5577.13	1030	5617.6	1029.75	5659.46	1029.5	5689.18	1029.35
5745.76	1029.36	5799.79	1029.45	5831.72	1029.39	5834.61	1029.45	5840.5	1029.5
5845.72	1029.54	5849.54	1029.5	5865.18	1029.26	5906.08	1029.5	5911.43	1029.56
5983.21	1029.75	6030	1030	6082.45	1029.9	6223.06	1030	6290.28	1030.02
6306.41	1030.06	6317.44	1030.14	6323.47	1030.05	6345.02	1030.25	6440.57	1030.5
6530.89	1030.75	6601.42	1031	6661.53	1031.18	6721.28	1031.16	6740.62	1031.25
6799.2	1031.46								

Manning's n Values num= 1

Sta	n Val
5000	.02

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6799.2	135	135	135	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

E.G. Elev (ft)	1030.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.19	Wt. n-Val.		0.020	
W.S. Elev (ft)	1030.02	Reach Len. (ft)	135.00	135.00	135.00
Crit W.S. (ft)	1030.02	Flow Area (sq ft)		415.54	
E.G. Slope (ft/ft)	0.008187	Area (sq ft)		415.54	
Q Total (cfs)	1451.00	Flow (cfs)		1451.00	
Top Width (ft)	1109.99	Top Width (ft)		1109.99	
Vel Total (ft/s)	3.49	Avg. Vel. (ft/s)		3.49	
Max Chl Dpth (ft)	0.95	Hydr. Depth (ft)		0.37	
Conv. Total (cfs)	16036.4	Conv. (cfs)		16036.4	
Length Wtd. (ft)		Wetted Per. (ft)		1110.00	
Min Ch El (ft)	1029.07	Shear (lb/sq ft)		0.19	
Alpha	1.00	Stream Power (lb/ft s)		0.67	
Frctn Loss (ft)		Cum Volume (acre-ft)		13.47	
C & E Loss (ft)		Cum SA (acres)		15.29	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: The user has entered a known water surface elevation at this cross section.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.506

INPUT
Description: RM 6.506
Station Elevation Data num= 120

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1030.2	5002.5	1030.2	5003.3	1030.7	5005.1	1031.4	5010.7	1029.8
5011.6	1029.7	5039.2	1028	5051.6	1029.1	5055.7	1029.4	5059.1	1029.1
5098.8	1029.3	5105	1029.3	5109.3	1029.2	5154.5	1028.2	5159.5	1027.4
5160.6	1027.6	5173.3	1027.7	5205.4	1028	5205.9	1028	5211.4	1028.2
5245.5	1028.7	5266.7	1028.9	5301.2	1028.2	5305.6	1028	5308.3	1027.8
5315.3	1026.5	5319.8	1025.8	5326	1027.3	5331.5	1028.6	5332.6	1028.6
5340.7	1028.7	5350.3	1028.8	5355.1	1028.9	5357.2	1028.9	5373.4	1029.5
5384.6	1029.5	5390.9	1029.6	5400.7	1029.2	5405	1029.1	5405.2	1029.1
5410.9	1029.1	5429.8	1029.2	5434	1029.2	5447.7	1028.7	5454.3	1028.6

5457.3	1028.5	5464.4	1028.6	5467.8	1026.3	5468	1026.1	5469.1	1026.1
5491.6	1024.9	5492.8	1025.4	5500.2	1028.9	5502.7	1028.8	5520.9	1029.3
5521.7	1029.4	5522.3	1029.4	5531.4	1029	5534.5	1028.6	5551.9	1027.3
5554.4	1027	5593.9	1027.4	5605	1027.4	5609.2	1027.4	5655	1027.7
5659.1	1027.7	5705	1027.5	5709.1	1027.5	5755	1027.3	5767.8	1027.6
5807	1027.8	5814.7	1028.4	5834.8	1027.6	5838.3	1027.5	5849.8	1027.5
5855.7	1027.4	5856.7	1027.5	5860.4	1027.4	5874.4	1027.1	5895.9	1027.5
5905.1	1027.7	5951.5	1027.9	5955.1	1027.9	5958.6	1028	6005.1	1028
6008.5	1028	6055	1027.9	6058.4	1027.9	6105	1028	6151.9	1028
6155	1028	6202	1027.9	6205	1027.9	6208.1	1027.9	6255.1	1028
6302.3	1028.3	6305.1	1028.3	6333.6	1028.4	6341.3	1028.5	6344	1028.5
6355.1	1028.6	6355.4	1028.6	6360	1029.1	6371.8	1029.1	6377.9	1029.2
6383.9	1028.4	6393.2	1027.5	6403.5	1026.2	6407.1	1025.9	6420.1	1025.3
6426.5	1024.9	6434.2	1024.8	6452.5	1024.6	6453.9	1024.5	6454.5	1024.5
6457	1024.5	6504.5	1024.5	6506.2	1024.5	6545.1	1024.9	6546.7	1024.8

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.04	5390.9	.03	5534.5	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6546.7	500	500	500	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
6260	6546.7	1030

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5464.4	5500.2	1028.5	6377.9	6546.7	1030

CROSS SECTION OUTPUT Profile #PF#1

E.G. Elev (ft)	1028.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.036	
W.S. Elev (ft)	1028.42	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)	1028.16	Flow Area (sq ft)		577.03	
E.G. Slope (ft/ft)	0.006106	Area (sq ft)		590.26	
Q Total (cfs)	1451.00	Flow (cfs)		1451.00	
Top Width (ft)	932.48	Top Width (ft)		932.48	
Vel Total (ft/s)	2.51	Avg. Vel. (ft/s)		2.51	
Max Chl Dpth (ft)	2.62	Hydr. Depth (ft)		0.67	
Conv. Total (cfs)	18569.7	Conv. (cfs)		18569.7	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		857.97	
Min Ch El (ft)	1025.80	Shear (lb/sq ft)		0.26	
Alpha	1.00	Stream Power (lb/ft s)		0.64	
Frctn Loss (ft)	0.46	Cum Volume (acre-ft)		11.91	
C & E Loss (ft)	0.02	Cum SA (acres)		12.13	

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.412

INPUT
Description: RM 6.412, END OF REACH TOLLESON 1
Station Elevation Data num= 103

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1028.7	5006.5	1028.8	5017.7	1027.3	5018.5	1027.2	5022.4	1028.4
5024.8	1029.2	5025.4	1029.2	5031.8	1029.6	5044	1029.8	5060.9	1029.8
5095.5	1029.7	5128.8	1029.6	5136.6	1026.5	5138.1	1026	5170.4	1026
5173.9	1026	5174.9	1026	5189.2	1025.9	5200.2	1025.8	5224.1	1026.3
5224.9	1026.3	5366.1	1025.4	5384.4	1025.4	5410.6	1025.2	5435.5	1025.1
5445.6	1026.5	5446.1	1026.5	5447.6	1026.7	5453.1	1027.1	5465.9	1027.8
5467.9	1026.6	5469.5	1025.9	5474.7	1025.7	5490.6	1025.3	5492.6	1025.9
5496.4	1027.1	5503.5	1027.1	5518.3	1027.1	5521.9	1027.1	5549.6	1026.6
5575.2	1026.3	5606.9	1026.8	5625.3	1026.9	5645.1	1026.9	5675.3	1026.8
5703.2	1026.8	5725.3	1026.5	5751.3	1026.5	5775.4	1026.5	5799.4	1026.2
5825.4	1026.4	5837.2	1026.1	5846.5	1026.1	5862	1025.9	5867.9	1026.2
5871.1	1026.3	5875.4	1026.4	5879.4	1026.4	5880.1	1026.4	5880.6	1026.4
5881.6	1026.4	5898.2	1026.1	5918.5	1026.5	5925.5	1026.9	5957.8	1026.7
5975.5	1026.8	6009.9	1026.9	6025.6	1026.9	6062.1	1026.6	6075.6	1026.5
6114.2	1027	6125.7	1027.1	6166.3	1027.3	6175.7	1027.4	6218.4	1026.8
6225.7	1026.8	6270.6	1027.2	6275.8	1027.2	6280.6	1027.2	6325.8	1027.3
6327.2	1027.3	6366.4	1026.9	6375.7	1027.1	6375.8	1027.1	6376.7	1027.1
6382.3	1027.4	6383.4	1027.4	6386	1027.3	6394	1027.3	6402.3	1027.3
6410.1	1027.2	6413.8	1027.3	6425.4	1027.4	6425.9	1027.4	6433.9	1026.9
6446.9	1027.4	6450.7	1027.7	6459.4	1027.9	6521.2	1028.4	6526	1028.4
6569.3	1028.4	6576	1028.5	6600	1028.9				

Manning's n Values num= 2

Sta	n Val	Sta	n Val
5000	.03	5521.9	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6600	0	0	0	.1	.3

Left Levee Station= 5006.5 Elevation= 1028.8
Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev

5050 5130 1035 5260 5430 1035 5465.9 5496.4 1027.1

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
E.G. Elev (ft)	1028.03	Element			
Vel Head (ft)	0.01	Wt. n-Val.		0.033	
W.S. Elev (ft)	1028.02	Reach Len. (ft)			
Crit W.S. (ft)	1026.98	Flow Area (sq ft)		1485.69	
E.G. Slope (ft/ft)	0.000354	Area (sq ft)		1485.69	
Q Total (cfs)	1451.00	Flow (cfs)		1451.00	
Top Width (ft)	1180.30	Top Width (ft)		1180.30	
Vel Total (ft/s)	0.98	Avg. Vel. (ft/s)		0.98	
Max Chl Dpth (ft)	2.92	Hydr. Depth (ft)		1.26	
Conv. Total (cfs)	77074.0	Conv. (cfs)		77074.0	
Length Wtd. (ft)		Wetted Per. (ft)		1186.15	
Min Ch El (ft)	1025.10	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)		0.03	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Warning: Divided flow computed for this cross-section.

SUMMARY OF MANNING'S N VALUES

River:Southern Pacific

Reach	River Sta.	n1	n2	n3
Tolleson 1	7.287	.08	.035	.04
Tolleson 1	7.264	.08	.035	
Tolleson 1	7.227	.08	.035	
Tolleson 1	7.169	.08	.035	
Tolleson 1	7.074	.08	.035	
Tolleson 1	7.033	.08	.035	
Tolleson 1	6.980	.07	.035	
Tolleson 1	6.885	.06	.035	
Tolleson 1	6.782	.035	.03	.03
Tolleson 1	6.723	.035	.03	.035
Tolleson 1	6.696	.035	.03	.035
Tolleson 1	6.601	.035	.03	.035
Tolleson 1	6.549	.035	.03	.035
Tolleson 1	6.532	.02		
Tolleson 1	6.506	.04	.03	.035
Tolleson 1	6.412	.03	.035	

SUMMARY OF REACH LENGTHS

River: Southern Pacific

Reach	River Sta.	Left	Channel	Right
Tolleson 1	7.287	124	124	124
Tolleson 1	7.264	192	192	192
Tolleson 1	7.227	308	308	308
Tolleson 1	7.169	500	500	500
Tolleson 1	7.074	218	218	218
Tolleson 1	7.033	282	282	282
Tolleson 1	6.980	500	500	500
Tolleson 1	6.885	545	545	545
Tolleson 1	6.782	312	312	312
Tolleson 1	6.723	143	143	143
Tolleson 1	6.696	500	500	500
Tolleson 1	6.601	273	273	273
Tolleson 1	6.549	90	90	90
Tolleson 1	6.532	135	135	135
Tolleson 1	6.506	500	500	500
Tolleson 1	6.412	0	0	0

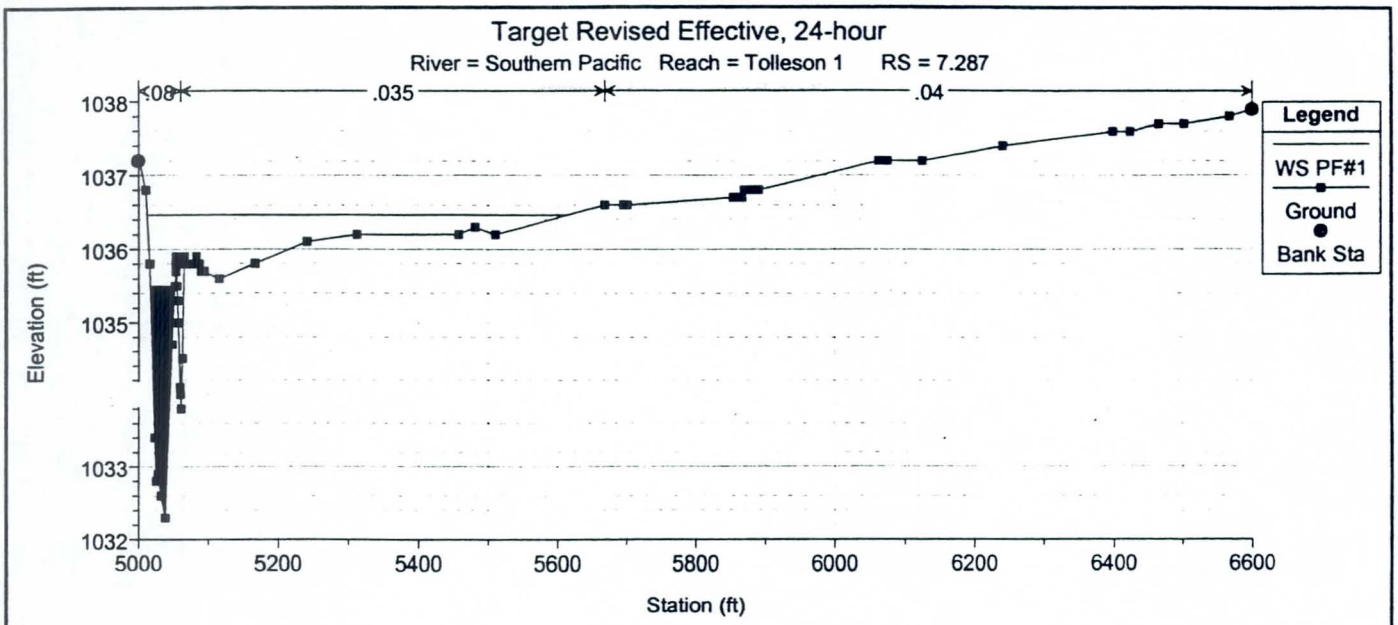
SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Southern Pacific

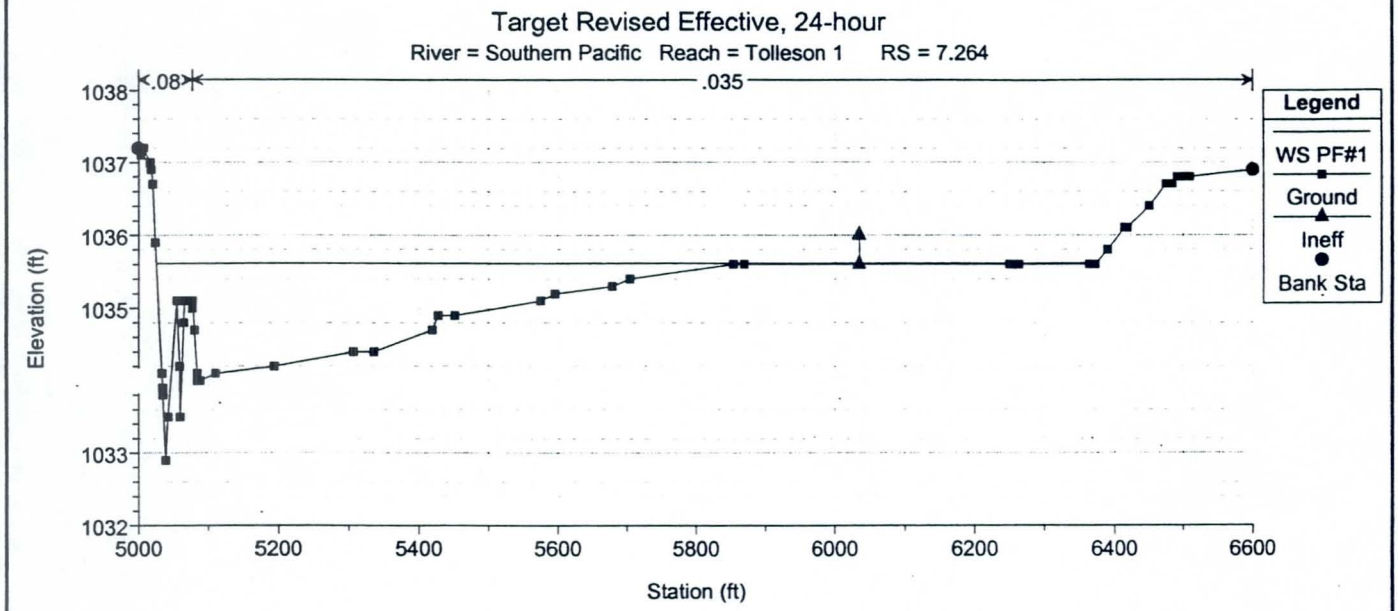
Reach	River Sta.	Contr.	Expan.
Tolleson 1	7.287	.1	.3
Tolleson 1	7.264	.1	.3
Tolleson 1	7.227	.1	.3
Tolleson 1	7.169	.1	.3
Tolleson 1	7.074	.1	.3
Tolleson 1	7.033	.1	.3
Tolleson 1	6.980	.1	.3

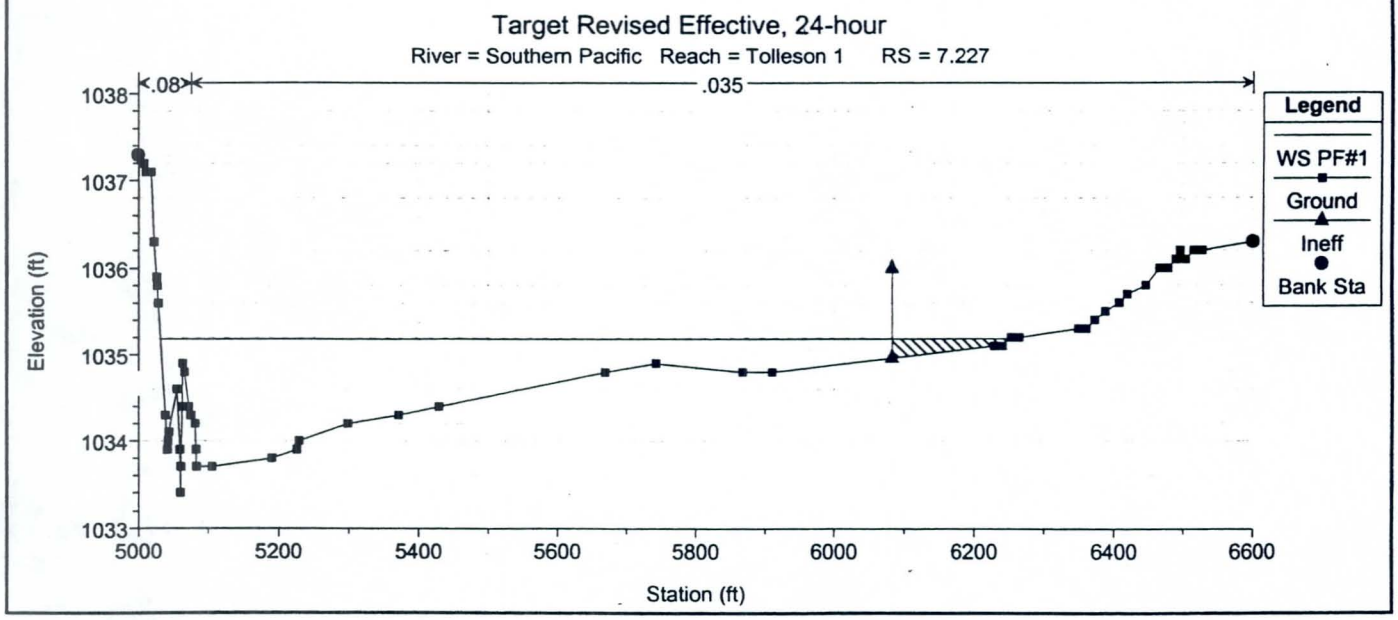
Tolleson 1	6.885	.1	.3
Tolleson 1	6.782	.1	.3
Tolleson 1	6.723	.1	.3
Tolleson 1	6.696	.1	.3
Tolleson 1	6.601	.1	.3
Tolleson 1	6.549	.1	.3
Tolleson 1	6.532	.1	.3
Tolleson 1	6.506	.1	.3
Tolleson 1	6.412	.1	.3

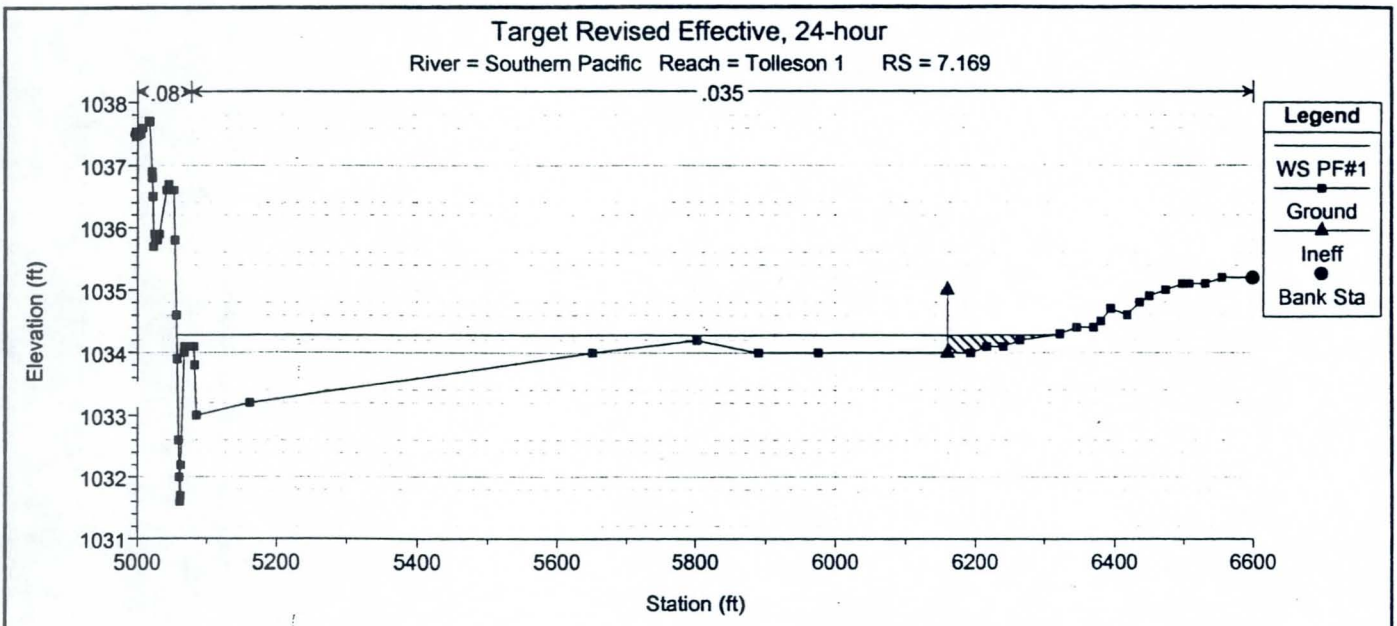
HEC-RAS Plan: Rev Eff 24hr River: Southern Pacific Reach: Tolleson 1

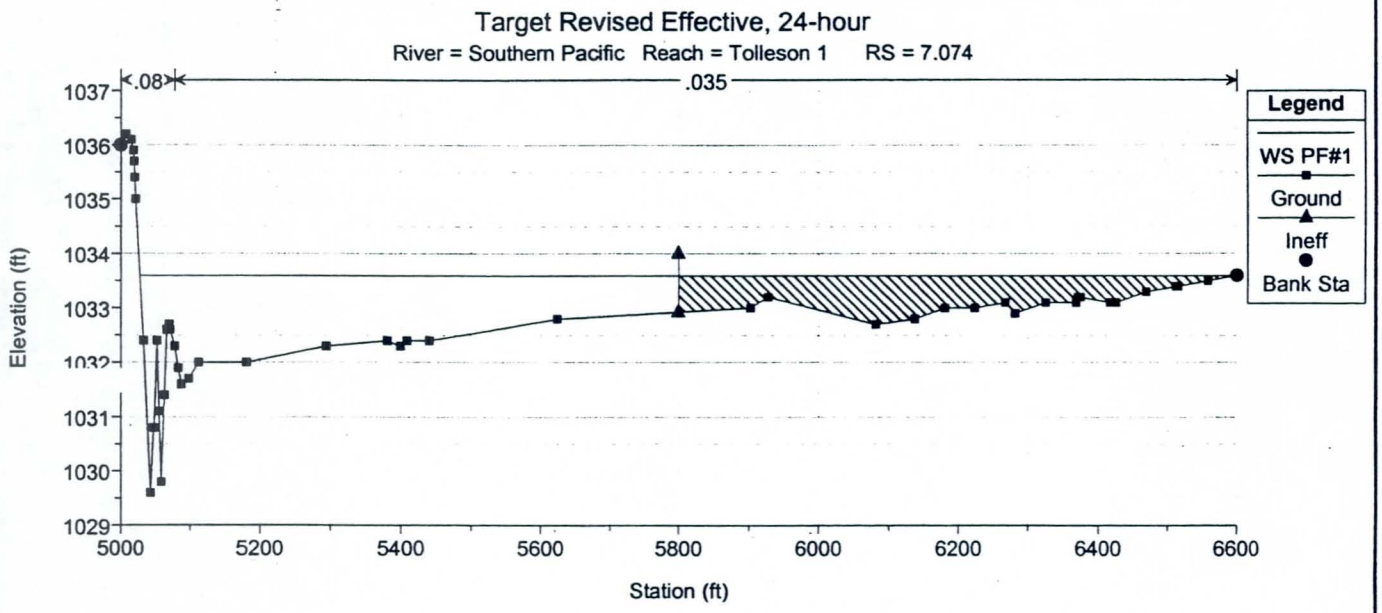
Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Tolleson 1	7.287	1020.00	1033.80	1036.46	1036.46	1036.71	0.034066	3.97	257.00	602.26	1.07
Tolleson 1	7.264	1020.00	1032.90	1035.61	1034.91	1035.65	0.002532	1.53	668.34	1347.86	0.33
Tolleson 1	7.227	1020.00	1033.40	1035.18	1034.68	1035.22	0.002007	1.43	714.54	1218.78	0.31
Tolleson 1	7.169	1020.00	1031.60	1034.28	1034.02	1034.33	0.004595	1.80	565.11	1255.56	0.44
Tolleson 1	7.074	1099.00	1029.60	1033.59	1032.69	1033.61	0.000713	1.19	925.99	1569.25	0.19
Tolleson 1	7.033	1099.00	1028.90	1032.93	1032.85	1033.14	0.023266	3.73	294.44	547.36	0.88
Tolleson 1	6.980	1099.00	1028.50	1031.88	1031.20	1031.93	0.001639	1.84	596.51	873.21	0.30
Tolleson 1	6.885	1099.00	1027.70	1031.54	1030.40	1031.56	0.000411	0.92	1193.81	1138.88	0.15
Tolleson 1	6.782	1099.00	1028.90	1030.57	1030.57	1030.87	0.015640	4.35	252.38	559.98	1.00
Tolleson 1	6.723	1099.00	1026.50	1030.33	1029.21	1030.35	0.000425	1.15	956.04	1234.86	0.16
Tolleson 1	6.696	1099.00	1026.30	1030.29	1029.02	1030.30	0.000249	0.91	1214.26	1418.04	0.13
Tolleson 1	6.601	1099.00	1025.60	1030.25	1028.35	1030.25	0.000049	0.43	2539.77	1548.29	0.06
Tolleson 1	6.549	1451.00	1025.40	1030.24	1028.03	1030.24	0.000040	0.41	3578.93	2047.59	0.05
Tolleson 1	6.532	1451.00	1029.07	1030.02	1030.02	1030.21	0.008187	3.49	415.54	1109.99	1.01
Tolleson 1	6.506	1451.00	1025.80	1028.42	1028.16	1028.52	0.006106	2.51	577.03	932.48	0.54
Tolleson 1	6.412	1451.00	1025.10	1028.02	1026.98	1028.03	0.000354	0.98	1485.69	1180.30	0.15

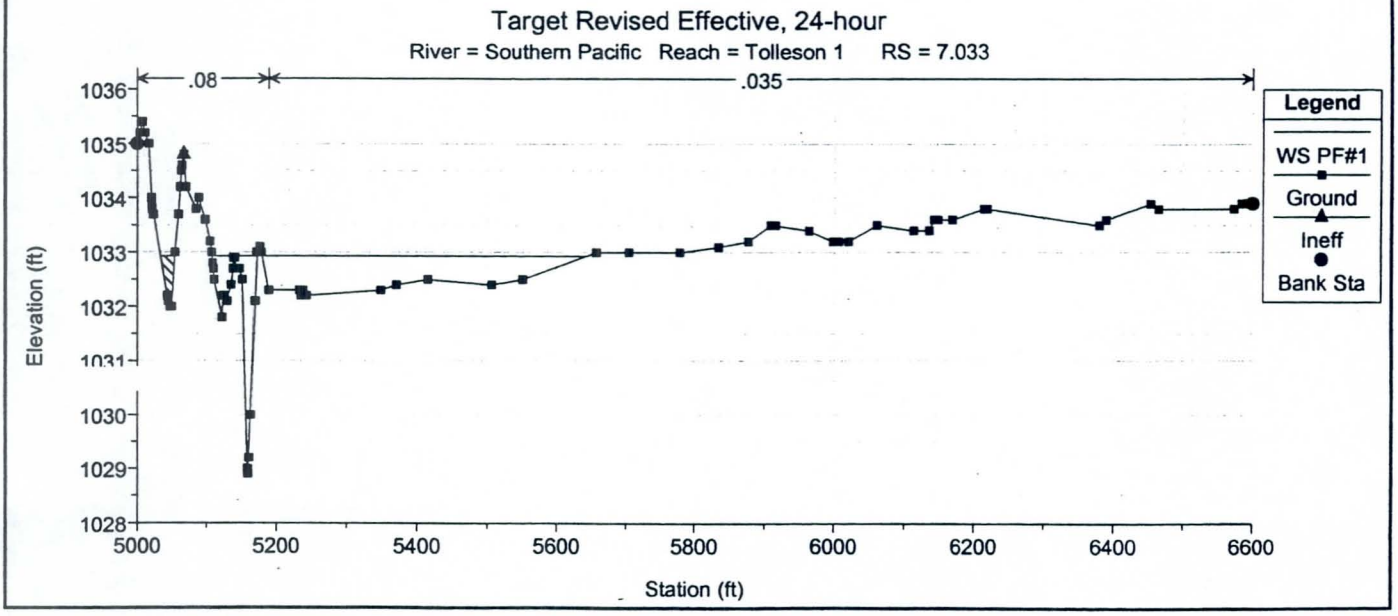

Target Revised Effective, 24-hour
River = Southern Pacific Reach = Tolleson 1 RS = 7.287
.08
.035
.04
Legend
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)

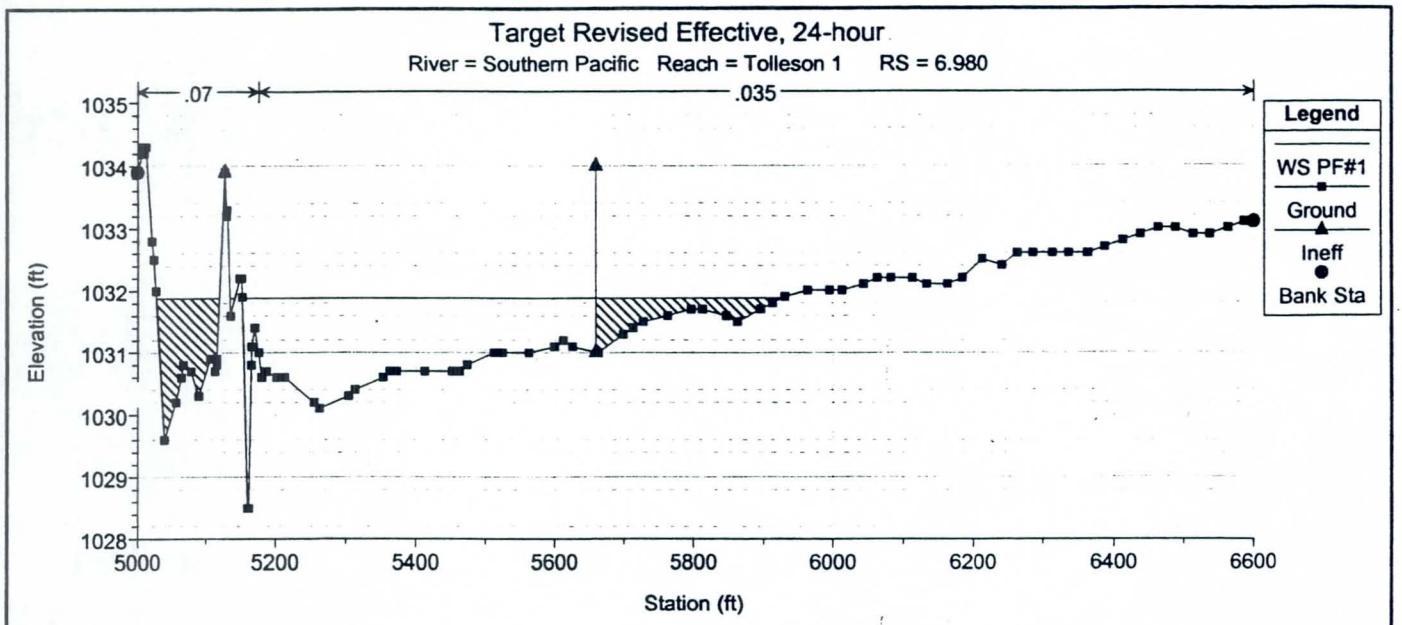

Target Revised Effective, 24-hour
River = Southern Pacific Reach = Tolleson 1 RS = 7.264
.08
.035
Legend
WS PF#1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

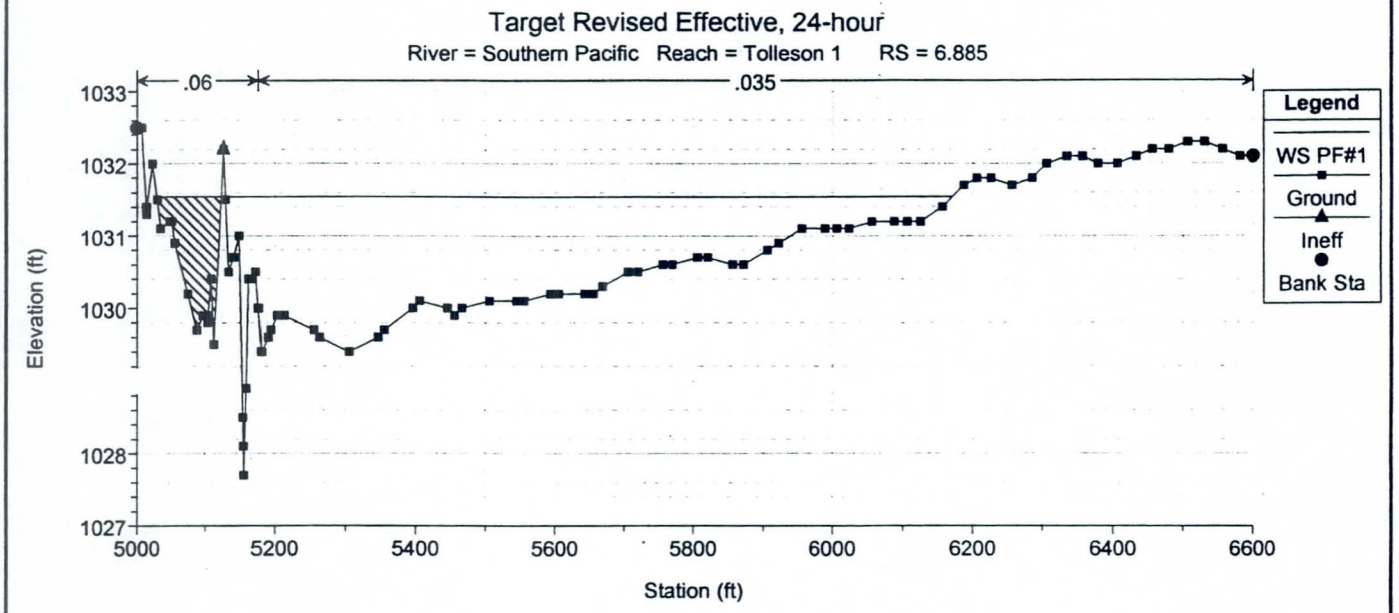

Target Revised Effective, 24-hour
River = Southern Pacific Reach = Tolleson 1 RS = 7.227
.08
.035
Legend
WS PF#1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

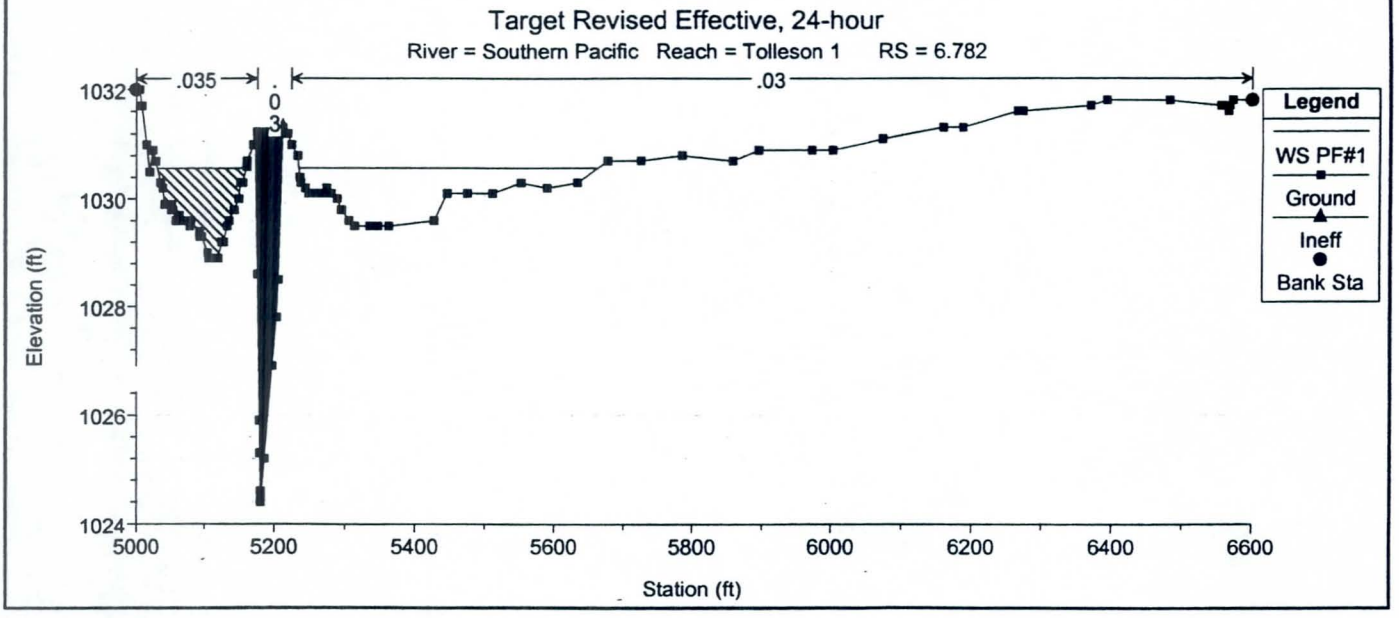

Target Revised Effective, 24-hour
River = Southern Pacific Reach = Tolleson 1 RS = 7.169
.08
.035
Legend
WS PF#1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

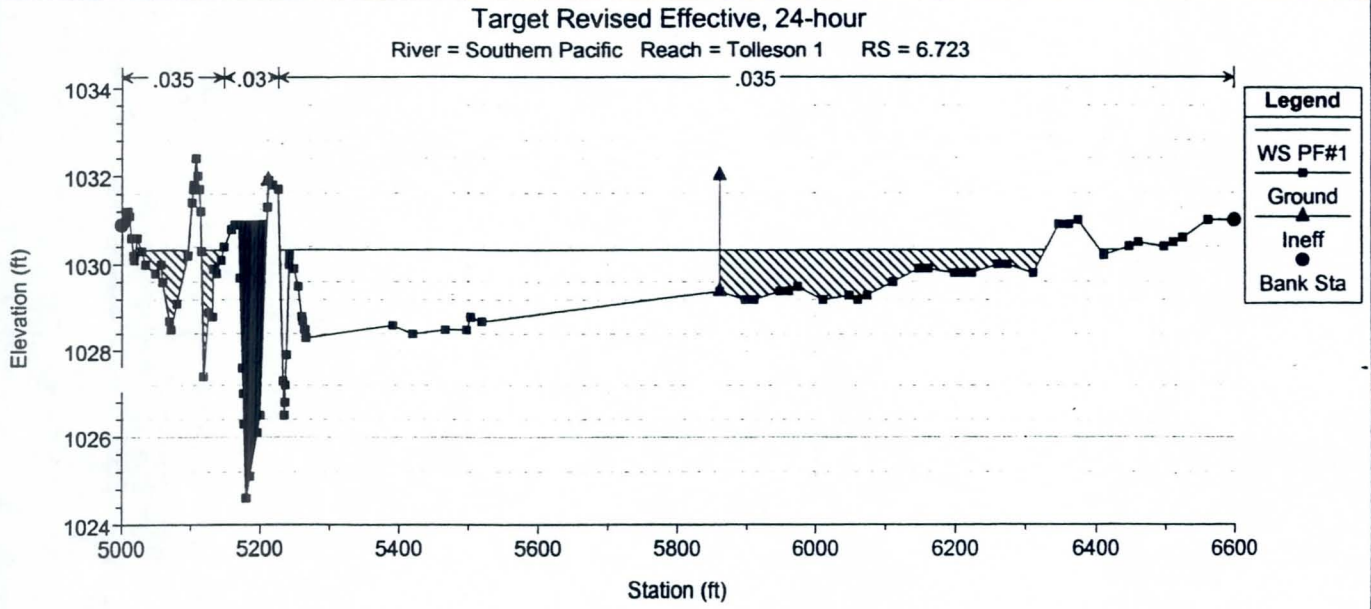

Target Revised Effective, 24-hour
River = Southern Pacific Reach = Tolleson 1 RS = 7.074
.08
.035
Legend
WS PF#1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

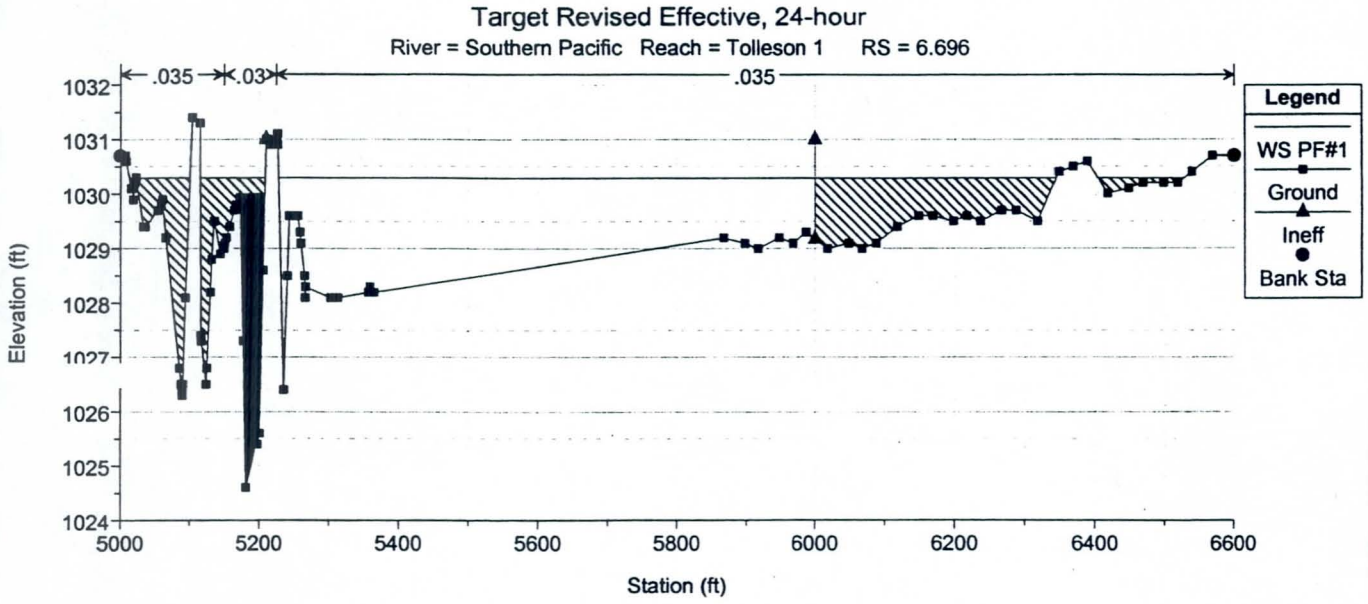

Target Revised Effective, 24-hour
River = Southern Pacific Reach = Tolleson 1 RS = 7.033
.08
.035
Legend
WS PF#1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

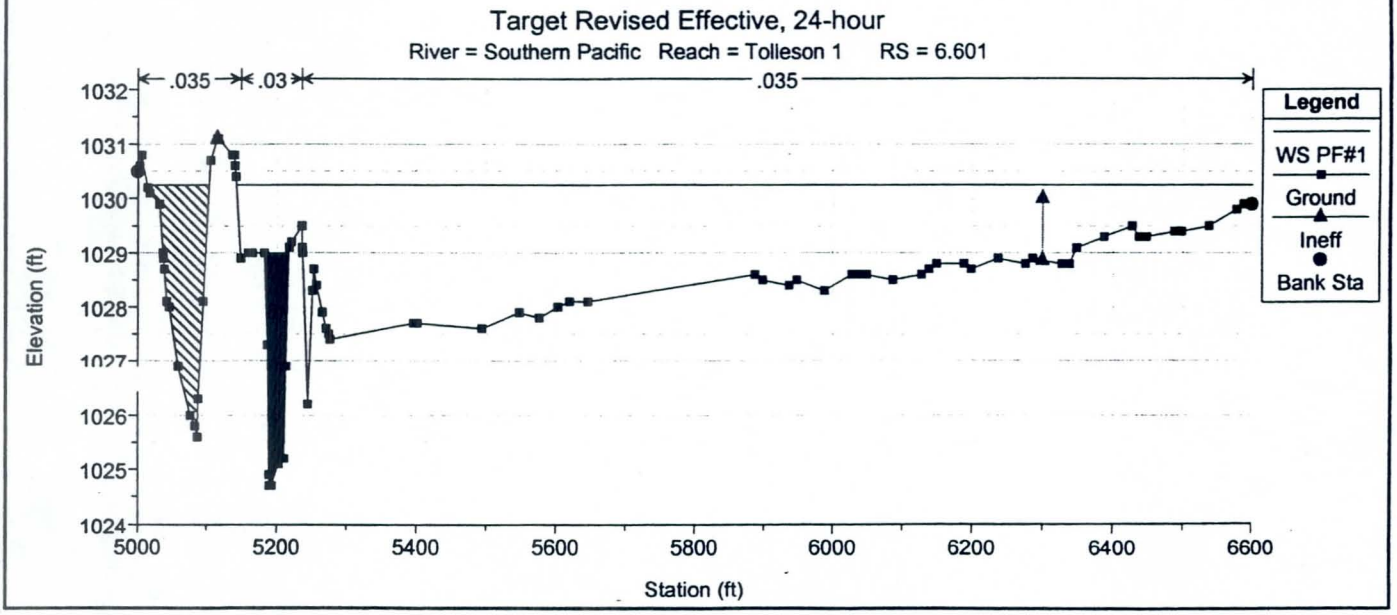

Target Revised Effective, 24-hour
River = Southern Pacific Reach = Tolleson 1 RS = 6.980
.07
.035
Legend
WS PF#1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

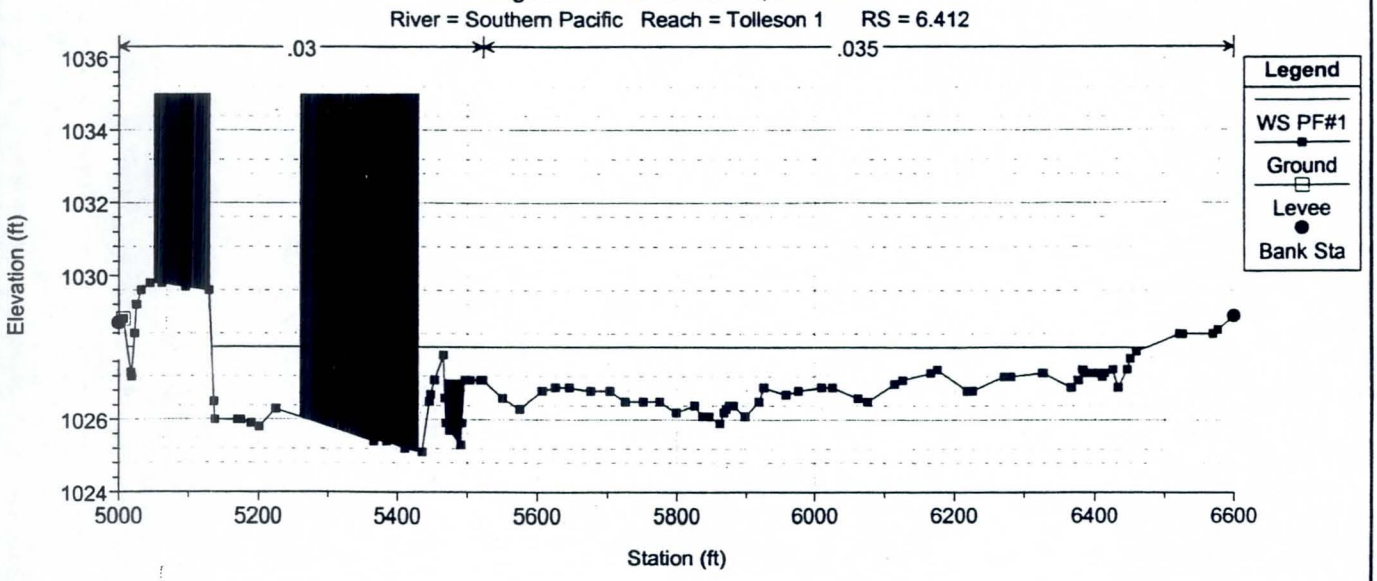

Target Revised Effective, 24-hour
River = Southern Pacific Reach = Tolleson 1 RS = 6.885
.06
.035
Legend
WS PF#1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Target Revised Effective, 24-hour
River = Southern Pacific Reach = Tolleson 1 RS = 6.782
.035
.03
Legend
WS PF#1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Target Revised Effective, 24-hour
River = Southern Pacific Reach = Tolleson 1 RS = 6.723
.035
.03
.035
Legend
WS PF#1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Target Revised Effective, 24-hour
River = Southern Pacific Reach = Tolleson 1 RS = 6.696
.035
.03
.035
Legend
WS PF#1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Target Revised Effective, 24-hour
River = Southern Pacific Reach = Tolleson 1 RS = 6.601
.035
.03
.035
Legend
WS PF#1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Target Revised Effective, 24-hour
River = Southern Pacific Reach = Tolleson 1 RS = 6.412
.03
.035
Legend
WS PF#1
Ground
Levee
Bank Sta
Elevation (ft)
1036
1034
1032
1030
1026
1024
5000
5200
5400
5600
5800
6000
6200
6400
6600
Station (ft)

HEC-RAS September 1998 Version 2.2
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

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

PROPOSED CONDITIONS
24-HOUR

PROJECT DATA
Project Title: Target Proposed Conditions, 24-hour
Project File : TGT24P.prj
Run Date and Time: 12/01/2000 5:00:58 PM

Project in English units

Project Description:
Target Proposed Conditions Model, 24-hour
Prepared By: Hoskin Engineering
Consultants, Inc.
HEC Project No.: 00-043
Date: 11-30-00
Description:
Geometry data for cross-sections 7.033 to 6.532 modified for Target Southwest Distribution Center site. Flow data modified to reflect 100-year, 24-hour proposed conditions HEC-1.

Original Model Info.:
Tolleson FIS, Project
FCD 95-26, El Mirage Road to 69th Avenue Alignment. August 17, 1998
Dibble &
Associates, Inc., with JE Fuller/Hydrology & Geomorphology, Inc.

The
Cross-section data were generated by ROADCALC from March 28, 1994 Topo flown by Kenney Aerial Mapping, Inc., NGVD 1929. Top-of-rail elevations and roadway/canal profile data were added to most cross-sections based on subsequent survey by Urban Engineering. Some cross sections were edited or added by hand.

Discharge data are from HEC-1 model for Tolleson Area dated December 1998 unless otherwise noted.

Hydrologic concentration points are noted in cross-section descriptions using the corresponding HEC-1 IDs. The flow rates have been rounded to the nearest 10 cubic feet per second (cfs).

The floodplain was mapped utilizing HEC-RAS Version 2.1, dated October 1997.

PLAN DATA

Plan Title: Proposed Conditions, 24-hour
Plan File : g:\Filedir\00\00-043 Target S.W. Dist.Center\hydro\hec-ras\TGT24P.p02

Geometry Title: Proposed Geometry
Geometry File : g:\Filedir\00\00-043 Target S.W. Dist.Center\hydro\hec-ras\TGT24P.g01

Flow Title : Proposed 100-yr 24-hr HEC-1 Flows
Flow File : g:\Filedir\00\00-043 Target S.W. Dist.Center\hydro\hec-ras\TGT24P.f01

Plan Summary Information:

Number of:	Cross Sections	= 24	Mulitple Openings	=	0
	Culverts	= 0	Inline Weirs	=	0
	Bridges	= 0			

Computational Information

Water surface calculation tolerance	=	0.01
Critical depth calculaton tolerance	=	0.01
Maximum number of interations	=	20
Maximum difference tolerance	=	0.3
Flow tolerance factor	=	0.001

Computation Options

Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: Proposed 100-yr 24-hr HEC-1 Flows
Flow File : g:\Filedir\00\00-043 Target S.W. Dist.Center\hydro\hec-ras\TGT24P.f01

Flow Data (cfs)

River	Reach	RS	Q100-24h
Southern Pacific	Tolleson 1	7.287	1020
Southern Pacific	Tolleson 1	7.074	1099
Southern Pacific	Tolleson 1	6.549	1432

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Southern Pacific	Tolleson 1	Q100-24h		Known WS = 1028.02

Changes in WS and EG

River	Reach	RS	Profile	Type	Value
Southern Pacific	Tolleson 1	6.532	Q100-24h	Known WS	1029.46
Southern Pacific	Tolleson 2	5.539	Q100-24h	Known WS	1024.18
Southern Pacific	Tolleson 2	5.054	Q100-24h	Known WS	1015.2
Southern Pacific	Tolleson 2	3.568	Q100-24h	Known WS	1003.1
Southern Pacific	Tolleson 2	1.771	Q100-24h	Known WS	992
Southern Pacific	Tolleson 2	1.138	Q100-24h	Known WS	986.3
Canal	Canal Split	5.798	Q100-24h	Known WS	1026.92
Canal	Canal Split	5.578	Q100-24h	Known WS	1026.3

GEOMETRY DATA

Geometry Title: Proposed Geometry
Geometry File : g:\Filedir\00\00-043 Target S.W. Dist.Center\hydro\hec-ras\TGT24P.g01

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 7.287

INPUT
Description: RM 7.287, HEC-1 CPUB1 Q=1020 CFS, Begin Detailed Study By Dibble & JEF, 69th Avenue Alignment.
Station Elevation Data num= 65

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1037.2	5001.6	1037.2	5010.1	1036.8	5010.2	1036.8	5010.5	1036.8
5010.7	1036.8	5016	1035.8	5023	1033.4	5025.2	1032.8	5027.8	1032.9
5032	1032.6	5038.3	1032.3	5048.1	1034.7	5051.9	1035.5	5053.3	1035.7
5053.5	1035.8	5053.6	1035.8	5054	1035.9	5054.1	1035.8	5054.3	1035.8
5055	1035.5	5055.6	1035.3	5056.5	1035	5059.4	1034.1	5059.9	1034
5060.7	1033.8	5062.5	1034.5	5065.5	1035.9	5066.5	1035.8	5072.1	1035.8
5076.6	1035.8	5081	1035.8	5082.8	1035.9	5087.3	1035.8	5089.7	1035.7
5094.2	1035.7	5115.9	1035.6	5167.7	1035.8	5241.4	1036.1	5312.7	1036.2
5457.9	1036.2	5481.4	1036.3	5510.7	1036.2	5668.1	1036.6	5695.3	1036.6
5701.3	1036.6	5854.7	1036.7	5862	1036.7	5867.4	1036.7	5870.3	1036.8
5879.9	1036.8	5891	1036.8	6062.7	1037.2	6066	1037.2	6067	1037.2
6070.1	1037.2	6075.3	1037.2	6124.6	1037.2	6240.6	1037.4	6398.7	1037.6
6423.9	1037.6	6465.8	1037.7	6502.5	1037.7	6567.4	1037.8	6600	1037.9

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.08	5059.9	.035	5668.1	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6600	124	124	124	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
5000	5055	1035.5

CROSS SECTION OUTPUT Profile #Q100-24h

			Left OB	Channel	Right OB
E.G. Elev (ft)	1036.71	Element			
Vel Head (ft)	0.24	Wt. n-Val.		0.042	
W.S. Elev (ft)	1036.46	Reach Len. (ft)	124.00	124.00	124.00
Crit W.S. (ft)	1036.46	Flow Area (sq ft)		257.00	
E.G. Slope (ft/ft)	0.034066	Area (sq ft)		257.00	
Q Total (cfs)	1020.00	Flow (cfs)		1020.00	
Top Width (ft)	602.26	Top Width (ft)		602.26	
Vel Total (ft/s)	3.97	Avg. Vel. (ft/s)		3.97	
Max Chl Dpth (ft)	2.66	Hydr. Depth (ft)		0.43	

Conv. Total (cfs)	5526.4	Conv. (cfs)	5526.4
Length Wtd. (ft)	124.00	Wetted Per. (ft)	603.23
Min Ch El (ft)	1033.80	Shear (lb/sq ft)	0.91
Alpha	1.00	Stream Power (lb/ft s)	3.60
Frctn Loss (ft)	0.74	Cum Volume (acre-ft)	100.37
C & E Loss (ft)	0.06	Cum SA (acres)	92.05

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 7.264

INPUT
Description: RM 7.264
Station Elevation Data num= 56

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1037.2	5003.1	1037.1	5007.3	1037.2	5016.5	1037	5018.1	1036.9
5020.1	1036.7	5023.8	1035.9	5033.2	1034.1	5034	1033.9	5034.5	1033.8
5038.9	1032.9	5041.7	1033.5	5054.9	1035.1	5058.4	1034.2	5059.5	1033.5
5064.3	1034.8	5065.3	1035.1	5070.4	1035.1	5076.9	1035	5077.2	1035.1
5080.2	1034.7	5083.7	1034.1	5084	1034	5088.1	1034	5110.4	1034.1
5193.6	1034.2	5306.8	1034.4	5336	1034.4	5419.5	1034.7	5427.6	1034.9
5451.5	1034.9	5575.5	1035.1	5595.7	1035.2	5678.4	1035.3	5704.2	1035.4
5853.6	1035.6	5869.4	1035.6	6249.8	1035.6	6254.3	1035.6	6258.8	1035.6
6263.3	1035.6	6363.5	1035.6	6367.8	1035.6	6372.1	1035.6	6390.1	1035.8
6415.5	1036.1	6419.7	1036.1	6451.5	1036.4	6475.9	1036.7	6480.1	1036.7
6484.3	1036.7	6491.3	1036.8	6500.9	1036.8	6505.1	1036.8	6509.3	1036.8
6600	1036.9								

Manning's n Values num= 2

Sta	n Val	Sta	n Val
5000	.08	5076.9	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6600	192	192	192	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
6035	6600	1036

CROSS SECTION OUTPUT Profile #Q100-24h

E.G. Elev (ft)	1035.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.038	
W.S. Elev (ft)	1035.63	Reach Len. (ft)	192.00	192.00	192.00
Crit W.S. (ft)	1034.91	Flow Area (sq ft)		681.90	
E.G. Slope (ft/ft)	0.002366	Area (sq ft)		690.44	
Q Total (cfs)	1020.00	Flow (cfs)		1020.00	
Top Width (ft)	1349.14	Top Width (ft)		1349.14	
Vel Total (ft/s)	1.50	Avg. Vel. (ft/s)		1.50	
Max Chl Dpth (ft)	2.73	Hydr. Depth (ft)		0.68	
Conv. Total (cfs)	20968.5	Conv. (cfs)		20968.5	
Length Wtd. (ft)	192.00	Wetted Per. (ft)		1010.85	
Min Ch El (ft)	1032.90	Shear (lb/sq ft)		0.10	
Alpha	1.00	Stream Power (lb/ft s)		0.15	
Frctn Loss (ft)	0.52	Cum Volume (acre-ft)		99.02	
C & E Loss (ft)	0.00	Cum SA (acres)		89.27	

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 7.227

INPUT
Description: RM 7.227
Station Elevation Data num= 57

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1037.3	5007.8	1037.2	5010.5	1037.1	5018.1	1037.1	5022.2	1036.3
5025.9	1035.9	5026.7	1035.8	5027.9	1035.6	5038.2	1034.3	5041.1	1033.9
5042	1034	5043.2	1034.1	5054.9	1034.6	5058.8	1033.9	5058.9	1033.9
5060	1033.4	5060.5	1033.7	5062	1034.4	5063.2	1034.9	5066	1034.8
5071.6	1034.4	5073.9	1034.3	5075.3	1034.3	5081.1	1034.2	5082.6	1033.9
5083	1033.7	5083.1	1033.7	5106	1033.7	5190.3	1033.8	5225.9	1033.9
5229.3	1034	5298.7	1034.2	5371.1	1034.3	5429.3	1034.4	5667.9	1034.8
5742	1034.9	5867.6	1034.8	5909.9	1034.8	6227.9	1035.1	6239.9	1035.1
6251.9	1035.2	6263.9	1035.2	6347.7	1035.3	6359.4	1035.3	6371.2	1035.4
6386.3	1035.5	6407.5	1035.6	6419.2	1035.7	6445.8	1035.8	6466.2	1036
6477.9	1036	6489.5	1036.1	6495.4	1036.2	6503.5	1036.1	6515.2	1036.2
6526.8	1036.2	6600	1036.3						

Manning's n Values num= 2

Sta	n Val	Sta	n Val

5000	.08	5075.3	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
5000 6600 308 308 308 .1 .3
Ineffective Flow num= 1

Sta L	Sta R	Elev
6082	6600	1036

CROSS SECTION OUTPUT Profile #Q100-24h

			Left OB	Channel	Right OB
E.G. Elev (ft)	1035.14	Element			
Vel Head (ft)	0.04	Wt. n-Val.		0.036	
W.S. Elev (ft)	1035.10	Reach Len. (ft)	308.00	308.00	308.00
Crit W.S. (ft)	1034.68	Flow Area (sq ft)		621.83	
E.G. Slope (ft/ft)	0.003194	Area (sq ft)		631.26	
Q Total (cfs)	1020.00	Flow (cfs)		1020.00	
Top Width (ft)	1191.47	Top Width (ft)		1191.47	
Vel Total (ft/s)	1.64	Avg. Vel. (ft/s)		1.64	
Max Chl Dpth (ft)	1.70	Hydr. Depth (ft)		0.59	
Conv. Total (cfs)	18048.7	Conv. (cfs)		18048.7	
Length Wtd. (ft)	308.00	Wetted Per. (ft)		1050.81	
Min Ch El (ft)	1033.40	Shear (lb/sq ft)		0.12	
Alpha	1.00	Stream Power (lb/ft s)		0.19	
Frctn Loss (ft)	0.58	Cum Volume (acre-ft)		96.11	
C & E Loss (ft)	0.01	Cum SA (acres)		83.68	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 7.169

INPUT
Description: RM 7.169
Station Elevation Data num= 58

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1037.5	5004.8	1037.5	5007.2	1037.6	5016.1	1037.7	5017.4	1037.7
5020.7	1036.9	5021.1	1036.8	5022.3	1036.5	5023	1035.7	5024.2	1035.9
5025.5	1035.8	5028.4	1035.8	5031.1	1035.9	5042	1036.6	5042.6	1036.6
5045.2	1036.7	5045.3	1036.7	5052.3	1036.6	5053.8	1035.8	5056	1034.6
5057.3	1033.9	5059.6	1032.6	5060.5	1032	5061.3	1031.6	5062	1031.7
5062.8	1032.2	5067	1034	5067.4	1034	5068.1	1034.1	5077.7	1034.1
5078.9	1034.1	5081.3	1034.1	5082.3	1033.8	5085.2	1033	5162.5	1033.2
5651.1	1034	5803.1	1034.2	5890.3	1034	5975.4	1034	6192.9	1034
6216.9	1034.1	6240.9	1034.1	6264.9	1034.2	6322.3	1034.3	6346.1	1034.4
6369.9	1034.4	6380.3	1034.5	6394.8	1034.7	6418.6	1034.6	6436.8	1034.8
6450.8	1034.9	6474.5	1035	6498.2	1035.1	6502.2	1035.1	6507.8	1035.1
6531.5	1035.1	6555.2	1035.2	6600	1035.2				

Manning's n Values num= 2

Sta	n Val	Sta	n Val
5000	.08	5077.7	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
5000 6600 500 500 500 .1 .3
Ineffective Flow num= 1

Sta L	Sta R	Elev
6160	6600	1035

CROSS SECTION OUTPUT Profile #Q100-24h

			Left OB	Channel	Right OB
E.G. Elev (ft)	1034.55	Element			
Vel Head (ft)	0.02	Wt. n-Val.		0.036	
W.S. Elev (ft)	1034.53	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)	1034.02	Flow Area (sq ft)		833.20	
E.G. Slope (ft/ft)	0.001254	Area (sq ft)		904.86	
Q Total (cfs)	1020.00	Flow (cfs)		1020.00	
Top Width (ft)	1325.99	Top Width (ft)		1325.99	
Vel Total (ft/s)	1.22	Avg. Vel. (ft/s)		1.22	
Max Chl Dpth (ft)	2.93	Hydr. Depth (ft)		0.75	
Conv. Total (cfs)	28807.9	Conv. (cfs)		28807.9	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		1105.32	
Min Ch El (ft)	1031.60	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)		0.07	
Frctn Loss (ft)	1.54	Cum Volume (acre-ft)		90.68	
C & E Loss (ft)	0.01	Cum SA (acres)		74.78	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 7.074

INPUT
Description: RM 7.074, HEC-1 CPSF1 Q=1099 CFS
Station Elevation Data num= 54

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1036	5002.5	1036	5007.2	1036.2	5014.7	1036.1	5017.9	1035.9
5019.1	1035.7	5019.8	1035.4	5020	1035.4	5021.2	1035	5032.5	1032.4
5042.9	1029.6	5047	1030.8	5047.7	1030.8	5052.2	1032.4	5055.4	1031.1
5058.3	1029.8	5063.3	1031.4	5066.2	1032.6	5069.5	1032.7	5069.8	1032.7
5071.4	1032.6	5077.9	1032.3	5082.7	1031.9	5087.6	1031.6	5098	1031.7
5112.2	1032	5181	1032	5294.6	1032.3	5380.6	1032.4	5399.6	1032.3
5408.8	1032.4	5440.5	1032.4	5624.1	1032.8	5902.3	1033	5927.3	1033.2
6081.5	1032.7	6136.7	1032.8	6180.1	1033	6223.5	1033	6266.9	1033.1
6281.5	1032.9	6324.9	1033.1	6368.1	1033.1	6370.8	1033.2	6374.6	1033.2
6417.8	1033.1	6422.5	1033.1	6426.1	1033.1	6469.3	1033.3	6512.5	1033.4
6513.6	1033.4	6515	1033.4	6558.1	1033.5	6600	1033.6		

Manning's n Values num= 2

Sta	n Val	Sta	n Val
5000	.08	5077.9	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6600	218	218	218	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
5800	6600	1034

CROSS SECTION OUTPUT Profile #Q100-24h

E.G. Elev (ft)	1033.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.		0.042	
W.S. Elev (ft)	1032.85	Reach Len. (ft)	218.00	218.00	218.00
Crit W.S. (ft)	1032.69	Flow Area (sq ft)		361.16	
E.G. Slope (ft/ft)	0.014541	Area (sq ft)		370.94	
Q Total (cfs)	1099.00	Flow (cfs)		1099.00	
Top Width (ft)	784.24	Top Width (ft)		784.24	
Vel Total (ft/s)	3.04	Avg. Vel. (ft/s)		3.04	
Max Chl Dpth (ft)	3.25	Hydr. Depth (ft)		0.54	
Conv. Total (cfs)	9113.7	Conv. (cfs)		9113.7	
Length Wtd. (ft)	218.00	Wetted Per. (ft)		671.43	
Min Ch El (ft)	1029.60	Shear (lb/sq ft)		0.49	
Alpha	1.00	Stream Power (lb/ft s)		1.49	
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)		83.36	
C & E Loss (ft)	0.04	Cum SA (acres)		62.66	

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 7.033

INPUT
Description: RM 7.033
Station Elevation Data num= 49

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1035	5003.7	1035.2	5007.5	1035.4	5011.1	1035.2	5016.5	1035
5020.3	1034	5020.7	1033.9	5021.2	1033.8	5022.4	1033.7	5022.6	1033.7
5023.1	1033.7	5023.5	1033.7	5042.6	1032.2	5042.9	1032.2	5044.3	1032.1
5046.9	1032	5049.5	1032	5054.4	1033	5059.5	1033.7	5062	1034.2
5063.5	1034.5	5064.4	1034.6	5064.5	1034.6	5067.1	1034.8	5067.3	1034.8
5069.9	1034.2	5084.7	1033.8	5088.7	1034	5098.2	1033.6	5105.6	1033.2
5107.9	1033	5109.3	1032.8	5110.7	1032.7	5111.5	1032.5	5123.1	1031.8
5124.1	1032.2	5126.7	1032.2	5130.3	1032.1	5135.8	1032.4	5138.9	1032.7
5139.4	1032.9	5141.4	1032.9	5143.2	1032.7	5148	1032.7	5152	1032.5
5159.4	1029	5159.9	1028.9	5671	1032	6500	1033		

Manning's n Values num= 2

Sta	n Val	Sta	n Val
5000	.08	5152	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6500	32	32	32	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
5000	5067.1	1034.8

CROSS SECTION OUTPUT Profile #Q100-24h

E.G. Elev (ft)	1032.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.035	
W.S. Elev (ft)	1032.79	Reach Len. (ft)	32.00	32.00	32.00
Crit W.S. (ft)	1030.50	Flow Area (sq ft)		1490.42	
E.G. Slope (ft/ft)	0.000227	Area (sq ft)		1499.24	
Q Total (cfs)	1099.00	Flow (cfs)		1099.00	
Top Width (ft)	1232.59	Top Width (ft)		1232.59	
Vel Total (ft/s)	0.74	Avg. Vel. (ft/s)		0.74	
Max Chl Dpth (ft)	3.89	Hydr. Depth (ft)		1.23	
Conv. Total (cfs)	72872.3	Conv. (cfs)		72872.3	
Length Wtd. (ft)	32.00	Wetted Per. (ft)		1215.26	
Min Ch El (ft)	1028.90	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)		0.01	
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)		78.68	

C & E Loss (ft) 0.02 Cum SA (acres) 57.62

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 7.020

INPUT
Description: RM 7.020
Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1034	5010	1034.01	5020	1033.25	5030	1031.35	5040	1030.59
5060	1030.62	5080	1030.89	5100	1031.66	5120	1033.37	5125	1034
5130	1032.73	5140	1031.69	5150	1031.14	5156	1031.1	5329	1032
5576	1032.36	5673	1032.5	6076	1033	6404	1034	6500	1033.8

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.06	5125	.03	5576	.025

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6500	50	50	50	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
5000	5125	1034

CROSS SECTION OUTPUT Profile #Q100-24h

E.G. Elev (ft)	1032.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.25	Wt. n-Val.		0.030	
W.S. Elev (ft)	1032.50	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	1032.50	Flow Area (sq ft)		273.00	
E.G. Slope (ft/ft)	0.013549	Area (sq ft)		393.29	
Q Total (cfs)	1099.00	Flow (cfs)		1099.00	
Top Width (ft)	627.48	Top Width (ft)		627.48	
Vel Total (ft/s)	4.03	Avg. Vel. (ft/s)		4.03	
Max Chl Dpth (ft)	1.91	Hydr. Depth (ft)		0.50	
Conv. Total (cfs)	9441.5	Conv. (cfs)		9441.5	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		541.65	
Min Ch El (ft)	1030.59	Shear (lb/sq ft)		0.43	
Alpha	1.00	Stream Power (lb/ft s)		1.72	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		77.98	
C & E Loss (ft)	0.07	Cum SA (acres)		56.93	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 7.007

INPUT
Description: RM 7.007 Blocked basin not used for conveyance
Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1034.1	5010	1033.95	5020	1033.18	5030	1031.04	5040	1030.37
5060	1030	5080	1030	5100	1030	5120	1032.28	5125	1033.48
5130	1032.55	5140	1031	5150	1031	5167	1030	5182	1028
5365	1028	5388	1025	5550	1025	5564	1028	5578	1031
5598	1031.3	5655	1032	5770	1031	6235	1030	6500	1030

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.06	5125	.03	5578	.025

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6500	80	80	80	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5125	1033.48	5655	6500	1032.2

Blocked Obstructions num= 1

Sta L	Sta R	Elev
5174.5	5568	1029

CROSS SECTION OUTPUT Profile #Q100-24h

E.G. Elev (ft)	1031.96	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.030	
W.S. Elev (ft)	1031.94	Reach Len. (ft)	80.00	80.00	80.00

Crit W.S. (ft)	1029.62	Flow Area (sq ft)	1267.06
E.G. Slope (ft/ft)	0.000081	Area (sq ft)	2649.62
Q Total (cfs)	1099.00	Flow (cfs)	1099.00
Top Width (ft)	1446.57	Top Width (ft)	1446.57
Vel Total (ft/s)	0.87	Avg. Vel. (ft/s)	0.87
Max Chl Dpth (ft)	3.09	Hydr. Depth (ft)	2.45
Conv. Total (cfs)	121894.6	Conv. (cfs)	121894.6
Length Wtd. (ft)	80.00	Wetted Per. (ft)	517.16
Min Ch El (ft)	1028.86	Shear (lb/sq ft)	0.01
Alpha	1.00	Stream Power (lb/ft s)	0.01
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	76.24
C & E Loss (ft)	0.00	Cum SA (acres)	55.74

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.993 M

INPUT
Description: RM 6.993 Blocked basin not used for conveyance
Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1033.4	5010	1033.75	5020	1033.08	5030	1031.08	5040	1030.26
5060	1030	5080	1030	5100	1030	5120	1030.66	5125	1031.85
5130	1032.33	5140	1031.7	5150	1031.27	5165	1030	5173	1028
5378	1028	5391	1025	5550	1025	5562	1028	5579	1032
5685	1032	6000	1031	6049	1030	6171	1030	6238	1030
6500	1030								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.06	5130	.03	5579	.02

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6500	120	120	120	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5130	1032.33	5579	6500	1032.2

Blocked Obstructions num= 1

Sta L	Sta R	Elev
5169	5570.5	1029

CROSS SECTION OUTPUT Profile #Q100-24h

E.G. Elev (ft)	1031.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.030	
W.S. Elev (ft)	1031.94	Reach Len. (ft)	120.00	120.00	120.00
Crit W.S. (ft)	1029.62	Flow Area (sq ft)		1219.41	
E.G. Slope (ft/ft)	0.000086	Area (sq ft)		2465.64	
Q Total (cfs)	1099.00	Flow (cfs)		1099.00	
Top Width (ft)	1337.93	Top Width (ft)		1337.93	
Vel Total (ft/s)	0.90	Avg. Vel. (ft/s)		0.90	
Max Chl Dpth (ft)	2.94	Hydr. Depth (ft)		2.76	
Conv. Total (cfs)	118622.1	Conv. (cfs)		118622.1	
Length Wtd. (ft)	120.00	Wetted Per. (ft)		443.03	
Min Ch El (ft)	1029.00	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)		0.01	
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)		71.54	
C & E Loss (ft)	0.00	Cum SA (acres)		53.19	

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.980 ✓

INPUT
Description: RM 6.980
Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1033.04	5010	1032.92	5020	1032.23	5030	1030.45	5040	1028.98
5060	1029.01	5080	1030	5100	1030	5120	1030.08	5125	1031.9
5130	1032.85	5140	1031.7	5150	1031.24	5164	1030	5172	1028
5369	1028	5424	1031	5564	1032	5611	1032	5613	1033
5658	1034	6004	1034	6040	1031	6500	1030.5		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.06	5130	.03	5564	.02

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6500	260	260	260	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5130	1032.85	5424	6500	1032.2

Blocked Obstructions num= 1

Sta L	Sta R	Elev
5168	5387.3	1029

CROSS SECTION OUTPUT Profile #Q100-24h

			Left OB	Channel	Right OB
E.G. Elev (ft)	1031.93	Element			
Vel Head (ft)	0.03	Wt. n-Val.		0.030	
W.S. Elev (ft)	1031.90	Reach Len. (ft)	260.00	260.00	260.00
Crit W.S. (ft)	1029.90	Flow Area (sq ft)		736.76	
E.G. Slope (ft/ft)	0.000257	Area (sq ft)		1538.45	
Q Total (cfs)	1099.00	Flow (cfs)		1099.00	
Top Width (ft)	985.11	Top Width (ft)		985.11	
Vel Total (ft/s)	1.49	Avg. Vel. (ft/s)		1.49	
Max Chl Dpth (ft)	2.92	Hydr. Depth (ft)		2.58	
Conv. Total (cfs)	68581.3	Conv. (cfs)		68581.3	
Length Wtd. (ft)	260.00	Wetted Per. (ft)		285.97	
Min Ch El (ft)	1028.98	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)		0.06	
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)		66.02	
C & E Loss (ft)	0.00	Cum SA (acres)		49.99	

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.932

INPUT
Description: RM 6.932
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1032.18	5010	1032.02	5020	1031.65	5030	1031.3	5040	1030.73
5060	1029.39	5080	1029.14	5100	1029.49	5120	1029.83	5125	1029.94
5130	1030.74	5140	1030.81	5150	1030.18	5163	1030	5170	1028
5358	1028	5375	1032	5536	1033	5628	1034	5663	1034
6500	1034								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.06	5130	.03	5375	.02

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6500	240	240	240	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5140	1032	5628	6500	1034

Blocked Obstructions num= 1

Sta L	Sta R	Elev
5166.5	5362.25	1029

CROSS SECTION OUTPUT Profile #Q100-24h

			Left OB	Channel	Right OB
E.G. Elev (ft)	1031.85	Element			
Vel Head (ft)	0.05	Wt. n-Val.		0.030	
W.S. Elev (ft)	1031.80	Reach Len. (ft)	240.00	240.00	240.00
Crit W.S. (ft)	1029.98	Flow Area (sq ft)		607.81	
E.G. Slope (ft/ft)	0.000375	Area (sq ft)		824.20	
Q Total (cfs)	1099.00	Flow (cfs)		1099.00	
Top Width (ft)	358.17	Top Width (ft)		358.17	
Vel Total (ft/s)	1.81	Avg. Vel. (ft/s)		1.81	
Max Chl Dpth (ft)	2.80	Hydr. Depth (ft)		2.60	
Conv. Total (cfs)	56785.3	Conv. (cfs)		56785.3	
Length Wtd. (ft)	240.00	Wetted Per. (ft)		234.63	
Min Ch El (ft)	1029.00	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)		0.11	
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)		58.97	
C & E Loss (ft)	0.00	Cum SA (acres)		45.98	

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.885

INPUT
Description: RM 6.885
Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1031.6	5010	1031.57	5020	1031.36	5030	1031.15	5040	1030.92
5060	1030.12	5080	1029.67	5100	1029.65	5120	1029.75	5125	1029.96
5130	1031	5140	1030.44	5150	1030.13	5162	1030	5168	1028
5361	1028	5376	1032	5401	1032	5507	1033	5605	1034
5661	1034	6286	1034	6286	1031	6491	1030		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.06	5130	.03	5376	.02

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6491	240	240	240	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5130	1032	5605	6491	1034

Blocked Obstructions num= 1

Sta L	Sta R	Elev
5165	5366	**1029**

CROSS SECTION OUTPUT Profile #Q100-24h

E.G. Elev (ft)	1031.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.030	
W.S. Elev (ft)	**1031.70**	Reach Len. (ft)	240.00	240.00	240.00
Crit W.S. (ft)	1029.97	Flow Area (sq ft)		604.32	
E.G. Slope (ft/ft)	0.000405	Area (sq ft)		1022.32	
Q Total (cfs)	1099.00	Flow (cfs)		1099.00	
Top Width (ft)	579.89	Top Width (ft)		579.89	
Vel Total (ft/s)	1.82	Avg. Vel. (ft/s)		1.82	
Max Chl Dpth (ft)	2.70	Hydr. Depth (ft)		2.47	
Conv. Total (cfs)	54579.7	Conv. (cfs)		54579.7	
Length Wtd. (ft)	240.00	Wetted Per. (ft)		245.43	
Min Ch El (ft)	1029.00	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)		0.11	
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)		53.89	
C & E Loss (ft)	0.00	Cum SA (acres)		43.39	

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.834

INPUT
Description: RM 6.834
Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1031.32	5010	1031.32	5020	1030.96	5030	1030.55	5040	1030.14
5060	1029.62	5080	1029.38	5100	1029.77	5120	1034.59	5125	1035
5130	1034.1	5140	1030	5150	1030	5160	1029.5	**5163**	**1029.5**
5167	1028	5360	1028	5403	1032	5515	1033	5620	1034
5660	1034	6295	1034	6295	1031	6490	1030		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.035	5140	.03	5403	.02

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6490	305	305	305	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5125	1035	5620	6490	1034

Blocked Obstructions num= 1

Sta L	Sta R	Elev
5164.3	5370.75	1029

CROSS SECTION OUTPUT Profile #Q100-24h

E.G. Elev (ft)	1031.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.030	
W.S. Elev (ft)	**1031.61**	Reach Len. (ft)	305.00	305.00	305.00
Crit W.S. (ft)	1029.94	Flow Area (sq ft)		622.79	
E.G. Slope (ft/ft)	0.000399	Area (sq ft)		992.67	
Q Total (cfs)	1099.00	Flow (cfs)		1099.00	
Top Width (ft)	565.38	Top Width (ft)		565.38	
Vel Total (ft/s)	1.76	Avg. Vel. (ft/s)		1.76	
Max Chl Dpth (ft)	2.61	Hydr. Depth (ft)		2.37	
Conv. Total (cfs)	55004.0	Conv. (cfs)		55004.0	
Length Wtd. (ft)	305.00	Wetted Per. (ft)		263.28	
Min Ch El (ft)	1029.00	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)		0.10	
Frctn Loss (ft)	0.23	Cum Volume (acre-ft)		48.34	
C & E Loss (ft)	0.01	Cum SA (acres)		40.24	

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.782

INPUT
Description: RM 6.782
Station Elevation Data num= 80

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1032	5003.5	1032	5004.7	1032	5005.2	1032	5008.3	1031.7
5015.3	1031	5019.5	1030.5	5019.8	1030.5	5024.4	1030.9	5028.6	1030.7
5035.6	1030.3	5038.5	1030.2	5038.9	1030.2	5041.6	1029.9	5043.1	1029.9
5051.3	1029.8	5052.2	1029.9	5054.1	1029.8	5057.9	1029.6	5063	1029.7

5064.5	1029.6	5066.7	1029.6	5069.2	1029.6	5069.4	1029.6	5074.5	1029.6
5075.5	1029.6	5078.1	1029.5	5078.8	1029.6	5079.9	1029.6	5092.6	1029.4
5093	1029.3	5093.4	1029.3	5095.6	1029.3	5104.9	1029	5106.2	1028.9
5109.4	1028.9	5113.6	1028.9	5120	1028.9	5125.6	1029.2	5126.6	1029.2
5128.4	1029.2	5133.7	1029.5	5136.5	1029.6	5143.7	1029.8	5150	1030
5152.9	1030.3	5155.8	1030.3	5161.5	1030.6	5162.2	1030.7	5171.5	1031
5172.8	1031	5173.3	1031	5176.3	1028.6	5179	1025.9	5179.6	1025.3
5180.3	1024.6	5180.4	1024.4	5181	1024.5	5185.8	1025.2	5196.9	1026.9
5203	1027.8	5203.2	1027.8	5205.7	1028.5	5212.3	1031.3	5213.4	1031.2
5219.2	1031.2	5224.7	1031	5233.3	1030.8	5242	1028	5255	1027
5362	1027	5372	1028	5391	1032	5432	1032	5537	1033
5627	1034	5662	1034	6297	1034	6297	1031	6497	1030

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.035	5176.3	.03	5391	.02

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6497	104	104	104	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5212.3	1031.3	5627	6497	1034

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5171.5	5212.3	1031.3	5238.9	5376.75	1029

CROSS SECTION OUTPUT Profile #Q100-24h

E.G. Elev (ft)	1031.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.		0.030	
W.S. Elev (ft)	1031.25	Reach Len. (ft)	104.00	104.00	104.00
Crit W.S. (ft)	1030.24	Flow Area (sq ft)		334.04	
E.G. Slope (ft/ft)	0.001865	Area (sq ft)		712.87	
Q Total (cfs)	1099.00	Flow (cfs)		1099.00	
Top Width (ft)	533.31	Top Width (ft)		533.31	
Vel Total (ft/s)	3.29	Avg. Vel. (ft/s)		3.29	
Max Chl Dpth (ft)	2.35	Hydr. Depth (ft)		1.91	
Conv. Total (cfs)	25446.8	Conv. (cfs)		25446.8	
Length Wtd. (ft)	104.00	Wetted Per. (ft)		175.13	
Min Ch El (ft)	1028.90	Shear (lb/sq ft)		0.22	
Alpha	1.00	Stream Power (lb/ft s)		0.73	
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)		42.36	
C & E Loss (ft)	0.00	Cum SA (acres)		36.39	

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.753 6

INPUT
Description: RM 6.753
Station Elevation Data num= 79

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1031.45	5003.5	1031.45	5004.7	1031.45	5005.2	1031.45	5008.3	1031.15
5015.3	1030.45	5019.5	1029.95	5019.8	1029.95	5024.4	1030.35	5028.6	1030.15
5035.6	1029.75	5038.5	1029.65	5038.9	1029.65	5041.6	1029.35	5043.1	1029.35
5051.3	1029.25	5052.2	1029.35	5054.1	1029.25	5057.9	1029.05	5063	1029.15
5064.5	1029.05	5066.7	1029.05	5069.2	1029.05	5069.4	1029.05	5074.5	1029.05
5075.5	1029.05	5078.1	1028.95	5078.8	1029.05	5079.9	1029.05	5092.6	1028.85
5093	1028.75	5093.4	1028.75	5095.6	1028.75	5104.9	1028.45	5106.2	1028.35
5109.4	1028.35	5113.6	1028.35	5120	1028.35	5125.6	1028.65	5126.6	1028.65
5128.4	1028.65	5133.7	1028.95	5136.5	1029.05	5143.7	1029.25	5150	1029.45
5152.9	1029.75	5155.8	1029.75	5161.5	1030.05	5162.2	1030.15	5171.5	1030.45
5172.8	1030.45	5173.3	1030.45	5176.3	1028.05	5179	1025.35	5179.6	1024.75
5180.3	1024.05	5180.4	1023.85	5181	1023.95	5185.8	1024.65	5196.9	1026.35
5203	1027.25	5203.2	1027.25	5205.7	1027.95	5212.3	1030.75	5216.42	1031.15
5225.06	1031.32	5233.97	1030.99	5243	1029	5245	1028	5250	1027
5254	1027	5379	1027	5404	1032	5504	1033	5634	1034
5669	1034	6304	1034	6304	1031	6499	1030		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.035	5176.3	.03	5404	.02

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6499	208	208	208	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5225.06	1031.32	5634	6499	1034

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5171.5	5212.3	1030.75	5243	5389	1029

CROSS SECTION OUTPUT Profile #Q100-24h

E.G. Elev (ft)	1031.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.19	Wt. n-Val.		0.030	
W.S. Elev (ft)	1031.02	Reach Len. (ft)	208.00	208.00	208.00

Crit W.S. (ft)	1030.20	Flow Area (sq ft)	314.35
E.G. Slope (ft/ft)	0.002133	Area (sq ft)	706.87
Q Total (cfs)	1099.00	Flow (cfs)	1099.00
Top Width (ft)	566.41	Top Width (ft)	566.41
Vel Total (ft/s)	3.50	Avg. Vel. (ft/s)	3.50
Max Chl Dpth (ft)	2.67	Hydr. Depth (ft)	1.89
Conv. Total (cfs)	23798.6	Conv. (cfs)	23798.6
Length Wtd. (ft)	208.00	Wetted Per. (ft)	166.35
Min Ch El (ft)	1028.35	Shear (lb/sq ft)	0.25
Alpha	1.00	Stream Power (lb/ft s)	0.88
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	40.67
C & E Loss (ft)	0.04	Cum SA (acres)	35.08

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The parabolic search method failed to converge on critical depth. The program will try the cross section slice/secant method to find critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.723

INPUT
Description: RM 6.723
Station Elevation Data num= 63

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1030.9	5006.5	1031	5008.6	1031.2	5008.9	1031.2	5010.9	1031.1
5013.5	1030.6	5016.5	1030.2	5017.3	1030.2	5017.7	1030.1	5018.4	1030.2
5022.2	1030.6	5028.5	1030.3	5034.2	1030	5048.4	1029.8	5056.6	1030
5059.1	1029.6	5069	1028.7	5071.3	1028.5	5079.7	1029.1	5095.1	1030.2
5101.4	1031.4	5103.2	1031.7	5103.8	1031.8	5104.2	1031.8	5107.3	1032.4
5109.7	1032	5112	1031.7	5113.9	1031.2	5114.9	1030.3	5118.3	1027.4
5125.9	1028.9	5131.5	1028.8	5132.7	1029.9	5134.7	1029.9	5137.4	1029.8
5143.6	1030.1	5147.6	1030.4	5158.3	1030.8	5162.9	1030.9	5169	1030.9
5171	1029.7	5174.4	1027.6	5175.7	1027	5177	1026.3	5180	1024.6
5184.6	1025.1	5195.8	1026.1	5199.6	1026.5	5209.8	1031.3	5210.9	1031.9
5211.4	1031.9	5211.8	1031.9	5217.8	1031.8	5225.5	1031.7	5237.53	1028
5242.54	1027	5482	1027	5577	1033	5625	1034	5667	1034
6297	1034	6297	1031	6497	1030				

lanning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.035	5147.6	.03	5625	.02

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6497	143	143	143	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5210.9	1031.9	5625	6497	1034

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5162.9	5210.9	1031	5234.3	5513.7	1029

CROSS SECTION OUTPUT Profile #Q100-24h

			Left OB	Channel	Right OB
E.G. Elev (ft)	1030.92	Element			
Vel Head (ft)	0.06	Wt. n-Val.		0.030	
W.S. Elev (ft)	1030.86	Reach Len. (ft)	143.00	143.00	143.00
Crit W.S. (ft)	1029.77	Flow Area (sq ft)		553.25	
E.G. Slope (ft/ft)	0.000760	Area (sq ft)		778.63	
Q Total (cfs)	1099.00	Flow (cfs)		1099.00	
Top Width (ft)	620.59	Top Width (ft)		620.59	
Vel Total (ft/s)	1.99	Avg. Vel. (ft/s)		1.99	
Max Chl Dpth (ft)	3.46	Hydr. Depth (ft)		1.76	
Conv. Total (cfs)	39867.6	Conv. (cfs)		39867.6	
Length Wtd. (ft)	143.00	Wetted Per. (ft)		315.27	
Min Ch El (ft)	1027.40	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)		0.17	
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)		37.12	
C & E Loss (ft)	0.00	Cum SA (acres)		32.25	

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.696

INPUT
escription: RM 6.696
tation Elevation Data num= 64

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1030.7	5005.9	1030.7	5007	1030.7	5007.4	1030.6	5008.1	1030.6
5015.3	1030.1	5017.7	1030.1	5018.2	1029.9	5020.7	1030.2	5022.5	1030.3
5033	1029.4	5035.9	1029.4	5053.7	1029.7	5058.9	1029.8	5061	1029.9
5065.7	1029.2	5085.8	1026.8	5088.1	1026.5	5089.3	1026.4	5089.9	1026.3

5090.4	1026.5	5094	1028.1	5103.9	1031.4	5114.5	1031.3	5115.7	1031.3
5117	1027.4	5117.5	1027.3	5124.2	1026.5	5125.1	1026.8	5130.5	1028.2
5132.3	1028.8	5135.2	1029.5	5136.2	1029.5	5144.8	1028.9	5149.9	1029
5151	1029.1	5153.2	1029.2	5158	1029.4	5164.3	1029.7	5167.2	1029.8
5172.1	1029.9	5176.7	1027.3	5181.1	1024.6	5195.9	1025.4	5197.6	1025.4
5200.9	1025.6	5205.6	1028.6	5209.8	1031	5211.5	1031	5216	1030.9
5217	1030.9	5224.8	1031	5225.9	1031.1	5226.8	1031.1	**5227.1**	**1030.9**
5239	**1029**	**5249**	**1027**	**5579**	**1027**	**5609**	**1033**	**5659**	**1034**
5684	**1034**	6314	1034	6314	1031	6500	1030		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.035	5149.9	.03	5609	.02

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6500	280	280	280	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5209.8	1031	5659	6500	1034

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5167.2	5205.6	1030	5239	5589	1029

CROSS SECTION OUTPUT Profile #Q100-24h

			Left OB	Channel	Right OB
E.G. Elev (ft)	1030.82	Element			
Vel Head (ft)	0.05	Wt. n-Val.		0.030	
W.S. Elev (ft)	1030.78	Reach Len. (ft)	280.00	280.00	280.00
Crit W.S. (ft)	1029.67	Flow Area (sq ft)		640.13	
E.G. Slope (ft/ft)	0.000579	Area (sq ft)		990.80	
Q Total (cfs)	1099.00	Flow (cfs)		1099.00	
Top Width (ft)	709.78	Top Width (ft)		709.78	
Vel Total (ft/s)	1.72	Avg. Vel. (ft/s)		1.72	
Max Chl Dpth (ft)	4.48	Hydr. Depth (ft)		1.73	
Conv. Total (cfs)	45665.2	Conv. (cfs)		45665.2	
Length Wtd. (ft)	280.00	Wetted Per. (ft)		370.34	
Min Ch El (ft)	1026.30	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)		0.11	
Frctn Loss (ft)	0.19	Cum Volume (acre-ft)		34.22	
C & E Loss (ft)	0.00	Cum SA (acres)		30.06	

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.649

INPUT
Description: RM 6.649
Station Elevation Data num= 60

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1030.7	5005.9	1030.7	5007	1030.7	5007.4	1030.6	5008.1	1030.6
5015.3	1030.1	5017.7	1030.1	5018.2	1029.9	5020.7	1030.2	5022.5	1030.3
5033	1029.4	5035.9	1029.4	5053.7	1029.7	5058.9	1029.8	5061	1029.9
5065.7	1029.2	5085.8	1026.8	5088.1	1026.5	5089.3	1026.4	5089.9	1026.3
5090.4	1026.5	5094	1028.1	5103.9	1031.4	5114.5	1031.3	5115.7	1031.3
5117	1027.4	5117.5	1027.3	5124.2	1026.5	5125.1	1026.8	5130.5	1028.2
5132.3	1028.8	5135.2	1029.5	5136.2	1029.5	5144.8	1028.9	5149.9	1029
5151	1029.1	5153.2	1029.2	5158	1029.4	5164.3	1029.7	5167.2	1029.8
5172.1	1029.9	5176.7	1027.3	5181.1	1024.6	5195.9	1025.4	5197.6	1025.4
5200.9	1025.6	5205.6	1030.2	5216.07	1030.3	**5226.67**	**1030.2**	5235	1028
5239	**1027**	**5241**	**1027**	**5586**	**1027**	5606	**1032**	**5641**	**1033**
5661	1034	5686	1034	6316	1034	6316	1031	6500	1030

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.035	5149.9	.03	5606	.02

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6500	220	220	220	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5216.07	1031.4	5661	6500	1034

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5167.2	5205.6	1030	5231.2	5594	**1029**

CROSS SECTION OUTPUT Profile #Q100-24h

			Left OB	Channel	Right OB
E.G. Elev (ft)	1030.63	Element			
Vel Head (ft)	0.05	Wt. n-Val.		0.030	
W.S. Elev (ft)	1030.58	Reach Len. (ft)	220.00	220.00	220.00
Crit W.S. (ft)	1029.66	Flow Area (sq ft)		584.63	
E.G. Slope (ft/ft)	0.000824	Area (sq ft)		873.89	
Q Total (cfs)	1099.00	Flow (cfs)		1099.00	
Top Width (ft)	683.34	Top Width (ft)		683.34	
Vel Total (ft/s)	1.88	Avg. Vel. (ft/s)		1.88	
Max Chl Dpth (ft)	4.28	Hydr. Depth (ft)		1.52	
Conv. Total (cfs)	38283.6	Conv. (cfs)		38283.6	

Length Wtd. (ft)	220.00	Wetted Per. (ft)	384.58
Min Ch El (ft)	1026.30	Shear (lb/sq ft)	0.08
Alpha	1.00	Stream Power (lb/ft s)	0.15
Frctn Loss (ft)	0.17	Cum Volume (acre-ft)	28.23
C & E Loss (ft)	0.00	Cum SA (acres)	25.59

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.601 C

INPUT
Description: RM 6.601
Station Elevation Data num= 53

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1030.5	5002.7	1030.6	5005.6	1030.8	5013.7	1030.2	5014.4	1030.2
5017	1030.1	5031.2	1029.9	5036.3	1029	5036.9	1028.9	5038	1028.7
5041.9	1028.1	5045.6	1028	5058.3	1026.9	5058.7	1026.9	5076.6	1026
5082.7	1025.8	5086.7	1025.6	5087.4	1026.3	5094.8	1028.1	5105.5	1030.7
5114.9	1031.1	5115.1	1031.1	5116.3	1031.1	5136.7	1030.8	5139.5	1030.8
5140.6	1030.6	5141.6	1030.4	5148.7	1028.9	5148.9	1028.9	5149	1028.9
5159.1	1029	5164.5	1029	5181.9	1029	5186.4	1027.3	5188.9	1024.9
5189.2	1024.7	5190.1	1024.7	5192.3	1024.7	5203.2	1025.1	5210.7	1025.2
5213.8	1026.9	5217.6	1029.1	5230.6	1028.56	5241.44	1028	5251	1028
5258	1027	5601	1027	5631	1033	5651	1033	5673	1034
6336	1034	6336	1031	6500	1030				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.035	5149	.03	5631	.02

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6500	141	141	141	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5114.9	1031.1	5673	6500	1034

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5181.9	5217.6	1029	5217.6	5611	1029

CROSS SECTION OUTPUT Profile #Q100-24h

E.G. Elev (ft)	1030.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.030	
W.S. Elev (ft)	1030.42	Reach Len. (ft)	141.00	141.00	141.00
Crit W.S. (ft)	1029.56	Flow Area (sq ft)		665.42	
E.G. Slope (ft/ft)	0.000712	Area (sq ft)		905.30	
Q Total (cfs)	1099.00	Flow (cfs)		1099.00	
Top Width (ft)	638.31	Top Width (ft)		638.31	
Vel Total (ft/s)	1.65	Avg. Vel. (ft/s)		1.65	
Max Chl Dpth (ft)	4.82	Hydr. Depth (ft)		1.40	
Conv. Total (cfs)	41199.1	Conv. (cfs)		41199.1	
Length Wtd. (ft)	141.00	Wetted Per. (ft)		476.89	
Min Ch El (ft)	1025.60	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)		0.10	
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)		23.73	
C & E Loss (ft)	0.00	Cum SA (acres)		22.25	

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.575 B

INPUT
Description: RM 6.575
Station Elevation Data num= 56

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1030.5	5002.7	1030.6	5005.6	1030.8	5013.7	1030.2	5014.4	1030.2
5017	1030.1	5031.2	1029.9	5036.3	1029	5036.9	1028.9	5038	1028.7
5041.9	1028.1	5045.6	1028	5058.3	1026.9	5058.7	1026.9	5076.6	1026
5082.7	1025.8	5086.7	1025.6	5087.4	1026.3	5094.8	1028.1	5105.5	1030.7
5114.9	1031.1	5115.1	1031.1	5116.3	1031.1	5136.7	1030.8	5139.5	1030.8
5140.6	1030.6	5141.6	1030.4	5148.7	1028.9	5148.9	1028.9	5149	1028.9
5159.1	1029	5164.5	1029	5181.9	1029	5186.4	1027.3	5188.9	1024.9
5189.2	1024.7	5190.1	1024.7	5192.3	1024.7	5203.2	1025.1	5210.7	1025.2
5213.8	1026.9	5217.6	1029.1	5228.46	1028.61	5240.78	1028	5244	1028
5259	1028	5264	1027	5616	1027	5641	1033	5674	1033
5714	1034	6249	1034	6284	1033	6319	1032	6424	1030
6500	1029.6								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.035	5149	.03	5674	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6500	132	132	132	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5114.9	**1031.1**	5714	6500	1034

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5181.9	5217.6	**1029**	5127.6	5624.3	1029

CROSS SECTION OUTPUT Profile #Q100-24h

E.G. Elev (ft)	1030.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.030	
W.S. Elev (ft)	**1030.30**	Reach Len. (ft)	132.00	132.00	132.00
Crit W.S. (ft)	1029.55	Flow Area (sq ft)		624.78	
E.G. Slope (ft/ft)	0.000905	Area (sq ft)		879.54	
Q Total (cfs)	1099.00	Flow (cfs)		1099.00	
Top Width (ft)	670.66	Top Width (ft)		670.66	
Vel Total (ft/s)	1.76	Avg. Vel. (ft/s)		1.76	
Max Chl Dpth (ft)	4.70	Hydr. Depth (ft)		1.28	
Conv. Total (cfs)	36524.9	Conv. (cfs)		36524.9	
Length Wtd. (ft)	132.00	Wetted Per. (ft)		487.94	
Min Ch El (ft)	1025.60	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)		0.13	
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)		20.84	
C & E Loss (ft)	0.01	Cum SA (acres)		20.13	

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.549 A

INPUT
Description: RM 6.549, HEC-1 RSSF2B Q=1432 CFS
Station Elevation Data num= 53

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1030.6	5007.3	1029.5	5022.3	1026.1	5024.5	1025.5	5024.7	1025.5
5026	1025.4	5048.2	1025.7	5049.4	1025.7	5063.1	1026.2	5065.7	1026.4
5068.3	1026.5	5079.5	1026	5088.9	1025.5	5093	1026.3	5095	1026.5
5098.1	1026.9	5101.4	1027.5	5105.6	1027.4	5110.1	1027.3	5116.7	1027.4
5132.6	1027.8	5134.8	1027.9	5141.2	1028.1	5145.3	1028.1	5147.9	1028.3
5148.7	1028.4	5154.6	1029	5157.8	1029.3	5161.8	1028.6	5168.4	1027.4
5171.7	1027.3	5173.7	1027.3	5177.8	1027.6	5185.6	1028.2	5199.1	1029.1
5202.6	1026.6	5204	1025.7	5207.2	1025.7	5220	1025.7	5230.2	1025.7
5232.9	1026.5	**5242.6**	**1029**	**5258.8**	**1029**	**5270**	**1028**	**5282**	**1026**
5682	1026	5715	1031	**5725**	**1032**	5820	1033	5865	1027
6097	1027	6240	1031	6500	1031.7				

Manning's n Values num= 2

Sta	n Val	Sta	n Val
5000	.035	5177.8	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6500	90	90	90	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5258.8	1029	5820	6500	1033

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5199.1	5242.6	**1029**	5258.8	5701.8	1029

CROSS SECTION OUTPUT Profile #Q100-24h

E.G. Elev (ft)	1030.28	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.033	
W.S. Elev (ft)	**1030.26**	Reach Len. (ft)	90.00	90.00	90.00
Crit W.S. (ft)	1029.02	Flow Area (sq ft)		1242.82	
E.G. Slope (ft/ft)	0.000246	Area (sq ft)		2230.56	
Q Total (cfs)	1432.00	Flow (cfs)		1432.00	
Top Width (ft)	1081.10	Top Width (ft)		1081.10	
Vel Total (ft/s)	1.15	Avg. Vel. (ft/s)		1.15	
Max Chl Dpth (ft)	4.86	Hydr. Depth (ft)		1.76	
Conv. Total (cfs)	91338.2	Conv. (cfs)		91338.2	
Length Wtd. (ft)	90.00	Wetted Per. (ft)		709.08	
Min Ch El (ft)	1025.40	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)		0.03	
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)		16.13	
C & E Loss (ft)	0.02	Cum SA (acres)		17.47	

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.532

INPUT

Description: RM 6.532, 75th Avenue
Station Elevation Data num= 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1031.47	5011.81	1031.25	5025.42	1031	5038.8	1030.75	5052.52	1030.5
5065.81	1030.25	5076.53	1030	5092.08	1029.75	5117.39	1029.5	5175.92	1029.25
5206.36	1029.07	5274.03	1029.25	5322.19	1029.5	5364.83	1029.75	5443.48	1030.13
5536.49	1030	5577.13	1030	5617.6	1029.75	5659.46	1029.5	5689.18	1029.35
5745.76	1029.36	5799.79	1029.45	5831.72	1029.39	5834.61	1029.45	5840.5	1029.5
5845.72	1029.54	5849.54	1029.5	5865.18	1029.26	5906.08	1029.5	5911.43	1029.56
5983.21	1029.75	6030	1030	6082.45	1029.9	6223.06	1030	6290.28	1030.02
6306.41	1030.06	6317.44	1030.14	6323.47	1030.05	6345.02	1030.25	6440.57	1030.5
6530.89	1030.75	6601.42	1031	6661.53	1031.18	6721.28	1031.16	6740.62	1031.25
6799.2	1031.46								

Manning's n Values num= 1

Sta	n Val
5000	.02

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6799.2	135	135	135	.1	.3

CROSS SECTION OUTPUT Profile #Q100-24h

			Left OB	Channel	Right OB
E.G. Elev (ft)	1030.20	Element			
Vel Head (ft)	0.19	Wt. n-Val.		0.020	
W.S. Elev (ft)	1030.01	Reach Len. (ft)	135.00	135.00	135.00
Crit W.S. (ft)	1030.01	Flow Area (sq ft)		409.51	
E.G. Slope (ft/ft)	0.008134	Area (sq ft)		409.51	
Q Total (cfs)	1432.00	Flow (cfs)		1432.00	
Top Width (ft)	1086.24	Top Width (ft)		1086.24	
Vel Total (ft/s)	3.50	Avg. Vel. (ft/s)		3.50	
Max Chl Dpth (ft)	0.94	Hydr. Depth (ft)		0.38	
Conv. Total (cfs)	15877.5	Conv. (cfs)		15877.5	
Length Wtd. (ft)		Wetted Per. (ft)		1086.26	
Min Ch El (ft)	1029.07	Shear (lb/sq ft)		0.19	
Alpha	1.00	Stream Power (lb/ft s)		0.67	
Frctn Loss (ft)		Cum Volume (acre-ft)		13.40	
C & E Loss (ft)		Cum SA (acres)		15.24	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: The user has entered a known water surface elevation at this cross section.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.506

INPUT
Description: RM 6.506
Station Elevation Data num= 120

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1030.2	5002.5	1030.2	5003.3	1030.7	5005.1	1031.4	5010.7	1029.8
5011.6	1029.7	5039.2	1028	5051.6	1029.1	5055.7	1029.4	5059.1	1029.1
5098.8	1029.3	5105	1029.3	5109.3	1029.2	5154.5	1028.2	5159.5	1027.4
5160.6	1027.6	5173.3	1027.7	5205.4	1028	5205.9	1028	5211.4	1028.2
5245.5	1028.7	5266.7	1028.9	5301.2	1028.2	5305.6	1028	5308.3	1027.8
5315.3	1026.5	5319.8	1025.8	5326	1027.3	5331.5	1028.6	5332.6	1028.6
5340.7	1028.7	5350.3	1028.8	5355.1	1028.9	5357.2	1028.9	5373.4	1029.5
5384.6	1029.5	5390.9	1029.6	5400.7	1029.2	5405	1029.1	5405.2	1029.1
5410.9	1029.1	5429.8	1029.2	5434	1029.2	5447.7	1028.7	5454.3	1028.6
5457.3	1028.5	5464.4	1028.6	5467.8	1026.3	5468	1026.1	5469.1	1026.1
5491.6	1024.9	5492.8	1025.4	5500.2	1028.9	5502.7	1028.8	5520.9	1029.3
5521.7	1029.4	5522.3	1029.4	5531.4	1029	5534.5	1028.6	5551.9	1027.3
5554.4	1027	5593.9	1027.4	5605	1027.4	5609.2	1027.4	5655	1027.7
5659.1	1027.7	5705	1027.5	5709.1	1027.5	5755	1027.3	5767.8	1027.6
5807	1027.8	5814.7	1028.4	5834.8	1027.6	5838.3	1027.5	5849.8	1027.5
5855.7	1027.4	5856.7	1027.5	5860.4	1027.4	5874.4	1027.1	5895.9	1027.5
5905.1	1027.7	5951.5	1027.9	5955.1	1027.9	5958.6	1028	6005.1	1028
6008.5	1028	6055	1027.9	6058.4	1027.9	6105	1028	6151.9	1028
6155	1028	6202	1027.9	6205	1027.9	6208.1	1027.9	6255.1	1028
6302.3	1028.3	6305.1	1028.3	6333.6	1028.4	6341.3	1028.5	6344	1028.5
6355.1	1028.6	6355.4	1028.6	6360	1029.1	6371.8	1029.1	6377.9	1029.2
6383.9	1028.4	6393.2	1027.5	6403.5	1026.2	6407.1	1025.9	6420.1	1025.3
6426.5	1024.9	6434.2	1024.8	6452.5	1024.6	6453.9	1024.5	6454.5	1024.5
6457	1024.5	6504.5	1024.5	6506.2	1024.5	6545.1	1024.9	6546.7	1024.8

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.04	5390.9	.03	5534.5	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6546.7	500	500	500	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
6260	6546.7	1030

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev

5464.4 5500.2 1028.5 6377.9 6546.7 1030

CROSS SECTION OUTPUT Profile #Q100-24h

			Left OB	Channel	Right OB
E.G. Elev (ft)	1028.51	Element			
Vel Head (ft)	0.10	Wt. n-Val.		0.036	
W.S. Elev (ft)	1028.41	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)	1028.16	Flow Area (sq ft)		569.61	
E.G. Slope (ft/ft)	0.006195	Area (sq ft)		582.19	
Q Total (cfs)	1432.00	Flow (cfs)		1432.00	
Top Width (ft)	930.02	Top Width (ft)		930.02	
Vel Total (ft/s)	2.51	Avg. Vel. (ft/s)		2.51	
Max Chl Dpth (ft)	2.61	Hydr. Depth (ft)		0.67	
Conv. Total (cfs)	18193.3	Conv. (cfs)		18193.3	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		856.16	
Min Ch El (ft)	1025.80	Shear (lb/sq ft)		0.26	
Alpha	1.00	Stream Power (lb/ft s)		0.65	
Frctn Loss (ft)	0.45	Cum Volume (acre-ft)		11.87	
C & E Loss (ft)	0.02	Cum SA (acres)		12.11	

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.412

INPUT
Description: RM 6.412 END OF REACH TOLLESON 1
Station Elevation Data num= 103

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1028.7	5006.5	1028.8	5017.7	1027.3	5018.5	1027.2	5022.4	1028.4
5024.8	1029.2	5025.4	1029.2	5031.8	1029.6	5044	1029.8	5060.9	1029.8
5095.5	1029.7	5128.8	1029.6	5136.6	1026.5	5138.1	1026	5170.4	1026
5173.9	1026	5174.9	1026	5189.2	1025.9	5200.2	1025.8	5224.1	1026.3
5224.9	1026.3	5366.1	1025.4	5384.4	1025.4	5410.6	1025.2	5435.5	1025.1
5445.6	1026.5	5446.1	1026.5	5447.6	1026.7	5453.1	1027.1	5465.9	1027.8
5467.9	1026.6	5469.5	1025.9	5474.7	1025.7	5490.6	1025.3	5492.6	1025.9
5496.4	1027.1	5503.5	1027.1	5518.3	1027.1	5521.9	1027.1	5549.6	1026.6
5575.2	1026.3	5606.9	1026.8	5625.3	1026.9	5645.1	1026.9	5675.3	1026.8
5703.2	1026.8	5725.3	1026.5	5751.3	1026.5	5775.4	1026.5	5799.4	1026.2
5825.4	1026.4	5837.2	1026.1	5846.5	1026.1	5862	1025.9	5867.9	1026.2
5871.1	1026.3	5875.4	1026.4	5879.4	1026.4	5880.1	1026.4	5880.6	1026.4
5881.6	1026.4	5898.2	1026.1	5918.5	1026.5	5925.5	1026.9	5957.8	1026.7
5975.5	1026.8	6009.9	1026.9	6025.6	1026.9	6062.1	1026.6	6075.6	1026.5
6114.2	1027	6125.7	1027.1	6166.3	1027.3	6175.7	1027.4	6218.4	1026.8
6225.7	1026.8	6270.6	1027.2	6275.8	1027.2	6280.6	1027.2	6325.8	1027.3
6327.2	1027.3	6366.4	1026.9	6375.7	1027.1	6375.8	1027.1	6376.7	1027.1
6382.3	1027.4	6383.4	1027.4	6386	1027.3	6394	1027.3	6402.3	1027.3
6410.1	1027.2	6413.8	1027.3	6425.4	1027.4	6425.9	1027.4	6433.9	1026.9
6446.9	1027.4	6450.7	1027.7	6459.4	1027.9	6521.2	1028.4	6526	1028.4
6569.3	1028.4	6576	1028.5	6600	1028.9				

Manning's n Values num= 2

Sta	n Val	Sta	n Val
5000	.03	5521.9	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6600	500	500	500	.1	.3

Left Levee Station= 5006.5 Elevation= 1028.8
Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
5050	5130	1035	5260	5430	1035	5465.9	5496.4	1027.1

CROSS SECTION OUTPUT Profile #Q100-24h

			Left OB	Channel	Right OB
E.G. Elev (ft)	1028.03	Element			
Vel Head (ft)	0.01	Wt. n-Val.		0.033	
W.S. Elev (ft)	1028.02	Reach Len. (ft)			
Crit W.S. (ft)	1026.98	Flow Area (sq ft)		1485.69	
E.G. Slope (ft/ft)	0.000345	Area (sq ft)		1485.69	
Q Total (cfs)	1432.00	Flow (cfs)		1432.00	
Top Width (ft)	1180.30	Top Width (ft)		1180.30	
Vel Total (ft/s)	0.96	Avg. Vel. (ft/s)		0.96	
Max Chl Dpth (ft)	2.92	Hydr. Depth (ft)		1.26	
Conv. Total (cfs)	77074.0	Conv. (cfs)		77074.0	
Length Wtd. (ft)		Wetted Per. (ft)		1186.15	
Min Ch El (ft)	1025.10	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)		0.03	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Warning: Divided flow computed for this cross-section.

SUMMARY OF MANNING'S N VALUES

River:Southern Pacific

Reach	River Sta.	n1	n2	n3
Tolleson 1	7.287	.08	.035	.04
Tolleson 1	7.264	.08	.035	
Tolleson 1	7.227	.08	.035	
Tolleson 1	7.169	.08	.035	
Tolleson 1	7.074	.08	.035	
Tolleson 1	7.033	.08	.035	
Tolleson 1	7.020	.06	.03	.025
Tolleson 1	7.007	.06	.03	.025
Tolleson 1	6.993	.06	.03	.02
Tolleson 1	6.980	.06	.03	.02
Tolleson 1	6.932	.06	.03	.02
Tolleson 1	6.885	.06	.03	.02
Tolleson 1	6.834	.035	.03	.02
Tolleson 1	6.782	.035	.03	.02
Tolleson 1	6.753	.035	.03	.02
Tolleson 1	6.723	.035	.03	.02
Tolleson 1	6.696	.035	.03	.02
Tolleson 1	6.649	.035	.03	.02
Tolleson 1	6.601	.035	.03	.02
Tolleson 1	6.575	.035	.03	.035
Tolleson 1	6.549	.035	.03	
Tolleson 1	6.532	.02		
Tolleson 1	6.506	.04	.03	.035
Tolleson 1	6.412	.03	.035	

SUMMARY OF REACH LENGTHS

River: Southern Pacific

Reach	River Sta.	Left	Channel	Right
Tolleson 1	7.287	124	124	124
Tolleson 1	7.264	192	192	192
Tolleson 1	7.227	308	308	308
Tolleson 1	7.169	500	500	500
Tolleson 1	7.074	218	218	218
Tolleson 1	7.033	32	32	32
Tolleson 1	7.020	50	50	50
Tolleson 1	7.007	80	80	80
Tolleson 1	6.993	120	120	120
Tolleson 1	6.980	260	260	260
Tolleson 1	6.932	240	240	240
Tolleson 1	6.885	240	240	240
Tolleson 1	6.834	305	305	305
Tolleson 1	6.782	104	104	104
Tolleson 1	6.753	208	208	208
Tolleson 1	6.723	143	143	143
Tolleson 1	6.696	280	280	280
Tolleson 1	6.649	220	220	220
Tolleson 1	6.601	141	141	141
Tolleson 1	6.575	132	132	132
Tolleson 1	6.549	90	90	90
Tolleson 1	6.532	135	135	135
Tolleson 1	6.506	500	500	500
Tolleson 1	6.412	500	500	500

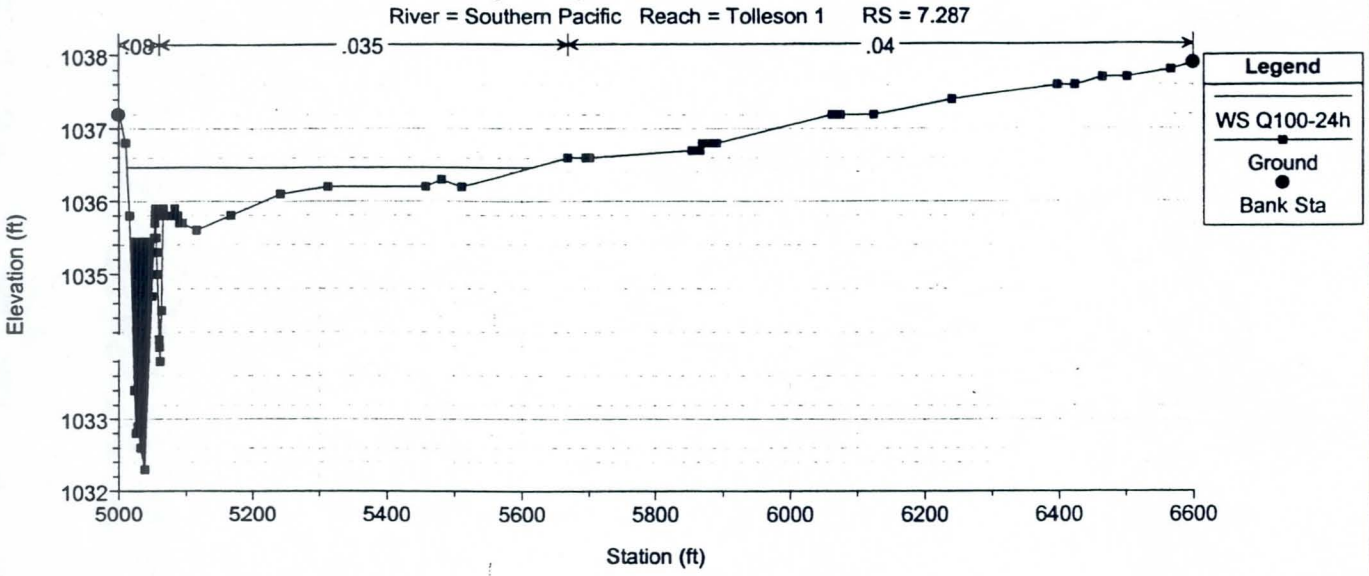
SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Southern Pacific

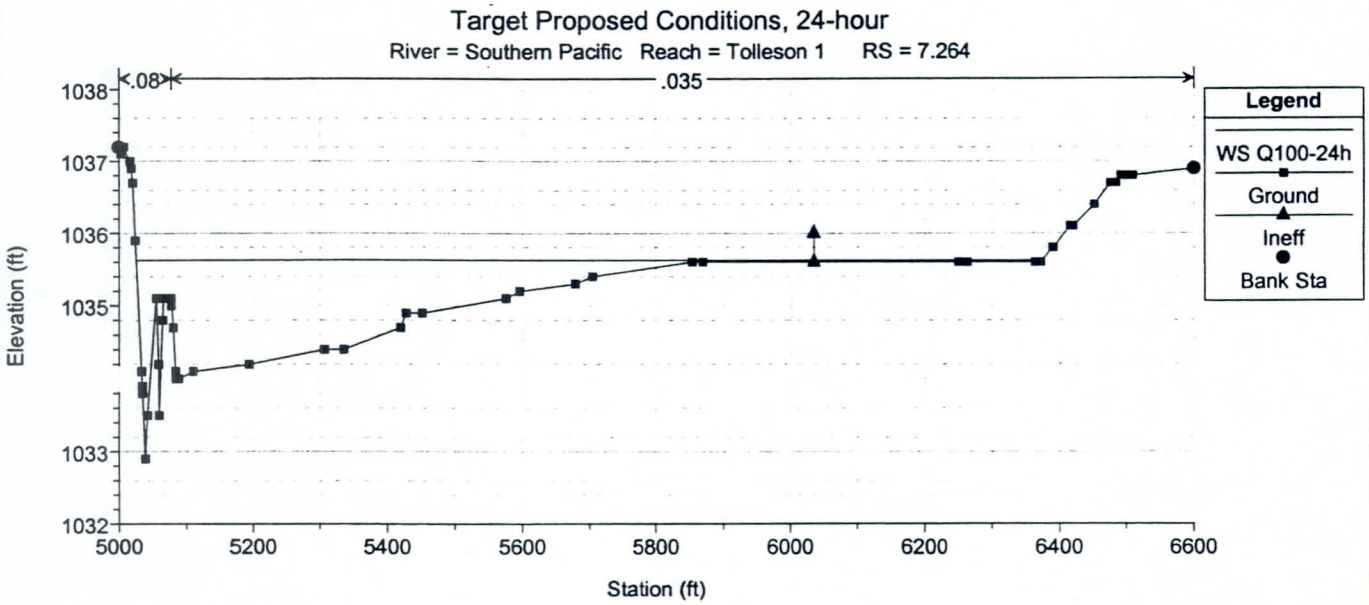
Reach	River Sta.	Contr.	Expan.
Tolleson 1	7.287	.1	.3
Tolleson 1	7.264	.1	.3
Tolleson 1	7.227	.1	.3
Tolleson 1	7.169	.1	.3
Tolleson 1	7.074	.1	.3
Tolleson 1	7.033	.1	.3
Tolleson 1	7.020	.1	.3
Tolleson 1	7.007	.1	.3
Tolleson 1	6.993	.1	.3
Tolleson 1	6.980	.1	.3
Tolleson 1	6.932	.1	.3
Tolleson 1	6.885	.1	.3
Tolleson 1	6.834	.1	.3
Tolleson 1	6.782	.1	.3
Tolleson 1	6.753	.1	.3
Tolleson 1	6.723	.1	.3
Tolleson 1	6.696	.1	.3
Tolleson 1	6.649	.1	.3

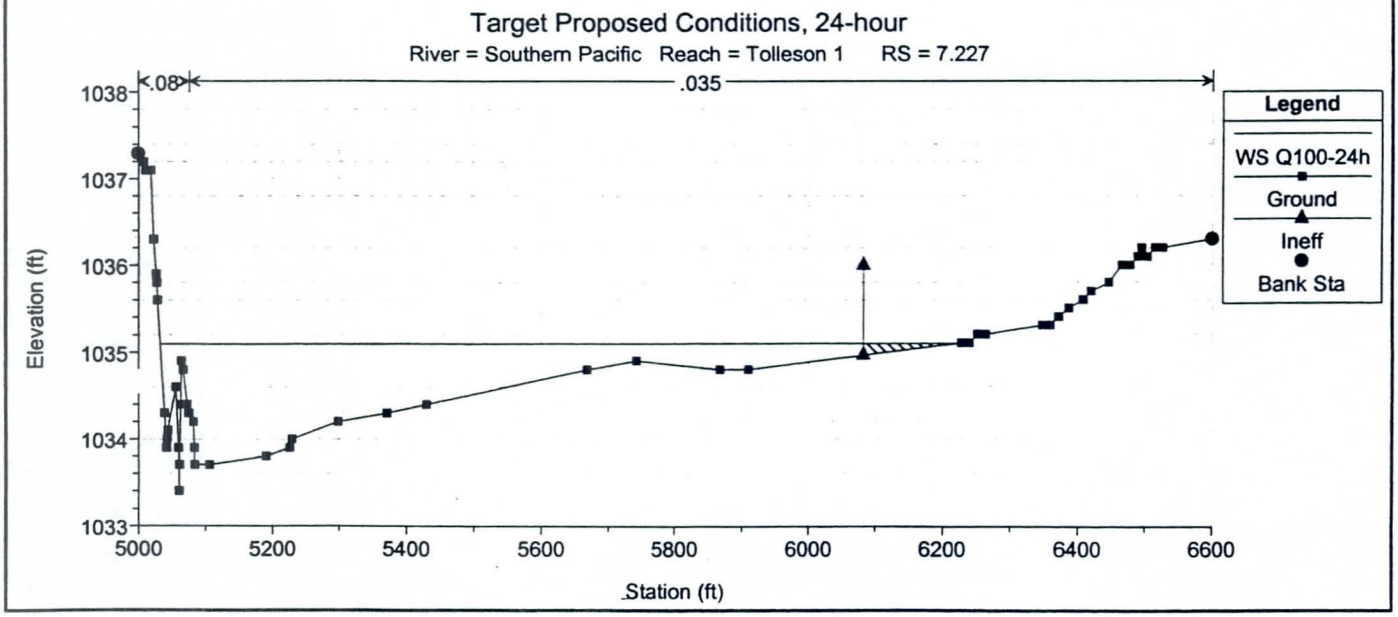
Tolleson 1	6.601	.1	.3
Tolleson 1	6.575	.1	.3
Tolleson 1	6.549	.1	.3
Tolleson 1	6.532	.1	.3
Tolleson 1	6.506	.1	.3
Tolleson 1	6.412	.1	.3

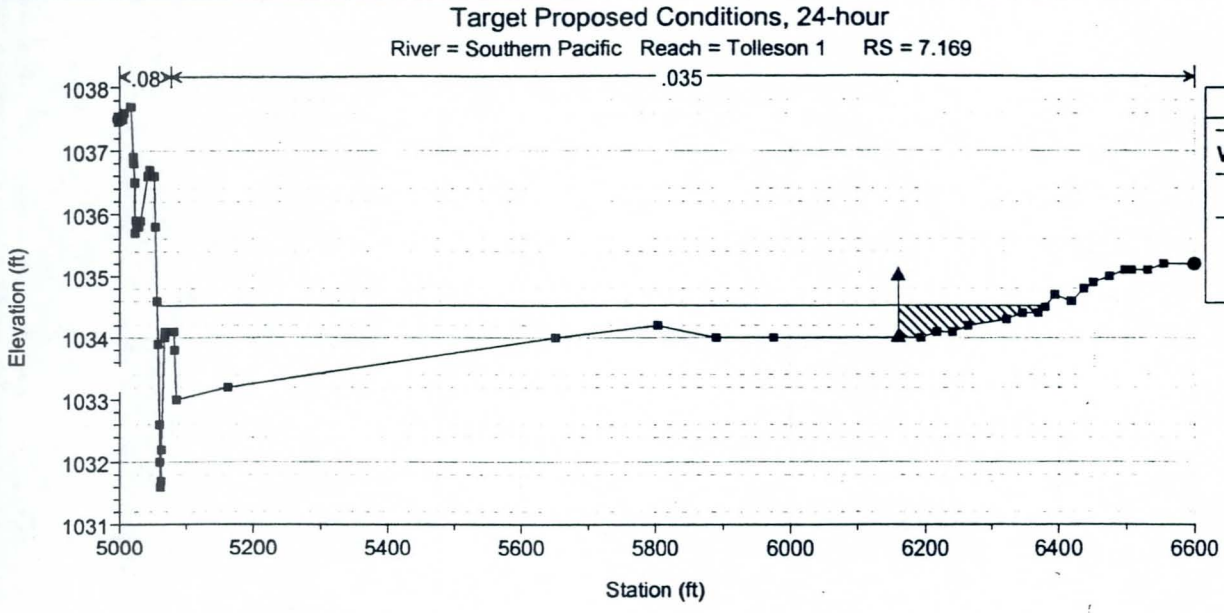
HEC-RAS Plan: Prop 24hr River: Southern Pacific Reach: Tolleson 1

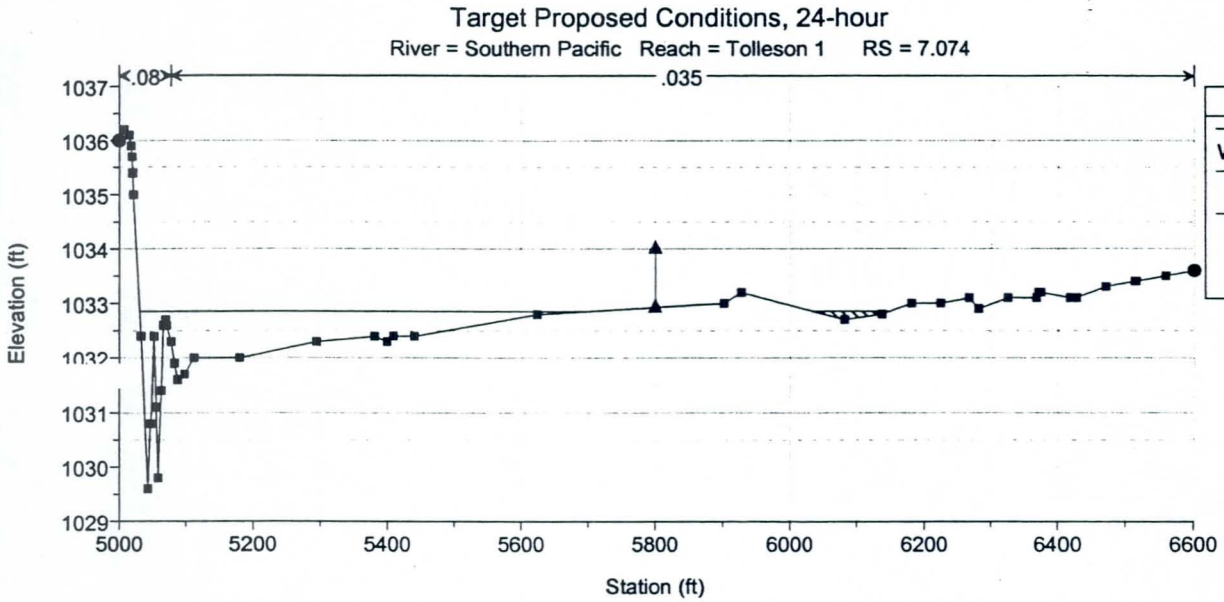
Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Tolleson 1	7.287	1020.00	1033.80	1036.46	1036.46	1036.71	0.034066	3.97	257.00	602.26	1.07
Tolleson 1	7.264	1020.00	1032.90	1035.63	1034.91	1035.66	0.002366	1.50	681.90	1349.14	0.32
Tolleson 1	7.227	1020.00	1033.40	1035.10	1034.68	1035.14	0.003194	1.64	621.83	1191.47	0.38
Tolleson 1	7.169	1020.00	1031.60	1034.53	1034.02	1034.55	0.001254	1.22	833.20	1325.99	0.25
Tolleson 1	7.074	1099.00	1029.60	1032.85	1032.69	1033.00	0.014541	3.04	361.16	784.24	0.73
Tolleson 1	7.033	1099.00	1028.90	1032.79	1030.50	1032.80	0.000227	0.74	1490.42	1232.59	0.12
Tolleson 1	7.020	1099.00	1030.59	1032.50	1032.50	1032.75	0.013549	4.03	273.00	627.48	1.00
Tolleson 1	7.007	1099.00	1028.86	1031.94	1029.62	1031.96	0.000081	0.87	1267.06	1446.57	0.10
Tolleson 1	6.993	1099.00	1029.00	1031.94	1029.62	1031.95	0.000086	0.90	1219.41	1337.93	0.10
Tolleson 1	6.980	1099.00	1028.98	1031.90	1029.90	1031.93	0.000257	1.49	736.76	985.11	0.16
Tolleson 1	6.932	1099.00	1029.00	1031.80	1029.98	1031.85	0.000375	1.81	607.81	358.17	0.20
Tolleson 1	6.885	1099.00	1029.00	1031.70	1029.97	1031.76	0.000405	1.82	604.32	579.89	0.20
Tolleson 1	6.834	1099.00	1029.00	1031.61	1029.94	1031.66	0.000399	1.76	622.79	565.38	0.20
Tolleson 1	6.782	1099.00	1028.90	1031.25	1030.24	1031.42	0.001865	3.29	334.04	533.31	0.42
Tolleson 1	6.753	1099.00	1028.35	1031.02	1030.20	1031.21	0.002133	3.50	314.35	566.41	0.45
Tolleson 1	6.723	1099.00	1027.40	1030.86	1029.77	1030.92	0.000760	1.99	553.25	620.59	0.26
Tolleson 1	6.696	1099.00	1026.30	1030.78	1029.67	1030.82	0.000579	1.72	640.13	709.78	0.23
Tolleson 1	6.649	1099.00	1026.30	1030.58	1029.66	1030.63	0.000824	1.88	584.63	683.34	0.27
Tolleson 1	6.601	1099.00	1025.60	1030.42	1029.56	1030.46	0.000712	1.65	665.42	638.31	0.25
Tolleson 1	6.575	1099.00	1025.60	1030.30	1029.55	1030.34	0.000905	1.76	624.78	670.66	0.27
Tolleson 1	6.549	1432.00	1025.40	1030.26	1029.02	1030.28	0.000246	1.15	1242.82	1081.10	0.15
Tolleson 1	6.532	1432.00	1029.07	1030.01	1030.01	1030.20	0.008134	3.50	409.51	1086.24	1.00
Tolleson 1	6.506	1432.00	1025.80	1028.41	1028.16	1028.51	0.006195	2.51	569.61	930.02	0.54
Tolleson 1	6.412	1432.00	1025.10	1028.02	1026.98	1028.03	0.000345	0.96	1485.69	1180.30	0.15

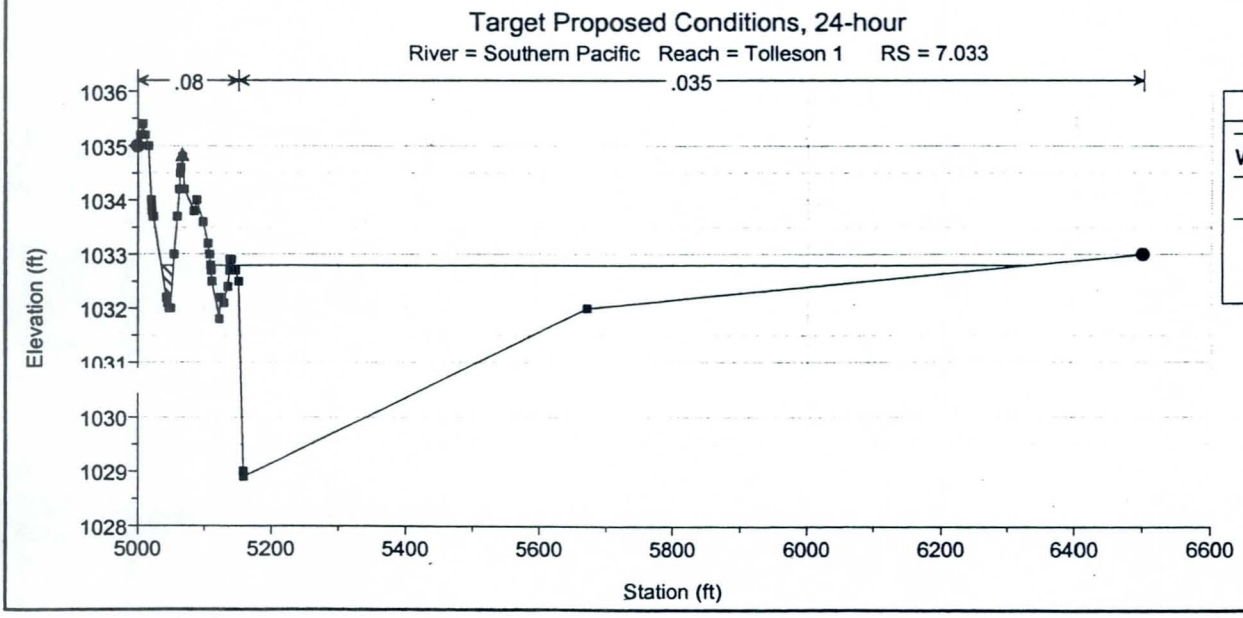

Target Proposed Conditions, 24-hour
River = Southern Pacific Reach = Tolleson 1 RS = 7.287
.08
.035
.04
Legend
WS Q100-24h
Ground
Bank Sta
Elevation (ft)
Station (ft)

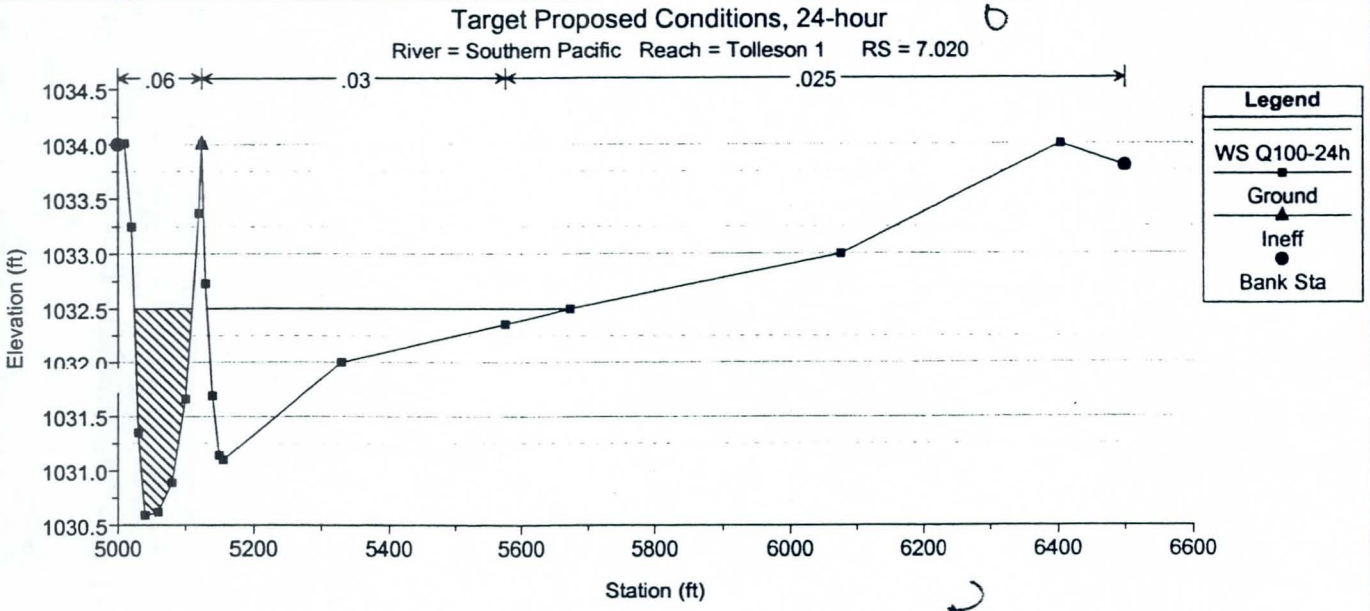

Target Proposed Conditions, 24-hour
River = Southern Pacific Reach = Tolleson 1 RS = 7.264
.08
.035
Legend
WS Q100-24h
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

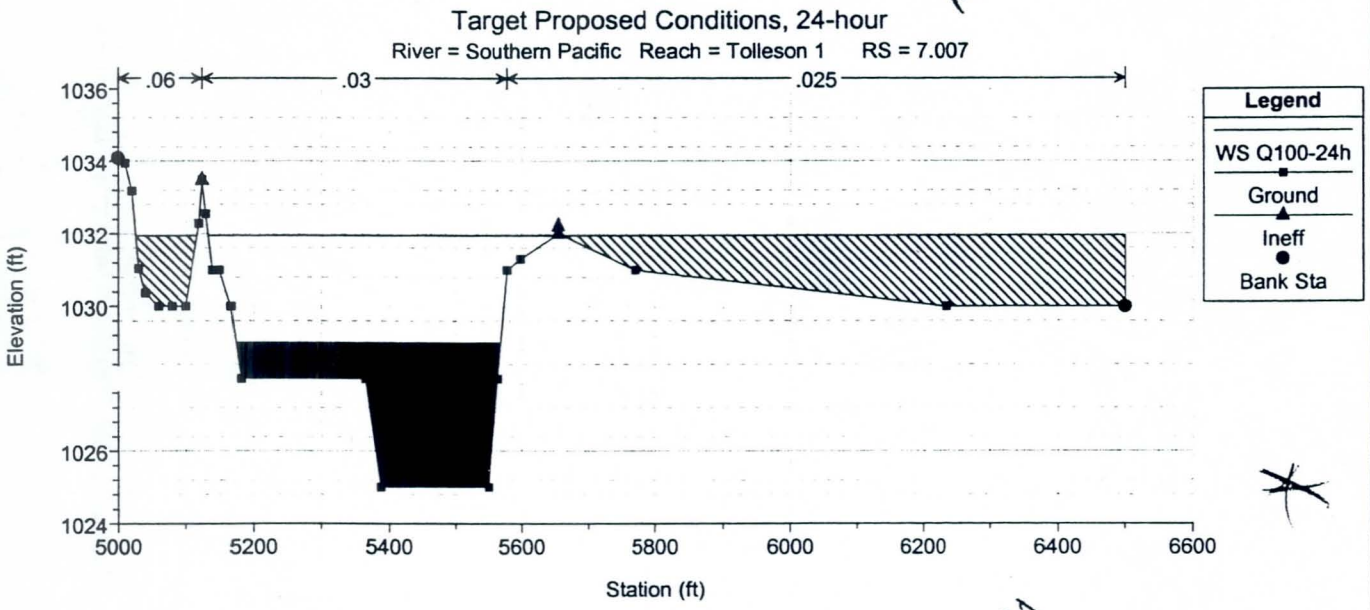

Target Proposed Conditions, 24-hour
River = Southern Pacific Reach = Tolleson 1 RS = 7.227
.08
.035
Legend
WS Q100-24h
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

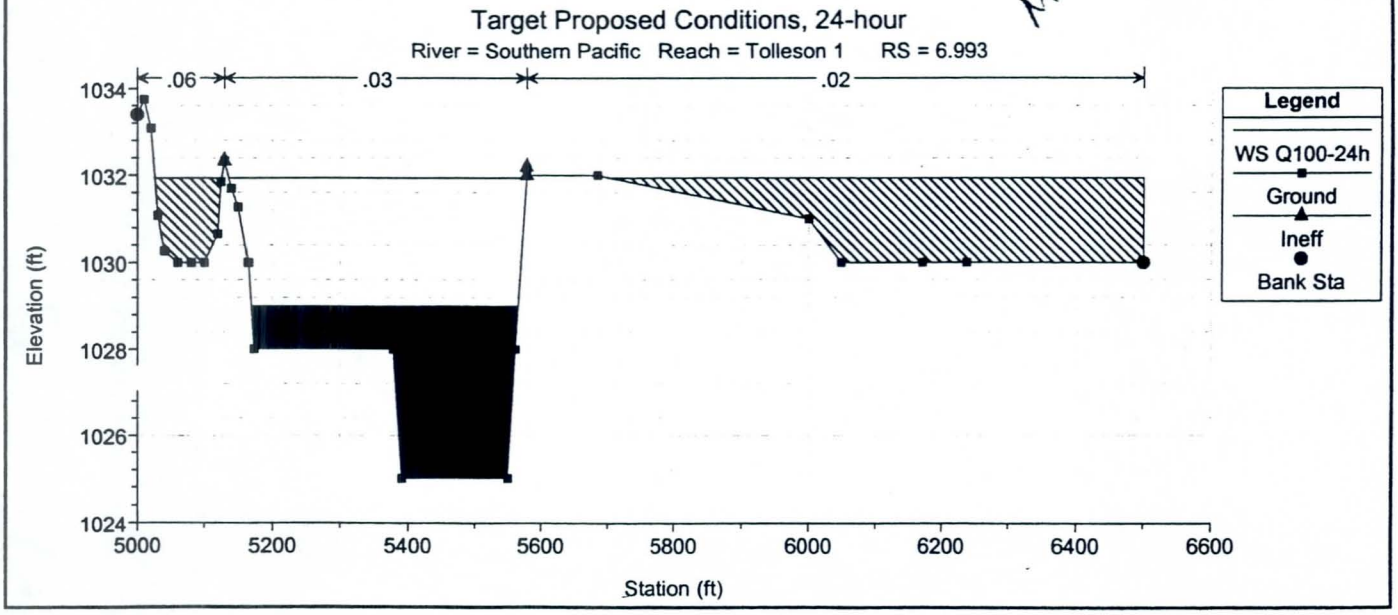

Target Proposed Conditions, 24-hour
River = Southern Pacific Reach = Tolleson 1 RS = 7.169
.08
.035
Legend
WS Q100-24h
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

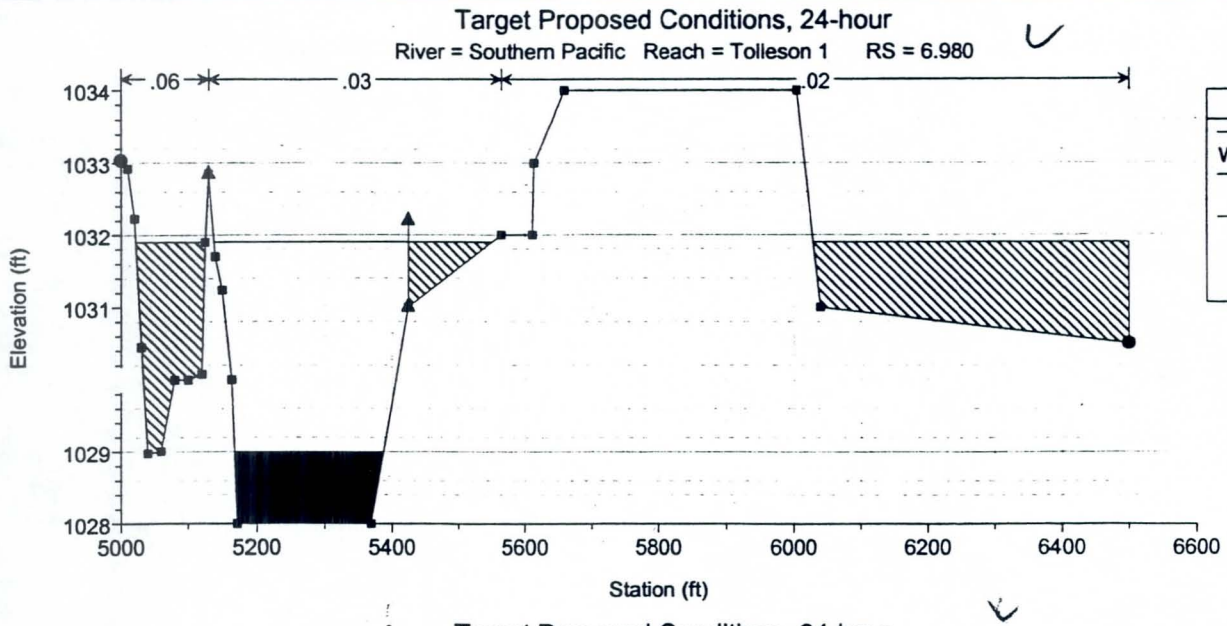

Target Proposed Conditions, 24-hour
River = Southern Pacific Reach = Tolleson 1 RS = 7.074
.08
.035
Legend
WS Q100-24h
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

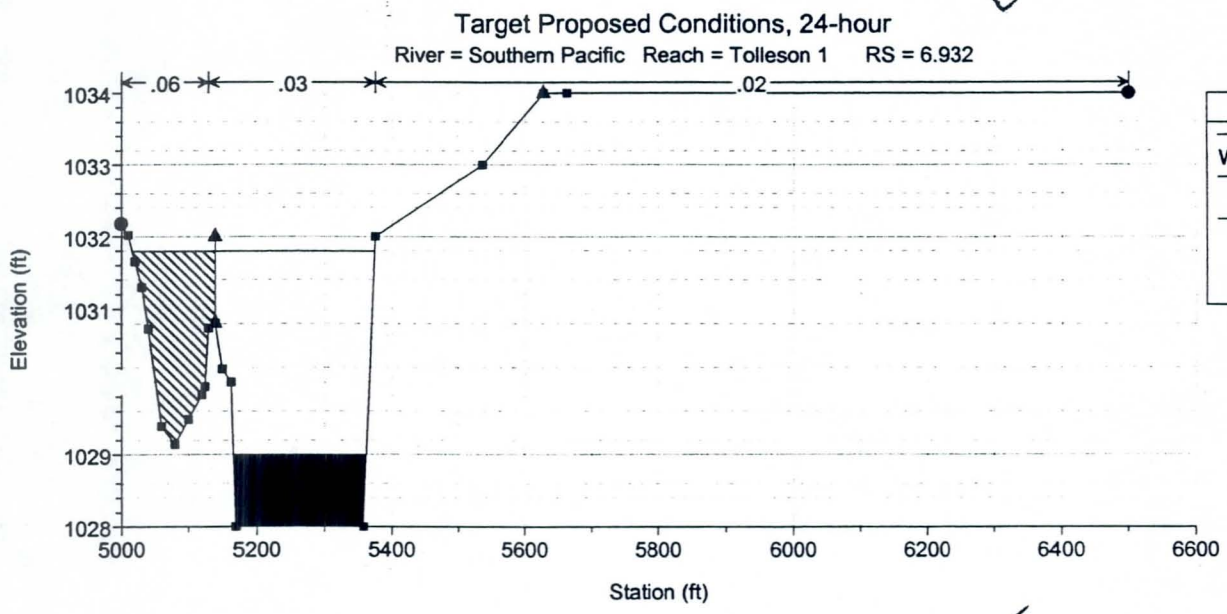

Target Proposed Conditions, 24-hour
River = Southern Pacific Reach = Tolleson 1 RS = 7.033
.08
.035
Legend
WS Q100-24h
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

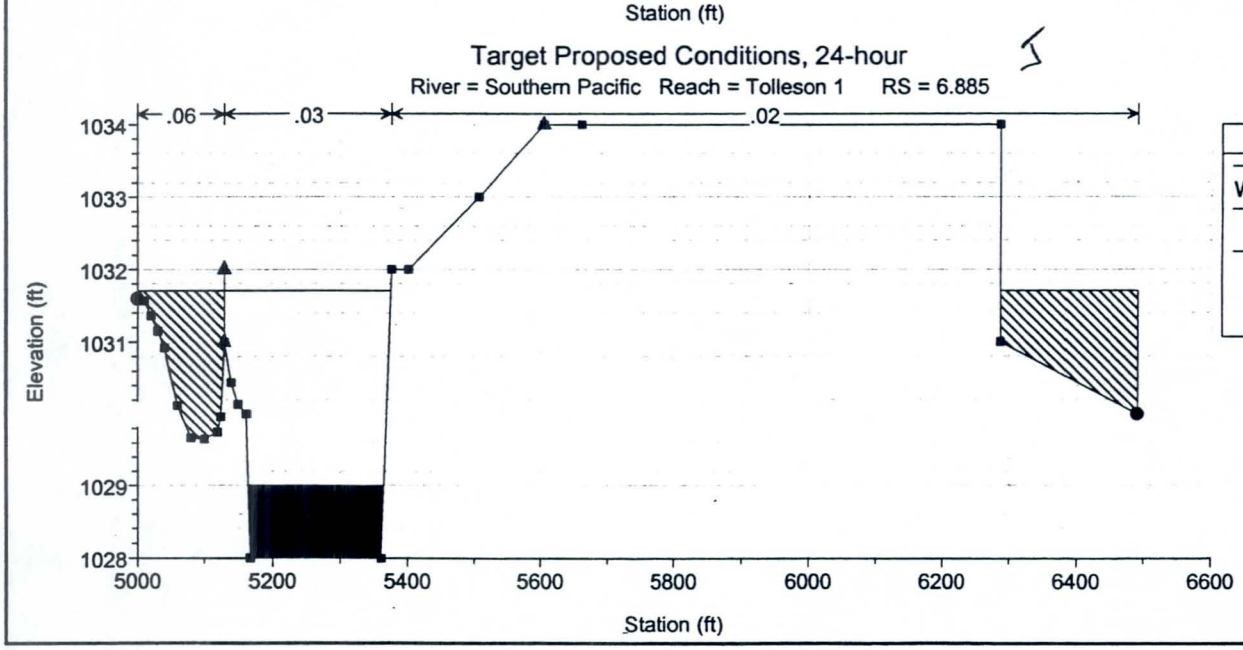

Target Proposed Conditions, 24-hour
River = Southern Pacific Reach = Tolleson 1 RS = 7.020
.06
.03
.025
Elevation (ft)
Station (ft)
Legend
WS Q100-24h
Ground
Ineff
Bank Sta

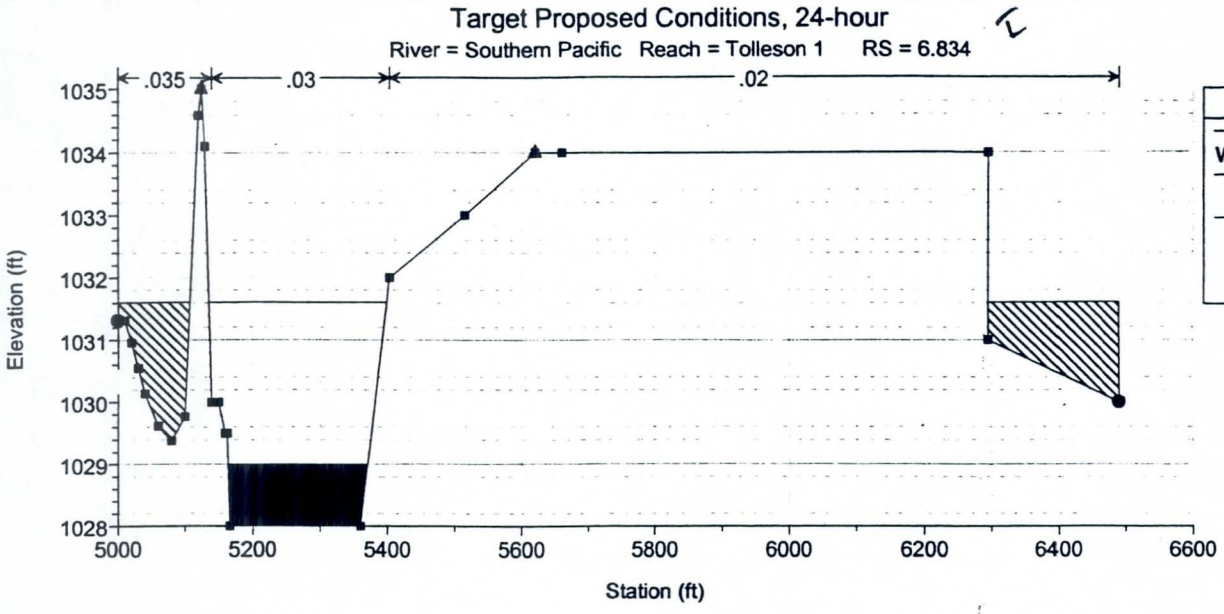

Target Proposed Conditions, 24-hour
River = Southern Pacific Reach = Tolleson 1 RS = 7.007
.06
.03
.025
Elevation (ft)
Station (ft)
Legend
WS Q100-24h
Ground
Ineff
Bank Sta

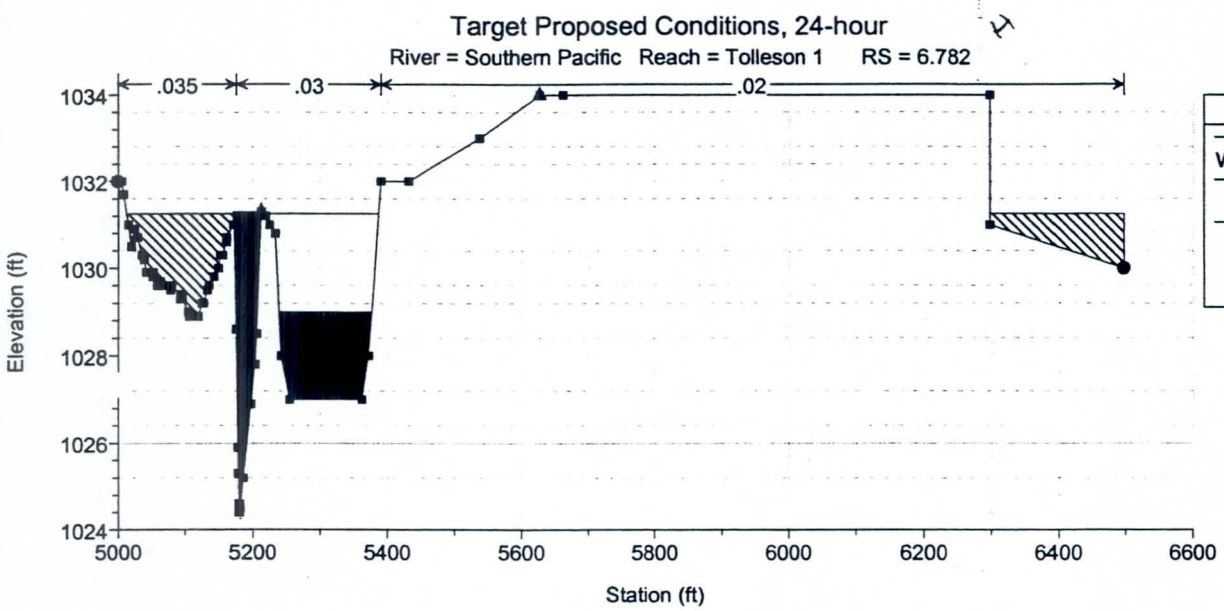

Target Proposed Conditions, 24-hour
River = Southern Pacific Reach = Tolleson 1 RS = 6.993
.06
.03
.02
Elevation (ft)
Station (ft)
Legend
WS Q100-24h
Ground
Ineff
Bank Sta

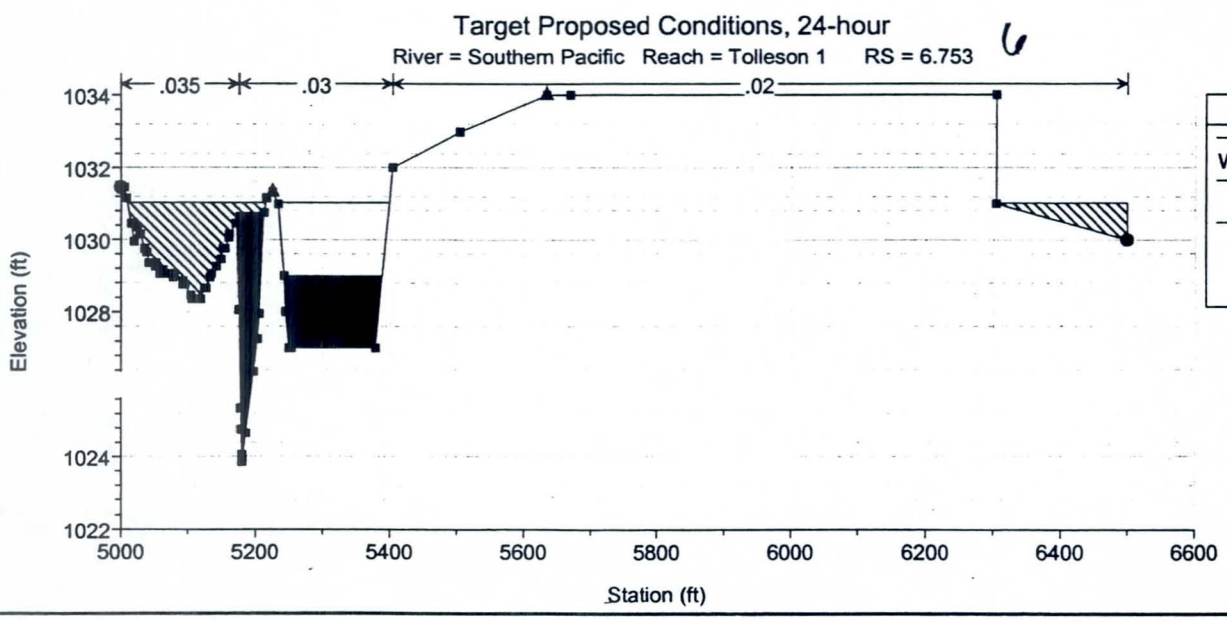

Target Proposed Conditions, 24-hour
River = Southern Pacific Reach = Tolleson 1 RS = 6.980
.06
.03
.02
Legend
WS Q100-24h
Ground
Ineff
Bank Sta
Elevation (ft)
1034
1033
1032
1031
1029
1028
5000
5200
5400
5600
5800
6000
6200
6400
6600
Station (ft)

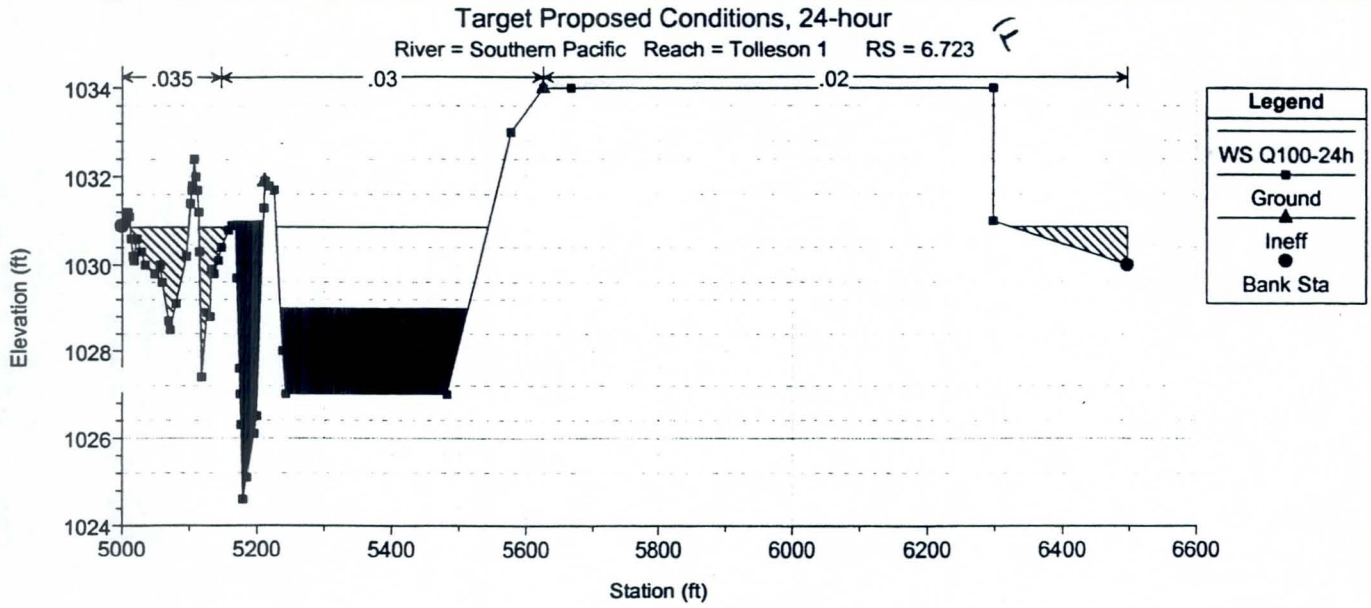

Target Proposed Conditions, 24-hour
River = Southern Pacific Reach = Tolleson 1 RS = 6.932
.06
.03
.02
Legend
WS Q100-24h
Ground
Ineff
Bank Sta
Elevation (ft)
1034
1033
1032
1031
1029
1028
5000
5200
5400
5600
5800
6000
6200
6400
6600
Station (ft)

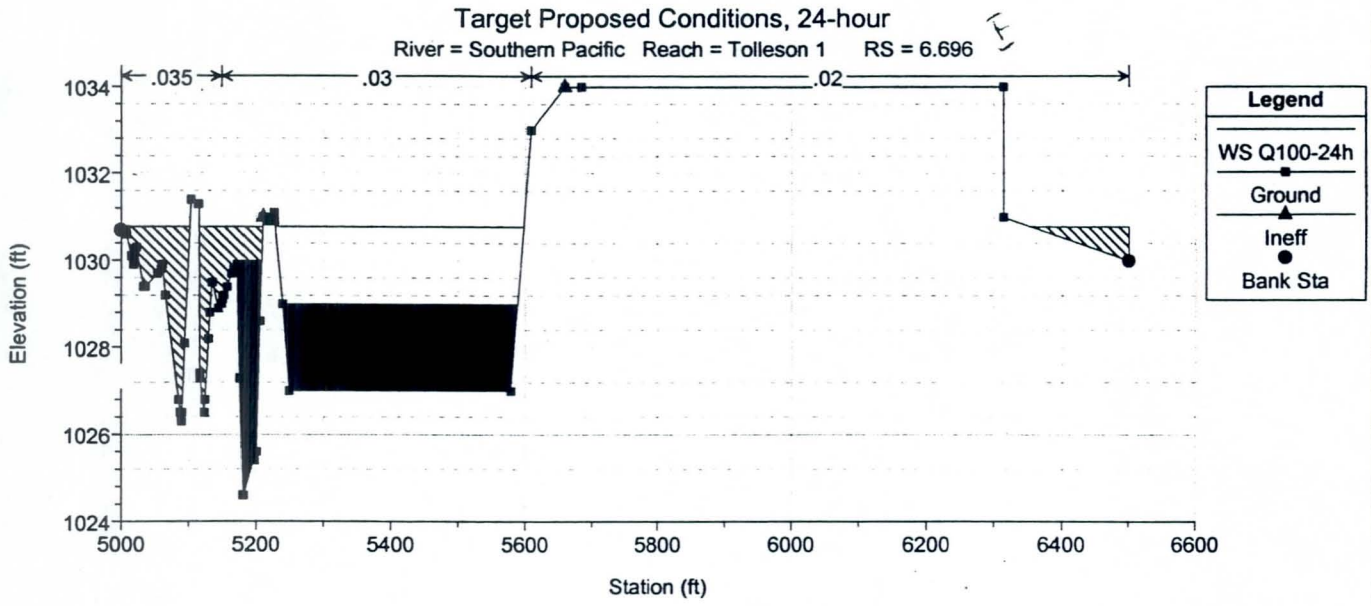

Target Proposed Conditions, 24-hour
River = Southern Pacific Reach = Tolleson 1 RS = 6.885
.06
.03
.02
Legend
WS Q100-24h
Ground
Ineff
Bank Sta
Elevation (ft)
1034
1033
1032
1031
1029
1028
5000
5200
5400
5600
5800
6000
6200
6400
6600
Station (ft)

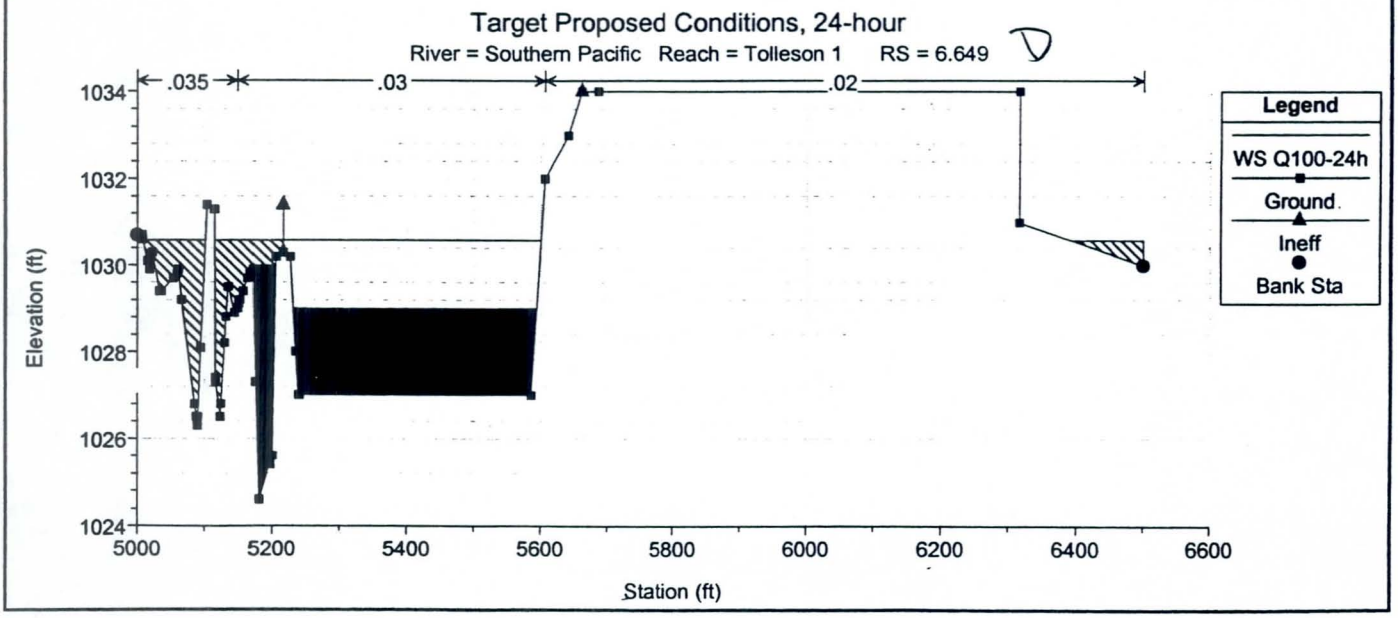

Target Proposed Conditions, 24-hour
River = Southern Pacific Reach = Tolleson 1 RS = 6.834
.035
.03
.02
Elevation (ft)
Station (ft)
Legend
WS Q100-24h
Ground
Ineff
Bank Sta

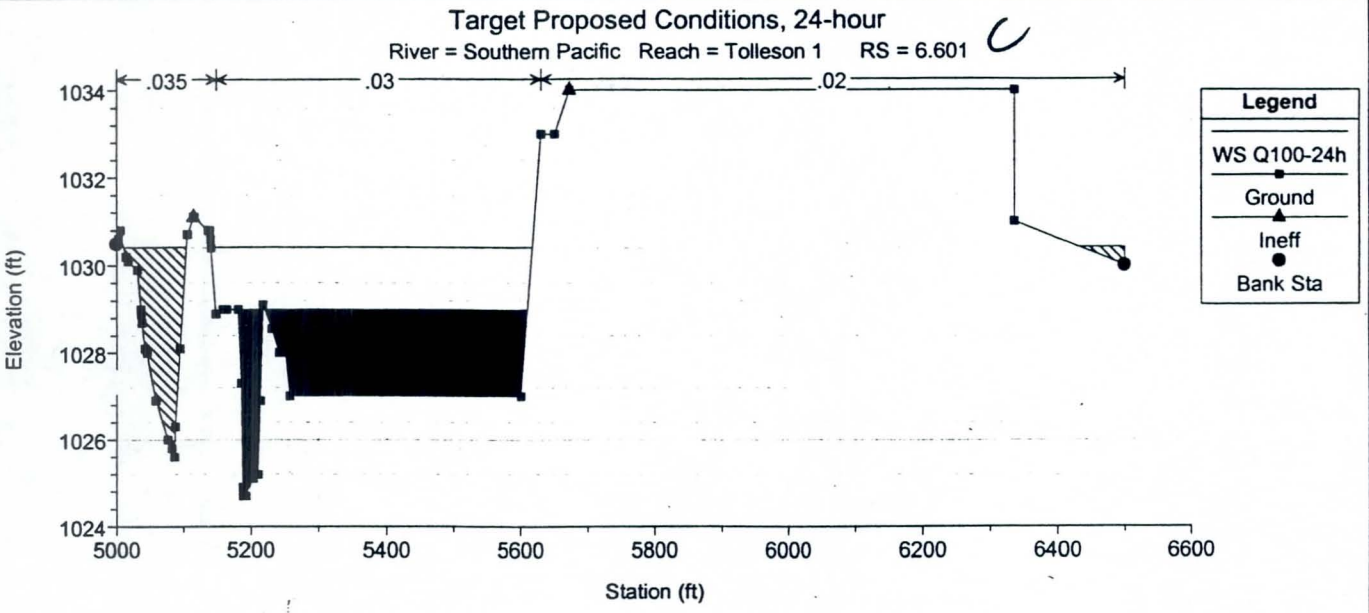

Target Proposed Conditions, 24-hour
River = Southern Pacific Reach = Tolleson 1 RS = 6.782
.035
.03
.02
Elevation (ft)
Station (ft)
Legend
WS Q100-24h
Ground
Ineff
Bank Sta

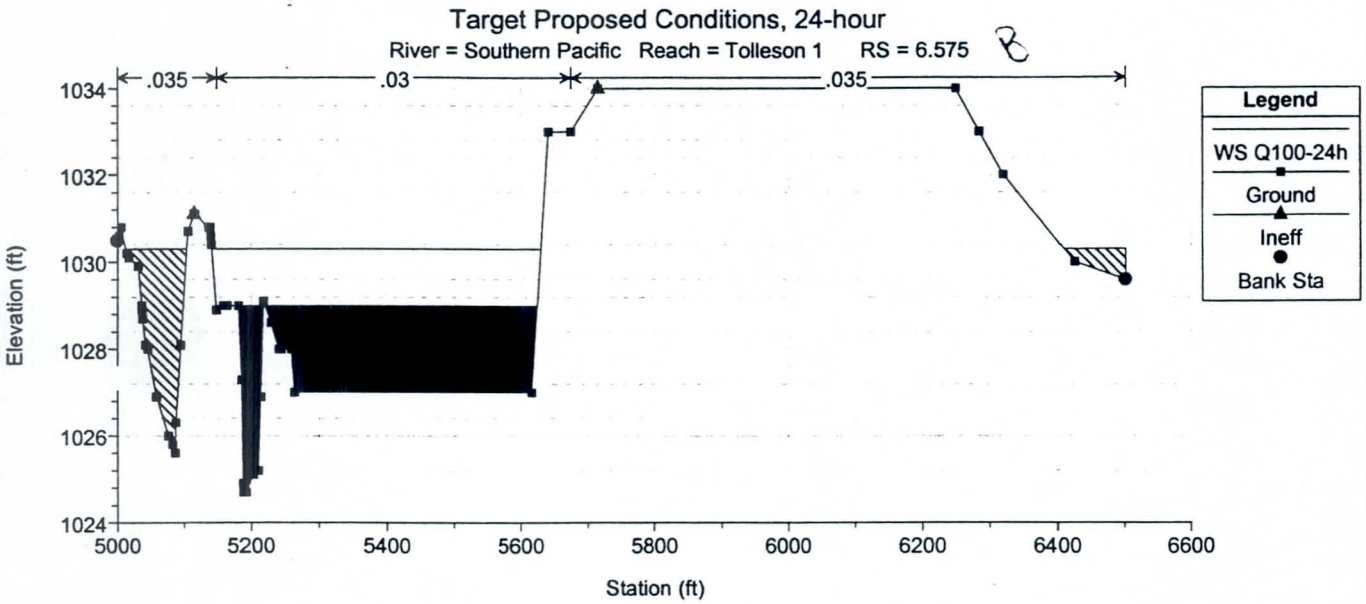

Target Proposed Conditions, 24-hour
River = Southern Pacific Reach = Tolleson 1 RS = 6.753
.035
.03
.02
Elevation (ft)
Station (ft)
Legend
WS Q100-24h
Ground
Ineff
Bank Sta

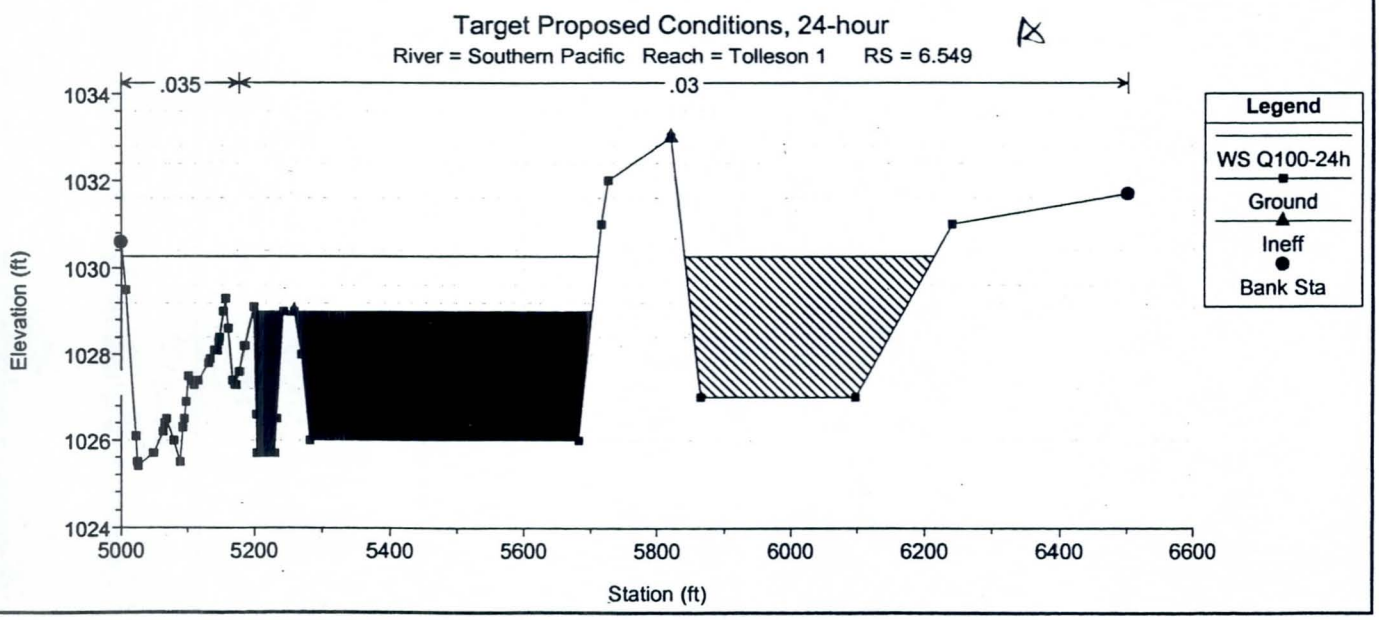

Target Proposed Conditions, 24-hour
River = Southern Pacific Reach = Tolleson 1 RS = 6.723
F
.035
.03
.02
Elevation (ft)
Station (ft)
Legend
WS Q100-24h
Ground
Ineff
Bank Sta

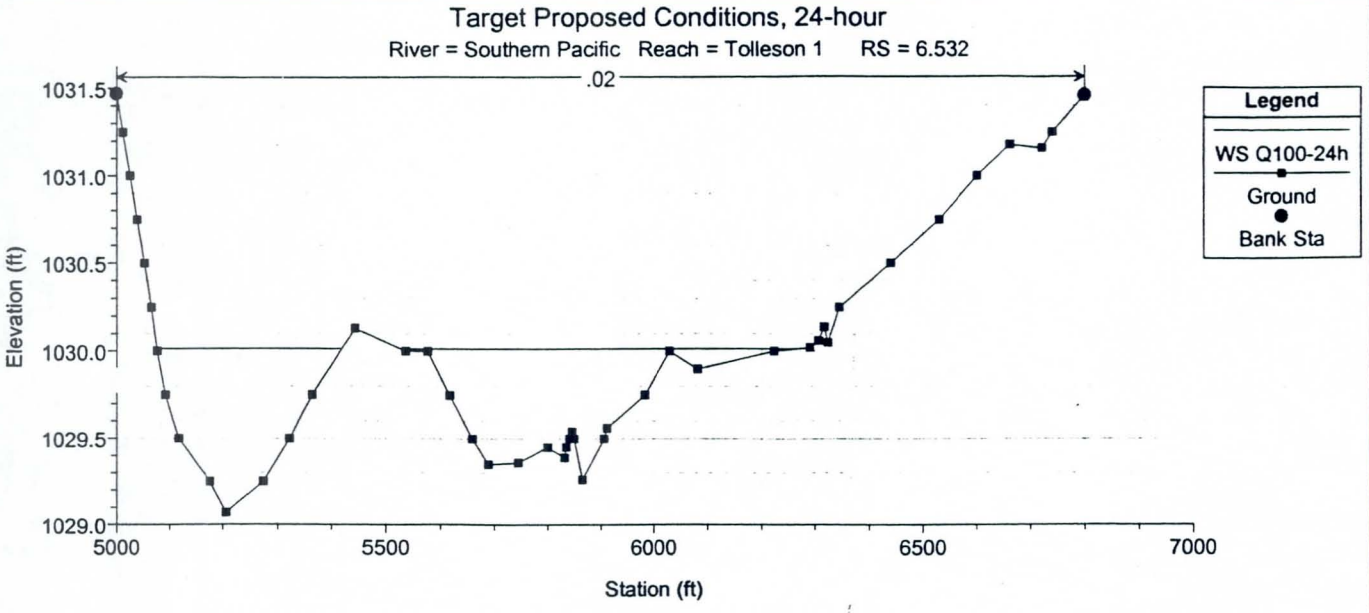

Target Proposed Conditions, 24-hour
River = Southern Pacific Reach = Tolleson 1 RS = 6.696
E
.035
.03
.02
Elevation (ft)
Station (ft)
Legend
WS Q100-24h
Ground
Ineff
Bank Sta

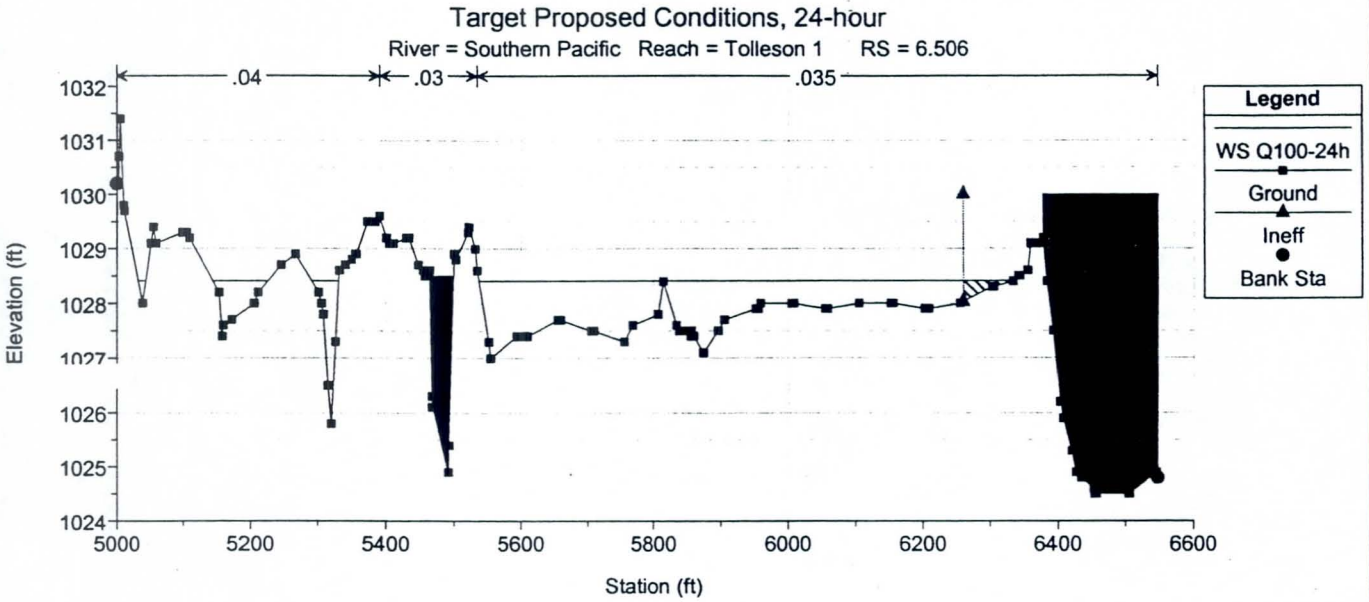

Target Proposed Conditions, 24-hour
River = Southern Pacific Reach = Tolleson 1 RS = 6.649
D
.035
.03
.02
Elevation (ft)
Station (ft)
Legend
WS Q100-24h
Ground
Ineff
Bank Sta

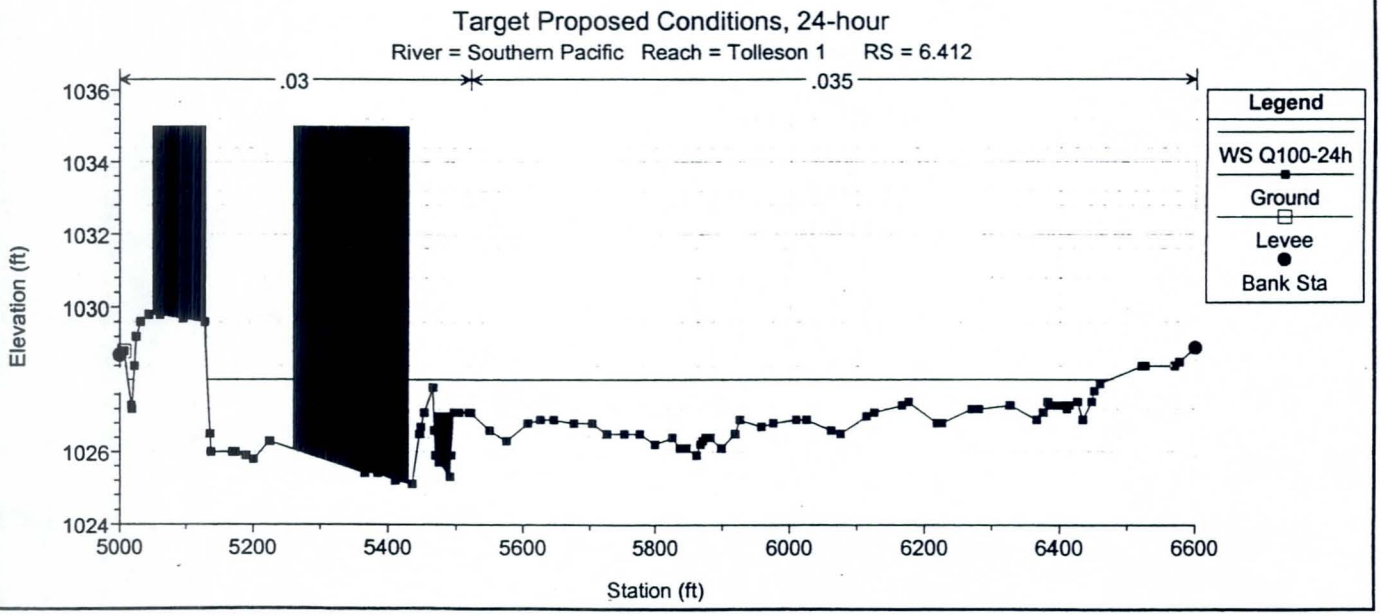

Target Proposed Conditions, 24-hour
River = Southern Pacific Reach = Tolleson 1 RS = 6.601
C
.035
.03
.02
Legend
WS Q100-24h
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Target Proposed Conditions, 24-hour
River = Southern Pacific Reach = Tolleson 1 RS = 6.575
B
.035
.03
.035
Legend
WS Q100-24h
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Target Proposed Conditions, 24-hour
River = Southern Pacific Reach = Tolleson 1 RS = 6.549
A
.035
.03
Legend
WS Q100-24h
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Target Proposed Conditions, 24-hour
River = Southern Pacific Reach = Tolleson 1 RS = 6.532
.02
Legend
WS Q100-24h
Ground
Bank Sta
Elevation (ft)
Station (ft)


Target Proposed Conditions, 24-hour
River = Southern Pacific Reach = Tolleson 1 RS = 6.506
.04
.03
.035
Legend
WS Q100-24h
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Target Proposed Conditions, 24-hour
River = Southern Pacific Reach = Tolleson 1 RS = 6.412
.03
.035
Legend
WS Q100-24h
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

Addendum to the Off-Site Drainage Report for Target Southwest Distribution Center

Phoenix, Arizona

December 7, 2000

Prepared for:
WRG Design, Inc.
4808 N. 22nd Street, Suite 150
Phoenix, AZ 85016
(602) 977-8000

REGISTERED PROFESSIONAL ENGINEER (CIVIL)
CERTIFICATE NO.
19690
PAUL W.R.
HOSKIN
Date Signed 12/7/00
ARIZONA, U.S.A.

HEC creative engineering solutions

Prepared by:
Hoskin Engineering Consultants, Inc.
323 W. Roosevelt Street, Suite 200
Phoenix, AZ 85003
(602) 252-8384

HEC 00-043

Addendum to the
Off-Site Drainage Report
for
Target Southwest Distribution Center
Phoenix, Arizona

Table of Contents

1 Introduction 1

2 Hydrology 1

3 Hydraulics 3

4 Conclusions 4

5 References 5

List of Figures

7. HEC-1 Schematic
8. On-Site Drainage Map

List of Tables

1. Summary of Off-Site Flows Impacting the Site
2. HEC-RAS Water Surface Elevation Summary

Appendix

100-Year, 6-Hour Existing Conditions HEC-1 Model
100-Year, 6-Hour Proposed Conditions HEC-1 Model
100-Year, 6-Hour Proposed Conditions HEC-RAS Model

REGISTERED PROFESSIONAL ENGINEER (CIVIL)
CERTIFICATE NO.
19690
PAUL W.R.
HOSKIN
Date Signed
ARIZONA, U.S.A.

1 Introduction

Hoskin Engineering Consultants, Inc. (HEC) has been contracted by WRG Design, Inc., to perform a hydrologic and hydraulic analysis for off-site flows which impact the proposed Southwest Distribution Center for Target Corporation, to be located at the southeast corner of 75th Avenue and Van Buren Street in Phoenix, Arizona (Figure 1). The results of the hydrologic and hydraulic analysis for the 100-year, 24-hour storm event have been documented in the report entitled *Off-Site Drainage Report for the Target Southwest Distribution Center* (Ref. 5). This addendum presents the 100-year, 6-hour storm event analysis for the site.

The approximately 144-acre site is located within the NW ¼ of Section 12, Township 1 North, Range 1 East, of the Gila and Salt River Base and Meridian, Maricopa County, Arizona. The site is bounded by Van Buren Street to the north, the Roosevelt Irrigation District canal and the Southern Pacific Railroad to the south, 75th Avenue to the west, and approximately 71st Avenue to the east.

2 Hydrology

The site is located within the watershed modeled as part of the *Floodplain Delineation of the Tolleson Area*, prepared by Dibble & Associates, on behalf of the Flood Control District of Maricopa County, in May 1999 (Refs. 1 and 2). The general direction of flow within the watershed is to the southwest, and is impacted by the Roosevelt Irrigation District canal and Southern Pacific Railroad which run in an east-west direction. A HEC-1 (Ref. 6) hydrologic model for the 100-year, 24-hour storm was prepared as part of the floodplain delineation study, and is referred to as the "effective" model in this addendum.

The HEC-1 model presented in the Tolleson study utilized the 100-year, 24-hour event, due to the large watershed size of the study. In accordance with the Flood Control District of Maricopa County's criteria (Ref. 3), for watershed areas of less than 20 square miles, the

100-year, 6-hour storm should be utilized. At this site, the contributing watershed area is 7.88 square miles, and the 100-year, 6-hour storm was therefore modeled as a check of the potential peak discharges which could impact the site.

Existing Conditions Model (TGT6E)

The HEC-1 hydrologic model prepared as part of the Tolleson Floodplain Delineation (Ref. 2) was modified to represent only the areas contributing flow to the site. The model was also modified as follows, to reflect the existing conditions surrounding the site:

1. Drainage areas TB and SF were subdivided in order to reflect drainage conditions directly affecting the site. Runoff parameters and unit hydrographs for the subdivided areas were based upon land usage and precipitation values presented in the Tolleson study (Ref. 2), and were generated using the Flood Control District's *Drainage Design Menu System* (Ref. 4).
2. A flow divert was added to model the existing 60-inch drainage pipe located along the south side of Van Buren. The pipe diverts approximately the first 100 cfs reaching the pipe to the west, and into the existing channel along the north side of the site. In addition, it is estimated that Van Buren Street can convey an additional 20 cfs in the north half of the right-of-way.
3. Unit hydrographs for each sub-basin were developed for the 100-year 6-hour storm using the Flood Control District's *Drainage Design Menu System*.

Proposed Conditions Model (TGT6P)

The existing conditions model was modified as follows to reflect the proposed grading plan for the site:

1. Drainage sub-basin SF2 was broken into two basins, SF2A and SF2B. Unit hydrographs for SF2A and SF2B were developed for the 100-year 6-hour storm using the Flood Control District's *Drainage Design Menu System*.
2. Retention storage routing within the site was broken into two areas, RSSF2A and RSSF2B. RSSF2A represents the retention provided in the basins within

the north half of the site, and RSSF2B represents the retention provided in the basins within the south half of the site.

The existing and proposed condition HEC-1 models were run for the 100-year 6-hour storm event. Results from the two models are summarized in the Table 1, and both the existing and proposed models are included in this addendum.

Table 1: Summary of Off-Site Flows Impacting the Site

HEC-1 I.D.	Description	100-yr, 6-hr Existing Conditions Q (cfs)	100-yr, 6-hr Proposed Conditions Q (cfs)
DITB2	Flow in pipe and street, Van Buren	120	120
CPSF1	Entering southeast corner of site	1541	1541
CPTB2	Entering northwest corner of site	758	758
SF2	Runoff from the site area	344	1514 (SF2A+SF2B)
RSSF2	Exiting southwest corner of site	2074	2022 (RSSF2B)

Note: HEC I.D. in parenthesis if different from Existing Conditions Model

3 HEC-RAS Analysis

A HEC-RAS hydraulic analysis was performed by Dibble and Associates, on behalf of the Flood Control District of Maricopa County, as part of the *Floodplain Delineation of the Tolleson Area* (Refs. 1 and 2). The Tolleson FIS model was used as the basis for the 100-year, 6-hour proposed conditions HEC-RAS model included in this addendum.

Proposed Conditions Model (TGT6P)

Flow values used in the proposed conditions model are 100-year, 6-hour peak flows from the proposed conditions HEC-1 model. Cross-sections within the property boundary were modified to reflect the proposed grading conditions. Additional cross-sections were added within the property limits. Due to a weir elevation of 1029 at 75th Avenue, all cross-sectional area below elevation 1029 was not used in the conveyance calculations. Results from the proposed conditions model are shown in Table 2, the resulting 100-year, 6-hour floodplain boundary is shown in Figure 8, and a copy of the model is included in this addendum.

Table 2: HEC-RAS Water Surface Elevation Summary

RM	Proposed Conditions (TGT6P)
7.033	1032.98
6.980	1032.38
6.885	1032.16
6.782	1031.62
6.723	1031.17
6.696	1031.07
6.601	1030.62
6.549	1030.42
6.532	1030.14

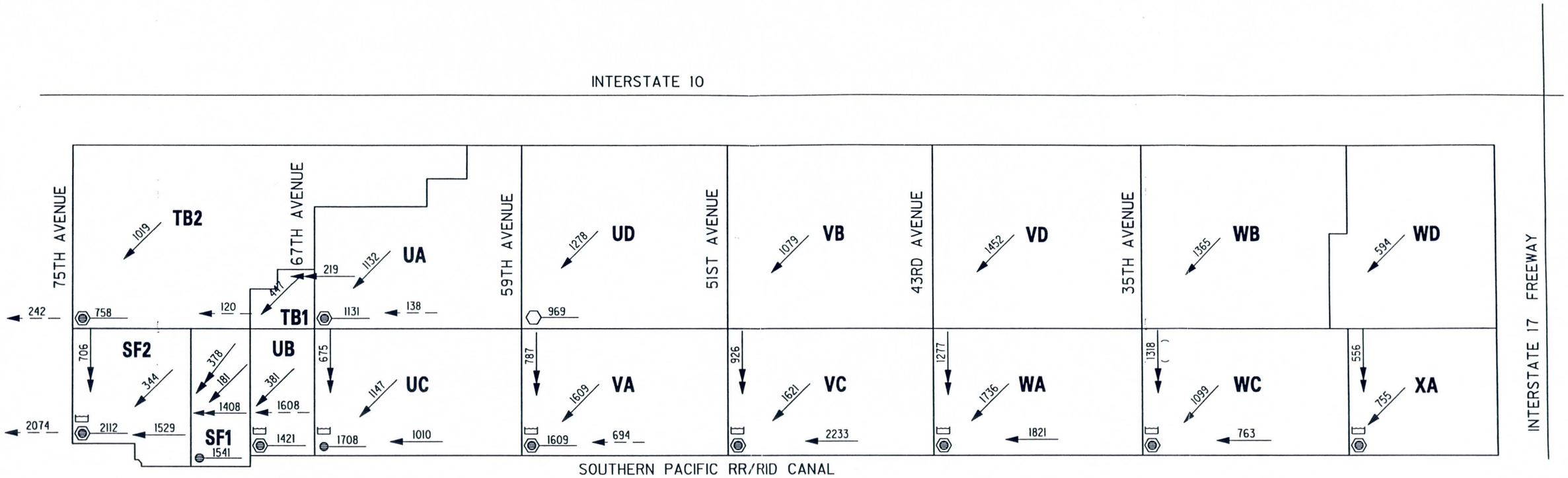
4 Conclusions

This addendum addresses the results of an analysis of the 100-year, 6-hour hydrology which impacts the site, and also the resultant changes to the floodplain conditions. Since the original floodplain delineation which has been accepted by FEMA (Effective Study) used the 100-year, 24-hour storm event, it is not the intent of this addendum to be submitted to FEMA. This study is not intended for floodplain management purposes. Instead, this study examines a worst-case scenario, and demonstrates that the site can still be safely developed without adverse impacts to either upstream or downstream properties. Results from the 100-year, 6-hour models are summarized as follows:

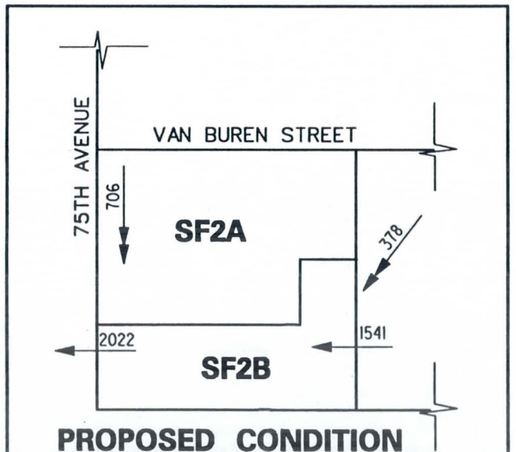
1. The 100-year, 6-hour peak flow which enters the site is 1541 cfs compared to the 100-year, 24-hour peak flow of 1099 cfs.
2. The 100-year, 6-hour peak flow which exits the site decreases following development of the site, as a result of the on-site retention storage provided.
3. The minimum finished floor elevation should be set a minimum of one foot above the computed 100-year, 6-hour water surface elevation. This sets a minimum finished floor elevation of 1033.38 feet.
4. There will be no adverse impacts either upstream or downstream of the site.

5 References

1. Dibble & Associates, *Floodplain Delineation of the Tolleson Area, Final Report and Technical Data Notebook*, FCDMC Contract No. 95-26, May 1999.
2. Dibble & Associates, *Floodplain Delineation of the Tolleson Area, Hydrology Report*, FCD 95-26, May 14, 1999.
3. Flood Control District of Maricopa County, Arizona, *Drainage Design Manual for Maricopa County, Arizona, Volume I - Hydrology,* Revised January 1,1995.
4. Flood Control District of Maricopa County, *Drainage Design Menu System, Version 1.0.*
5. Hoskin Engineering Consultants, Inc., *Off-Site Drainage Report for Target Southwest Distribution Center*, December 4, 2000.
6. United States Army Corps of Engineers, Hydrologic Engineering Center, *HEC-1 Flood Hydrograph Package, Version 4.1*, June 1998.
7. Unites States Army Corps of Engineers, *Hydrologic Engineering Center, HEC-RAS River Analysis System, Version 2.2*, September 1998.
8. WRG Design, Inc., *Preliminary Drainage Study, Target Southwest Distribution Center Phoenix, Arizona*, August 18, 2000.



EXISTING CONDITION



PROPOSED CONDITION

(SEE ALSO FIGURE 4)

LEGEND

- DRAINAGE AREA BOUNDARY
- UC — DRAINAGE AREA IDENTIFICATION
- 1494 — SUB-BASIN RUNOFF
- 730 — FLOW ROUTING
- 620 — DIVERT ROUTING
- 1164 — 100YR, 6HR REVISED EFFECTIVE Q (CFS)
- HYDROGRAPH COMBINE POINT
- FLOW DIVERSION
- HYDOGRAPH COMBINE & DIVERSION POINT
- RESERVOIR

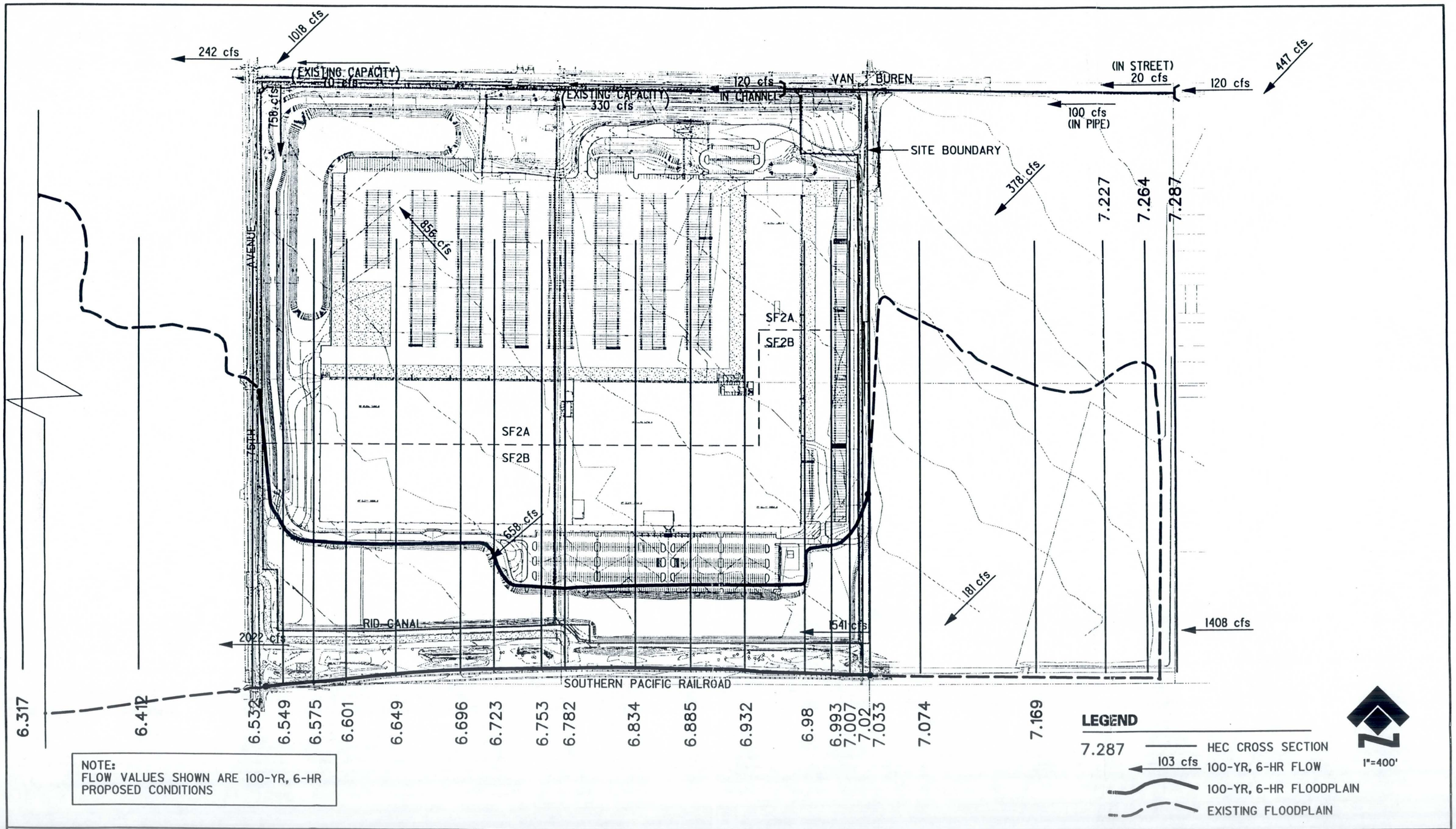
NOTE: HEC-1 MODEL BASED UPON "TOLLESON AREA FLOODPLAIN DELINEATION STUDY",DIBBLE & ASSOCIATES, MAY 1999

N.T.S.

Hoskin Engineering Consultants, Inc.
323 West Roosevelt Street
Suite 200
Phoenix, Arizona 85003-1136
Tel: (602) 252-8384
Fax: (602) 252-8385

TARGET S.W. DIST. CENTER
HEC-1 SCHEMATIC
100-YEAR, 6-HOUR

FIGURE 7



NOTE:
FLOW VALUES SHOWN ARE 100-YR, 6-HR
PROPOSED CONDITIONS

Hoskin Engineering Consultants, Inc.
323 West Roosevelt Street
Suite 200
Phoenix, Arizona 85003-1136
Tel: (602) 252-8384
Fax: (602) 252-8385

TARGET S.W. DIST. CENTER
ON-SITE DRAINAGE MAP
100 YEAR, 6 HOUR

FIGURE 8

APPENDIX

```
1*************************************
 *                                   *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)*
 *              JUN   1998           *
 *           VERSION 4.1             *
 *                                   *
 *  RUN DATE   27NOV00  TIME  11:22:12*
 *                                   *
 *************************************
```

```
*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*   HYDROLOGIC ENGINEERING CENTER   *
*         609 SECOND STREET         *
*       DAVIS, CALIFORNIA 95616     *
*          (916) 756-1104           *
*                                   *
*************************************
```

```
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
```

REVISED EFFECTIVE

6-HOUR

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


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

  1           ID   FILENAME:    TGT6E.DAT       WITH ADDITION OF DIVERT AT PIPE
  2           ID   DATE:        11-13-00        WITH MODIFICATION TO RSSF2
  3           ID
  4           ID   TARGET SW DISTRIBUTION CENTER WATERSHED RAINFALL-RUNOFF MODEL.
  5           ID   HOSKIN ENGINEERING CONSULTANTS, INC. JOB NO. 00-043
  6           ID   100-YR 6-HR PRECIPITATION
  7           ID   DDM MCUHP2 TARGET SOUTHWEST DISTRIBUTION CENTER
              *DIAGRAM
  8           IT       5            1200     300
  9           IO       5
              *
 10           JD    3.23    0.01
 11           PC    .000    .008    .016    .025    .033    .041    .050    .058    .066    .074
 12           PC    .087    .099    .118    .138    .216    .377    .834    .911    .931    .950
 13           PC    .962    .972    .983    .991   1.000
 14           JD    3.21    0.50
 15           JD    3.17    2.80
 16           PC    .000    .009    .016    .025    .034    .042    .051    .059    .067    .076
 17           PC    .087    .100    .120    .163    .252    .451    .694    .837    .900    .938
 18           PC    .950    .963    .975    .988   1.000
 19           JD    2.98    16.0
 20           PC    .000    .015    .020    .030    .048    .063    .076    .090    .105    .119
 21           PC    .135    .152    .175    .222    .304    .472    .670    .796    .868    .912
 22           PC    .946    .960    .973    .987   1.000
              *

 23           KK   SUBWD
 24           KM   BASIN SUBWD
 25           KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 26           KM    L=        .7  Lca=        .4   S=   11.1  Kn= .079  LAG=  43.1
 27           KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
 28           BA     .37
 29           LG     .21     .19    6.80     .19    9.00
 30           UI     32.     38.     81.    162.    183.    239.    266.    266.    249.    225.
 31           UI    215.    173.    144.    111.     92.     78.     55.     45.     39.     29.
 32           UI     28.     18.     18.     18.      6.      4.      4.      4.      4.      4.
 33           UI      4.      4.      4.      4.      4.      4.      4.      4.      0.      0.
 34           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 35           KK  RTWDXA
 36           KM        ROUTE FLOW FROM CPWD TO CPXA (ALONG 27TH AVENUE).
 37           KM        TYPE A CHANNEL
 38           RS       4               -1       0
 39           RC    .025    .025    .025    2500   .0016
 40           RX       0     100     400     500   500.1     600     900    1000
 41           RY       5       4       1       0       0       1       4       5

 42           KK   SUBXA
 43           KM   BASIN SUBXA
 44           KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 45           KM    L=        .8  Lca=        .4   S=   10.5  Kn= .041  LAG=  23.6
 46           KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
```

```
 47          BA     .25
 48          LG     .12     .15    9.70     .06   45.00
 49          UI     39.    127.    246.    311.    309.    270.    199.    129.     94.     56.
1                                         HEC-1 INPUT                                          PAGE  2

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

 50          UI     40.     28.     22.      9.      5.      5.      5.      5.      5.      5.
 51          UI      5.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 52          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 53          KK   CPXA1
 54          KM        ADD HYDROGRAPHS AT CPXA
 55          HC       2

 56          KK    RSXA
 57          KM   MODIFIED PULS ROUTING THROUGH PONDING BEHIND SPRR.
 58          KO       3
 59          RS       1    STOR       0       0
 60          SV     .01     .07     1.0     5.1    14.0    28.5    50.0    79.1   117.4   165.0
 61          SE  1063.3  1063.5  1063.6  1064.1  1064.6  1065.1  1065.6  1066.1  1066.6  1067.1
 62          SQ       0      15      43     455    1751    3879    6999   11192   17236   25382

 63          KK   CPZZ1
 64          KM        DIVERT FLOW FROM CPXA SOUTHWARD OVER SPRR
 65          DT   DIZZ1
 66          DI       0       0      43     455    1751    3879    6999   11192   17236   25382
 67          DQ       0       0       0       0       0       0       0      44     960    3141
             * SUB-BASIN ZZ1 DOES NOT EXIST

 68          KK  RTXAWC
 69          KM        ROUTE FLOW FROM CPXA TO CPWC (ALONG SPRR).
 70          KM        TYPE C CHANNEL
 71          RS       9              -1       0
 72          RC    .035    .035    .035    5100   .0016
 73          RX       0      20      35      50    50.1     250     450     550
 74          RY       5       5     2.5       0       0       2       4       5

 75          KK   SUBWB
 76          KM   BASIN SUBWB
 77          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 78          KM    L=      1.2  Lca=       .6   S=    12.0  Kn= .048  LAG=  37.2
 79          KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
 80          BA     .67
 81          LG     .16     .15    9.70     .06   36.00
 82          UI     66.     98.    232.    373.    462.    552.    555.    504.    483.    379.
 83          UI    341.    239.    194.    154.    109.     84.     68.     60.     39.     38.
 84          UI     33.      8.      8.      8.      8.      8.      8.      8.      8.      8.
 85          UI      8.      8.      8.      0.      0.      0.      0.      0.      0.      0.
 86          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 87          KK  RTWBWC
 88          KM        ROUTE FLOW FROM CPWB TO CPWC (ALONG 35TH AVENUE).
 89          KM        TYPE A CHANNEL
 90          RS       3              -1       0
 91          RC    .025    .025    .025    2000   .0020
 92          RX       0     100     400     500   500.1     600     900    1000
 93          RY       5       4       1       0       0       1       4       5
1                                         HEC-1 INPUT                                          PAGE  3

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

 94          KK   SUBWC
 95          KM   BASIN SUBWC
 96          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 97          KM    L=      1.2  Lca=       .6   S=     6.0  Kn= .037  LAG=  32.9
 98          KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
 99          BA     .47
100          LG     .15     .16    9.70     .06   45.00
101          UI     53.     89.    237.    320.    422.    443.    412.    386.    296.    248.
102          UI    174.    147.     93.     72.     56.     48.     30.     30.     16.      7.
103          UI      7.      7.      7.      7.      7.      7.      7.      7.      7.      0.
104          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
105          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

106          KK    CPWC
107          KM        ADD HYDROGRAPHS AT CPWC.
108          HC       3

109          KK    RSWC
110          KM   MODIFIED PULS ROUTING THROUGH PONDING BEHIND SPRR.
111          KO       3
112          RS       1    STOR       0       0
113          SV    16.1    27.6    44.0    65.2    90.7   121.5   159.6   206.8   263.7   329.5
114          SE  1057.1  1057.6  1058.1  1058.6  1059.1  1059.6  1060.1  1060.6  1061.1  1061.6
115          SQ       0     115     608    1579    3086    5253    8972   15024   23745   35057

116          KK   CPWC2
117          KM        DIVERT FLOW FROM CPWC TO CPQE
```

```
118          DT    DIQE
119          DI       0     115     608    1579    3086    5253    8972   15024   23745   35057
120          DQ       0       0       0       0       0      40     951    3350    7104   12173

121          KK  RTWCWA
122          KM        ROUTE FLOW FROM CPWC TO CPWA (ALONG SPRR).
123          KM        TYPE C CHANNEL
124          RS       9              -1       0
125          RC    .035    .035    .035    5200   .0012
126          RX       0      20      35      50    50.1     250     450     550
127          RY       5       5     2.5       0       0       2       4       5

128          KK   SUBVD
129          KM   BASIN SUBVD
130          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
131          KM    L=       1.2  Lca=       .6   S=    9.9  Kn= .044  LAG=  36.5
132          KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
133          BA     .70
134          LG     .15     .16    9.70     .06   38.00
135          UI     70.    107.    257.    397.    507.    592.    592.    523.    526.    376.
136          UI    337.    242.    210.    138.    109.     87.     66.     58.     40.     40.
137          UI     23.      9.      9.      9.      9.      9.      9.      9.      9.      9.
138          UI      9.      9.      0.      0.      0.      0.      0.      0.      0.      0.
139          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
1                                          HEC-1 INPUT                                          PAGE  4

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

140          KK  RTVDWA
141          KM        ROUTE FLOW FROM CPVD TO CPWA (ALONG 43RD AVENUE).
142          KM        TYPE B CHANNEL
143          RS       3              -1       0
144          RC      .1     .02      .1    2000   .0030
145          RX       0     470     476     480     520     524     530    1000
146          RY     4.7       0       0       1       1       0       0     4.7

147          KK   SUBWA
148          KM   BASIN SUBWA
149          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
150          KM    L=       1.1  Lca=       .6   S=    9.1  Kn= .025  LAG=  19.5
151          KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
152          BA     .49
153          LG     .22     .17   10.10     .04   28.00
154          UI    112.    408.    682.    769.    644.    453.    290.    159.    102.     68.
155          UI     50.     12.     12.     12.     12.     12.     12.      0.      0.      0.
156          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

157          KK    CPWA
158          KM        ADD HYDROGRAPHS AT CPWA.
159          HC       3

160          KK    RSWA
161          KM   MODIFIED PULS ROUTING THROUGH PONDING BEHIND SPRR.
162          KO       3
163          RS       1    STOR       0       0
164          SV     1.3     1.9     2.4     3.1     4.0     8.5    16.7    29.9    48.5    74.4
165          SE  1050.7  1050.9  1051.1  1051.3  1051.4  1051.9  1052.4  1052.9  1053.4  1053.9
166          SQ       0       6      35     111     167     810    2025    3817    6199    9237

167          KK   CPWA2
168          KM        DIVERT FLOW FROM CPWA TO CPQD OVER SPRR
169          DT    DIQD
170          DI       0     810    9237   10710
171          DQ       0       0       0      63

172          KK  RTWAVC
173          KM        ROUTE FLOW FROM CPWA TO CPVC (ALONG SPRR).
174          KM        TYPE C CHANNEL
175          RS       8              -1       0
176          RC    .035    .035    .035    5000   .0028
177          RX       0      20      35      50    50.1     250     450     550
178          RY       5       5     2.5       0       0       2       4       5

179          KK   SUBVB
180          KM   BASIN SUBVB
181          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
182          KM    L=       1.1  Lca=       .6   S=   11.8  Kn= .067  LAG=  49.9
183          KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
184          BA     .72
185          LG     .37     .09    9.70     .07   17.00
186          UI     53.     53.    106.    208.    307.    317.    410.    446.    446.    445.
187          UI    372.    390.    323.    298.    235.    193.    154.    157.    101.     86.
                                           HEC-1 INPUT                                          PAGE  5

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

188          UI     71.     65.     49.     49.     35.     30.     30.     29.      7.      7.
189          UI      7.      7.      7.      7.      7.      7.      7.      7.      7.      7.
190          UI      7.      7.      7.      7.      0.      0.      0.      0.      0.      0.
```

```
191          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

192          KK  RTVBVC
193          KM        ROUTE FLOW FROM CPVB TO CPVC (ALONG 51ST AVENUE).
194          KM        TYPE B CHANNEL
195          RS       4              -1       0
196          RC      .1     .02      .1    2400   .0017
197          RX       0     470     476     480     520     524     530    1000
198          RY     4.7       0       0       1       1       0       0     4.7

199          KK   SUBVC
200          KM   BASIN SUBVC
201          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
202          KM    L=      1.1  Lca=       .5   S=    8.5  Kn= .028  LAG=  21.6
203          KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
204          BA     .49
205          LG     .15     .17    8.80     .07   44.00
206          UI     92.    319.    556.    701.    626.    514.    340.    226.    133.     90.
207          UI     62.     47.     14.     10.     10.     10.     10.     10.     10.      0.
208          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
209          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

210          KK    CPVC
211          KM        ADD HYDROGRAPHS AT CPVC.
212          HC       3

213          KK    RSVC
214          KM   MODIFIED PULS ROUTING THROUGH PONDING BEHIND SPRR.
215          KO       3
216          RS       1    STOR       0       0
217          SV      49      59      70      83      97     113     149     170     192     216
218          SE  1051.0  1051.2  1051.4  1051.6  1051.8  1052.0  1052.4  1052.6  1052.8  1053.0
219          SQ       9     129     425     944    1729    2822    6117    8287   10832   13747

220          KK   CPVC2
221          KM        DIVERT FLOW FROM CPVC TO CPVA OVER 51st AVE.
222          DT    DIVA
223          DI       0       9     654    2822    7159
224          DQ       0       4     214     753    1814

225          KK  RTVCQA
226          KM        ROUTE FLOW FROM CPVC TO CPQA (ALONG SPRR).
227          KM        TYPE B CHANNEL
228          RS       3              -1       0
229          RC      .1     .02      .1    2000    .003
230          RX       0     470     476     480     520     524     530    1000
231          RY     4.7       0       0       1       1       0       0     4.7
             *
```



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

232          KK   SUBUD
233          KM   BASIN SUBUD
234          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
235          KM    L=      1.3  Lca=       .6   S=   20.0  Kn= .060  LAG=  44.7
236          KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
237          BA     .78
238          LG     .37     .11    9.70     .06   11.00
239          UI     64.     73.    156.    303.    368.    472.    535.    541.    535.    450.
240          UI    490.    338.    347.    249.    196.    196.    123.    104.     83.     73.
241          UI     59.     53.     37.     37.     37.      9.      8.      8.      8.      8.
242          UI      8.      8.      8.      8.      8.      8.      8.      8.      8.      8.
243          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
244          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

245          KK    CPUD
246          KM        DIVERT 25% OF FLOW FROM CPUD TO CPUA.
247          DT    DIUA
248          DI       0      25      50      75     100     150     200
249          DQ       0       6      13      19      25      38      50

250          KK  RTUDVA
251          KM        ROUTE FLOW FROM CPUD TO CPVA (ALONG 59TH AVENUE).
252          KM        TYPE B CHANNEL
253          RS       4              -1       0
254          RC      .1     .02      .1    2600   .0019
255          RX       0     470     476     480     520     524     530    1000
256          RY     4.7       0       0       1       1       0       0     4.7

257          KK   SUBVA
258          KM   BASIN SUBVA
259          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
260          KM    L=      1.1  Lca=       .5   S=    8.5  Kn= .029  LAG=  22.3
261          KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
262          BA     .49
263          LG     .09     .15    8.40     .10   60.00
264          UI     87.    292.    532.    683.    623.    523.    376.    246.    143.     97.
265          UI     70.     46.     28.     10.     10.     10.     10.     10.     10.      0.
```

```
266          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
267          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

268          KK    CPVA
269          KM        RETURN DIVERT FROM CPVC
270          DR    DIVA

271          KK  RTDIVA
272          KM        ROUTE DIVERT TO CPVA
273          KM        TYPE C CHANNEL
274          RS       9              -1       0
275          RC    .035    .035    .035    5200   .0015
276          RX       0      20      35      50    50.1     250     450     550
277          RY       5       5     2.5       0       0       2       4       5
```



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

278          KK   CPVA2
279          KM        ADD HYDROGRAPHS AT CPVA.
280          HC       3                                                                  HC

281          KK    RSVA
282          KM   MODIFIED PULS ROUTING THROUGH PONDING BEHIND SPRR.
283          KO       3
284          RS       1    STOR       0       0
285          SV    10.3    13.3    15.6    23.9    34.6    48.9    67.7    90.8   118.6   140.8
286          SE  1044.2  1044.3  1044.5  1045.0  1045.5  1046.0  1046.5  1047.0  1047.5  1047.8
287          SQ       0       4      70     593    1618    3189    6809   12640   20432   26055

288          KK  RTVAUC
289          KM        ROUTE FLOW FROM CPVA TO CPUC
290          KM        TYPE C FLOW
291          RS       9              -1       0
292          RC    .035    .035    .035    5200   .0012
293          RX       0      20      35      50    50.1     250     450     550
294          RY       5       5     2.5       0       0       2       4       5
             *

295          KK   SUBUA
296          KM   BASIN SUBUA
297          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
298          KM    L=      1.2  Lca=       .6   S=   14.9  Kn= .049  LAG=  36.7
299          KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
300          BA     .56
301          LG     .24     .16    9.70     .06   20.00
302          UI     56.     85.    204.    318.    402.    473.    473.    421.    421.    304.
303          UI    276.    197.    167.    117.     89.     70.     54.     48.     32.     32.
304          UI     21.      7.      7.      7.      7.      7.      7.      7.      7.      7.
305          UI      7.      7.      0.      0.      0.      0.      0.      0.      0.      0.
306          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

307          KK    CPUA
308          KM        RETURN DIVERT FROM CPUD
309          DR    DIUA

310          KK  RTDIUA
311          KM        ROUTE DIVERT TO CPUA
312          KM        TYPE B CHANNEL
313          RS       8              -1       0
314          RC      .1     .02      .1    5000   .0014
315          RX       0     470     476     480     520     524     530    1000
316          RY     4.7       0       0       1       1       0       0     4.7

317          KK   CPUA1
318          KM        ADD HYDROGRAPHS AT CPUA
319          HC       2   1.334
```



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

320          KK   CPUA2
321          KM        DIVERT 20% OF FLOW FROM CPUA TO CPTB
322          DT   DITB1
323          DI       0      25      50      75     100     150     200
324          DQ       0       5      10      15      20      30      40

325          KK  RTUAUC
326          KM        ROUTE FLOW FROM CPUA TO CPUC (ALONG 67TH AVENUE).
327          KM        TYPE B CHANNEL
328          RS       4              -1       0
329          RC      .1     .02      .1    2400   .0017
330          RX       0     470     476     480     520     524     530    1000
331          RY     4.7       0       0       1       1       0       0     4.7

332          KK   SUBUC
333          KM   BASIN SUBUC
334          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
```

```
335          KM    L=       1.0  Lca=        .5   S=   12.7  Kn= .044  LAG=  30.5
336          KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
337          BA     .48
338          LG     .26      .15     9.70      .06   22.00
339          UI     58.     113.     299.     386.    474.    491.    417.    383.    304.    206.
340          UI    170.     104.      81.      61.     50.     33.     33.      9.      7.      7.
341          UI      7.       7.       7.       7.      7.      7.      7.      0.      0.      0.
342          UI      0.       0.       0.       0.      0.      0.      0.      0.      0.      0.

343          KK    CPUC
344          KM        ADDHYDROGRAPHS AT CPUC
345          HC       3   7.101

346          KK    RSUC
347          KM        ROUTE FLOW FROM CPUC TO CPUB OVER 67th AVE.
348          KO       3
349          RS       1    STOR       0       0
350          SV     4.8     6.9     9.9    19.0    33.0    52.6    77.4   108.7   148.6   172.0
351          SE  1036.2  1036.3  1036.5  1037.0  1037.5  1038.0  1038.5  1039.0  1039.5  1040.0
352          SQ       0       5      77     789    2369    4778    8161   12516   18033   23378

353          KK  RTUCUB
354          KM        ROUTE FLOW FROM CPUC TO CPUB
355          KM        TYPE C CHANNEL
356          RS       2              -1       0
357          RC    .035    .035    .035    1400   .0043
358          RX       0      20      35      50    50.1     250     450     550
359          RY       5       5     2.5       0       0       2       4       5

360          KK   SUBUB
361          KM   BASIN SUBUB
362          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
363          KM    L=        .8  Lca=        .4   S=   16.2  Kn= .048  LAG=  26.4
364          KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
365          BA     .14
366          LG     .22      .14     8.80      .08   23.00
367          UI     20.      50.     110.     152.    164.    145.    127.     96.     63.     48.
```



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

368          UI     30.      22.      17.      11.      9.      2.      2.      2.      2.      2.
369          UI      2.       2.       2.       0.      0.      0.      0.      0.      0.      0.
370          UI      0.       0.       0.       0.      0.      0.      0.      0.      0.      0.

371          KK    CPUB
372          KM        ADD HYDROGRAPHS AT CPUB
373          HC       2

374          KK    RSUB
375          KM        STORAGE ROUTING AT CPUB (69TH AVE.)
376          KO       3
377          RS       1    STOR       0       0
378          SV      18      28      41      59      82     108
379          SE  1035.5  1036.0  1036.5  1037.0  1037.5    1038
380          SQ       1      85     494    1710    4700    9466

381          KK   CPUB1
382          KM        DIVERT FLOW FROM CPUB TO CPUE OVER SPRR.
383          DT    DIUE
384          DI       0     1.2    85.4   493.7  1710.3  4699.8  9465.7
385          DQ       0       0       0       0   101.6   887.6  2402.3

386          KK  RUBSF1
387          KM        ROUTE FLOW FROM CPUB TO CPSF1
388          KM        TYPE C CHANNEL
389          RS       5              -1       0
390          RC    .035    .035    .035    1373   .0007
391          RX       0      20      35      50    50.1     250     450     550
392          RY       5       5     2.5       0       0       2       4       5

393          KK   DITB1
394          KM   RETRIEVE FLOW ALONG VAN BUREN
395          DR   DITB1

396          KK  DITB1A
397          KM   FIRST 120 CFS FLOWS WEST IN PIPE AND STREET
398          DT   DITB2
399          DI       0     120    1000
400          DQ       0     120     120

401          KK     TB1
402          KM   BASIN TB1
403          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
404          KM    L=        .7  Lca=        .4   S=   10.2  Kn= .046  LAG=  27.2
405          KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
406          BA     .17
407          LG     .21      .19     8.80      .07   28.00
408          UI     23.      54.     126.     172.    191.    173.    156.    119.     79.     62.
409          UI     39.      28.      21.      15.     13.      5.      3.      3.      3.      3.
```

```
410          UI      3.      3.      3.      3.      0.      0.      0.      0.      0.      0.
411          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


412          KK   COTB1
413          KM   COMBINE TB1 AND EXCESS FLOW ALONG VAN BUREN
414          HC       2

415          KK  RTBSF1
416          KM        ROUTE FLOW FROM CPTB1 TO CPSF1
417          KM        TYPE C CHANNEL
418          RS       5              -1       0
419          RC    .035    .035    .035    2814   .0007
420          RX       0      20      35      50    50.1     250     450     550
421          RY       5       5     2.5       0       0       2       4       5
             *

422          KK     SF1
423          KM   BASIN SF1
424          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
425          KM    L=        .5  Lca=        .3   S=    9.2  Kn= .100  LAG=  46.9
426          KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
427          BA     .13
428          LG     .50     .15    9.70     .07     .00
429          UI     10.     10.     22.     44.     57.     71.     75.     83.     83.     75.
430          UI     72.     65.     54.     47.     36.     29.     28.     18.     16.     12.
431          UI     11.      9.      8.      6.      6.      6.      2.      1.      1.      1.
432          UI      1.      1.      1.      1.      1.      1.      1.      1.      1.      1.
433          UI      1.      1.      0.      0.      0.      0.      0.      0.      0.      0.
434          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

435          KK   CPSF1
436          KM        ADD HYDROGRAPH AT CPSF1
437          HC       3

438          KK  RSFSF1
439          KM        ROUTE FLOW FROM CPSF1 TO CPSF2
440          KM        TYPE C CHANNEL
441          RS       5              -1       0
442          RC    .035    .035    .035    1427   .0007
443          RX       0      20      35      50    50.1     250     450     550
444          RY       5       5     2.5       0       0       2       4       5

445          KK     TB2
446          KM   BASIN TB2
447          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
448          KM    L=       2.0  Lca=        .9   S=   10.2  Kn= .046  LAG=  53.4
449          KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
450          BA     .72
451          LG     .25     .18    8.80     .08   28.00
452          UI     50.     50.     91.    156.    277.    273.    376.    392.    416.    416.
453          UI    394.    347.    375.    282.    281.    219.    184.    145.    151.    102.
454          UI     84.     74.     61.     53.     45.     44.     28.     28.     28.     26.
455          UI      6.      6.      6.      6.      6.      6.      6.      6.      6.      6.
456          UI      6.      6.      6.      6.      6.      6.      6.      0.      0.      0.
457          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
1                                          HEC-1 INPUT                                          PAGE 11

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


458          KK   DITB2
459          KM   RETRIEVE FLOW WEST ALONG VAN BUREN
460          DR   DITB2

461          KK  RTDITB
462          KM        ROUTE DIVERT TO CPTB2, THROUGH PIPE AND CHANNEL TO 75TH & vAN BUREN
463          KM        TYPE A CHANNEL
464          RS       9              -1       0
465          RC    .025    .025    .025    5200   .0019
466          RX       0     100     400     500   500.1     600     900    1000
467          RY       5       4       1       0       0       1       4       5

468          KK   CPTB2
469          KM        ADD HYDROGRAPH AT CPTB2 = COMBINE FLOW AT 75TH & VAN BUREN
470          HC       2   2.192

471          KK   CPTB2
472          KM        DIVERT 25% OF FLOW TO CPTA
473          DT    DITA
474          DI       0      25      50      75     100     150     200
475          DQ       0       6      13      19      25      38      50

476          KK  RTBSF2
477          KM        ROUTE FLOW FROM CPTB2 TO CPSF2 (ALONG 75TH AVENUE).
478          KM        TYPE B CHANNEL
479          RS       4              -1       0
```

```
480          RC      .1     .02      .1    2160   .0023
481          RX       0     470     476     480     520     524     530    1000
482          RY     4.7       0       0       1       1       0       0     4.7
             *

483          KK     SF2
484          KM   BASIN SF2
485          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
486          KM    L=        .7  Lca=        .3   S=     9.2  Kn= .092  LAG=  49.2
487          KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
488          BA     .25
489          LG     .49     .16    9.70     .07     .00
490          UI     19.     19.     38.     76.    108.    114.    146.    157.    157.    153.
491          UI    131.    141.    104.    107.     75.     64.     53.     51.     34.     30.
492          UI     23.     21.     17.     16.     11.     11.     11.      7.      2.      2.
493          UI      2.      2.      2.      2.      2.      2.      2.      2.      2.      2.
494          UI      2.      2.      2.      2.      0.      0.      0.      0.      0.      0.
495          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

496          KK   CPSF2
497          KM        ADD HYDROGRAPHS AT CPSF2.
498          HC       3   8.464
```



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

499          KK   RSSF2
500          KM        STORAGE ROUTING AT CPSF2
501          KO       3
502          RS       1    STOR       0       0
503          SV     6.5     9.6    13.8    18.0    34.2    56.1    84.8
504          SE  1029.1 1029.37 1029.57 1029.77 1030.27 1030.77 1031.27
505          SQ       0   28.58  140.46  364.83 1847.07 4303.63 7628.27
506          ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

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

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

   23      SUBWD
              V
              V
   35     RTWDXA
              .
              .
   42          .        SUBXA
               .            .
               .            .
   53      CPXA1............
              V
              V
   56       RSXA
              .
              .
   65          .-------->   DIZZ1
   63      CPZZ1
              V
              V
   68     RTXAWC
              .
              .
   75          .        SUBWB
               .            V
               .            V
   87          .       RTWBWC
               .            .
               .            .
   94          .            .        SUBWC
               .            .            .
               .            .            .
  106       CPWC........................
              V
              V
  109       RSWC
              .
              .
  118         .-------->    DIQE
  116      CPWC2
              V
              V
  121     RTWCWA
              .
              .
  128         .        SUBVD
               .            V
               .            V
  140          .       RTVDWA
```

```
                .           .
                .           .
147             .           .       SUBWA
                .           .           .
                .           .           .
157         CPWA.......................
               V
               V
160         RSWA
                .
                .
169             .-------->    DIQD
167        CPWA2
               V
               V
172       RTWAVC
                .
                .
179             .       SUBVB
                .           V
                .           V
192             .      RTVBVC
                .           .
                .           .
199             .           .       SUBVC
                .           .           .
                .           .           .
210         CPVC.......................
               V
               V
213         RSVC
                .
                .
222             .-------->    DIVA
220        CPVC2
               V
               V
225       RTVCQA
                .
                .
232             .       SUBUD
                .           .
                .           .
247             .           .-------->    DIUA
245             .        CPUD
                .           V
                .           V
250             .      RTUDVA
                .           .
                .           .
257             .           .       SUBVA
                .           .           .
                .           .           .
270             .           .           .           .<-------    DIVA
268             .           .           .        CPVA
                .           .           .           V
                .           .           .           V
271             .           .           .      RTDIVA
                .           .           .           .
                .           .           .           .
278             .       CPVA2.......................
                .           V
                .           V
281             .        RSVA
                .           V
                .           V
288             .      RTVAUC
                .           .
                .           .
295             .           .       SUBUA
                .           .           .
                .           .           .
309             .           .           .           .<-------    DIUA
307             .           .           .        CPUA
                .           .           .           V
                .           .           .           V
310             .           .           .      RTDIUA
                .           .           .           .
                .           .           .           .
317             .           .       CPUA1............
                .           .           .
                .           .           .
322             .           .           .-------->   DITB1
320             .           .       CPUA2
                .           .           V
                .           .           V
325             .           .      RTUAUC
                .           .           .
                .           .           .
332             .           .           .       SUBUC
```

```
                .           .           .           .
                .           .           .           .
343             .        CPUC.......................
                .           V
                .           V
346             .        RSUC
                .           V
                .           V
353             .      RTUCUB
                .           .
                .           .
360             .           .       SUBUB
                .           .           .
                .           .           .
371             .        CPUB............
                .           V
                .           V
374             .        RSUB
                .           .
                .           .
383             .           .-------->    DIUE
381             .      CPUB1
                .           V
                .           V
386             .      RUBSF1
                .           .
                .           .
395             .           .           .<-------   DITB1
393             .           .       DITB1
                .           .           .
                .           .           .
398             .           .           .-------->  DITB2
396             .           .      DITB1A
                .           .           .
                .           .           .
401             .           .           .         TB1
                .           .           .           .
                .           .           .           .
412             .           .       COTB1............
                .           .           V
                .           .           V
415             .           .      RTBSF1
                .           .           .
                .           .           .
422             .           .           .         SF1
                .           .           .           .
                .           .           .           .
435             .      CPSF1.......................
                .           V
                .           V
438             .      RSFSF1
                .           .
                .           .
445             .           .         TB2
                .           .           .
                .           .           .
460             .           .           .           .<-------   DITB2
458             .           .           .       DITB2
                .           .           .           V
                .           .           .           V
461             .           .           .      RTDITB
                .           .           .           .
                .           .           .           .
468             .           .       CPTB2............
                .           .           .
                .           .           .
473             .           .           .-------->    DITA
471             .           .       CPTB2
                .           .           V
                .           .           V
476             .           .      RTBSF2
                .           .           .
                .           .           .
483             .           .           .         SF2
                .           .           .           .
                .           .           .           .
496             .      CPSF2.......................
                .           V
                .           V
499             .      RSSF2
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
 *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
 *              JUN   1998               *
 *           VERSION 4.1                 *
 *                                       *
 *  RUN DATE   27NOV00  TIME  11:22:12   *
 *                                       *
 *****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

```
                    FILENAME:    TGT6E.DAT       WITH ADDITION OF DIVERT AT PIPE
                    DATE:        11-13-00        WITH MODIFICATION TO RSSF2

                    TARGET SW DISTRIBUTION CENTER WATERSHED RAINFALL-RUNOFF MODEL.
                    HOSKIN ENGINEERING CONSULTANTS, INC. JOB NO. 00-043
                    100-YR 6-HR PRECIPITATION
                    DDM MCUHP2 TARGET SOUTHWEST DISTRIBUTION CENTER

  9 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       1200  STARTING TIME
                       NQ        300  NUMBER OF HYDROGRAPH ORDINATES
                   NDDATE      2   0  ENDING DATE
                   NDTIME       1255  ENDING TIME
                    ICENT         19  CENTURY MARK

                COMPUTATION INTERVAL     .08 HOURS
                     TOTAL TIME BASE   24.92 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

 10 JD        INDEX STORM NO. 1
                    STRM        3.23  PRECIPITATION DEPTH
                    TRDA         .01  TRANSPOSITION DRAINAGE AREA

 11 PI          PRECIPITATION PATTERN
                  .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                  .01       .02       .02       .08       .16       .46       .08       .02       .02       .01
                  .01       .01       .01       .01

 14 JD        INDEX STORM NO. 2
                    STRM        3.21  PRECIPITATION DEPTH
                    TRDA         .50  TRANSPOSITION DRAINAGE AREA

  0 PI          PRECIPITATION PATTERN
                  .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                  .01       .02       .02       .08       .16       .46       .08       .02       .02       .01
                  .01       .01       .01       .01

 15 JD        INDEX STORM NO. 3
                    STRM        3.17  PRECIPITATION DEPTH
                    TRDA        2.80  TRANSPOSITION DRAINAGE AREA

 16 PI          PRECIPITATION PATTERN
                  .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                  .01       .02       .04       .09       .20       .24       .14       .06       .04       .01
                  .01       .01       .01       .01

 19 JD        INDEX STORM NO. 4
                    STRM        2.98  PRECIPITATION DEPTH
                    TRDA       16.00  TRANSPOSITION DRAINAGE AREA

 20 PI          PRECIPITATION PATTERN
                  .01       .00       .01       .02       .02       .01       .01       .01       .01       .02
                  .02       .02       .05       .08       .17       .20       .13       .07       .04       .03
                  .01       .01       .01       .01
```

```
                **************
                *            *
499 KK          *     RSSF2  *
                *            *
                **************

501 KO            OUTPUT CONTROL VARIABLES
                        IPRNT          3  PRINT CONTROL
                        IPLOT          0  PLOT CONTROL
                        QSCAL         0.  HYDROGRAPH PLOT SCALE

                HYDROGRAPH ROUTING DATA

502 RS            STORAGE ROUTING
                        NSTPS          1  NUMBER OF SUBREACHES
                         ITYP       STOR  TYPE OF INITIAL CONDITION
                       RSVRIC        .00  INITIAL CONDITION
                            X        .00 WORKING R AND D COEFFICIENT

503 SV              STORAGE        6.5       9.6      13.8      18.0      34.2      56.1      84.8

504 SE            ELEVATION    1029.10   1029.37   1029.57   1029.77   1030.27   1030.77   1031.27

505 SQ            DISCHARGE        0.        29.      140.      365.     1847.     4304.     7628.
                                                                  ***


                          HYDROGRAPH AT STATION     RSSF2
                        TRANSPOSITION AREA      2.8 SQ MI

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                        6-HR       24-HR       72-HR     24.92-HR
+   (CFS)        (HR)
                            (CFS)
+    2253.       2.92                  1007.        288.        278.        278.
                         (INCHES)     1.106       1.267       1.267       1.267
                          (AC-FT)      499.        572.        572.        572.

 PEAK STORAGE    TIME                          MAXIMUM AVERAGE STORAGE
                                        6-HR       24-HR       72-HR     24.92-HR
+  (AC-FT)       (HR)
      38.        2.92                    25.         13.         13.         13.

  PEAK STAGE     TIME                          MAXIMUM AVERAGE STAGE
                                        6-HR       24-HR       72-HR     24.92-HR
   (FEET)        (HR)
   1030.35       2.92                 1029.98     1029.50     1029.48     1029.48

                          CUMULATIVE AREA =     8.46 SQ MI

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

                          HYDROGRAPH AT STATION     RSSF2
                        TRANSPOSITION AREA     16.0 SQ MI

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                        6-HR       24-HR       72-HR     24.92-HR
+   (CFS)        (HR)
                            (CFS)
+    1975.       3.00                   906.        263.        253.        253.
                         (INCHES)      .995       1.153       1.153       1.153
                          (AC-FT)      449.        521.        521.        521.

 PEAK STORAGE    TIME                          MAXIMUM AVERAGE STORAGE
                                        6-HR       24-HR       72-HR     24.92-HR
+  (AC-FT)       (HR)
      35.        3.00                    24.         13.         12.         12.

  PEAK STAGE     TIME                          MAXIMUM AVERAGE STAGE
                                        6-HR       24-HR       72-HR     24.92-HR
+   (FEET)       (HR)
   1030.30       3.00                 1029.95     1029.49     1029.47     1029.47

                          CUMULATIVE AREA =     8.46 SQ MI
```

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	SUBWD	594.	1.83	92.	23.	22.	.37		
+	ROUTED TO	RTWDXA	556.	2.08	92.	23.	22.	.37		
+	HYDROGRAPH AT	SUBXA	755.	1.58	76.	19.	18.	.25		
+	2 COMBINED AT	CPXA1	807.	1.75	167.	42.	40.	.62		
+	ROUTED TO	RSXA	796.	1.83	167.	42.	40.	.62		
+	DIVERSION TO	DIZZ1	0.	.00	0.	0.	0.	.62		
+	HYDROGRAPH AT	CPZZ1	796.	1.83	167.	42.	40.	.62		
+	ROUTED TO	RTXAWC	763.	2.42	166.	42.	40.	.62		
+	HYDROGRAPH AT	SUBWB	1365.	1.83	199.	50.	48.	.67		
+	ROUTED TO	RTWBWC	1318.	1.92	199.	50.	48.	.67		
+	HYDROGRAPH AT	SUBWC	1099.	1.75	144.	36.	35.	.47		
+	3 COMBINED AT	CPWC	2213.	1.92	501.	126.	121.	1.76		
	ROUTED TO	RSWC	1907.	2.33	466.	118.	113.	1.76		
+	DIVERSION TO	DIQE	0.	.00	0.	0.	0.	1.76		
+	HYDROGRAPH AT	CPWC2	1907.	2.33	466.	118.	113.	1.76		
+	ROUTED TO	RTWCWA	1821.	2.75	460.	118.	113.	1.76		
+	HYDROGRAPH AT	SUBVD	1452.	1.75	208.	52.	50.	.70		
+	ROUTED TO	RTVDWA	1277.	2.08	208.	52.	50.	.70		
+	HYDROGRAPH AT	SUBWA	1736.	1.58	145.	36.	35.	.49		
+	3 COMBINED AT	CPWA	2336.	2.67	792.	204.	196.	2.95		
+	ROUTED TO	RSWA	2290.	2.75	791.	203.	196.	2.95		
+	DIVERSION TO	DIQD	0.	.00	0.	0.	0.	2.95		
+	HYDROGRAPH AT	CPWA2	2290.	2.75	791.	203.	196.	2.95		
+	ROUTED TO	RTWAVC	2233.	3.08	785.	203.	196.	2.95		
+	HYDROGRAPH AT	SUBVB	1079.	2.00	199.	50.	48.	.72		
	ROUTED TO	RTVBVC	926.	2.50	198.	50.	48.	.72		
+	HYDROGRAPH AT	SUBVC	1621.	1.58	148.	37.	36.	.49		

3 COMBINED AT							
+	CPVC	2749.	3.00	1091.	283.	273.	4.16
ROUTED TO							
+	RSVC	2657.	3.08	989.	262.	253.	4.16
DIVERSION TO							
	DIVA	712.	3.08	282.	76.	73.	4.16
HYDROGRAPH AT							
+	CPVC2	1945.	3.08	707.	186.	179.	4.16
ROUTED TO							
+	RTVCQA	1901.	3.33	700.	186.	179.	4.16
HYDROGRAPH AT							
+	SUBUD	1278.	1.92	212.	53.	51.	.78
DIVERSION TO							
+	DIUA	309.	1.92	51.	13.	12.	.78
HYDROGRAPH AT							
+	CPUD	969.	1.92	160.	40.	39.	.78
ROUTED TO							
+	RTUDVA	787.	2.42	159.	40.	39.	.78
HYDROGRAPH AT							
+	SUBVA	1609.	1.58	154.	38.	37.	.49
HYDROGRAPH AT							
+	CPVA	712.	3.08	282.	76.	73.	4.16
ROUTED TO							
+	RTDIVA	694.	3.58	278.	76.	73.	4.16
3 COMBINED AT							
+	CPVA2	1609.	1.58	582.	158.	152.	1.27
ROUTED TO							
+	RSVA	1222.	1.75	557.	150.	144.	1.27
ROUTED TO							
+	RTVAUC	1010.	3.58	544.	149.	144.	1.27
HYDROGRAPH AT							
	SUBUA	1132.	1.75	158.	39.	38.	.56
HYDROGRAPH AT							
+	CPUA	309.	1.92	51.	13.	12.	.78
ROUTED TO							
+	RTDIUA	138.	3.67	49.	13.	12.	.78
2 COMBINED AT							
+	CPUA1	1131.	1.75	202.	52.	50.	1.33
DIVERSION TO							
+	DITB1	219.	1.83	40.	10.	10.	1.33
HYDROGRAPH AT							
+	CPUA2	875.	1.83	160.	42.	40.	1.33
ROUTED TO							
+	RTUAUC	675.	2.33	157.	42.	40.	1.33
HYDROGRAPH AT							
+	SUBUC	1147.	1.75	137.	34.	33.	.48
3 COMBINED AT							
+	CPUC	1708.	2.33	767.	212.	205.	7.10
ROUTED TO							
+	RSUC	1623.	2.50	756.	209.	202.	7.10
ROUTED TO							
+	RTUCUB	1608.	2.58	754.	209.	201.	7.10
HYDROGRAPH AT							
+	SUBUB	381.	1.67	40.	10.	10.	.14
2 COMBINED AT							
+	CPUB	1627.	2.50	780.	218.	210.	7.24
ROUTED TO							
	RSUB	1505.	2.75	735.	209.	201.	7.24
DIVERSION TO							
+	DIUE	84.	2.75	25.	6.	6.	7.24

+	HYDROGRAPH AT	CPUB1	1421.	2.75	710.	203.	195.	7.24
+	ROUTED TO	RUBSF1	1408.	2.92	707.	202.	195.	7.24
	HYDROGRAPH AT	DITB1	219.	1.83	40.	10.	10.	1.33
+	DIVERSION TO	DITB2	120.	1.58	33.	9.	8.	1.33
+	HYDROGRAPH AT	DITB1A	99.	1.83	7.	2.	2.	1.33
+	HYDROGRAPH AT	TB1	447.	1.67	48.	12.	12.	.17
+	2 COMBINED AT	COTB1	493.	1.75	55.	14.	13.	1.50
+	ROUTED TO	RTBSF1	378.	2.17	54.	14.	13.	1.50
+	HYDROGRAPH AT	SF1	181.	1.92	30.	8.	7.	.13
+	3 COMBINED AT	CPSF1	1541.	2.83	755.	220.	211.	8.88
+	ROUTED TO	RSFSF1	1529.	3.00	754.	219.	211.	8.88
+	HYDROGRAPH AT	TB2	1019.	2.00	201.	50.	48.	.72
+	HYDROGRAPH AT	DITB2	120.	1.58	33.	9.	8.	1.33
+	ROUTED TO	RTDITB	113.	2.67	32.	9.	8.	1.33
+	2 COMBINED AT	CPTB2	1018.	2.08	231.	59.	57.	2.19
	DIVERSION TO	DITA	242.	2.08	56.	14.	14.	2.19
+	HYDROGRAPH AT	CPTB2	758.	2.08	173.	44.	42.	2.19
+	ROUTED TO	RTBSF2	706.	2.50	172.	44.	42.	2.19
+	HYDROGRAPH AT	SF2	344.	2.00	60.	15.	14.	.25
+	3 COMBINED AT	CPSF2	2112.	2.83	956.	275.	265.	8.46
+	ROUTED TO	RSSF2	2074.	3.00	943.	272.	262.	8.46

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

```
1*************************************
*                                   *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)*
*             JUN   1998            *
*          VERSION 4.1              *
*                                   *
*  RUN DATE   27NOV00  TIME  14:30:24*
*                                   *
*************************************
```

```
*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*          (916) 756-1104           *
*                                   *
*************************************
```

```
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
```

PROPOSED CONDITIONS

6-HOUR

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   FILENAME:    TGT6P.DAT       PROPOSED CONDITIONS
  2           ID                               WITH ADDITION OF DIVERT AT PIPE
  3           ID                               WITH MODIFICATION TO RSSF2
  4           ID   TARGET SW DISTRIBUTION CENTER WATERSHED RAINFALL-RUNOFF MODEL.
  5           ID   HOSKIN ENGINEERING CONSULTANTS, INC. JOB NO.   00-043
  6           ID   NOVEMBER 22, 2000
  7           ID   100-YR 6-HR PRECIPITATION
  8           ID   DDM MCUHP2 TARGET SOUTHWEST DISTRIBUTION CENTER
              *DIAGRAM
  9           IT       5            1200     300
 10           IO       5
              *
 11           JD    3.23    0.01
 12           PC    .000    .008    .016    .025    .033    .041    .050    .058    .066    .074
 13           PC    .087    .099    .118    .138    .216    .377    .834    .911    .931    .950
 14           PC    .962    .972    .983    .991   1.000
 15           JD    3.21    0.50
 16           JD    3.17    2.80
 17           PC    .000    .009    .016    .025    .034    .042    .051    .059    .067    .076
 18           PC    .087    .100    .120    .163    .252    .451    .694    .837    .900    .938
 19           PC    .950    .963    .975    .988   1.000
 20           JD    2.98    16.0
 21           PC    .000    .015    .020    .030    .048    .063    .076    .090    .105    .119
 22           PC    .135    .152    .175    .222    .304    .472    .670    .796    .868    .912
 23           PC    .946    .960    .973    .987   1.000
              *

 24           KK   SUBWD
 25           KM   BASIN SUBWD
 26           KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 27           KM    L=        .7  Lca=        .4   S=   11.1  Kn= .079  LAG=  43.1
 28           KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
 29           BA     .37
 30           LG     .21     .19    6.80     .19    9.00
 31           UI     32.     38.     81.    162.    183.    239.    266.    266.    249.    225.
 32           UI    215.    173.    144.    111.     92.     78.     55.     45.     39.     29.
 33           UI     28.     18.     18.     18.      6.      4.      4.      4.      4.      4.
 34           UI      4.      4.      4.      4.      4.      4.      4.      4.      0.      0.
 35           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 36           KK  RTWDXA
 37           KM        ROUTE FLOW FROM CPWD TO CPXA (ALONG 27TH AVENUE).
 38           KM        TYPE A CHANNEL
 39           RS       4              -1       0
 40           RC    .025    .025    .025    2500   .0016
 41           RX       0     100     400     500   500.1     600     900    1000
 42           RY       5       4       1       0       0       1       4       5

 43           KK   SUBXA
 44           KM   BASIN SUBXA
 45           KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 46           KM    L=        .8  Lca=        .4   S=   10.5  Kn= .041  LAG=  23.6
```

```
 47          KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
 48          BA     .25
 49          LG     .12      .15     9.70      .06    45.00
1                                        HEC-1 INPUT                                                          PAGE  2

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

 50          UI     39.     127.     246.     311.     309.     270.     199.     129.      94.      56.
 51          UI     40.      28.      22.       9.       5.       5.       5.       5.       5.       5.
 52          UI      5.       0.       0.       0.       0.       0.       0.       0.       0.       0.
 53          UI      0.       0.       0.       0.       0.       0.       0.       0.       0.       0.

 54          KK   CPXA1
 55          KM        ADD HYDROGRAPHS AT CPXA
 56          HC       2

 57          KK    RSXA
 58          KM   MODIFIED PULS ROUTING THROUGH PONDING BEHIND SPRR.
 59          KO       5
 60          RS       1    STOR       0       0
 61          SV     .01     .07     1.0     5.1    14.0    28.5    50.0    79.1   117.4   165.0
 62          SE  1063.3  1063.5  1063.6  1064.1  1064.6  1065.1  1065.6  1066.1  1066.6  1067.1
 63          SQ       0      15      43     455    1751    3879    6999   11192   17236   25382

 64          KK   CPZZ1
 65          KM        DIVERT FLOW FROM CPXA SOUTHWARD OVER SPRR
 66          DT   DIZZ1
 67          DI       0       0      43     455    1751    3879    6999   11192   17236   25382
 68          DQ       0       0       0       0       0       0       0      44     960    3141
             * SUB-BASIN ZZ1 DOES NOT EXIST

 69          KK  RTXAWC
 70          KM        ROUTE FLOW FROM CPXA TO CPWC (ALONG SPRR).
 71          KM        TYPE C CHANNEL
 72          RS       9              -1       0
 73          RC    .035    .035    .035    5100   .0016
 74          RX       0      20      35      50    50.1     250     450     550
 75          RY       5       5     2.5       0       0       2       4       5

 76          KK   SUBWB
 77          KM   BASIN SUBWB
 78          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 79          KM    L=      1.2  Lca=       .6   S=   12.0  Kn= .048  LAG=  37.2
 80          KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
 81          BA     .67
 82          LG     .16     .15     9.70      .06   36.00
 83          UI     66.     98.     232.     373.     462.     552.     555.     504.     483.     379.
 84          UI    341.    239.     194.     154.     109.      84.      68.      60.      39.      38.
 85          UI     33.      8.      8.       8.       8.       8.       8.       8.       8.       8.
 86          UI      8.      8.      8.       0.       0.       0.       0.       0.       0.       0.
 87          UI      0.      0.      0.       0.       0.       0.       0.       0.       0.       0.

 88          KK  RTWBWC
 89          KM        ROUTE FLOW FROM CPWB TO CPWC (ALONG 35TH AVENUE).
 90          KM        TYPE A CHANNEL
 91          RS       3              -1       0
 92          RC    .025    .025    .025    2000   .0020
 93          RX       0     100     400     500   500.1     600     900    1000
 94          RY       5       4       1       0       0       1       4       5
1                                        HEC-1 INPUT                                                          PAGE  3

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

 95          KK   SUBWC
 96          KM   BASIN SUBWC
 97          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 98          KM    L=      1.2  Lca=       .6   S=    6.0  Kn= .037  LAG=  32.9
 99          KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
100          BA     .47
101          LG     .15     .16     9.70      .06   45.00
102          UI     53.     89.     237.     320.     422.     443.     412.     386.     296.     248.
103          UI    174.    147.      93.      72.      56.      48.      30.      30.      16.       7.
104          UI      7.      7.       7.       7.       7.       7.       7.       7.       7.       0.
105          UI      0.      0.       0.       0.       0.       0.       0.       0.       0.       0.
106          UI      0.      0.       0.       0.       0.       0.       0.       0.       0.       0.

107          KK    CPWC
108          KM        ADD HYDROGRAPHS AT CPWC.
109          HC       3

110          KK    RSWC
111          KM   MODIFIED PULS ROUTING THROUGH PONDING BEHIND SPRR.
112          KO       5
113          RS       1    STOR       0       0
114          SV    16.1    27.6    44.0    65.2    90.7   121.5   159.6   206.8   263.7   329.5
115          SE  1057.1  1057.6  1058.1  1058.6  1059.1  1059.6  1060.1  1060.6  1061.1  1061.6
116          SQ       0     115     608    1579    3086    5253    8972   15024   23745   35057

117          KK   CPWC2
```

```
118          KM        DIVERT FLOW FROM CPWC TO CPQE
119          DT    DIQE
120          DI       0     115     608    1579    3086    5253    8972   15024   23745   35057
121          DQ       0       0       0       0       0      40     951    3350    7104   12173

122          KK  RTWCWA
123          KM        ROUTE FLOW FROM CPWC TO CPWA (ALONG SPRR).
124          KM        TYPE C CHANNEL
125          RS       9              -1       0
126          RC    .035    .035    .035    5200   .0012
127          RX       0      20      35      50    50.1     250     450     550
128          RY       5       5     2.5       0       0       2       4       5

129          KK   SUBVD
130          KM   BASIN SUBVD
131          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
132          KM    L=       1.2  Lca=       .6   S=    9.9  Kn= .044  LAG=  36.5
133          KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
134          BA     .70
135          LG     .15     .16    9.70     .06   38.00
136          UI     70.    107.    257.    397.    507.    592.    592.    523.    526.    376.
137          UI    337.    242.    210.    138.    109.     87.     66.     58.     40.     40.
138          UI     23.      9.      9.      9.      9.      9.      9.      9.      9.      9.
139          UI      9.      9.      0.      0.      0.      0.      0.      0.      0.      0.
140          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
```



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

141          KK  RTVDWA
142          KM        ROUTE FLOW FROM CPVD TO CPWA (ALONG 43RD AVENUE).
143          KM        TYPE B CHANNEL
144          RS       3              -1       0
145          RC      .1     .02      .1    2000   .0030
146          RX       0     470     476     480     520     524     530    1000
147          RY     4.7       0       0       1       1       0       0     4.7

148          KK   SUBWA
149          KM   BASIN SUBWA
150          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
151          KM    L=       1.1  Lca=       .6   S=    9.1  Kn= .025  LAG=  19.5
152          KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
153          BA     .49
154          LG     .22     .17   10.10     .04   28.00
155          UI    112.    408.    682.    769.    644.    453.    290.    159.    102.     68.
156          UI     50.     12.     12.     12.     12.     12.     12.      0.      0.      0.
157          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

158          KK    CPWA
159          KM        ADD HYDROGRAPHS AT CPWA.
160          HC       3

161          KK    RSWA
162          KM   MODIFIED PULS ROUTING THROUGH PONDING BEHIND SPRR.
163          KO       5
164          RS       1    STOR       0       0
165          SV     1.3     1.9     2.4     3.1     4.0     8.5    16.7    29.9    48.5    74.4
166          SE  1050.7  1050.9  1051.1  1051.3  1051.4  1051.9  1052.4  1052.9  1053.4  1053.9
167          SQ       0       6      35     111     167     810    2025    3817    6199    9237

168          KK   CPWA2
169          KM        DIVERT FLOW FROM CPWA TO CPQD OVER SPRR
170          DT    DIQD
171          DI       0     810    9237   10710
172          DQ       0       0       0      63

173          KK  RTWAVC
174          KM        ROUTE FLOW FROM CPWA TO CPVC (ALONG SPRR).
175          KM        TYPE C CHANNEL
176          RS       8              -1       0
177          RC    .035    .035    .035    5000   .0028
178          RX       0      20      35      50    50.1     250     450     550
179          RY       5       5     2.5       0       0       2       4       5

180          KK   SUBVB
181          KM   BASIN SUBVB
182          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
183          KM    L=       1.1  Lca=       .6   S=   11.8  Kn= .067  LAG=  49.9
184          KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
185          BA     .72
186          LG     .37     .09    9.70     .07   17.00
187          UI     53.     53.    106.    208.    307.    317.    410.    446.    446.    445.
188          UI    372.    390.    323.    298.    235.    193.    154.    157.    101.     86.
```



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

189          UI     71.     65.     49.     49.     35.     30.     30.     29.      7.      7.
190          UI      7.      7.      7.      7.      7.      7.      7.      7.      7.      7.
```

```
191          UI      7.      7.      7.      7.      0.      0.      0.      0.      0.      0.
192          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

193          KK  RTVBVC
194          KM        ROUTE FLOW FROM CPVB TO CPVC (ALONG 51ST AVENUE).
195          KM        TYPE B CHANNEL
196          RS       4              -1       0
197          RC      .1     .02      .1    2400   .0017
198          RX       0     470     476     480     520     524     530    1000
199          RY     4.7       0       0       1       1       0       0     4.7

200          KK   SUBVC
201          KM   BASIN SUBVC
202          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
203          KM    L=      1.1  Lca=       .5   S=    8.5  Kn= .028  LAG=  21.6
204          KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
205          BA     .49
206          LG     .15     .17    8.80     .07   44.00
207          UI     92.    319.    556.    701.    626.    514.    340.    226.    133.     90.
208          UI     62.     47.     14.     10.     10.     10.     10.     10.     10.      0.
209          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
210          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

211          KK    CPVC
212          KM        ADD HYDROGRAPHS AT CPVC.
213          HC       3

214          KK    RSVC
215          KM   MODIFIED PULS ROUTING THROUGH PONDING BEHIND SPRR.
216          KO       5
217          RS       1    STOR       0       0
218          SV      49      59      70      83      97     113     149     170     192     216
219          SE  1051.0  1051.2  1051.4  1051.6  1051.8  1052.0  1052.4  1052.6  1052.8  1053.0
220          SQ       9     129     425     944    1729    2822    6117    8287   10832   13747

221          KK   CPVC2
222          KM        DIVERT FLOW FROM CPVC TO CPVA OVER 51st AVE.
223          DT    DIVA
224          DI       0       9     654    2822    7159
225          DQ       0       4     214     753    1814

226          KK  RTVCQA
227          KM        ROUTE FLOW FROM CPVC TO CPQA (ALONG SPRR).
228          KM        TYPE B CHANNEL
229          RS       3              -1       0
230          RC      .1     .02      .1    2000    .003
231          RX       0     470     476     480     520     524     530    1000
232          RY     4.7       0       0       1       1       0       0     4.7
             *
```



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

233          KK   SUBUD
234          KM   BASIN SUBUD
235          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
236          KM    L=      1.3  Lca=       .6   S=   20.0  Kn= .060  LAG=  44.7
237          KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
238          BA     .78
239          LG     .37     .11    9.70     .06   11.00
240          UI     64.     73.    156.    303.    368.    472.    535.    541.    535.    450.
241          UI    490.    338.    347.    249.    196.    196.    123.    104.     83.     73.
242          UI     59.     53.     37.     37.     37.      9.      8.      8.      8.      8.
243          UI      8.      8.      8.      8.      8.      8.      8.      8.      8.      8.
244          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
245          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

246          KK    CPUD
247          KM        DIVERT 25% OF FLOW FROM CPUD TO CPUA.
248          DT    DIUA
249          DI       0      25      50      75     100     150     200
250          DQ       0       6      13      19      25      38      50

251          KK  RTUDVA
252          KM        ROUTE FLOW FROM CPUD TO CPVA (ALONG 59TH AVENUE).
253          KM        TYPE B CHANNEL
254          RS       4              -1       0
255          RC      .1     .02      .1    2600   .0019
256          RX       0     470     476     480     520     524     530    1000
257          RY     4.7       0       0       1       1       0       0     4.7

258          KK   SUBVA
259          KM   BASIN SUBVA
260          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
261          KM    L=      1.1  Lca=       .5   S=    8.5  Kn= .029  LAG=  22.3
262          KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
263          BA     .49
264          LG     .09     .15    8.40     .10   60.00
265          UI     87.    292.    532.    683.    623.    523.    376.    246.    143.     97.
```

```
266          UI     70.     46.     28.     10.     10.     10.     10.     10.     10.      0.
267          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
268          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

269          KK    CPVA
270          KM        RETURN DIVERT FROM CPVC
271          DR    DIVA

272          KK  RTDIVA
273          KM        ROUTE DIVERT TO CPVA
274          KM        TYPE C CHANNEL
275          RS       9              -1       0
276          RC    .035    .035    .035    5200   .0015
277          RX       0      20      35      50    50.1     250     450     550
278          RY       5       5     2.5       0       0       2       4       5
```



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

279          KK   CPVA2
280          KM        ADD HYDROGRAPHS AT CPVA.
281          HC       3                                                                    HC

282          KK    RSVA
283          KM   MODIFIED PULS ROUTING THROUGH PONDING BEHIND SPRR.
284          KO       5
285          RS       1    STOR       0       0
286          SV    10.3    13.3    15.6    23.9    34.6    48.9    67.7    90.8   118.6   140.8
287          SE  1044.2  1044.3  1044.5  1045.0  1045.5  1046.0  1046.5  1047.0  1047.5  1047.8
288          SQ       0       4      70     593    1618    3189    6809   12640   20432   26055

289          KK  RTVAUC
290          KM        ROUTE FLOW FROM CPVA TO CPUC
291          KM        TYPE C FLOW
292          RS       9              -1       0
293          RC    .035    .035    .035    5200   .0012
294          RX       0      20      35      50    50.1     250     450     550
295          RY       5       5     2.5       0       0       2       4       5
             *

296          KK   SUBUA
297          KM   BASIN SUBUA
298          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
299          KM    L=      1.2  Lca=       .6   S=   14.9  Kn= .049  LAG=  36.7
300          KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
301          BA     .56
302          LG     .24     .16    9.70     .06   20.00
303          UI     56.     85.    204.    318.    402.    473.    473.    421.    421.    304.
304          UI    276.    197.    167.    117.     89.     70.     54.     48.     32.     32.
305          UI     21.      7.      7.      7.      7.      7.      7.      7.      7.      7.
306          UI      7.      7.      0.      0.      0.      0.      0.      0.      0.      0.
307          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

308          KK    CPUA
309          KM        RETURN DIVERT FROM CPUD
310          DR    DIUA

311          KK  RTDIUA
312          KM        ROUTE DIVERT TO CPUA
313          KM        TYPE B CHANNEL
314          RS       8              -1       0
315          RC      .1     .02      .1    5000   .0014
316          RX       0     470     476     480     520     524     530    1000
317          RY     4.7       0       0       1       1       0       0     4.7

318          KK   CPUA1
319          KM        ADD HYDROGRAPHS AT CPUA
320          HC       2   1.334
```



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

321          KK   CPUA2
322          KM        DIVERT 20% OF FLOW FROM CPUA TO CPTB
323          DT   DITB1
324          DI       0      25      50      75     100     150     200
325          DQ       0       5      10      15      20      30      40

326          KK  RTUAUC
327          KM        ROUTE FLOW FROM CPUA TO CPUC (ALONG 67TH AVENUE).
328          KM        TYPE B CHANNEL
329          RS       4              -1       0
330          RC      .1     .02      .1    2400   .0017
331          RX       0     470     476     480     520     524     530    1000
332          RY     4.7       0       0       1       1       0       0     4.7

333          KK   SUBUC
334          KM   BASIN SUBUC
```

```
KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
KM    L=       1.0  Lca=        .5   S=    12.7  Kn= .044  LAG=  30.5
KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
BA     .48
LG     .26      .15     9.70      .06    22.00
UI     58.     113.     299.     386.     474.     491.     417.     383.     304.     206.
UI    170.     104.      81.      61.      50.      33.      33.       9.       7.       7.
UI      7.       7.       7.       7.       7.       7.       7.       0.       0.       0.
UI      0.       0.       0.       0.       0.       0.       0.       0.       0.       0.

KK    CPUC
KM        ADDHYDROGRAPHS AT CPUC
HC       3   7.101

KK    RSUC
KM        ROUTE FLOW FROM CPUC TO CPUB OVER 67th AVE.
KO       5
RS       1    STOR       0       0
SV     4.8      6.9      9.9     19.0     33.0     52.6     77.4    108.7    148.6    172.0
SE  1036.2   1036.3   1036.5   1037.0   1037.5   1038.0   1038.5   1039.0   1039.5   1040.0
SQ       0        5       77      789     2369     4778     8161    12516    18033    23378

KK  RTUCUB
KM        ROUTE FLOW FROM CPUC TO CPUB
KM        TYPE C CHANNEL
RS       2               -1       0
RC    .035     .035     .035     1400    .0043
RX       0       20       35       50     50.1      250      450      550
RY       5        5      2.5        0        0        2        4        5

KK   SUBUB
KM   BASIN SUBUB
KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
KM    L=        .8  Lca=        .4   S=    16.2  Kn= .048  LAG=  26.4
KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
BA     .14
LG     .22      .14     8.80      .08    23.00
UI     20.      50.     110.     152.     164.     145.     127.      96.      63.      48.
```



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

UI     30.      22.      17.      11.       9.       2.       2.       2.       2.       2.
UI      2.       2.       2.       0.       0.       0.       0.       0.       0.       0.
UI      0.       0.       0.       0.       0.       0.       0.       0.       0.       0.

KK    CPUB
KM        ADD HYDROGRAPHS AT CPUB
HC       2

KK    RSUB
KM        STORAGE ROUTING AT CPUB (69TH AVE.)
KO       5
RS       1    STOR       0       0
SV      18       28       41       59       82      108
SE  1035.5   1036.0   1036.5   1037.0   1037.5     1038
SQ       1       85      494     1710     4700     9466

KK   CPUB1
KM        DIVERT FLOW FROM CPUB TO CPUE OVER SPRR.
DT    DIUE
DI       0      1.2     85.4    493.7   1710.3   4699.8   9465.7
DQ       0        0        0        0    101.6    887.6   2402.3

KK  RUBSF1
KM        ROUTE FLOW FROM CPUB TO CPSF1
KM        TYPE C CHANNEL
RS       5               -1       0
RC    .035     .035     .035     1373    .0007
RX       0       20       35       50     50.1      250      450      550
RY       5        5      2.5        0        0        2        4        5

KK   DITB1
KM   RETRIEVE FLOW ALONG VAN BUREN
DR   DITB1

KK  DITB1A
KM   FIRST 120 CFS FLOWS WEST IN PIPE AND STREET
DT   DITB2
DI       0      120     1000
DQ       0      120      120

KK     TB1
KM   BASIN TB1
KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
KM    L=        .7  Lca=        .4   S=    10.2  Kn= .046  LAG=  27.2
KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
BA     .17
LG     .21      .19     8.80      .07    28.00
UI     23.      54.     126.     172.     191.     173.     156.     119.      79.      62.
```

```
410          UI     39.     28.     21.     15.     13.      5.      3.      3.      3.      3.
411          UI      3.      3.      3.      3.      0.      0.      0.      0.      0.      0.
412          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


413          KK  COTB1
414          KM  COMBINE TB1 AND EXCESS FLOW ALONG VAN BUREN
415          HC      2

416          KK  RTBSF1
417          KM       ROUTE FLOW FROM CPTB1 TO CPSF1
418          KM       TYPE C CHANNEL
419          RS      5              -1       0
420          RC   .035    .035    .035    2814   .0007
421          RX      0      20      35      50    50.1     250     450     550
422          RY      5       5     2.5       0       0       2       4       5
             *

423          KK    SF1
424          KM  BASIN SF1
425          KM   THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
426          KM   L=       .5  Lca=       .3   S=    9.2  Kn= .100  LAG=  46.9
427          KM   AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
428          BA    .13
429          LG    .50     .15    9.70     .07     .00
430          UI    10.     10.     22.     44.     57.     71.     75.     83.     83.     75.
431          UI    72.     65.     54.     47.     36.     29.     28.     18.     16.     12.
432          UI    11.      9.      8.      6.      6.      6.      2.      1.      1.      1.
433          UI     1.      1.      1.      1.      1.      1.      1.      1.      1.      1.
434          UI     1.      1.      0.      0.      0.      0.      0.      0.      0.      0.
435          UI     0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

436          KK  CPSF1
437          KM       ADD HYDROGRAPH AT CPSF1
438          HC      3

439          KK  RSFSF1
440          KM       ROUTE FLOW FROM CPSF1 TO CPSF2
441          KM       TYPE C CHANNEL
442          RS      5              -1       0
443          RC   .035    .035    .035    1427   .0007
444          RX      0      20      35      50    50.1     250     450     550
445          RY      5       5     2.5       0       0       2       4       5

446          KK    TB2
447          KM  BASIN TB2
448          KM   THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
449          KM   L=      2.0  Lca=       .9   S=   10.2  Kn= .046  LAG=  53.4
450          KM   AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
451          BA    .72
452          LG    .25     .18    8.80     .08   28.00
453          UI    50.     50.     91.    156.    277.    273.    376.    392.    416.    416.
454          UI   394.    347.    375.    282.    281.    219.    184.    145.    151.    102.
455          UI    84.     74.     61.     53.     45.     44.     28.     28.     28.     26.
456          UI     6.      6.      6.      6.      6.      6.      6.      6.      6.      6.
457          UI     6.      6.      6.      6.      6.      6.      6.      0.      0.      0.
458          UI     0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
1                                          HEC-1 INPUT                                                    PAGE 11

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


459          KK  DITB2
460          KM  RETRIEVE FLOW WEST ALONG VAN BUREN
461          DR  DITB2

462          KK  RTDITB
463          KM       ROUTE DIVERT TO CPTB2, THROUGH PIPE AND CHANNEL TO 75TH & vAN BUREN
464          KM       TYPE A CHANNEL
465          RS      9              -1       0
466          RC   .025    .025    .025    5200   .0019
467          RX      0     100     400     500   500.1     600     900    1000
468          RY      5       4       1       0       0       1       4       5

469          KK  CPTB2
470          KM       ADD HYDROGRAPH AT CPTB2 = COMBINE FLOW AT 75TH & VAN BUREN
471          HC      2   2.192

472          KK  CPTB2
473          KM       DIVERT 25% OF FLOW TO CPTA
474          DT   DITA
475          DI      0      25      50      75     100     150     200
476          DQ      0       6      13      19      25      38      50

477          KK  RTBSF2
478          KM       ROUTE FLOW FROM CPTB2 TO CPSF2 (ALONG 75TH AVENUE).
479          KM       TYPE B CHANNEL
```

```
480          RS       4              -1       0
481          RC      .1     .02      .1    2160   .0023
482          RX       0     470     476     480     520     524     530    1000
483          RY     4.7       0       0       1       1       0       0     4.7
             *   BEGIN CHANGES 11-21-00

484          KK    SF2B
485          KM    BASIN SF2B
486          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
487          KM    L=        .5  Lca=       .3   S=    5.9  Kn= .020  LAG=  9.3
488          KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
489          BA    0.11
490          LG    0.15    0.15    9.70    0.07   50.00
491          UI     124     336     234      88      33       9       5       5       0       0
492          UI       0       0       0       0       0       0       0       0       0       0
             *

493          KK    SF2A
494          KM    BASIN SF2A
495          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
496          KM    L=        .6  Lca=       .2   S=    5.9  Kn= .020  LAG=  9.6
497          KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
498          BA    0.14
499          LG    0.15    0.15    9.70    0.07   80.00
500          UI     154     426     314     124      47      16       7       7       0       0
501          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

502          KK  RSSF2A
503          KM    RETENTION STORAGE AT SF2A, RETENTION BASINS 1,2,3
504          KO       3
505          RS       1    STOR       0       0
506          SA    5.57    6.03    6.50    6.98    6.56    8.03   12.56   20.42   28.51   37.89
507          SE       0       1       2       3       4       5       6       7       8       9
508          SQ       0       0       0       0       0       0       0       0       0     300
             *

509          KK  CPSF2B
510          KM        ADD HYDROGRAPHS AT CPSF2B
511          HC       4   8.464
             *

512          KK  RSSF2B
513          KM    RETENTION STORAGE AT CPSF2B, RETENTION BASIN 4
514          KO       3
515          RS       1    STOR       0       0
516          SA    1.10    8.75   14.39   15.08   26.14   28.46   37.36
517          SE      26      27      28      29      30      31      32
518          SQ       0       0       0       0  861.51 5728.16 14050.2
             *   END CHANGES 11-21-00
519          ZZ
1
        SCHEMATIC DIAGRAM OF STREAM NETWORK

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

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

   24      SUBWD
               V
               V
   36     RTWDXA
               .
               .
   43          .       SUBXA
               .           .
               .           .
   54      CPXA1............
               V
               V
   57       RSXA
               .
               .
   66          .-------->   DIZZ1
   64      CPZZ1
               V
               V
   69     RTXAWC
               .
               .
   76          .       SUBWB
               .           V
               .           V
   88          .      RTWBWC
               .           .
               .           .
```

```
 95          .           .       SUBWC
             .           .           .
             .           .           .
107        CPWC.......................
             V
             V
110        RSWC
             .
             .
119          .-------->    DIQE
117       CPWC2
             V
             V
122      RTWCWA
             .
             .
129          .       SUBVD
             .           V
             .           V
141          .      RTVDWA
             .           .
             .           .
148          .           .       SUBWA
             .           .           .
             .           .           .
158        CPWA.......................
             V
             V
161        RSWA
             .
             .
170          .-------->    DIQD
168       CPWA2
             V
             V
173      RTWAVC
             .
             .
180          .       SUBVB
             .           V
             .           V
193          .      RTVBVC
             .           .
             .           .
200          .           .       SUBVC
             .           .           .
             .           .           .
211        CPVC.......................
             V
             V
214        RSVC
             .
             .
223          .-------->    DIVA
221       CPVC2
             V
             V
226      RTVCQA
             .
             .
233          .       SUBUD
             .           .
             .           .
248          .           .-------->    DIUA
246          .        CPUD
             .           V
             .           V
251          .      RTUDVA
             .           .
             .           .
258          .           .       SUBVA
             .           .           .
             .           .           .
271          .           .           .          .<-------    DIVA
269          .           .           .       CPVA
             .           .           .          V
             .           .           .          V
272          .           .           .     RTDIVA
             .           .           .          .
             .           .           .          .
279          .       CPVA2.......................
             .           V
             .           V
282          .        RSVA
             .           V
             .           V
289          .      RTVAUC
             .           .
             .           .
296          .           .       SUBUA
```

```
310                                  .<-------    DIUA
308                              CPUA
                                    V
                                    V
311                            RTDIUA
                                    .
                                    .
318                     CPUA1............
                                    .
                                    .
323                                 .------->   DITB1
321                     CPUA2
                                    V
                                    V
326                    RTUAUC
                                    .
                                    .
333                                 .       SUBUC
                                    .           .
                                    .           .
344                 CPUC........................
                       V
                       V
347                 RSUC
                       V
                       V
354               RTUCUB
                       .
                       .
361                    .       SUBUB
                       .           .
                       .           .
372                 CPUB............
                       V
                       V
375                 RSUB
                       .
                       .
384                    .------->    DIUE
382               CPUB1
                       V
                       V
387               RUBSF1
                       .
                       .
396                    .           .<-------   DITB1
394                    .       DITB1
                       .           .
                       .           .
399                    .           .------->   DITB2
397                    .      DITB1A
                       .           .
                       .           .
402                    .           .         TB1
                       .           .           .
                       .           .           .
413                    .       COTB1............
                       .           V
                       .           V
416                    .      RTBSF1
                       .           .
                       .           .
423                    .           .         SF1
                       .           .           .
                       .           .           .
436                 CPSF1........................
                       V
                       V
439               RSFSF1
                       .
                       .
446                    .         TB2
                       .           .
                       .           .
461                    .           .           .<-------   DITB2
459                    .           .       DITB2
                       .           .           V
                       .           .           V
462                    .           .      RTDITB
                       .           .           .
                       .           .           .
469                    .       CPTB2............
                       .           .
                       .           .
474                    .           .------->    DITA
472                    .       CPTB2
                       .           V
                       .           V
```

```
477          .          .      RTBSF2
             .          .          .
             .          .          .
484          .          .          .        SF2B
             .          .          .          .
             .          .          .          .
493          .          .          .          .        SF2A
             .          .          .          .          V
             .          .          .          .          V
502          .          .          .          .      RSSF2A
             .          .          .          .          .
             .          .          .          .          .
509          .      CPSF2B.......................................
             .          V
             .          V
512          .      RSSF2B
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN   1998              *
*           VERSION 4.1                *
*                                      *
*  RUN DATE   27NOV00  TIME  14:30:24  *
*                                      *
****************************************
```

```
****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*           (916) 756-1104             *
*                                      *
****************************************
```

```
                    FILENAME:    TGT6P.DAT       PROPOSED CONDITIONS
                                                 WITH ADDITION OF DIVERT AT PIPE
                                                 WITH MODIFICATION TO RSSF2
                    TARGET SW DISTRIBUTION CENTER WATERSHED RAINFALL-RUNOFF MODEL.
                    HOSKIN ENGINEERING CONSULTANTS, INC. JOB NO.   00-043
                    NOVEMBER 22, 2000
                    100-YR 6-HR PRECIPITATION
                    DDM MCUHP2 TARGET SOUTHWEST DISTRIBUTION CENTER

 10 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       1200  STARTING TIME
                       NQ        300  NUMBER OF HYDROGRAPH ORDINATES
                   NDDATE      2   0  ENDING DATE
                   NDTIME       1255  ENDING TIME
                    ICENT         19  CENTURY MARK

              COMPUTATION INTERVAL     .08 HOURS
                   TOTAL TIME BASE   24.92 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


          **************
          *            *
502 KK    *    RSSF2A  *
          *            *
          **************

504 KO        OUTPUT CONTROL VARIABLES
                    IPRNT          3  PRINT CONTROL
                    IPLOT          0  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE

            HYDROGRAPH ROUTING DATA

505 RS        STORAGE ROUTING
                    NSTPS          1  NUMBER OF SUBREACHES
                     ITYP       STOR  TYPE OF INITIAL CONDITION
                   RSVRIC        .00  INITIAL CONDITION
                        X        .00 WORKING R AND D COEFFICIENT

506 SA             AREA        5.6      6.0      6.5      7.0      6.6      8.0      12.6     20.4     28.5
37.9
```

```
 507 SE          ELEVATION          .00       1.00       2.00       3.00       4.00       5.00       6.00       7.00       8.00
9.00

 508 SQ          DISCHARGE          0.         0.         0.         0.         0.         0.         0.         0.         0.
0.

                                                                  ***

                                                   COMPUTED STORAGE-ELEVATION DATA

              STORAGE        .00       5.80      12.06      18.80      25.57      32.85      43.06      59.39      83.75     116.84
            ELEVATION        .00       1.00       2.00       3.00       4.00       5.00       6.00       7.00       8.00       9.00

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

                          HYDROGRAPH AT STATION   RSSF2A
                        TRANSPOSITION AREA        .0 SQ MI

  PEAK FLOW      TIME                                   MAXIMUM AVERAGE FLOW
                                              6-HR       24-HR       72-HR      24.92-HR
+   (CFS)        (HR)
                                   (CFS)
+       0.        .00                           0.          0.          0.          0.
                                 (INCHES)      .000        .000        .000        .000
                                  (AC-FT)        0.          0.          0.          0.

 PEAK STORAGE    TIME                                 MAXIMUM AVERAGE STORAGE
                                              6-HR       24-HR       72-HR      24.92-HR
+  (AC-FT)       (HR)
      23.       2.58                          23.         23.         22.         22.

  PEAK STAGE     TIME                                   MAXIMUM AVERAGE STAGE
                                              6-HR       24-HR       72-HR      24.92-HR
+   (FEET)       (HR)
      3.66      2.67                          3.66        3.59        3.46        3.46

                          CUMULATIVE AREA =      .14 SQ MI

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

                          HYDROGRAPH AT STATION   RSSF2A
                        TRANSPOSITION AREA        .5 SQ MI

  PEAK FLOW      TIME                                   MAXIMUM AVERAGE FLOW
                                              6-HR       24-HR       72-HR      24.92-HR
+   (CFS)        (HR)
                                   (CFS)
+       0.        .00                           0.          0.          0.          0.
                                 (INCHES)      .000        .000        .000        .000
                                  (AC-FT)        0.          0.          0.          0.

 PEAK STORAGE    TIME                                 MAXIMUM AVERAGE STORAGE
                                              6-HR       24-HR       72-HR      24.92-HR
+  (AC-FT)       (HR)
      23.       2.58                          23.         23.         22.         22.

  PEAK STAGE     TIME                                   MAXIMUM AVERAGE STAGE
                                              6-HR       24-HR       72-HR      24.92-HR
+   (FEET)       (HR)
      3.64      2.67                          3.64        3.57        3.44        3.44

                          CUMULATIVE AREA =      .14 SQ MI


                 **************
                 *            *
 512 KK          *    RSSF2B  *
                 *            *
                 **************

 514 KO               OUTPUT CONTROL VARIABLES
                            IPRNT          3  PRINT CONTROL
                            IPLOT          0  PLOT CONTROL
                            QSCAL         0.  HYDROGRAPH PLOT SCALE

                      HYDROGRAPH ROUTING DATA

 515 RS               STORAGE ROUTING
                            NSTPS          1  NUMBER OF SUBREACHES
                             ITYP       STOR  TYPE OF INITIAL CONDITION
                           RSVRIC        .00  INITIAL CONDITION
                                X        .00 WORKING R AND D COEFFICIENT
```

516 SA	AREA	1.1	8.8	14.4	15.1	26.1	28.5	37.4
517 SE	ELEVATION	26.00	27.00	28.00	29.00	30.00	31.00	32.00
518 SQ	DISCHARGE	0.	0.	0.	0.	862.	5728.	14050.

***

COMPUTED STORAGE-ELEVATION DATA

STORAGE	.00	4.32	15.77	30.50	50.86	78.15	110.96
ELEVATION	26.00	27.00	28.00	29.00	30.00	31.00	32.00

HYDROGRAPH AT STATION RSSF2B
TRANSPOSITION AREA 2.8 SQ MI

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 2193.	2.92		950.	270.	260.	260.
		(INCHES)	1.044	1.187	1.187	1.187
		(AC-FT)	471.	536.	536.	536.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (AC-FT)	(HR)				
58.	2.92	48.	35.	33.	33.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (FEET)	(HR)				
30.27	2.92	29.85	29.17	29.05	29.05

CUMULATIVE AREA = 8.46 SQ MI

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

HYDROGRAPH AT STATION RSSF2B
TRANSPOSITION AREA 16.0 SQ MI

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
(CFS)	(HR)					
		(CFS)				
+ 1931.	3.00		853.	245.	236.	236.
		(INCHES)	.937	1.076	1.076	1.076
		(AC-FT)	423.	486.	486.	486.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (AC-FT)	(HR)				
57.	3.00	47.	34.	33.	33.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (FEET)	(HR)				
30.22	3.00	29.81	29.16	29.04	29.04

CUMULATIVE AREA = 8.46 SQ MI

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	SUBWD	594.	1.83	92.	23.	22.	.37		
+	ROUTED TO	RTWDXA	556.	2.08	92.	23.	22.	.37		
+	HYDROGRAPH AT	SUBXA	755.	1.58	76.	19.	18.	.25		
	2 COMBINED AT	CPXA1	807.	1.75	167.	42.	40.	.62		
+	ROUTED TO	RSXA	796.	1.83	167.	42.	40.	.62		

+ DIVERSION TO	DIZZ1	0.	.00	0.	0.	0.	.62
+ HYDROGRAPH AT	CPZZ1	796.	1.83	167.	42.	40.	.62
ROUTED TO	RTXAWC	763.	2.42	166.	42.	40.	.62
+ HYDROGRAPH AT	SUBWB	1365.	1.83	199.	50.	48.	.67
+ ROUTED TO	RTWBWC	1318.	1.92	199.	50.	48.	.67
+ HYDROGRAPH AT	SUBWC	1099.	1.75	144.	36.	35.	.47
+ 3 COMBINED AT	CPWC	2213.	1.92	501.	126.	121.	1.76
+ ROUTED TO	RSWC	1907.	2.33	466.	118.	113.	1.76
+ DIVERSION TO	DIQE	0.	.00	0.	0.	0.	1.76
+ HYDROGRAPH AT	CPWC2	1907.	2.33	466.	118.	113.	1.76
+ ROUTED TO	RTWCWA	1821.	2.75	460.	118.	113.	1.76
+ HYDROGRAPH AT	SUBVD	1452.	1.75	208.	52.	50.	.70
+ ROUTED TO	RTVDWA	1277.	2.08	208.	52.	50.	.70
+ HYDROGRAPH AT	SUBWA	1736.	1.58	145.	36.	35.	.49
+ 3 COMBINED AT	CPWA	2336.	2.67	792.	204.	196.	2.95
+ ROUTED TO	RSWA	2290.	2.75	791.	203.	196.	2.95
+ DIVERSION TO	DIQD	0.	.00	0.	0.	0.	2.95
+ HYDROGRAPH AT	CPWA2	2290.	2.75	791.	203.	196.	2.95
+ ROUTED TO	RTWAVC	2233.	3.08	785.	203.	196.	2.95
+ HYDROGRAPH AT	SUBVB	1079.	2.00	199.	50.	48.	.72
+ ROUTED TO	RTVBVC	926.	2.50	198.	50.	48.	.72
+ HYDROGRAPH AT	SUBVC	1621.	1.58	148.	37.	36.	.49
+ 3 COMBINED AT	CPVC	2749.	3.00	1091.	283.	273.	4.16
+ ROUTED TO	RSVC	2657.	3.08	989.	262.	253.	4.16
+ DIVERSION TO	DIVA	712.	3.08	282.	76.	73.	4.16
+ HYDROGRAPH AT	CPVC2	1945.	3.08	707.	186.	179.	4.16
+ ROUTED TO	RTVCQA	1901.	3.33	700.	186.	179.	4.16
+ HYDROGRAPH AT	SUBUD	1278.	1.92	212.	53.	51.	.78
+ DIVERSION TO	DIUA	309.	1.92	51.	13.	12.	.78
+ HYDROGRAPH AT	CPUD	969.	1.92	160.	40.	39.	.78

ROUTED TO	RTUDVA	787.	2.42	159.	40.	39.	.78
HYDROGRAPH AT	SUBVA	1609.	1.58	154.	38.	37.	.49
HYDROGRAPH AT	CPVA	712.	3.08	282.	76.	73.	4.16
ROUTED TO	RTDIVA	694.	3.58	278.	76.	73.	4.16
3 COMBINED AT	CPVA2	1609.	1.58	582.	158.	152.	1.27
ROUTED TO	RSVA	1222.	1.75	557.	150.	144.	1.27
ROUTED TO	RTVAUC	1010.	3.58	544.	149.	144.	1.27
HYDROGRAPH AT	SUBUA	1132.	1.75	158.	39.	38.	.56
HYDROGRAPH AT	CPUA	309.	1.92	51.	13.	12.	.78
ROUTED TO	RTDIUA	138.	3.67	49.	13.	12.	.78
2 COMBINED AT	CPUA1	1131.	1.75	202.	52.	50.	1.33
DIVERSION TO	DITB1	219.	1.83	40.	10.	10.	1.33
HYDROGRAPH AT	CPUA2	875.	1.83	160.	42.	40.	1.33
ROUTED TO	RTUAUC	675.	2.33	157.	42.	40.	1.33
HYDROGRAPH AT	SUBUC	1147.	1.75	137.	34.	33.	.48
3 COMBINED AT	CPUC	1708.	2.33	767.	212.	205.	7.10
ROUTED TO	RSUC	1623.	2.50	756.	209.	202.	7.10
ROUTED TO	RTUCUB	1608.	2.58	754.	209.	201.	7.10
HYDROGRAPH AT	SUBUB	381.	1.67	40.	10.	10.	.14
2 COMBINED AT	CPUB	1627.	2.50	780.	218.	210.	7.24
ROUTED TO	RSUB	1505.	2.75	735.	209.	201.	7.24
DIVERSION TO	DIUE	84.	2.75	25.	6.	6.	7.24
HYDROGRAPH AT	CPUB1	1421.	2.75	710.	203.	195.	7.24
ROUTED TO	RUBSF1	1408.	2.92	707.	202.	195.	7.24
HYDROGRAPH AT	DITB1	219.	1.83	40.	10.	10.	1.33
DIVERSION TO	DITB2	120.	1.58	33.	9.	8.	1.33
HYDROGRAPH AT	DITB1A	99.	1.83	7.	2.	2.	1.33
HYDROGRAPH AT	TB1	447.	1.67	48.	12.	12.	.17
2 COMBINED AT	COTB1	493.	1.75	55.	14.	13.	1.50
ROUTED TO	RTBSF1	378.	2.17	54.	14.	13.	1.50

+	HYDROGRAPH AT	SF1	181.	1.92	30.	8.	7.	.13
+	3 COMBINED AT	CPSF1	1541.	2.83	755.	220.	211.	8.88
	ROUTED TO	RSFSF1	1529.	3.00	754.	219.	211.	8.88
+	HYDROGRAPH AT	TB2	1019.	2.00	201.	50.	48.	.72
+	HYDROGRAPH AT	DITB2	120.	1.58	33.	9.	8.	1.33
+	ROUTED TO	RTDITB	113.	2.67	32.	9.	8.	1.33
+	2 COMBINED AT	CPTB2	1018.	2.08	231.	59.	57.	2.19
+	DIVERSION TO	DITA	242.	2.08	56.	14.	14.	2.19
+	HYDROGRAPH AT	CPTB2	758.	2.08	173.	44.	42.	2.19
+	ROUTED TO	RTBSF2	706.	2.50	172.	44.	42.	2.19
+	HYDROGRAPH AT	SF2B	658.	1.42	33.	8.	8.	.11
+	HYDROGRAPH AT	SF2A	856.	1.42	47.	12.	11.	.14
+	ROUTED TO	RSSF2A	0.	.00	0.	0.	0.	.14
+	4 COMBINED AT	CPSF2B	2039.	2.92	915.	269.	260.	8.46
+	ROUTED TO	RSSF2B	2022.	3.00	888.	254.	245.	8.46

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

HEC-RAS September 1998 Version 2.2
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

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

PROPOSED CONDITIONS

6-HOUR

PROJECT DATA
Project Title: Target Proposed Conditions, 6-hour
Project File : TGT6P.prj
Run Date and Time: 12/01/2000 4:56:32 PM

Project in English units

Project Description:
Target Proposed Conditions Model, 6-hour
Prepared By: Hoskin Engineering
Consultants, Inc.
HEC Project No.: 00-043
Date: 11-30-00
Description:
Geometry data for cross-sections 7.033 to 6.532 modified for Target Southwest Distribution Center site. Flow data modified to reflect 100-year, 6-hour proposed conditions HEC-1.

Original Model Info.:
Tolleson FIS, Project
FCD 95-26, El Mirage Road to 69th Avenue Alignment. August 17, 1998
Dibble &
Associates, Inc., with JE Fuller/Hydrology & Geomorphology, Inc.

The
Cross-section data were generated by ROADCALC from March 28, 1994 Topo flown by Kenney Aerial Mapping, Inc., NGVD 1929. Top-of-rail elevations and roadway/canal profile data were added to most cross-sections based on subsequent survey by Urban Engineering. Some cross sections were edited or added by hand.

Discharge data are from HEC-1 model for Tolleson Area dated December 1998 unless otherwise noted.

Hydrologic concentration points are
noted in cross-section descriptions using the corresponding HEC-1 IDs. The flow rates have been rounded to the nearest 10 cubic feet per second (cfs).

The floodplain was mapped utilizing HEC-RAS Version 2.1, dated October 1997.

PLAN DATA

Plan Title: Proposed Conditions, 6-hour
Plan File : g:\Filedir\00\00-043 Target S.W. Dist.Center\hydro\hec-ras\TGT6P.p02

Geometry Title: Proposed Geometry
Geometry File : g:\Filedir\00\00-043 Target S.W. Dist.Center\hydro\hec-ras\TGT6P.g01

Flow Title : Proposed 100-yr 6-hr HEC-1 Flows
Flow File : g:\Filedir\00\00-043 Target S.W. Dist.Center\hydro\hec-ras\TGT6P.f01

Plan Summary Information:

Number of:	Cross Sections	= 24	Mulitple Openings	=	0
	Culverts	= 0	Inline Weirs	=	0
	Bridges	= 0			

Computational Information

Water surface calculation tolerance	=	0.01
Critical depth calculaton tolerance	=	0.01
Maximum number of interations	=	20
Maximum difference tolerance	=	0.3
Flow tolerance factor	=	0.001

Computation Options

Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: Proposed 100-yr 6-hr HEC-1 Flows
Flow File : g:\Filedir\00\00-043 Target S.W. Dist.Center\hydro\hec-ras\TGT6P.f01

Flow Data (cfs)

River	Reach	RS	Q100-6h
Southern Pacific	Tolleson 1	7.287	1421
Southern Pacific	Tolleson 1	7.074	1541
Southern Pacific	Tolleson 1	6.549	2022

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Southern Pacific	Tolleson 1	Q100-6h		Known WS = 1028.02

Changes in WS and EG

River	Reach	RS	Profile	Type	Value
Southern Pacific	Tolleson 1	6.532	Q100-6h	Known WS	1029.46
Southern Pacific	Tolleson 2	5.539	Q100-6h	Known WS	1024.18
Southern Pacific	Tolleson 2	5.054	Q100-6h	Known WS	1015.2
Southern Pacific	Tolleson 2	3.568	Q100-6h	Known WS	1003.1
Southern Pacific	Tolleson 2	1.771	Q100-6h	Known WS	992
Southern Pacific	Tolleson 2	1.138	Q100-6h	Known WS	986.3
Canal	Canal Split	5.798	Q100-6h	Known WS	1026.92
Canal	Canal Split	5.578	Q100-6h	Known WS	1026.3

GEOMETRY DATA

Geometry Title: Proposed Geometry
Geometry File : g:\Filedir\00\00-043 Target S.W. Dist.Center\hydro\hec-ras\TGT6P.g01

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 7.287

INPUT
Description: RM 7.287, HEC-1 CPUB1 Q=1421 CFS, Begin Detailed Study By Dibble & JEF, 69th Avenue Alignment.

Station Elevation Data num= 65

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1037.2	5001.6	1037.2	5010.1	1036.8	5010.2	1036.8	5010.5	1036.8
5010.7	1036.8	5016	1035.8	5023	1033.4	5025.2	1032.8	5027.8	1032.9
5032	1032.6	5038.3	1032.3	5048.1	1034.7	5051.9	1035.5	5053.3	1035.7
5053.5	1035.8	5053.6	1035.8	5054	1035.9	5054.1	1035.8	5054.3	1035.8
5055	1035.5	5055.6	1035.3	5056.5	1035	5059.4	1034.1	5059.9	1034
5060.7	1033.8	5062.5	1034.5	5065.5	1035.9	5066.5	1035.8	5072.1	1035.8
5076.6	1035.8	5081	1035.8	5082.8	1035.9	5087.3	1035.8	5089.7	1035.7
5094.2	1035.7	5115.9	1035.6	5167.7	1035.8	5241.4	1036.1	5312.7	1036.2
5457.9	1036.2	5481.4	1036.3	5510.7	1036.2	5668.1	1036.6	5695.3	1036.6
5701.3	1036.6	5854.7	1036.7	5862	1036.7	5867.4	1036.7	5870.3	1036.8
5879.9	1036.8	5891	1036.8	6062.7	1037.2	6066	1037.2	6067	1037.2
6070.1	1037.2	6075.3	1037.2	6124.6	1037.2	6240.6	1037.4	6398.7	1037.6
6423.9	1037.6	6465.8	1037.7	6502.5	1037.7	6567.4	1037.8	6600	1037.9

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.08	5059.9	.035	5668.1	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6600	124	124	124	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
5000	5055	1035.5

CROSS SECTION OUTPUT Profile #Q100-6h

			Left OB	Channel	Right OB
E.G. Elev (ft)	1036.87	Element			
Vel Head (ft)	0.25	Wt. n-Val.		0.040	
W.S. Elev (ft)	1036.62	Reach Len. (ft)	124.00	124.00	124.00
Crit W.S. (ft)	1036.62	Flow Area (sq ft)		355.49	
E.G. Slope (ft/ft)	0.024659	Area (sq ft)		355.49	
Q Total (cfs)	1421.00	Flow (cfs)		1421.00	
Top Width (ft)	718.30	Top Width (ft)		718.30	
Vel Total (ft/s)	4.00	Avg. Vel. (ft/s)		4.00	
Max Chl Dpth (ft)	2.82	Hydr. Depth (ft)		0.49	

Conv. Total (cfs)	9049.1	Conv. (cfs)	9049.1
Length Wtd. (ft)	124.00	Wetted Per. (ft)	719.28
Min Ch El (ft)	1033.80	Shear (lb/sq ft)	0.76
Alpha	1.00	Stream Power (lb/ft s)	3.04
Frctn Loss (ft)	0.70	Cum Volume (acre-ft)	124.00
C & E Loss (ft)	0.06	Cum SA (acres)	101.70

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 7.264

INPUT
Description: RM 7.264
Station Elevation Data num= 56

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1037.2	5003.1	1037.1	5007.3	1037.2	5016.5	1037	5018.1	1036.9
5020.1	1036.7	5023.8	1035.9	5033.2	1034.1	5034	1033.9	5034.5	1033.8
5038.9	1032.9	5041.7	1033.5	5054.9	1035.1	5058.4	1034.2	5059.5	1033.5
5064.3	1034.8	5065.3	1035.1	5070.4	1035.1	5076.9	1035	5077.2	1035.1
5080.2	1034.7	5083.7	1034.1	5084	1034	5088.1	1034	5110.4	1034.1
5193.6	1034.2	5306.8	1034.4	5336	1034.4	5419.5	1034.7	5427.6	1034.9
5451.5	1034.9	5575.5	1035.1	5595.7	1035.2	5678.4	1035.3	5704.2	1035.4
5853.6	1035.6	5869.4	1035.6	6249.8	1035.6	6254.3	1035.6	6258.8	1035.6
6263.3	1035.6	6363.5	1035.6	6367.8	1035.6	6372.1	1035.6	6390.1	1035.8
6415.5	1036.1	6419.7	1036.1	6451.5	1036.4	6475.9	1036.7	6480.1	1036.7
6484.3	1036.7	6491.3	1036.8	6500.9	1036.8	6505.1	1036.8	6509.3	1036.8
6600	1036.9								

Manning's n Values num= 2

Sta	n Val	Sta	n Val
5000	.08	5076.9	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6600	192	192	192	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
6035	6600	1036

CROSS SECTION OUTPUT Profile #Q100-6h

E.G. Elev (ft)	1035.81	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.037	
W.S. Elev (ft)	1035.76	Reach Len. (ft)	192.00	192.00	192.00
Crit W.S. (ft)	1035.09	Flow Area (sq ft)		821.97	
E.G. Slope (ft/ft)	0.002445	Area (sq ft)		878.45	
Q Total (cfs)	1421.00	Flow (cfs)		1421.00	
Top Width (ft)	1362.34	Top Width (ft)		1362.34	
Vel Total (ft/s)	1.73	Avg. Vel. (ft/s)		1.73	
Max Chl Dpth (ft)	2.86	Hydr. Depth (ft)		0.81	
Conv. Total (cfs)	28735.6	Conv. (cfs)		28735.6	
Length Wtd. (ft)	192.00	Wetted Per. (ft)		1011.58	
Min Ch El (ft)	1032.90	Shear (lb/sq ft)		0.12	
Alpha	1.00	Stream Power (lb/ft s)		0.21	
Frctn Loss (ft)	0.51	Cum Volume (acre-ft)		122.25	
C & E Loss (ft)	0.00	Cum SA (acres)		98.74	

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 7.227

INPUT
Description: RM 7.227
Station Elevation Data num= 57

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1037.3	5007.8	1037.2	5010.5	1037.1	5018.1	1037.1	5022.2	1036.3
5025.9	1035.9	5026.7	1035.8	5027.9	1035.6	5038.2	1034.3	5041.1	1033.9
5042	1034	5043.2	1034.1	5054.9	1034.6	5058.8	1033.9	5058.9	1033.9
5060	1033.4	5060.5	1033.7	5062	1034.4	5063.2	1034.9	5066	1034.8
5071.6	1034.4	5073.9	1034.3	5075.3	1034.3	5081.1	1034.2	5082.6	1033.9
5083	1033.7	5083.1	1033.7	5106	1033.7	5190.3	1033.8	5225.9	1033.9
5229.3	1034	5298.7	1034.2	5371.1	1034.3	5429.3	1034.4	5667.9	1034.8
5742	1034.9	5867.6	1034.8	5909.9	1034.8	6227.9	1035.1	6239.9	1035.1
6251.9	1035.2	6263.9	1035.2	6347.7	1035.3	6359.4	1035.3	6371.2	1035.4
6386.3	1035.5	6407.5	1035.6	6419.2	1035.7	6445.8	1035.8	6466.2	1036
6477.9	1036	6489.5	1036.1	6495.4	1036.2	6503.5	1036.1	6515.2	1036.2
6526.8	1036.2	6600	1036.3						

Manning's n Values num= 2

Sta	n Val	Sta	n Val

5000	.08	5075.3	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
5000 6600 308 308 308 .1 .3
Ineffective Flow num= 1

Sta L	Sta R	Elev
6082	6600	1036

CROSS SECTION OUTPUT Profile #Q100-6h

			Left OB	Channel	Right OB
E.G. Elev (ft)	1035.30	Element			
Vel Head (ft)	0.05	Wt. n-Val.		0.036	
W.S. Elev (ft)	1035.25	Reach Len. (ft)	308.00	308.00	308.00
Crit W.S. (ft)	1034.85	Flow Area (sq ft)		781.13	
E.G. Slope (ft/ft)	0.002893	Area (sq ft)		817.11	
Q Total (cfs)	1421.00	Flow (cfs)		1421.00	
Top Width (ft)	1272.86	Top Width (ft)		1272.86	
Vel Total (ft/s)	1.82	Avg. Vel. (ft/s)		1.82	
Max Chl Dpth (ft)	1.85	Hydr. Depth (ft)		0.74	
Conv. Total (cfs)	26419.1	Conv. (cfs)		26419.1	
Length Wtd. (ft)	308.00	Wetted Per. (ft)		1052.02	
Min Ch El (ft)	1033.40	Shear (lb/sq ft)		0.13	
Alpha	1.00	Stream Power (lb/ft s)		0.24	
Frctn Loss (ft)	0.60	Cum Volume (acre-ft)		118.51	
C & E Loss (ft)	0.01	Cum SA (acres)		92.93	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 7.169

INPUT
Description: RM 7.169
Station Elevation Data num= 58

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1037.5	5004.8	1037.5	5007.2	1037.6	5016.1	1037.7	5017.4	1037.7
5020.7	1036.9	5021.1	1036.8	5022.3	1036.5	5023	1035.7	5024.2	1035.9
5025.5	1035.8	5028.4	1035.8	5031.1	1035.9	5042	1036.6	5042.6	1036.6
5045.2	1036.7	5045.3	1036.7	5052.3	1036.6	5053.8	1035.8	5056	1034.6
5057.3	1033.9	5059.6	1032.6	5060.5	1032	5061.3	1031.6	5062	1031.7
5062.8	1032.2	5067	1034	5067.4	1034	5068.1	1034.1	5077.7	1034.1
5078.9	1034.1	5081.3	1034.1	5082.3	1033.8	5085.2	1033	5162.5	1033.2
5651.1	1034	5803.1	1034.2	5890.3	1034	5975.4	1034	6192.9	1034
6216.9	1034.1	6240.9	1034.1	6264.9	1034.2	6322.3	1034.3	6346.1	1034.4
6369.9	1034.4	6380.3	1034.5	6394.8	1034.7	6418.6	1034.6	6436.8	1034.8
6450.8	1034.9	6474.5	1035	6498.2	1035.1	6502.2	1035.1	6507.8	1035.1
6531.5	1035.1	6555.2	1035.2	6600	1035.2				

Manning's n Values num= 2

Sta	n Val	Sta	n Val
5000	.08	5077.7	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
5000 6600 500 500 500 .1 .3
Ineffective Flow num= 1

Sta L	Sta R	Elev
6160	6600	1035

CROSS SECTION OUTPUT Profile #Q100-6h

			Left OB	Channel	Right OB
E.G. Elev (ft)	1034.69	Element			
Vel Head (ft)	0.03	Wt. n-Val.		0.036	
W.S. Elev (ft)	1034.66	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)	1034.12	Flow Area (sq ft)		983.33	
E.G. Slope (ft/ft)	0.001399	Area (sq ft)		1086.48	
Q Total (cfs)	1421.00	Flow (cfs)		1421.00	
Top Width (ft)	1356.27	Top Width (ft)		1356.27	
Vel Total (ft/s)	1.45	Avg. Vel. (ft/s)		1.45	
Max Chl Dpth (ft)	3.06	Hydr. Depth (ft)		0.89	
Conv. Total (cfs)	37997.8	Conv. (cfs)		37997.8	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		1105.60	
Min Ch El (ft)	1031.60	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)		0.11	
Frctn Loss (ft)	1.46	Cum Volume (acre-ft)		111.78	
C & E Loss (ft)	0.01	Cum SA (acres)		83.64	

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 7.074

INPUT
Description: RM 7.074, HEC-1 CPSF1 Q=1541 CFS

Station Elevation Data num= 54

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1036	5002.5	1036	5007.2	1036.2	5014.7	1036.1	5017.9	1035.9
5019.1	1035.7	5019.8	1035.4	5020	1035.4	5021.2	1035	5032.5	1032.4
5042.9	1029.6	5047	1030.8	5047.7	1030.8	5052.2	1032.4	5055.4	1031.1
5058.3	1029.8	5063.3	1031.4	5066.2	1032.6	5069.5	1032.7	5069.8	1032.7
5071.4	1032.6	5077.9	1032.3	5082.7	1031.9	5087.6	1031.6	5098	1031.7
5112.2	1032	5181	1032	5294.6	1032.3	5380.6	1032.4	5399.6	1032.3
5408.8	1032.4	5440.5	1032.4	5624.1	1032.8	5902.3	1033	5927.3	1033.2
6081.5	1032.7	6136.7	1032.8	6180.1	1033	6223.5	1033	6266.9	1033.1
6281.5	1032.9	6324.9	1033.1	6368.1	1033.1	6370.8	1033.2	6374.6	1033.2
6417.8	1033.1	6422.5	1033.1	6426.1	1033.1	6469.3	1033.3	6512.5	1033.4
6513.6	1033.4	6515	1033.4	6558.1	1033.5	6600	1033.6		

Manning's n Values num= 2

Sta	n Val	Sta	n Val
5000	.08	5077.9	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6600	218	218	218	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
5800	6600	1034

CROSS SECTION OUTPUT Profile #Q100-6h

			Left OB	Channel	Right OB
E.G. Elev (ft)	1033.22	Element			
Vel Head (ft)	0.13	Wt. n-Val.		0.040	
W.S. Elev (ft)	1033.09	Reach Len. (ft)	218.00	218.00	218.00
Crit W.S. (ft)	1032.85	Flow Area (sq ft)		542.26	
E.G. Slope (ft/ft)	0.008585	Area (sq ft)		619.22	
Q Total (cfs)	1541.00	Flow (cfs)		1541.00	
Top Width (ft)	1245.73	Top Width (ft)		1245.73	
Vel Total (ft/s)	2.84	Avg. Vel. (ft/s)		2.84	
Max Chl Dpth (ft)	3.49	Hydr. Depth (ft)		0.70	
Conv. Total (cfs)	16631.6	Conv. (cfs)		16631.6	
Length Wtd. (ft)	218.00	Wetted Per. (ft)		772.48	
Min Ch El (ft)	1029.60	Shear (lb/sq ft)		0.38	
Alpha	1.00	Stream Power (lb/ft s)		1.07	
Frctn Loss (ft)	0.20	Cum Volume (acre-ft)		101.99	
C & E Loss (ft)	0.03	Cum SA (acres)		68.71	

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 7.033

INPUT
Description: RM 7.033
Station Elevation Data num= 50

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1035	5003.7	1035.2	5007.5	1035.4	5011.1	1035.2	5016.5	1035
5020.3	1034	5020.7	1033.9	5021.2	1033.8	5022.4	1033.7	5022.6	1033.7
5023.1	1033.7	5023.5	1033.7	5042.6	1032.2	5042.9	1032.2	5044.3	1032.1
5046.9	1032	5049.5	1032	5054.4	1033	5059.5	1033.7	5062	1034.2
5063.5	1034.5	5064.4	1034.6	5064.5	1034.6	5067.1	1034.8	5067.3	1034.8
5069.9	1034.2	5084.7	1033.8	5088.7	1034	5098.2	1033.6	5105.6	1033.2
5107.9	1033	5109.3	1032.8	5110.7	1032.7	5111.5	1032.5	5123.1	1031.8
5124.1	1032.2	5126.7	1032.2	5130.3	1032.1	5135.8	1032.4	5138.9	1032.7
5139.4	1032.9	5141.4	1032.9	5143.2	1032.7	5148	1032.7	5152	1032.5
5159.4	1029	5159.9	1028.9	5671	1032	6500	1033	6911	1033.8

Manning's n Values num= 2

Sta	n Val	Sta	n Val
5000	.08	5152	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6911	32	32	32	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
5000	5067.1	1034.8

CROSS SECTION OUTPUT Profile #Q100-6h

			Left OB	Channel	Right OB
E.G. Elev (ft)	1032.99	Element			
Vel Head (ft)	0.01	Wt. n-Val.		0.035	
W.S. Elev (ft)	1032.98	Reach Len. (ft)	32.00	32.00	32.00
Crit W.S. (ft)	1030.73	Flow Area (sq ft)		1729.10	
E.G. Slope (ft/ft)	0.000323	Area (sq ft)		1741.60	
Q Total (cfs)	1541.00	Flow (cfs)		1541.00	
Top Width (ft)	1393.45	Top Width (ft)		1393.45	
Vel Total (ft/s)	0.89	Avg. Vel. (ft/s)		0.89	
Max Chl Dpth (ft)	4.08	Hydr. Depth (ft)		1.26	
Conv. Total (cfs)	85719.0	Conv. (cfs)		85719.0	
Length Wtd. (ft)	32.00	Wetted Per. (ft)		1372.92	
Min Ch El (ft)	1028.90	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)		0.02	

Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	96.08
C & E Loss (ft)	0.03	Cum SA (acres)	62.10

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 7.020

INPUT
Description: RM 7.020
Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1034	5010	1034.01	5020	1033.25	5030	1031.35	5040	1030.59
5060	1030.62	5080	1030.89	5100	1031.66	5120	1033.37	5125	1034
5130	1032.73	5140	1031.69	5150	1031.14	5156	1031.1	5329	1032
5576	1032.36	5673	1032.5	6076	1033	6404	1034	6500	1033.8

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.06	5125	.03	5576	.025

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6500	50	50	50	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
5000	5125	

CROSS SECTION OUTPUT Profile #Q100-6h

			Left OB	Channel	Right OB
E.G. Elev (ft)	1032.93	Element			
Vel Head (ft)	0.28	Wt. n-Val.		0.030	
W.S. Elev (ft)	1032.65	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	1032.65	Flow Area (sq ft)		359.79	
E.G. Slope (ft/ft)	0.012333	Area (sq ft)		492.67	
Q Total (cfs)	1541.00	Flow (cfs)		1541.00	
Top Width (ft)	747.81	Top Width (ft)		747.81	
Vel Total (ft/s)	4.28	Avg. Vel. (ft/s)		4.28	
Max Chl Dpth (ft)	2.06	Hydr. Depth (ft)		0.55	
Conv. Total (cfs)	13876.1	Conv. (cfs)		13876.1	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		659.53	
Min Ch El (ft)	1030.59	Shear (lb/sq ft)		0.42	
Alpha	1.00	Stream Power (lb/ft s)		1.80	
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)		95.26	
C & E Loss (ft)	0.08	Cum SA (acres)		61.32	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section..
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 7.007

INPUT
Description: RM 7.007 Blocked basin not used for conveyance
Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1034.1	5010	1033.95	5020	1033.18	5030	1031.04	5040	1030.37
5060	1030	5080	1030	5100	1030	5120	1032.28	5125	1033.48
5130	1032.55	5140	1031	5150	1031	5167	1030	5182	1028
5365	1028	5388	1025	5550	1025	5564	1028	5578	1031
5598	1031.3	5655	1032	5770	1031	6235	1030	6500	1030

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.06	5125	.03	5578	.025

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6500	80	80	80	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5125		5655	6500	

Blocked Obstructions num= 1

Sta L	Sta R	Elev
5174.5	5568	1029

CROSS SECTION OUTPUT Profile #Q100-6h

			Left OB	Channel	Right OB
E.G. Elev (ft)	1032.46	Element			
Vel Head (ft)	0.02	Wt. n-Val.		0.030	
W.S. Elev (ft)	1032.45	Reach Len. (ft)	80.00	80.00	80.00
Crit W.S. (ft)		Flow Area (sq ft)		1528.55	

E.G. Slope (ft/ft)	0.000090	Area (sq ft)	3381.15
Q Total (cfs)	1541.00	Flow (cfs)	1541.00
Top Width (ft)	1466.58	Top Width (ft)	1466.58
Vel Total (ft/s)	1.01	Avg. Vel. (ft/s)	1.01
Max Chl Dpth (ft)	3.59	Hydr. Depth (ft)	2.92
Conv. Total (cfs)	162510.8	Conv. (cfs)	162510.8
Length Wtd. (ft)	80.00	Wetted Per. (ft)	524.91
Min Ch El (ft)	1028.86	Shear (lb/sq ft)	0.02
Alpha	1.00	Stream Power (lb/ft s)	0.02
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	93.04
C & E Loss (ft)	0.00	Cum SA (acres)	60.04

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.993

INPUT
Description: RM 6.993 Blocked basin not used for conveyance
Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1033.4	5010	1033.75	5020	1033.08	5030	1031.08	5040	1030.26
5060	1030	5080	1030	5100	1030	5120	1030.66	5125	1031.85
5130	1032.33	5140	1031.7	5150	1031.27	5165	1030	5173	1028
5378	1028	5391	1025	5550	1025	5562	1028	5579	1032
5685	1032	6000	1031	6049	1030	6171	1030	6238	1030
6500	1030								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.06	5130	.03	5579	.02

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6500	120	120	120	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5130		5579	6500	

Blocked Obstructions num= 1

Sta L	Sta R	Elev
5169	5570.5	1029

CROSS SECTION OUTPUT Profile #Q100-6h

			Left OB	Channel	Right OB
E.G. Elev (ft)	1032.45	Element			
Vel Head (ft)	0.02	Wt. n-Val.		0.030	
W.S. Elev (ft)	1032.44	Reach Len. (ft)	120.00	120.00	120.00
Crit W.S. (ft)		Flow Area (sq ft)		1442.02	
E.G. Slope (ft/ft)	0.000098	Area (sq ft)		3191.93	
Q Total (cfs)	1541.00	Flow (cfs)		1541.00	
Top Width (ft)	1476.78	Top Width (ft)		1476.78	
Vel Total (ft/s)	1.07	Avg. Vel. (ft/s)		1.07	
Max Chl Dpth (ft)	3.44	Hydr. Depth (ft)		3.21	
Conv. Total (cfs)	155347.8	Conv. (cfs)		155347.8	
Length Wtd. (ft)	120.00	Wetted Per. (ft)		449.55	
Min Ch El (ft)	1029.00	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)		0.02	
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)		87.00	
C & E Loss (ft)	0.00	Cum SA (acres)		57.34	

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.980

INPUT
Description: RM 6.980
Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1033.04	5010	1032.92	5020	1032.23	5030	1030.45	5040	1028.98
5060	1029.01	5080	1030	5100	1030	5120	1030.08	5125	1031.9
5130	1032.85	5140	1031.7	5150	1031.24	5164	1030	5172	1028
5369	1028	5424	1031	5564	1032	5611	1032	5613	1033
5658	1034	6004	1034	6040	1031	6500	1030.5		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.06	5130	.03	5564	.02

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6500	260	260	260	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5130		5424	6500	

Blocked Obstructions num= 1

Sta L	Sta R	Elev

5168 5387.3 1029

CROSS SECTION OUTPUT Profile #Q100-6h

E.G. Elev (ft)	1032.43	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.030	
W.S. Elev (ft)	1032.38	Reach Len. (ft)	260.00	260.00	260.00
Crit W.S. (ft)		Flow Area (sq ft)		876.95	
E.G. Slope (ft/ft)	0.000288	Area (sq ft)		2046.59	
Q Total (cfs)	1541.00	Flow (cfs)		1541.00	
Top Width (ft)	1064.09	Top Width (ft)		1064.09	
Vel Total (ft/s)	1.76	Avg. Vel. (ft/s)		1.76	
Max Chl Dpth (ft)	3.40	Hydr. Depth (ft)		3.02	
Conv. Total (cfs)	90782.6	Conv. (cfs)		90782.6	
Length Wtd. (ft)	260.00	Wetted Per. (ft)		290.23	
Min Ch El (ft)	1028.98	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)		0.10	
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)		79.79	
C & E Loss (ft)	0.00	Cum SA (acres)		53.84	

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.932

INPUT
Description: RM 6.932
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1032.18	5010	1032.02	5020	1031.65	5030	1031.3	5040	1030.73
5060	1029.39	5080	1029.14	5100	1029.49	5120	1029.83	5125	1029.94
5130	1030.74	5140	1030.81	5150	1030.18	5163	1030	5170	1028
5358	1028	5375	1032	5536	1033	5628	1034	5663	1034
6500	1034								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.06	5130	.03	5375	.02

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6500	240	240	240	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
5000	5140	

Blocked Obstructions num= 1

Sta L	Sta R	Elev
5166.5	5362.25	1029

CROSS SECTION OUTPUT Profile #Q100-6h

E.G. Elev (ft)	1032.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.030	
W.S. Elev (ft)	1032.27	Reach Len. (ft)	240.00	240.00	240.00
Crit W.S. (ft)		Flow Area (sq ft)		724.09	
E.G. Slope (ft/ft)	0.000423	Area (sq ft)		1002.65	
Q Total (cfs)	1541.00	Flow (cfs)		1541.00	
Top Width (ft)	418.34	Top Width (ft)		418.34	
Vel Total (ft/s)	2.13	Avg. Vel. (ft/s)		2.13	
Max Chl Dpth (ft)	3.27	Hydr. Depth (ft)		2.60	
Conv. Total (cfs)	74931.2	Conv. (cfs)		74931.2	
Length Wtd. (ft)	240.00	Wetted Per. (ft)		278.85	
Min Ch El (ft)	1029.00	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)		0.15	
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)		70.69	
C & E Loss (ft)	0.00	Cum SA (acres)		49.42	

Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.885

INPUT
Description: RM 6.885
Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1031.6	5010	1031.57	5020	1031.36	5030	1031.15	5040	1030.92
5060	1030.12	5080	1029.67	5100	1029.65	5120	1029.75	5125	1029.96
5130	1031	5140	1030.44	5150	1030.13	5162	1030	5168	1028
5361	1028	5376	1032	5401	1032	5507	1033	5605	1034
5661	1034	6286	1034	6286	1031	6491	1030		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.06	5130	.03	5376	.02

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6491	240	240	240	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5130		5605	6491	

Blocked Obstructions num= 1

Sta L	Sta R	Elev
5165	5366	1029

CROSS SECTION OUTPUT Profile #Q100-6h

			Left OB	Channel	Right OB
E.G. Elev (ft)	1032.23	Element			
Vel Head (ft)	0.07	Wt. n-Val.		0.030	
W.S. Elev (ft)	1032.16	Reach Len. (ft)	240.00	240.00	240.00
Crit W.S. (ft)		Flow Area (sq ft)		722.65	
E.G. Slope (ft/ft)	0.000452	Area (sq ft)		1294.49	
Q Total (cfs)	1541.00	Flow (cfs)		1541.00	
Top Width (ft)	623.38	Top Width (ft)		623.38	
Vel Total (ft/s)	2.13	Avg. Vel. (ft/s)		2.13	
Max Chl Dpth (ft)	3.16	Hydr. Depth (ft)		2.51	
Conv. Total (cfs)	72476.4	Conv. (cfs)		72476.4	
Length Wtd. (ft)	240.00	Wetted Per. (ft)		288.96	
Min Ch El (ft)	1029.00	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)		0.15	
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)		64.36	
C & E Loss (ft)	0.00	Cum SA (acres)		46.55	

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.834

INPUT
Description: RM 6.834
Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1031.32	5010	1031.32	5020	1030.96	5030	1030.55	5040	1030.14
5060	1029.62	5080	1029.38	5100	1029.77	5120	1034.59	5125	1035
5130	1034.1	5140	1030	5150	1030	5160	1029.5	5163	1029.5
5167	1028	5360	1028	5403	1032	5515	1033	5620	1034
5660	1034	6295	1034	6295	1031	6490	1030		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.035	5140	.03	5403	.02

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6490	305	305	305	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5125		5620	6490	

Blocked Obstructions num= 1

Sta L	Sta R	Elev
5164.3	5370.75	1029

CROSS SECTION OUTPUT Profile #Q100-6h

			Left OB	Channel	Right OB
E.G. Elev (ft)	1032.13	Element			
Vel Head (ft)	0.07	Wt. n-Val.		0.030	
W.S. Elev (ft)	1032.06	Reach Len. (ft)	305.00	305.00	305.00
Crit W.S. (ft)		Flow Area (sq ft)		742.00	
E.G. Slope (ft/ft)	0.000450	Area (sq ft)		1247.87	
Q Total (cfs)	1541.00	Flow (cfs)		1541.00	
Top Width (ft)	579.05	Top Width (ft)		579.05	
Vel Total (ft/s)	2.08	Avg. Vel. (ft/s)		2.08	
Max Chl Dpth (ft)	3.06	Hydr. Depth (ft)		2.70	
Conv. Total (cfs)	72667.2	Conv. (cfs)		72667.2	
Length Wtd. (ft)	305.00	Wetted Per. (ft)		275.20	
Min Ch El (ft)	1029.00	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)		0.16	
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)		57.36	
C & E Loss (ft)	0.02	Cum SA (acres)		43.24	

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.782

INPUT
Description: RM 6.782
Station Elevation Data num= 80

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1032	5003.5	1032	5004.7	1032	5005.2	1032	5008.3	1031.7
5015.3	1031	5019.5	1030.5	5019.8	1030.5	5024.4	1030.9	5028.6	1030.7
5035.6	1030.3	5038.5	1030.2	5038.9	1030.2	5041.6	1029.9	5043.1	1029.9
5051.3	1029.8	5052.2	1029.9	5054.1	1029.8	5057.9	1029.6	5063	1029.7

5064.5	1029.6	5066.7	1029.6	5069.2	1029.6	5069.4	1029.6	5074.5	1029.6
5075.5	1029.6	5078.1	1029.5	5078.8	1029.6	5079.9	1029.6	5092.6	1029.4
5093	1029.3	5093.4	1029.3	5095.6	1029.3	5104.9	1029	5106.2	1028.9
5109.4	1028.9	5113.6	1028.9	5120	1028.9	5125.6	1029.2	5126.6	1029.2
5128.4	1029.2	5133.7	1029.5	5136.5	1029.6	5143.7	1029.8	5150	1030
5152.9	1030.3	5155.8	1030.3	5161.5	1030.6	5162.2	1030.7	5171.5	1031
5172.8	1031	5173.3	1031	5176.3	1028.6	5179	1025.9	5179.6	1025.3
5180.3	1024.6	5180.4	1024.4	5181	1024.5	5185.8	1025.2	5196.9	1026.9
5203	1027.8	5203.2	1027.8	5205.7	1028.5	5212.3	1031.3	5213.4	1031.2
5219.2	1031.2	5224.7	1031	5233.3	1030.8	5242	1028	5255	1027
5362	1027	5372	1028	5391	1032	5432	1032	5537	1033
5627	1034	5662	1034	6297	1034	6297	1031	6497	1030

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.035	5176.3	.03	5391	.02

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6497	104	104	104	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5212.3		5627	6497	

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5171.5	5212.3	1031.3	5238.9	5376.75	1029

CROSS SECTION OUTPUT Profile #Q100-6h

E.G. Elev (ft)	1031.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.23	Wt. n-Val.		0.030	
W.S. Elev (ft)	1031.62	Reach Len. (ft)	104.00	104.00	104.00
Crit W.S. (ft)		Flow Area (sq ft)		399.56	
E.G. Slope (ft/ft)	0.002055	Area (sq ft)		925.82	
Q Total (cfs)	1541.00	Flow (cfs)		1541.00	
Top Width (ft)	580.14	Top Width (ft)		580.14	
Vel Total (ft/s)	3.86	Avg. Vel. (ft/s)		3.86	
Max Chl Dpth (ft)	2.72	Hydr. Depth (ft)		2.26	
Conv. Total (cfs)	33995.4	Conv. (cfs)		33995.4	
Length Wtd. (ft)	104.00	Wetted Per. (ft)		177.48	
Min Ch El (ft)	1028.90	Shear (lb/sq ft)		0.29	
Alpha	1.00	Stream Power (lb/ft s)		1.11	
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)		49.75	
C & E Loss (ft)	0.00	Cum SA (acres)		39.18	

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.753

INPUT
Description: RM 6.753
Station Elevation Data num= 79

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1031.45	5003.5	1031.45	5004.7	1031.45	5005.2	1031.45	5008.3	1031.15
5015.3	1030.45	5019.5	1029.95	5019.8	1029.95	5024.4	1030.35	5028.6	1030.15
5035.6	1029.75	5038.5	1029.65	5038.9	1029.65	5041.6	1029.35	5043.1	1029.35
5051.3	1029.25	5052.2	1029.35	5054.1	1029.25	5057.9	1029.05	5063	1029.15
5064.5	1029.05	5066.7	1029.05	5069.2	1029.05	5069.4	1029.05	5074.5	1029.05
5075.5	1029.05	5078.1	1028.95	5078.8	1029.05	5079.9	1029.05	5092.6	1028.85
5093	1028.75	5093.4	1028.75	5095.6	1028.75	5104.9	1028.45	5106.2	1028.35
5109.4	1028.35	5113.6	1028.35	5120	1028.35	5125.6	1028.65	5126.6	1028.65
5128.4	1028.65	5133.7	1028.95	5136.5	1029.05	5143.7	1029.25	5150	1029.45
5152.9	1029.75	5155.8	1029.75	5161.5	1030.05	5162.2	1030.15	5171.5	1030.45
5172.8	1030.45	5173.3	1030.45	5176.3	1028.05	5179	1025.35	5179.6	1024.75
5180.3	1024.05	5180.4	1023.85	5181	1023.95	5185.8	1024.65	5196.9	1026.35
5203	1027.25	5203.2	1027.25	5205.7	1027.95	5212.3	1030.75	5216.42	1031.15
5225.06	1031.32	5233.97	1030.99	5243	1029	5245	1028	5250	1027
5254	1027	5379	1027	5404	1032	5504	1033	5634	1034
5669	1034	6304	1034	6304	1031	6499	1030		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.035	5176.3	.03	5404	.02

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6499	208	208	208	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5225.06		5634	6499	

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5171.5	5212.3	1030.75	5243	5389	1029

CROSS SECTION OUTPUT Profile #Q100-6h

E.G. Elev (ft)	1031.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.27	Wt. n-Val.		0.030	
W.S. Elev (ft)	1031.34	Reach Len. (ft)	208.00	208.00	208.00

Crit W.S. (ft)		Flow Area (sq ft)	368.43
E.G. Slope (ft/ft)	0.002664	Area (sq ft)	889.33
Q Total (cfs)	1541.00	Flow (cfs)	1541.00
Top Width (ft)	589.30	Top Width (ft)	589.30
Vel Total (ft/s)	4.18	Avg. Vel. (ft/s)	4.18
Max Chl Dpth (ft)	2.99	Hydr. Depth (ft)	2.10
Conv. Total (cfs)	29854.0	Conv. (cfs)	29854.0
Length Wtd. (ft)	208.00	Wetted Per. (ft)	176.07
Min Ch El (ft)	1028.35	Shear (lb/sq ft)	0.35
Alpha	1.00	Stream Power (lb/ft s)	1.46
Frctn Loss (ft)	0.30	Cum Volume (acre-ft)	47.58
C & E Loss (ft)	0.05	Cum SA (acres)	37.78

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.723

INPUT
Description: RM 6.723
Station Elevation Data num= 63

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1030.9	5006.5	1031	5008.6	1031.2	5008.9	1031.2	5010.9	1031.1
5013.5	1030.6	5016.5	1030.2	5017.3	1030.2	5017.7	1030.1	5018.4	1030.2
5022.2	1030.6	5028.5	1030.3	5034.2	1030	5048.4	1029.8	5056.6	1030
5059.1	1029.6	5069	1028.7	5071.3	1028.5	5079.7	1029.1	5095.1	1030.2
5101.4	1031.4	5103.2	1031.7	5103.8	1031.8	5104.2	1031.8	5107.3	1032.4
5109.7	1032	5112	1031.7	5113.9	1031.2	5114.9	1030.3	5118.3	1027.4
5125.9	1028.9	5131.5	1028.8	5132.7	1029.9	5134.7	1029.9	5137.4	1029.8
5143.6	1030.1	5147.6	1030.4	5158.3	1030.8	5162.9	1030.9	5169	1030.9
5171	1029.7	5174.4	1027.6	5175.7	1027	5177	1026.3	5180	1024.6
5184.6	1025.1	5195.8	1026.1	5199.6	1026.5	5209.8	1031.3	5210.9	1031.9
5211.4	1031.9	5211.8	1031.9	5217.8	1031.8	5225.5	1031.7	5237.53	1028
5242.54	1027	5482	1027	5577	1033	5625	1034	5667	1034
6297	1034	6297	1031	6497	1030				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.035	5147.6	.03	5625	.02

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6497	143	143	143	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5210.9	1031.9	5625	6497	

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5162.9	5210.9	1031	5234.3	5513.7	1029

CROSS SECTION OUTPUT Profile #Q100-6h

			Left OB	Channel	Right OB
E.G. Elev (ft)	1031.25	Element			
Vel Head (ft)	0.09	Wt. n-Val.		0.030	
W.S. Elev (ft)	1031.17	Reach Len. (ft)	143.00	143.00	143.00
Crit W.S. (ft)	1029.97	Flow Area (sq ft)		650.20	
E.G. Slope (ft/ft)	0.000894	Area (sq ft)		985.73	
Q Total (cfs)	1541.00	Flow (cfs)		1541.00	
Top Width (ft)	715.19	Top Width (ft)		715.19	
Vel Total (ft/s)	2.37	Avg. Vel. (ft/s)		2.37	
Max Chl Dpth (ft)	3.77	Hydr. Depth (ft)		2.03	
Conv. Total (cfs)	51541.3	Conv. (cfs)		51541.3	
Length Wtd. (ft)	143.00	Wetted Per. (ft)		321.14	
Min Ch El (ft)	1027.40	Shear (lb/sq ft)		0.11	
Alpha	1.00	Stream Power (lb/ft s)		0.27	
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)		43.10	
C & E Loss (ft)	0.01	Cum SA (acres)		34.67	

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.696

INPUT
Description: RM 6.696
Station Elevation Data num= 64

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1030.7	5005.9	1030.7	5007	1030.7	5007.4	1030.6	5008.1	1030.6
5015.3	1030.1	5017.7	1030.1	5018.2	1029.9	5020.7	1030.2	5022.5	1030.3
5033	1029.4	5035.9	1029.4	5053.7	1029.7	5058.9	1029.8	5061	1029.9
5065.7	1029.2	5085.8	1026.8	5088.1	1026.5	5089.3	1026.4	5089.9	1026.3
5090.4	1026.5	5094	1028.1	5103.9	1031.4	5114.5	1031.3	5115.7	1031.3
5117	1027.4	5117.5	1027.3	5124.2	1026.5	5125.1	1026.8	5130.5	1028.2
5132.3	1028.8	5135.2	1029.5	5136.2	1029.5	5144.8	1028.9	5149.9	1029
5151	1029.1	5153.2	1029.2	5158	1029.4	5164.3	1029.7	5167.2	1029.8

5172.1	1029.9	5176.7	1027.3	5181.1	1024.6	5195.9	1025.4	5197.6	1025.4
5200.9	1025.6	5205.6	1028.6	5209.8	1031	5211.5	1031	5216	1030.9
5217	1030.9	5224.8	1031	5225.9	1031.1	5226.8	1031.1	5227.1	1030.9
5239	1029	5249	1027	5579	1027	5609	1033	5659	1034
5684	1034	6314	1034	6314	1031	6500	1030		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.035	5149.9	.03	5609	.02

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6500	280	280	280	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5209.8	1031.4	5659	6500	1034

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5167.2	5205.6	1030	5239	5589	1029

CROSS SECTION OUTPUT Profile #Q100-6h

E.G. Elev (ft)	1031.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.030	
W.S. Elev (ft)	1031.07	Reach Len. (ft)	280.00	280.00	280.00
Crit W.S. (ft)	1029.84	Flow Area (sq ft)		749.43	
E.G. Slope (ft/ft)	0.000718	Area (sq ft)		1206.15	
Q Total (cfs)	1541.00	Flow (cfs)		1541.00	
Top Width (ft)	771.16	Top Width (ft)		771.16	
Vel Total (ft/s)	2.06	Avg. Vel. (ft/s)		2.06	
Max Chl Dpth (ft)	4.77	Hydr. Depth (ft)		1.93	
Conv. Total (cfs)	57507.6	Conv. (cfs)		57507.6	
Length Wtd. (ft)	280.00	Wetted Per. (ft)		388.64	
Min Ch El (ft)	1026.30	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)		0.18	
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)		39.51	
C & E Loss (ft)	0.00	Cum SA (acres)		32.23	

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.649

INPUT
Description: RM 6.649
Station Elevation Data num= 59

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1030.7	5005.9	1030.7	5007	1030.7	5007.4	1030.6	5008.1	1030.6
5015.3	1030.1	5017.7	1030.1	5018.2	1029.9	5020.7	1030.2	5022.5	1030.3
5033	1029.4	5035.9	1029.4	5053.7	1029.7	5058.9	1029.8	5061	1029.9
5065.7	1029.2	5085.8	1026.8	5088.1	1026.5	5089.3	1026.4	5089.9	1026.3
5090.4	1026.5	5094	1028.1	5103.9	1031.4	5114.5	1031.3	5115.7	1031.3
5117	1027.4	5117.5	1027.3	5124.2	1026.5	5125.1	1026.8	5130.5	1028.2
5132.3	1028.8	5135.2	1029.5	5136.2	1029.5	5144.8	1028.9	5149.9	1029
5151	1029.1	5153:2	1029.2	5158	1029.4	5164.3	1029.7	5167.2	1029.8
5172.1	1029.9	5176.7	1027.3	5181.1	1024.6	5195.9	1025.4	5197.6	1025.4
5200.9	1025.6	5205.6	1030.2	5216.07	1030.3	5226.67	1030.2	5235	1028
5241	1027	5586	1027	5606	1032	5641	1033	5661	1034
5686	1034	6316	1034	6316	1031	6500	1030		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.035	5149.9	.03	5606	.02

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6500	220	220	220	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5216.07	1031.4	5661	6500	1034

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5167.2	5205.6	1030	5231.2	5594	1029

CROSS SECTION OUTPUT Profile #Q100-6h

E.G. Elev (ft)	1030.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.		0.030	
W.S. Elev (ft)	1030.82	Reach Len. (ft)	220.00	220.00	220.00
Crit W.S. (ft)	1029.82	Flow Area (sq ft)		676.96	
E.G. Slope (ft/ft)	0.000997	Area (sq ft)		1044.51	
Q Total (cfs)	1541.00	Flow (cfs)		1541.00	
Top Width (ft)	737.70	Top Width (ft)		737.70	
Vel Total (ft/s)	2.28	Avg. Vel. (ft/s)		2.28	
Max Chl Dpth (ft)	4.52	Hydr. Depth (ft)		1.76	
Conv. Total (cfs)	48798.1	Conv. (cfs)		48798.1	
Length Wtd. (ft)	220.00	Wetted Per. (ft)		385.57	
Min Ch El (ft)	1026.30	Shear (lb/sq ft)		0.11	
Alpha	1.00	Stream Power (lb/ft s)		0.25	
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)		32.27	

C & E Loss (ft)	0.01	Cum SA (acres)	27.38

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.601

INPUT
Description: RM 6.601
Station Elevation Data num= 53

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1030.5	5002.7	1030.6	5005.6	1030.8	5013.7	1030.2	5014.4	1030.2
5017	1030.1	5031.2	1029.9	5036.3	1029	5036.9	1028.9	5038	1028.7
5041.9	1028.1	5045.6	1028	5058.3	1026.9	5058.7	1026.9	5076.6	1026
5082.7	1025.8	5086.7	1025.6	5087.4	1026.3	5094.8	1028.1	5105.5	1030.7
5114.9	1031.1	5115.1	1031.1	5116.3	1031.1	5136.7	1030.8	5139.5	1030.8
5140.6	1030.6	5141.6	1030.4	5148.7	1028.9	5148.9	1028.9	5149	1028.9
5159.1	1029	5164.5	1029	5181.9	1029	5186.4	1027.3	5188.9	1024.9
5189.2	1024.7	5190.1	1024.7	5192.3	1024.7	5203.2	1025.1	5210.7	1025.2
5213.8	1026.9	5217.6	1029	5230.6	1028.56	5241.44	1028	5251	1028
5258	1027	5601	1027	5631	1033	5651	1033	5673	1034
6336	1034	6336	1031	6500	1030				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.035	5149	.03	5631	.02

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6500	141	141	141	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5114.9	1031.1	5673	6500	1034

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5181.9	5217.6	1029	5217.6	5611	1029

CROSS SECTION OUTPUT Profile #Q100-6h

			Left OB	Channel	Right OB
E.G. Elev (ft)	1030.68	Element			
Vel Head (ft)	0.06	Wt. n-Val.		0.030	
W.S. Elev (ft)	1030.62	Reach Len. (ft)	141.00	141.00	141.00
Crit W.S. (ft)	1029.69	Flow Area (sq ft)		763.20	
E.G. Slope (ft/ft)	0.000890	Area (sq ft)		1040.14	
Q Total (cfs)	1541.00	Flow (cfs)		1541.00	
Top Width (ft)	680.50	Top Width (ft)		680.50	
Vel Total (ft/s)	2.02	Avg. Vel. (ft/s)		2.02	
Max Chl Dpth (ft)	5.02	Hydr. Depth (ft)		1.59	
Conv. Total (cfs)	51640.2	Conv. (cfs)		51640.2	
Length Wtd. (ft)	141.00	Wetted Per. (ft)		478.95	
Min Ch El (ft)	1025.60	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)		0.18	
Frctn Loss (ft)	0.14	Cum Volume (acre-ft)		27.01	
C & E Loss (ft)	0.00	Cum SA (acres)		23.80	

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.575

INPUT
Description: RM 6.575
Station Elevation Data num= 56

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1030.5	5002.7	1030.6	5005.6	1030.8	5013.7	1030.2	5014.4	1030.2
5017	1030.1	5031.2	1029.9	5036.3	1029	5036.9	1028.9	5038	1028.7
5041.9	1028.1	5045.6	1028	5058.3	1026.9	5058.7	1026.9	5076.6	1026
5082.7	1025.8	5086.7	1025.6	5087.4	1026.3	5094.8	1028.1	5105.5	1030.7
5114.9	1031.1	5115.1	1031.1	5116.3	1031.1	5136.7	1030.8	5139.5	1030.8
5140.6	1030.6	5141.6	1030.4	5148.7	1028.9	5148.9	1028.9	5149	1028.9
5159.1	1029	5164.5	1029	5181.9	1029	5186.4	1027.3	5188.9	1024.9
5189.2	1024.7	5190.1	1024.7	5192.3	1024.7	5203.2	1025.1	5210.7	1025.2
5213.8	1026.9	5217.6	1029	5228.46	1028.61	5240.78	1028	5244	1028
5259	1028	5264	1027	5616	1027	5641	1033	5674	1033
5714	1034	6249	1034	6284	1033	6319	1032	6424	1030
6500	1029.6								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.035	5149	.03	5674	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6500	132	132	132	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5114.9	1031.1	5714	6500	1034

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5181.9	5217.6	1029	5217.6	5624.3	1029

CROSS SECTION OUTPUT Profile #Q100-6h

E.G. Elev (ft)	1030.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.030	
W.S. Elev (ft)	1030.47	Reach Len. (ft)	132.00	132.00	132.00
Crit W.S. (ft)	1029.68	Flow Area (sq ft)		707.65	
E.G. Slope (ft/ft)	0.001180	Area (sq ft)		994.19	
Q Total (cfs)	1541.00	Flow (cfs)		1541.00	
Top Width (ft)	683.99	Top Width (ft)		683.99	
Vel Total (ft/s)	2.18	Avg. Vel. (ft/s)		2.18	
Max Chl Dpth (ft)	4.87	Hydr. Depth (ft)		1.45	
Conv. Total (cfs)	44861.8	Conv. (cfs)		44861.8	
Length Wtd. (ft)	132.00	Wetted Per. (ft)		489.51	
Min Ch El (ft)	1025.60	Shear (lb/sq ft)		0.11	
Alpha	1.00	Stream Power (lb/ft s)		0.23	
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)		23.71	
C & E Loss (ft)	0.01	Cum SA (acres)		21.59	

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.549

INPUT
Description: RM 6.549, HEC-1 RSSF2B Q=2022 CFS
Station Elevation Data num= 53

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1030.6	5007.3	1029.5	5022.3	1026.1	5024.5	1025.5	5024.7	1025.5
5026	1025.4	5048.2	1025.7	5049.4	1025.7	5063.1	1026.2	5065.7	1026.4
5068.3	1026.5	5079.5	1026	5088.9	1025.5	5093	1026.3	5095	1026.5
5098.1	1026.9	5101.4	1027.5	5105.6	1027.4	5110.1	1027.3	5116.7	1027.4
5132.6	1027.8	5134.8	1027.9	5141.2	1028.1	5145.3	1028.1	5147.9	1028.3
5148.7	1028.4	5154.6	1029	5157.8	1029.3	5161.8	1028.6	5168.4	1027.4
5171.7	1027.3	5173.7	1027.3	5177.8	1027.6	5185.6	1028.2	5199.1	1029.1
5202.6	1026.6	5204	1025.7	5207.2	1025.7	5220	1025.7	5230.2	1025.7
5232.9	1026.5	5242.6	1029	5258.8	1029	5270	1028	5282	1026
5682	1026	5715	1031	5725	1032	5820	1033	5865	1027
6097	1027	6240	1031	6500	1031.7				

Manning's n Values num= 2

Sta	n Val	Sta	n Val
5000	.035	5177.8	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6500	90	90	90	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5258.8	1029	5820	6500	1033

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5199.1	5242.6	1029	5258.8	5701.8	1029

CROSS SECTION OUTPUT Profile #Q100-6h

E.G. Elev (ft)	1030.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.033	
W.S. Elev (ft)	1030.42	Reach Len. (ft)	90.00	90.00	90.00
Crit W.S. (ft)	1029.13	Flow Area (sq ft)		1350.39	
E.G. Slope (ft/ft)	0.000382	Area (sq ft)		2395.25	
Q Total (cfs)	2022.00	Flow (cfs)		2022.00	
Top Width (ft)	1089.67	Top Width (ft)		1089.67	
Vel Total (ft/s)	1.50	Avg. Vel. (ft/s)		1.50	
Max Chl Dpth (ft)	5.02	Hydr. Depth (ft)		1.90	
Conv. Total (cfs)	103389.2	Conv. (cfs)		103389.2	
Length Wtd. (ft)	90.00	Wetted Per. (ft)		711.12	
Min Ch El (ft)	1025.40	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)		0.07	
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)		18.58	
C & E Loss (ft)	0.02	Cum SA (acres)		18.90	

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.532

INPUT
Description: RM 6.532, 75th Avenue
Station Elevation Data num= 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1031.47	5011.81	1031.25	5025.42	1031	5038.8	1030.75	5052.52	1030.5

5065.81	1030.25	5076.53	1030	5092.08	1029.75	5117.39	1029.5	5175.92	1029.25
5206.36	1029.07	5274.03	1029.25	5322.19	1029.5	5364.83	1029.75	5443.48	1030.13
5536.49	1030	5577.13	1030	5617.6	1029.75	5659.46	1029.5	5689.18	1029.35
5745.76	1029.36	5799.79	1029.45	5831.72	1029.39	5834.61	1029.45	5840.5	1029.5
5845.72	1029.54	5849.54	1029.5	5865.18	1029.26	5906.08	1029.5	5911.43	1029.56
5983.21	1029.75	6030	1030	6082.45	1029.9	6223.06	1030	6290.28	1030.02
6306.41	1030.06	6317.44	1030.14	6323.47	1030.05	6345.02	1030.25	6440.57	1030.5
6530.89	1030.75	6601.42	1031	6661.53	1031.18	6721.28	1031.16	6740.62	1031.25
6799.2	1031.46								

Manning's n Values num= 1

Sta	n Val
5000	.02

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6799.2	135	135	135	.1	.3

CROSS SECTION OUTPUT Profile #Q100-6h

			Left OB	Channel	Right OB
E.G. Elev (ft)	1030.34	Element			
Vel Head (ft)	0.21	Wt. n-Val.		0.020	
W.S. Elev (ft)	1030.14	Reach Len. (ft)	135.00	135.00	135.00
Crit W.S. (ft)	1030.14	Flow Area (sq ft)		553.59	
E.G. Slope (ft/ft)	0.007244	Area (sq ft)		553.59	
Q Total (cfs)	2022.00	Flow (cfs)		2022.00	
Top Width (ft)	1260.95	Top Width (ft)		1260.95	
Vel Total (ft/s)	3.65	Avg. Vel. (ft/s)		3.65	
Max Chl Dpth (ft)	1.07	Hydr. Depth (ft)		0.44	
Conv. Total (cfs)	23757.8	Conv. (cfs)		23757.8	
Length Wtd. (ft)		Wetted Per. (ft)		1260.96	
Min Ch El (ft)	1029.07	Shear (lb/sq ft)		0.20	
Alpha	1.00	Stream Power (lb/ft s)		0.73	
Frctn Loss (ft)		Cum Volume (acre-ft)		15.53	
C & E Loss (ft)		Cum SA (acres)		16.47	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: The user has entered a known water surface elevation at this cross section.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.506

INPUT
Description: RM 6.506
Station Elevation Data num= 120

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1030.2	5002.5	1030.2	5003.3	1030.7	5005.1	1031.4	5010.7	1029.8
5011.6	1029.7	5039.2	1028	5051.6	1029.1	5055.7	1029.4	5059.1	1029.1
5098.8	1029.3	5105	1029.3	5109.3	1029.2	5154.5	1028.2	5159.5	1027.4
5160.6	1027.6	5173.3	1027.7	5205.4	1028	5205.9	1028	5211.4	1028.2
5245.5	1028.7	5266.7	1028.9	5301.2	1028.2	5305.6	1028	5308.3	1027.8
5315.3	1026.5	5319.8	1025.8	5326	1027.3	5331.5	1028.6	5332.6	1028.6
5340.7	1028.7	5350.3	1028.8	5355.1	1028.9	5357.2	1028.9	5373.4	1029.5
5384.6	1029.5	5390.9	1029.6	5400.7	1029.2	5405	1029.1	5405.2	1029.1
5410.9	1029.1	5429.8	1029.2	5434	1029.2	5447.7	1028.7	5454.3	1028.6
5457.3	1028.5	5464.4	1028.6	5467.8	1026.3	5468	1026.1	5469.1	1026.1
5491.6	1024.9	5492.8	1025.4	5500.2	1028.9	5502.7	1028.8	5520.9	1029.3
5521.7	1029.4	5522.3	1029.4	5531.4	1029	5534.5	1028.6	5551.9	1027.3
5554.4	1027	5593.9	1027.4	5605	1027.4	5609.2	1027.4	5655	1027.7
5659.1	1027.7	5705	1027.5	5709.1	1027.5	5755	1027.3	5767.8	1027.6
5807	1027.8	5814.7	1028.4	5834.8	1027.6	5838.3	1027.5	5849.8	1027.5
5855.7	1027.4	5856.7	1027.5	5860.4	1027.4	5874.4	1027.1	5895.9	1027.5
5905.1	1027.7	5951.5	1027.9	5955.1	1027.9	5958.6	1028	6005.1	1028
6008.5	1028	6055	1027.9	6058.4	1027.9	6105	1028	6151.9	1028
6155	1028	6202	1027.9	6205	1027.9	6208.1	1027.9	6255.1	1028
6302.3	1028.3	6305.1	1028.3	6333.6	1028.4	6341.3	1028.5	6344	1028.5
6355.1	1028.6	6355.4	1028.6	6360	1029.1	6371.8	1029.1	6377.9	1029.2
6383.9	1028.4	6393.2	1027.5	6403.5	1026.2	6407.1	1025.9	6420.1	1025.3
6426.5	1024.9	6434.2	1024.8	6452.5	1024.6	6453.9	1024.5	6454.5	1024.5
6457	1024.5	6504.5	1024.5	6506.2	1024.5	6545.1	1024.9	6546.7	1024.8

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.04	5390.9	.03	5534.5	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6546.7	500	500	500	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
6260	6546.7	1030

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5464.4	5500.2	1028.5	6377.9	6546.7	1030

CROSS SECTION OUTPUT Profile #Q100-6h

E.G. Elev (ft)	1028.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.035	
W.S. Elev (ft)	1028.67	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)	1028.29	Flow Area (sq ft)		808.11	
E.G. Slope (ft/ft)	0.004221	Area (sq ft)		843.54	
Q Total (cfs)	2022.00	Flow (cfs)		2022.00	
Top Width (ft)	1062.53	Top Width (ft)		1062.53	
Vel Total (ft/s)	2.50	Avg. Vel. (ft/s)		2.50	
Max Chl Dpth (ft)	2.87	Hydr. Depth (ft)		0.84	
Conv. Total (cfs)	31122.1	Conv. (cfs)		31122.1	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		967.33	
Min Ch El (ft)	1025.80	Shear (lb/sq ft)		0.22	
Alpha	1.00	Stream Power (lb/ft s)		0.55	
Frctn Loss (ft)	0.70	Cum Volume (acre-ft)		13.37	
C & E Loss (ft)	0.02	Cum SA (acres)		12.87	

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.412

INPUT
Description: RM 6.412 END OF REACH TOLLESON 1
Station Elevation Data num= 103

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1028.7	5006.5	1028.8	5017.7	1027.3	5018.5	1027.2	5022.4	1028.4
5024.8	1029.2	5025.4	1029.2	5031.8	1029.6	5044	1029.8	5060.9	1029.8
5095.5	1029.7	5128.8	1029.6	5136.6	1026.5	5138.1	1026	5170.4	1026
5173.9	1026	5174.9	1026	5189.2	1025.9	5200.2	1025.8	5224.1	1026.3
5224.9	1026.3	5366.1	1025.4	5384.4	1025.4	5410.6	1025.2	5435.5	1025.1
5445.6	1026.5	5446.1	1026.5	5447.6	1026.7	5453.1	1027.1	5465.9	1027.8
5467.9	1026.6	5469.5	1025.9	5474.7	1025.7	5490.6	1025.3	5492.6	1025.9
5496.4	1027.1	5503.5	1027.1	5518.3	1027.1	5521.9	1027.1	5549.6	1026.6
5575.2	1026.3	5606.9	1026.8	5625.3	1026.9	5645.1	1026.9	5675.3	1026.8
5703.2	1026.8	5725.3	1026.5	5751.3	1026.5	5775.4	1026.5	5799.4	1026.2
5825.4	1026.4	5837.2	1026.1	5846.5	1026.1	5862	1025.9	5867.9	1026.2
5871.1	1026.3	5875.4	1026.4	5879.4	1026.4	5880.1	1026.4	5880.6	1026.4
5881.6	1026.4	5898.2	1026.1	5918.5	1026.5	5925.5	1026.9	5957.8	1026.7
5975.5	1026.8	6009.9	1026.9	6025.6	1026.9	6062.1	1026.6	6075.6	1026.5
6114.2	1027	6125.7	1027.1	6166.3	1027.3	6175.7	1027.4	6218.4	1026.8
6225.7	1026.8	6270.6	1027.2	6275.8	1027.2	6280.6	1027.2	6325.8	1027.3
6327.2	1027.3	6366.4	1026.9	6375.7	1027.1	6375.8	1027.1	6376.7	1027.1
6382.3	1027.4	6383.4	1027.4	6386	1027.3	6394	1027.3	6402.3	1027.3
6410.1	1027.2	6413.8	1027.3	6425.4	1027.4	6425.9	1027.4	6433.9	1026.9
6446.9	1027.4	6450.7	1027.7	6459.4	1027.9	6521.2	1028.4	6526	1028.4
6569.3	1028.4	6576	1028.5	6600	1028.9				

Manning's n Values num= 2

Sta	n Val	Sta	n Val
5000	.03	5521.9	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6600	500	500	500	.1	.3

Left Levee Station= 5006.5 Elevation= 1028.8
Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
5050	5130	1035	5260	5430	1035	5465.9	5496.4	1027.1

CROSS SECTION OUTPUT Profile #Q100-6h

E.G. Elev (ft)	1028.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.033	
W.S. Elev (ft)	1028.02	Reach Len. (ft)			
Crit W.S. (ft)	1027.12	Flow Area (sq ft)		1485.69	
E.G. Slope (ft/ft)	0.000688	Area (sq ft)		1485.69	
Q Total (cfs)	2022.00	Flow (cfs)		2022.00	
Top Width (ft)	1180.30	Top Width (ft)		1180.30	
Vel Total (ft/s)	1.36	Avg. Vel. (ft/s)		1.36	
Max Chl Dpth (ft)	2.92	Hydr. Depth (ft)		1.26	
Conv. Total (cfs)	77074.0	Conv. (cfs)		77074.0	
Length Wtd. (ft)		Wetted Per. (ft)		1186.15	
Min Ch El (ft)	1025.10	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)		0.07	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Warning: Divided flow computed for this cross-section.

SUMMARY OF MANNING'S N VALUES

River:Southern Pacific

Reach	River Sta.	n1	n2	n3

Tolleson 1	7.287	.08	.035	.04
Tolleson 1	7.264	.08	.035	
Tolleson 1	7.227	.08	.035	
Tolleson 1	7.169	.08	.035	
Tolleson 1	7.074	.08	.035	
Tolleson 1	7.033	.08	.035	
Tolleson 1	7.020	.06	.03	.025
Tolleson 1	7.007	.06	.03	.025
Tolleson 1	6.993	.06	.03	.02
Tolleson 1	6.980	.06	.03	.02
Tolleson 1	6.932	.06	.03	.02
Tolleson 1	6.885	.06	.03	.02
Tolleson 1	6.834	.035	.03	.02
Tolleson 1	6.782	.035	.03	.02
Tolleson 1	6.753	.035	.03	.02
Tolleson 1	6.723	.035	.03	.02
Tolleson 1	6.696	.035	.03	.02
Tolleson 1	6.649	.035	.03	.02
Tolleson 1	6.601	.035	.03	.02
Tolleson 1	6.575	.035	.03	.035
Tolleson 1	6.549	.035	.03	
Tolleson 1	6.532	.02		
Tolleson 1	6.506	.04	.03	.035
Tolleson 1	6.412	.03	.035	

SUMMARY OF REACH LENGTHS

River: Southern Pacific

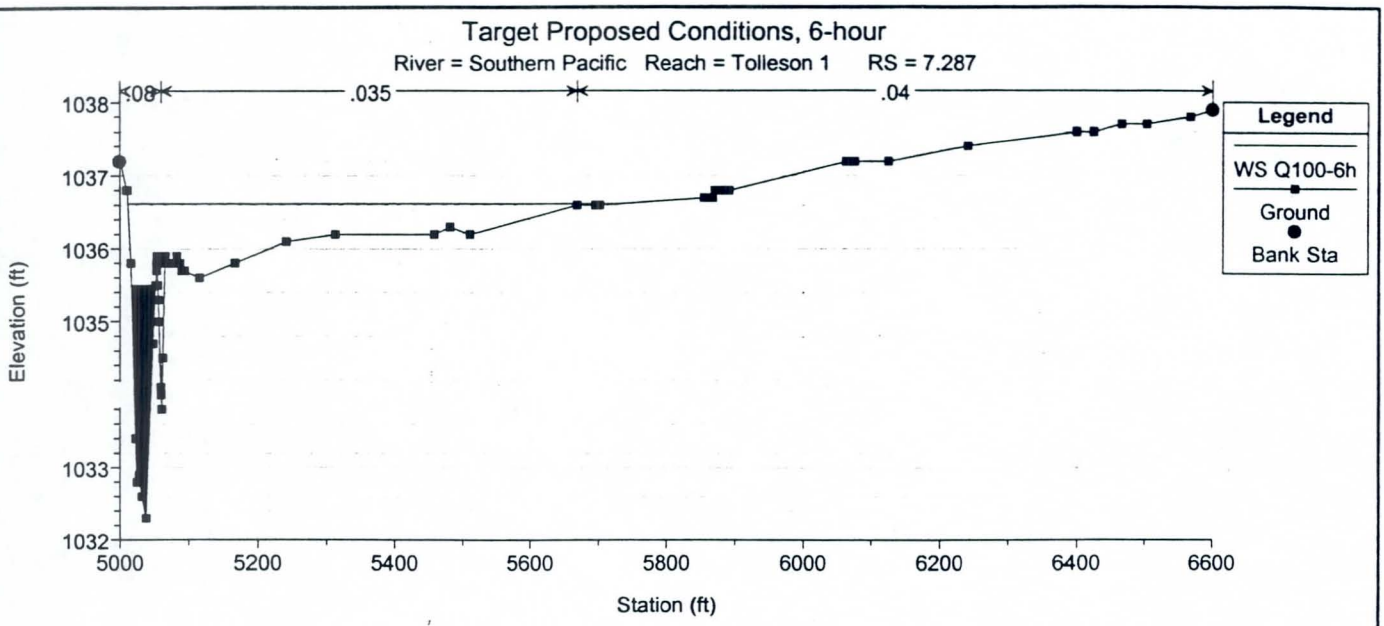
Reach	River Sta.	Left	Channel	Right
Tolleson 1	7.287	124	124	124
Tolleson 1	7.264	192	192	192
Tolleson 1	7.227	308	308	308
Tolleson 1	7.169	500	500	500
Tolleson 1	7.074	218	218	218
Tolleson 1	7.033	32	32	32
Tolleson 1	7.020	50	50	50
Tolleson 1	7.007	80	80	80
Tolleson 1	6.993	120	120	120
Tolleson 1	6.980	260	260	260
Tolleson 1	6.932	240	240	240
Tolleson 1	6.885	240	240	240
Tolleson 1	6.834	305	305	305
Tolleson 1	6.782	104	104	104
Tolleson 1	6.753	208	208	208
Tolleson 1	6.723	143	143	143
Tolleson 1	6.696	280	280	280
Tolleson 1	6.649	220	220	220
Tolleson 1	6.601	141	141	141
Tolleson 1	6.575	132	132	132
Tolleson 1	6.549	90	90	90
Tolleson 1	6.532	135	135	135
Tolleson 1	6.506	500	500	500
Tolleson 1	6.412	500	500	500

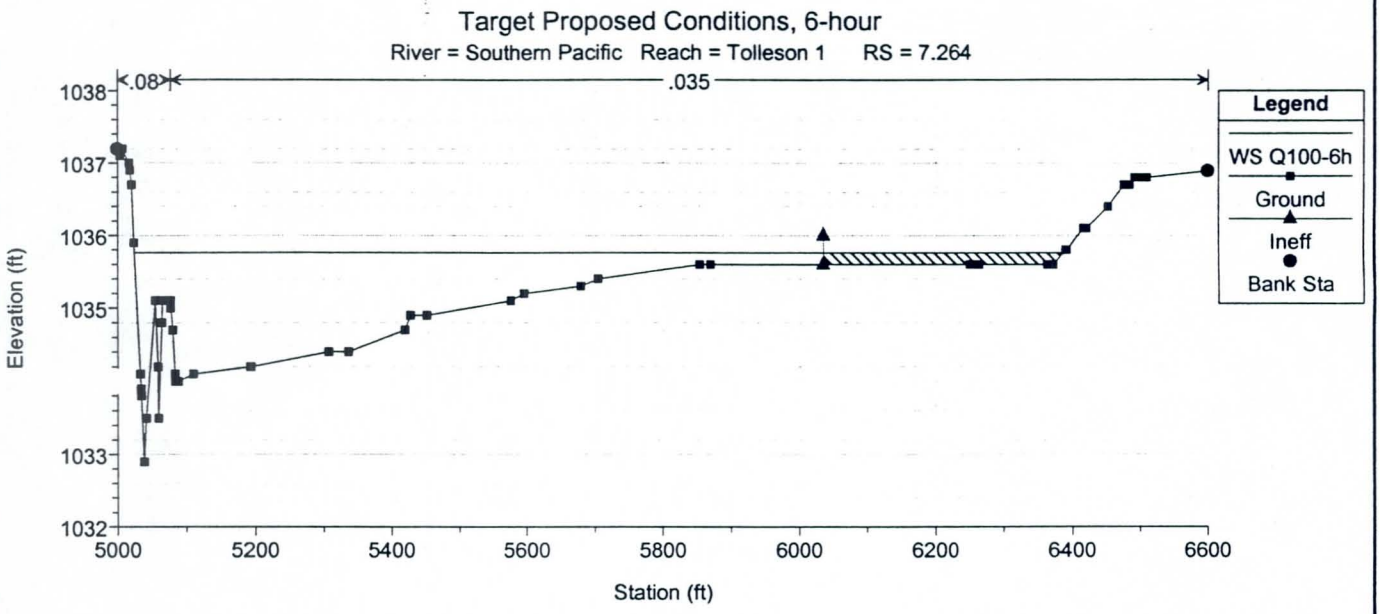
SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Southern Pacific

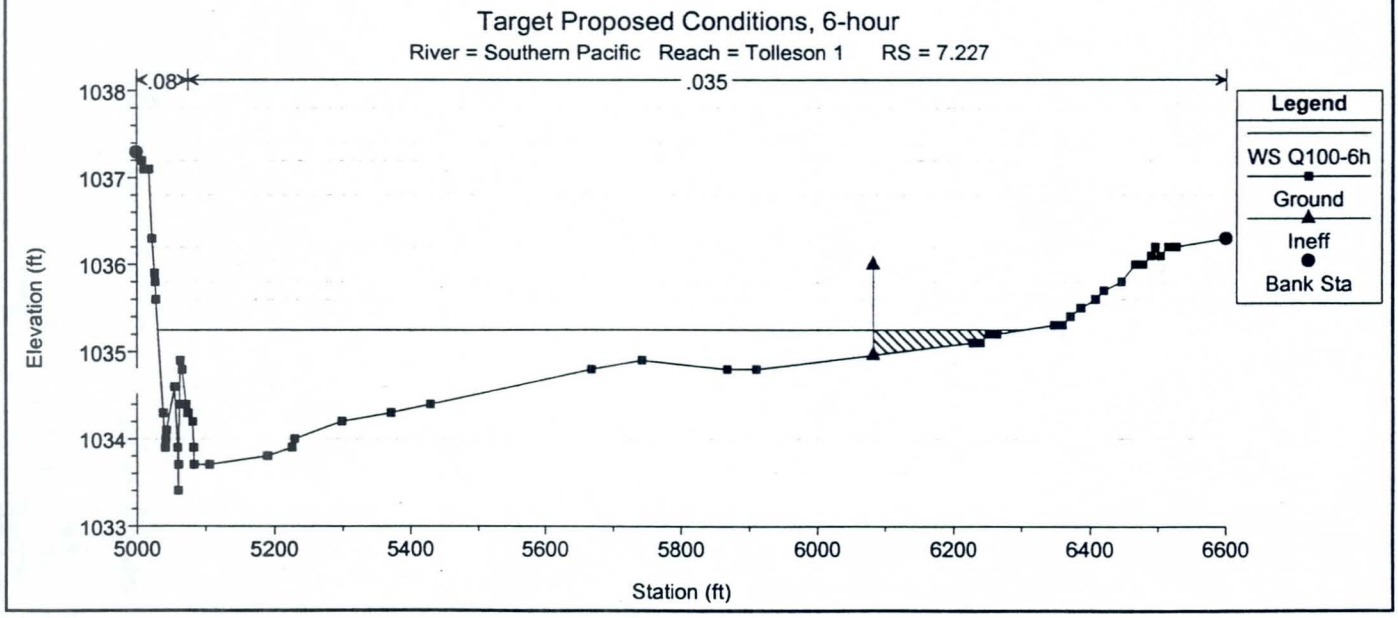
Reach	River Sta.	Contr.	Expan.
Tolleson 1	7.287	.1	.3
Tolleson 1	7.264	.1	.3
Tolleson 1	7.227	.1	.3
Tolleson 1	7.169	.1	.3
Tolleson 1	7.074	.1	.3
Tolleson 1	7.033	.1	.3
Tolleson 1	7.020	.1	.3
Tolleson 1	7.007	.1	.3
Tolleson 1	6.993	.1	.3
Tolleson 1	6.980	.1	.3
Tolleson 1	6.932	.1	.3
Tolleson 1	6.885	.1	.3
Tolleson 1	6.834	.1	.3
Tolleson 1	6.782	.1	.3
Tolleson 1	6.753	.1	.3
Tolleson 1	6.723	.1	.3
Tolleson 1	6.696	.1	.3
Tolleson 1	6.649	.1	.3
Tolleson 1	6.601	.1	.3
Tolleson 1	6.575	.1	.3
Tolleson 1	6.549	.1	.3
Tolleson 1	6.532	.1	.3
Tolleson 1	6.506	.1	.3
Tolleson 1	6.412	.1	.3

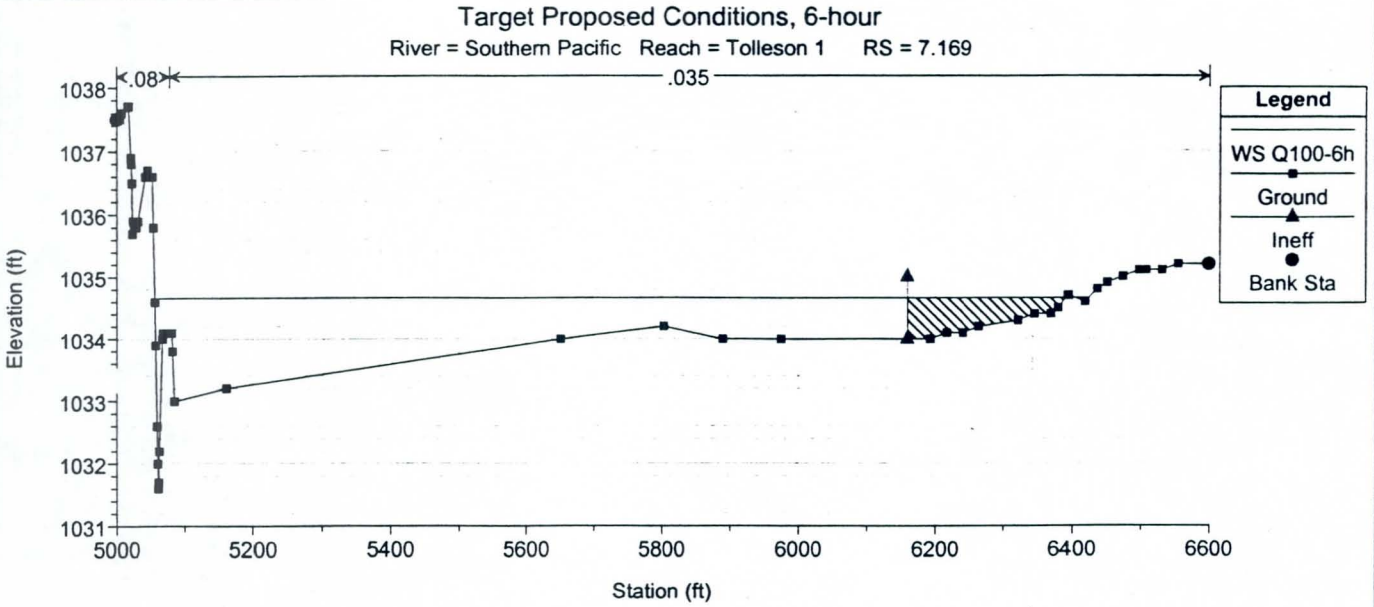
HEC-RAS Plan: Prop 6hr River: Southern Pacific Reach: Tolleson 1

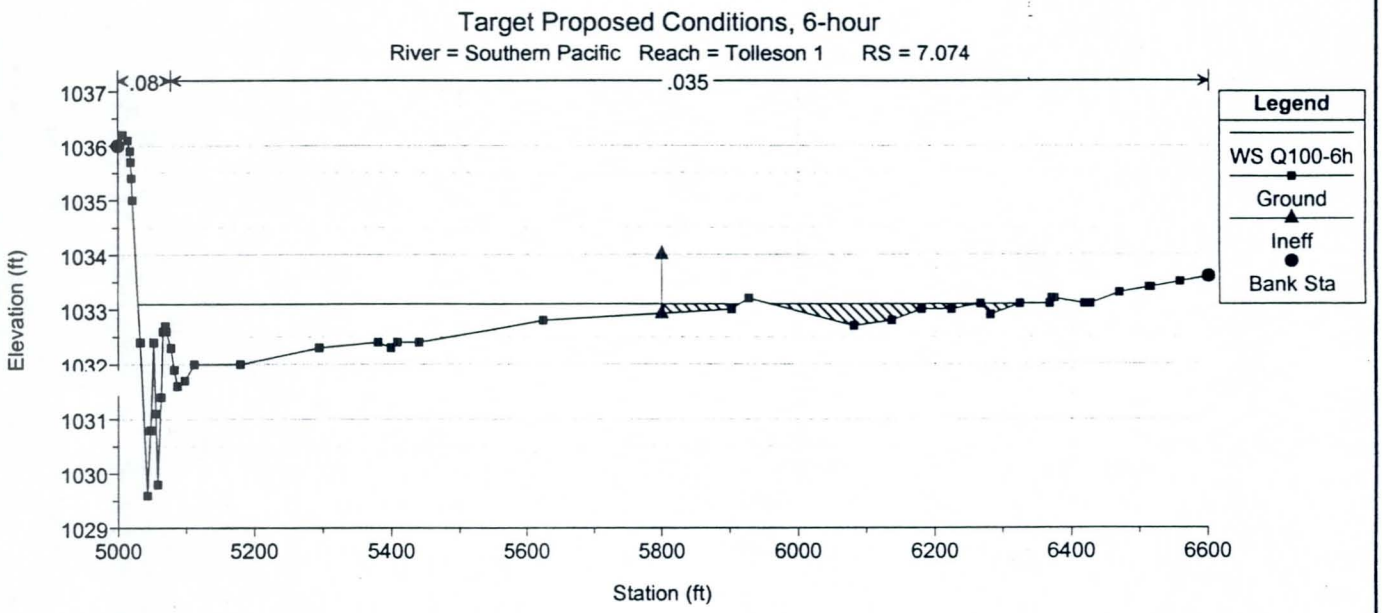
Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Tolleson 1	7.287	1421.00	1033.80	1036.62	1036.62	1036.87	0.024659	4.00	355.49	718.30	1.00
Tolleson 1	7.264	1421.00	1032.90	1035.76	1035.09	1035.81	0.002445	1.73	821.97	1362.34	0.34
Tolleson 1	7.227	1421.00	1033.40	1035.25	1034.85	1035.30	0.002893	1.82	781.13	1272.86	0.37
Tolleson 1	7.169	1421.00	1031.60	1034.66	1034.12	1034.69	0.001399	1.45	983.33	1356.27	0.27
Tolleson 1	7.074	1541.00	1029.60	1033.09	1032.85	1033.22	0.008585	2.84	542.26	1245.73	0.60
Tolleson 1	7.033	1541.00	1028.90	1032.98	1030.73	1032.99	0.000323	0.89	1729.10	1393.45	0.14
Tolleson 1	7.020	1541.00	1030.59	1032.65	1032.65	1032.93	0.012333	4.28	359.79	747.81	1.02
Tolleson 1	7.007	1541.00	1028.86	1032.45		1032.46	0.000090	1.01	1528.55	1466.58	0.10
Tolleson 1	6.993	1541.00	1029.00	1032.44		1032.45	0.000098	1.07	1442.02	1476.78	0.11
Tolleson 1	6.980	1541.00	1028.98	1032.38		1032.43	0.000288	1.76	876.95	1064.09	0.18
Tolleson 1	6.932	1541.00	1029.00	1032.27		1032.34	0.000423	2.13	724.09	418.34	0.23
Tolleson 1	6.885	1541.00	1029.00	1032.16		1032.23	0.000452	2.13	722.65	623.38	0.24
Tolleson 1	6.834	1541.00	1029.00	1032.06		1032.13	0.000450	2.08	742.00	579.05	0.22
Tolleson 1	6.782	1541.00	1028.90	1031.62		1031.85	0.002055	3.86	399.56	580.14	0.45
Tolleson 1	6.753	1541.00	1028.35	1031.34		1031.61	0.002664	4.18	368.43	589.30	0.51
Tolleson 1	6.723	1541.00	1027.40	1031.17	1029.97	1031.25	0.000894	2.37	650.20	715.19	0.29
Tolleson 1	6.696	1541.00	1026.30	1031.07	1029.84	1031.13	0.000718	2.06	749.43	771.16	0.26
Tolleson 1	6.649	1541.00	1026.30	1030.82	1029.82	1030.90	0.000997	2.28	676.96	737.70	0.30
Tolleson 1	6.601	1541.00	1025.60	1030.62	1029.69	1030.68	0.000890	2.02	763.20	680.50	0.28
Tolleson 1	6.575	1541.00	1025.60	1030.47	1029.68	1030.54	0.001180	2.18	707.65	683.99	0.32
Tolleson 1	6.549	2022.00	1025.40	1030.42	1029.13	1030.45	0.000382	1.50	1350.39	1089.67	0.19
Tolleson 1	6.532	2022.00	1029.07	1030.14	1030.14	1030.34	0.007244	3.65	553.59	1260.95	0.97
Tolleson 1	6.506	2022.00	1025.80	1028.67	1028.29	1028.77	0.004221	2.50	808.11	1062.53	0.48
Tolleson 1	6.412	2022.00	1025.10	1028.02	1027.12	1028.05	0.000688	1.36	1485.69	1180.30	0.21

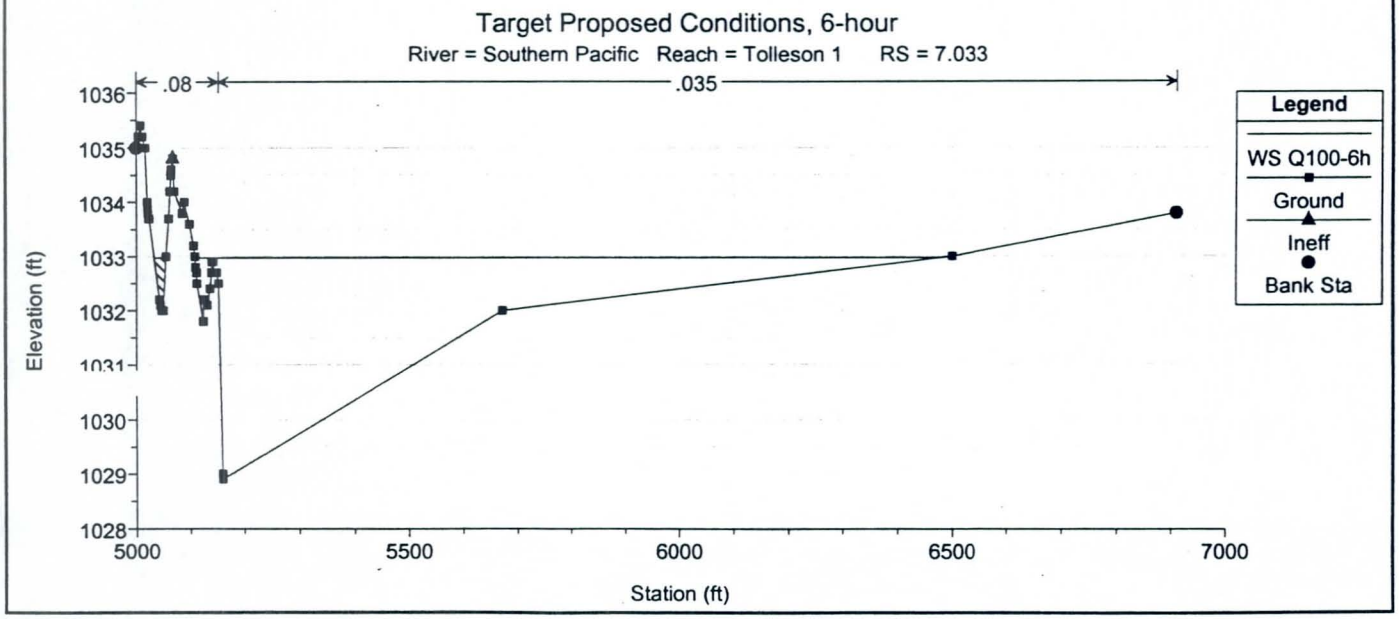

Target Proposed Conditions, 6-hour
River = Southern Pacific Reach = Tolleson 1 RS = 7.287
.08
.035
.04
Legend
WS Q100-6h
Ground
Bank Sta
Elevation (ft)
Station (ft)

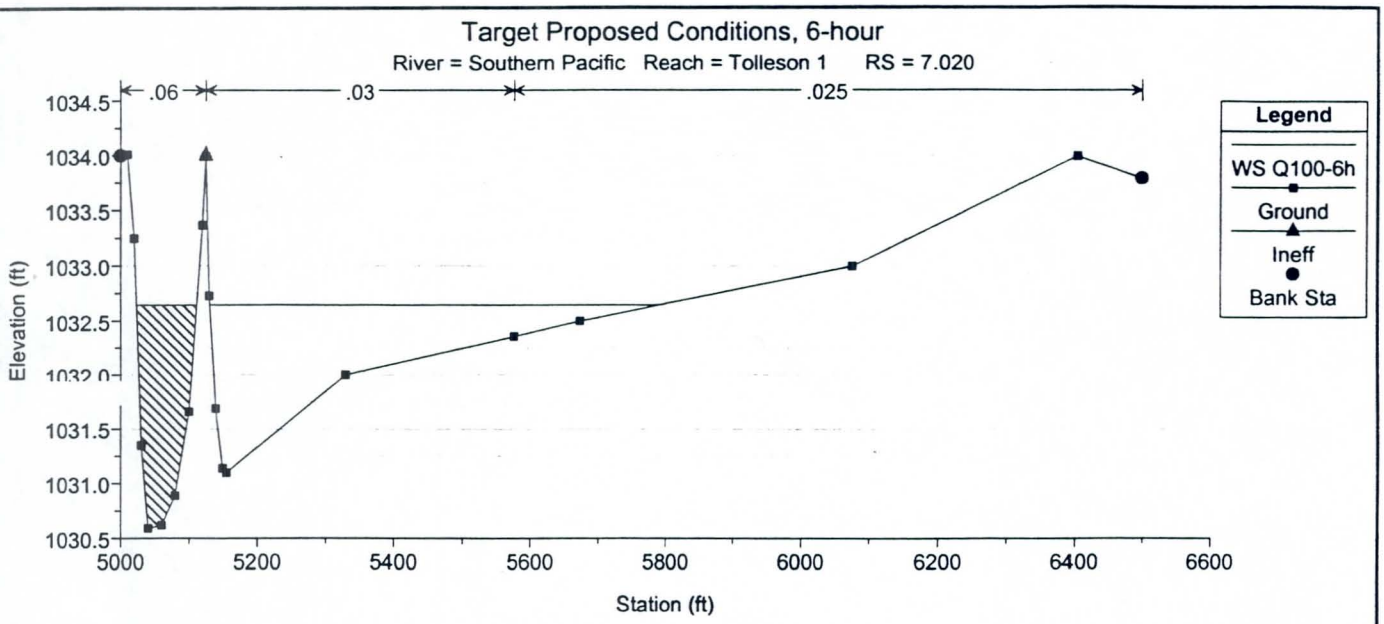

Target Proposed Conditions, 6-hour
River = Southern Pacific Reach = Tolleson 1 RS = 7.264
.08
.035
Legend
WS Q100-6h
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

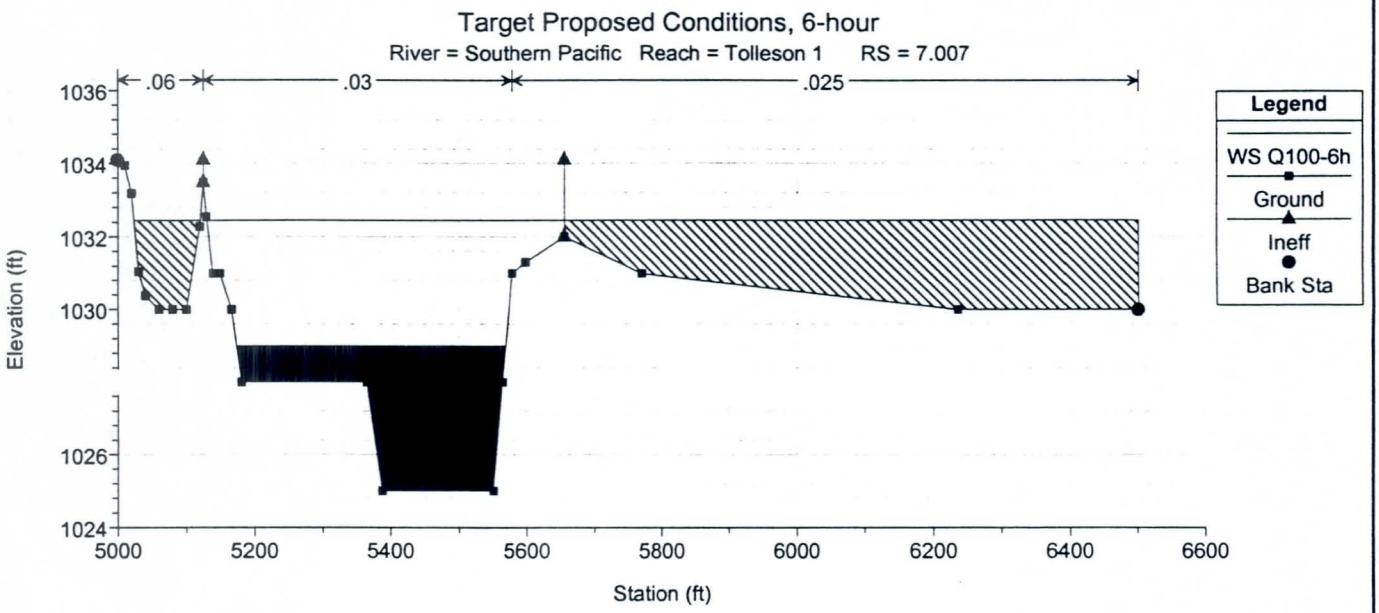

Target Proposed Conditions, 6-hour
River = Southern Pacific Reach = Tolleson 1 RS = 7.227
.08
.035
Legend
WS Q100-6h
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

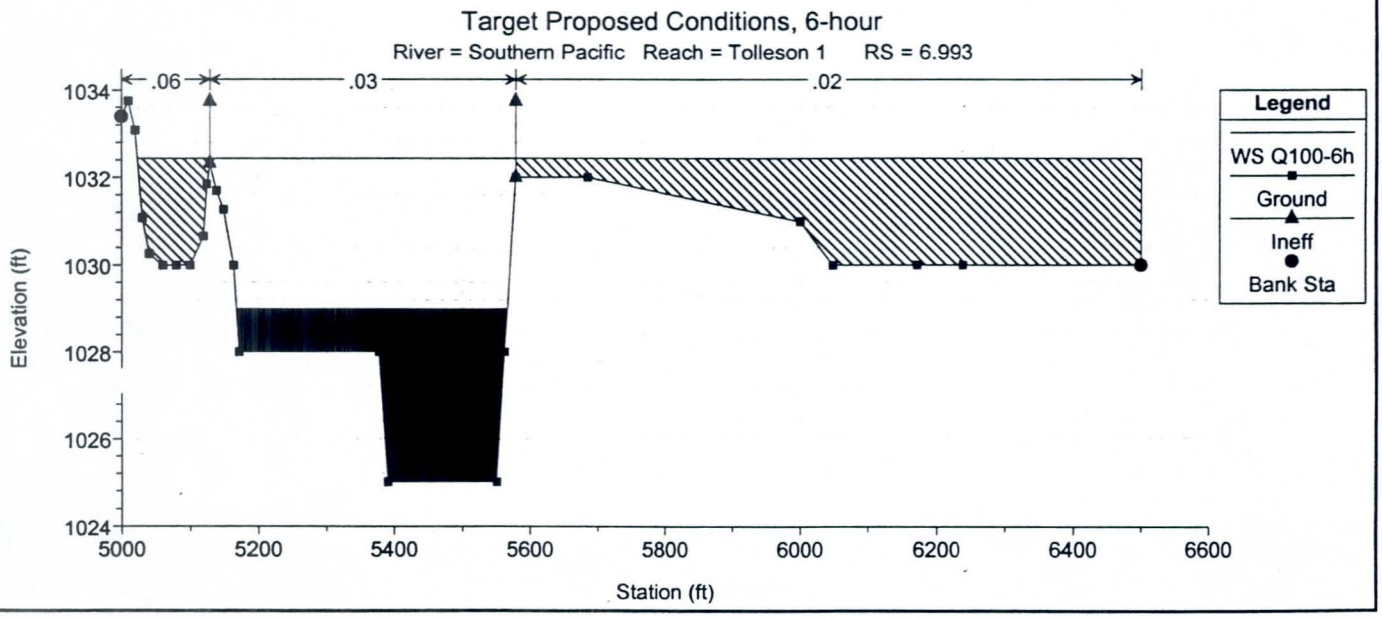

Target Proposed Conditions, 6-hour
River = Southern Pacific Reach = Tolleson 1 RS = 7.169
.08
.035
Legend
WS Q100-6h
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

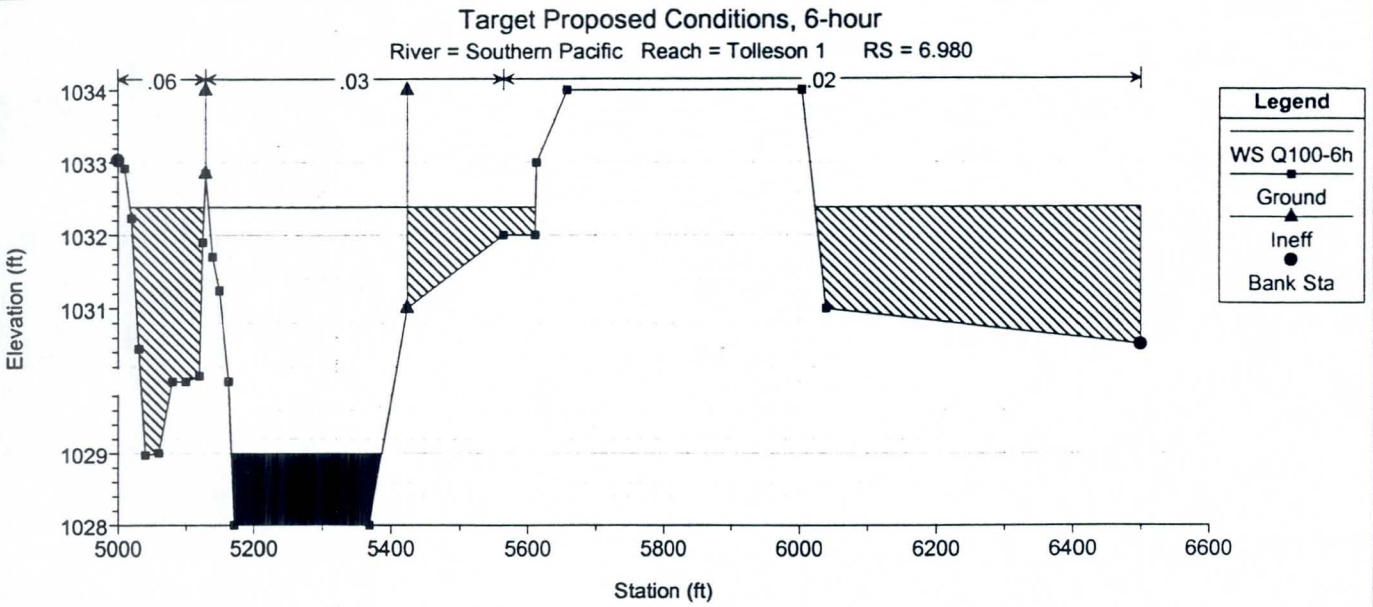

Target Proposed Conditions, 6-hour
River = Southern Pacific Reach = Tolleson 1 RS = 7.074
.08
.035
Legend
WS Q100-6h
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

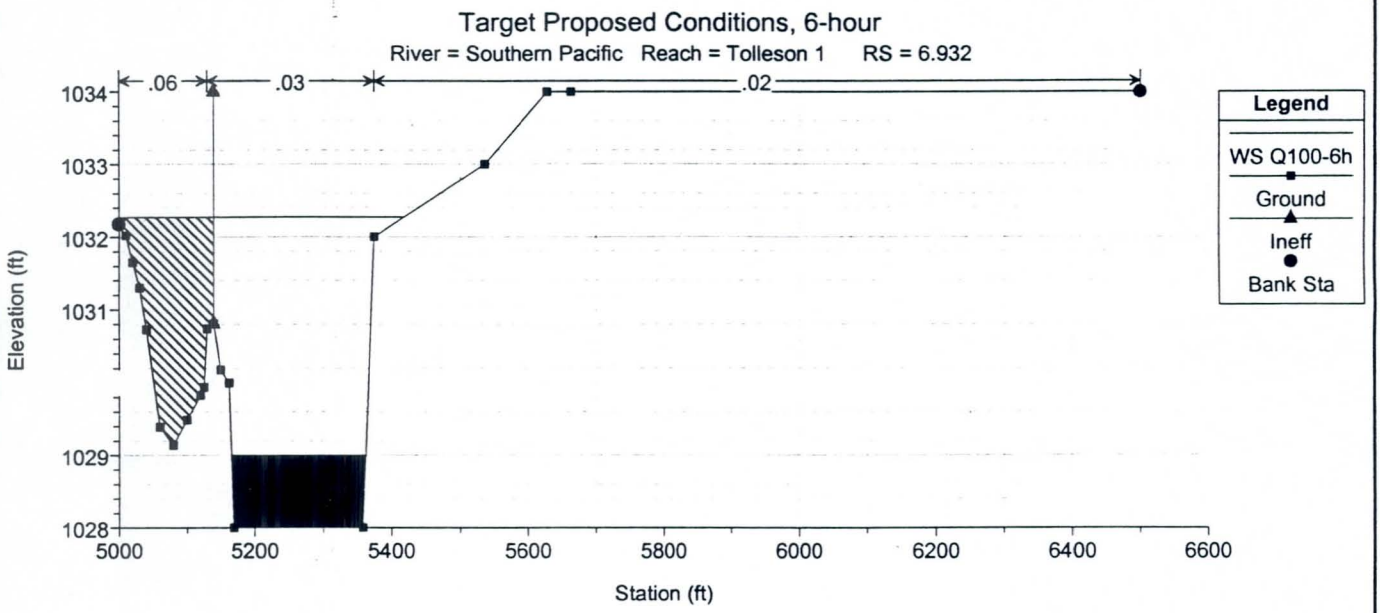

Target Proposed Conditions, 6-hour
River = Southern Pacific Reach = Tolleson 1 RS = 7.033
.08
.035
Legend
WS Q100-6h
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

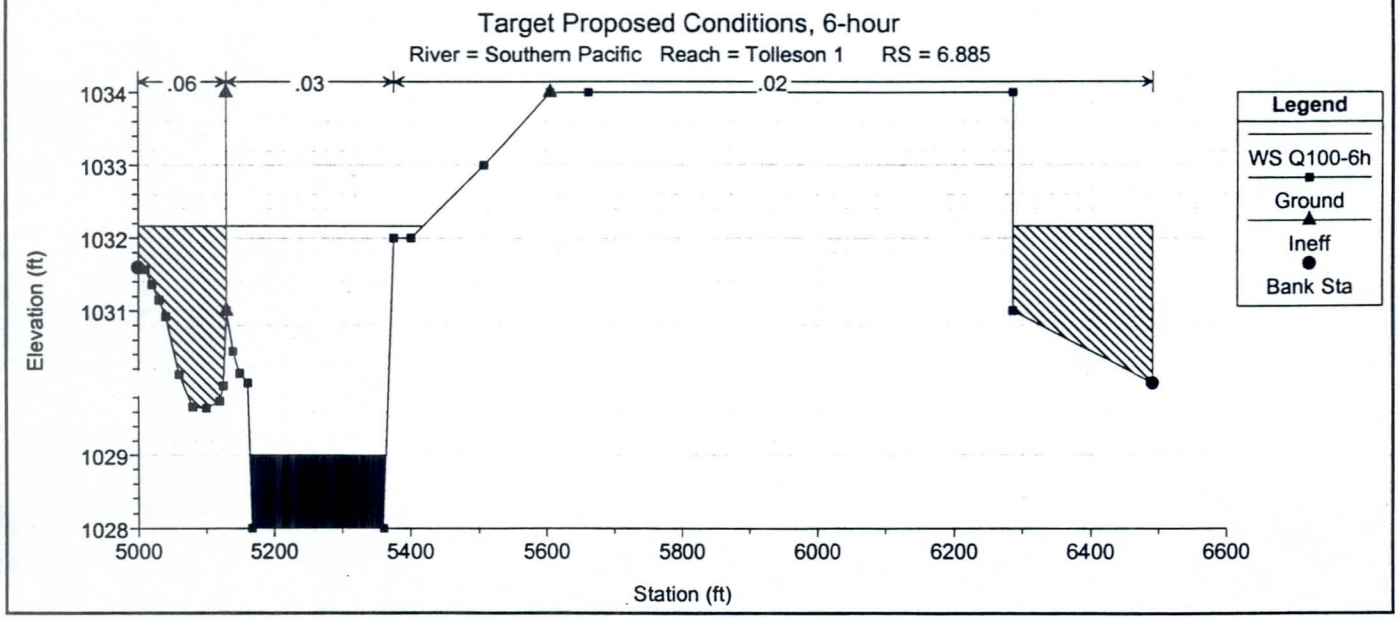

Target Proposed Conditions, 6-hour
River = Southern Pacific Reach = Tolleson 1 RS = 7.020
.06
.03
.025
Elevation (ft)
Station (ft)
Legend
WS Q100-6h
Ground
Ineff
Bank Sta

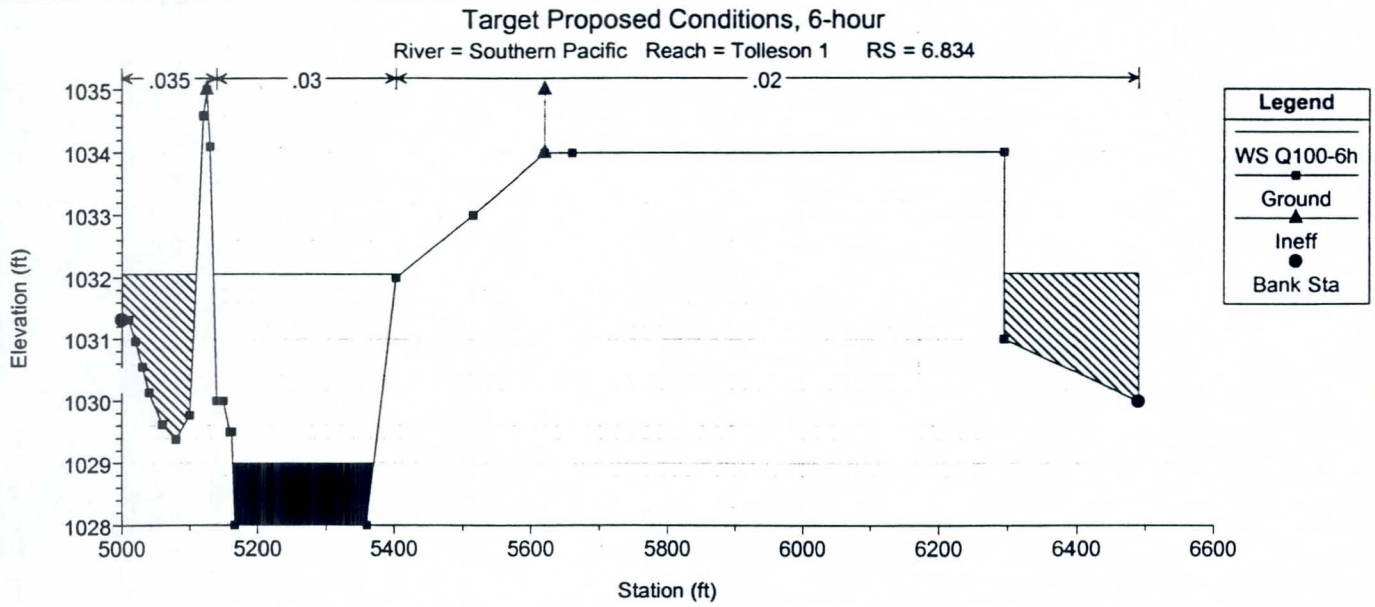

Target Proposed Conditions, 6-hour
River = Southern Pacific Reach = Tolleson 1 RS = 7.007
.06
.03
.025
Elevation (ft)
Station (ft)
Legend
WS Q100-6h
Ground
Ineff
Bank Sta

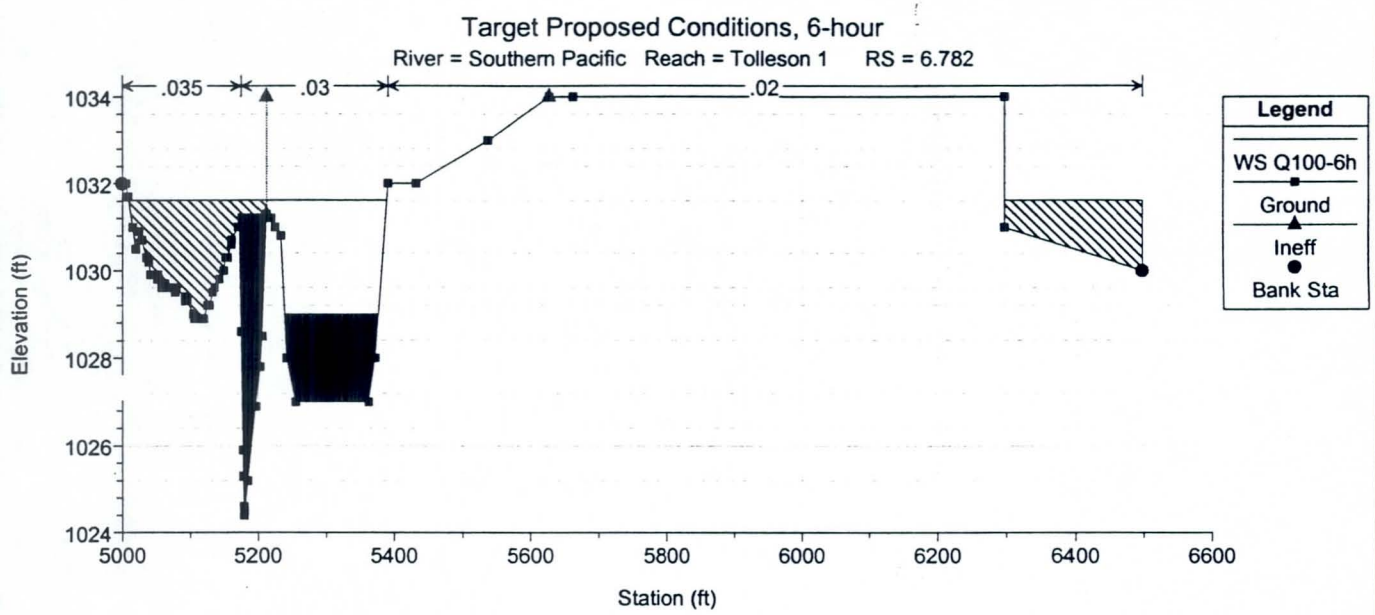

Target Proposed Conditions, 6-hour
River = Southern Pacific Reach = Tolleson 1 RS = 6.993
.06
.03
.02
Elevation (ft)
Station (ft)
Legend
WS Q100-6h
Ground
Ineff
Bank Sta

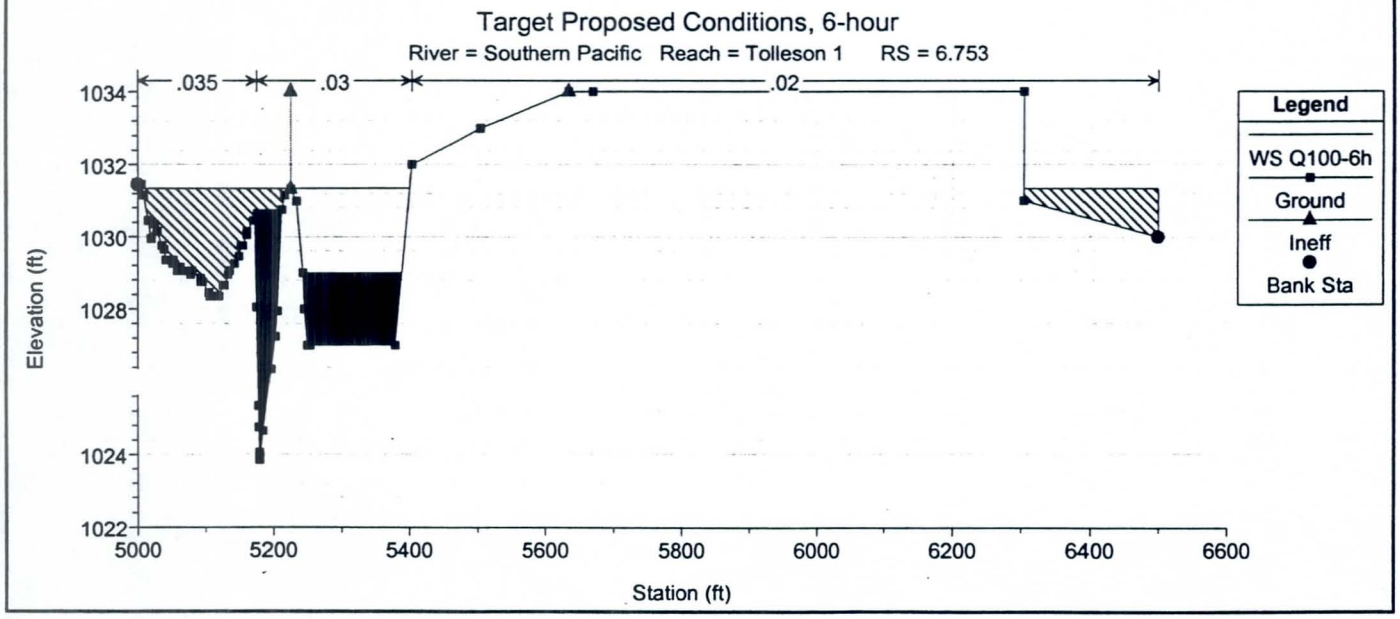

Target Proposed Conditions, 6-hour
River = Southern Pacific Reach = Tolleson 1 RS = 6.980
.06
.03
.02
Elevation (ft)
Station (ft)
Legend
WS Q100-6h
Ground
Ineff
Bank Sta

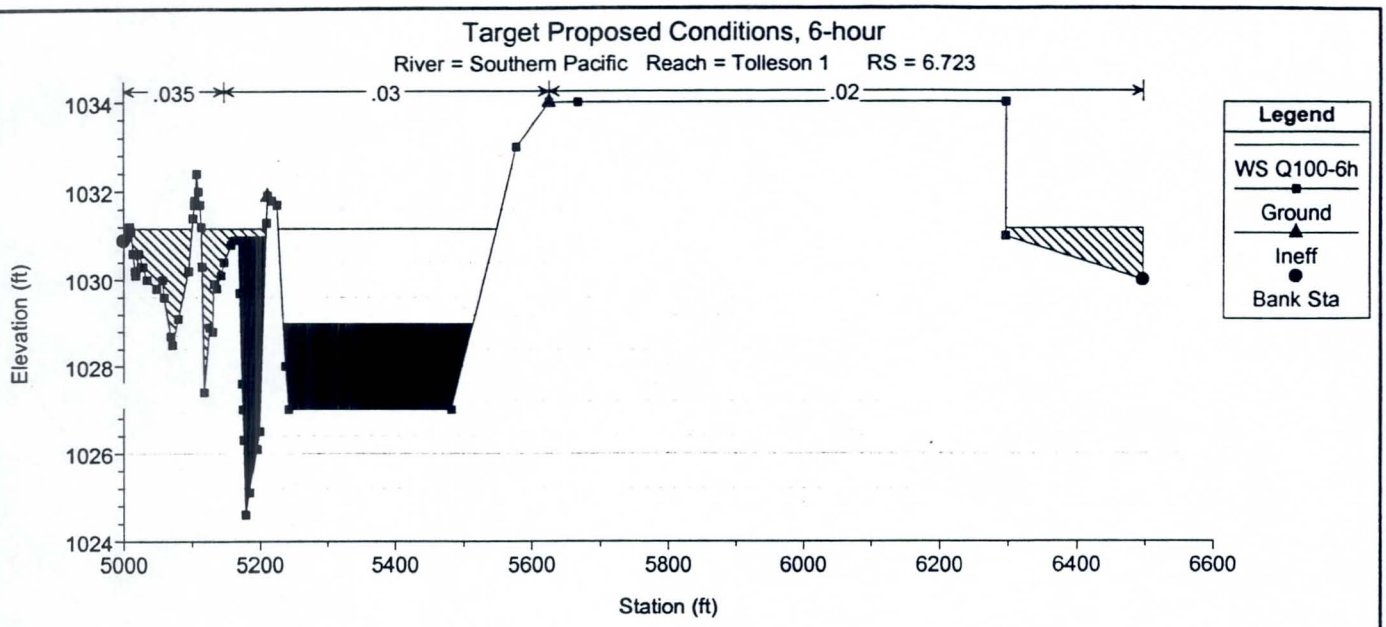

Target Proposed Conditions, 6-hour
River = Southern Pacific Reach = Tolleson 1 RS = 6.932
.06
.03
.02
Elevation (ft)
Station (ft)
Legend
WS Q100-6h
Ground
Ineff
Bank Sta

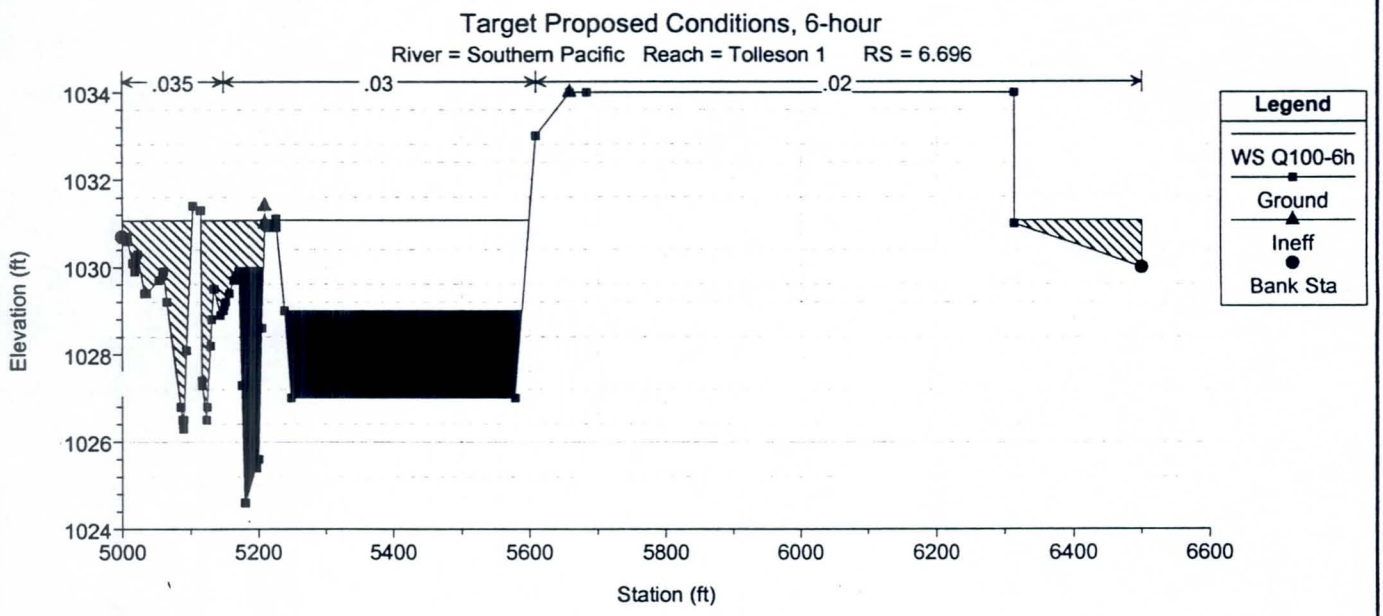

Target Proposed Conditions, 6-hour
River = Southern Pacific Reach = Tolleson 1 RS = 6.885
.06
.03
.02
Elevation (ft)
Station (ft)
Legend
WS Q100-6h
Ground
Ineff
Bank Sta

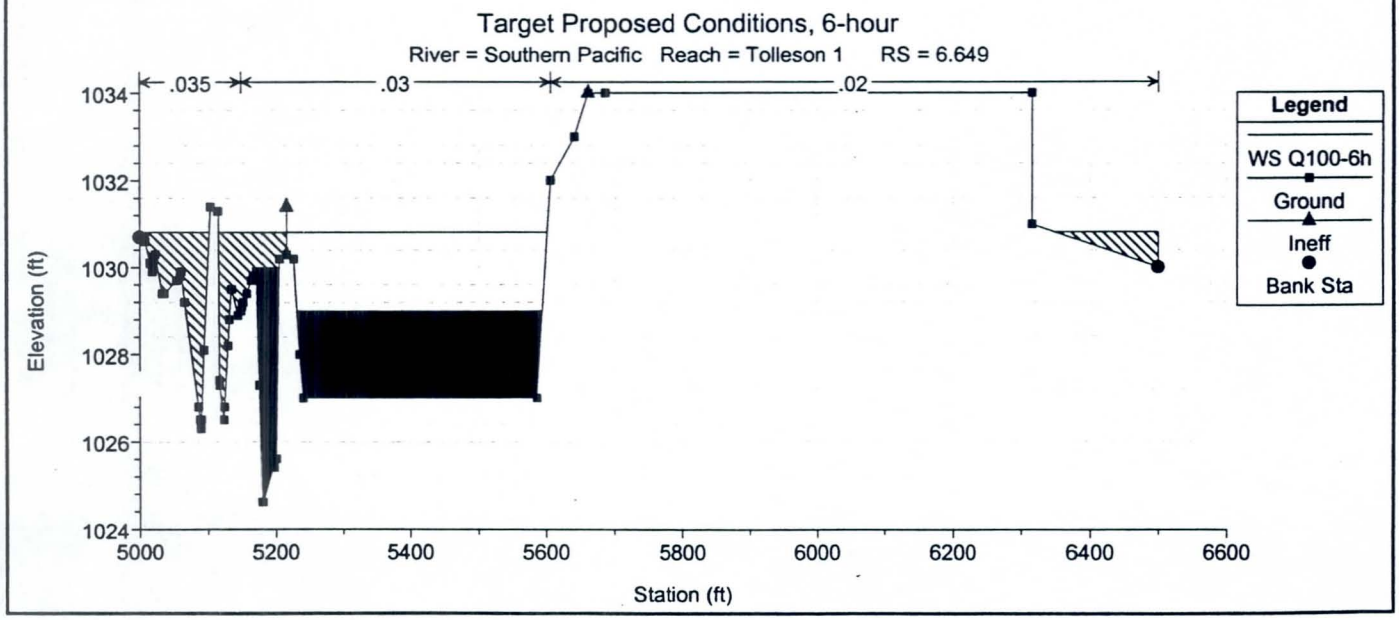

Target Proposed Conditions, 6-hour
River = Southern Pacific Reach = Tolleson 1 RS = 6.834
.035
.03
.02
Elevation (ft)
Station (ft)
Legend
WS Q100-6h
Ground
Ineff
Bank Sta

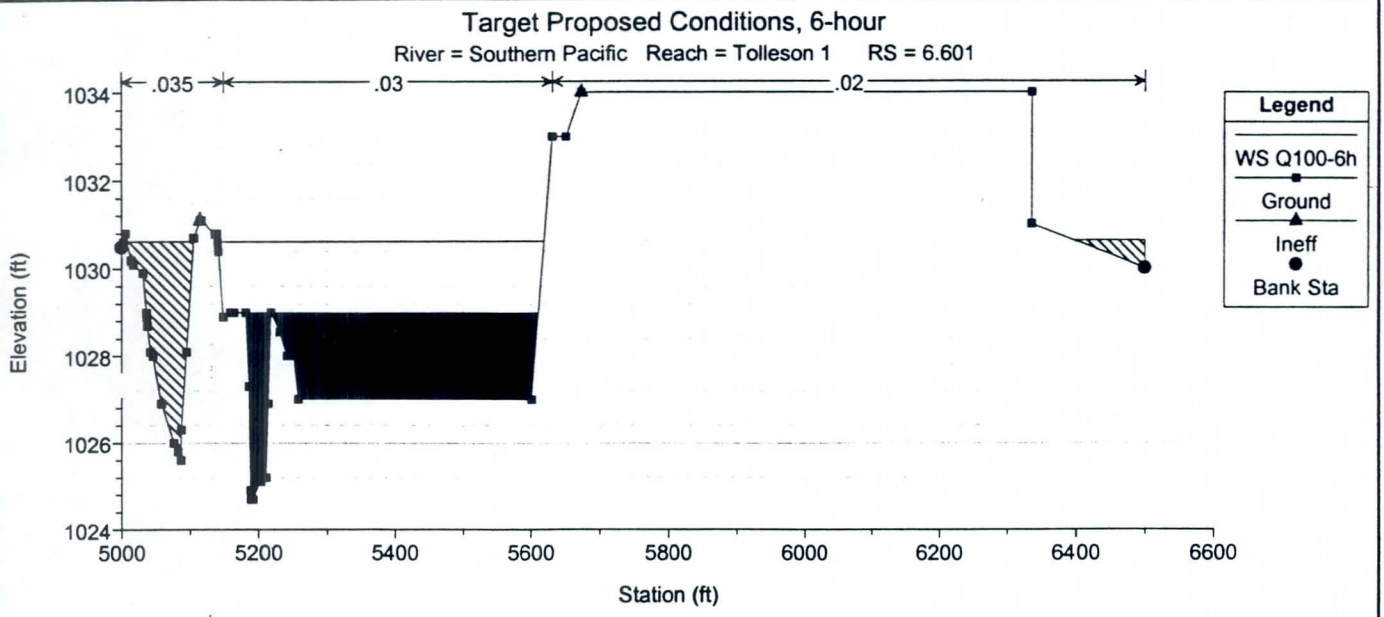

Target Proposed Conditions, 6-hour
River = Southern Pacific Reach = Tolleson 1 RS = 6.782
.035
.03
.02
Elevation (ft)
Station (ft)
Legend
WS Q100-6h
Ground
Ineff
Bank Sta

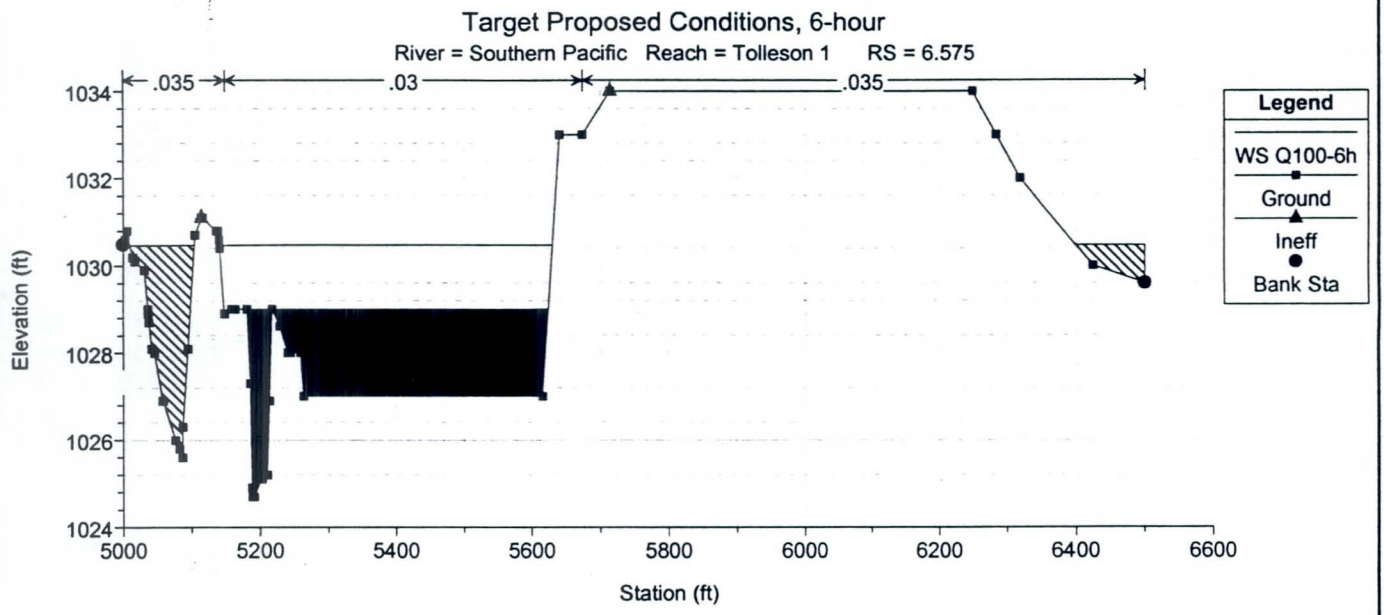

Target Proposed Conditions, 6-hour
River = Southern Pacific Reach = Tolleson 1 RS = 6.753
.035
.03
.02
Elevation (ft)
Station (ft)
Legend
WS Q100-6h
Ground
Ineff
Bank Sta

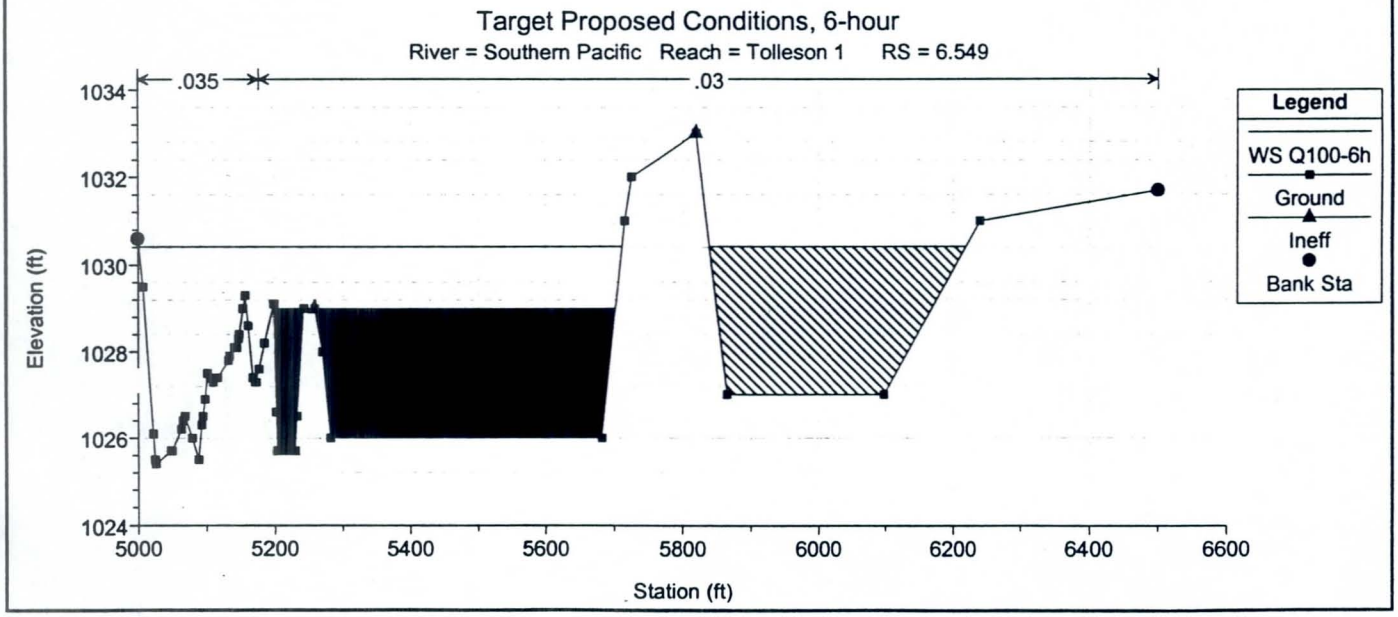

Target Proposed Conditions, 6-hour
River = Southern Pacific Reach = Tolleson 1 RS = 6.723
.035
.03
.02
Elevation (ft)
Station (ft)
Legend
WS Q100-6h
Ground
Ineff
Bank Sta

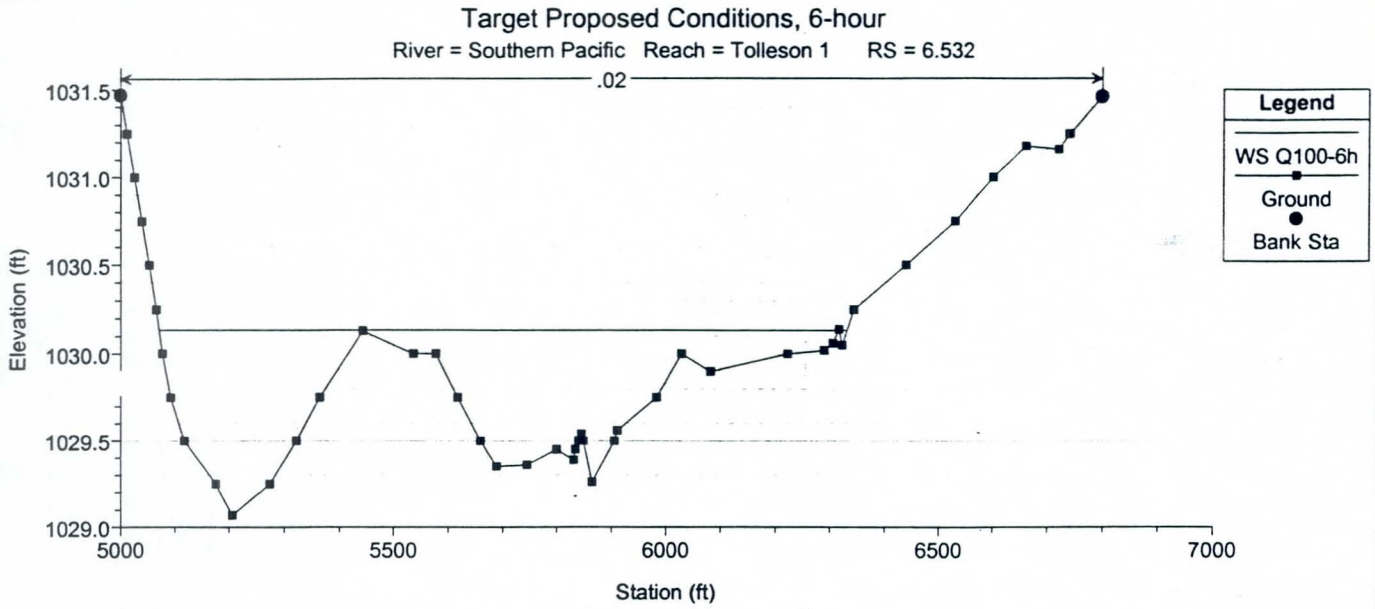

Target Proposed Conditions, 6-hour
River = Southern Pacific Reach = Tolleson 1 RS = 6.696
.035
.03
.02
Elevation (ft)
Station (ft)
Legend
WS Q100-6h
Ground
Ineff
Bank Sta

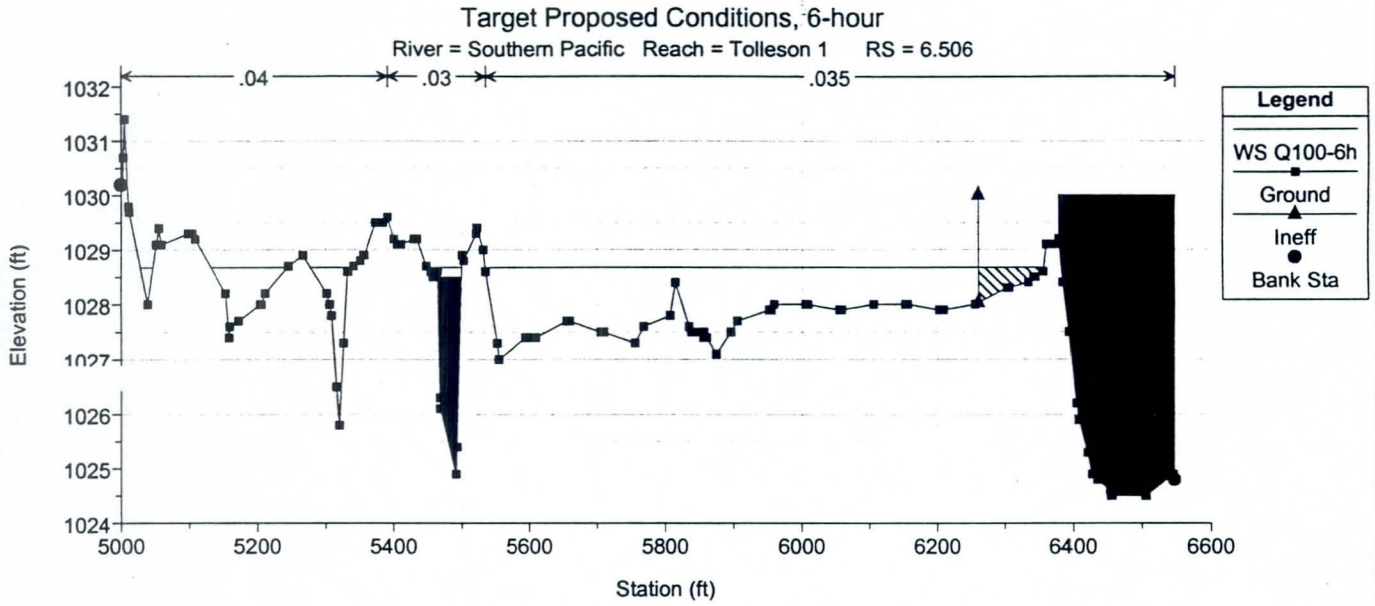

Target Proposed Conditions, 6-hour
River = Southern Pacific Reach = Tolleson 1 RS = 6.649
.035
.03
.02
Elevation (ft)
Station (ft)
Legend
WS Q100-6h
Ground
Ineff
Bank Sta

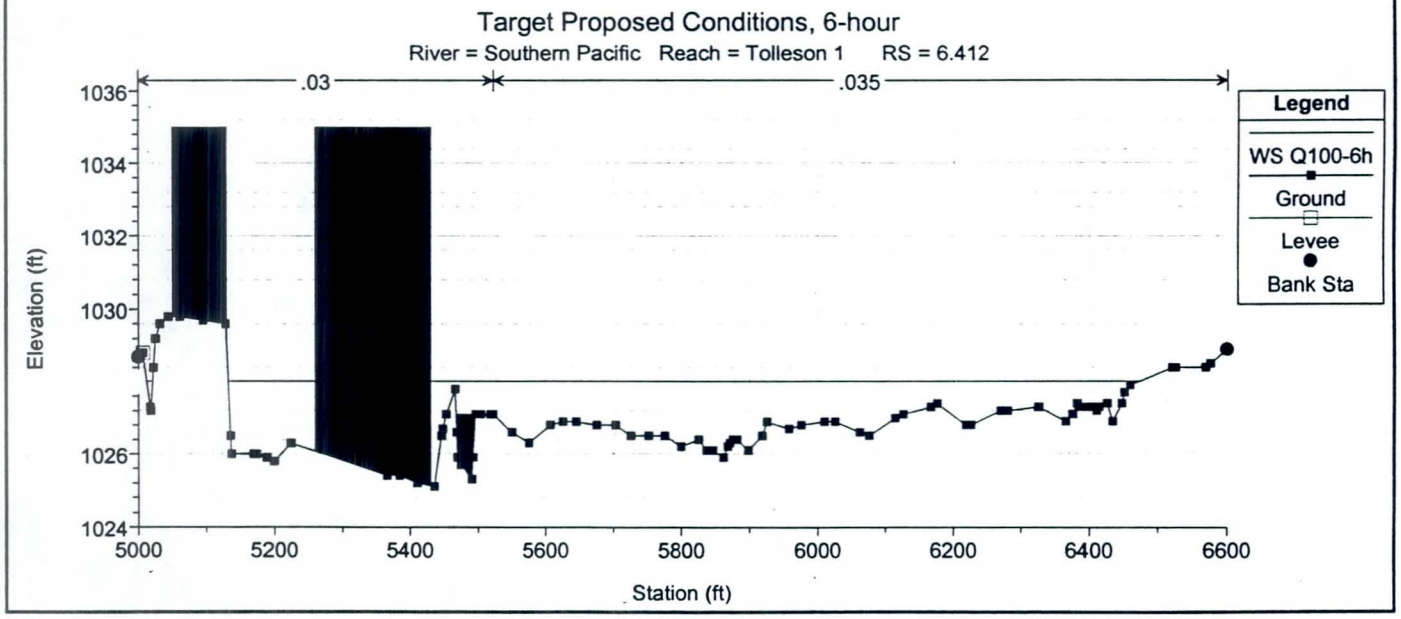

Target Proposed Conditions, 6-hour
River = Southern Pacific Reach = Tolleson 1 RS = 6.601
.035
.03
.02
Elevation (ft)
Station (ft)
Legend
WS Q100-6h
Ground
Ineff
Bank Sta


Target Proposed Conditions, 6-hour
River = Southern Pacific Reach = Tolleson 1 RS = 6.575
.035
.03
.035
Elevation (ft)
Station (ft)
Legend
WS Q100-6h
Ground
Ineff
Bank Sta


Target Proposed Conditions, 6-hour
River = Southern Pacific Reach = Tolleson 1 RS = 6.549
.035
.03
Elevation (ft)
Station (ft)
Legend
WS Q100-6h
Ground
Ineff
Bank Sta


Target Proposed Conditions, 6-hour
River = Southern Pacific Reach = Tolleson 1 RS = 6.532
.02
Legend
WS Q100-6h
Ground
Bank Sta
Elevation (ft)
Station (ft)


Target Proposed Conditions, 6-hour
River = Southern Pacific Reach = Tolleson 1 RS = 6.506
.04
.03
.035
Legend
WS Q100-6h
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Target Proposed Conditions, 6-hour
River = Southern Pacific Reach = Tolleson 1 RS = 6.412
.03
.035
Legend
WS Q100-6h
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

HEC creative engineering solutions

Hoskin Engineering Consultants, Inc.

323 West Roosevelt Street
Suite 200
Phoenix, Arizona 85003-1136
Tel: (602) 252-8384
Fax: (602) 252-8385

April 19, 2002

WRG Design, Inc.
4808 N. 22nd Street
Suite 150
Phoenix, AZ 85016

Attn.: Robert Hedrick, PE

Re: Target SW Distribution Center LOMR

At your request, Hoskin Engineering Consultants, Inc. (HEC) has updated the hydraulic analysis for the retention basin/channel along the south property boundary of the Target SW Distribution Center, located on the southeast corner of 75th Avenue and Van Buren Street, in Phoenix, AZ.

The proposed conditions HEC-RAS model (TGT24E.PRJ) previously prepared for the CLOMR submittal was modified to reflect the 'As-Built' plans provided by WRG Design staff. Water surface elevation changes through the site, as a result of the 'As-Built' channel geometry, were minor and do not result in a revision to the previously delineated 100-year floodplain. Water surface elevations at the two cross-sections upstream of the site decrease less than one (1) foot. Results of the analysis are shown below.

HEC-RAS Water Surface Elevation Summary, 100-year 24-hour

Cross-Section		Effective FIS Model (TOL_RAS)	Pre-Project Model (TGT24E)	As-Built Model (TGT24A)	As-Built – Pre-Project Difference
7.169		1034.27	1034.28	1034.56	0.29
7.074		1033.55	1033.59	1032.69	-0.90
7.033		1032.89	1032.93	1031.96	-0.97
Project Site	6.980	1031.83	1031.88	1031.90	0.02
	6.885	1031.49	1031.54	1031.70	0.16
	6.782	1030.58	1030.57	1031.27	0.70
	6.723	1029.89	1030.33	1030.86	0.53
	6.696	1029.76	1030.29	1030.78	0.49
	6.601	1029.62	1030.25	1030.43	0.18
	6.549	1029.57	1030.24	1030.26	0.02
6.532		1029.46	1030.02	1030.01	-0.01

Revisions were made to the On-Site Drainage Map and the Annotated FIRM to reflect the floodplain boundary changes. The point of matching between the effective and revised floodplain boundaries moved to cross-section 7.169. Also included in this package are updated FEMA forms, HEC-RAS printouts, and the accompanying files which must be submitted with the LOMR application.

If there is anything else you need for the submittal, or you have any questions, please feel free to give me a call.

Sincerely,

REGISTERED PROFESSIONAL ENGINEER (CIVIL)
CERTIFICATE NO.
18690
PAUL W.R.
HOSKIN
Date Signed 4/19/02
ARIZONA, U.S.A.

Paul W.R. Hoskin, P.E.

FORM 1: REVISION REQUESTER AND COMMUNITY OFFICIAL

Section 2, Item 1:

The basis for the revision request is a change in the 100-year, 24-hour floodplain delineation due to development within the watershed. The development is the Target Southwest Distribution Center.

Section 2, Items 2 and 6:

The flooding is urban runoff which ponds north of the Roosevelt Irrigation District Canal and the Southern Pacific Railroad.

FORM 4: RIVERINE HYDRAULIC ANALYSIS

Section 3:

The starting water surface elevation for the existing conditions model (TGT24E.PRJ) and the as-built conditions model (TGT24A.PRJ) is from the effective model (TOL_RAS.PRJ). For the existing and as-built conditions models, the upstream and downstream portions of the effective model were removed due to the overall size of the effective model. The boundary condition for the existing and as-built models therefore became a known water surface of 1028.02 at RM 6.412.

Section 4:

Water surface elevations are higher that the end points of cross-sections only where ineffective flow areas are shown upstream of the warehouse. Project causes increase in the 100-year floodplain only within the property limits.

Section 5, Item 1a:

Water Surface Elevation Summary

RM	Effective Model (TOL_RAS)	As-Built Conditions Model (TGT24P)	Difference = As-Built – Effective
7.169	1034.27	1034.56	0.29
6.532	1029.46	1030.01	0.55

The 0.55' increase at RM 6.532 is the result of more detailed field cross-sections taken along the centerline of 75th Avenue. The "Revised Effective" model also incorporates this updated information. The difference between the revised effective and proposed conditions is less.

HEC-RAS September 1998 Version 2.2
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

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

PROJECT DATA
Project Title: Target As-Built Conditions, 24-hour
Project File : TGT24A.prj
Run Date and Time: 4/19/2002 11:20:02 AM

Project in English units

Project Description: Target As-Built Conditions Model, 100-year 24-hour
Prepared By: Hoskin Engineering Consultants, Inc.
HEC Project No.: 02-026
Date: 04-15-02
Description: Model TGT24P.prj cross-section geometry modified per As-Built drawings prepared by WRG Design, Inc.
HEC-RAS Version 2.2 with Raspatch.

Original Model Info.:

Tolleson FIS, Project FCD 95-26, El Mirage Road to 69th Avenue Alignment. August 17, 1998 Dibble & Associates, Inc., with JE Fuller/Hydrology & Geomorphology, Inc.

The Cross-section data were generated by ROADCALC from March 28, 1994 Topo flown by Kenney Aerial Mapping, Inc., NGVD 1929. Top-of-rail elevations and roadway/canal profile data were added to most cross-sections based on subsequent survey by Urban Engineering. Some cross sections were edited or added by hand.

Discharge data are from HEC-1 model for Tolleson Area dated December 1998 unless otherwise noted.

Hydrologic concentration points are noted in cross-section descriptions using the corresponding HEC-1 IDs. The flow rates have been rounded to the nearest 10 cubic feet per second (cfs).

The floodplain was mapped utilizing HEC-RAS Version 2.1, dated October 1997.

PLAN DATA

Plan Title: As-Built Conditions, 24-hour
Plan File : G:\Projects\02-026 Target Distribution LOMR\Hydro\TGT24A.p02

Geometry Title: As-Built Geometry
Geometry File : G:\Projects\02-026 Target Distribution LOMR\Hydro\TGT24A.g01

Flow Title : As-Built 100-yr 24-hr HEC-1 Flows
Flow File : G:\Projects\02-026 Target Distribution LOMR\Hydro\TGT24A.f01

Plan Description:
As-Built Conditions for the 100-year, 24-hout event

Plan Summary Information:
Number of: Cross Sections = 24 Mulitple Openings = 0

Culverts = 0 Inline Weirs = 0
Bridges = 0

Computational Information
Water surface calculation tolerance = 0.01
Critical depth calculaton tolerance = 0.01
Maximum number of interations = 20
Maximum difference tolerance = 0.3
Flow tolerance factor = 0.001

Computation Options
Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: As-Built 100-yr 24-hr HEC-1 Flows
Flow File : G:\Projects\02-026 Target Distribution LOMR\Hydro\TGT24A.f01

Flow Data (cfs)

River	Reach	RS	Q100-24h
Southern Pacific	Tolleson 1	7.287	1020
Southern Pacific	Tolleson 1	7.074	1099
Southern Pacific	Tolleson 1	6.549	1432

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Southern Pacific	Tolleson 1	Q100-24h		Known WS = 1028.02

Changes in WS and EG

River	Reach	RS	Profile	Type	Value
Southern Pacific	Tolleson 1	6.532	Q100-24h	Known WS	1029.46
Southern Pacific	Tolleson 2	5.539	Q100-24h	Known WS	1024.18
Southern Pacific	Tolleson 2	5.054	Q100-24h	Known WS	1015.2
Southern Pacific	Tolleson 2	3.568	Q100-24h	Known WS	1003.1
Southern Pacific	Tolleson 2	1.771	Q100-24h	Known WS	992
Southern Pacific	Tolleson 2	1.138	Q100-24h	Known WS	986.3
Canal	Canal Split	5.798	Q100-24h	Known WS	1026.92
Canal	Canal Split	5.578	Q100-24h	Known WS	1026.3

GEOMETRY DATA

Geometry Title: As-Built Geometry
Geometry File : G:\Projects\02-026 Target Distribution LOMR\Hydro\TGT24A.g01

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 7.287

INPUT
Description: RM 7.287, HEC-1 CPUB1 Q=1020 CFS, Begin Detailed Study By Dibble & JEF, 69th Avenue Alignment.
Station Elevation Data num= 65

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1037.2	5001.6	1037.2	5010.1	1036.8	5010.2	1036.8	5010.5	1036.8
5010.7	1036.8	5016	1035.8	5023	1033.4	5025.2	1032.8	5027.8	1032.9
5032	1032.6	5038.3	1032.3	5048.1	1034.7	5051.9	1035.5	5053.3	1035.7
5053.5	1035.8	5053.6	1035.8	5054	1035.9	5054.1	1035.8	5054.3	1035.8
5055	1035.5	5055.6	1035.3	5056.5	1035	5059.4	1034.1	5059.9	1034
5060.7	1033.8	5062.5	1034.5	5065.5	1035.9	5066.5	1035.8	5072.1	1035.8
5076.6	1035.8	5081	1035.8	5082.8	1035.9	5087.3	1035.8	5089.7	1035.7
5094.2	1035.7	5115.9	1035.6	5167.7	1035.8	5241.4	1036.1	5312.7	1036.2

5457.9	1036.2	5481.4	1036.3	5510.7	1036.2	5668.1	1036.6	5695.3	1036.6
5701.3	1036.6	5854.7	1036.7	5862	1036.7	5867.4	1036.7	5870.3	1036.8
5879.9	1036.8	5891	1036.8	6062.7	1037.2	6066	1037.2	6067	1037.2
6070.1	1037.2	6075.3	1037.2	6124.6	1037.2	6240.6	1037.4	6398.7	1037.6
6423.9	1037.6	6465.8	1037.7	6502.5	1037.7	6567.4	1037.8	6600	1037.9

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.08	5059.9	.035	5668.1	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6600	124	124	124	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
5000	5055	1035.5

CROSS SECTION OUTPUT Profile #Q100-24h

E.G. Elev (ft)	1036.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.24	Wt. n-Val.		0.042	
W.S. Elev (ft)	1036.46	Reach Len. (ft)	124.00	124.00	124.00
Crit W.S. (ft)	1036.46	Flow Area (sq ft)		257.00	
E.G. Slope (ft/ft)	0.034066	Area (sq ft)		257.00	
Q Total (cfs)	1020.00	Flow (cfs)		1020.00	
Top Width (ft)	602.26	Top Width (ft)		602.26	
Vel Total (ft/s)	3.97	Avg. Vel. (ft/s)		3.97	
Max Chl Dpth (ft)	2.66	Hydr. Depth (ft)		0.43	
Conv. Total (cfs)	5526.4	Conv. (cfs)		5526.4	
Length Wtd. (ft)	124.00	Wetted Per. (ft)		603.23	
Min Ch El (ft)	1033.80	Shear (lb/sq ft)		0.91	
Alpha	1.00	Stream Power (lb/ft s)		3.60	
Frctn Loss (ft)	0.73	Cum Volume (acre-ft)		98.41	
C & E Loss (ft)	0.06	Cum SA (acres)		87.58	

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 7.264

INPUT
Description: RM 7.264
Station Elevation Data num= 56

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1037.2	5003.1	1037.1	5007.3	1037.2	5016.5	1037	5018.1	1036.9
5020.1	1036.7	5023.8	1035.9	5033.2	1034.1	5034	1033.9	5034.5	1033.8
5038.9	1032.9	5041.7	1033.5	5054.9	1035.1	5058.4	1034.2	5059.5	1033.5
5064.3	1034.8	5065.3	1035.1	5070.4	1035.1	5076.9	1035	5077.2	1035.1
5080.2	1034.7	5083.7	1034.1	5084	1034	5088.1	1034	5110.4	1034.1
5193.6	1034.2	5306.8	1034.4	5336	1034.4	5419.5	1034.7	5427.6	1034.9
5451.5	1034.9	5575.5	1035.1	5595.7	1035.2	5678.4	1035.3	5704.2	1035.4
5853.6	1035.6	5869.4	1035.6	6249.8	1035.6	6254.3	1035.6	6258.8	1035.6
6263.3	1035.6	6363.5	1035.6	6367.8	1035.6	6372.1	1035.6	6390.1	1035.8
6415.5	1036.1	6419.7	1036.1	6451.5	1036.4	6475.9	1036.7	6480.1	1036.7
6484.3	1036.7	6491.3	1036.8	6500.9	1036.8	6505.1	1036.8	6509.3	1036.8
6600	1036.9								

Manning's n Values num= 2

Sta	n Val	Sta	n Val
5000	.08	5076.9	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6600	192	192	192	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
6035	6600	1036

CROSS SECTION OUTPUT Profile #Q100-24h

			Left OB	Channel	Right OB
E.G. Elev (ft)	1035.66	Element			
Vel Head (ft)	0.03	Wt. n-Val.		0.038	
W.S. Elev (ft)	1035.63	Reach Len. (ft)	192.00	192.00	192.00
Crit W.S. (ft)	1034.91	Flow Area (sq ft)		684.61	
E.G. Slope (ft/ft)	0.002335	Area (sq ft)		694.07	
Q Total (cfs)	1020.00	Flow (cfs)		1020.00	
Top Width (ft)	1349.39	Top Width (ft)		1349.39	
Vel Total (ft/s)	1.49	Avg. Vel. (ft/s)		1.49	
Max Chl Dpth (ft)	2.73	Hydr. Depth (ft)		0.68	
Conv. Total (cfs)	21109.4	Conv. (cfs)		21109.4	
Length Wtd. (ft)	192.00	Wetted Per. (ft)		1010.86	
Min Ch El (ft)	1032.90	Shear (lb/sq ft)		0.10	
Alpha	1.00	Stream Power (lb/ft s)		0.15	
Frctn Loss (ft)	0.53	Cum Volume (acre-ft)		97.06	
C & E Loss (ft)	0.00	Cum SA (acres)		84.80	

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 7.227

INPUT
Description: RM 7.227
Station Elevation Data num= 57

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1037.3	5007.8	1037.2	5010.5	1037.1	5018.1	1037.1	5022.2	1036.3
5025.9	1035.9	5026.7	1035.8	5027.9	1035.6	5038.2	1034.3	5041.1	1033.9
5042	1034	5043.2	1034.1	5054.9	1034.6	5058.8	1033.9	5058.9	1033.9
5060	1033.4	5060.5	1033.7	5062	1034.4	5063.2	1034.9	5066	1034.8
5071.6	1034.4	5073.9	1034.3	5075.3	1034.3	5081.1	1034.2	5082.6	1033.9
5083	1033.7	5083.1	1033.7	5106	1033.7	5190.3	1033.8	5225.9	1033.9
5229.3	1034	5298.7	1034.2	5371.1	1034.3	5429.3	1034.4	5667.9	1034.8
5742	1034.9	5867.6	1034.8	5909.9	1034.8	6227.9	1035.1	6239.9	1035.1
6251.9	1035.2	6263.9	1035.2	6347.7	1035.3	6359.4	1035.3	6371.2	1035.4
6386.3	1035.5	6407.5	1035.6	6419.2	1035.7	6445.8	1035.8	6466.2	1036
6477.9	1036	6489.5	1036.1	6495.4	1036.2	6503.5	1036.1	6515.2	1036.2
6526.8	1036.2	6600	1036.3						

Manning's n Values num= 2

Sta	n Val	Sta	n Val
5000	.08	5075.3	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6600	308	308	308	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
6082	6600	1036

CROSS SECTION OUTPUT Profile #Q100-24h

			Left OB	Channel	Right OB
E.G. Elev (ft)	1035.13	Element			
Vel Head (ft)	0.04	Wt. n-Val.		0.036	
W.S. Elev (ft)	1035.09	Reach Len. (ft)	308.00	308.00	308.00
Crit W.S. (ft)	1034.68	Flow Area (sq ft)		611.07	
E.G. Slope (ft/ft)	0.003386	Area (sq ft)		619.10	
Q Total (cfs)	1020.00	Flow (cfs)		1020.00	
Top Width (ft)	1180.52	Top Width (ft)		1180.52	
Vel Total (ft/s)	1.67	Avg. Vel. (ft/s)		1.67	
Max Chl Dpth (ft)	1.69	Hydr. Depth (ft)		0.58	
Conv. Total (cfs)	17529.3	Conv. (cfs)		17529.3	
Length Wtd. (ft)	308.00	Wetted Per. (ft)		1050.73	
Min Ch El (ft)	1033.40	Shear (lb/sq ft)		0.12	
Alpha	1.00	Stream Power (lb/ft s)		0.21	
Frctn Loss (ft)	0.54	Cum Volume (acre-ft)		94.16	
C & E Loss (ft)	0.01	Cum SA (acres)		79.23	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 7.169

INPUT
Description: RM 7.169
Station Elevation Data num= 58

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1037.5	5004.8	1037.5	5007.2	1037.6	5016.1	1037.7	5017.4	1037.7
5020.7	1036.9	5021.1	1036.8	5022.3	1036.5	5023	1035.7	5024.2	1035.9
5025.5	1035.8	5028.4	1035.8	5031.1	1035.9	5042	1036.6	5042.6	1036.6
5045.2	1036.7	5045.3	1036.7	5052.3	1036.6	5053.8	1035.8	5056	1034.6
5057.3	1033.9	5059.6	1032.6	5060.5	1032	5061.3	1031.6	5062	1031.7
5062.8	1032.2	5067	1034	5067.4	1034	5068.1	1034.1	5077.7	1034.1
5078.9	1034.1	5081.3	1034.1	5082.3	1033.8	5085.2	1033	5162.5	1033.2
5651.1	1034	5803.1	1034.2	5890.3	1034	5975.4	1034	6192.9	1034
6216.9	1034.1	6240.9	1034.1	6264.9	1034.2	6322.3	1034.3	6346.1	1034.4
6369.9	1034.4	6380.3	1034.5	6394.8	1034.7	6418.6	1034.6	6436.8	1034.8
6450.8	1034.9	6474.5	1035	6498.2	1035.1	6502.2	1035.1	6507.8	1035.1
6531.5	1035.1	6555.2	1035.2	6600	1035.2				

Manning's n Values num= 2

Sta	n Val	Sta	n Val
5000	.08	5077.7	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6600	500	500	500	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
6160	6600	1035

CROSS SECTION OUTPUT Profile #Q100-24h

			Left OB	Channel	Right OB
E.G. Elev (ft)	1034.58	Element			
Vel Head (ft)	0.02	Wt. n-Val.		0.036	
W.S. Elev (ft)	1034.56	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)	1034.02	Flow Area (sq ft)		872.15	
E.G. Slope (ft/ft)	0.001076	Area (sq ft)		951.69	
Q Total (cfs)	1020.00	Flow (cfs)		1020.00	
Top Width (ft)	1328.62	Top Width (ft)		1328.62	
Vel Total (ft/s)	1.17	Avg. Vel. (ft/s)		1.17	
Max Chl Dpth (ft)	2.96	Hydr. Depth (ft)		0.79	
Conv. Total (cfs)	31093.8	Conv. (cfs)		31093.8	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		1105.39	
Min Ch El (ft)	1031.60	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)		0.06	
Frctn Loss (ft)	1.60	Cum Volume (acre-ft)		88.61	
C & E Loss (ft)	0.02	Cum SA (acres)		70.36	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 7.074

INPUT
Description: RM 7.074, HEC-1 CPSF1 Q=1099 CFS
Station Elevation Data num= 54

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1036	5002.5	1036	5007.2	1036.2	5014.7	1036.1	5017.9	1035.9
5019.1	1035.7	5019.8	1035.4	5020	1035.4	5021.2	1035	5032.5	1032.4
5042.9	1029.6	5047	1030.8	5047.7	1030.8	5052.2	1032.4	5055.4	1031.1
5058.3	1029.8	5063.3	1031.4	5066.2	1032.6	5069.5	1032.7	5069.8	1032.7
5071.4	1032.6	5077.9	1032.3	5082.7	1031.9	5087.6	1031.6	5098	1031.7
5112.2	1032	5181	1032	5294.6	1032.3	5380.6	1032.4	5399.6	1032.3
5408.8	1032.4	5440.5	1032.4	5624.1	1032.8	5902.3	1033	5927.3	1033.2
6081.5	1032.7	6136.7	1032.8	6180.1	1033	6223.5	1033	6266.9	1033.1
6281.5	1032.9	6324.9	1033.1	6368.1	1033.1	6370.8	1033.2	6374.6	1033.2
6417.8	1033.1	6422.5	1033.1	6426.1	1033.1	6469.3	1033.3	6512.5	1033.4
6513.6	1033.4	6515	1033.4	6558.1	1033.5	6600	1033.6		

Manning's n Values num= 2

Sta	n Val	Sta	n Val
5000	.08	5077.9	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6600	218	218	218	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
5700	6600	

CROSS SECTION OUTPUT Profile #Q100-24h

E.G. Elev (ft)	1032.96	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.27	Wt. n-Val.		0.044	
W.S. Elev (ft)	1032.69	Reach Len. (ft)	218.00	218.00	218.00
Crit W.S. (ft)	1032.69	Flow Area (sq ft)		265.11	
E.G. Slope (ft/ft)	0.032101	Area (sq ft)		265.11	
Q Total (cfs)	1099.00	Flow (cfs)		1099.00	
Top Width (ft)	542.41	Top Width (ft)		542.41	
Vel Total (ft/s)	4.15	Avg. Vel. (ft/s)		4.15	
Max Chl Dpth (ft)	3.09	Hydr. Depth (ft)		0.49	
Conv. Total (cfs)	6134.0	Conv. (cfs)		6134.0	
Length Wtd. (ft)	218.00	Wetted Per. (ft)		544.32	
Min Ch El (ft)	1029.60	Shear (lb/sq ft)		0.98	
Alpha	1.00	Stream Power (lb/ft s)		4.05	
Frctn Loss (ft)	0.41	Cum Volume (acre-ft)		81.63	
C & E Loss (ft)	0.07	Cum SA (acres)		59.62	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 7.033

INPUT
Description: RM 7.033
Station Elevation Data num= 49

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1035	5003.7	1035.2	5007.5	1035.4	5011.1	1035.2	5016.5	1035
5020.3	1034	5020.7	1033.9	5021.2	1033.8	5022.4	1033.7	5022.6	1033.7
5023.1	1033.7	5023.5	1033.7	5042.6	1032.2	5042.9	1032.2	5044.3	1032.1
5046.9	1032	5049.5	1032	5054.4	1033	5059.5	1033.7	5062	1034.2
5063.5	1034.5	5064.4	1034.6	5064.5	1034.6	5067.1	1034.8	5067.3	1034.8
5069.9	1034.2	5084.7	1033.8	5088.7	1034	5098.2	1033.6	5105.6	1033.2
5107.9	1033	5109.3	1032.8	5110.7	1032.7	5111.5	1032.5	5123.1	1031.8
5124.1	1032.2	5126.7	1032.2	5130.3	1032.1	5135.8	1032.4	5138.9	1032.7
5139.4	1032.9	5141.4	1032.9	5143.2	1032.7	5148	1032.7	5152	1032.5
5159.4	1029	5159.9	1028.9	5671	1032	6500	1033		

Manning's n Values num= 2

Sta	n Val	Sta	n Val
5000	.08	5152	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6500	32	32	32	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
5000	5067.1	1034.8

CROSS SECTION OUTPUT Profile #Q100-24h

E.G. Elev (ft)	1031.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.035	
W.S. Elev (ft)	1031.96	Reach Len. (ft)	32.00	32.00	32.00
Crit W.S. (ft)	1030.50	Flow Area (sq ft)		785.14	
E.G. Slope (ft/ft)	0.000616	Area (sq ft)		785.14	
Q Total (cfs)	1099.00	Flow (cfs)		1099.00	
Top Width (ft)	515.12	Top Width (ft)		515.12	
Vel Total (ft/s)	1.40	Avg. Vel. (ft/s)		1.40	
Max Chl Dpth (ft)	3.06	Hydr. Depth (ft)		1.52	
Conv. Total (cfs)	44263.8	Conv. (cfs)		44263.8	
Length Wtd. (ft)	32.00	Wetted Per. (ft)		515.85	

Min Ch El (ft)	1028.90	Shear (lb/sq ft)	0.06
Alpha	1.00	Stream Power (lb/ft s)	0.08
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	79.00
C & E Loss (ft)	0.00	Cum SA (acres)	56.97

Warning: Divided flow computed for this cross-section.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 7.020

INPUT
Description: RM 7.020
Station Elevation Data num= 31

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1034	5010	1034.01	5020	1034	5036	1031.8	5042	1032
5050	1033	5070	1029	5121	1029	5135	1031	5139	1031
5145	1029	5150	1029	5155	1031	5197	1030.3	5425	1031
5478	1031	5501	1031.1	5510	1031.1	5534	1031	5560	1030
5580	1029	5590	1028	5609	1027	5620	1027	5645	1027.2
5656	1027	5667	1027	5673	1032.5	6076	1033	6404	1034
6500	1033.8								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.06	5155	.03	5667	.025

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6500	50	50	50	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5160		5673	6500	1032.5

Blocked Obstructions num= 1

Sta L	Sta R	Elev
5560	5673	1029

CROSS SECTION OUTPUT Profile #Q100-24h

			Left OB	Channel	Right OB
E.G. Elev (ft)	1031.98	Element			
Vel Head (ft)	0.03	Wt. n-Val.		0.030	
W.S. Elev (ft)	1031.95	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	1030.73	Flow Area (sq ft)		800.28	
E.G. Slope (ft/ft)	0.000423	Area (sq ft)		1045.04	
Q Total (cfs)	1099.00	Flow (cfs)		1099.00	
Top Width (ft)	622.69	Top Width (ft)		622.69	
Vel Total (ft/s)	1.37	Avg. Vel. (ft/s)		1.37	
Max Chl Dpth (ft)	2.95	Hydr. Depth (ft)		1.56	
Conv. Total (cfs)	53437.5	Conv. (cfs)		53437.5	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		513.60	
Min Ch El (ft)	1029.00	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)		0.06	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		78.33	
C & E Loss (ft)	0.01	Cum SA (acres)		56.56	

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 7.007

INPUT
Description: RM 7.007 Blocked basin not used for conveyance
Station Elevation Data num= 28

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1034.1	5010	1033.95	5020	1033.18	5021	1033	5035	1030
5050	1030	5058	1031	5067	1034	5076	1031	5088	1030
5093	1029.9	5095	1030	5107	1031	5115	1033	5122	1033.5
5133	1033	5152	1033	5168	1031	5190	1027	5198	1026.3
5555	1026.2	5627	1027	5658	1028	5675	1029	5692	1030
5770	1031	6235	1030	6500	1030				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

5000	.06	5122	.03	5692	.025

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6500	80	80	80	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5122	1033.5	5692	6500	

Blocked Obstructions num= 1

Sta L	Sta R	Elev
5168	5675	1029

CROSS SECTION OUTPUT Profile #Q100-24h

			Left OB	Channel	Right OB
E.G. Elev (ft)	1031.97	Element			
Vel Head (ft)	0.01	Wt. n-Val.		0.030	
W.S. Elev (ft)	1031.96	Reach Len. (ft)	80.00	80.00	80.00
Crit W.S. (ft)	1029.53	Flow Area (sq ft)		1534.17	
E.G. Slope (ft/ft)	0.000051	Area (sq ft)		2948.35	
Q Total (cfs)	1099.00	Flow (cfs)		1099.00	
Top Width (ft)	1412.38	Top Width (ft)		1412.38	
Vel Total (ft/s)	0.72	Avg. Vel. (ft/s)		0.72	
Max Chl Dpth (ft)	2.96	Hydr. Depth (ft)		2.89	
Conv. Total (cfs)	153965.5	Conv. (cfs)		153965.5	
Length Wtd. (ft)	80.00	Wetted Per. (ft)		531.93	
Min Ch El (ft)	1029.00	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)		0.01	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		76.03	
C & E Loss (ft)	0.00	Cum SA (acres)		55.39	

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.993

INPUT
Description: RM 6.993 Blocked basin not used for conveyance
Station Elevation Data num= 30

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1033.4	5010	1033.75	5020	1033.08	5023	1032	5034	1030
5055	1029.7	5083	1029.6	5102	1030	5107	1030.5	5112	1030
5115	1030	5120	1031	5125	1033	5128	1033	5133	1033
5140	1033	5150	1033	5168	1030	5181	1026	5550	1026.2
5566	1027	5575	1028	5615	1029	5663	1031	5685	1032
6000	1031	6049	1030	6171	1030	6238	1030	6500	1030

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.06	5133	.03	5663	.02

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6500	120	120	120	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5150	1033	5575	6500	

Blocked Obstructions num= 1

Sta L	Sta R	Elev
5168	5615	1029

CROSS SECTION OUTPUT Profile #Q100-24h

			Left OB	Channel	Right OB
E.G. Elev (ft)	1031.96	Element			
Vel Head (ft)	0.01	Wt. n-Val.		0.030	
W.S. Elev (ft)	1031.95	Reach Len. (ft)	120.00	120.00	120.00
Crit W.S. (ft)	1029.61	Flow Area (sq ft)		1209.39	
E.G. Slope (ft/ft)	0.000082	Area (sq ft)		2712.09	
Q Total (cfs)	1099.00	Flow (cfs)		1099.00	
Top Width (ft)	1425.08	Top Width (ft)		1425.08	
Vel Total (ft/s)	0.91	Avg. Vel. (ft/s)		0.91	
Max Chl Dpth (ft)	2.95	Hydr. Depth (ft)		2.89	
Conv. Total (cfs)	121435.1	Conv. (cfs)		121435.1	
Length Wtd. (ft)	120.00	Wetted Per. (ft)		419.00	
Min Ch El (ft)	1029.00	Shear (lb/sq ft)		0.01	

Alpha	1.00	Stream Power (lb/ft s)	0.01
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	70.84
C & E Loss (ft)	0.00	Cum SA (acres)	52.78

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.980

INPUT
Description: RM 6.980
Station Elevation Data num= 31

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1033.04	5010	1032.92	5020	1032.23	5030	1030.45	5032	1030
5036	1029.7	5057	1029.2	5077	1030	5100	1030	5119	1030
5129	1033	5133	1033	5135	1032	5141	1031.6	5170	1030
5184	1026	5190	1025.9	5360	1026	5377	1027	5410	1031
5492	1032	5532	1032.2	5545	1032	5585	1031	5593	1031
5612	1032	5628	1033	5658	1034	6004	1034	6040	1031
6500	1030.5								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.06	5129	.03	5585	.02

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6500	260	260	260	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5133	1033	5410	6500	

Blocked Obstructions num= 1

Sta L	Sta R	Elev
5170	5410	1029

CROSS SECTION OUTPUT Profile #Q100-24h

E.G. Elev (ft)	1031.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.030	
W.S. Elev (ft)	1031.90	Reach Len. (ft)	260.00	260.00	260.00
Crit W.S. (ft)	1029.91	Flow Area (sq ft)		711.57	
E.G. Slope (ft/ft)	0.000272	Area (sq ft)		1513.68	
Q Total (cfs)	1099.00	Flow (cfs)		1099.00	
Top Width (ft)	983.48	Top Width (ft)		983.48	
Vel Total (ft/s)	1.54	Avg. Vel. (ft/s)		1.54	
Max Chl Dpth (ft)	2.90	Hydr. Depth (ft)		2.60	
Conv. Total (cfs)	66607.6	Conv. (cfs)		66607.6	
Length Wtd. (ft)	260.00	Wetted Per. (ft)		273.88	
Min Ch El (ft)	1029.00	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)		0.07	
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)		65.02	
C & E Loss (ft)	0.00	Cum SA (acres)		49.47	

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.932

INPUT
Description: RM 6.932
Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1032.18	5010	1032.02	5020	1031.65	5023	1032	5030	1031
5040	1029	5065	1028.6	5098	1029	5117	1030	5123	1032
5126	1032	5131	1031	5136	1030.9	5142	1031	5147	1031
5160	1029	5167	1029	5180	1026	5343	1026	5363	1030
5373	1032	5437	1033	5628	1034	5663	1034	6500	1034

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.06	5126	.03	5373	.02

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6500	240	240	240	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5126	1032	5628	6500	1034

Blocked Obstructions num= 1

Sta L	Sta R	Elev
5147	5363	1029

CROSS SECTION OUTPUT Profile #Q100-24h

			Left OB	Channel	Right OB
E.G. Elev (ft)	1031.86	Element			
Vel Head (ft)	0.05	Wt. n-Val.		0.030	
W.S. Elev (ft)	1031.81	Reach Len. (ft)	240.00	240.00	240.00
Crit W.S. (ft)	1029.98	Flow Area (sq ft)		614.10	
E.G. Slope (ft/ft)	0.000385	Area (sq ft)		858.04	
Q Total (cfs)	1099.00	Flow (cfs)		1099.00	
Top Width (ft)	348.74	Top Width (ft)		348.74	
Vel Total (ft/s)	1.79	Avg. Vel. (ft/s)		1.79	
Max Chl Dpth (ft)	3.21	Hydr. Depth (ft)		2.51	
Conv. Total (cfs)	56036.2	Conv. (cfs)		56036.2	
Length Wtd. (ft)	240.00	Wetted Per. (ft)		245.58	
Min Ch El (ft)	1028.60	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)		0.11	
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)		57.94	
C & E Loss (ft)	0.00	Cum SA (acres)		45.49	

Warning: Divided flow computed for this cross-section.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.885

INPUT
Description: RM 6.885
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1031.6	5010	1031.57	5020	1031.36	5030	1031.15	5040	1030.92
5057	1030	5088	1029	5100	1029	5109	1030	5116	1031
5120	1031.8	5122	1031.5	5126	1031	5146	1030	5155	1027.3
5159	1029	5163	1029.6	5165	1029	5177	1026	5336	1026
5356	1030	5374	1033	5605	1034	5661	1034	6286	1034
6286	1031	6491	1030						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.06	5120	.03	5374	.02

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6491	240	240	240	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5120	1031.8	5605	6491	1034

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5146	5163	1029.6	5163	5356	1029

CROSS SECTION OUTPUT Profile #Q100-24h

			Left OB	Channel	Right OB
E.G. Elev (ft)	1031.76	Element			
Vel Head (ft)	0.05	Wt. n-Val.		0.030	
W.S. Elev (ft)	1031.70	Reach Len. (ft)	240.00	240.00	240.00
Crit W.S. (ft)	1030.01	Flow Area (sq ft)		588.86	
E.G. Slope (ft/ft)	0.000443	Area (sq ft)		1001.66	
Q Total (cfs)	1099.00	Flow (cfs)		1099.00	
Top Width (ft)	570.09	Top Width (ft)		570.09	
Vel Total (ft/s)	1.87	Avg. Vel. (ft/s)		1.87	
Max Chl Dpth (ft)	2.70	Hydr. Depth (ft)		2.40	
Conv. Total (cfs)	52187.9	Conv. (cfs)		52187.9	
Length Wtd. (ft)	240.00	Wetted Per. (ft)		246.03	
Min Ch El (ft)	1029.00	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)		0.12	

Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	52.81
C & E Loss (ft)	0.00	Cum SA (acres)	42.96

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.834

INPUT
Description: RM 6.834
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1031.32	5010	1031.32	5020	1030.96	5030	1030.55	5040	1029
5062	1029	5099	1030	5106	1031	5120	1034	5125	1034
5134	1031	5150	1030	5155	1027.1	5160	1029	5165	1029
5183	1025	5327	1025	5335	1026	5351	1029	5357	1030
5370	1032	5400	1033	5620	1034	5660	1034	6295	1034
6295	1031	6490	1030						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.035	5125	.03	5400	.02

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6490	305	305	305	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5125	1034	5620	6490	1034

Blocked Obstructions num= 1

Sta L	Sta R	Elev
5150	5357	1029

CROSS SECTION OUTPUT Profile #Q100-24h

			Left OB	Channel	Right OB
E.G. Elev (ft)	1031.64	Element			
Vel Head (ft)	0.06	Wt. n-Val.		0.030	
W.S. Elev (ft)	1031.58	Reach Len. (ft)	305.00	305.00	305.00
Crit W.S. (ft)	1029.97	Flow Area (sq ft)		556.77	
E.G. Slope (ft/ft)	0.000505	Area (sq ft)		943.62	
Q Total (cfs)	1099.00	Flow (cfs)		1099.00	
Top Width (ft)	538.76	Top Width (ft)		538.76	
Vel Total (ft/s)	1.97	Avg. Vel. (ft/s)		1.97	
Max Chl Dpth (ft)	2.58	Hydr. Depth (ft)		2.37	
Conv. Total (cfs)	48922.8	Conv. (cfs)		48922.8	
Length Wtd. (ft)	305.00	Wetted Per. (ft)		235.64	
Min Ch El (ft)	1029.00	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)		0.15	
Frctn Loss (ft)	0.23	Cum Volume (acre-ft)		47.46	
C & E Loss (ft)	0.01	Cum SA (acres)		39.90	

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.782

INPUT
Description: RM 6.782
Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1032	5003.5	1032	5004.7	1032	5005.2	1032	5008.3	1031.7
5015.3	1031	5019.5	1030.5	5019.8	1030.5	5024.4	1030.9	5028.6	1030.7
5032	1030	5053	1029	5119	1029	5187	1029	5193	1030
5197	1031	5202	1031.3	5209	1031.4	5215	1031	5223	1028
5227	1028	5230	1028.5	5233	1029	5252	1029	5268	1025
5357	1025	5393	1032	5428	1033	5627	1034	5662	1034
6297	1034	6297	1031	6497	1030				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

5000	.035	5209	.03	5428	.02

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6497	104	104	104	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5209	1031.4	5627	6497	1034

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5215	5233	1029	5238.9	5376.75	1029

CROSS SECTION OUTPUT Profile #Q100-24h

			Left OB	Channel	Right OB
E.G. Elev (ft)	1031.40	Element			
Vel Head (ft)	0.13	Wt. n-Val.		0.030	
W.S. Elev (ft)	1031.27	Reach Len. (ft)	104.00	104.00	104.00
Crit W.S. (ft)	1030.13	Flow Area (sq ft)		378.16	
E.G. Slope (ft/ft)	0.001271	Area (sq ft)		899.61	
Q Total (cfs)	1099.00	Flow (cfs)		1099.00	
Top Width (ft)	567.35	Top Width (ft)		567.35	
Vel Total (ft/s)	2.91	Avg. Vel. (ft/s)		2.91	
Max Chl Dpth (ft)	2.43	Hydr. Depth (ft)		2.12	
Conv. Total (cfs)	30823.7	Conv. (cfs)		30823.7	
Length Wtd. (ft)	104.00	Wetted Per. (ft)		179.13	
Min Ch El (ft)	1028.84	Shear (lb/sq ft)		0.17	
Alpha	1.00	Stream Power (lb/ft s)		0.49	
Frctn Loss (ft)	0.17	Cum Volume (acre-ft)		41.00	
C & E Loss (ft)	0.01	Cum SA (acres)		36.03	

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.753

INPUT
Description: RM 6.753
Station Elevation Data num= 52

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1031.45	5003.5	1031.45	5004.7	1031.45	5005.2	1031.45	5008.3	1031.15
5015.3	1030.45	5019.5	1029.95	5019.8	1029.95	5024.4	1030.35	5028.6	1030.15
5035.6	1029.75	5038.5	1029.65	5038.9	1029.65	5041.6	1029.35	5043.1	1029.35
5051.3	1029.25	5052.2	1029.35	5054.1	1029.25	5057.9	1029.05	5063	1029.15
5064.5	1029.05	5065	1029	5093	1028.7	5108	1029	5118	1033
5120	1033	5125	1033	5130	1030	5141	1029	5170	1030
5175	1029	5178	1028.8	5201	1028.8	5205	1029	5210	1031
5218	1031.3	5225	1031	5232	1027	5237	1026.8	5240	1029
5243	1029.8	5254	1029	5267	1025	5363	1025	5370	1026
5387	1030	5400	1033	5634	1034	5669	1034	6304	1034
6304	1031	6499	1030						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.035	5218	.03	5400	.02

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6499	208	208	208	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5218	1031.3	5634	6499	1034

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5218	5243	1029.8	5243	5387	1029

CROSS SECTION OUTPUT Profile #Q100-24h

			Left OB	Channel	Right OB
E.G. Elev (ft)	1031.22	Element			
Vel Head (ft)	0.20	Wt. n-Val.		0.030	
W.S. Elev (ft)	1031.03	Reach Len. (ft)	208.00	208.00	208.00
Crit W.S. (ft)	1030.26	Flow Area (sq ft)		308.50	
E.G. Slope (ft/ft)	0.002294	Area (sq ft)		722.08	
Q Total (cfs)	1099.00	Flow (cfs)		1099.00	
Top Width (ft)	548.06	Top Width (ft)		548.06	

Vel Total (ft/s)	3.56	Avg. Vel. (ft/s)	3.56
Max Chl Dpth (ft)	2.33	Hydr. Depth (ft)	1.85
Conv. Total (cfs)	22943.9	Conv. (cfs)	22943.9
Length Wtd. (ft)	208.00	Wetted Per. (ft)	167.66
Min Ch El (ft)	1028.70	Shear (lb/sq ft)	0.26
Alpha	1.00	Stream Power (lb/ft s)	0.94
Frctn Loss (ft)	0.26	Cum Volume (acre-ft)	39.07
C & E Loss (ft)	0.04	Cum SA (acres)	34.70

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.723

INPUT
Description: RM 6.723
Station Elevation Data num= 54

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1030.9	5006.5	1031	5008.6	1031.2	5008.9	1031.2	5010.9	1031.1
5013.5	1030.6	5016.5	1030.2	5017.3	1030.2	5017.7	1030.1	5018.4	1030.2
5022.2	1030.6	5028.5	1030.3	5034.2	1030	5048.4	1029.8	5056.6	1030
5059.1	1029.6	5069	1028.7	5071.3	1028.5	5079.7	1029.1	5084	1030
5109	1031	5115	1031	5129	1030	5132	1030	5137	1031
5148	1030.5	5163	1030.5	5172	1030	5175	1029	5180	1028.5
5201	1028.5	5205	1029	5210	1030	5213	1031.3	5223	1031.3
5227	1031	5232	1027	5235	1026	5240	1028	5243	1028.7
5257	1028	5267	1025	5477	1025	5485	1026	5507	1029
5523	1030	5542	1031	5546	1032	5558	1033	5625	1034
5667	1034	6297	1034	6297	1031	6497	1030		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.035	5137	.03	5558	.02

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6497	143	143	143	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5223	1031.3	5625	6497	1034

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5137	5223	1031	5223	5523	1029

CROSS SECTION OUTPUT Profile #Q100-24h

E.G. Elev (ft)	1030.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.030	
W.S. Elev (ft)	1030.86	Reach Len. (ft)	143.00	143.00	143.00
Crit W.S. (ft)	1029.78	Flow Area (sq ft)		548.08	
E.G. Slope (ft/ft)	0.000776	Area (sq ft)		722.26	
Q Total (cfs)	1099.00	Flow (cfs)		1099.00	
Top Width (ft)	597.71	Top Width (ft)		597.71	
Vel Total (ft/s)	2.01	Avg. Vel. (ft/s)		2.01	
Max Chl Dpth (ft)	2.36	Hydr. Depth (ft)		1.76	
Conv. Total (cfs)	39444.2	Conv. (cfs)		39444.2	
Length Wtd. (ft)	143.00	Wetted Per. (ft)		312.94	
Min Ch El (ft)	1028.50	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)		0.17	
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)		35.62	
C & E Loss (ft)	0.01	Cum SA (acres)		31.96	

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.696

INPUT
Description: RM 6.696
Station Elevation Data num= 49

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1030.7	5005.9	1030.7	5007	1030.7	5007.4	1030.6	5008.1	1030.6
5015.3	1030.1	5017.7	1030.1	5018.2	1029.9	5020.7	1030.2	5022.5	1030.3
5033	1029.4	5035.9	1029.4	5053.7	1029.7	5058.9	1029.8	5061	1029.9
5065.7	1029.2	5085.8	1026.8	5088.1	1026.5	5089.3	1026.4	5089.9	1026.3
5090.4	1026.5	5093	1027	5102	1031	5111	1031	5117	1027
5123	1027	5135	1030	5142	1030.8	5151	1030	5170	1029.2
5176	1029	5203	1029	5206	1031	5226	1031	5228	1030
5230	1028	5236	1025.9	5241	1028	5260	1028	5271	1025
5573	1025	5594	1030	5606	1033	5609	1033	5659	1034
5684	1034	6314	1034	6314	1031	6500	1030		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.035	5142	.03	5609	.02

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6500	280	280	280	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5226	1031	5659	6500	1034

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5142	5226	1030.8	5226	5594	1029

CROSS SECTION OUTPUT Profile #Q100-24h

			Left OB	Channel	Right OB
E.G. Elev (ft)	1030.83	Element			
Vel Head (ft)	0.04	Wt. n-Val.		0.030	
W.S. Elev (ft)	1030.78	Reach Len. (ft)	280.00	280.00	280.00
Crit W.S. (ft)	1029.66	Flow Area (sq ft)		652.03	
E.G. Slope (ft/ft)	0.000547	Area (sq ft)		932.38	
Q Total (cfs)	1099.00	Flow (cfs)		1099.00	
Top Width (ft)	648.49	Top Width (ft)		648.49	
Vel Total (ft/s)	1.69	Avg. Vel. (ft/s)		1.69	
Max Chl Dpth (ft)	4.48	Hydr. Depth (ft)		1.76	
Conv. Total (cfs)	46989.5	Conv. (cfs)		46989.5	
Length Wtd. (ft)	280.00	Wetted Per. (ft)		371.51	
Min Ch El (ft)	1026.30	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)		0.10	
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)		32.90	
C & E Loss (ft)	0.00	Cum SA (acres)		29.92	

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.649

INPUT
Description: RM 6.649
Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1030.7	5005.9	1030.7	5007	1030.7	5007.4	1030.6	5008.1	1030.6
5015.3	1030.1	5017.7	1030.1	5018.2	1029.9	5020.7	1030.2	5022.5	1030.3
5030	1029	5055	1028.4	5064	1028.5	5076	1029	5112	1029.5
5134	1029.7	5154	1030	5158	1030	5175	1029	5184	1028.5
5197	1028.5	5205	1029	5210	1030	5216	1030.1	5227	1030.1
5228	1030	5230	1029	5236	1025.8	5242	1028	5265	1027
5274	1025	5583	1025	5605	1030	5620	1033	5645	1034
5661	1034	5686	1034	6316	1034	6316	1031	6500	1030

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.035	5158	.03	5620	.02

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6500	220	220	220	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5227	1031.4	5645	6500	1034

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5154	5216	1030	5216	5620	1029

CROSS SECTION OUTPUT Profile #Q100-24h

			Left OB	Channel	Right OB
E.G. Elev (ft)	1030.65	Element			
Vel Head (ft)	0.05	Wt. n-Val.		0.030	
W.S. Elev (ft)	1030.60	Reach Len. (ft)	220.00	220.00	220.00
Crit W.S. (ft)	1029.65	Flow Area (sq ft)		600.19	
E.G. Slope (ft/ft)	0.000747	Area (sq ft)		861.69	
Q Total (cfs)	1099.00	Flow (cfs)		1099.00	
Top Width (ft)	709.63	Top Width (ft)		709.63	
Vel Total (ft/s)	1.83	Avg. Vel. (ft/s)		1.83	
Max Chl Dpth (ft)	2.20	Hydr. Depth (ft)		1.58	
Conv. Total (cfs)	40219.1	Conv. (cfs)		40219.1	
Length Wtd. (ft)	220.00	Wetted Per. (ft)		381.40	
Min Ch El (ft)	1028.40	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)		0.13	
Frctn Loss (ft)	0.17	Cum Volume (acre-ft)		27.14	
C & E Loss (ft)	0.00	Cum SA (acres)		25.55	

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.601

INPUT
Description: RM 6.601
Station Elevation Data num= 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1030.5	5002.7	1030.6	5005.6	1030.8	5013.7	1030.2	5014.4	1030.2
5017	1030.1	5031.2	1029.9	5036.3	1029	5036.9	1028.9	5038	1028.7
5041.9	1028.1	5045.6	1028	5058.3	1026.9	5058.7	1026.9	5076.6	1026
5082.7	1025.8	5086.7	1025.6	5087.4	1026.3	5094.8	1028.1	5105.5	1030.7
5114.9	1031.1	5115.1	1031.1	5116.3	1031.1	5136.7	1030.8	5139.5	1030.8
5140	1030	5145	1029	5175	1028	5195	1028	5218	1029
5229	1029.4	5233	1029	5236	1028	5240	1025	5247	1027
5275	1027	5280	1026	5288	1025.8	5585	1025.8	5590	1026
5610	1030	5629	1034	5673	1034	6336	1034	6336	1031
6500	1030								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.035	5145	.03	5629	.02

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6500	141	141	141	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5114.9	1031.1	5629	6500	1034

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5114.9	5229	1029.4	5229	5629	1029

CROSS SECTION OUTPUT Profile #Q100-24h

			Left OB	Channel	Right OB
E.G. Elev (ft)	1030.47	Element			
Vel Head (ft)	0.05	Wt. n-Val.		0.030	
W.S. Elev (ft)	1030.43	Reach Len. (ft)	141.00	141.00	141.00
Crit W.S. (ft)	1029.63	Flow Area (sq ft)		630.92	
E.G. Slope (ft/ft)	0.000841	Area (sq ft)		872.44	
Q Total (cfs)	1099.00	Flow (cfs)		1099.00	
Top Width (ft)	635.88	Top Width (ft)		635.88	
Vel Total (ft/s)	1.74	Avg. Vel. (ft/s)		1.74	
Max Chl Dpth (ft)	4.83	Hydr. Depth (ft)		1.34	
Conv. Total (cfs)	37901.5	Conv. (cfs)		37901.5	
Length Wtd. (ft)	141.00	Wetted Per. (ft)		472.75	
Min Ch El (ft)	1025.60	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)		0.12	
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)		22.76	
C & E Loss (ft)	0.00	Cum SA (acres)		22.16	

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.575

INPUT
Description: RM 6.575
Station Elevation Data num= 61

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1030.5	5002.7	1030.6	5005.6	1030.8	5013.7	1030.2	5014.4	1030.2
5017	1030.1	5031.2	1029.9	5036.3	1029	5036.9	1028.9	5038	1028.7
5041.9	1028.1	5045.6	1028	5058.3	1026.9	5058.7	1026.9	5076.6	1026
5082.7	1025.8	5086.7	1025.6	5087.4	1026.3	5094.8	1028.1	5105.5	1030.7
5114.9	1031.1	5115.1	1031.1	5116.3	1031.1	5136.7	1030.8	5139.5	1030.8
5140.6	1030.6	5141.6	1030.4	5148.7	1028.9	5148.9	1028.9	5149	1028.9
5159.1	1029	5164.5	1029	5181.9	1029	5186.4	1027.3	5188.9	1024.9
5189.2	1024.7	5190.1	1024.7	5192.3	1024.7	5203.2	1025.1	5210.7	1025.2
5213.8	1026.9	5217.6	1029.1	5228.46	1028.61	5240.78	1028	5244	1028
5248	1025.3	5253	1027	5280	1026	5444	1025.8	5570	1025.8
5588	1026	5598	1027	5628	1031	5637	1033	5643	1034
5714	1034	6249	1034	6284	1033	6319	1032	6424	1030
6500	1029.6								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.035	5149	.03	5643	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6500	132	132	132	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5114.9	1031.1	5643	6500	1034

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5181.9	5217.6	1029	5127.6	5624.3	1029

CROSS SECTION OUTPUT Profile #Q100-24h

E.G. Elev (ft)	1030.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.030	
W.S. Elev (ft)	1030.30	Reach Len. (ft)	132.00	132.00	132.00
Crit W.S. (ft)	1029.55	Flow Area (sq ft)		613.10	
E.G. Slope (ft/ft)	0.000946	Area (sq ft)		867.93	
Q Total (cfs)	1099.00	Flow (cfs)		1099.00	
Top Width (ft)	663.70	Top Width (ft)		663.70	
Vel Total (ft/s)	1.79	Avg. Vel. (ft/s)		1.79	
Max Chl Dpth (ft)	4.70	Hydr. Depth (ft)		1.28	
Conv. Total (cfs)	35738.4	Conv. (cfs)		35738.4	
Length Wtd. (ft)	132.00	Wetted Per. (ft)		480.89	
Min Ch El (ft)	1025.60	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)		0.13	
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)		19.94	
C & E Loss (ft)	0.01	Cum SA (acres)		20.05	

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.549

INPUT
Description: RM 6.549, HEC-1 RSSF2B Q=1432 CFS
Station Elevation Data num= 67

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1030.6	5007.3	1029.5	5022.3	1026.1	5024.5	1025.5	5024.7	1025.5
5026	1025.4	5048.2	1025.7	5049.4	1025.7	5063.1	1026.2	5065.7	1026.4
5068.3	1026.5	5079.5	1026	5088.9	1025.5	5093	1026.3	5095	1026.5
5098.1	1026.9	5101.4	1027.5	5105.6	1027.4	5110.1	1027.3	5116.7	1027.4
5132.6	1027.8	5134.8	1027.9	5141.2	1028.1	5145.3	1028.1	5147.9	1028.3
5148.7	1028.4	5154.6	1029	5157.8	1029.3	5161.8	1028.6	5168.4	1027.4
5171.7	1027.3	5173.7	1027.3	5177.8	1027.6	5185.6	1028.2	5199.1	1029.1
5202.6	1026.6	5204	1025.7	5207.2	1025.7	5220	1025.7	5230.2	1025.7
5232.9	1026.5	5242.6	1029	5250	1028	5255	1025.1	5260	1027

5325	1027.9	5375	1027.8	5433	1027.75	5467	1027.5	5500	1027
5517	1025	5644	1025	5677	1026	5700	1030	5714	1032
5720	1032.3	5725	1032	5732	1031.2	5749	1031	5820	1030.8
5864	1030	5866	1028	5880	1028	5956	1028	6097	1028
6240	1031	6500	1031.7						

Manning's n Values num= 2

Sta	n Val	Sta	n Val
5000	.035	5177.8	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6500	90	90	90	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5000	5157.8	1029.3	5720	6500	1032.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
5199.1	5701.8	1029

CROSS SECTION OUTPUT Profile #Q100-24h

E.G. Elev (ft)	1030.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.033	
W.S. Elev (ft)	1030.26	Reach Len. (ft)	90.00	90.00	90.00
Crit W.S. (ft)	1029.30	Flow Area (sq ft)		1232.90	
E.G. Slope (ft/ft)	0.000249	Area (sq ft)		1882.72	
Q Total (cfs)	1432.00	Flow (cfs)		1432.00	
Top Width (ft)	1055.13	Top Width (ft)		1055.13	
Vel Total (ft/s)	1.16	Avg. Vel. (ft/s)		1.16	
Max Chl Dpth (ft)	4.86	Hydr. Depth (ft)		1.76	
Conv. Total (cfs)	90788.1	Conv. (cfs)		90788.1	
Length Wtd. (ft)	90.00	Wetted Per. (ft)		700.80	
Min Ch El (ft)	1025.40	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)		0.03	
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)		15.77	
C & E Loss (ft)	0.02	Cum SA (acres)		17.45	

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The cross section had to be extended vertically during the critical depth calculations.
Warning: The parabolic search method failed to converge on critical depth. The program will try the cross section slice/secant method to find critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.532

INPUT
Description: RM 6.532, 75th Avenue
Station Elevation Data num= 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1031.47	5011.81	1031.25	5025.42	1031	5038.8	1030.75	5052.52	1030.5
5065.81	1030.25	5076.53	1030	5092.08	1029.75	5117.39	1029.5	5175.92	1029.25
5206.36	1029.07	5274.03	1029.25	5322.19	1029.5	5364.83	1029.75	5443.48	1030.13
5536.49	1030	5577.13	1030	5617.6	1029.75	5659.46	1029.5	5689.18	1029.35
5745.76	1029.36	5799.79	1029.45	5831.72	1029.39	5834.61	1029.45	5840.5	1029.5
5845.72	1029.54	5849.54	1029.5	5865.18	1029.26	5906.08	1029.5	5911.43	1029.56
5983.21	1029.75	6030	1030	6082.45	1029.9	6223.06	1030	6290.28	1030.02
6306.41	1030.06	6317.44	1030.14	6323.47	1030.05	6345.02	1030.25	6440.57	1030.5
6530.89	1030.75	6601.42	1031	6661.53	1031.18	6721.28	1031.16	6740.62	1031.25
6799.2	1031.46								

Manning's n Values num= 1

Sta	n Val
5000	.02

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6799.2	135	135	135	.1	.3

CROSS SECTION OUTPUT Profile #Q100-24h

E.G. Elev (ft)	1030.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.19	Wt. n-Val.		0.020	
W.S. Elev (ft)	1030.01	Reach Len. (ft)	135.00	135.00	135.00
Crit W.S. (ft)	1030.01	Flow Area (sq ft)		409.51	
E.G. Slope (ft/ft)	0.008134	Area (sq ft)		409.51	
Q Total (cfs)	1432.00	Flow (cfs)		1432.00	
Top Width (ft)	1086.24	Top Width (ft)		1086.24	
Vel Total (ft/s)	3.50	Avg. Vel. (ft/s)		3.50	
Max Chl Dpth (ft)	0.94	Hydr. Depth (ft)		0.38	
Conv. Total (cfs)	15877.5	Conv. (cfs)		15877.5	
Length Wtd. (ft)		Wetted Per. (ft)		1086.26	
Min Ch El (ft)	1029.07	Shear (lb/sq ft)		0.19	
Alpha	1.00	Stream Power (lb/ft s)		0.67	
Frctn Loss (ft)		Cum Volume (acre-ft)		13.40	
C & E Loss (ft)		Cum SA (acres)		15.24	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: The user has entered a known water surface elevation at this cross section.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.506

INPUT
Description: RM 6.506
Station Elevation Data num= 120

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1030.2	5002.5	1030.2	5003.3	1030.7	5005.1	1031.4	5010.7	1029.8
5011.6	1029.7	5039.2	1028	5051.6	1029.1	5055.7	1029.4	5059.1	1029.1
5098.8	1029.3	5105	1029.3	5109.3	1029.2	5154.5	1028.2	5159.5	1027.4
5160.6	1027.6	5173.3	1027.7	5205.4	1028	5205.9	1028	5211.4	1028.2
5245.5	1028.7	5266.7	1028.9	5301.2	1028.2	5305.6	1028	5308.3	1027.8
5315.3	1026.5	5319.8	1025.8	5326	1027.3	5331.5	1028.6	5332.6	1028.6
5340.7	1028.7	5350.3	1028.8	5355.1	1028.9	5357.2	1028.9	5373.4	1029.5
5384.6	1029.5	5390.9	1029.6	5400.7	1029.2	5405	1029.1	5405.2	1029.1
5410.9	1029.1	5429.8	1029.2	5434	1029.2	5447.7	1028.7	5454.3	1028.6
5457.3	1028.5	5464.4	1028.6	5467.8	1026.3	5468	1026.1	5469.1	1026.1
5491.6	1024.9	5492.8	1025.4	5500.2	1028.9	5502.7	1028.8	5520.9	1029.3
5521.7	1029.4	5522.3	1029.4	5531.4	1029	5534.5	1028.6	5551.9	1027.3
5554.4	1027	5593.9	1027.4	5605	1027.4	5609.2	1027.4	5655	1027.7
5659.1	1027.7	5705	1027.5	5709.1	1027.5	5755	1027.3	5767.8	1027.6
5807	1027.8	5814.7	1028.4	5834.8	1027.6	5838.3	1027.5	5849.8	1027.5
5855.7	1027.4	5856.7	1027.5	5860.4	1027.4	5874.4	1027.1	5895.9	1027.5
5905.1	1027.7	5951.5	1027.9	5955.1	1027.9	5958.6	1028	6005.1	1028
6008.5	1028	6055	1027.9	6058.4	1027.9	6105	1028	6151.9	1028
6155	1028	6202	1027.9	6205	1027.9	6208.1	1027.9	6255.1	1028
6302.3	1028.3	6305.1	1028.3	6333.6	1028.4	6341.3	1028.5	6344	1028.5
6355.1	1028.6	6355.4	1028.6	6360	1029.1	6371.8	1029.1	6377.9	1029.2
6383.9	1028.4	6393.2	1027.5	6403.5	1026.2	6407.1	1025.9	6420.1	1025.3
6426.5	1024.9	6434.2	1024.8	6452.5	1024.6	6453.9	1024.5	6454.5	1024.5
6457	1024.5	6504.5	1024.5	6506.2	1024.5	6545.1	1024.9	6546.7	1024.8

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
5000	.04	5390.9	.03	5534.5	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6546.7	500	500	500	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
6260	6546.7	1030

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
5464.4	5500.2	1028.5	6377.9	6546.7	1030

CROSS SECTION OUTPUT Profile #Q100-24h

E.G. Elev (ft)	1028.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.036	
W.S. Elev (ft)	1028.41	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)	1028.16	Flow Area (sq ft)		569.61	

E.G. Slope (ft/ft)	0.006195	Area (sq ft)	582.19
Q Total (cfs)	1432.00	Flow (cfs)	1432.00
Top Width (ft)	930.02	Top Width (ft)	930.02
Vel Total (ft/s)	2.51	Avg. Vel. (ft/s)	2.51
Max Chl Dpth (ft)	2.61	Hydr. Depth (ft)	0.67
Conv. Total (cfs)	18193.3	Conv. (cfs)	18193.3
Length Wtd. (ft)	500.00	Wetted Per. (ft)	856.16
Min Ch El (ft)	1025.80	Shear (lb/sq ft)	0.26
Alpha	1.00	Stream Power (lb/ft s)	0.65
Frctn Loss (ft)	0.45	Cum Volume (acre-ft)	11.87
C & E Loss (ft)	0.02	Cum SA (acres)	12.11

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Southern Pacific
REACH: Tolleson 1 RS: 6.412

INPUT
Description: RM 6.412 END OF REACH TOLLESON 1
Station Elevation Data num= 103

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5000	1028.7	5006.5	1028.8	5017.7	1027.3	5018.5	1027.2	5022.4	1028.4
5024.8	1029.2	5025.4	1029.2	5031.8	1029.6	5044	1029.8	5060.9	1029.8
5095.5	1029.7	5128.8	1029.6	5136.6	1026.5	5138.1	1026	5170.4	1026
5173.9	1026	5174.9	1026	5189.2	1025.9	5200.2	1025.8	5224.1	1026.3
5224.9	1026.3	5366.1	1025.4	5384.4	1025.4	5410.6	1025.2	5435.5	1025.1
5445.6	1026.5	5446.1	1026.5	5447.6	1026.7	5453.1	1027.1	5465.9	1027.8
5467.9	1026.6	5469.5	1025.9	5474.7	1025.7	5490.6	1025.3	5492.6	1025.9
5496.4	1027.1	5503.5	1027.1	5518.3	1027.1	5521.9	1027.1	5549.6	1026.6
5575.2	1026.3	5606.9	1026.8	5625.3	1026.9	5645.1	1026.9	5675.3	1026.8
5703.2	1026.8	5725.3	1026.5	5751.3	1026.5	5775.4	1026.5	5799.4	1026.2
5825.4	1026.4	5837.2	1026.1	5846.5	1026.1	5862	1025.9	5867.9	1026.2
5871.1	1026.3	5875.4	1026.4	5879.4	1026.4	5880.1	1026.4	5880.6	1026.4
5881.6	1026.4	5898.2	1026.1	5918.5	1026.5	5925.5	1026.9	5957.8	1026.7
5975.5	1026.8	6009.9	1026.9	6025.6	1026.9	6062.1	1026.6	6075.6	1026.5
6114.2	1027	6125.7	1027.1	6166.3	1027.3	6175.7	1027.4	6218.4	1026.8
6225.7	1026.8	6270.6	1027.2	6275.8	1027.2	6280.6	1027.2	6325.8	1027.3
6327.2	1027.3	6366.4	1026.9	6375.7	1027.1	6375.8	1027.1	6376.7	1027.1
6382.3	1027.4	6383.4	1027.4	6386	1027.3	6394	1027.3	6402.3	1027.3
6410.1	1027.2	6413.8	1027.3	6425.4	1027.4	6425.9	1027.4	6433.9	1026.9
6446.9	1027.4	6450.7	1027.7	6459.4	1027.9	6521.2	1028.4	6526	1028.4
6569.3	1028.4	6576	1028.5	6600	1028.9				

Manning's n Values num= 2

Sta	n Val	Sta	n Val
5000	.03	5521.9	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5000	6600	500	500	500	.1	.3

Left Levee Station= 5006.5 Elevation= 1028.8
Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
5050	5130	1035	5260	5430	1035	5465.9	5496.4	1027.1

CROSS SECTION OUTPUT Profile #Q100-24h

			Left OB	Channel	Right OB
E.G. Elev (ft)	1028.03	Element			
Vel Head (ft)	0.01	Wt. n-Val.		0.033	
W.S. Elev (ft)	1028.02	Reach Len. (ft)			
Crit W.S. (ft)	1026.98	Flow Area (sq ft)		1485.69	
E.G. Slope (ft/ft)	0.000345	Area (sq ft)		1485.69	
Q Total (cfs)	1432.00	Flow (cfs)		1432.00	
Top Width (ft)	1180.30	Top Width (ft)		1180.30	
Vel Total (ft/s)	0.96	Avg. Vel. (ft/s)		0.96	
Max Chl Dpth (ft)	2.92	Hydr. Depth (ft)		1.26	
Conv. Total (cfs)	77074.0	Conv. (cfs)		77074.0	
Length Wtd. (ft)		Wetted Per. (ft)		1186.15	
Min Ch El (ft)	1025.10	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)		0.03	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Warning: Divided flow computed for this cross-section.

SUMMARY OF MANNING'S N VALUES

River:Southern Pacific

Reach	River Sta.	n1	n2	n3
Tolleson 1	7.287	.08	.035	.04
Tolleson 1	7.264	.08	.035	
Tolleson 1	7.227	.08	.035	
Tolleson 1	7.169	.08	.035	
Tolleson 1	7.074	.08	.035	
Tolleson 1	7.033	.08	.035	
Tolleson 1	7.020	.06	.03	.025
Tolleson 1	7.007	.06	.03	.025
Tolleson 1	6.993	.06	.03	.02
Tolleson 1	6.980	.06	.03	.02
Tolleson 1	6.932	.06	.03	.02
Tolleson 1	6.885	.06	.03	.02
Tolleson 1	6.834	.035	.03	.02
Tolleson 1	6.782	.035	.03	.02
Tolleson 1	6.753	.035	.03	.02
Tolleson 1	6.723	.035	.03	.02
Tolleson 1	6.696	.035	.03	.02
Tolleson 1	6.649	.035	.03	.02
Tolleson 1	6.601	.035	.03	.02
Tolleson 1	6.575	.035	.03	.035
Tolleson 1	6.549	.035	.03	
Tolleson 1	6.532	.02		
Tolleson 1	6.506	.04	.03	.035
Tolleson 1	6.412	.03	.035	

SUMMARY OF REACH LENGTHS

River: Southern Pacific

Reach	River Sta.	Left	Channel	Right
Tolleson 1	7.287	124	124	124
Tolleson 1	7.264	192	192	192
Tolleson 1	7.227	308	308	308
Tolleson 1	7.169	500	500	500
Tolleson 1	7.074	218	218	218
Tolleson 1	7.033	32	32	32
Tolleson 1	7.020	50	50	50
Tolleson 1	7.007	80	80	80
Tolleson 1	6.993	120	120	120
Tolleson 1	6.980	260	260	260
Tolleson 1	6.932	240	240	240
Tolleson 1	6.885	240	240	240
Tolleson 1	6.834	305	305	305
Tolleson 1	6.782	104	104	104
Tolleson 1	6.753	208	208	208
Tolleson 1	6.723	143	143	143
Tolleson 1	6.696	280	280	280
Tolleson 1	6.649	220	220	220
Tolleson 1	6.601	141	141	141
Tolleson 1	6.575	132	132	132
Tolleson 1	6.549	90	90	90
Tolleson 1	6.532	135	135	135
Tolleson 1	6.506	500	500	500
Tolleson 1	6.412	500	500	500

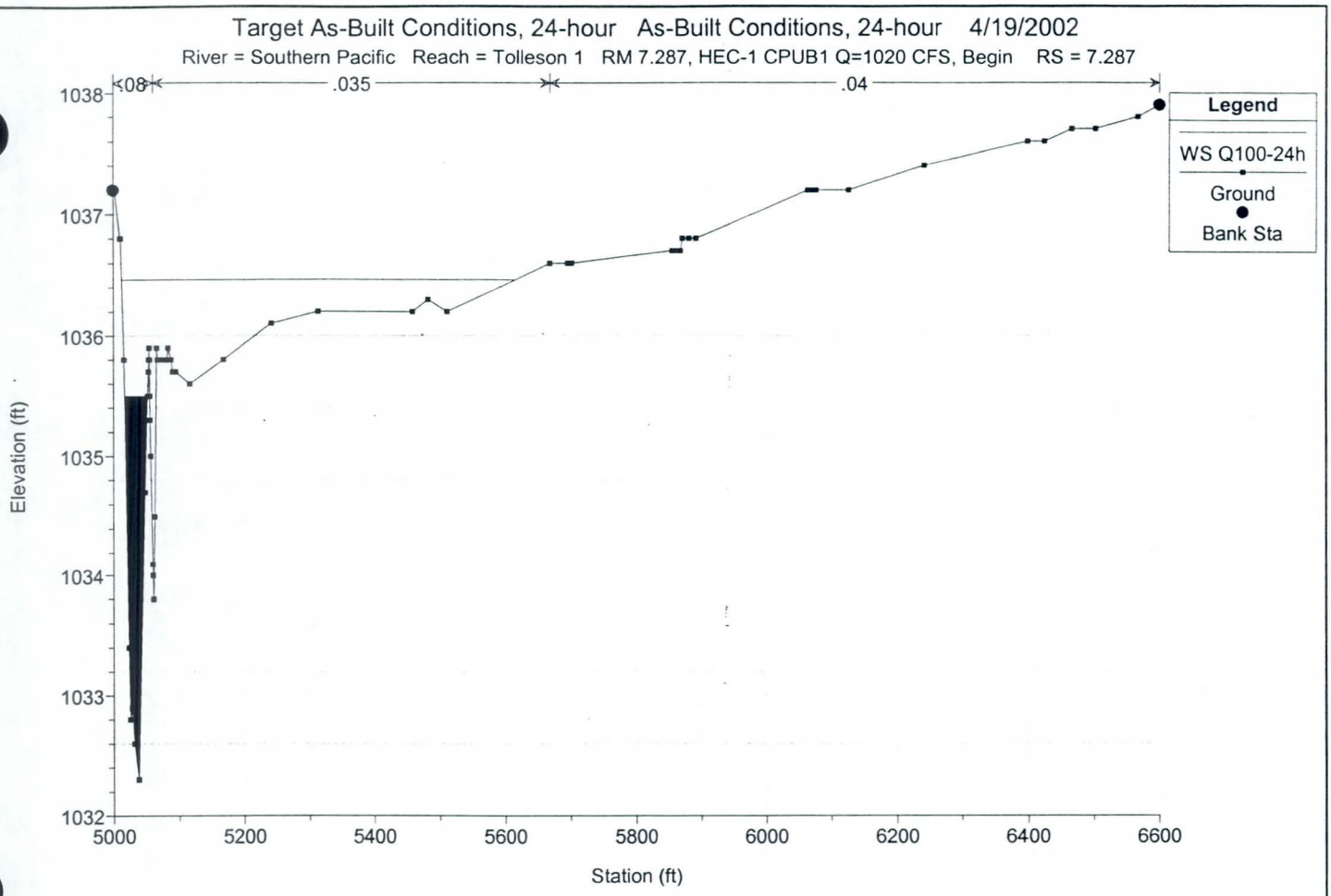
SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

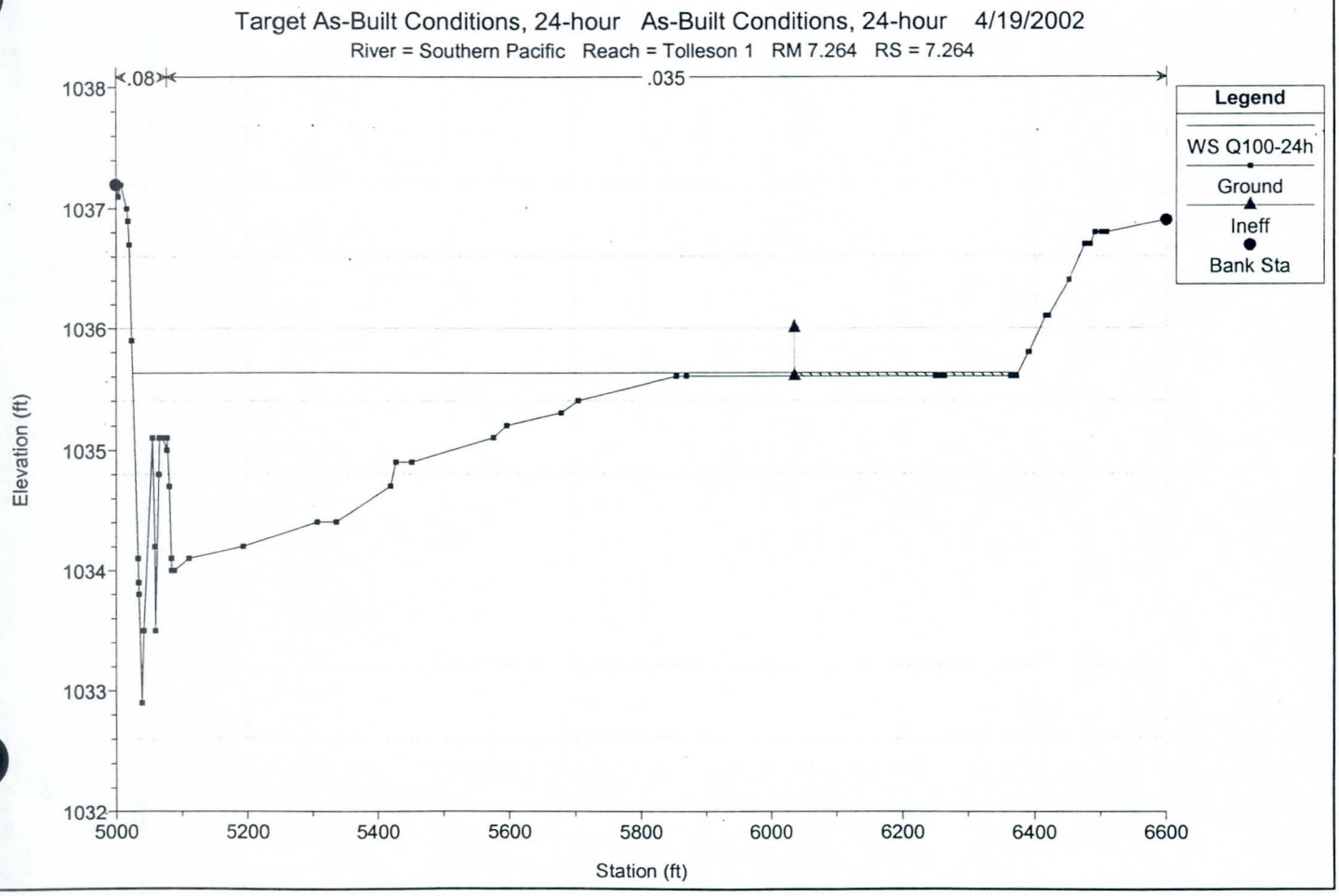
River: Southern Pacific

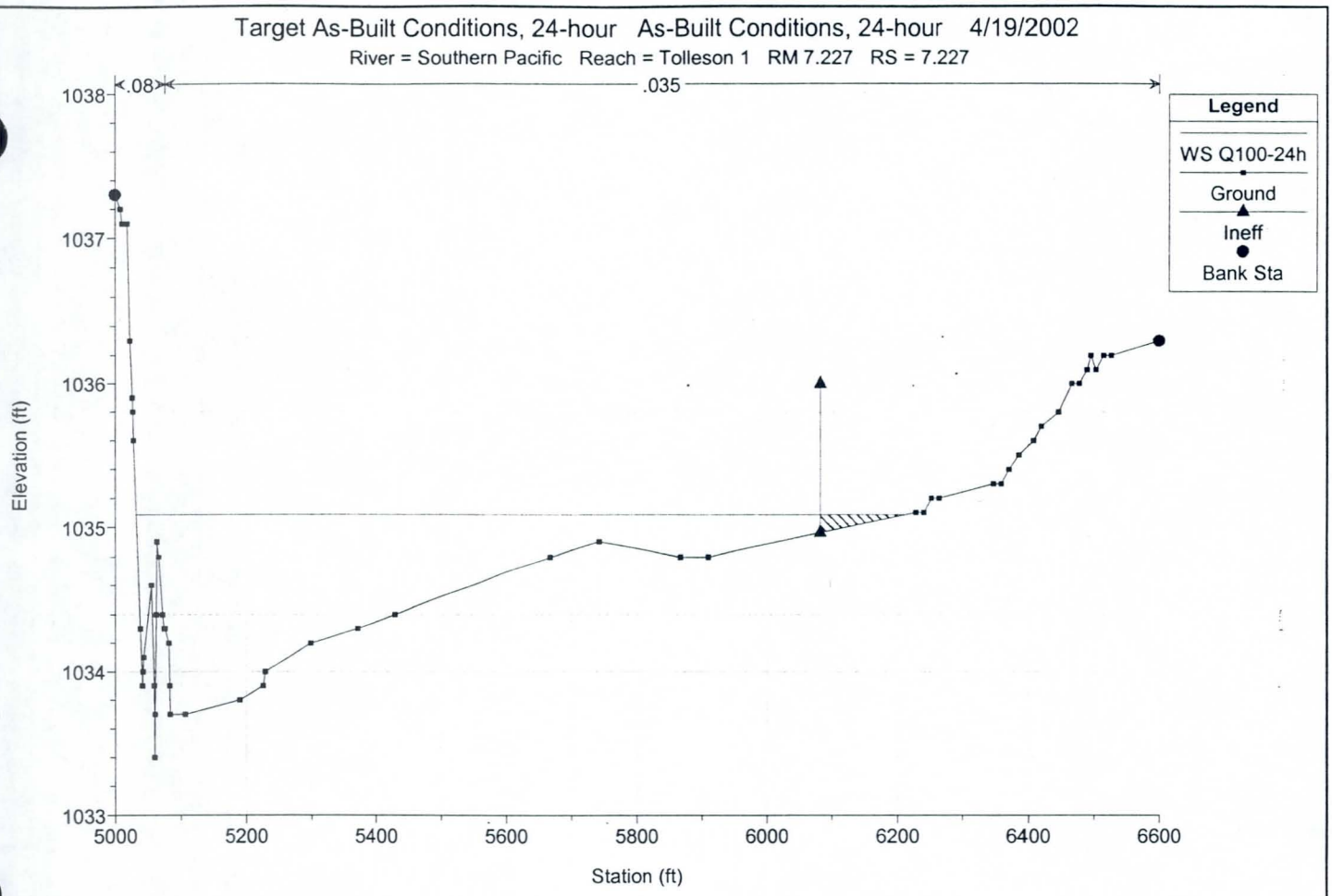
Reach	River Sta.	Contr.	Expan.
Tolleson 1	7.287	.1	.3
Tolleson 1	7.264	.1	.3
Tolleson 1	7.227	.1	.3
Tolleson 1	7.169	.1	.3
Tolleson 1	7.074	.1	.3
Tolleson 1	7.033	.1	.3
Tolleson 1	7.020	.1	.3
Tolleson 1	7.007	.1	.3
Tolleson 1	6.993	.1	.3
Tolleson 1	6.980	.1	.3
Tolleson 1	6.932	.1	.3
Tolleson 1	6.885	.1	.3
Tolleson 1	6.834	.1	.3
Tolleson 1	6.782	.1	.3
Tolleson 1	6.753	.1	.3
Tolleson 1	6.723	.1	.3
Tolleson 1	6.696	.1	.3
Tolleson 1	6.649	.1	.3
Tolleson 1	6.601	.1	.3
Tolleson 1	6.575	.1	.3
Tolleson 1	6.549	.1	.3
Tolleson 1	6.532	.1	.3
Tolleson 1	6.506	.1	.3
Tolleson 1	6.412	.1	.3

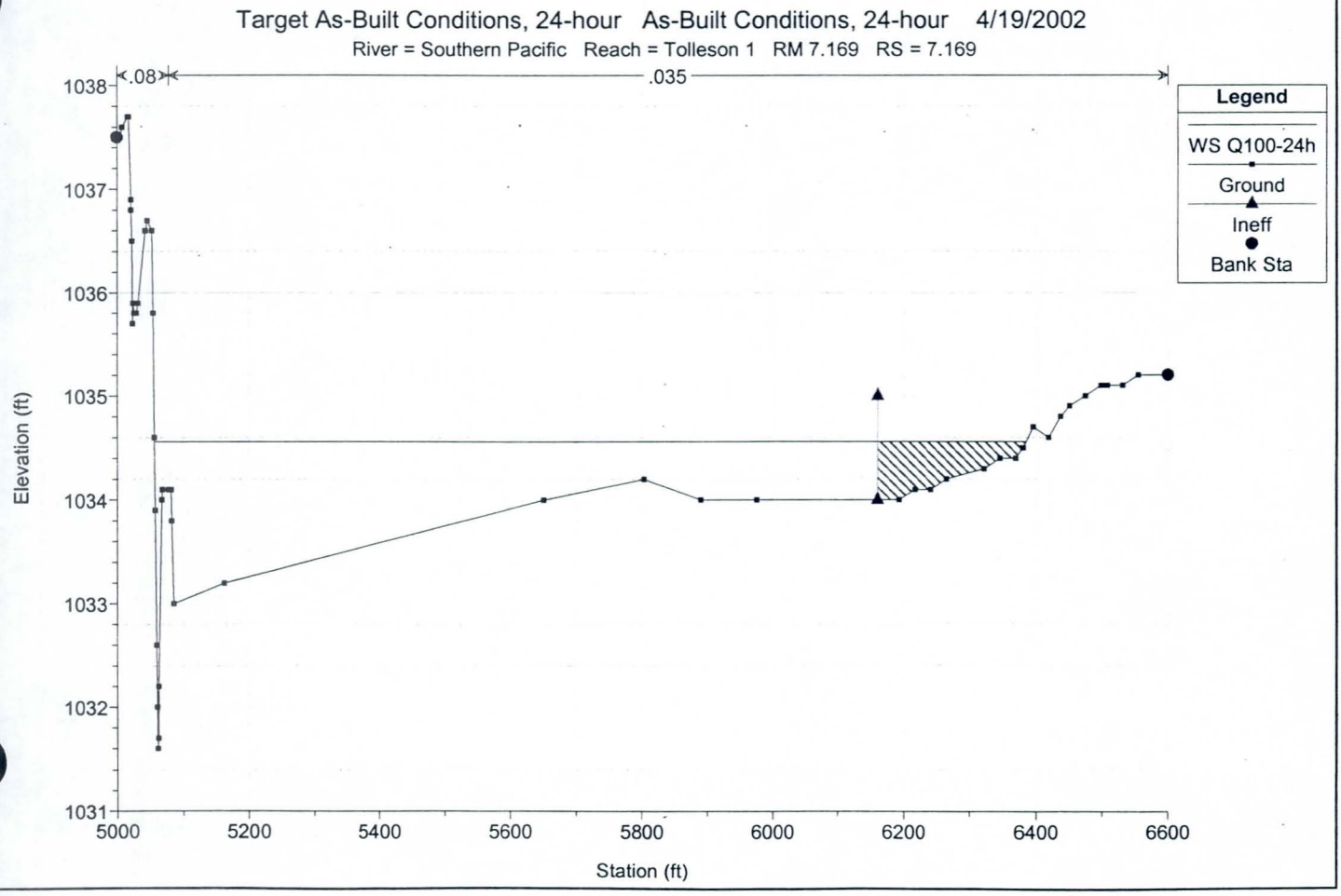
HEC-RAS Plan: AsBuilt 24hr River: Southern Pacific Reach: Tolleson 1

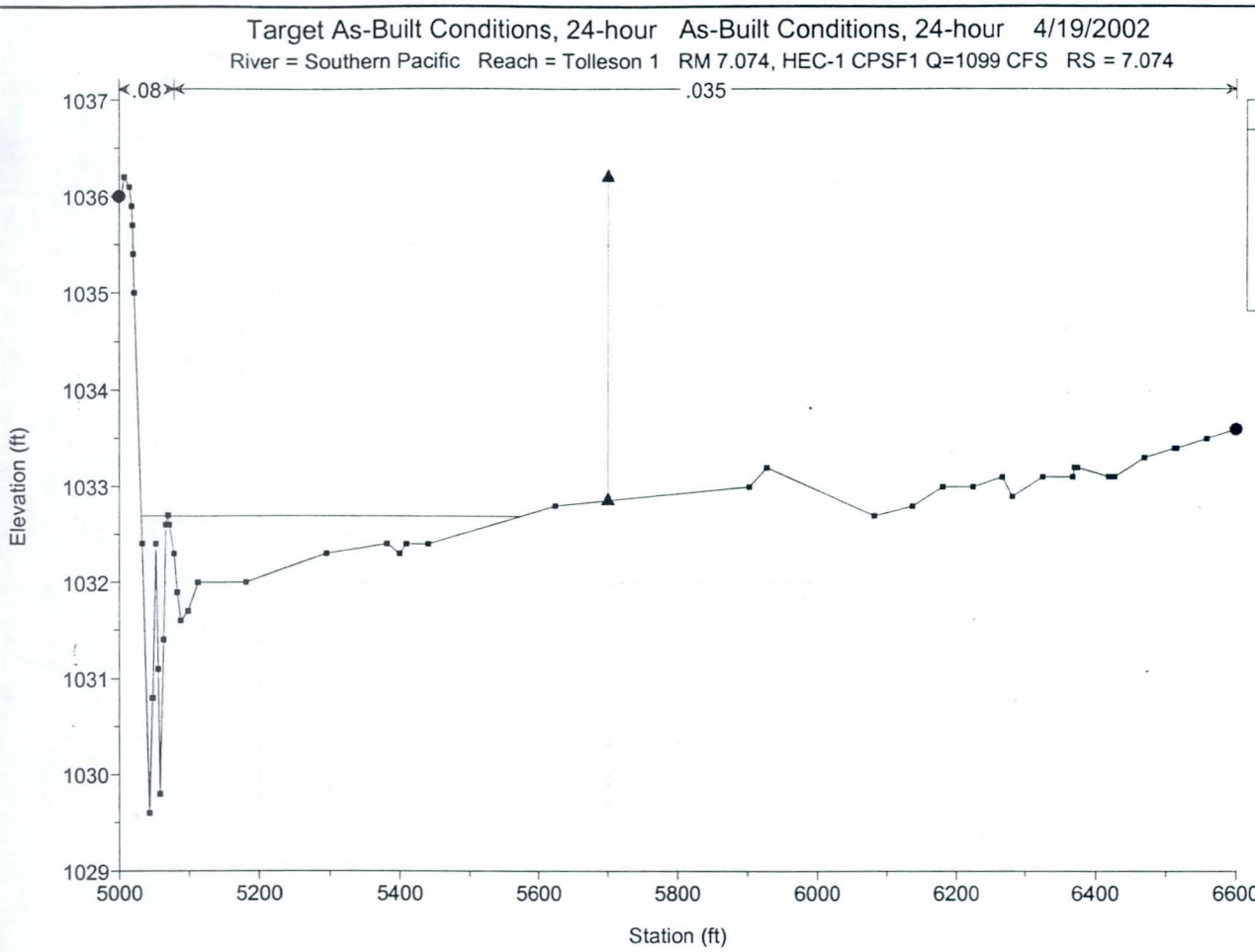
Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Tolleson 1	7.287	1020.00	1033.80	1036.46	1036.46	1036.71	0.034066	3.97	257.00	602.26	1.07
Tolleson 1	7.264	1020.00	1032.90	1035.63	1034.91	1035.66	0.002335	1.49	684.61	1349.39	0.32
Tolleson 1	7.227	1020.00	1033.40	1035.09	1034.68	1035.13	0.003386	1.67	611.07	1180.52	0.39
Tolleson 1	7.169	1020.00	1031.60	1034.56	1034.02	1034.58	0.001076	1.17	872.15	1328.62	0.23
Tolleson 1	7.074	1099.00	1029.60	1032.69	1032.69	1032.96	0.032101	4.15	265.11	542.41	1.04
Tolleson 1	7.033	1099.00	1028.90	1031.96	1030.50	1031.99	0.000616	1.40	785.14	515.12	0.20
Tolleson 1	7.020	1099.00	1029.00	1031.95	1030.73	1031.98	0.000423	1.37	800.28	622.69	0.19
Tolleson 1	7.007	1099.00	1029.00	1031.96	1029.53	1031.97	0.000051	0.72	1534.17	1412.38	0.07
Tolleson 1	6.993	1099.00	1029.00	1031.95	1029.61	1031.96	0.000082	0.91	1209.39	1425.08	0.09
Tolleson 1	6.980	1099.00	1029.00	1031.90	1029.91	1031.94	0.000272	1.54	711.57	983.48	0.17
Tolleson 1	6.932	1099.00	1028.60	1031.81	1029.98	1031.86	0.000385	1.79	614.10	348.74	0.20
Tolleson 1	6.885	1099.00	1029.00	1031.70	1030.01	1031.76	0.000443	1.87	588.86	570.09	0.21
Tolleson 1	6.834	1099.00	1029.00	1031.58	1029.97	1031.64	0.000505	1.97	556.77	538.76	0.23
Tolleson 1	6.782	1099.00	1028.84	1031.27	1030.13	1031.40	0.001271	2.91	378.16	567.35	0.35
Tolleson 1	6.753	1099.00	1028.70	1031.03	1030.26	1031.22	0.002294	3.56	308.50	548.06	0.46
Tolleson 1	6.723	1099.00	1028.50	1030.86	1029.78	1030.93	0.000776	2.01	548.08	597.71	0.27
Tolleson 1	6.696	1099.00	1026.30	1030.78	1029.66	1030.83	0.000547	1.69	652.03	648.49	0.22
Tolleson 1	6.649	1099.00	1028.40	1030.60	1029.65	1030.65	0.000747	1.83	600.19	709.63	0.26
Tolleson 1	6.601	1099.00	1025.60	1030.43	1029.63	1030.47	0.000841	1.74	630.92	635.88	0.27
Tolleson 1	6.575	1099.00	1025.60	1030.30	1029.55	1030.35	0.000946	1.79	613.10	663.70	0.28
Tolleson 1	6.549	1432.00	1025.40	1030.26	1029.30	1030.29	0.000249	1.16	1232.90	1055.13	0.15
Tolleson 1	6.532	1432.00	1029.07	1030.01	1030.01	1030.20	0.008134	3.50	409.51	1086.24	1.00
Tolleson 1	6.506	1432.00	1025.80	1028.41	1028.16	1028.51	0.006195	2.51	569.61	930.02	0.54
Tolleson 1	6.412	1432.00	1025.10	1028.02	1026.98	1028.03	0.000345	0.96	1485.69	1180.30	0.15

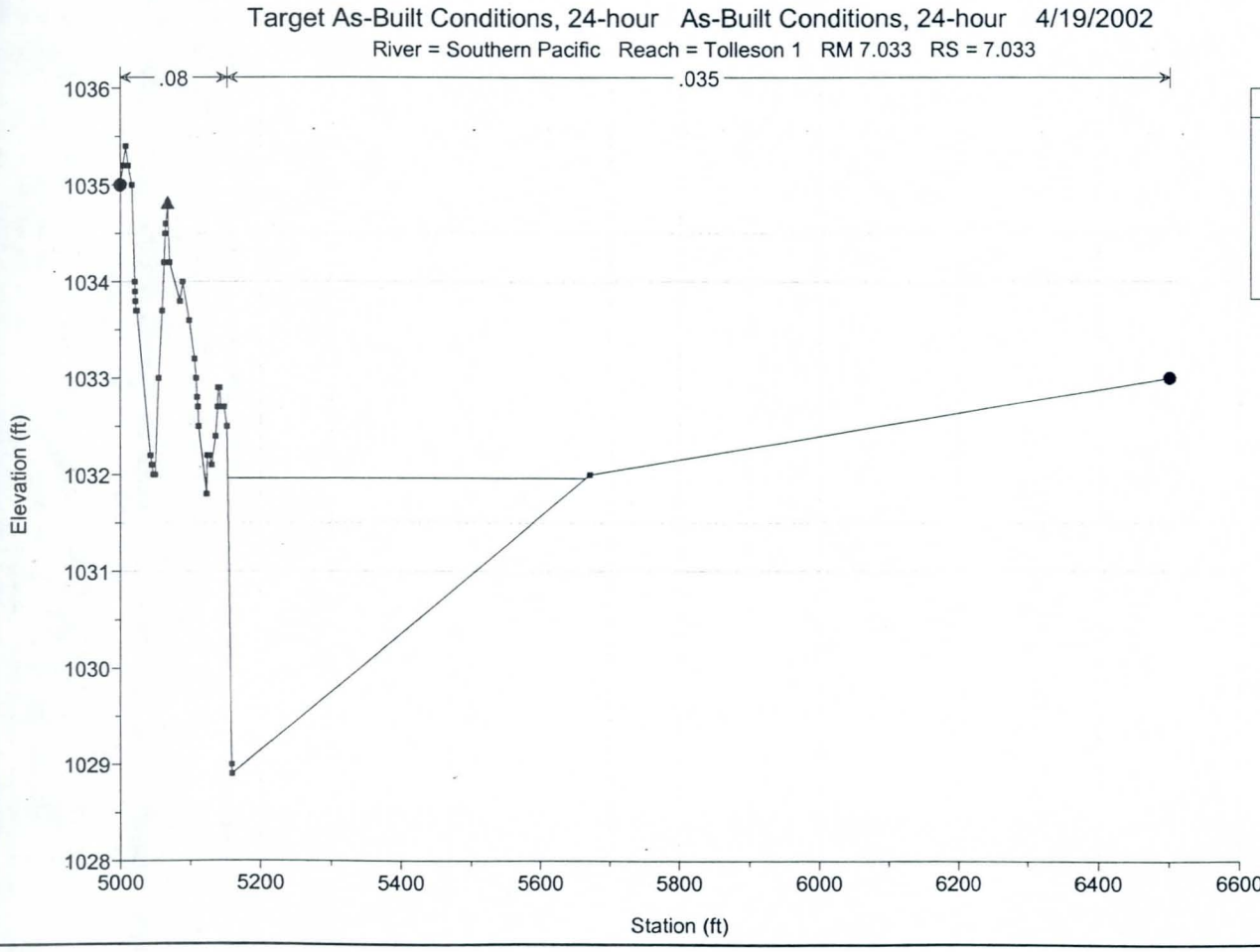

Target As-Built Conditions, 24-hour As-Built Conditions, 24-hour 4/19/2002
River = Southern Pacific Reach = Tolleson 1 RM 7.287, HEC-1 CPUB1 Q=1020 CFS, Begin RS = 7.287
.08
.035
.04
Legend
WS Q100-24h
Ground
Bank Sta
Elevation (ft)
1038
1037
1036
1035
1034
1033
1032
5000
5200
5400
5600
5800
6000
6200
6400
6600
Station (ft)

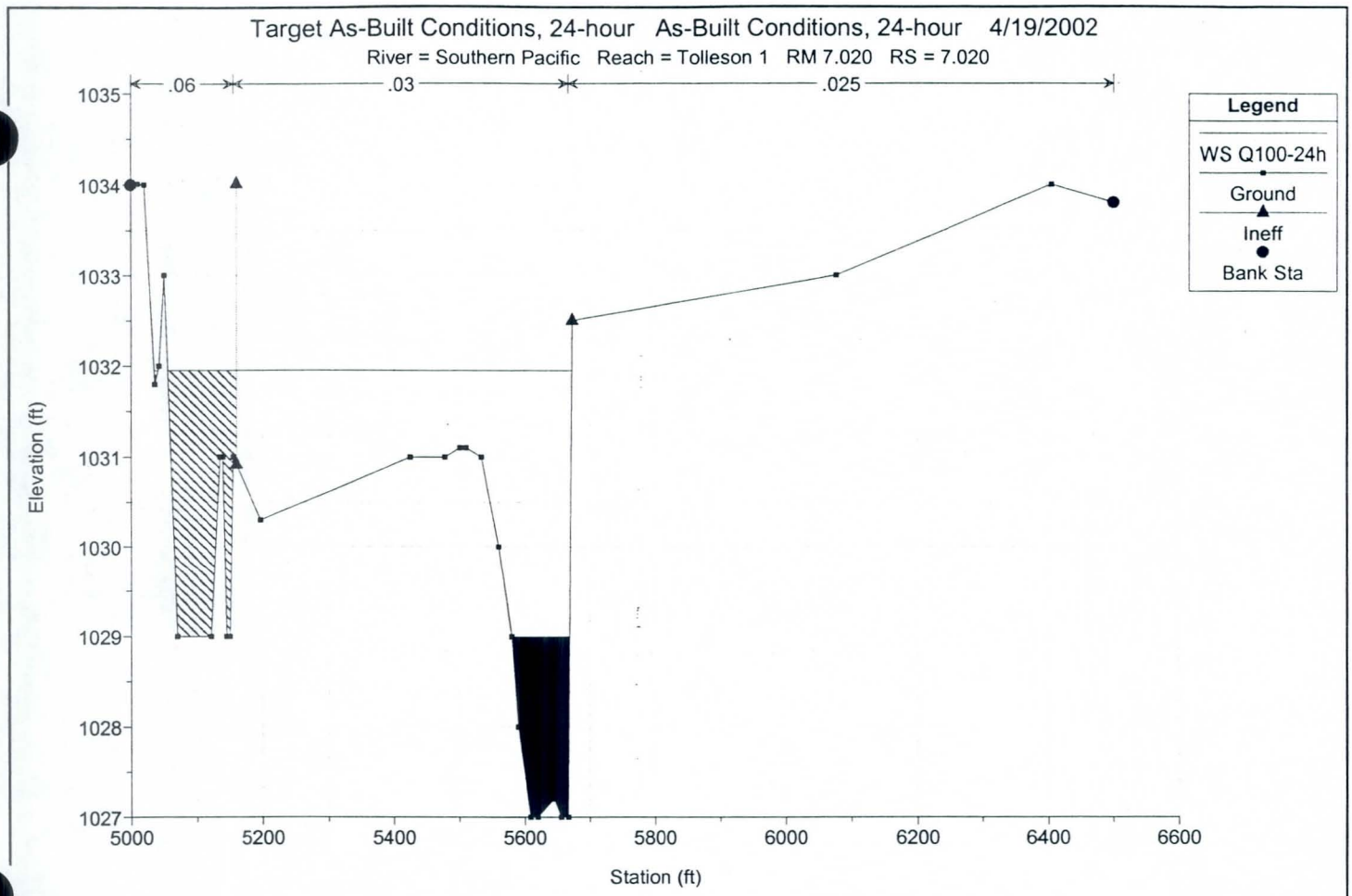

Target As-Built Conditions, 24-hour As-Built Conditions, 24-hour 4/19/2002
River = Southern Pacific Reach = Tolleson 1 RM 7.264 RS = 7.264
.08
.035
Legend
WS Q100-24h
Ground
Ineff
Bank Sta
Elevation (ft)
1038
1037
1036
1035
1034
1033
1032
5000
5200
5400
5600
5800
6000
6200
6400
6600
Station (ft)

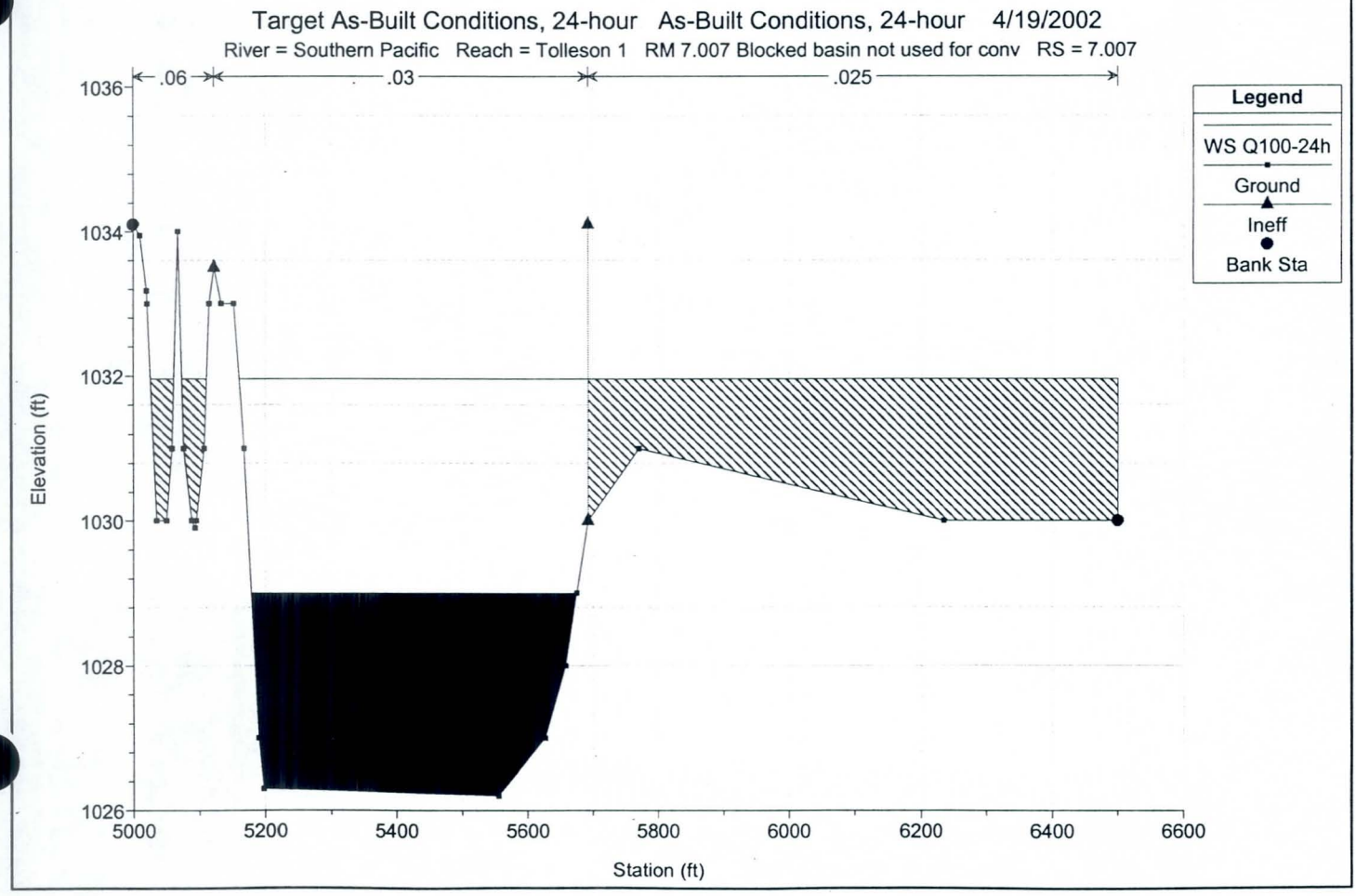

Target As-Built Conditions, 24-hour As-Built Conditions, 24-hour 4/19/2002
River = Southern Pacific Reach = Tolleson 1 RM 7.227 RS = 7.227
.08
.035
Legend
WS Q100-24h
Ground
Ineff
Bank Sta
Elevation (ft)
1038
1037
1036
1035
1034
1033
5000
5200
5400
5600
5800
6000
6200
6400
6600
Station (ft)

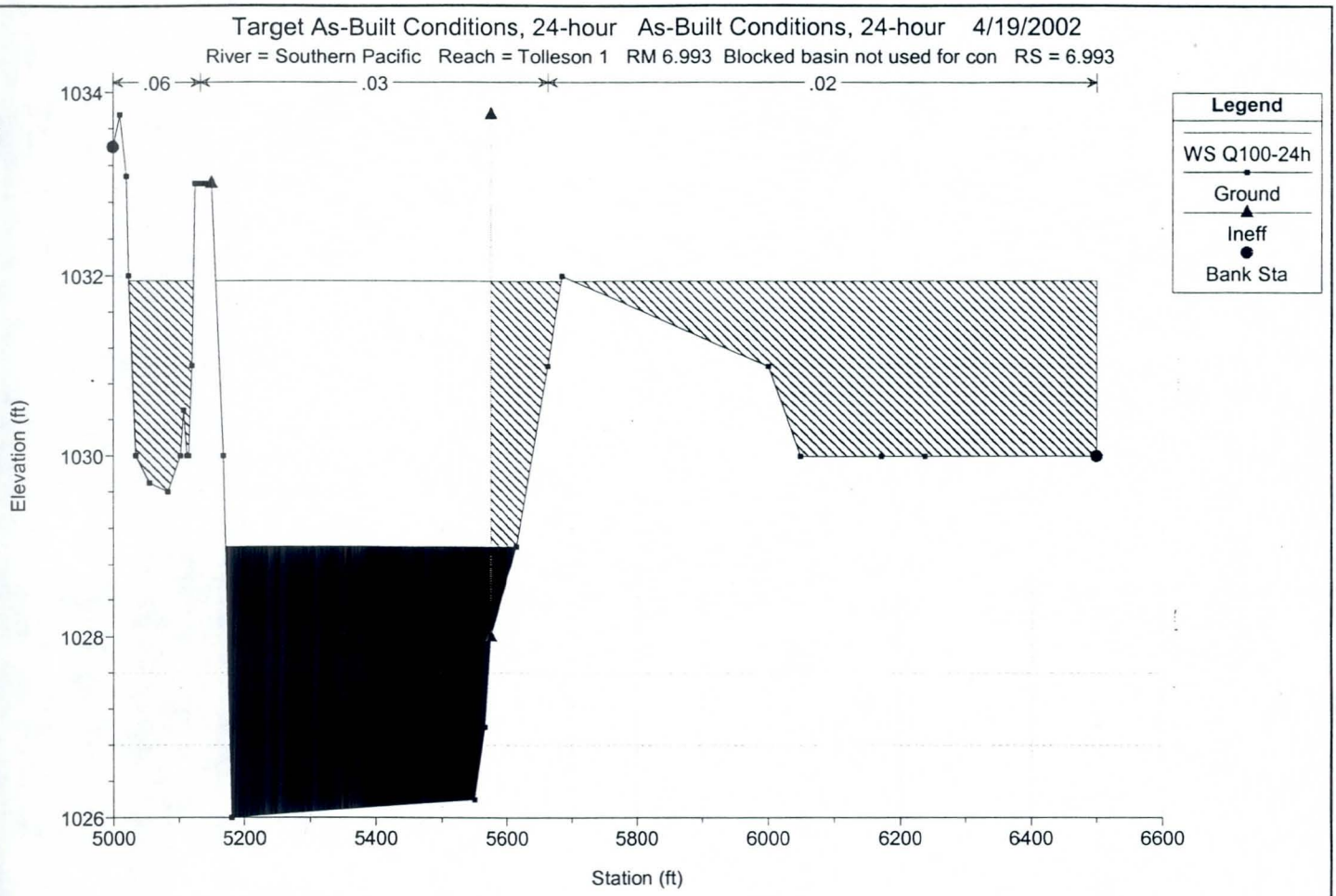

Target As-Built Conditions, 24-hour As-Built Conditions, 24-hour 4/19/2002
River = Southern Pacific Reach = Tolleson 1 RM 7.169 RS = 7.169
.08
.035
Legend
WS Q100-24h
Ground
Ineff
Bank Sta
Elevation (ft)
1038
1037
1036
1035
1034
1033
1032
1031
5000
5200
5400
5600
5800
6000
6200
6400
6600
Station (ft)

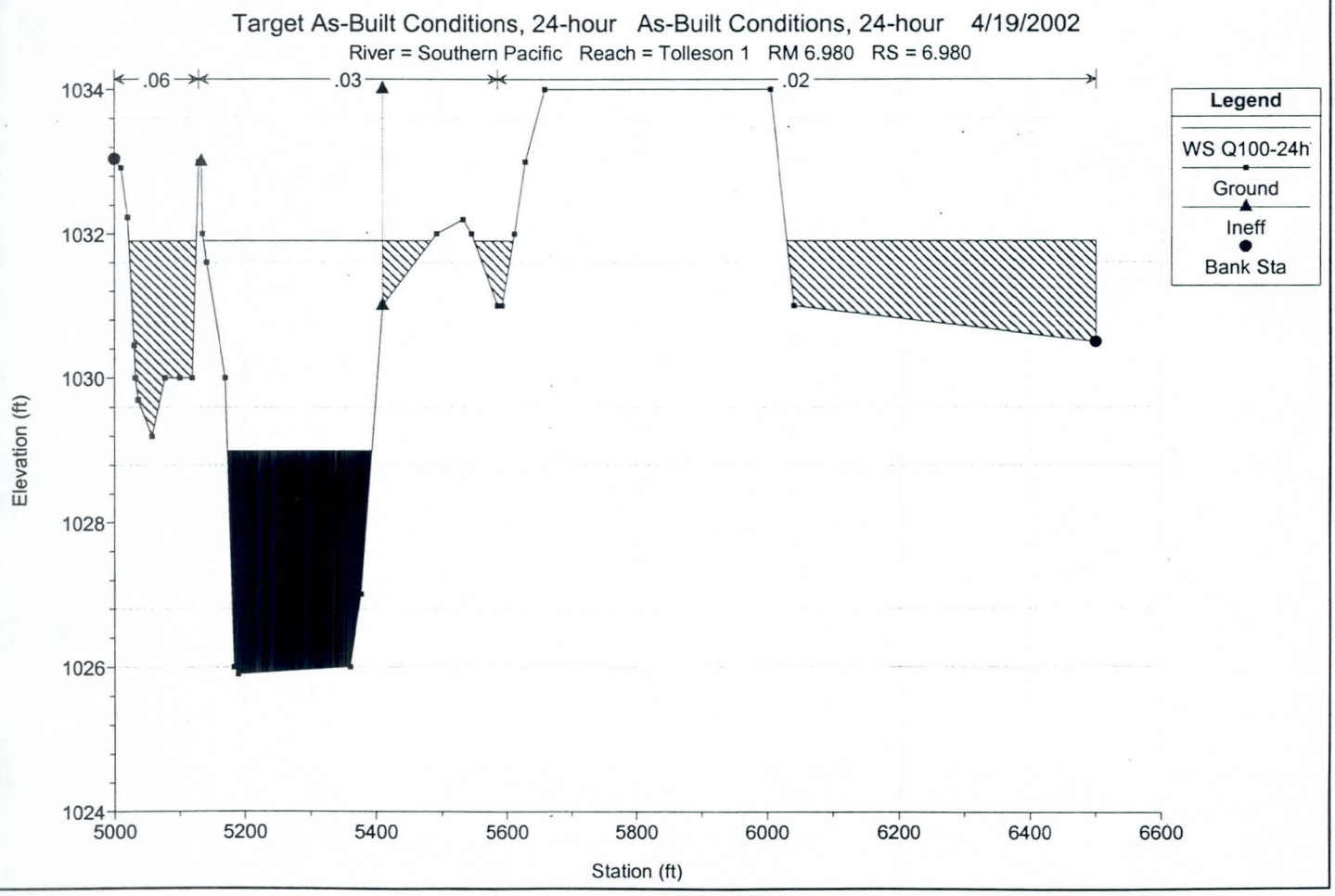

Target As-Built Conditions, 24-hour As-Built Conditions, 24-hour 4/19/2002
River = Southern Pacific Reach = Tolleson 1 RM 7.074, HEC-1 CPSF1 Q=1099 CFS RS = 7.074
.08
.035
Legend
WS Q100-24h
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
1037
1036
1035
1034
1033
1032
1031
1030
1029
5000
5200
5400
5600
5800
6000
6200
6400
6600

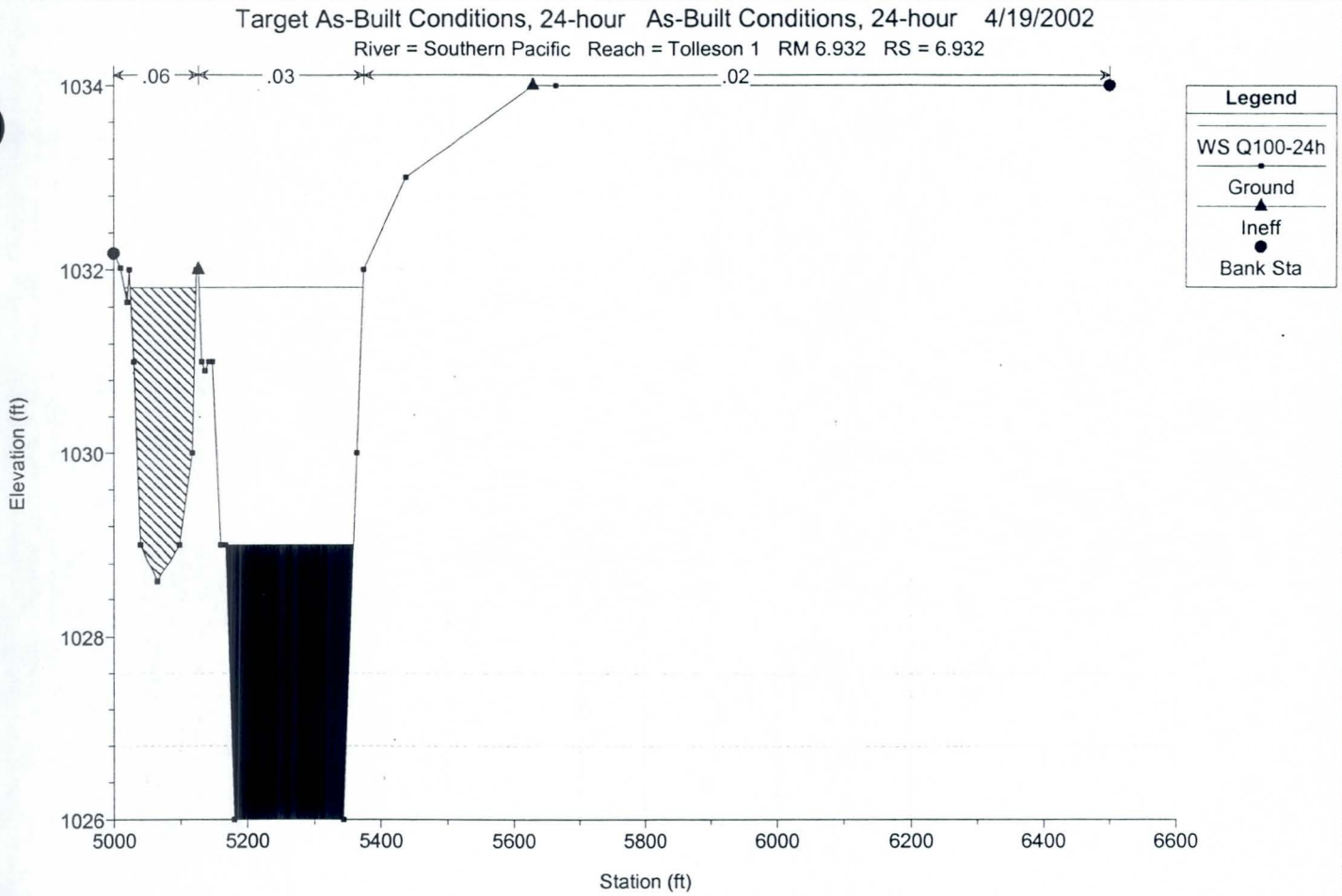

Target As-Built Conditions, 24-hour As-Built Conditions, 24-hour 4/19/2002
River = Southern Pacific Reach = Tolleson 1 RM 7.033 RS = 7.033
.08
.035
Legend
WS Q100-24h
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
1036
1035
1034
1033
1032
1031
1030
1029
1028
5000
5200
5400
5600
5800
6000
6200
6400
6600

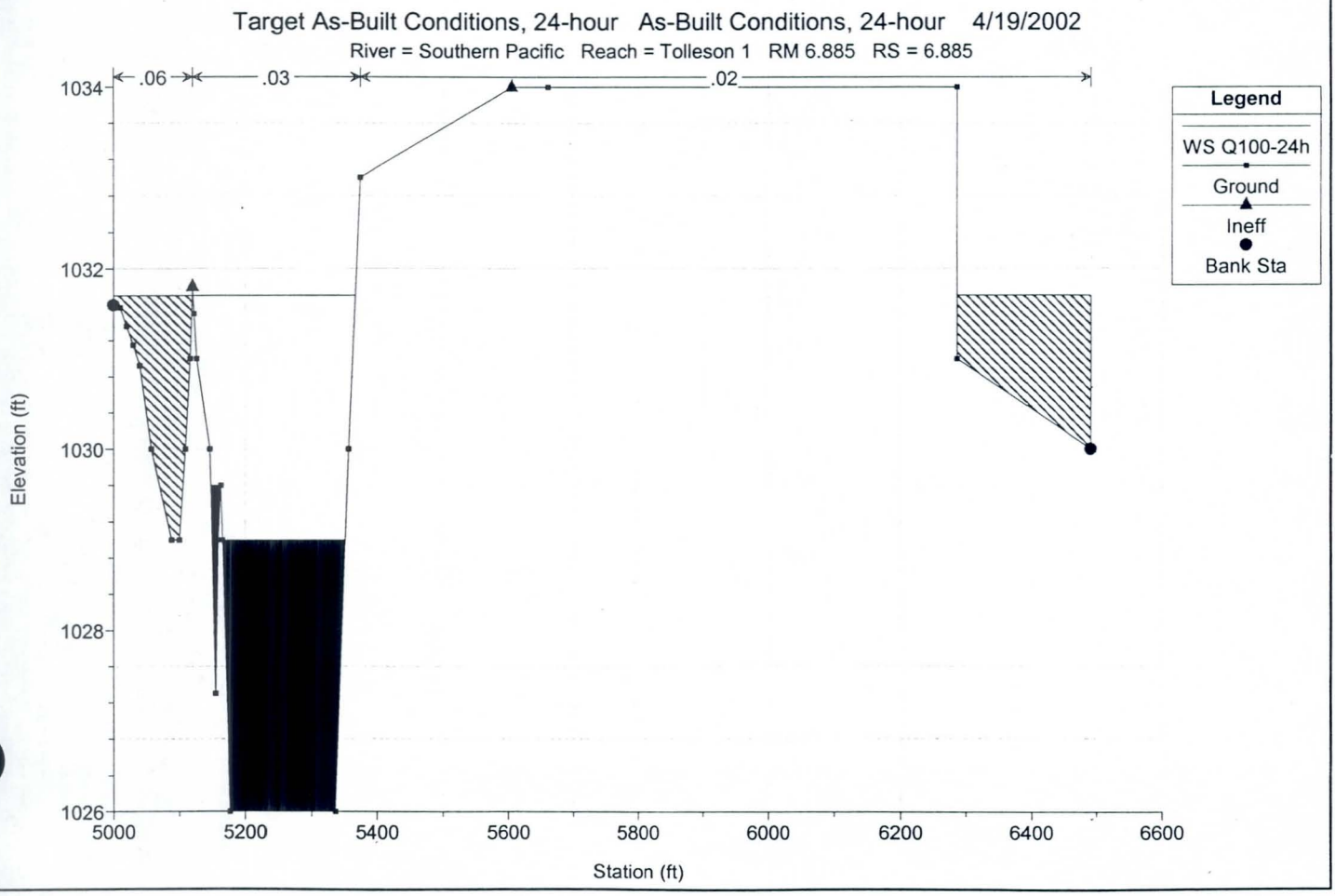

Target As-Built Conditions, 24-hour As-Built Conditions, 24-hour 4/19/2002
River = Southern Pacific Reach = Tolleson 1 RM 7.020 RS = 7.020
.06
.03
.025
Legend
WS Q100-24h
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
1035
1034
1033
1032
1031
1030
1029
1028
1027
5000
5200
5400
5600
5800
6000
6200
6400
6600

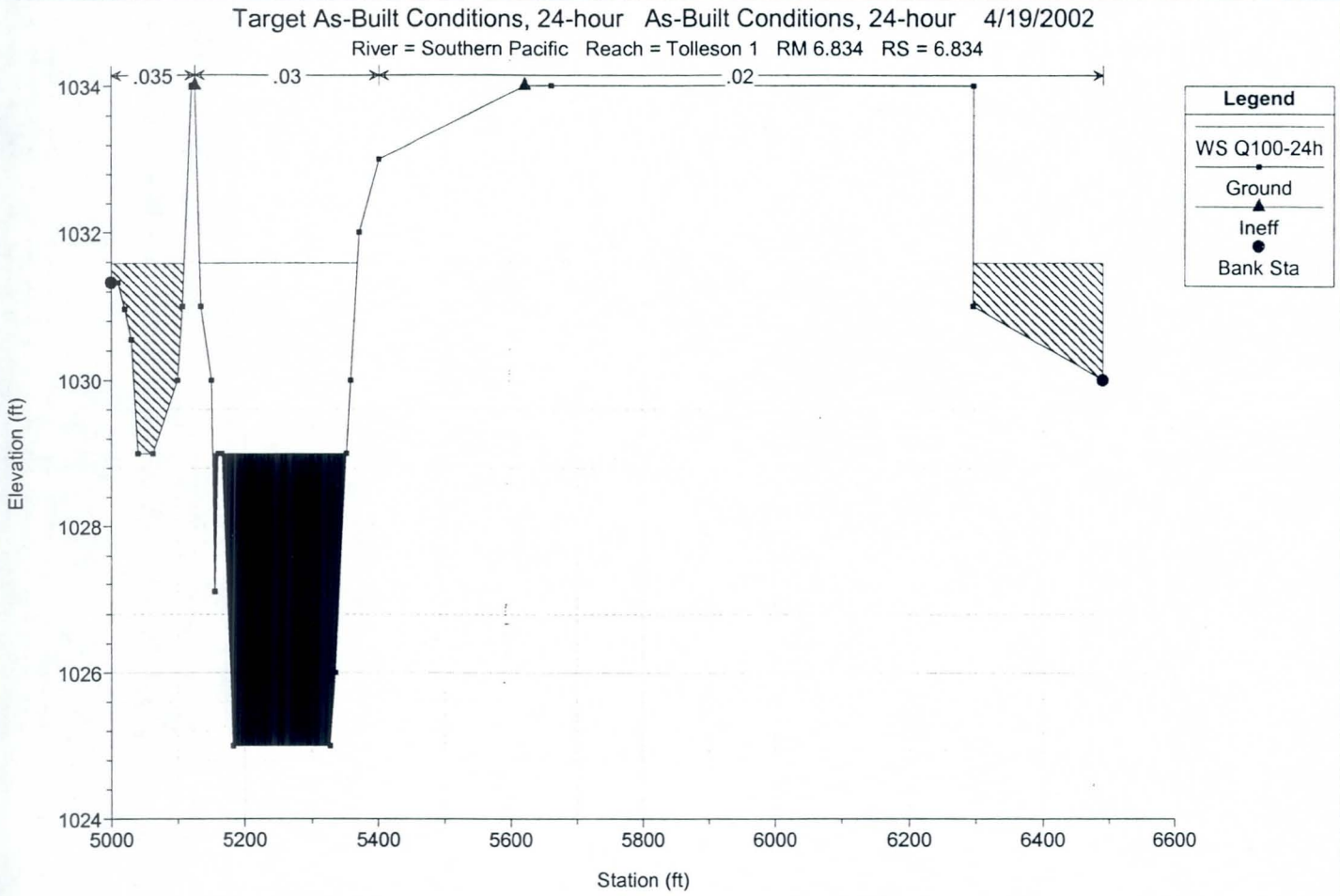

Target As-Built Conditions, 24-hour As-Built Conditions, 24-hour 4/19/2002
River = Southern Pacific Reach = Tolleson 1 RM 7.007 Blocked basin not used for conv RS = 7.007
.06
.03
.025
Legend
WS Q100-24h
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
1036
1034
1032
1030
1028
1026
5000
5200
5400
5600
5800
6000
6200
6400
6600

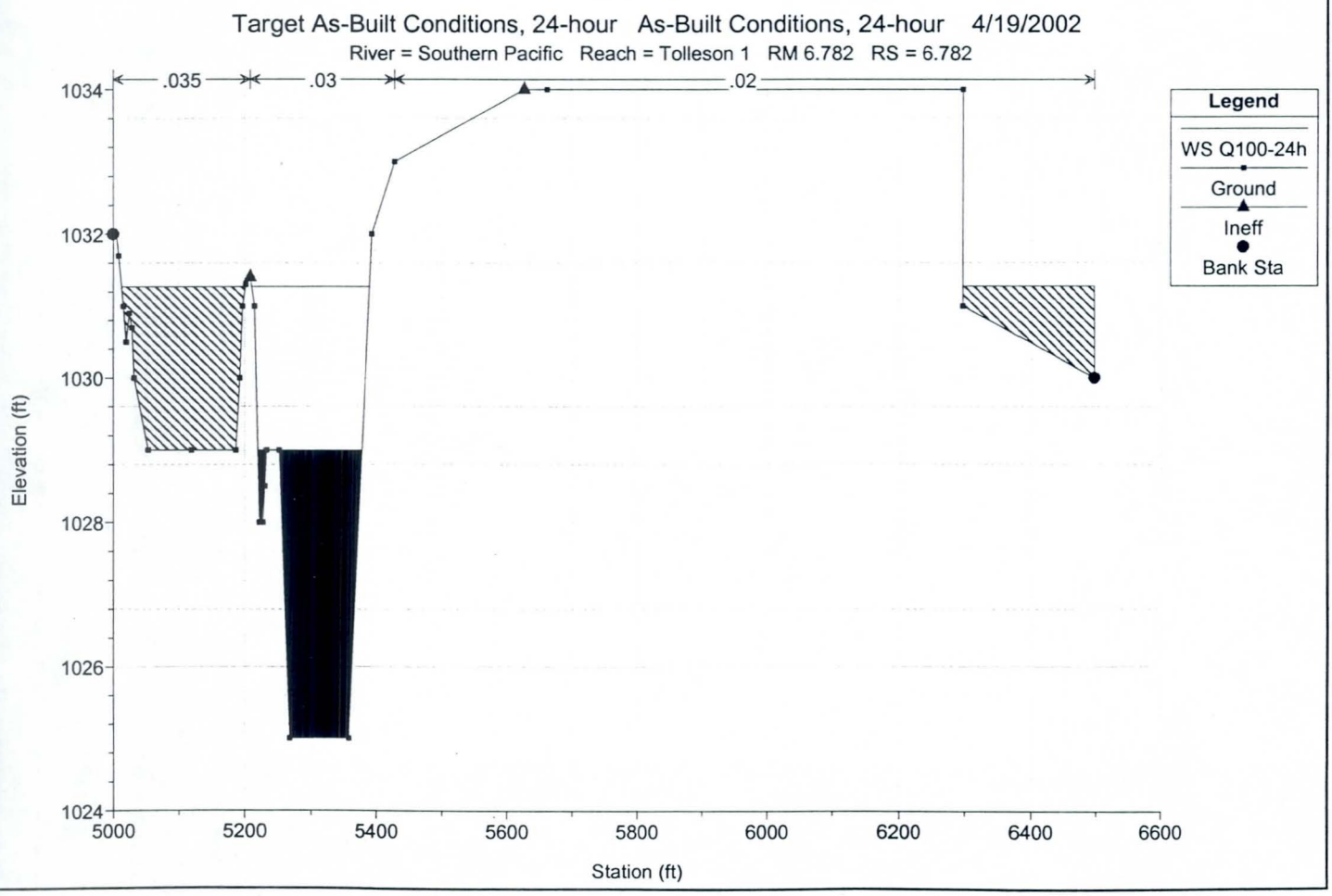

Target As-Built Conditions, 24-hour As-Built Conditions, 24-hour 4/19/2002
River = Southern Pacific Reach = Tolleson 1 RM 6.993 Blocked basin not used for con RS = 6.993
.06
.03
.02
Legend
WS Q100-24h
Ground
Ineff
Bank Sta
Elevation (ft)
1034
1032
1030
1028
1026
5000
5200
5400
5600
5800
6000
6200
6400
6600
Station (ft)

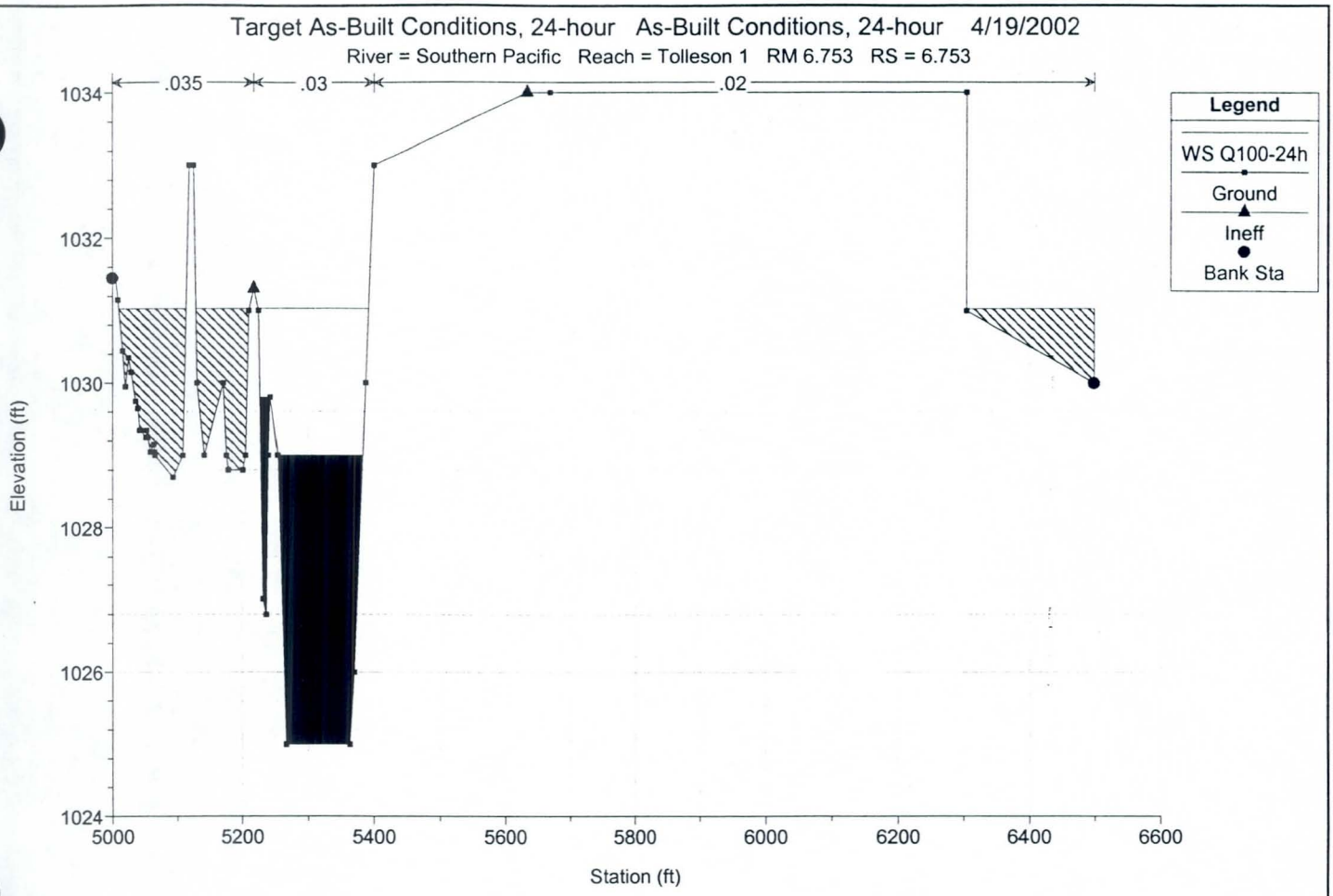

Target As-Built Conditions, 24-hour As-Built Conditions, 24-hour 4/19/2002
River = Southern Pacific Reach = Tolleson 1 RM 6.980 RS = 6.980
.06
.03
.02
Legend
WS Q100-24h
Ground
Ineff
Bank Sta
Elevation (ft)
1034
1032
1030
1028
1026
1024
5000
5200
5400
5600
5800
6000
6200
6400
6600
Station (ft)

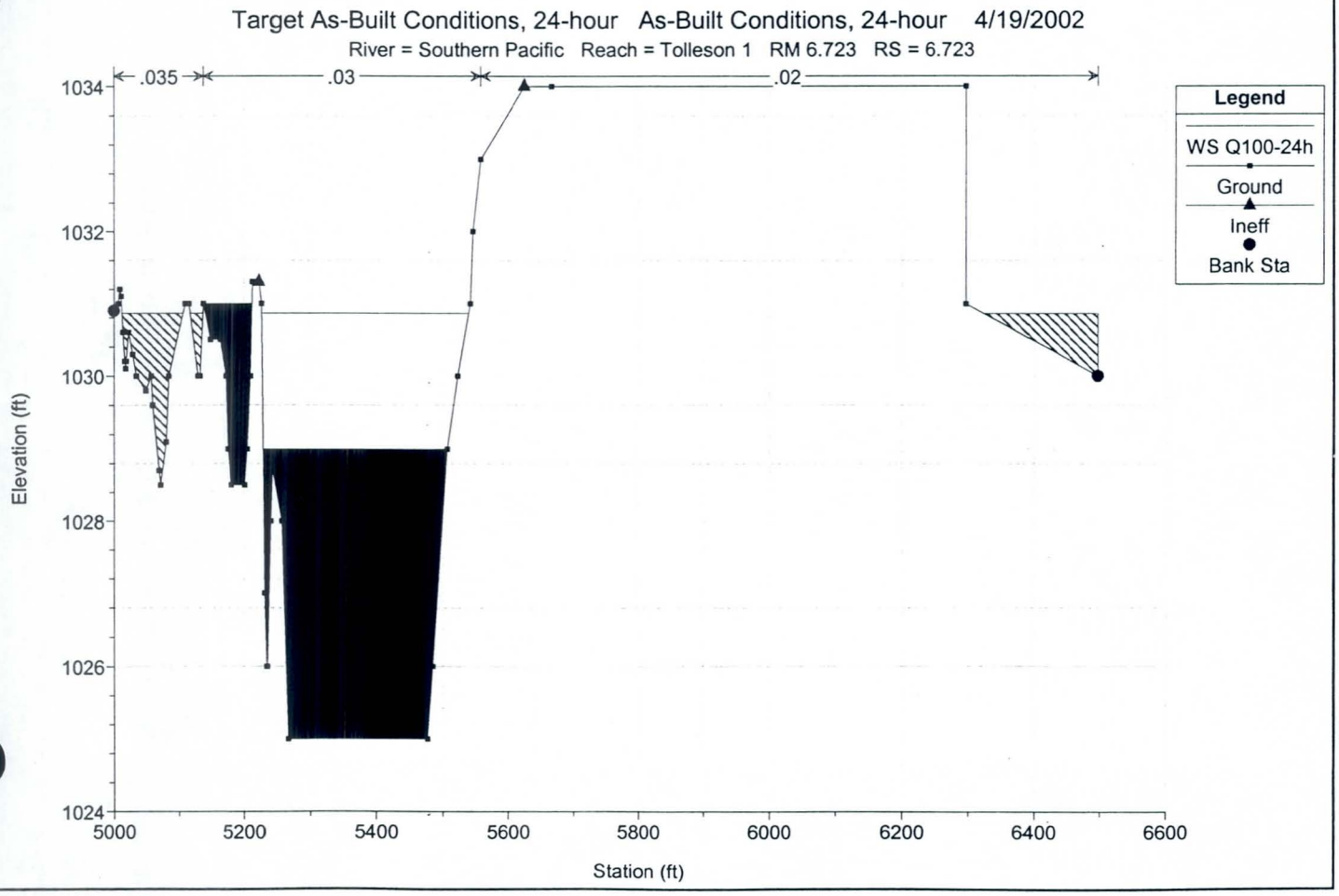

Target As-Built Conditions, 24-hour As-Built Conditions, 24-hour 4/19/2002
River = Southern Pacific Reach = Tolleson 1 RM 6.932 RS = 6.932
.06
.03
.02
Legend
WS Q100-24h
Ground
Ineff
Bank Sta
Elevation (ft)
1034
1032
1030
1028
1026
5000
5200
5400
5600
5800
6000
6200
6400
6600
Station (ft)

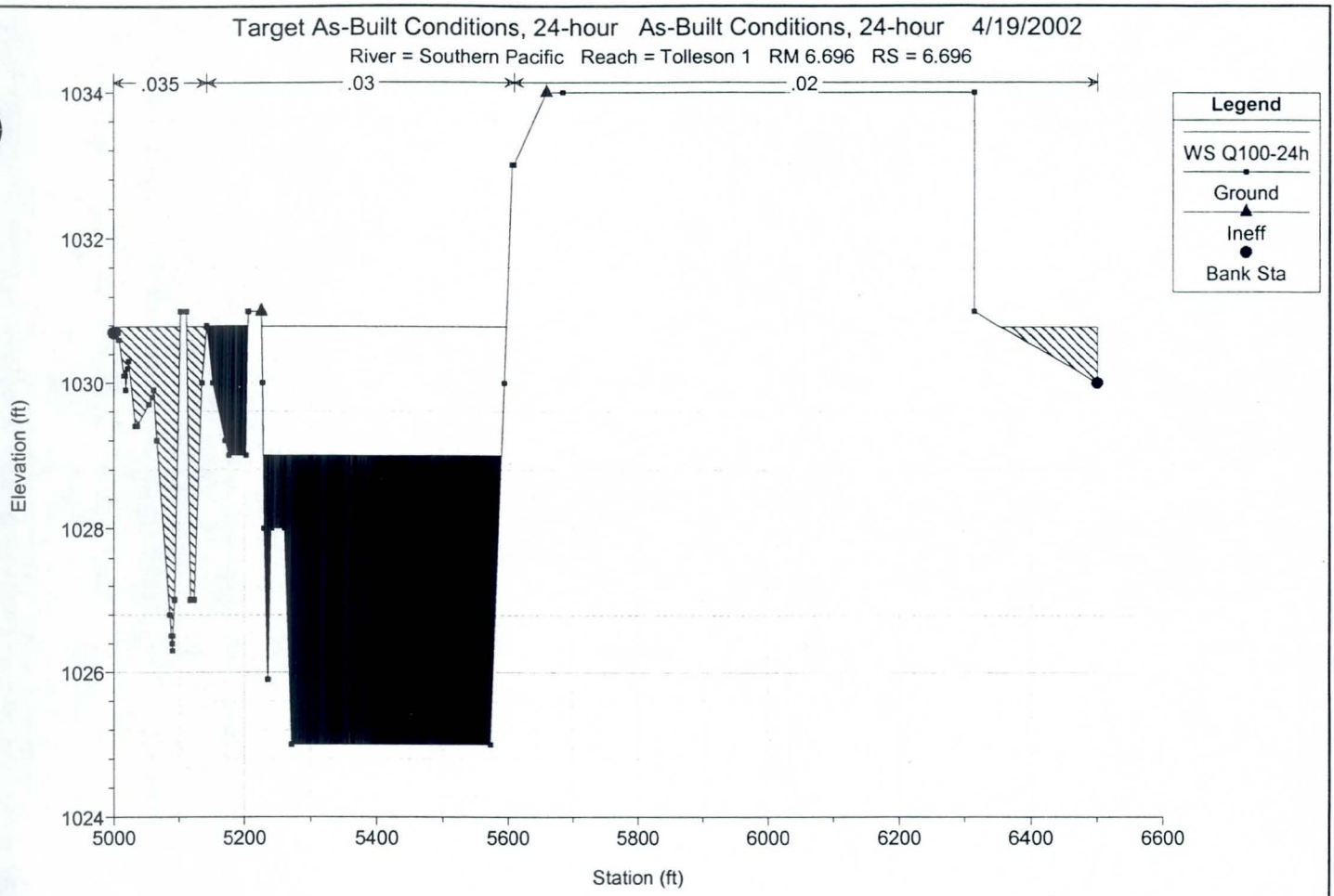

Target As-Built Conditions, 24-hour As-Built Conditions, 24-hour 4/19/2002
River = Southern Pacific Reach = Tolleson 1 RM 6.885 RS = 6.885
.06
.03
.02
Legend
WS Q100-24h
Ground
Ineff
Bank Sta
Elevation (ft)
1034
1032
1030
1028
1026
5000
5200
5400
5600
5800
6000
6200
6400
6600
Station (ft)

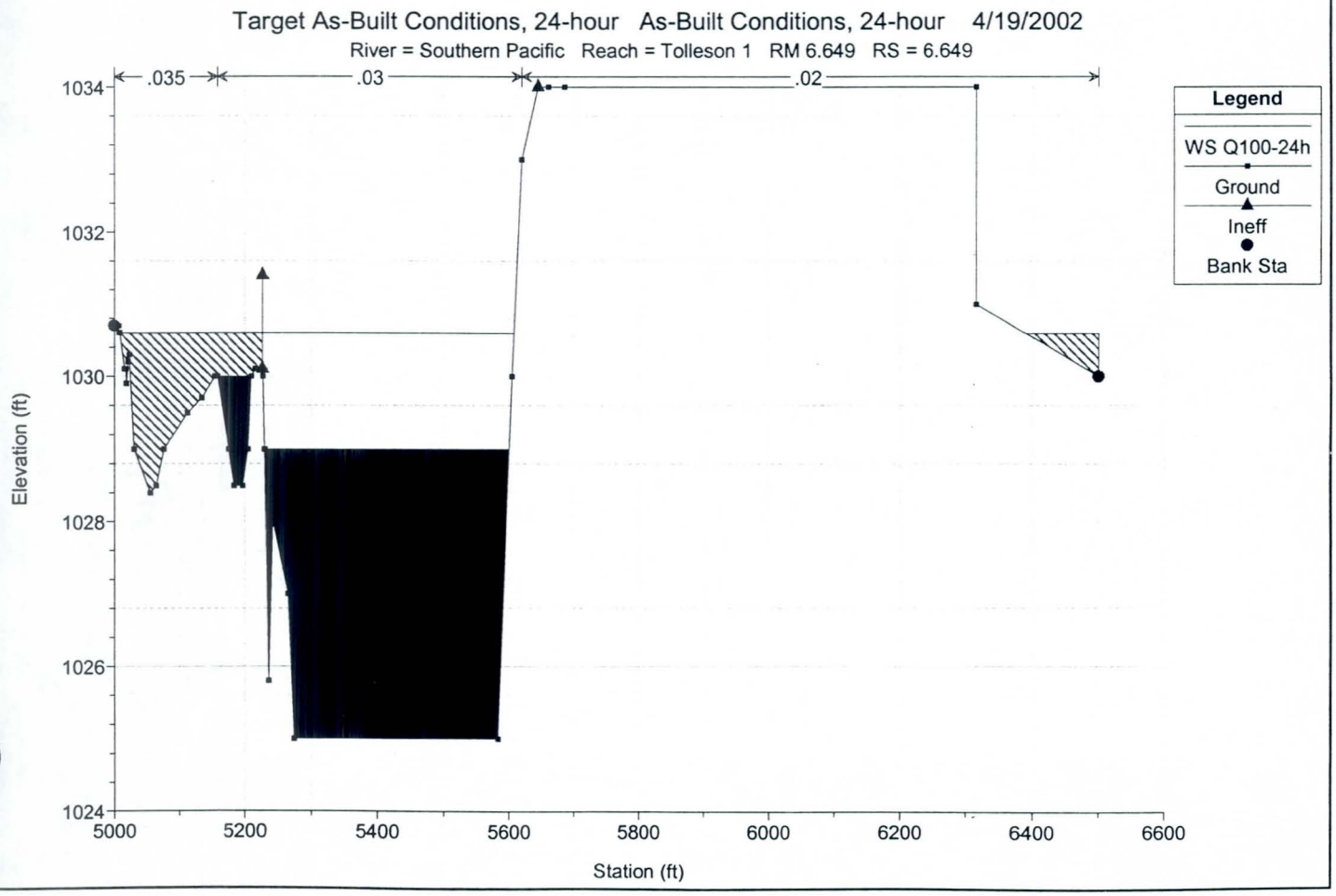

Target As-Built Conditions, 24-hour As-Built Conditions, 24-hour 4/19/2002
River = Southern Pacific Reach = Tolleson 1 RM 6.834 RS = 6.834
.035
.03
.02
Legend
WS Q100-24h
Ground
Ineff
Bank Sta
Elevation (ft)
1034
1032
1030
1028
1026
1024
5000
5200
5400
5600
5800
6000
6200
6400
6600
Station (ft)

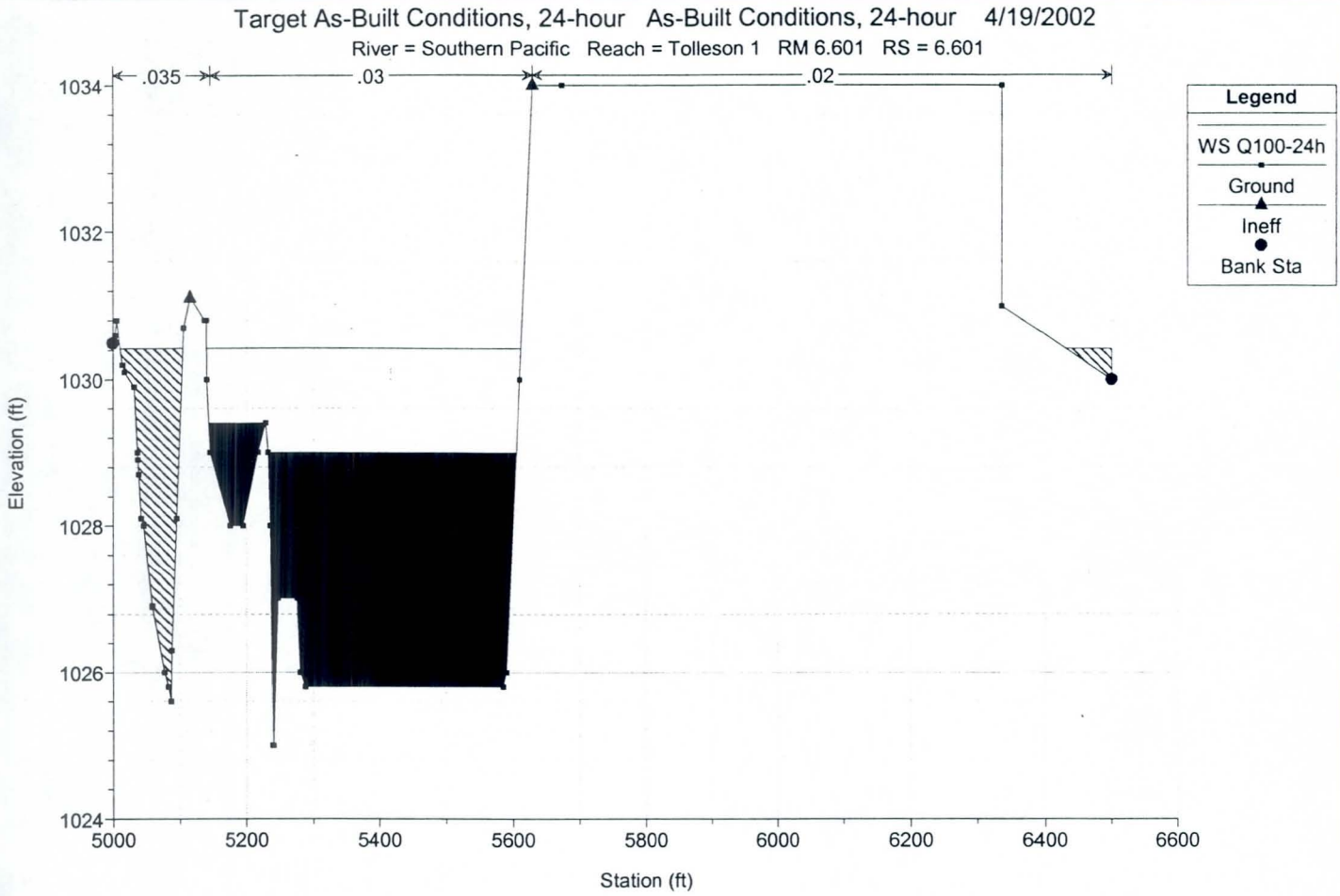

Target As-Built Conditions, 24-hour As-Built Conditions, 24-hour 4/19/2002
River = Southern Pacific Reach = Tolleson 1 RM 6.782 RS = 6.782
.035
.03
.02
Legend
WS Q100-24h
Ground
Ineff
Bank Sta
Elevation (ft)
1034
1032
1030
1028
1026
1024
5000
5200
5400
5600
5800
6000
6200
6400
6600
Station (ft)

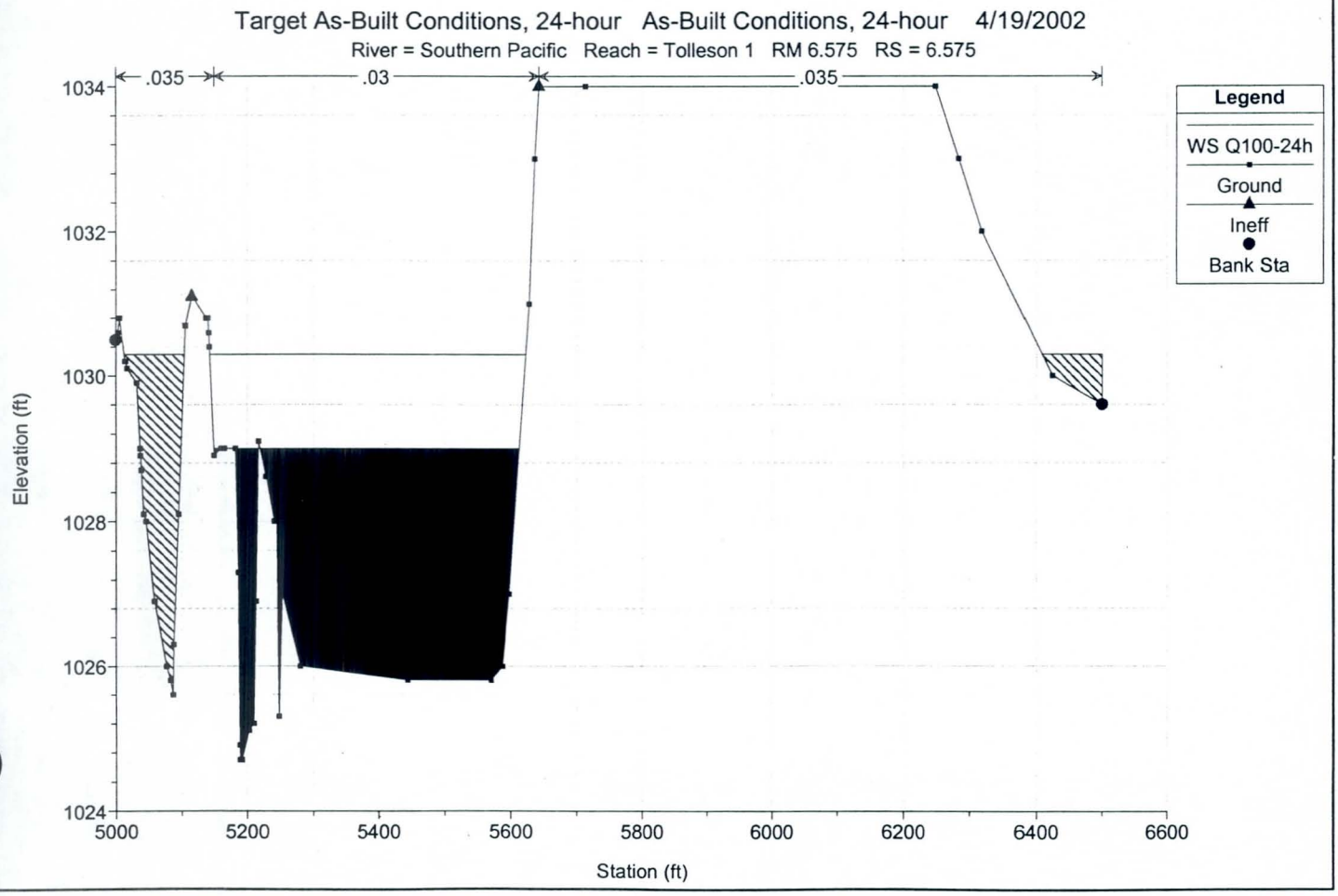

Target As-Built Conditions, 24-hour As-Built Conditions, 24-hour 4/19/2002
River = Southern Pacific Reach = Tolleson 1 RM 6.753 RS = 6.753
.035
.03
.02
Legend
WS Q100-24h
Ground
Ineff
Bank Sta
Elevation (ft)
1034
1032
1030
1028
1026
1024
5000
5200
5400
5600
5800
6000
6200
6400
6600
Station (ft)

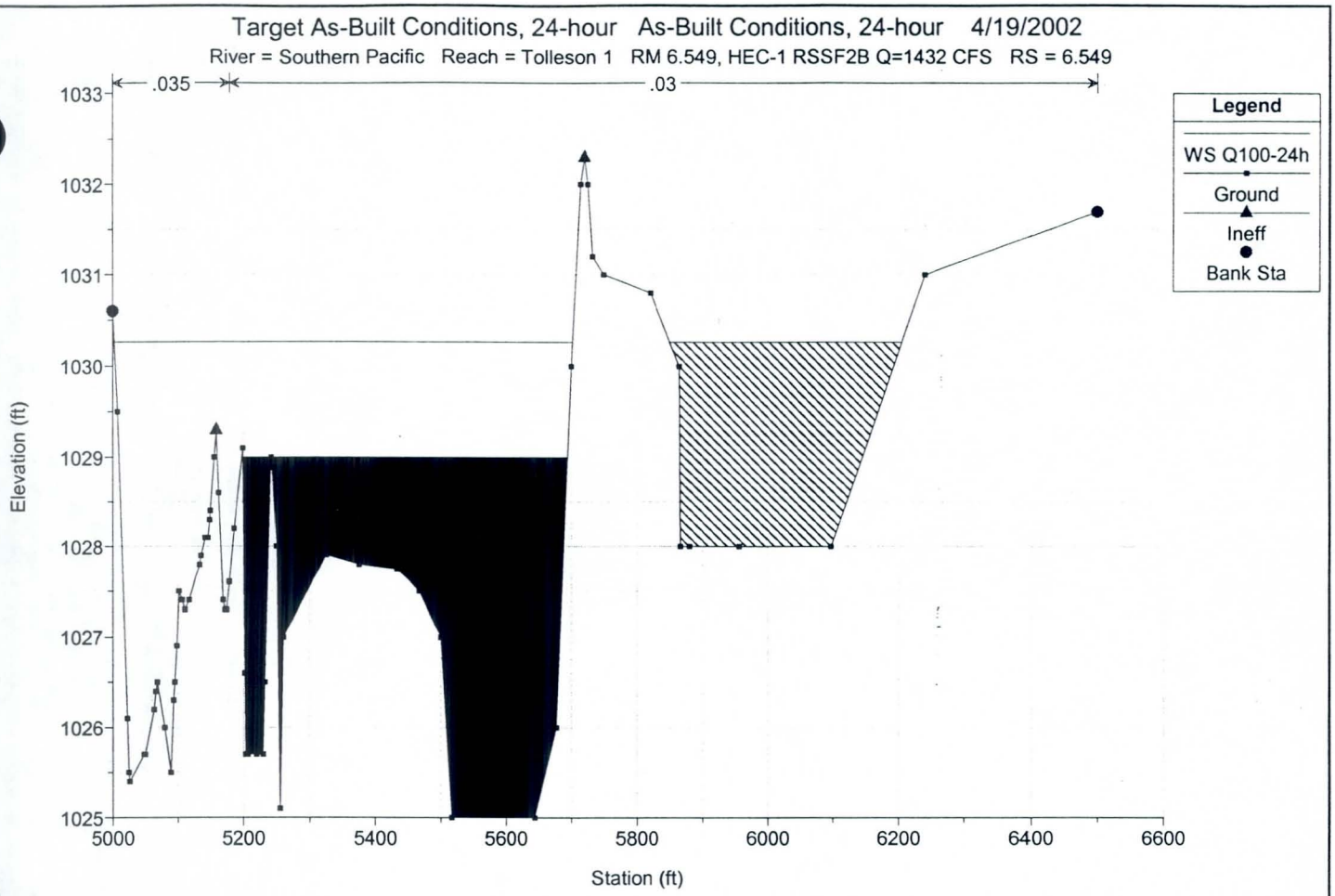

Target As-Built Conditions, 24-hour As-Built Conditions, 24-hour 4/19/2002
River = Southern Pacific Reach = Tolleson 1 RM 6.723 RS = 6.723
.035
.03
.02
Legend
WS Q100-24h
Ground
Ineff
Bank Sta
Elevation (ft)
1034
1032
1030
1028
1026
1024
5000
5200
5400
5600
5800
6000
6200
6400
6600
Station (ft)

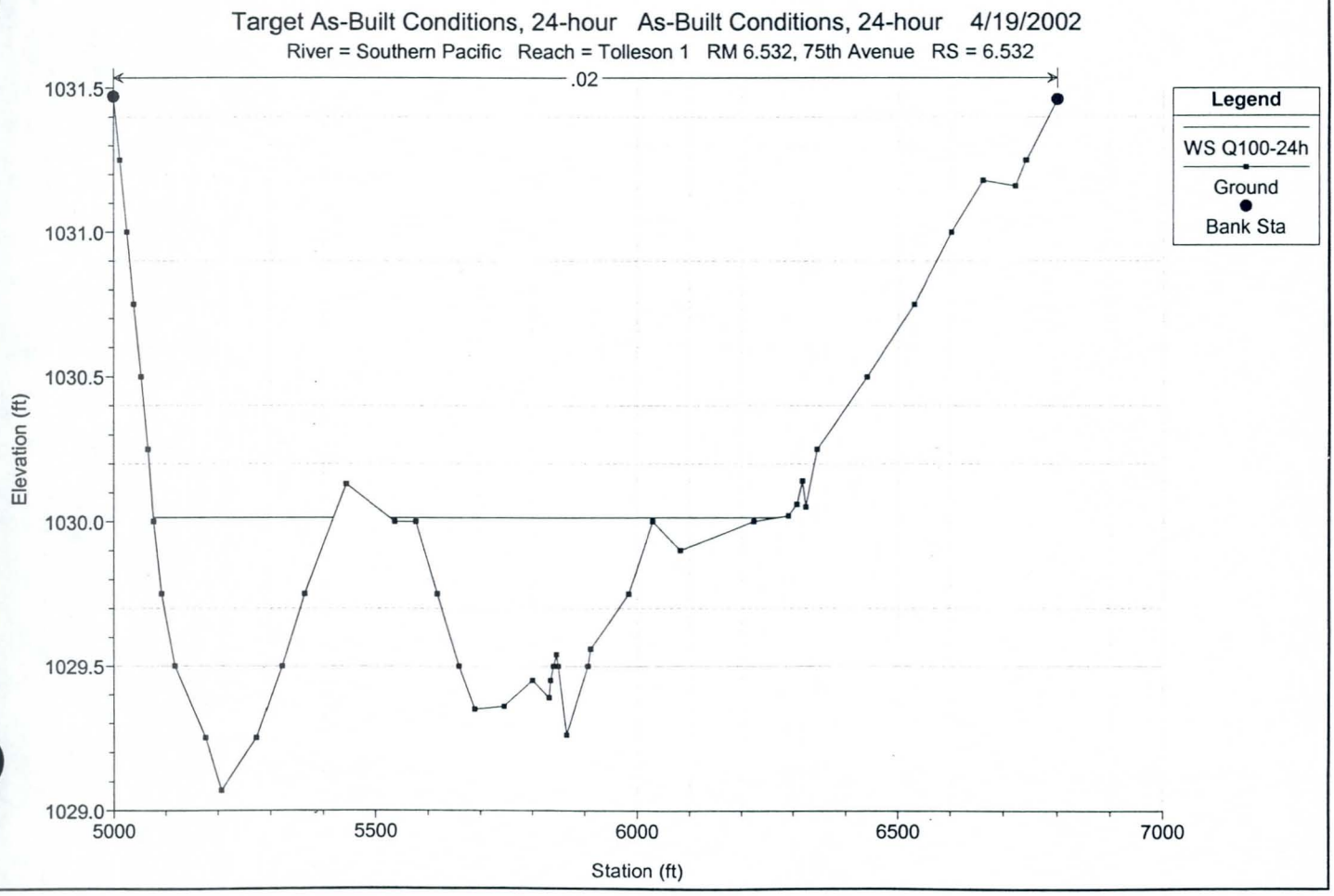

Target As-Built Conditions, 24-hour As-Built Conditions, 24-hour 4/19/2002
River = Southern Pacific Reach = Tolleson 1 RM 6.696 RS = 6.696
.035
.03
.02
Legend
WS Q100-24h
Ground
Ineff
Bank Sta
Elevation (ft)
1034
1032
1030
1028
1026
1024
5000
5200
5400
5600
5800
6000
6200
6400
6600
Station (ft)

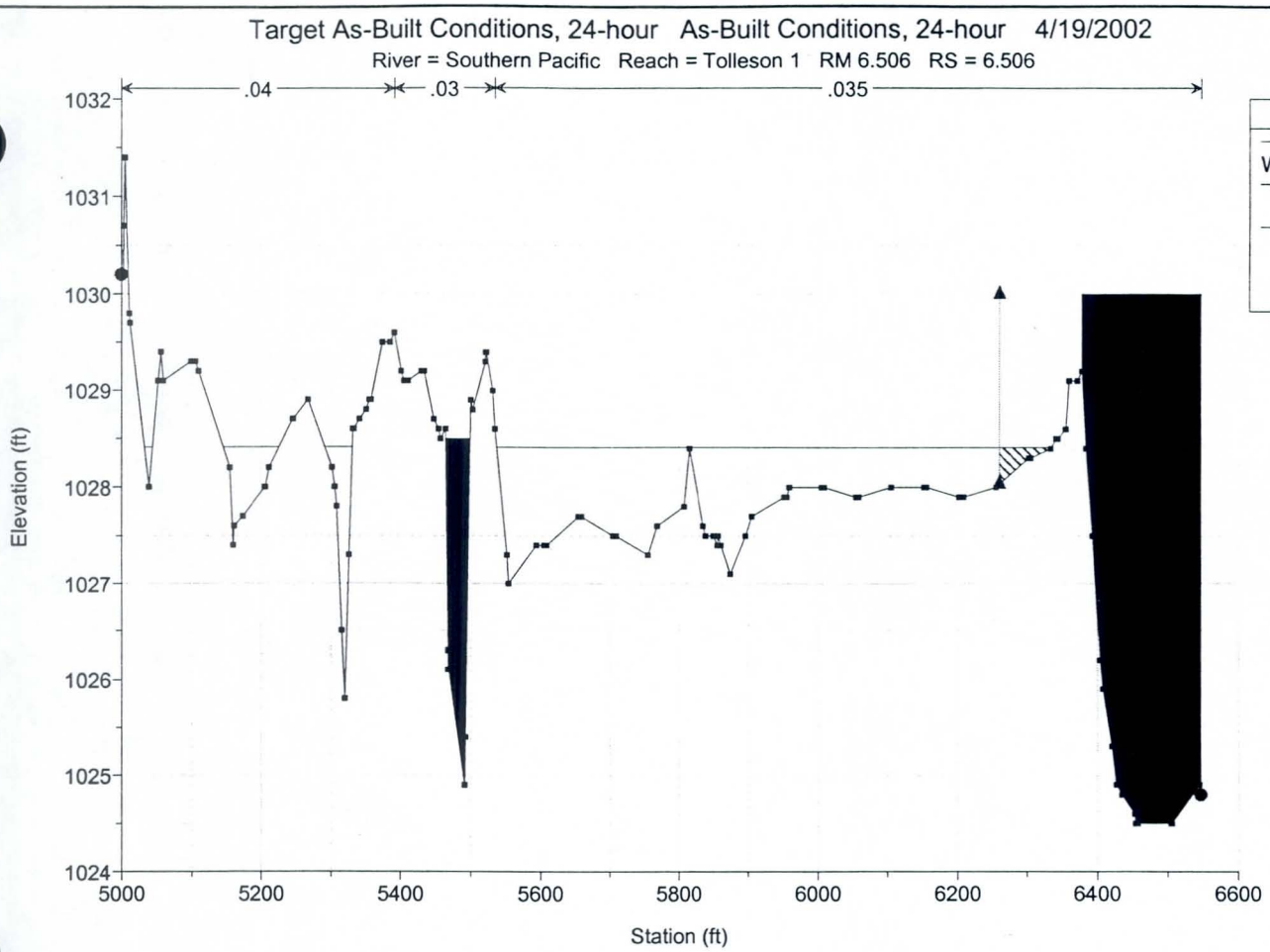

Target As-Built Conditions, 24-hour As-Built Conditions, 24-hour 4/19/2002
River = Southern Pacific Reach = Tolleson 1 RM 6.649 RS = 6.649
.035
.03
.02
Legend
WS Q100-24h
Ground
Ineff
Bank Sta
Elevation (ft)
1034
1032
1030
1028
1026
1024
5000
5200
5400
5600
5800
6000
6200
6400
6600
Station (ft)

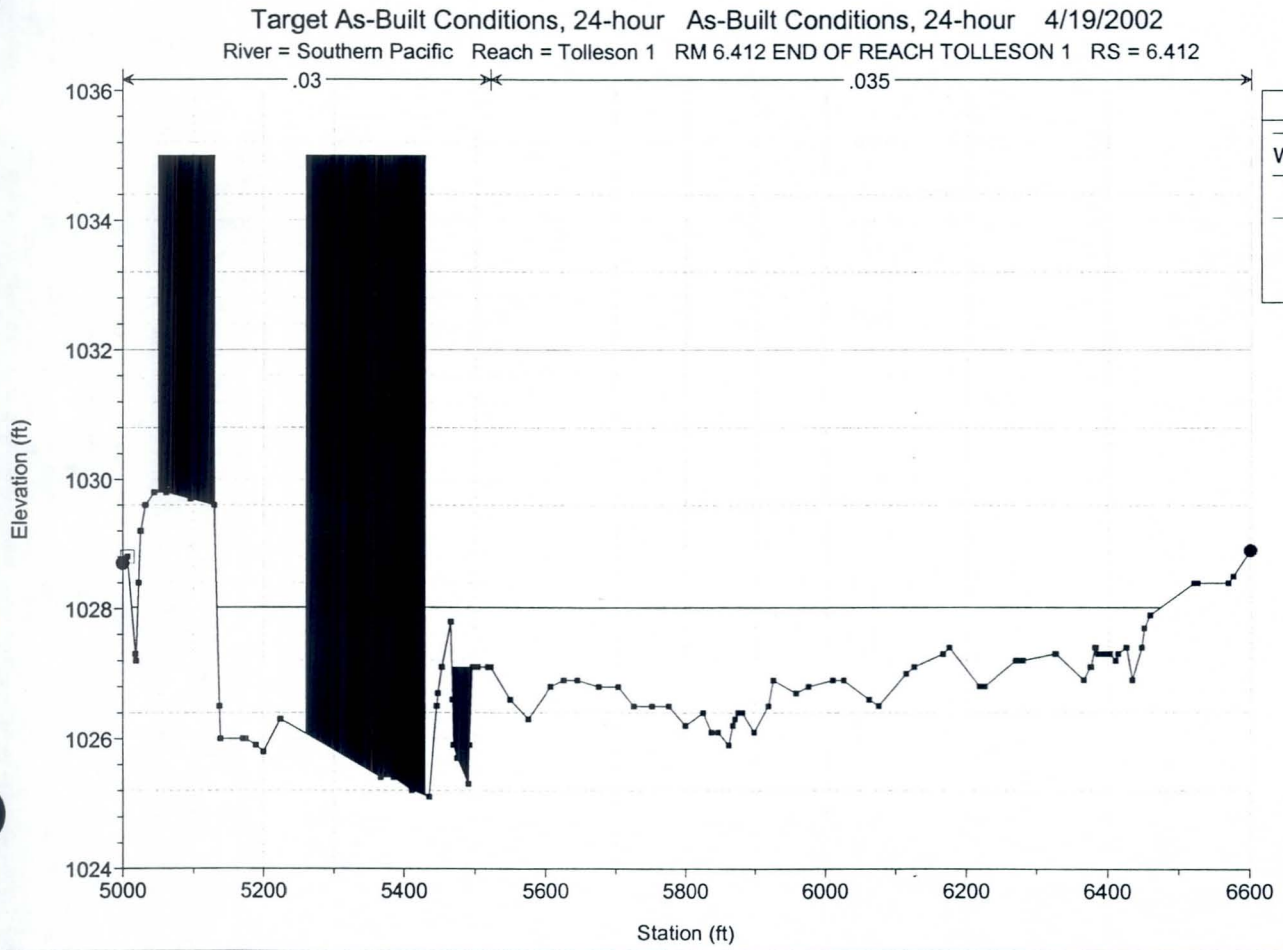

Target As-Built Conditions, 24-hour As-Built Conditions, 24-hour 4/19/2002
River = Southern Pacific Reach = Tolleson 1 RM 6.601 RS = 6.601
.035
.03
.02
Legend
WS Q100-24h
Ground
Ineff
Bank Sta
Elevation (ft)
1034
1032
1030
1028
1026
1024
5000
5200
5400
5600
5800
6000
6200
6400
6600
Station (ft)

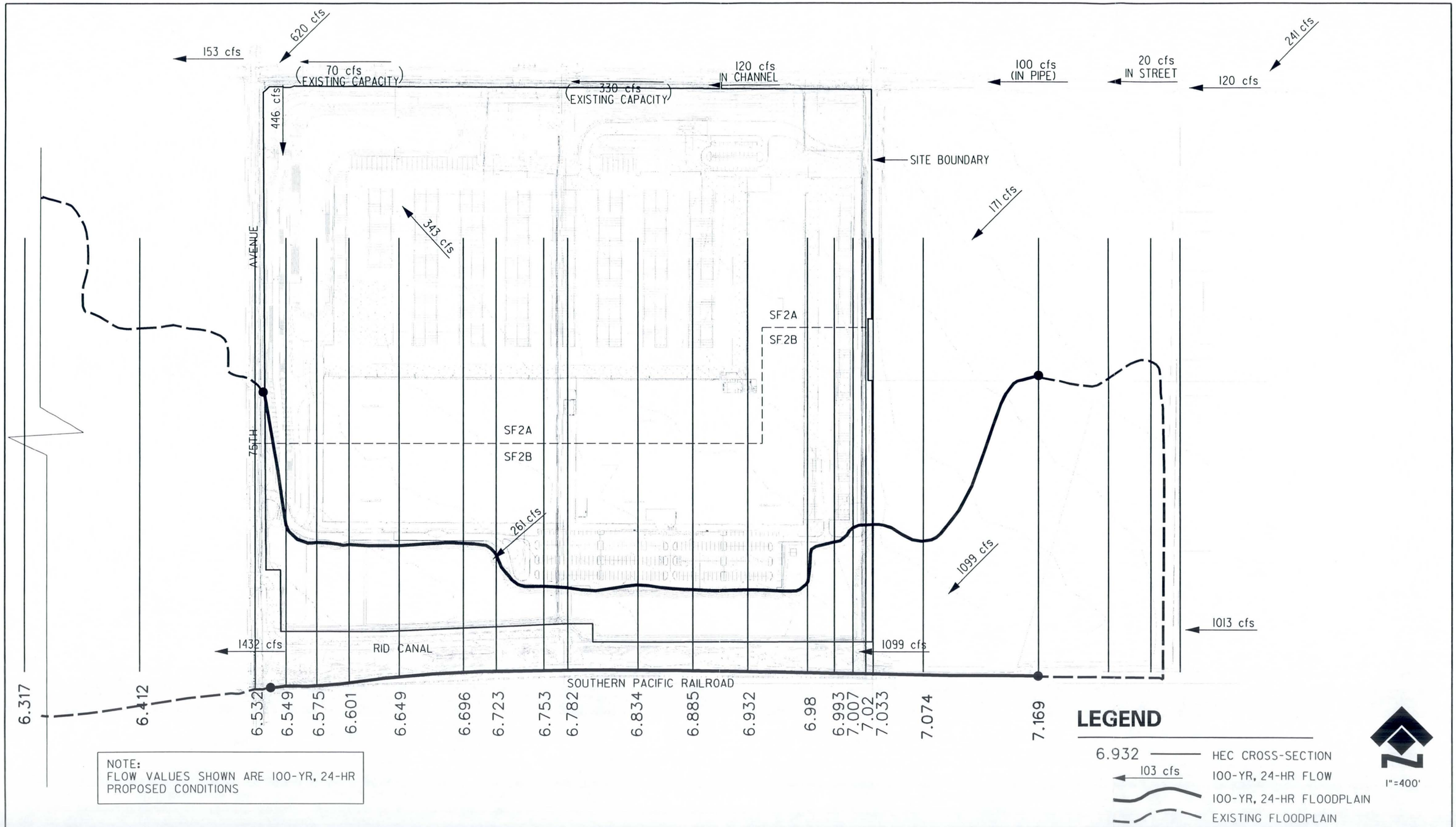

Target As-Built Conditions, 24-hour As-Built Conditions, 24-hour 4/19/2002
River = Southern Pacific Reach = Tolleson 1 RM 6.575 RS = 6.575
.035
.03
.035
Legend
WS Q100-24h
Ground
Ineff
Bank Sta
Elevation (ft)
1034
1032
1030
1028
1026
1024
5000
5200
5400
5600
5800
6000
6200
6400
6600
Station (ft)


Target As-Built Conditions, 24-hour As-Built Conditions, 24-hour 4/19/2002
River = Southern Pacific Reach = Tolleson 1 RM 6.549, HEC-1 RSSF2B Q=1432 CFS RS = 6.549
.035
.03
Legend
WS Q100-24h
Ground
Ineff
Bank Sta
Elevation (ft)
1033
1032
1031
1030
1029
1028
1027
1026
1025
5000
5200
5400
5600
5800
6000
6200
6400
6600
Station (ft)


Target As-Built Conditions, 24-hour As-Built Conditions, 24-hour 4/19/2002
River = Southern Pacific Reach = Tolleson 1 RM 6.532, 75th Avenue RS = 6.532
.02
Legend
WS Q100-24h
Ground
Bank Sta
Elevation (ft)
1031.5
1031.0
1030.5
1030.0
1029.5
1029.0
5000
5500
6000
6500
7000
Station (ft)


Target As-Built Conditions, 24-hour As-Built Conditions, 24-hour 4/19/2002
River = Southern Pacific Reach = Tolleson 1 RM 6.506 RS = 6.506
.04
.03
.035
Legend
WS Q100-24h
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Target As-Built Conditions, 24-hour As-Built Conditions, 24-hour 4/19/2002
River = Southern Pacific Reach = Tolleson 1 RM 6.412 END OF REACH TOLLESON 1 RS = 6.412
.03
.035
Legend
WS Q100-24h
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)



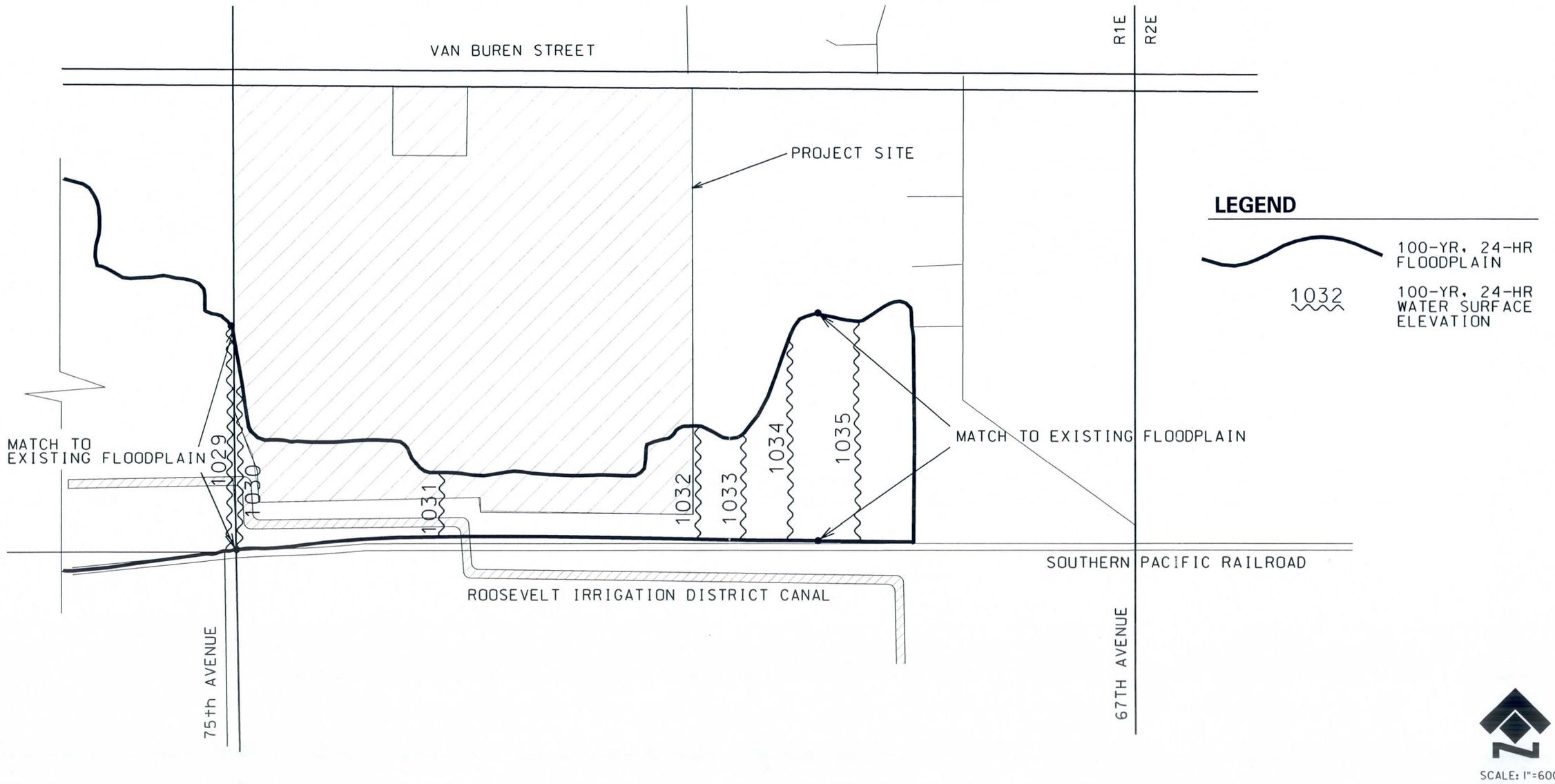
Hoskin Engineering Consultants, Inc.
323 West Roosevelt Street
Suite 200
Phoenix, Arizona 85003-1136
Tel: (602) 252-8384
Fax: (602) 252-8385

TARGET S.W. DIST. CENTER

ON-SITE DRAINAGE MAP

100 YEAR, 24 HOUR

FIGURE 4

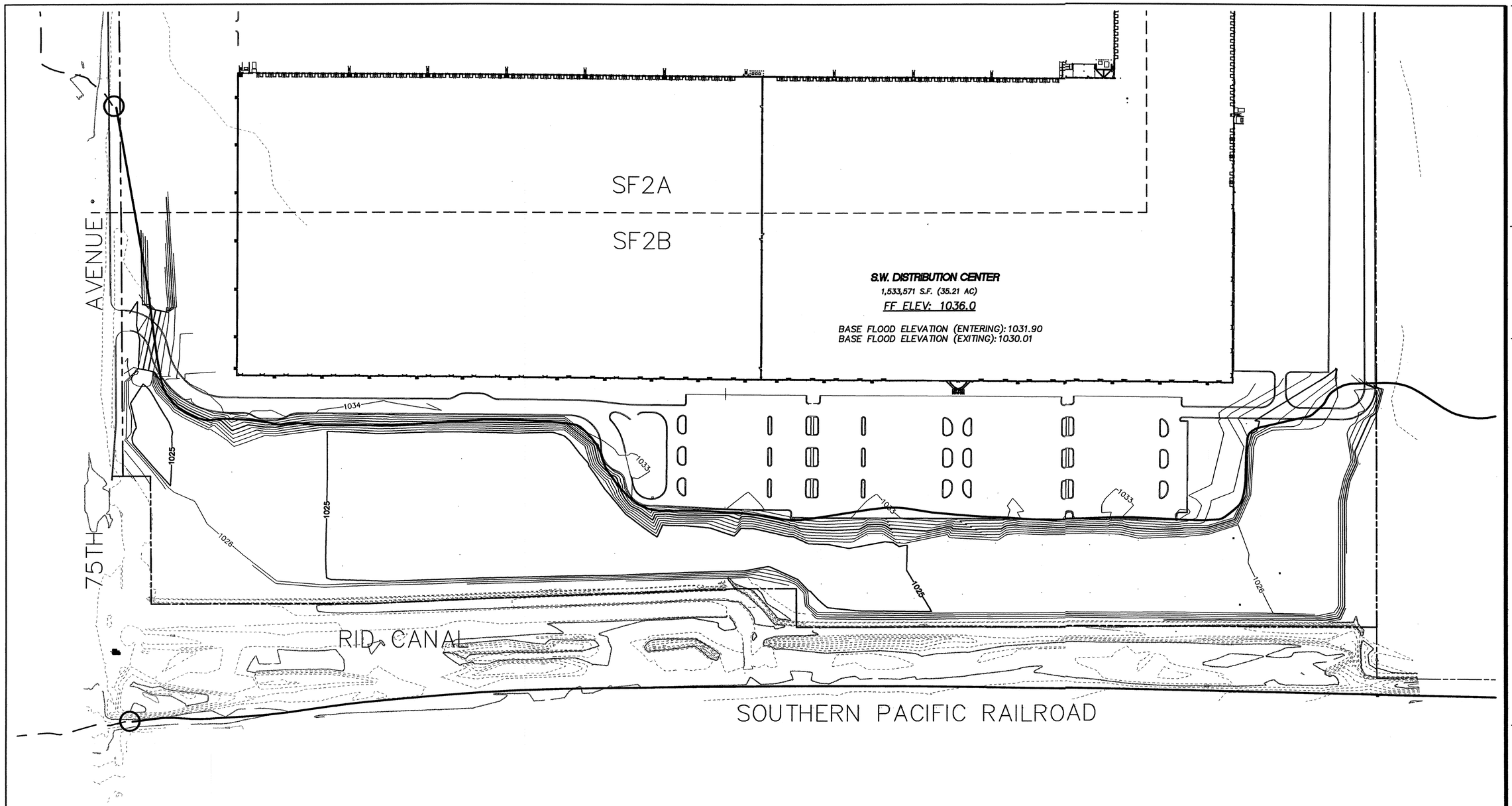


Hoskin Engineering Consultants, Inc.
323 West Roosevelt Street
Suite 200
Phoenix, Arizona 85003-1136
Tel: (602) 252-8384
Fax: (602) 252-8385

TARGET S.W. DIST. CENTER

ANNOTATED FIRM

FIGURE 6



LEGEND

- AS-BUILT 1' CONTOUR LINE
- AS-BUILT 5' CONTOUR LINE
- 100-YR, 24-HR FLOODPLAIN
- EXISTING FLOODPLAIN

AS-BUILT CERTIFICATION

I HEREBY CERTIFY THAT THE "RECORD DRAWING" MEASUREMENTS AND SURVEY MONUMENTS AS SHOWN HEREON WERE MADE UNDER MY SUPERVISION OR AS NOTED AND ARE CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

Jeff A. Curran — REGISTERED ENGINEER

5-3-02 — DATE

35241 — REGISTRATION NUMBER

Registered Professional Engineer (Civil) CERTIFICATE NO. 35241 JEFFREY A. CURRAN Date Signed 5-3-02 ARIZONA, U.S.A.

W R G DESIGN INC.
4808 N. 22nd Street, Phoenix, Arizona
602 | 977-8000 FAX: 602 | 977-8099
PLANNERS ■ ENGINEERS ■ LANDSCAPE ARCHITECTS ■ SURVEYORS

DRAINAGE SWALE AS-BUILT
TARGET S.W. DISTRIBUTION CENTER

PHOENIX, AZ

7101 W VAN BUREN STREET, PHOENIX, AZ

REV.	DESCRIPTION	BY

PROJECT NO. NDC002

DATE	05/03/02
DESIGNED	P. LOWRY
ENGINEER	R. HEDRICK
CHECKED	

SHEET TITLE: EXHIBIT

SHEET NUMBER: EX-1

MAINTENANCE POLICY AND PROCEDURE

PURPOSE:

To insure all drainage facilities are maintained and kept clear from objects that may impede the flow of storm runoff.

POLICY:

All drainage facilities shall be inspected and cleaned on a maintenance schedule.

PROCEDURE:

1. The Maintenance department shall visually inspect each drainage facility once a month.

2. The Maintenance department shall schedule the cleaning as needed, but no more than the established service levels, unless it is determined that if allowed to exist could become an obstruction to drainage.

3. The following is the established service levels.

    a) Man-made Drainage Easements: Inspected and cleaned, if needed, once a month.

    b) Man-made Retention Basins and conveyance swales: Inspect monthly and clean as needed.

    c) Storm Drainage Inlets and culverts: Inspect monthly and clean as needed.

The Maintenance department shall respond to any complaints regarding the clogging of drainage facilities and correct the problem within five days of notification. The above service levels shall be followed for routine maintenance. Extenuating circumstances may require deviation.

FORM 1: REVISION REQUESTER AND COMMUNITY OFFICIAL

Section 2, Item 1:

The basis for the revision request is a change in the 100-year, 24-hour floodplain delineation due to development within the watershed. The proposed development is the Target Southwest Distribution Center.

Section 2, Items 2 and 6:

The flooding is urban runoff which ponds north of the Roosevelt Irrigation District Canal and the Southern Pacific Railroad.

FORM 3: HYDROLOGIC ANALYSIS

Included in this CLOMR submittal is the *Off-Site Drainage Report for Target Southwest Distribution Center*, prepared by Hoskin Engineering Consultants and dated December 7, 2000, which addresses the reason for new hydrologic analysis, the methodology of the new analysis, a comparison of the base flood discharges, and copies of the effective, revised effective, and proposed conditions hydrology models.

FORM 4: RIVERINE HYDRAULIC ANALYSIS

Section 3:

The starting water surface elevation for the existing conditions model (TGT24E.PRJ) and the proposed conditions model (TGT24P.PRJ) is from the effective model (TOL_RAS.PRJ). For the existing and proposed conditions models, the upstream and downstream portions of the effective model were removed due to the overall size of the effective model. The boundary condition for the existing and proposed models therefore became a known water surface of 1028.02 at RM 6.412.

Section 4:

Water surface elevations are higher that the end points of cross-sections only where ineffective flow areas are shown upstream of the warehouse. Project causes increase in the 100-year floodplain only within the property limits.

Section 5, Item 1a:

Water Surface Elevation Summary

RM	Effective Model (TOL_RAS)	Proposed Conditions Model (TGT24P)	Difference = Proposed – Effective
7.033	1032.89	1032.79	-0.10
6.532	1029.46	1030.01	0.55

The 0.55' increase at RM 6.532 is the result of more detailed field cross-sections taken along the centerline of 75th Avenue. The "Revised Effective" model also incorporates this updated information. The difference between the revised effective and proposed conditions is less.

DESIGN INC.

December 13, 2000

ATTN: LOMR Manager
FEMA LOMR Depot
3601 Eisenhower Avenue, Suite 600
Alexandria, Virginia 22304

RE: Target Distribution Center
Topographic Survey

To whom it may concern,

WRG Design, Inc. was contracted to complete a Topographic Survey of the Target Distribution Center in Phoenix, Arizona. This Survey was completed on August 08, 2000, using the field survey method for locating all topographic features at their relative "X", "Y" and "Z" positions. After the completion of the field survey, a topographic map was prepared.

The vertical datum for this project is NAVD 29, based upon information provided by the City of Phoenix.

Sincerely,
WRG Design, Inc.

Richard Stockman
Survey Manager

cc: File (Project #.filing code #)

M:\DATA\NDC002\WORD\LETTERFMEA.DOC

PLANNERS ■ ENGINEERS ■ LANDSCAPE ARCHITECTS ■ SURVEYORS
4808 North 22nd St., Suite 150, Phoenix, AZ 85016 / (602) 977-8000 (Fax) 977-8099
Oregon ■ Nevada ■ Arizona

FEDERAL EMERGENCY MANAGEMENT AGENCY **REVISION REQUESTER AND COMMUNITY OFFICIAL**	O.M.B No. 3067-0148 Expires April 30, 2001

Public reporting burden for this form is estimated to average 2.13 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

You are not required to respond to this collection of information unless a valid OMB Control Number is displayed in the upper right corner of this form.

1. REQUESTED RESPONSE FROM FEMA

This request is for a:

☐ CLOMR A letter from FEMA commenting on whether a proposed project, if built as proposed, would justify a map revision, or proposed hydrology changes (See 44 CFR Ch. 1, Parts 60,65 & 72).

☒ LOMR A letter from FEMA officially revising the current NFIP map to show the changes to floodplains, floodway or flood elevations. LOMRs typically decrease flood hazards. (See 44 CFR Ch. 1 Parts 60 & 65.)

☐ Other Describe: _____

2. OVERVIEW

1. The basis for this revision request is (are): (check all that apply)

☒ Physical Change ☐ Improved Methodology/Data ☐ Floodway Revision

☐ Other Describe: _____

Note: A photograph is not required, but is very helpful during review.

2. Flooding Source: Roosevelt Irrigation District (RID) Canal / Southern Pacific Railroad

3. Project Name/Identifier: Target Southwest Distribution Center

4. FEMA zone designations affected: AE, X
(example: A, AH, AO, A1-A30, A99, AE, V, V1-V30, VE, B, C, D, X)

5. The NFIP map panel(s) affected for all impacted communities is (are):

Community No.	Community Name	State	Map No.	Panel No.	Effective Date
Ex: 480301 480287	Katy, City Harris County	TX TX	480301 48201C	0005D 0220G	02/08/83 09/28/90
040037 040051 040055	Maricopa County, Unincorporated Areas Phoenix, City of Tolleson, City of	AZ	04013C	2105D	04/15/88

6. The area of revision encompasses the following types of flooding and structures. Check all that apply.

Types of Flooding	Structures
☐ Riverine	☐ Channelization
☐ Coastal	☐ Levee/Floodwall
☐ Alluvial fan	☐ Bridge/Culvert
☒ Shallow Flooding (e.g. Zones AO and AH)	☐ Dam
☐ Lakes	☐ Fill
☒ Other (describe)	☒ Other (describe)

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

4. ENCROACHMENT INFORMATION

1. Does the State have jurisdiction over the floodway or its adoption by communities participating in the NFIP?
   ☐ Yes ☐ No

If Yes, attach a copy of a letter notifying the appropriate State agency of the floodway revision and documentation of the approval of the revised floodway by the appropriate State agency.

2. Does the development in the floodway cause the 1% annual chance (base) elevation to increase at any location by more than 0.000 feet? ☐ Yes ☐ No ☒ N/A

3. Does the cumulative effect of all development that has occurred since the effective SFHA was originally identified cause the base flood elevation to increase at any location by more than one foot (or other increase limit if community or state has adopted more stringent criteria - even if a floodway has not been delineated by FEMA)? ☐ Yes ☒ No

If the answer to either items is Yes, please attach documentation that all requirements of Section 65.12 of the NFIP regulations have been met, regarding evaluation of alternatives, notice to individual legal property owners, concurrence of CEO, and certification that no insurable structures are impacted.

5. MAINTENANCE RESPONSIBILITY

The community is willing to assume responsibility for ☐ performing ☐ overseeing compliance with the maintenance and operation plans of the _____
(Name)
flood control structure. If not performed promptly by an owner other than the community, the community will provide the necessary services without cost to the Federal government.

Operation and maintenance plans are attached. ☐ **Yes** ☐ **No** ☒ **N/A**

6. REVIEW FEE

The review fee for the appropriate request category has been included. ☒ Yes Fee amount: $3,400.00

OR

This request is based on a federally sponsored flood-control project where 50 percent or more of the project's cost is federally sponsored, or the request is based on detailed hydrologic and hydraulic studies conducted by Federal, State, or local agencies to replace approximate studies conducted by FEMA and shown on the effective FIRM; thus the project is fee exempt.
☐ Yes

Please see Instructions for Fee Amounts

7. SIGNATURE

Note: **I understand that my signature indicates that all information submitted in support of this request is correct**

_____
Signature of Revision Requester

_____
Printed Name and Title of Revision Requester

_____
Company Name

Telephone No.: _____ Date: _____

Note: **Signature indicates that the community understands, from the revision requester, the impacts of the revision on flooding conditions in the community.**

_____
Signature of Community Official

Hasan Mushtaq, P.E., Floodplain Manager
Printed Name and Title of Community Official

City of Phoenix
Community Name

Telephone No.: 602-495-3752 Date: _____

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

This certification is in accordance with 44 CFR Ch. 1, Sec

_____
Signature 4/19/02

Paul W.R. Hoskin, P.E.
Printed Name and Title of Revision Requester

REGISTERED PROFESSIONAL ENGINEER (CIVIL) CERTIFICATE NO. 19690 PAUL W.R. HOSKIN Date Signed ARIZONA, U.S.A.

Registr No. 19690 Expires (Date) 3/31/2003 State AZ

Type of License/Expertise: Engineer (Civil)

Check which forms have been included with this request

Form Name and (Number)	Required if .....
☐ **Hydrologic** (3)	new or revised discharges
☒ **Hydraulic** (4)	new or revised water-surface elevations
☒ **Mapping** (5)	floodplain/floodway changes
☐ **Channelization** (6)	channel is modified
☐ **Bridge/Culvert** (7)	addition/revision of bridge/culvert
☐ **Levee/Floodwall** (8)	addition/revision of levee/floodwall
☐ **Coastal** (9)	new or revised coastal elevations
☐ **Coastal Structures** (10)	addition/revision of coastal structure
☐ **Dam** (11)	addition/revision of dam
☐ **Alluvial Fan** (12)	structures proposed on alluvial fan

FEDERAL EMERGENCY MANAGEMENT AGENCY **HYDROLOGIC ANALYSIS**	O.M.B No. 3067-0148 Expires April 30, 2001

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average **3.67** hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

You are not required to respond to this collection of information unless a valid OMB Control Number is displayed in the upper right corner of this form.

Note: Fill out one form for each flooding source studied

Community Name: Phoenix, City of

Flooding Source: Roosevelt Irrigation District (RID) Canal / Southern Pacific Railroad

Project Name/Identifier: Target Southwest Distribution Center

1. REASON FOR NEW HYDROLOGIC ANALYSIS

☐ No existing analysis ☐ Improved data ☐ Changed physical condition of watershed

☐ Alternative methodology ☒ Proposed Conditions (CLOMR) ☐ Other

For the reason stated above, please attach a detailed explanation. If a computer program/model was used in revising the hydrologic analysis, **please provide a diskette with the input files** for the same flood recurrence intervals contained in the FIS for that stream; and at least for the 1% annual chance (base) flood where no detailed study exists.

Explanation provided: ☒ Yes ☐ No **Diskettes provided:** ☒ Yes ☐ No

2. METHODOLOGY FOR NEW ANALYSIS

Indicate Method	Required Data	Data Included
☐ Statistical Analysis of Gage Records	Form 3 - Attachment A	☐ Yes ☐ No
☐ Regional Regression Equations	Form 3 - Attachment C	☐ Yes ☐ No
☒ Precipitation/Runoff Model	Form 3 - Attachment D	☒ Yes ☐ No
☐ Other	Back-up computations and supporting data	☐ Yes ☐ No

3. APPROVAL OF ANALYSIS

The hydrologic analysis has already been approved by a local, state, or Federal Agency. ☒ Yes ☐ No ☐ Not Required

If Yes, attach evidence of approval. ☒ **Approval attached.** If No, attach explanation. ☐ **Explanation attached.**

4. COMPARISON OF BASE FLOOD DISCHARGES

Location:	Drainage Area (SqMi)	FIS(cfs)	Revised (cfs)
entering southeast corner of site - 71st Ave. & RID canal	_____	1020 (CPUB1)	1099 (CFSF1)
entering northwest corner of site - 75th Ave. & Van Buren Street	_____	504 (CPTB2)	477 (CPTB2)
exiting southwest corner of site - 75th Ave. & RID canal	_____	1490 (RSSF)	1432 (RSSF2B)

Note: When revised discharges are not significantly different than the FIS discharges, FEMA may require a confidence limits analysis (see attachment B) at a later date to complete the review.

If only a portion of a detailed study area was revised please attach an explanation describing the transition from the proposed discharges to the effective discharges. ☐ **Explanation Included** ☒ **Explanation Not Required**

5. HISTORICAL FLOODING INFORMATION

If historical data are available for the flooding source please provide: Location, peak discharges/water-surface elevations and dates, and source of information. ☐ **Data Attached** ☒ **Data Not Available**

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

ATTACHMENT D: PRECIPITATION/RUNOFF MODEL

		FIS:		Revised:	
1.	Method or model used:	HEC-1		HEC-1	
	Version:	4.1		4.1	
	Date:	March 1999		November 2000	
2.	Source of rainfall depth:	_____		_____	
3.	Source of rainfall distribution:	_____		from FIS	
4.	Rainfall duration:	24-hour		24-hour	
5.	Areal adjustment to precipitation (%):	_____		_____	
6.	Maximum overland flow length	_____		_____	
7.	Hydrograph development method:	_____		MCHUP2	
8.	Loss rate method:	_____		_____	
	Source of soils information:	Central County Soil Survey		Central County Soil Survey	
	Source of land use information:	_____		FIS and proposed site plan	
9.	Channel routing method:	_____		_____	
10.	Reservoir routing:	☒ Yes	☐ No	☒ Yes	☐ No
11.	Baseflow considerations: **If Yes, explain below how baseflow was determined:**	☐ Yes	☒ No	☐ Yes	☒ No
	_____				
12.	Snowmelt considerations:	☐ Yes	☒ No	☐ Yes	☒ No
13.	Model calibration: **If Yes, explain below how calibration was performed**	☐ Yes	☒ No	☐ Yes	☒ No
	Minor modifications to effective model.				
14.	Future land use condition: **If Yes, explain why below**	☐ Yes	☒ No	☒ Yes	☐ No

The model was modified to reflect the development of the Target Southwest Distribution Center at the southeast corner of 75th Avenue and Van Buren Street. The site is proposed to be a warehouse and distribution center, with truck trailer and employee parking. A more detailed description of the future land use condition is included in the "Off-Site Drainage Report for Target Southwest Distribution Center" prepared by Hoskin Engineering Consultants, and dated December 7, 2000.

15. **Attach precipitation/runoff model, hydrologic model schematic, curve number calculations, time of concentration calculations, and supporting maps, delineating the watershed boundary and drainage area divides.**

Information and Maps provided? ☒ Yes ☐ No

NOTE: FEMA policy is to base flooding on existing conditions.

FEDERAL EMERGENCY MANAGEMENT AGENCY **RIVERINE HYDRAULIC ANALYSIS**	O.M.B No. 3067-0148 Expires April 30, 2001

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2.25 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

You are not required to respond to this collection of information unless a valid OMB Control Number is displayed in the upper right corner of this form.

Note: Fill out one form for each flooding source studied

Community Name: Phoenix, City of

Flooding Source: Roosevelt Irrigation District Canal (RID) / Southern Pacific Railroad

Project Name/Identifier: Target Southwest Distribution Center

1. REACH TO BE REVISED

Describe the limits of the revision OR submit a copy of the FIRM with the revision area clearly highlighted.
Copy of FIRM(s) attached depicting area of the revision (highlighted, or circled)? ☒ Yes

Downstream Limit: RM 6.532

Upstream Limit: RM 7.169

2. MODELS SUBMITTED

Requirements: for areas which have detailed flooding:
Full input and output listings along with files on diskette for each of the models listed below (items 1-4) and a summary of the source of input parameters used in the models must be provided. The summary must include a description of any changes made from model to model (e.g., Duplicate Effective model to Corrected Effective model). At a minimum, the Duplicate Effective (item 1) and the Revised or Post-Project Conditions (item 4) models must be submitted. See instructions for directions on when other models may be required.

for areas which do not have detailed flooding:
Only the 100-year (Base) flood profile is required. A hydraulic model is not required for areas which do not have detailed flooding; however, BFEs may not be added to the revised FIRM. If a hydraulic model is developed for the area, items 3 and 4 described below must be submitted.

If hydraulic models are not developed, hydraulic analyses (including all calculations) for existing or pre-project conditions and revised or post-project conditions must be submitted.

1. Duplicate Effective Model ☒ **Natural** **File Name** TOL_RAS.PRJ ☐ **Floodway** **File Name** _____
Copies of the hydraulic analysis used in the effective FIS, referred to as the effective models (10-, 50-, 100-, and 500-year multi-profile runs and the floodway run) must be obtained and then reproduced on the requester's equipment to produce the Duplicate Effective model. This is required to assure that the effective models input data has been transferred correctly to the requester's equipment and to assure that the revised data will be integrated into the effective data to provide a continuous FIS model upstream and downstream of the revised reach.

2. Corrected Effective Model ☐ **Natural** **File Name** _____ ☐ **Floodway** **File Name** _____
The Corrected Effective model is the model that corrects any errors that occur in the Duplicate Effective model, adds any additional cross sections to the Duplicate Effective model, or incorporates more detailed topographic information than that used in the currently effective model. The Corrected Effective model must not reflect any man-made physical changes since the date of the effective model. An error could be a technical error in the modeling procedures, or any construction in the floodplain that occurred prior to the date of the effective model but was not incorporated into the effective model.

3. Existing or Pre-Project Conditions Model ☒ **Natural** **File Name** TGT24E.PRJ ☐ **Floodway** **File Name** _____
The Duplicate Effective model or Corrective Effective model is modified to produce the Existing or Pre-Project Conditions model to reflect any modifications that have occurred within the floodplain since the date of the Effective model but prior to the construction of the project for which the revision is being requested. If no modification has occurred since the date of the effective model, then this model would be identical to the Corrected Effective model or Duplicate Effective model.

4. Revised or Post-Project Conditions Model ☒ **Natural** **File Name** TGT24A.PRJ ☐ **Floodway** **File Name** _____
The Existing or Pre-Project Conditions model (or Duplicate Effective model or Corrected Effective model, as appropriate) is revised to reflect revised or post-project conditions. This model must incorporate any physical changes to the floodplain since the effective model was produced as well as the effects of the project. When the request is for the proposed project this model must reflect proposed conditions.

5. Other – Please attach a sheet describing all other models submitted along with the file names. ☐ **Natural** ☐ **Floodway**

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

3. STARTING WATER-SURFACE ELEVATIONS

Explain how they were determined. Explanation Attached? ☒ Yes ☐ No

NOTE: If the effective study is an approximate study, the slope/area method is recommended.
For detailed analysis studies, using a known water-surface elevation is recommended.

4. RESULTS (from the model used to revise the 100-year water surface elevations)

If the results indicate any of the following, attach an explanation - to this form, or to the hydraulic model printout- as to the reasonableness of the situation.

☐ Supercritical depth ☐ Critical Depth ☐ Drawdowns ☐ Negative Floodway Surcharges

☐ Floodway Surcharges Greater Than Maximum Allowed by Community/State

☒ Water surface elevations higher than the end points of cross sections.

☐ Floodway discharge is different than the Natural 100-year (base) flood discharge.

☒ Project causes 100-year floodplain or floodway elevations to increase (state if increases are located off the requester's property)

Explanation attached with Form ☒ **Explanation provided on attached printout** ☐

If Hydraulic model used is HEC-2, has it been checked with FEMA'S CHECK-2 computer program? ☐ **Yes** ☒ **No**
(see instructions for information on how to obtain CHECK-2)

5. REVISED FIRM/FBFM AND FLOOD PROFILES

1. Profile Transition

a. 100-Year Water-Surface Elevations - indicate the difference in water surface elevations where the project 100-year elevations tie into the existing 100-year water surface elevations at each end of the project.

Downstream End 6.532 within 0.55 (feet) Upstream End 7.169 within 0.29 (feet)
Cross-Section # *Cross-Section #*

b. Floodway Elevations - indicate the difference in water surface elevations where the project floodway elevations tie into the existing floodway water surface elevations at each end of the project.

Downstream End _____ within _____ (feet) Upstream End _____ within _____ (feet)
Cross-Section # *Cross-Section #*

c. Floodway widths - indicate the difference in floodway widths where the project floodway widths tie into the existing floodway width at each end of the project.

Downstream End _____ within _____ (feet) Upstream End _____ within _____ (feet)
Cross-Section # *Cross-Section #*

2. Profile Checklist (check box if information has been provided on profile)

The following information (unless in parentheses) must be included at the same scale as the existing profiles for this project:

☐ Stream Name ☐ Community Name ☐ Corporate Limits labeled ☐ Study limits labeled

☐ Confluences labeled ☐ Channel Stationing ☐ Streambed profiled ☐ Cross Sections labeled

☐ Horizontal/Vertical Scales indicated ☐ 100-year elevs profiled*

☐ Road Crossings ☐ Labeled ☐ Low Chord Elevations ☐ Top of Road Elevations

*All recurrence intervals in the effective study must also be profiled.

Floodway Data Table

Attach a Floodway Data Table for each cross section listed in the published Floodway Data table in the FIS report.

Floodway Data Table Attached ☐ **Yes** ☒ **Not Required**

FEDERAL EMERGENCY MANAGEMENT AGENCY **RIVERINE / COASTAL MAPPING**	O.M.B No. 3067-0148 Expires April 30, 2001

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1.5 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

You are not required to respond to this collection of information unless a valid OMB Control Number is displayed in the upper right corner of this form.

Note: Fill out one form for each flooding source studied

Community Name: Phoenix, City of

Flooding Source: Roosevelt Irrigation District Canal (RID) / Southern Pacific Railroad

Project Name/Identifier: Target Southwest Distribution Center

This is a ☒ Manual ☐ Digital submission. *Digital map submissions may be used to update digital FIRMs (DFIRMs). For updating DFIRMs, these submissions must be coordinated with FEMA Headquarters as far in advance as possible.*

1. MAPPING CHANGES

1. A topographic workmap must be submitted showing the following information (check N/A when not applicable):

a. Revised approximate 100-year floodplain boundaries (Zone A)	☐ Yes	☐ No	☒ N/A
b. Revised detailed 100- and 500-year floodplain boundaries.	☒ Yes	☐ No	☐ N/A
c. Revised floodway boundaries	☐ Yes	☐ No	☒ N/A
d. Location and alignment of all cross sections with stationing control indicated.	☒ Yes	☐ No	☐ N/A
e. Stream alignments, road alignments and dam alignments.	☒ Yes	☐ No	☐ N/A
f. Current community boundaries.	☐ Yes	☐ No	☒ N/A
g. Effective 100- year floodplain and floodway boundaries from FIRM/FBFM reduced or enlarged to the scale of the topographic workmap	☒ Yes	☐ No	☐ N/A
h. Tie-ins between the effective and revised 100-, 500-year and floodway boundaries	☒ Yes	☐ No	☐ N/A
i. The requester's property boundaries and community easements	☒ Yes	☐ No	☐ N/A
j. The signed certification of a registered professional engineer	☒ Yes	☐ No	☐ N/A
k. Location and description of reference marks	☒ Yes	☐ No	☐ N/A
l. Vertical datum (example: NGVD, NAVD)	☒ Yes	☐ No	☐ N/A
m. Coastal zone designations tie into adjacent areas not being revised	☐ Yes	☐ No	☒ N/A
n. Location and alignment of all coastal transects used to revise the coastal analyze	☐ Yes	☐ No	☒ N/A
o. V-zone has been delineated to extend landward to the heel of the primary frontal dune	☐ Yes	☐ No	☒ N/A

If any items are marked No or N/A please attach an explanation.

2. What is the source and date of the updated topographic information (example: orthophoto maps, July 1985; filed survey, May 1979, beach profile, June 1987 etc.)? _____

3. What is the scale and contour interval of the following workmaps?

Effective FIS Scale 1" = 200' Contour Interval 2'

Revision Request Scale 1" = 40' Contour Interval 1'

NOTE: Revised topographic information must be of equal or greater detail than effective.

4. Attach an annotated FIRM/FBFM at the scale of the effective FIRM/FBFM showing the revised 100- and 500-year floodplain and the floodway boundaries and how they tie into those shown on the effective FIRM/FBFM downstream and upstream of the revisions or adjacent to the area of revision for coastal studies. **FIRM/FBFM attached?** ☒ **Yes** ☐ **No**

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

2. EARTH FILL PLACEMENT

1. The fill is: ☒ Existing ☐ Proposed

2. Has fill been/will be placed in the regulatory floodway? ☐ Yes ☒ No
If Yes, please attach completed Riverine Hydraulic Analysis Form (Form 4).

3. Has fill been/will be placed in floodway fringe (*area between the floodway and 100-year floodplain boundaries*)? ☐ Yes ☒ No

If Yes, then complete A, B, C, and D below.

a. Are fill slopes for granular materials steeper than one vertical on one-and-one-half horizontal? ☐ Yes ☐ No

If Yes, justify steeper slopes _____

b. Is adequate erosion protection provided for fill slopes exposed to moving flood waters? (*Slopes exposed to flows with velocities of up to 5 feet per second (fps) during the 100-year flood must, at a minimum, be protected by a cover of grass, vines, weeds, or similar vegetation; slopes exposed to flows with velocities greater than 5 fps during the 100-year flood must, at a minimum, be protected by stone or rock riprap.)*

☐ Yes ☐ No

If No, describe erosion protection provided _____

c. Has all fill placed in revised 100-year floodplain been compacted to 95 percent of the maximum density obtainable with the Standard Proctor Test Method or acceptable equivalent method? ☐ Yes ☐ No

d. Can structures conceivably be constructed on the fill at any time in the future? ☐ Yes ☐ No

If Yes, attach certification of fill compaction (item 3c. above) by the community's NFIP permit official, a registered professional engineer, or an accredited soils engineer in accordance with Subparagraph 65.5(a)(6) of the NFIP regulations.

Fill certification attached ☐ **Yes** ☐ **No**

4. Has fill been/will be placed in a V zone? ☐ Yes ☒ No

If Yes, is the fill protected from erosion by a flood control structure such as a revetment or seawall?

☐ Yes ☐ No

If Yes, attach the Coastal Structures Form (Form 10).

FEDERAL EMERGENCY MANAGEMENT AGENCY **CHANNELIZATION**	O.M.B. Burden No. 3067-0148 Expires April 30, 2001

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1.75 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

You are not required to respond to this collection of information unless a valid OMB Control Number is displayed in the upper right corner of this form.

Community Name: Phoenix, City of

Flooding Source: Roosevelt Irrigation District Canal (RID) / Southern Pacific Railroad

Project Name/Identifier: Target Southwest Distribution Center

1. REACH TO BE REVISED

Describe the limits of the revision **OR** submit a copy of the FIRM with the revision area clearly highlighted.
Copy of FIRM(s) attached depicting area of the revision (highlighted, or circled)? ☒ Yes

Downstream Limit: RM 6.532

Upstream Limit: RM 7.169

2. CHANNEL DESCRIPTION

Attach the following information about the channel (check box if information has been provided):

☒ Description of the inlet and outlet

☒ Description of the shape of the channel *(both cross sectional and planimetric configuration)* and its lining *(channel bottom and sides)*:

3. ACCESSORY STRUCTURES

The channelization includes:

- ☐ Levees *(Attach Levee/Floodwall System Analysis Form - Form 8)*
- ☐ Drop structures
- ☐ Superelevated sections
- ☐ Transitions in cross sectional geometry
- ☐ Debris basin/detention basin
- ☐ Energy dissipater
- ☐ Other (Describe):

4. DRAWING CHECKLIST

Attach the plans of the channelization certified by a registered professional engineer. The plan detail and information should include (check box if information has been provided):

☒ Channel alignment and locations of inlet, outlet, and accessory structures

☒ Channel lining

☒ Typical cross sections and profiles of channel banks and invert

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

5. HYDRAULIC CONSIDERATIONS

1. The channel was designed to carry 1099 (cfs) and/or the 100-year flood.

2. The design elevation in the channel based on:

   ☒ Subcritical flow

   ☐ Critical flow

   ☐ Supercritical flow

   ☐ Energy grade line

3. **If there is the potential for a hydraulic jump at the following locations, check the box(es) that apply and attach an explanation of how the hydraulic jump is controlled without affecting the stability of the channel.**

Inlet to channel?	☐ Yes
Outlet of channel?	☐ Yes
At Drop Structures?	☐ Yes
At Transitions?	☐ Yes
Other locations?	☐ Yes

Explanation Attached? ☐ **Yes** ☐ **No** ☒ **N/A**

6. SEDIMENT TRANSPORT CONSIDERATIONS

If there is any indication from historical records that sediment transport (including scour and deposition) can affect the 100-year (base flood) water-surface elevations; and/or based on the stream geomorphology, vegetative cover, development of the watershed and bank conditions, there is a potential for debris and sediment transport (including sewer and deposition) to affect the base flood water-surface elevations, then provide the following information **(Check the box if provided):**

☐ Estimated sediment load

☐ Method used to estimate sediment transport

☐ Method used to estimate scour and/or deposition

☐ Method used to revise hydraulic or hydrologic analysis (model) to account for sediment transport

SPEEDIE
AND ASSOCIATES

Gregg A. Creaser, P.E.
Brett P. Creaser, P.E.
Donald L. Cornelison, P.E.
Steven A. Griess, P.E.
Prabhakar (Peter) Rupal, P.E.
Timothy J. Rheinschmidt, R.G.
James A. Speedie, P.E.

Geotechnical
Environmental
Materials Engineers

February 8, 2001
Revised March 7, 2001

Mr. Harry Jenkins
Nielsen Dillingham Builders
11811 N. Tatum Blvd., Suite 3030
Phoenix, AZ 85028

RE: Grading Report
Shipping Wing
Target SW Distribution Center
7101 W. Van Buren St.
Phoenix, AZ
Project No. 000858TA

Dear Mr. Jenkins:

At your request, we have performed field density tests on subgrade and compacted fill within the Shipping Wing building pad at the referenced site from December of 2000 through February of 2001. Details of the operations were presented in the Daily Field Reports and laboratory and field test data, copies of which have been previously transmitted to all concerned parties.

A soils investigation has been performed for this project by Speedie & Associates, Inc, Project No. 000858SA dated November 9, 2000. To the best of our professional opinion, the requirements of the soil investigation report, including the limitations contained therein, have been met. A guarantee that the contractor has necessarily performed this work in full accord with the plans and specifications is neither intended nor implied.

Based upon our observations of earthwork operations, it is our professional opinion that the compacted fill is suitable for the support of shallow footings placed at a minimum depth of 18 inches below finished pavement grade for exterior footings (below finished floor for interior footings) designed on the basis of a net allowable bearing capacity of 2,500 pounds per square foot.

If you have any questions or need additional assistance, please do not hesitate to call.

Respectfully submitted,

SPEEDIE & ASSOCIATES

Registered Professional Engineer (Civil)
CERTIFICATE NO. 20900
BRETT PAUL CREASER
Date Signed 3-7-01
ARIZONA, U.S.A.

Brett P. Creaser, P.E.

3331 East Wood Street ▪ Phoenix, AZ 85040
Phone 602-997-6391 ▪ Fax 602-943-5508 ▪ www.speedie.net

SPEEDIE
AND ASSOCIATES

Geotechnical
Environmental
Materials Engineers

Gregg A. Creaser, P.E.
Brett P. Creaser, P.E.
Donald L. Cornelison, P.E.
Steven A. Griess, P.E.
Prabhakar (Peter) Rupal, P.E.
Timothy J. Rheinschmidt, R.G.
James A. Speedie, P.E.

~~March 5, 2001~~
Revised March 7, 2001

Mr. Harry Jenkins
Nielsen Dillingham Builders
7101 West Van Buren Street
Phoenix, AZ 85043

RE: Grading Report
Receiving Wing
Target SW Distribution Center
7101 W. Van Buren St.
Phoenix, AZ
Project No. 000858TA

Dear Mr. Jenkins:

At your request, we have performed field density tests on subgrade and compacted fill within the Receiving Wing building pad at the referenced site from December of 2000 through February of 2001. Details of the operations were presented in the Daily Field Reports and laboratory and field test data, copies of which have been previously transmitted to all concerned parties.

A soils investigation has been performed for this project by Speedie & Associates, Inc, Project No. 000858SA dated November 9, 2000. To the best of our professional opinion, the requirements of the soil investigation report, including the limitations contained therein, have been met. A guarantee that the contractor has necessarily performed this work in full accord with the plans and specifications is neither intended nor implied.

Based upon our observations of earthwork operations, it is our professional opinion that the compacted fill is suitable for the support of shallow footings placed at a minimum depth of 18 inches below finished pavement or finished landscape grade for exterior footings (below finished floor for interior footings) designed on the basis of a net allowable bearing capacity of 2,500 pounds per square foot.

If you have any questions or need additional assistance, please do not hesitate to call.

Respectfully submitted,

SPEEDIE & ASSOCIATES

Brett P. Creaser, P.E.

Registered Professional Engineer (Civil)
CERTIFICATE NO. 20900
BRETT PAUL CREASER
Date Signed 3-7-01
ARIZONA U.S.A.

3331 East Wood Street ▪ Phoenix, AZ 85040
Phone 602-997-6391 ▪ Fax 602-943-5508 ▪ www.speedie.net

SPEEDIE
AND ASSOCIATES

Gregg A. Creaser, P.E.
Brett P. Creaser, P.E.
Donald L. Cornelison, P.E.
Steven A. Griess, P.E.
Prabhakar (Peter) Rupal, P.E.
Timothy J. Rheinschmidt, R.G.
James A. Speedie, P.E.

Geotechnical
Environmental
Materials Engineers

February 12, 2001

Mr. Harry Jenkins
Nielsen Dillingham Builders
11811 N. Tatum Blvd., Suite 3030
Phoenix, AZ 85028

RE: Target SW Distribution Center
Shipping Wing
7101 West Van Buren St.
Project No. 000858TA

Dear Mr. Jenkins:

Pursuant to your request, we have performed construction materials testing within the building pad of the Shipping Wing at the referenced site through February 9, 2001. Services provided by our firm include observation of earthwork operations and field and laboratory testing of representative samples of native and lime treated soils.

A soils investigation has been performed for this project by Speedie & Associates, Inc, Project No. 000858SA dated November 9, 2000. To the best of our professional opinion, the requirements of the soil investigation report, including the limitations contained therein, have been met. A guarantee that the contractor has necessarily performed this work in full accord with the plans and specifications is neither intended nor implied.

Results of Field Density Tests performed within the Shipping Wing building pad indicate compaction levels that met or exceeded 95% of the maximum dry density as determined by ASTM D698.

Results of laboratory testing of representative samples of lime treated soils for percentage of lime content by dry weight of soil/lime mixture, ASTM D3155, within the Shipping Wing building pad indicate that the requirements of the Lime Stabilization Mix Design performed by Speedie and Associates, dated January 23, 2001, have been met. In addition, depth checks conducted at representative locations within the Shipping Wing building pad indicated the recommended lime stabilized thickness had been achieved.

Additionally, based upon our observations of earthwork operations, the removal of plant stalks and the turning of the root system into the surface soils was done in accordance with our soils investigation.

If you have any questions or need additional assistance, please do not hesitate to call.

Respectfully submitted,

SPEEDIE & ASSOCIATES

Brett P. Creaser, P.E.

Registered Professional Engineer (Civil) CERTIFICATE NO. 30900 BRETT PAUL CREASER Date Signed 2-12-01 ARIZONA, U.S.A.

3331 East Wood Street • Phoenix, AZ 85040
Phone 602-997-6391 • Fax 602-943-5508 • www.speedie.net

SPEEDIE
ANDASSOCIATES

Gregg A. Creaser, P.E.
Brett P. Creaser, P.E.
Donald L. Cornelison, P.E.
Steven A. Griess, P.E.
Prabhakar (Peter) Rupal, P.E.
Timothy J. Rheinschmidt, R.G.
James A. Speedie, P.E.

Geotechnical
Environmental
Materials Engineers

March 5, 2001
Updated May 25, 2001

Mr. Harry Jenkins
Nielsen Dillingham Builders
7101 West Van Buren Street
Phoenix, AZ 85043

RE: Target SW Distribution Center
Receiving Wing
7101 West Van Buren St.
Phoenix, AZ
Project No. 000858TA

Dear Mr. Jenkins:

Pursuant to your request, we have performed construction materials testing within the Receiving Wing building pad at the referenced site through February 23, 2001. Additionally, the building pad surface was observed and evaluated by a representative of this firm on May 24, 2001.

A soils investigation has been performed for this project by Speedie & Associates, Inc, Project No. 000858SA dated November 9, 2000. To the best of our professional opinion, the requirements of the soil investigation report, including the limitations contained therein, have been met. A guarantee that the contractor has necessarily performed this work in full accord with the plans and specifications is neither intended nor implied.

Results of Field Density Tests performed within the Receiving Wing building pad indicate compaction levels met or exceeded 95% of the maximum dry density as determined by ASTM D698.

Results of laboratory testing of representative samples of lime treated soils for percentage of lime content by dry weight of soil/lime mixture, ASTM D3155, within the Receiving Wing building pad indicate that the requirements of the of the Lime Stabilization Mix Design performed by Speedie and Associates, dated January 23, 2001, have been met. In addition, depth checks conducted at representative locations within the Receiving Wing building pad indicated the recommended lime stabilized thickness had been achieved.

If you have any questions or need additional assistance, please do not hesitate to call.

Respectfully submitted,

SPEEDIE & ASSOCIATES

Jason C. Wells, E.I.

Brett P. Creaser, P.E.

Registered Professional Engineer (Civil) CERTIFICATE NO. 20900 BRETT PAUL CREASER Date Signed 5-25-01 ARIZONA, U.S.A.

3331 East Wood Street ▪ Phoenix, AZ 85040
Phone 602-997-6391 ▪ Fax 602-943-5508 ▪ www.speedie.net