

*file*

**HYDROLOGY REPORT  
FOR  
SAN JOAQUIN ESTATES-IMPROVEMENT PLANS  
LOTS 268 THROUGH 290**

**SUBMITTED TO PIMA COUNTY  
FLOODPLAIN SECTION**

*Not Approved  
4/14/87  
G. Hershberger  
Impr. Plans Hydrology*

**ACCEPTED**  
*for Impr. Plan  
Review  
5.4.87  
Jitt.*

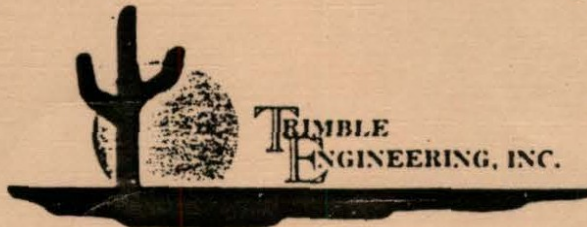
**MARCH, 1987**

**RECEIVED**  
MAR 31 1987

Improvement Plans & Hydrology

*see memo*

*\* See Mylar rolled plan  
in vertical file*



Hydrology Report  
for  
San Joaquin Estates - Improvement Plans  
Lots 268 thru 290

Being a Proposed Development Located in the Southeast Quarter  
of Section 24, Township 14 South, Range 11 East,  
Gila and Salt River Base and Meridian,  
Pima County, Arizona.

March, 1987

Prepared By:

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TEI #340-86

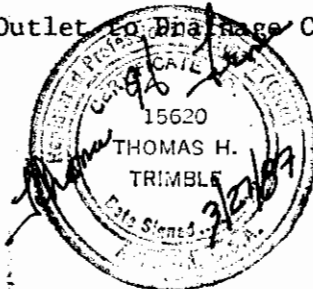


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## INTRODUCTION

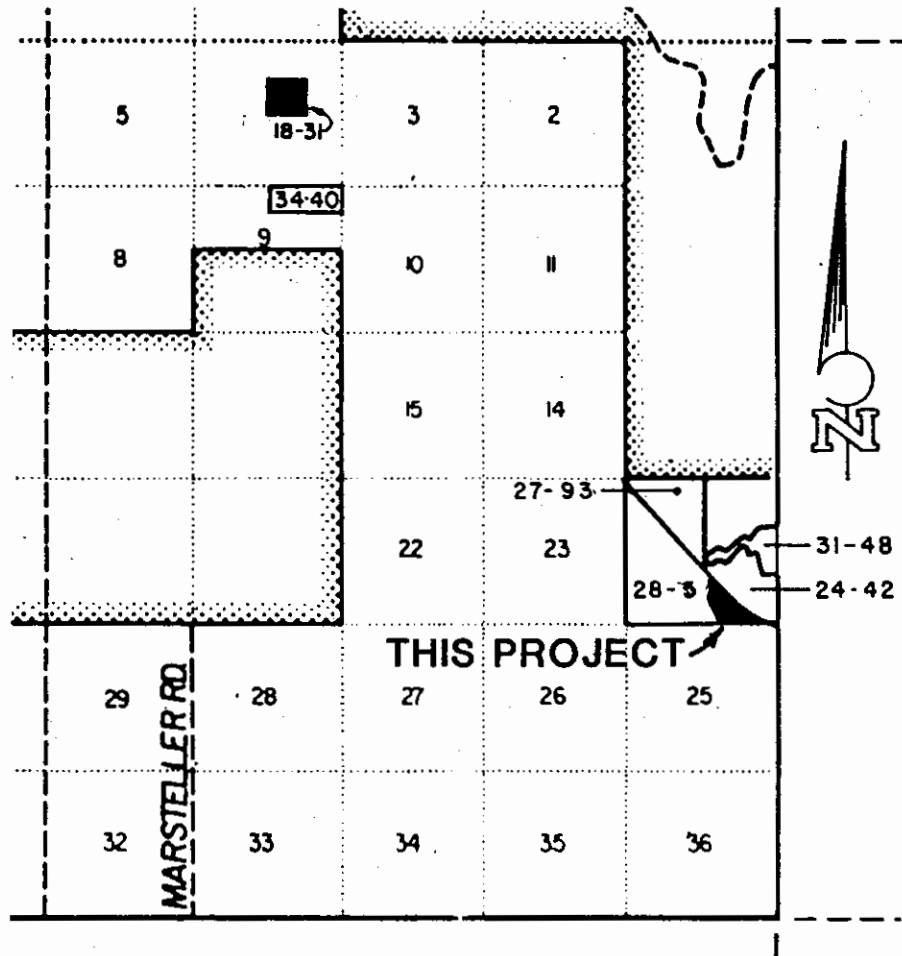
The project is located in the Southeast Quarter of Section 24, Township 14 South, Range 11 East, Gila and Salt River Base and Meridian, Pima County, Arizona (see Figure 1). The site is bounded on the northeast by San Joaquin Road; on the south by undeveloped land; on the southwest by the future location of the Tucson Aqueduct (Reach 5) of the Central Arizona Project; and on the northwest by undeveloped land.

Offsite drainage impacts the project site from several watersheds whose headwaters lie to the northeast of the project site. The only development within these offsite watersheds is the Tucson Saguaro Estates Subdivision immediately across San Joaquin Road adjacent to this project. The remaining area of these offsite watersheds is undeveloped.

This project is the eastern portion only of the previously recorded San Joaquin Subdivision, Lots 268 thru 290, Book 28 of Maps on Page 5. The central and western portion of this project will be acquired for or rendered undeveloped (respectively) by the Tucson Aqueduct (Reach 5) of the Central Arizona Project. This report will address the manner in which the existing offsite and the post-development onsite drainage will be conveyed across this project to points of discharge at the common boundary between this project and the CAP right-of-way.

This development will convert the existing 51.5 acres (59.09 acres if the western right-of-way of San Joaquin Road is included) between the Tucson Aqueduct and San Joaquin Road into a mobile home subdivision. Drainage across

the site will be conveyed either in improved drainage channels or in earthen drainage ditches along the streets of the subdivision. The project is to be completed in two phases using the Design Certification option as presented in a letter dated July 22, 1986 from Mr. Chuck Huckleberry, Director of the Pima County Transportation and Flood Control District.



LOCATION PLAN  
TOWNSHIP 14 SOUTH, RANGE 11 EAST

FIGURE 1

## OBJECTIVES

The objectives of this study are to:

1. Define the offsite watersheds which affect this proposed development and determine their peak discharges for storms with return frequencies of 10, 25 and 100 years.
2. Delineate and compute the post-development onsite drainage conditions and peak discharges for 10, 25 and 100 year events.
3. Assimilate the previously mentioned information and recommend specific design requirements to insure that the proposed development and all downstream land owners will be adequately protected during a 100 year storm event.

## PROCEDURES

1. The offsite watersheds were delineated by planimeter using a Cooper Aerial photograph taken at 1" = 400 (December 22, 1986) and U.S.G.S., 7.5 Minute Brown Mountain quadrangle.
2. The onsite drainage conditions were determined from topographic information provided by Cella Barr & Associates, Inc.
3. Detailed topographic information at the drainage channel inlets and street entrances was obtained from survey work completed by Trimble Engineering, Inc., in February, 1987
4. Peak discharges for the 10, 25 and 100 year events for offsite and post-development onsite watersheds were obtained using methods described in the Pima County Hydrology Manual (Pima County Department of Transportation-Flood Control District 1979).
5. The 100 year water surface elevations for the existing natural channels and the post-development channels were sized using Manning's equation and the appropriate 100 year peak discharges.
6. A cross-section was taken across the paved onsite streets to insure that they will have enough capacity to convey the post-development onsite and existing offsite 100 year peak discharges.
7. A HEC-II computer program was utilized to determine the adequacy of the drainage channel inlet designs, and the 100 year flood limits of several existing washes which cross the site.



## REFERENCES

1. Brater, E.F. and H.W. King, 1976, "Handbook of Hydraulics", 6th Edition, McGraw-Hill Book Company, New York.
2. Cella Barr & Associates, 1983, Topographic Survey.
3. Cooper Aerial Survey Company, Aerial photographs scale 1" = 400', December 22, 1986, No. 2-14 and 3-14.
4. Henderson, F.M., 1966, "Open Channel Flow", MacMillan Publishing Co., Inc., New York.
5. Pima County Department of Transportation and Flood Control District, 1979, "Hydrology Manual for Engineering Design and Floodplain Management within Pima County, Arizona".
6. Pima County Department of Transportation and Flood Control District, 1984, "Drainage and Channel Design Standards for Local Drainage for Floodplain Management within Pima County, Arizona".
7. Trimble Engineering, Inc., 1987, Topographic Survey.
8. U.S. Army Corps. of Engineers, Water Resources Support Center, 1982, "HEC-2 Water Surface Profiles, Computer Program 723-X6-L202A" Davis, California.

9. U.S. Department of Transportation, Hydraulics Branch, Federal Highway Administration, 1978, "Hydraulic Design of Energy Dissipators for Culverts and Channels", Hydraulic Engineering Circular No. 14.
  
10. U.S.G.S. 7.5 Minute Topographic Quadrangle, Brown Mountain, 1975.

## OFFSITE HYDROLOGY

There are eight offsite drainage areas (labeled A through H) which generate drainage that will impact the northeastern property line of this project (see Figures 2 and 3). All of these offsite watersheds are primarily undeveloped (they have impervious cover percentages of 5% or less) and all have headwaters which lie to the northeast of this project. None of the drainage channels within these offsite watersheds have been improved or significantly altered within the adjacent Tucson Saguaro Estates Subdivision to the northeast, and the peak discharge generated by each area crosses San Joaquin Road unimpeded in minor dip sections. *provide analyses*

Also, it must be mentioned that the drainage within these offsite watersheds is very complex with many converging and diverging channels with potential sheetflooding areas between the defined channel reaches. Since these existing, natural channels have been formed by the peak discharges generated by storms of low magnitude, it can be assumed that there will be some break out of flow across the offsite watershed boundaries during the 100 year event. Therefore, any channels or ditches which will convey offsite flow across this project site will be designed with an extra margin of capacity.

The 10, 25 and 100 year peak discharges generated by offsite drainage areas A through H are presented in Figure 4. This drainage from these offsite watersheds will be conveyed across the site in their existing natural channels; in earthen drainage ditches adjacent to the paved roads within the subdivision; or in improved drainage channels. This drainage will be discharged into the undeveloped land to the south or into the CAP right-of-way to the west and southwest, at or near their existing, natural flow paths.

SCALE 1" = 400'

C.A.P. R.O.W.

THIS PROJECT

G  
Q100 - 42 CFS  
D.A. - 7.5 AC

D  
Q100 - 128 CFS  
D.A. - 25.2 AC

B  
Q100 - 80 CFS  
D.A. - 15.8 AC

H  
Q100 - 18 CFS  
D.A. - 3.7 AC

E  
Q100 - 800 CFS  
D.A. - 197 AC

C  
Q100 - 402 CFS  
D.A. - 148 AC

A  
Q100 - 556 CFS  
D.A. - 182 AC

F  
Q100 - 12 CFS  
D.A. - 2.1 AC

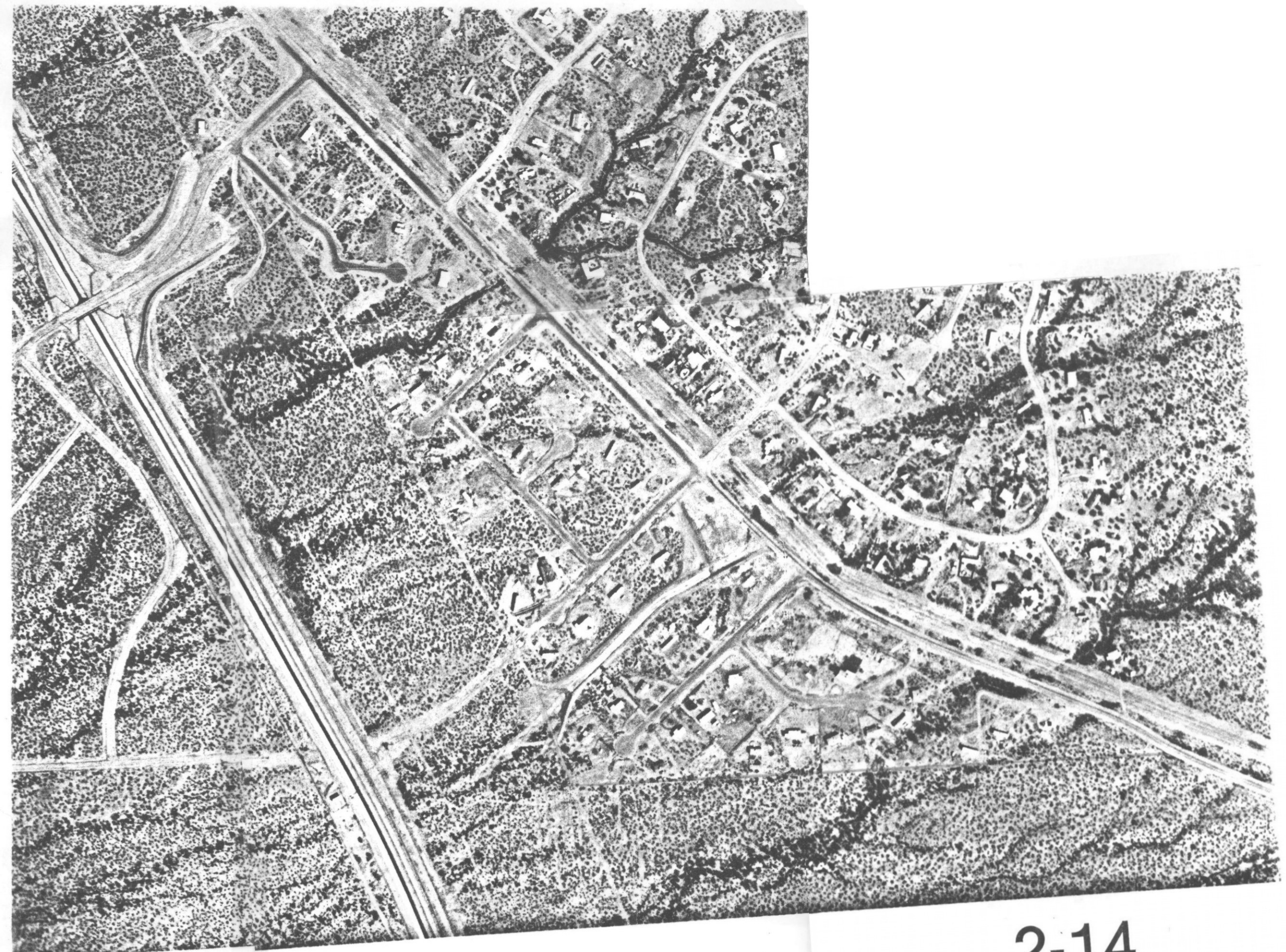
FIGURE 2 - OFFSITE DRAINAGE AREAS

HYDROLOGY REPORT EXHIBIT

TEI-340-86



FIG. 2 H/H Report



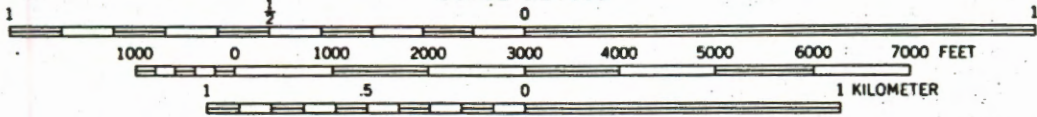
ON

MARCH 19

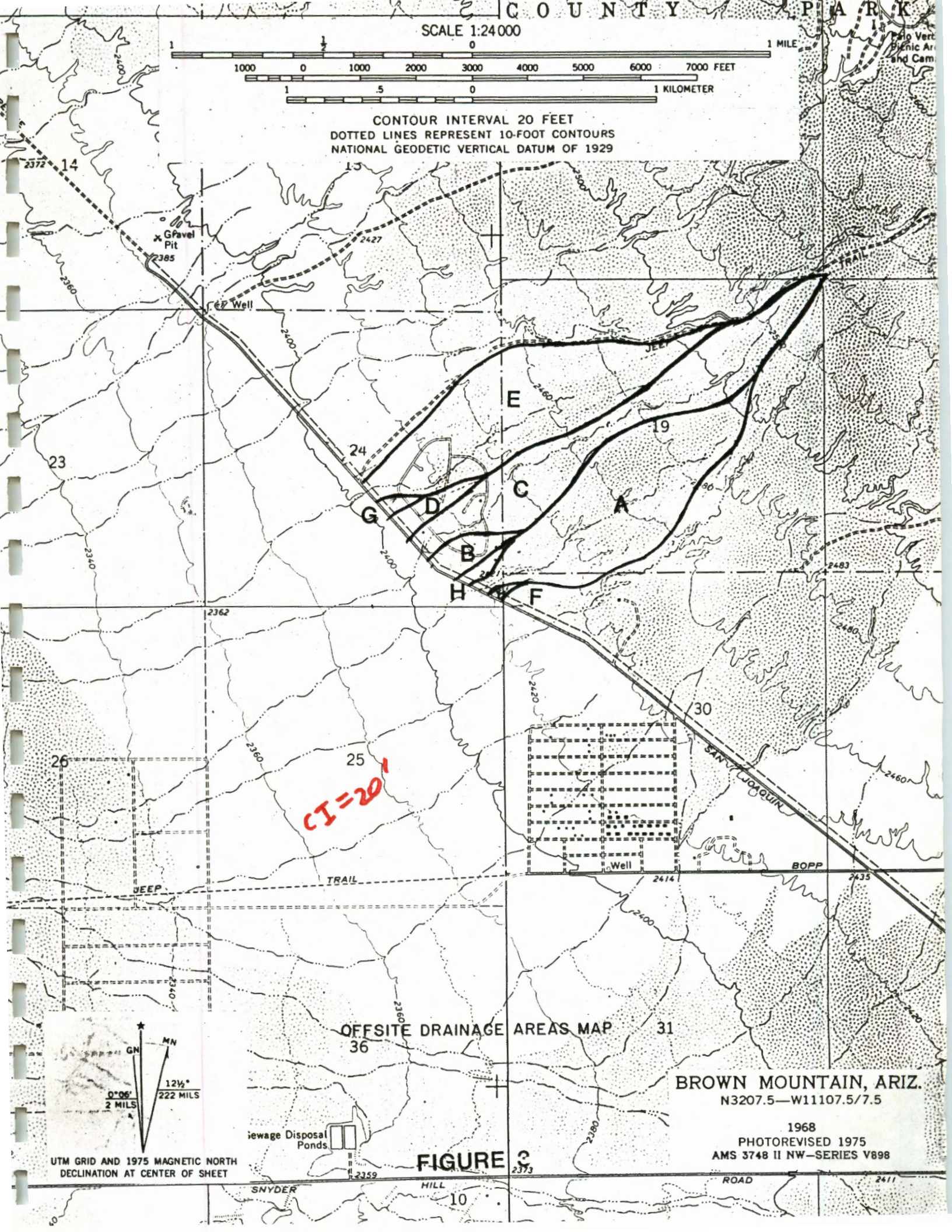
*1"=400'*

2-14

SCALE 1:24000



CONTOUR INTERVAL 20 FEET  
 DOTTED LINES REPRESENT 10-FOOT CONTOURS  
 NATIONAL GEODETIC VERTICAL DATUM OF 1929



*CI=20'*

OFFSITE DRAINAGE AREAS MAP

BROWN MOUNTAIN, ARIZ.

N3207.5—W11107.5/7.5

1968

PHOTOREVISED 1975

AMS 3748 II NW—SERIES V898

FIGURE 2

2373

UTM GRID AND 1975 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET



PEAK DISCHARGE SUMMARY TABLE

Drainage Area

10 year (CFS)

25 year (CFS)

100 year (CFS)

A. Offsite:

A	220	331	555
B	35	52	80
C	156	235	402
D	57	83	128
E	238	358	600
F	5	7	12
G	19	27	42
H	9	12	18

B. Onsite  
Post-Development:

*lts  
269-290*

	<i>Area (ac)</i>			
PD1	6.9	15	21	34
PD2	6.3	17	24	36
PD3	3.4	11	14	22
PD4	1.7	6	7	11
PD5	6.7	21	28	42
PD6	5.3	15	21	32
PD7	1.2	5	6	9
PD8	5.7	19	25	35
PD9	9.1	26	36	54
PD10	2.4	9	11	16
PD11	3.1	10	14	19

FIGURE 4

## ONSITE HYDROLOGY

The existing 51.5 acre natural desert brush site is to be developed into a mobile home subdivision (see Figure 5). Construction of this project is to be in two phases with development to begin initially in Phase I which includes all lots to the south of drainageway "D". Drainage across the proposed lots will essentially remain as natural since very little grading will be done on each lot. However, any drainage which discharges towards an onsite paved street will be collected in earthen drainage ditches along either side of the street. Onsite drainage not intercepted by these street drainage ditches will exit the southern and western boundaries of the site in their natural, existing channels. *trace to logical downstream conclusion*

The post-development site has been divided into eleven drainage areas (see Figure 5). The 10, 25 and 100 year peak discharges generated by these eleven drainage areas, labeled PD1 through PD11, have been presented in Figure 4.

A HEC-II water surface profile computer program was used to compute the 100 year flood limits for the natural drainage channels which receive runoff from offsite drainage areas A, D and G (see the computer program output in the Appendix). Both of these drainage channels will be left for the most part undisturbed after the development of this subdivision. The 100 year flood limits and water surface elevations (all of which are subcritical) for each cross-section are presented in Figure 5. *clarify*

The drainage generated onsite by post-development watersheds PD1 through PD11 will either exit the southern or southwestern property lines in it's existing



natural channels or it will be conveyed offsite via earthen drainage ditches along either side of the onsite streets. Three separate drainage ditch configurations will be used along various streets depending upon the specific peak discharge and flowline slopes present (see Figure 6 for the drainage ditch configurations and capacity calculations). All of the drainage ditches have been designed with excess capacity to accommodate any breakout across the offsite or onsite drainage area boundaries. They have also been designed to convey the 100 year peak discharge at depths of less than one foot. All the driveways will cross these drainage ditches at dip sections. The finished floor elevations of the various lots will be set at a minimum of one foot above the greatest adjacent 100 year surface elevation in these drainage ditches or the onsite improved drainageways.

The 100 year peak discharge of 402 CFS from offsite drainage area C will be conveyed through the site via a 22 foot wide (bottom width) gunite-lined, trapezoidal drainage channel. This channel (labeled drainageway "D"), is located between Ursa Way and Calle Anasazi (see Figure 5). A Manning's analysis of a typical cross-section taken across this 2.5 foot deep drainage channel (Figure 7), revealed that the 100 year flow in the channel will be 1.54 feet and will be supercritical. The capacity of this channel at a depth of 2.5 feet will be 935 CFS.

(collector channel)

The inlet to this drainageway will extend diagonally across Lot 251 from the southwest lot corner to the northwest lot corner (see Figure 8 for a detail of this inlet). A 3 to 1, 3.5 foot deep, cobble lined slope (with the top of bank matching existing topography as much as possible) will direct the 100

need details for exist + improved conditions

year peak discharge into the 22 foot wide (bottom width) gunite channel. In addition, a small portion of the northeastern corner of Lot 274 will also serve as a collector for the 402 CFS from drainage area C.

The slope across this inlet will vary from .5% along the toe of the cobble slope across Lot 251, to 3.2% toward the channel inlet near the southeastern corner of Lot 251. No grading will be done within the San Joaquin Road right-of-way and the elevations along the eastern property line of Lot 251 will be left at existing levels. Only some minor grading within the right-of-way will be required near the northeastern corner of Lot 274.

natural  
3.5'  
slope?

A HEC-2 computer program was used to compute the existing and post-development 100 year water surface elevations and flood limits across San Joaquin Road and the proposed drainage channel inlet (see the Appendix for the computer program outputs). The locations of the various cross-sections and the 100 year flood limits produced by the HEC-II runs are presented in Figure 8. The post development super-critical HEC-2 run shows that the 100 year flow velocities in the right over bank for cross-sections 2, 3 and 4 (against the 3:1 cobble lined slope) will be a maximum of 7.44 feet per second. Therefore, 10 inch cobble bank protection will provide sufficient erosion protection.

cales?

Cross-section 1.0 of both HEC-2 computer runs shows that there will be some break out across the watershed boundaries near the entrance to Calle Anasazi. For this reason, the capacity of both the ditches along Calle Anasazi have been designated to accommodate a Q100 of 191 CFS. This is 182 CFS greater than the onsite 100 year peak discharge draining into Calle Anasazi. This is also 73% of the 261 CFS in this right flow channel in cross-section 1.0.

An analysis of the superelevation which will occur at the bend in drainageway "D" (Figure 9) shows that the 100 year water surface will rise 0.36 feet on the outside of the bend. Since this rise is still 0.2 feet below the critical depth, no cross slope will be required.

Since flow in drainageway "D" is supercritical, it will be necessary to lessen the velocity of the flow in the channel at the channel outlet to, at or below the velocities in the existing, natural channels. Therefore, the channel outlet at the western property line will be flared to a total bottom width of 200 feet (see Figure 10). This 200 foot wide trapezoidal channel with 3 to 1 cobble-lined slopes will convey the 100 year peak discharge (402 CFS) at a depth of 0.52 feet and a velocity of 3.83 feet per second. This is equivalent to the velocities for the flow in the existing cross-sections across San Joaquin Road (see the supercritical HEC-2 computer output in the Appendix) which are predominantly from 3.93 fps to 4.54 fps.

may reduce  
vel but  
widening  
flood plain?  
What is  
exist.  
depth @  
PL?

Drainageway "B" which lies at the northern end of Phase II of this project will be designed immediately prior to the development of the second phase. It is anticipated that this drainageway, which receives 600 CFS from offsite drainage area E and 19 CFS from onsite drainage area PD11, will need to be designed similar to drainageway "D" of Phase I, however, drainageway "B" will be wider and shallower since more area is available for the drainageway.

Calle Anasaji: may need to acct for some brookcut from offsite area D - to be conservative,

very close:  
a little bit  
bigger to be  
conservative

$$5090(128) = 64 \text{ cfs} \\ + 54 \text{ cfs} \quad \text{PD-9}$$

118 - prob OK on N. side  
prob " S. "

Constell. Way:

S side: 19 cfs PD-11  
16 cfs PD-10

---

25

as above

N side: looks OK

Unsa Way: N side: <sup>made</sup> 10 + 80 = 90 cfs  
S side: 18 D.A. "H"

as above

22 PD-3  
1.1 PD-4  
36 PD-2  
87 looks OK

Polaris Way:

N: 54

as above

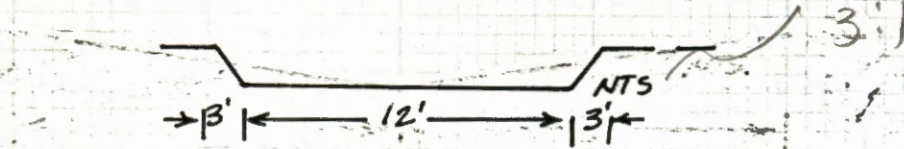
Unsa Pl:

N: 22 + 18 = 40  
S: 36

looks a  
bit small

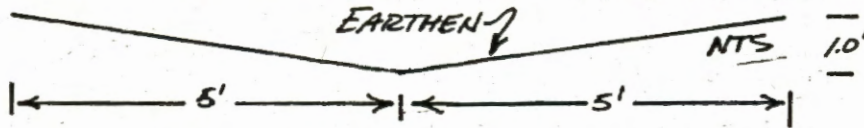
CONVEYANCE CAPACITIES OF DRAINAGE DITCHES ALONG STREETS:

*in both sides*



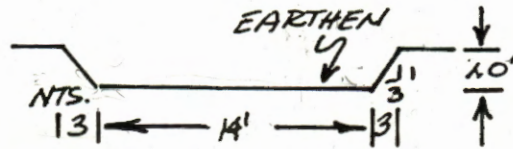
ALONG CALLE ANASAZI:

$Q_{100} = 9$  CFS,  $S = .015$  FT/FT,  $n = .025$ ; AT  $d = 1.0$  FT:  $A = 15.0$  FT<sup>2</sup>,  $P = 18.32$  FT,  $R = .8189$  FT,  $V = 6.37$  FPS  $\therefore Q_c = (15.0)(6.37) = 95.6$  CFS OR  $(95.6 \text{ CFS}) \times 2 = 191.2$  CFS IN BOTH DITCHES.



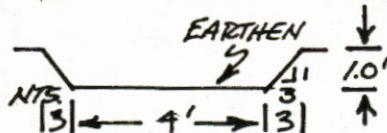
ALONG CONSTELLATION WAY:

$Q_{100} = 19$  CFS,  $S = .015$ ,  $n = .025$ ; AT  $d = 1.0$  FT  
 $Q_c = (5.0)(4.52) = 22.6$  CFS OR  $(22.6 \text{ CFS}) \times 2 = 45.2$  CFS IN BOTH DITCHES



ALONG URSA WAY:

$Q_{100} = 149$  CFS,  $S = .01$  FT/FT,  $n = .025$ ; AT  $d = 1.0$  FT:  
 $A = 17$  FT<sup>2</sup>,  $P = 20.32$  FT,  $R = .8366$  FT,  $V = 5.28$  FPS  $\therefore$   
 $Q_c = (5.28)(17) = 89.7$  CFS OR  $(89.7) \times 2 = 179$  CFS IN BOTH DITCHES. *2 in one ditch*



*prob. should be larger on S. Side*

ALONG POLARIS WAY:

$Q_{100} = 54$  CFS,  $S = 1.2\%$ ,  $n = .025$ ; AT  $d = 1.0$  FT:  $A = 7.0$  FT<sup>2</sup>,  $P = 10.32$  FT,  $R = .6783$  FT,  $V = 5.028$  FPS  $\therefore Q_c = (5.028 \text{ FPS}) \times (7.0 \text{ FT}^2) = 35.19$  CFS OR  $(35.19) \times 2 = 70.4$  CFS IN BOTH DITCHES  
*seems as if could be better des.*

ALONG URSA PLACE:

*prob. OK*  $Q_{100} = 22$  CFS IN EAST DITCH, 18 CFS IN WEST DITCH;  $S = .01$  FT/FT,  $n = .025$ ; AT  $d = 1.0$  FT:  $A = 7.0$  FT<sup>2</sup>,  $P = 10.32$  FT,  $R = .6783$ ,  $V = 4.59$  FPS  $\therefore Q_c = (7.0 \text{ FT}^2)(4.59 \text{ FPS}) = 32.12$  CFS IN EACH DITCH

*overall - gen OK - some could have extra 20% capacity to be conservative*

FIGURE 6

PROJECT SAN JOE JIN

JOB NO. TEI-340-86

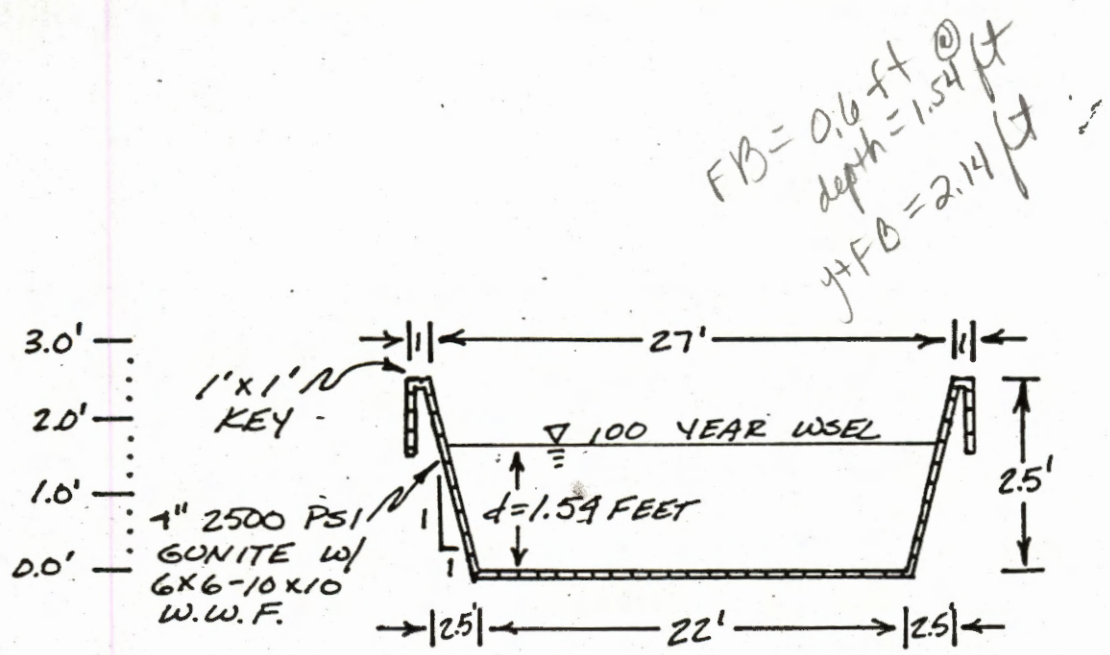
DESIGNED BY JDM DATE 1/15/87

CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_



SHEET 1 OF 1

### TYPICAL CHANNEL CROSS SECTION - DRAINAGEWAY "D":



$Q_{100} = 4.18$  CFS (402 FROM "C" +  
 $S = .01$  FT./FT. 18 FROM 1/2 OF  
 PD6)

SCALE  
 HORIZ. 1" = 10'  
 VERT. 1" = 2.5'

MANNINGS,  
 TRAPEZOIDAL  
 CHANNEL

MANNINGS,  
 TRAPEZOIDAL  
 CHANNEL

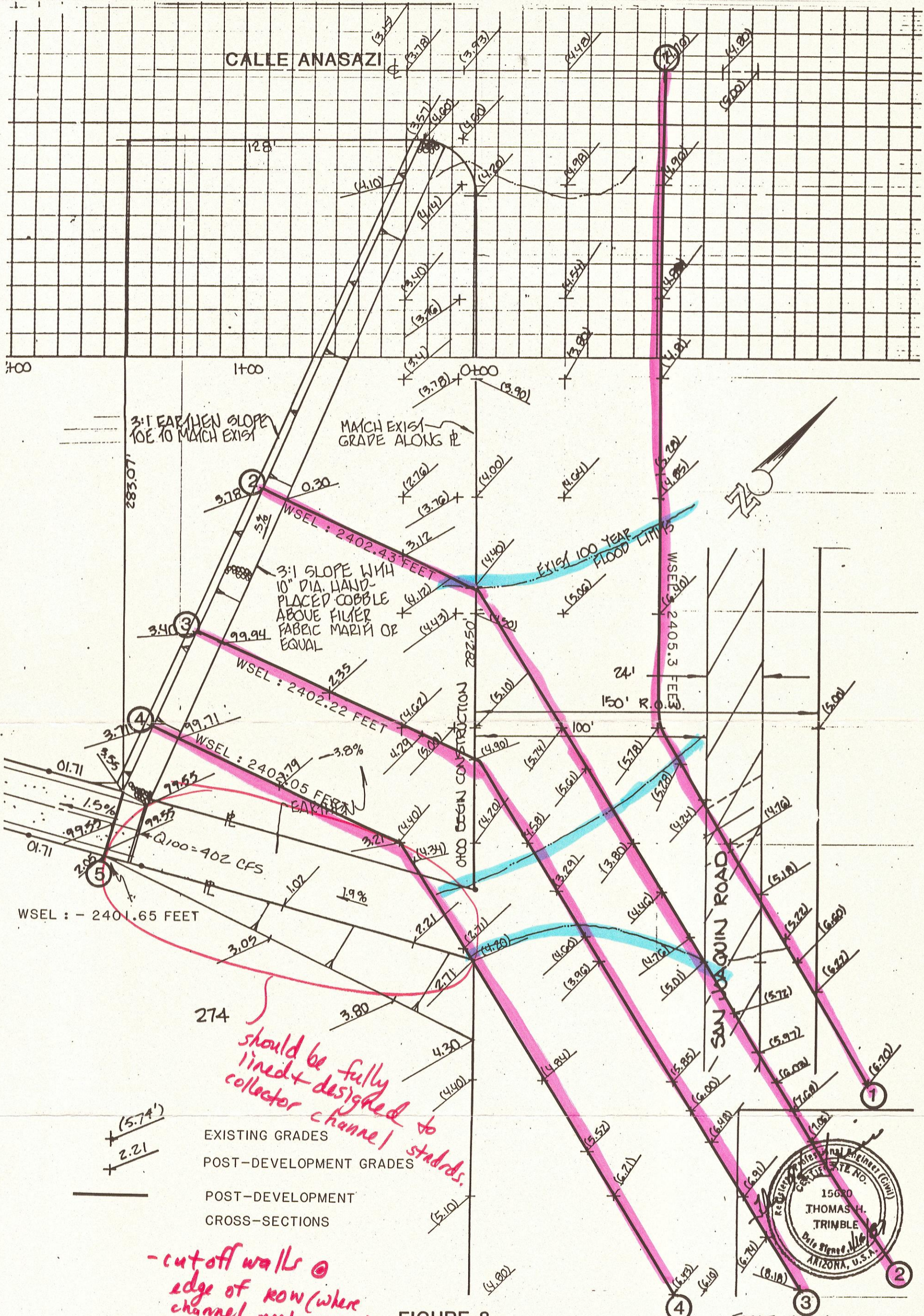
WASH:  
 TEI-340-86  
 LOCATION:  
 DRAINAGEWAY "D"  
 FLOOD FREQUENCY:  
 100 YR  
 DATE:

WASH:  
 TEI-340-86  
 LOCATION:  
 DRAINAGEWAY "D"  
 FLOOD FREQUENCY:  
 $Q_{CAPACITY} = 935$  CFS  
 DATE:

BY: JDM ✓  
 N=0.0160  
 H/V=1.00 FT/FT  
 b=22.00 FT  
 D=1.54 FT  
 S=0.0100 FT/FT  
 K=21.02  
 V=11.58 FPS (11.0)  
 E=3.68 FT  
 DM=1.45 FT ✓  
 FR=1.68  
 Sc=0.0035 FT/FT  
 Dc=2.16 FT

BY: JDM  
 N=0.0160  
 H/V=1.00 FT/FT  
 b=22.00 FT  
 D=2.50 FT  
 Q=935. CFS  
 S=0.0100 FT/FT  
 K=12.99  
 V=15.26 FPS  
 E=6.12 FT  
 DM=2.27 FT  
 FR=1.79  
 Sc=0.0031 FT/FT  
 Dc=3.61 FT

FIGURE 7



PROJECT \_\_\_\_\_

JOB NO. TEI-340-96

DESIGNED BY JDM DATE \_\_\_\_\_

CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_



SHEET 1 OF 1

DRAINAGEWAY "D" - BEND CALCULATIONS:

(FROM PIMA COUNTY, 1989):

Q<sub>100</sub> = 418 CFS (402 CFS FROM "C" + 16 FROM PDG)

n = .016

S = .01 FT/FT

FROM MANNING'S ANALYSIS:

D = 1.54 FT. FR = 1.68

V = 11.5 FPS D<sub>c</sub> = 2.16 FT.

FOR FR > .86 - RADIUS OF CURVATURE ≥ 4 [  $\frac{V^2 W}{g}$  ]

$$r_c \geq 4 \left[ \frac{(11.5)^2 (25.08')}{(32.2)(1.54)} \right]$$

$$r_c \geq 267.5 \text{ FT}$$

$$\text{DESIGN } r_c = 295.5' \quad \checkmark$$

SUPERELEVATION AT BEND (W/O BANKING):

$$\Delta y = \frac{V^2 W}{g r_c} = \left[ \frac{(11.5)^2 (25.08')}{(32.2)(295.5')} \right] = .36 \text{ FT. } \checkmark$$

incl. 1.54 + .36 + FC = 1.54 + .36 + 1.6 = 2.5

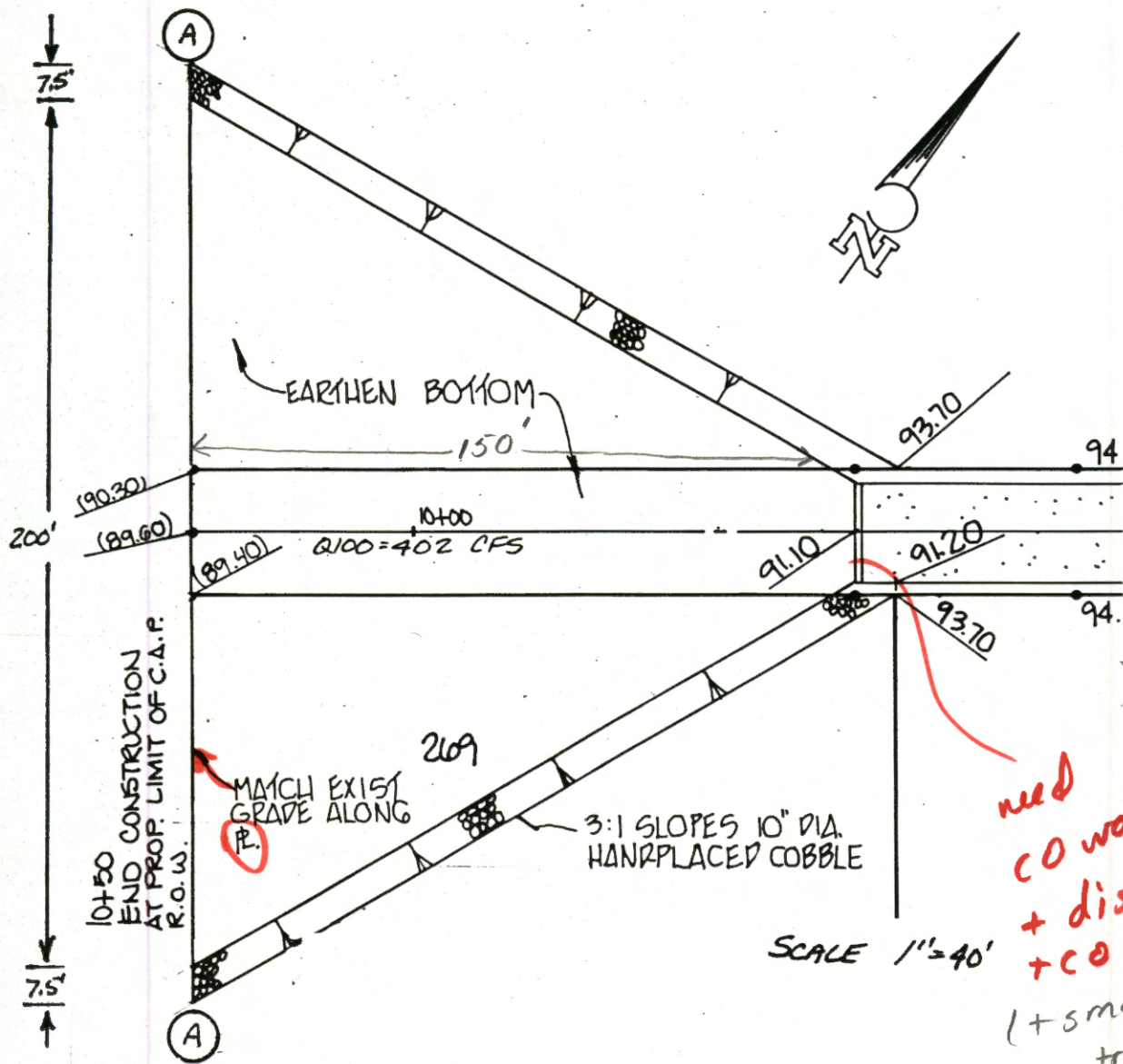
TOTAL DEPTH DUE TO SUPERELEVATION - 1.9 FT.

NO CROSS SLOPE NEEDED SINCE SUPERELEVATION DEPTH DOES NOT EXCEED CRITICAL DEPTH AND NO HYDRAULIC JUMP WILL OCCUR

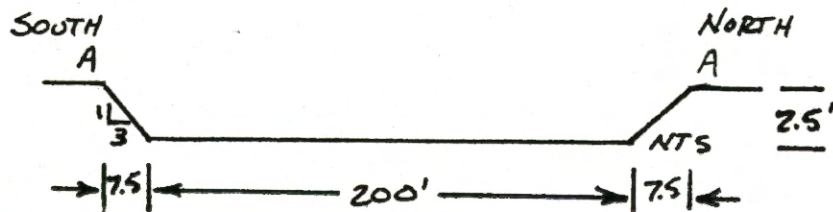
→ not applicable // but true, no hydraulic jump will occur

FIGURE 9





*need  
CO wall  
+ dissipator  
+ CO wall  
(+ small sed trap)*



$Q_{100} = 402 \text{ CFS}$      $n = .025$   
 $S = .01 \text{ FT/FT.}$      $V = 3.93 \text{ FPS}$   
 AT  $d = .52 \text{ FEET}$      $FR = 0.94$   
 $K = 570.95$      $D_c = 0.50 \text{ FEET}$

$Q_{100} = 476$

FIGURE 10  
DETAIL OF OUTLET TO DRAINAGEWAY "D"

-FFE's  
-pad loss.

CONCLUSIONS

This report has shown that the proposed subdivision will be adequately protected during the 100 year storm event and that this development will not adversely impact downstream landowners. The finished floor elevations for the various lots have been set at a minimum of one foot above the adjacent drainage ditch top of bank or the greatest adjacent 100 year water surface elevation in one of the drainage channels. It has also been demonstrated that the numerous drainage ditches along the onsite streets, and the improved drainage channel will have more than adequate capacity to convey the appropriate 100 year peak discharge. In addition, the improved drainage channel will have a flaired outlet constructed at the western property line to reduce the velocity of the flow discharging out of the drainageway to, at or below the velocities in the existing, natural channels.

A P P E N D I X

Rainfall Data  
Soils Map  
Hydrologic Computation Sheets  
HEC-2 Computer Program Output

RAINFALL DATA SHEET

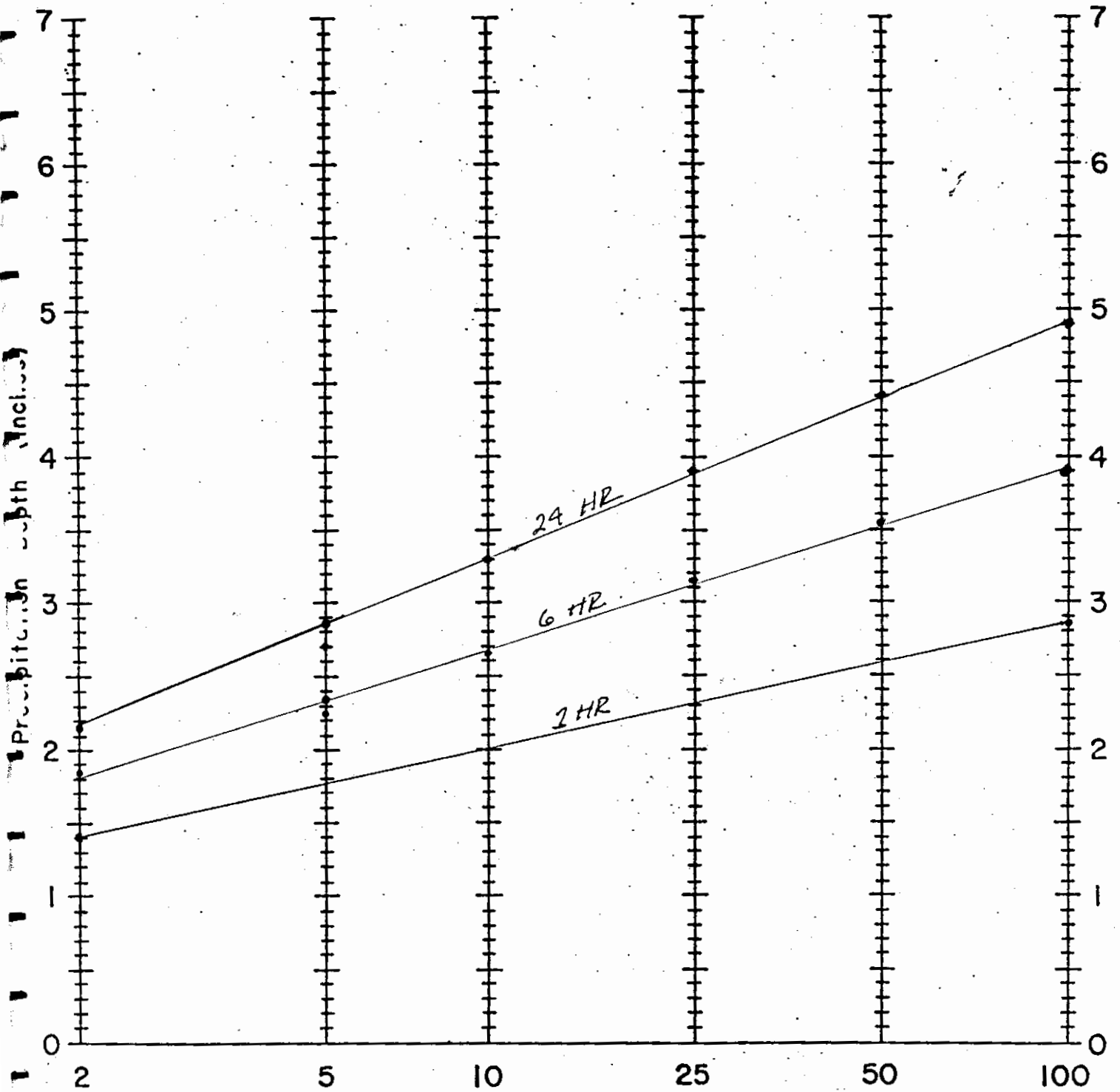
Return Period (Years)	Precipitation Values (inches)			
	6 Hour Duration		24 Hour Duration	
	Map Value	Corrected Value	Map Value	Corrected Value
2	1.85	1.80	2.15	2.17
5	2.25	2.35	2.70	2.85
10	2.65	2.65	3.30	3.30
25	3.15	3.12	3.90	3.90
50	3.55	3.52	4.40	4.40
100	3.90	3.90	4.90	4.90

$$Y_2 = -0.011 + .942 (1.80)^2 / 2.17 = 1.395'' = 1.40''$$

$$Y_{100} = .494 + .755 (3.90)^2 / 4.90 = 2.84''$$

Latitude 32° 10'

Longitude 111° 10'



Return Period in Years, Partial-Duration Series

Precipitation Depth Versus Return Period For  
Partial-Duration Series



TUCSON MOUNTAIN  
COUNTY PARK

28A  
10070B ✓



UTM GRID AND 1972 MAGNETIC NORTH  
DECLINATION AT CENTER OF SHEET

SOILS MAP  
EXHIBIT D

SCALE 1:24 000

BROWN MOUNTAIN, ARIZ.  
N3207.5-W11107.5/7.5  
ORTHOPHOTOQUAD  
1972

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MDSLEY

Name and Location: SAN JOAQUIN ESTATES  
 Drainage Concentration Point: OFFSITE A

Watershed Area (A): 182.00 Acres  
 Length of Watercourse (Lc): 6800. ft.  
 Length to Center of Gravity (Lca): 3200. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.  
 6800.00 102.00  
 Mean Slope(Sc): .015 Ft./Ft.

Watershed Type(s): FOOTHILLS (EXISTING)

Basin Factor(nb): .035 (EXISTING) Flood Frequency: 10 yrs.

P24(24 hour):	3.300 in.	Areal Value:	in.
P6(6 hour):	2.650 in.	Areal Value:	in.
P1(1 hour):	2.000 in.	Areal Value:	in.
P2(2 hour):	2.222 in.	Areal Value:	in.
P3(3 hour):	2.370 in.	Areal Value:	in.

Soil Group(s): 100. % B  
 Cover type(s): DESERT BRUSH  
 Cover Density(perVIOUS area): 20. %  
 Impervious cover: 1. % (EXISTING)

CN(s): 83 (perVIOUS areas) CN\*(s): 85.08  
 CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .400 (perVIOUS areas)  
 .942 (impervious areas)  
 Runoff Supply Rate(c): .405 i in./hr. (function of i)  
 Time of Concentration(Tc): .857 a-0.4 hrs. (function of a)  
 Iterative Solution of Tc: 33.00 min.  
 Rainfall Intensity (i) at Tc: 2.96 in./hr.  
 Runoff Supply Rate (c) at Tc: 1.20 in./hr.  
 Peak Discharge:  $1.008cA$ (acres): 220. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: OFFSITE A

Watershed Area (A): 182.00 Acres  
Length of Watercourse (Lc): 6800. ft.  
Length to Center of Gravity (Lca): 3200. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

6800.00

102.00

Mean Slope(Sc): .015 Ft./Ft.

Watershed Type(s): FOOTHILLS (EXISTING)

Basin Factor(nb): .035 (EXISTING) Flood Frequency: 25 yrs.

P24(24 hour):	3.900 in.	Areal Value:	in.
P6(6 hour):	3.120 in.	Areal Value:	in.
P1(1 hour):	2.300 in.	Areal Value:	in.
P2(2 hour):	2.580 in.	Areal Value:	in.
P3(3 hour):	2.767 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density(perVIOUS area): 20. %

Impervious cover: 1. % (EXISTING)

CN(s): 83 (perVIOUS areas) CN\*(s): 86.11

CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (D): .474 (perVIOUS areas)  
.949 (impervious areas)

Runoff Supply Rate(a): .478 i in./hr. (function of i)

Time of Concentration(Tc): .802 p-0.4 hrs. (function of a)

Iterative Solution of Tc: 28.00 min.

Rainfall Intensity (i) at Tc: 3.77 in./hr.

Runoff Supply Rate (a) at Tc: 1.80 in./hr.

Peak Discharge: 1.008aA(acres): 331. cfs.



PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: OFFSITE A

Watershed Area (A): 182.00 Acres  
 Length of Watercourse (Lc): 6800. ft.  
 Length to Center of Gravity (Lca): 3200. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

6800.00 102.00  
 Mean Slope(Sc): .015 Ft./Ft.

Watershed Type(s): FOOTHILLS (EXISTING)

Basin Factor(nb): .035 (EXISTING) Flood Frequency: 100 yrs.

P24(24 hour):	4.900 in.	Areal Value:	in.
P6(6 hour):	3.900 in.	Areal Value:	in.
P1(1 hour):	2.840 in.	Areal Value:	in.
P2(2 hour):	3.201 in.	Areal Value:	in.
P3(3 hour):	3.443 in.	Areal Value:	in.

Soil Group(s): 100. % B  
 Cover type(s): DESERT BRUSH  
 Cover Density(pervious area): 20. %  
 Impervious cover: 1. % (EXISTING)

CN(s): 83 (pervious areas) CN\*(s): 87.42  
 CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .575 (pervious areas)  
 .959 (impervious areas)  
 Runoff Supply Rate(c): .579 1 in./hr. (function of i)  
 Time of Concentration(Tc): .743 a-0.4 hrs. (function of c)  
 Iterative Solution of Tc: 23.00 min.  
 Rainfall Intensity (i) at Tc: 5.23 in./hr.  
 Runoff Supply Rate (c) at Tc: 3.02 in./hr.  
 Peak Discharge: 1.008qA(acres): 555. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: OFFSITE B

Watershed Area (A): 15.80 Acres  
 Length of Watercourse (Lc): 1840. ft.  
 Length to Center of Gravity (Lca): 740. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

1840.00 28.50  
 Mean Slope(Sc): .015 Ft./Ft.

Watershed Type(s): SUBURBAN (EXISTING)

Basin Factor(nb): .034 (EXISTING) Flood Frequency: 10 yrs.

P24(24 hour):	3.300 in.	Areal Value:	in.
P6(6 hour):	2.650 in.	Areal Value:	in.
P1(1 hour):	2.000 in.	Areal Value:	in.
P2(2 hour):	2.222 in.	Areal Value:	in.
P3(3 hour):	2.370 in.	Areal Value:	in.

Soil Group(s): 100. % B  
 Cover type(s): DESERT BRUSH  
 Cover Density(pervious area): 20. %  
 Impervious cover: 5. % (EXISTING)

DN(s): 83 (pervious areas) DN\*(s): 85.06  
 DN(s): 99 (impervious areas) DN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .400 (pervious areas)  
 .942 (impervious areas)  
 Runoff Supply Rate(c): .427 i in./hr. (function of i)  
 Time of Concentration(Tc): .350 a-0.4 hrs. (function of c)  
 Iterative Solution of Tc: 11.00 min.  
 Rainfall Intensity (i) at Tc: 5.22 in./hr.  
 Runoff Supply Rate (c) at Tc: 2.23 in./hr.  
 Peak Discharge: 1.008cA(acres): 35. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES  
 Drainage Concentration Point: OFFSITE B

Watershed Area (A): 15.80 Acres  
 Length of Watercourse (Lc): 1840. ft.  
 Length to Center of Gravity (Lca): 740. ft.

Change in Length(L)-ft. Change in Elevation(H)<sup>1</sup>-ft.  
 1840.00 28.50  
 Mean Slope(Sc): .015 Ft./Ft.

Watershed Type(s): SUBURBAN (EXISTING)

Basin Factor(nb): .034 (EXISTING) Flood Frequency: 25 yrs.

P24(24 hour):	3.900 in.	Areal Value:	in.
P6(6 hour):	3.120 in.	Areal Value:	in.
P1(1 hour):	2.300 in.	Areal Value:	in.
P2(2 hour):	2.580 in.	Areal Value:	in.
P3(3 hour):	2.767 in.	Areal Value:	in.

Soil Group(s): 100. % B  
 Cover type(s): DESERT BRUSH  
 Cover Density(pervious area): 20. %  
 Impervious cover: 5. % (EXISTING)

CN(s): 83 (pervious areas) CN\*(s): 86.11  
 CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .474 (pervious areas)  
 .949 (impervious areas)  
 Runoff Supply Rate(q): .497 i in./hr. (function of i)  
 Time of Concentration(Tc): .330 a-0.4 hrs. (function of a)  
 Iterative Solution of Tc: 9.00 min.  
 Rainfall Intensity (i) at Tc: 6.53 in./hr.  
 Runoff Supply Rate (q) at Tc: 3.25 in./hr.  
 Peak Discharge: 1.008qA(acres): 52. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES  
Drainage Concentration Point: OFFSITE B

Watershed Area (A): 15.80 Acres  
Length of Watercourse (Lc): 1840. ft.  
Length to Center of Gravity (Lca): 740. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

1840.00

28.50

Mean Slope(Sc): .015 Ft./Ft.

Watershed Type(s): SUBURBAN (EXISTING)

Basin Factor(nb): .034 (EXISTING) Flood Frequency: 100 yrs.

P24(24 hour):	4.900 in.	Areal Value:	in.
P6(6 hour):	3.900 in.	Areal Value:	in.
P1(1 hour):	2.840 in.	Areal Value:	in.
P2(2 hour):	3.201 in.	Areal Value:	in.
P3(3 hour):	3.443 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density(pervious area): 20. %

Impervious cover: 5. % (EXISTING)

CN(s): 83 (pervious areas) CN\*(s): 87.42

CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .575 (pervious areas)  
.959 (impervious areas)

Runoff Supply Rate(q): .594 i in./hr. (function of i)

Time of Concentration(Tc): .307 q-0.4 hrs. (function of q)

Iterative Solution of Tc: 8.00 min.

Rainfall Intensity (i) at Tc: 8.49 in./hr.

Runoff Supply Rate (q) at Tc: 5.04 in./hr.

Peak Discharge: 1.008qA(acres): 80. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: OFFSITE C

Watershed Area (A): 148.00 Acres  
Length of Watercourse (Lc): 8800. ft.  
Length to Center of Gravity (Lca): 4100. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

8800.00 130.00  
Mean Slope(Sc): .015 Ft./Ft.

Watershed Type(s): SUBURBAN (EXISTING)

Basin Factor(nb): .035 (EXISTING) Flood Frequency: 10 yrs.

P24(24 hour):	3.300 in.	Areal Value:	in.
P6(6 hour):	2.650 in.	Areal Value:	in.
P1(1 hour):	2.000 in.	Areal Value:	in.
P2(2 hour):	2.222 in.	Areal Value:	in.
P3(3 hour):	2.370 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(pervious area): 20. %  
Impervious cover: 1. % (EXISTING)

CN(s): 83 (pervious areas) CN\*(s): 85.08  
CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .400 (pervious areas)  
.942 (impervious areas)  
Runoff Supply Rate(a): .405 i in./hr. (function of i)  
Time of Concentration(Tc): 1.003 q-0.4 hrs. (function of c)  
Iterative Solution of Tc: 41.00 min.  
Rainfall Intensity (i) at Tc: 2.58 in./hr.  
Runoff Supply Rate (a) at Tc: 1.05 in./hr.  
Peak Discharge: 1.008cA(acres): 156. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES  
 Drainage Concentration Point: OFFSITE C

Watershed Area (A): 148.00 Acres  
 Length of Watercourse (Lc): 8800. ft.  
 Length to Center of Gravity (Lca): 4100. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

8800.00 130.00  
 Mean Slope(Sc): .015 Ft./Ft.

Watershed Type(s): FOOTHILLS (EXISTING)

Basin Factor(nb): .035 (EXISTING) Flood Frequency: 25 yrs.

P24(24 hour):	3.900 in.	Areal Value:	in.
P6(6 hour):	3.120 in.	Areal Value:	in.
P1(1 hour):	2.300 in.	Areal Value:	in.
P2(2 hour):	2.580 in.	Areal Value:	in.
P3(3 hour):	2.767 in.	Areal Value:	in.

Soil Group(s): 100. % B  
 Cover type(s): DESERT BRUSH  
 Cover Density(pervious area): 20. %  
 Impervious cover: 1. % (EXISTING)

CN(s): 83 (pervious areas) CN\*(s): 88.11  
 CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .474 (pervious areas)  
 .949 (impervious areas)  
 Runoff Supply Rate(a): .478 i in./hr. (function of i)  
 Time of Concentration(Tc): .939 a-0.4 hrs. (function of a)  
 Iterative Solution of Tc: 35.00 min.  
 Rainfall Intensity (i) at Tc: 3.29 in./hr.  
 Runoff Supply Rate (a) at Tc: 1.57 in./hr.  
 Peak Discharge: 1.008aR(acres): 235. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES  
Drainage Concentration Point: OFFSITE C

Watershed Area (A): 148.00 Acres  
Length of Watercourse (Lc): 8800. ft.  
Length to Center of Gravity (Lca): 4100. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

8800.00 130.00  
Mean Slope(Sc): .015 Ft./Ft.

Watershed Type(s): FOOTHILLS (EXISTING)

Basin Factor(nb): .035 (EXISTING) Flood Frequency: 100 yrs.

P24(24 hour):	4.900 in.	Areal Value:	in.
P6(6 hour):	3.900 in.	Areal Value:	in.
P1(1 hour):	2.840 in.	Areal Value:	in.
P2(2 hour):	3.201 in.	Areal Value:	in.
P3(3 hour):	3.443 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(pervious area): 20. %  
Impervious cover: 1. % (EXISTING)

CN(s): 83 (pervious areas) CN\*(s): 87.42  
CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .575 (pervious areas)  
.959 (impervious areas)  
Runoff Supply Rate(c): .579 i in./hr. (function of i)  
Time of Concentration(Tc): .870 c-0.4 hrs. (function of c)  
Iterative Solution of Tc: 28.00 min.  
Rainfall Intensity (i) at Tc: 4.66 in./hr.  
Runoff Supply Rate (c) at Tc: 2.69 in./hr.  
Peak Discharge: 1.008qA(acres): 402. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: OFFSITE D

Watershed Area (A): 25.20 Acres  
Length of Watercourse (Lc): 2010. ft.  
Length to Center of Gravity (Lca): 880. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

2010.00 37.00  
Mean Slope(Sc): .018 Ft./Ft.

Watershed Type(s): SUBURBAN (EXISTING)

Basin Factor(nb): .034 (EXISTING) Flood Frequency: 10 yrs.

P24(24 hour):	3.300 in.	Areal Value:	in.
P6(6 hour):	2.650 in.	Areal Value:	in.
P1(1 hour):	2.000 in.	Areal Value:	in.
P2(2 hour):	2.222 in.	Areal Value:	in.
P3(3 hour):	2.370 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(pervious area): 20. %  
Impervious cover: 5. % (EXISTING)

CN(s): 83 (pervious areas) CN\*(s): 85.08  
CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .400 (pervious areas)  
.942 (impervious areas)  
Runoff Supply Rate(q): .427 i in./hr. (function of i)  
Time of Concentration(Tc): .354 a-0.4 hrs. (function of a)  
Iterative Solution of Tc: 11.00 min.  
Rainfall Intensity (i) at Tc: 5.22 in./hr.  
Runoff Supply Rate (q) at Tc: 2.23 in./hr.  
Peak Discharge: 1.008oA(acres): 57. cfs.



PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: OFFSITE D

Watershed Area (A): 25.20 Acres  
 Length of Watercourse (Lc): 2010. ft.  
 Length to Center of Gravity (Lca): 880. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

2010.00

37.00

Mean Slope(Sc): .018 Ft./Ft.

Watershed Type(s): SUBURBAN (EXISTING)

Basin Factor(nb): .034 (EXISTING) Flood Frequency: 25 yrs.

P24(24 hour):	3.900 in.	Areal Value:	in.
P6(6 hour):	3.120 in.	Areal Value:	in.
P1(1 hour):	2.300 in.	Areal Value:	in.
P2(2 hour):	2.580 in.	Areal Value:	in.
P3(3 hour):	2.767 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density(pervious area): 20. %

Impervious cover: 5. % (EXISTING)

CN(s): 83 (pervious areas) CN\*(s): 86.11

CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .474 (pervious areas)  
 .949 (impervious areas)

Runoff Supply Rate(c): .497 i in./hr. (function of i)

Time of Concentration(Tc): .333 c-0.4 hrs. (function of c)

Iterative Solution of Tc: 9.00 min.

Rainfall Intensity (i) at Tc: 6.53 in./hr.

Runoff Supply Rate (c) at Tc: 3.25 in./hr.

Peak Discharge: 1.0080A(acres): 83. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: OFFSITE D

Watershed Area (A): 25.20 Acres  
Length of Watercourse (Lc): 2010. ft.  
Length to Center of Gravity (Lca): 880. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

2010.00 37.00  
Mean Slope(Sc): .018 Ft./Ft.

Watershed Type(s): SUBURBAN (EXISTING)

Basin Factor(nb): .034 (EXISTING) Flood Frequency: 100 yrs.

P24(24 hour):	4.900 in.	Areal Value:	in.
P6(6 hour):	3.900 in.	Areal Value:	in.
P1(1 hour):	2.840 in.	Areal Value:	in.
P2(2 hour):	3.201 in.	Areal Value:	in.
P3(3 hour):	3.443 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(pervious area): 20. %  
Impervious cover: 5. % (EXISTING)

CN(s): 83 (pervious areas) CN\*(s): 87.42  
CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .575 (pervious areas)  
.959 (impervious areas)  
Runoff Supply Rate(a): .594 i in./hr. (function of i)  
Time of Concentration(Tc): .310 a-0.4 hrs. (function of a)  
Iterative Solution of Tc: 8.00 min.  
Rainfall Intensity (i) at Tc: 8.49 in./hr.  
Runoff Supply Rate (a) at Tc: 5.04 in./hr.  
Peak Discharge: 1.008Q(A acres): 128. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: OFFSITE E

Watershed Area (A): 197.00 Acres  
Length of Watercourse (Lc): 7200. ft.  
Length to Center of Gravity (Lca): 3200. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

7200.00 116.00  
Mean Slope(Sc): .016 Ft./Ft.

Watershed Type(s): FOOTHILLS (EXISTING)

Basin Factor(nb): .035 (EXISTING) Flood Frequency: 10 yrs.

P24(24 hour):	3.300 in.	Areal Value:	in.
P6(6 hour):	2.650 in.	Areal Value:	in.
P1(1 hour):	2.000 in.	Areal Value:	in.
P2(2 hour):	2.222 in.	Areal Value:	in.
P3(3 hour):	2.370 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(pervious area): 20. %  
Impervious cover: 1. % (EXISTING)

CN(s): 83 (pervious areas) CN\*(s): 85.08  
CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .400 (pervious areas)  
.942 (impervious areas)  
Runoff Supply Rate(q): .405 i in./hr. (function of i)  
Time of Concentration(Tc): .847 a-0.4 hrs. (function of a)  
Iterative Solution of Tc: 33.00 min.  
Rainfall Intensity (i) at Tc: 2.96 in./hr.  
Runoff Supply Rate (q) at Tc: 1.20 in./hr.  
Peak Discharge: 1.006qA(acres): 238. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: OFFSITE E

Watershed Area (A): 197.00 Acres  
Length of Watercourse (Lc): 7200. ft.  
Length to Center of Gravity (Lca): 3200. ft.

Change in Length(L)-ft. Change in Elevation(H<sub>v</sub>)-ft.

7200.00

116.00

Mean Slope(S<sub>c</sub>): .016 Ft./Ft.

Watershed Type(s): FOOTHILLS

(EXISTING)

Basin Factor(nb): .035 (EXISTING) Flood Frequency: 25 yrs.

P24(24 hour):	3.900 in.	Areal Value:	in.
P6(6 hour):	3.120 in.	Areal Value:	in.
P1(1 hour):	2.300 in.	Areal Value:	in.
P2(2 hour):	2.580 in.	Areal Value:	in.
P3(3 hour):	2.767 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density(pervious area): 20. %

Impervious cover: 1. % (EXISTING)

CN(s): 83 (pervious areas) CN\*(s): 86.11

CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .474 (pervious areas)  
.949 (impervious areas)

Runoff Supply Rate(o): .478 i in./hr. (function of i)

Time of Concentration(T<sub>c</sub>): .793 a-0.4 hrs. (function of a)

Iterative Solution of T<sub>c</sub>: 28.00 min.

Rainfall Intensity (i) at T<sub>c</sub>: 3.77 in./hr.

Runoff Supply Rate (o) at T<sub>c</sub>: 1.80 in./hr.

Peak Discharge: 1.008qA(acres): 358. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: OFFSITE E

Watershed Area (A): 197.00 Acres  
 Length of Watercourse (Lc): 7200. ft.  
 Length to Center of Gravity (Lca): 3200. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

7200.00

116.00

Mean Slope(Sc): .016 Ft./Ft.

Watershed Type(s): FOOTHILLS (EXISTING)

Basin Factor(nb): .035 (EXISTING) Flood Frequency: 100 yrs.

P24(24 hour):	4.900 in.	Areal Value:	in.
P6(6 hour):	3.900 in.	Areal Value:	in.
P1(1 hour):	2.840 in.	Areal Value:	in.
P2(2 hour):	3.201 in.	Areal Value:	in.
P3(3 hour):	3.443 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density(pervious area): 20. %

Impervious cover: 1. % (EXISTING)

CN(s): 83 (pervious areas) CN\*(s): 87.42

CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .575 (pervious areas)  
 .959 (impervious areas)

Runoff Supply Rate(a): .579 i in./hr. (function of i)

Time of Concentration(Tc): .735 a-0.4 hrs. (function of a)

Iterative Solution of Tc: 23.00 min.

Rainfall Intensity (i) at Tc: 5.23 in./hr.

Runoff Supply Rate (a) at Tc: 3.02 in./hr.

Peak Discharge: 1.008aA(acres): 600. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: OFFSITE F

Watershed Area (A): 2.10 Acres  
Length of Watercourse (Lc): 800. ft.  
Length to Center of Gravity (Lca): 350. ft.

Change in Length(L)-ft. Change in Elevation(H<sub>V</sub>)-ft.

800.00

8.00

Mean Slope(S<sub>c</sub>): .010 Ft./Ft.

Watershed Type(s): FOOTHILLS (EXISTING)

Basin Factor(nb): .035 (EXISTING) Flood Frequency: 10 yrs.

P24(24 hour):	3.300 in.	Areal Value:	in.
P6(6 hour):	2.650 in.	Areal Value:	in.
P1(1 hour):	2.000 in.	Areal Value:	in.
P2(2 hour):	2.222 in.	Areal Value:	in.
P3(3 hour):	2.370 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density(pervious area): 20. %

Impervious cover: 1. % (EXISTING)

CN(s): 83 (pervious areas) CN\*(s): 85.08

CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .400 (pervious areas)  
.942 (impervious areas)

Runoff Supply Rate(q): .405 i in./hr. (function of i)

Time of Concentration(T<sub>c</sub>): .273 q-0.4 hrs. (function of q)

Iterative Solution of T<sub>c</sub>: 8.00 min.

Rainfall Intensity (i) at T<sub>c</sub>: 5.98 in./hr.

Runoff Supply Rate (q) at T<sub>c</sub>: 2.42 in./hr.

Peak Discharge: 1.008qA(acres): 5. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: OFFSITE F

Watershed Area (A): 2.10 Acres  
Length of Watercourse (Lc): 800. ft.  
Length to Center of Gravity (Lca): 350. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

800.00

8.00

Mean Slope(Sc): .010 Ft./Ft.

Watershed Type(s): FOOTHILLS (EXISTING)

Basin Factor(nb): .035 (EXISTING) Flood Frequency: 25 yrs.

P24(24 hour):	3.900 in.	Areal Value:	in.
P6(6 hour):	3.120 in.	Areal Value:	in.
P1(1 hour):	2.300 in.	Areal Value:	in.
P2(2 hour):	2.580 in.	Areal Value:	in.
P3(3 hour):	2.767 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density(pervious area): 20. %

Impervious cover: 1. % (EXISTING)

CN(s): 83 (pervious areas) CN\*(s): 86.11

CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .474 (pervious areas)

.949 (impervious areas)

Runoff Supply Rate(a): .478 i in./hr. (function of i)

Time of Concentration(Tc): .255 a-0.4 hrs. (function of a)

Iterative Solution of Tc: 7.00 min.

Rainfall Intensity (i) at Tc: 7.25 in./hr.

Runoff Supply Rate (a) at Tc: 3.47 in./hr.

Peak Discharge:  $1.008qa$ (acres): 7. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: OFFSITE F

Watershed Area (A): 2.10 Acres  
Length of Watercourse (Lc): 800. ft.  
Length to Center of Gravity (Lca): 350. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

800.00 8.00  
Mean Slope(Sc): .010 Ft./Ft.

Watershed Type(s): FOOTHILLS (EXISTING)

Basin Factor(nb): .035 (EXISTING) Flood Frequency: 100 yrs.

P24(24 hour):	4.900 in.	Areal Value:	in.
P6(6 hour):	3.900 in.	Areal Value:	in.
P1(1 hour):	2.840 in.	Areal Value:	in.
P2(2 hour):	3.201 in.	Areal Value:	in.
P3(3 hour):	3.443 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density(pervious area): 20. %

Impervious cover: 1. % (EXISTING)

CN(s): 83 (pervious areas) CN\*(s): 87.42

CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .575 (pervious areas)  
.959 (impervious areas)

Runoff Supply Rate(c): .579 i in./hr. (function of i)

Time of Concentration(Tc): .237 c-0.4 hrs. (function of c)

Iterative Solution of Tc: 6.00 min.

Rainfall Intensity (i) at Tc: 9.43 in./hr.

Runoff Supply Rate (c) at Tc: 5.46 in./hr.

Peak Discharge: 1.008qA(acres): 12. cfs.



PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: OFFSITE G

Watershed Area (A): 7.50 Acres  
Length of Watercourse (Lc): 1115. ft.  
Length to Center of Gravity (Lca): 410. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

1115.00

15.00

Mean Slope(Sc): .013 Ft./Ft.

Watershed Type(s): SUBURBAN (EXISTING)

Basin Factor(nb): .034 (EXISTING) Flood Frequency: 10 yrs.

P24(24 hour):	3.300 in.	Areal Value:	in.
P6(6 hour):	2.650 in.	Areal Value:	in.
P1(1 hour):	2.000 in.	Areal Value:	in.
P2(2 hour):	2.222 in.	Areal Value:	in.
P3(3 hour):	2.370 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density(pervious area): 20. %

Impervious cover: 5. % (EXISTING)

CN(s): 83 (pervious areas) CN\*(s): 85.08

CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (D): .400 (pervious areas)  
.942 (impervious areas)

Runoff Supply Rate(a): .427 i in./hr. (function of i)

Time of Concentration(Tc): .267 a-0.4 hrs. (function of a)

Iterative Solution of Tc: 8.00 min.

Rainfall Intensity (i) at Tc: 5.98 in./hr.

Runoff Supply Rate (c) at Tc: 2.55 in./hr.

Peak Discharge:  $1.008cA$ (acres): 19. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES  
Drainage Concentration Point: OFFSITE G

Watershed Area (A): 7.50 Acres  
Length of Watercourse (Lc): 1115. ft.  
Length to Center of Gravity (Lca): 410. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

1115.00

15.00

Mean Slope(Sc): .013 Ft./Ft.

Watershed Type(s): SUBURBAN (EXISTING)

Basin Factor(nb): .034 (EXISTING) Flood Frequency: 25 yrs.

P24(24 hour):	3.900 in.	Areal Value:	in.
P6(6 hour):	3.120 in.	Areal Value:	in.
P1(1 hour):	2.300 in.	Areal Value:	in.
P2(2 hour):	2.580 in.	Areal Value:	in.
P3(3 hour):	2.767 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(pervious area): 20. %  
Impervious cover: 5. % (EXISTING)

CN(s): 83 (pervious areas) CN\*(s): 86.11  
CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .474 (pervious areas)  
.949 (impervious areas)  
Runoff Supply Rate(q): .497 i in./hr. (function of i)  
Time of Concentration(Tc): .251 a-0.4 hrs. (function of a)  
Iterative Solution of Tc: 7.00 min.  
Rainfall Intensity (i) at Tc: 7.25 in./hr.  
Runoff Supply Rate (q) at Tc: 3.60 in./hr.  
Peak Discharge:  $1.008qA$ (acres): 27. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: OFFSITE G

Watershed Area (A): 7.50 Acres  
Length of Watercourse (Lc): 1115. ft.  
Length to Center of Gravity (Lca): 410. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

1115.00 15.00  
Mean Slope(Sc): .013 Ft./Ft.

Watershed Type(s): SUBURBAN (EXISTING)

Basin Factor(nb): .034 (EXISTING) Flood Frequency: 100 yrs.

P24(24 hour):	4.900 in.	Areal Value:	in.
P6(6 hour):	3.900 in.	Areal Value:	in.
P1(1 hour):	2.840 in.	Areal Value:	in.
P2(2 hour):	3.201 in.	Areal Value:	in.
P3(3 hour):	3.443 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(perVIOUS area): 20. %  
Impervious cover: 5. % (EXISTING)

CN(s): 83 (perVIOUS areas) CN\*(s): 87.42  
CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .575 (perVIOUS areas)  
.959 (impervious areas)  
Runoff Supply Rate(a): .594 i in./hr. (function of i)  
Time of Concentration(Tc): .234 a-0.4 hrs. (function of a)  
Iterative Solution of Tc: 6.00 min.  
Rainfall Intensity (i) at Tc: 9.43 in./hr.  
Runoff Supply Rate (a) at Tc: 5.60 in./hr.  
Peak Discharge: 1.008aA(acres): 42. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87  
DATE PREPARED: 2/21/87  
Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES  
Drainage Concentration Point: OFFSITE H

Watershed Area (A): 3.10 Acres  
Length of Watercourse (Lc): 900. ft.  
Length to Center of Gravity (Lca): 440. ft.

Change in Length(L)-ft.                      Change in Elevation(H)-ft.  
900.00    16.00  
Mean Slope(Sc): .018 Ft./Ft.

Watershed Type(s): SUBURBAN (EXISTING)

Basin Factor(nb): .034 (EXISTING) Flood Frequency: 10 yrs.

P24(24 hour):	3.300 in.	Areal Value:	in.
P6(6 hour):	2.650 in.	Areal Value:	in.
P1(1 hour):	2.000 in.	Areal Value:	in.
P2(2 hour):	2.222 in.	Areal Value:	in.
P3(3 hour):	2.370 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(pervious area): 20. %  
Impervious cover: 5. % (EXISTING)

CN(s): 83 (pervious areas) CN\*(s): 85.08  
CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .400 (pervious areas)  
.942 (impervious areas)  
Runoff Supply Rate(a): .427 i in./hr. (function of i)  
Time of Concentration(Tc): .229 p-0.4 hrs. (function of a)  
Iterative Solution of Tc: 6.00 min.  
Rainfall Intensity (i) at Tc: 6.64 in./hr.  
Runoff Supply Rate (a) at Tc: 2.83 in./hr.  
Peak Discharge: 1.008aA(acres): 9. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87  
DATE PREPARED: 2/21/87  
Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES  
Drainage Concentration Point: OFFSITE H

Watershed Area (A): 3.10 Acres  
Length of Watercourse (Lc): 900. ft.  
Length to Center of Gravity (Lca): 440. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

900.00 16.00  
Mean Slope(Sc): .018 Ft./Ft.

Watershed Type(s): SUBURBAN (EXISTING)

Basin Factor(nb): .034 (EXISTING) Flood Frequency: 25 yrs.

P24(24 hour):	3.900 in.	Areal Value:	in.
P6(6 hour):	3.120 in.	Areal Value:	in.
P1(1 hour):	2.300 in.	Areal Value:	in.
P2(2 hour):	2.580 in.	Areal Value:	in.
P3(3 hour):	2.767 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(perVIOUS area): 20. %  
Impervious cover: 5. % (EXISTING)

CN(s): 83 (perVIOUS areas) CN\*(s): 86.11  
CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .474 (perVIOUS areas)  
.949 (impervious areas)  
Runoff Supply Rate(a): .497 i in./hr. (function of i)  
Time of Concentration(Tc): .215 a-0.4 hrs. (function of a)  
Iterative Solution of Tc: 6.00 min.  
Rainfall Intensity (i) at Tc: 7.64 in./hr.  
Runoff Supply Rate (a) at Tc: 3.80 in./hr.  
Peak Discharge:  $1.008Q_A$ (acres): 12. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES  
 Drainage Concentration Point: OFFSITE H

Watershed Area (A): 3.10 Acres  
 Length of Watercourse (Lc): 900. ft.  
 Length to Center of Gravity (Lca): 440. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft./  
 900.00 16.00  
 Mean Slope(Sc): .018 Ft./Ft.

Watershed Type(s): SUBURBAN (EXISTING)

Basin Factor(nb): .034 (EXISTING) Flood Frequency: 100 yrs.

P24(24 hour):	4.900 in.	Areal Value:	in.
P6(6 hour):	3.900 in.	Areal Value:	in.
P1(1 hour):	2.840 in.	Areal Value:	in.
P2(2 hour):	3.201 in.	Areal Value:	in.
P3(3 hour):	3.443 in.	Areal Value:	in.

Soil Group(s): 100. % B  
 Cover type(s): DESERT BRUSH  
 Cover Density(pervious area): 20. %  
 Impervious cover: 5. % (EXISTING)

CN(s): 83 (pervious areas) CN\*(s): 87.42  
 CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .575 (pervious areas)  
 .959 (impervious areas)  
 Runoff Supply Rate(a): .594 i in./hr. (function of i)  
 Time of Concentration(Tc): .201 a-0.4 hrs. (function of a)  
 Iterative Solution of Tc: 5.00 min.  
 Rainfall Intensity (i) at Tc: 9.88 in./hr.  
 Runoff Supply Rate (a) at Tc: 5.87 in./hr.  
 Peak Discharge:  $1.008qA$ (acres): 18. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD1

Watershed Area (A): 6.90 Acres  
Length of Watercourse (Lc): 950. ft.  
Length to Center of Gravity (Lca): 690. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

950.00 6.00  
Mean Slope(Sc): .006 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 10 yrs.

P24(24 hour):	3.300 in.	Areal Value:	in.
P6(6 hour):	2.650 in.	Areal Value:	in.
P1(1 hour):	2.000 in.	Areal Value:	in.
P2(2 hour):	2.222 in.	Areal Value:	in.
P3(3 hour):	2.370 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(pervious area): 20. %  
Impervious cover: 8. % (FUTURE )

CN(s): 83 (pervious areas) CN\*(s): 85.08  
CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .400 (pervious areas)  
.942 (impervious areas)  
Runoff Supply Rate(a): .440 i in./hr. (function of i)  
Time of Concentration(Tc): .398 a-0.4 hrs. (function of a)  
Iterative Solution of Tc: 13.00 min.  
Rainfall Intensity (i) at Tc: 4.88 in./hr.  
Runoff Supply Rate (a) at Tc: 2.15 in./hr.  
Peak Discharge: 1.008aA(acres): 15. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD1

Watershed Area (A): 6.90 Acres  
Length of Watercourse (Lc): 950. ft.  
Length to Center of Gravity (Lca): 690. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

950.00 6.00  
Mean Slope(Sc): .006 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 25 yrs.

P24(24 hour):	3.900 in.	Areal Value:	in.
P6(6 hour):	3.120 in.	Areal Value:	in.
P1(1 hour):	2.300 in.	Areal Value:	in.
P2(2 hour):	2.580 in.	Areal Value:	in.
P3(3 hour):	2.767 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(pervious area): 20. %  
Impervious cover: 8. % (FUTURE )

CN(s): 83 (pervious areas) CN\*(s): 86.11  
CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .474 (pervious areas)  
.949 (impervious areas)  
Runoff Supply Rate(q): .509 i in./hr. (function of i)  
Time of Concentration(Tc): .375 q-0.4 hrs. (function of q)  
Iterative Solution of Tc: 11.00 min.  
Rainfall Intensity (i) at Tc: 6.00 in./hr.  
Runoff Supply Rate (q) at Tc: 3.06 in./hr.  
Peak Discharge: 1.008qA(acres): 21. cfs.



PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD1

Watershed Area (A): 6.90 Acres  
Length of Watercourse (Lc): 950. ft.  
Length to Center of Gravity (Lca): 690. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

950.00

6.00

Mean Slope(Sc): .006 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 100 yrs.

P24(24 hour):	4.900 in.	Areal Value:	in.
P6(6 hour):	3.900 in.	Areal Value:	in.
P1(1 hour):	2.840 in.	Areal Value:	in.
P2(2 hour):	3.201 in.	Areal Value:	in.
P3(3 hour):	3.443 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density(pervious area): 20. %

Impervious cover: 8. % (FUTURE )

CN(s): 83 (pervious areas) CN\*(s): 87.42

CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .575 (pervious areas)  
.959 (impervious areas)

Runoff Supply Rate(a): .604 i in./hr. (function of i)

Time of Concentration(Tc): .351 a-0.4 hrs. (function of a)

Iterative Solution of Tc: 9.00 min.

Rainfall Intensity (i) at Tc: 8.07 in./hr.

Runoff Supply Rate (a) at Tc: 4.87 in./hr.

Peak Discharge: 1.008qA(acres): 34. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD2

Watershed Area (A): 6.30 Acres  
Length of Watercourse (Lc): 1310. ft.  
Length to Center of Gravity (Lca): 650. ft.

Change in Length(L)-ft. Change in Elevation(H<sub>v</sub>)-ft.

1310.00  
Mean Slope(Sc): .015 Ft./Ft.

19.00 (14)

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 10 yrs.

P24(24 hour):	3.300 in.	Areal Value:	in.
P6(6 hour):	2.650 in.	Areal Value:	in.
P1(1 hour):	2.000 in.	Areal Value:	in.
P2(2 hour):	2.222 in.	Areal Value:	in.
P3(3 hour):	2.370 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(pervious area): 20. %  
Impervious cover: 14. % (FUTURE )

CN(s): 83 (pervious areas) CN\*(s): 85.08  
CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .400 (pervious areas)  
.942 (impervious areas)  
Runoff Supply Rate(a): .476 i in./hr. (function of i)  
Time of Concentration(Tc): .299 a-0.4 hrs. (function of a)  
Iterative Solution of Tc: 9.00 min.  
Rainfall Intensity (i) at Tc: 5.68 in./hr.  
Runoff Supply Rate (a) at Tc: 2.70 in./hr.  
Peak Discharge: 1.008aA(acres): 17. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD2

Watershed Area (A): 6.30 Acres  
Length of Watercourse (Lc): 1310. ft.  
Length to Center of Gravity (Lca): 650. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

1310.00

19.00

Mean Slope(Sc): .015 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 25 yrs.

P24(24 hour):	3.900 in.	Areal Value:	in.
P6(6 hour):	3.120 in.	Areal Value:	in.
P1(1 hour):	2.300 in.	Areal Value:	in.
P2(2 hour):	2.580 in.	Areal Value:	in.
P3(3 hour):	2.767 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density(pervious area): 20. %

Impervious cover: 14. % (FUTURE )

CN(s): 83 (pervious areas) CN\*(s): 86.11

CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s),(C): .474 (pervious areas)

.949 (impervious areas)

Runoff Supply Rate(o): .540 i in./hr. (function of i)

Time of Concentration(Tc): .284 o-0.4 hrs. (function of o)

Iterative Solution of Tc: 8.00 min.

Rainfall Intensity (i) at Tc: 6.88 in./hr.

Runoff Supply Rate (o) at Tc: 3.71 in./hr.

Peak Discharge: 1.008qA(acres): 24. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD2

Watershed Area (A): 6.30 Acres  
 Length of Watercourse (Lc): 1310. ft.  
 Length to Center of Gravity (Lca): 650. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

1310.00 19.00  
 Mean Slope(Sc): .015 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 100 yrs.

P24(24 hour):	4.900 in.	Areal Value:	in.
P6(6 hour):	3.900 in.	Areal Value:	in.
P1(1 hour):	2.840 in.	Areal Value:	in.
P2(2 hour):	3.201 in.	Areal Value:	in.
P3(3 hour):	3.443 in.	Areal Value:	in.

Soil Group(s): 100. % B  
 Cover type(s): DESERT BRUSH  
 Cover Density(pervious area): 20. %  
 Impervious cover: 14. % (FUTURE )

CN(s): 83 (pervious areas) CN\*(s): 87.42  
 CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .575 (pervious areas)  
 .959 (impervious areas)  
 Runoff Supply Rate(q): .628 i in./hr. (function of i)  
 Time of Concentration(Tc): .268 q-0.4 hrs. (function of q)  
 Iterative Solution of Tc: 7.00 min.  
 Rainfall Intensity (i) at Tc: 8.95 in./hr.  
 Runoff Supply Rate (q) at Tc: 5.62 in./hr.  
 Peak Discharge:  $1.008qA$ (acres): 36. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87  
 DATE PREPARED: 2/21/87  
 Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES  
 Drainage Concentration Point: PD3

Watershed Area (A): 3.40 Acres  
 Length of Watercourse (Lc): 960. ft.  
 Length to Center of Gravity (Lca): 540. ft.

Change in Length(L)-ft. Change in Elevation(H)<sup>f</sup>-ft.  
 960.00 14.00 (9)  
 Mean Slope(Sc): .015 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 10 yrs.

P24(24 hour):	3.300 in.	Areal Value:	in.
P6(6 hour):	2.650 in.	Areal Value:	in.
P1(1 hour):	2.000 in.	Areal Value:	in.
P2(2 hour):	2.222 in.	Areal Value:	in.
P3(3 hour):	2.370 in.	Areal Value:	in.

Soil Group(s): 100. % B  
 Cover type(s): DESERT BRUSH  
 Cover Density(pervious area): 20. %  
 Impervious cover: 16. % (FUTURE )

CN(s): 83 (pervious areas) CN\*(s): 85.08  
 CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (D): .400 (pervious areas)  
 .942 (impervious areas)  
 Runoff Supply Rate(o): .486 i in./hr. (function of i)  
 Time of Concentration(Tc): .255 a-0.4 hrs. (function of a)  
 Iterative Solution of Tc: 7.00 min.  
 Rainfall Intensity (i) at Tc: 6.30 in./hr.  
 Runoff Supply Rate (o) at Tc: 3.06 in./hr.  
 Peak Discharge: 1.008qA(acres): 11. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD3

Watershed Area (A): 3.40 Acres  
 Length of Watercourse (Lc): 960. ft.  
 Length to Center of Gravity (Lca): 540. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

960.00

14.00

Mean Slope(Sc): .015 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 25 yrs.

P24(24 hour):	3.900 in.	Areal Value:	in.
P6(6 hour):	3.120 in.	Areal Value:	in.
P1(1 hour):	2.300 in.	Areal Value:	in.
P2(2 hour):	2.580 in.	Areal Value:	in.
P3(3 hour):	2.767 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density(pervious area): 20. %

Impervious cover: 16. % (FUTURE )

CN(s): 83 (pervious areas) CN\*(s): 86.11

CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .474 (pervious areas)  
 .949 (impervious areas)

Runoff Supply Rate(q): .550 i in./hr. (function of i)

Time of Concentration(Tc): .243 q-0.4 hrs. (function of q)

Iterative Solution of Tc: 6.00 min.

Rainfall Intensity (i) at Tc: 7.64 in./hr.

Runoff Supply Rate (q) at Tc: 4.20 in./hr.

Peak Discharge: 1.008qA(acres): 14. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD3

Watershed Area (A): 3.40 Acres  
Length of Watercourse (Lc): 960. ft.  
Length to Center of Gravity (Lca): 540. ft.

Change in Length(L)-ft. Change in Elevation(H)<sup>r</sup>-ft.  
960.00 14.00 (9)  
Mean Slope(Sc): .015 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 100 yrs.

P24(24 hour):	4.900 in.	Areal Value:	in.
P6(6 hour):	3.900 in.	Areal Value:	in.
P1(1 hour):	2.840 in.	Areal Value:	in.
P2(2 hour):	3.201 in.	Areal Value:	in.
P3(3 hour):	3.443 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(pervious area): 20. %  
Impervious cover: 16. % (FUTURE )

CN(s): 83 (pervious areas) CN\*(s): 87.42  
CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .575 (pervious areas)  
.959 (impervious areas)  
Runoff Supply Rate(o): .636 i in./hr. (function of i)  
Time of Concentration(Tc): .229 a-0.4 hrs. (function of a)  
Iterative Solution of Tc: 5.00 min.  
Rainfall Intensity (i) at Tc: 9.88 in./hr.  
Runoff Supply Rate (o) at Tc: 6.29 in./hr.  
Peak Discharge: 1.008oA(acres): 22. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD4

Watershed Area (A): 1.70 Acres  
Length of Watercourse (Lc): 450. ft.  
Length to Center of Gravity (Lca): 170. ft.

Change in Length(L)-ft. Change in Elevation(H)<sup>1</sup>-ft.

450.00

9.00

Mean Slope(Sc): .020 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 10 yrs.

P24(24 hour):	3.300 in.	Areal Value:	in.
P6(6 hour):	2.650 in.	Areal Value:	in.
P1(1 hour):	2.000 in.	Areal Value:	in.
P2(2 hour):	2.222 in.	Areal Value:	in.
P3(3 hour):	2.370 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density(pervious area): 20. %

Impervious cover: 12. % (FUTURE )

CN(s): 83 (pervious areas) CN\*(s): 85.08

CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .400 (pervious areas)  
.942 (impervious areas)

Runoff Supply Rate(q): .465 i in./hr. (function of i)

Time of Concentration(Tc): .129 q-0.4 hrs. (function of q)

Iterative Solution of Tc: 5.00 min.

Rainfall Intensity (i) at Tc: 6.96 in./hr.

Runoff Supply Rate (q) at Tc: 3.23 in./hr.

Peak Discharge: 1.008qA(acres): 6. cfs.



PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD4

Watershed Area (A): 1.70 Acres  
Length of Watercourse (Lc): 450. ft.  
Length to Center of Gravity (Lca): 170. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

450.00  
Mean Slope(Sc): .020 Ft./Ft.

9.00

(5)

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 25 yrs.

P24(24 hour):	3.900 in.	Areal Value:	in.
P6(6 hour):	3.120 in.	Areal Value:	in.
P1(1 hour):	2.300 in.	Areal Value:	in.
P2(2 hour):	2.580 in.	Areal Value:	in.
P3(3 hour):	2.767 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density(pervious area): 20. %

Impervious cover: 12. % (FUTURE )

CN(s): 83 (pervious areas) CN\*(s): 86.11

CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .474 (pervious areas)  
.949 (impervious areas)

Runoff Supply Rate(o): .531 i in./hr. (function of i)

Time of Concentration(Tc): .122 q-0.4 hrs. (function of o)

Iterative Solution of Tc: 5.00 min.

Rainfall Intensity (i) at Tc: 8.00 in./hr.

Runoff Supply Rate (o) at Tc: 4.25 in./hr.

Peak Discharge: 1.008qA(acres): 7. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD4

Watershed Area (A): 1.70 Acres  
Length of Watercourse (Lc): 450. ft.  
Length to Center of Gravity (Lca): 170. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.  
450.00 9.00 (5)  
Mean Slope(Sc): .020 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034<sup>.022</sup> (FUTURE ) Flood Frequency: 100 yrs.

P24(24 hour):	4.900 in.	Areal Value:	in.
P6(6 hour):	3.900 in.	Areal Value:	in.
P1(1 hour):	2.840 in.	Areal Value:	in.
P2(2 hour):	3.201 in.	Areal Value:	in.
P3(3 hour):	3.443 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(pervious area): 20. %  
Impervious cover: 12. % (FUTURE )

CN(s): 83 (pervious areas) CN\*(s): 87.42  
CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .575 (pervious areas)  
.959 (impervious areas)  
Runoff Supply Rate(a): .621 i in./hr. (function of i)  
Time of Concentration(Tc): .115 a-0.4 hrs. (function of a)  
Iterative Solution of Tc: 5.00 min.  
Rainfall Intensity (i) at Tc: 9.88 in./hr.  
Runoff Supply Rate (c) at Tc: 6.14 in./hr.  
Peak Discharge: 1.008cA(acres): 11. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PDS

Watershed Area (A): 6.70 Acres  
Length of Watercourse (Lc): 1010. ft.  
Length to Center of Gravity (Lca): 580. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

1010.00 17.00  
Mean Slope(Sc): .017 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 10 yrs.

P24(24 hour):	3.300 in.	Areal Value:	in.
P6(6 hour):	2.650 in.	Areal Value:	in.
P1(1 hour):	2.000 in.	Areal Value:	in.
P2(2 hour):	2.222 in.	Areal Value:	in.
P3(3 hour):	2.370 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(perVIOUS area): 20. %  
Impervious cover: 16. % (FUTURE )

CN(s): 83 (perVIOUS areas) CN\*(s): 85.08  
CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s),(C): .400 (perVIOUS areas)  
.942 (impervious areas)  
Runoff Supply Rate(o): .486 i in./hr. (function of i)  
Time of Concentration(Tc): .250 o-0.4 hrs. (function of o)  
Iterative Solution of Tc: 7.00 min.  
Rainfall Intensity (i) at Tc: 6.30 in./hr.  
Runoff Supply Rate (o) at Tc: 3.06 in./hr.  
Peak Discharge: 1.008oA(acres): 21. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-86

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PDS

Watershed Area (A): 6.70 Acres  
Length of Watercourse (Lc): 1010. ft.  
Length to Center of Gravity (Lca): 580. ft.

Change in Length(L)-ft. Change in Elevation(H)<sup>1</sup>-ft.

1010.00 17.00  
Mean Slope(Sc): .017 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 25 yrs.

P24(24 hour):	3.900 in.	Areal Value:	in.
P6(6 hour):	3.120 in.	Areal Value:	in.
P1(1 hour):	2.300 in.	Areal Value:	in.
P2(2 hour):	2.580 in.	Areal Value:	in.
P3(3 hour):	2.767 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(pervious area): 20. %  
Impervious cover: 16. % (FUTURE )

CN(s): 83 (pervious areas) CN\*(s): 86.11  
CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .474 (pervious areas)  
.949 (impervious areas)  
Runoff Supply Rate(o): .550 i in./hr. (function of i)  
Time of Concentration(Tc): .238 a-0.4 hrs. (function of a)  
Iterative Solution of Tc: 6.00 min.  
Rainfall Intensity (i) at Tc: 7.64 in./hr.  
Runoff Supply Rate (o) at Tc: 4.20 in./hr.  
Peak Discharge: 1.008qA(acres): 28. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-86

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PDS

Watershed Area (A): 6.70 Acres  
Length of Watercourse (Lc): 1010. ft.  
Length to Center of Gravity (Lca): 580. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

1010.00

17.00

Mean Slope(Sc): .017 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 100 yrs.

P24(24 hour):	4.900 in.	Areal Value:	in.
P6(6 hour):	3.900 in.	Areal Value:	in.
P1(1 hour):	2.840 in.	Areal Value:	in.
P2(2 hour):	3.201 in.	Areal Value:	in.
P3(3 hour):	3.443 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density(pervious area): 20. %

Impervious cover: 16. % (FUTURE )

CN(s): 83 (pervious areas) CN\*(s): 87.42

CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .575 (pervious areas)  
.959 (impervious areas)

Runoff Supply Rate(a): .636 i in./hr. (function of i)

Time of Concentration(Tc): .224 a-0.4 hrs. (function of a)

Iterative Solution of Tc: 5.00 min.

Rainfall Intensity (i) at Tc: 9.88 in./hr.

Runoff Supply Rate (a) at Tc: 6.29 in./hr.

Peak Discharge: 1.008aA(acres): 42. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-86

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD6

Watershed Area (A): 5.30 Acres  
 Length of Watercourse (Lc): 1040. ft.  
 Length to Center of Gravity (Lca): 490. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

1040.00 16.00

Mean Slope(Sc): .015 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 10 yrs.

P24(24 hour):	3.300 in.	Areal Value:	in.
P6(6 hour):	2.650 in.	Areal Value:	in.
P1(1 hour):	2.000 in.	Areal Value:	in.
P2(2 hour):	2.222 in.	Areal Value:	in.
P3(3 hour):	2.370 in.	Areal Value:	in.

Soil Group(s): 100. % B  
 Cover type(s): DESERT BRUSH  
 Cover Density(pervious area): 20. %  
 Impervious cover: 7. % (FUTURE )

CN(s): 83 (pervious areas) CN\*(s): 85.08  
 CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .400 (pervious areas)  
 .942 (impervious areas)

Runoff Supply Rate(a): .438 i in./hr. (function of i)  
 Time of Concentration(Tc): .259 a-0.4 hrs. (function of a)  
 Iterative Solution of Tc: 7.00 min.  
 Rainfall Intensity (i) at Tc: 6.30 in./hr.  
 Runoff Supply Rate (c) at Tc: 2.76 in./hr.  
 Peak Discharge: 1.008cA(acres): 15. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-86

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD6

Watershed Area (A): 5.30 Acres  
Length of Watercourse (Lc): 1040. ft.  
Length to Center of Gravity (Lca): 490. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

1040.00 16.00  
Mean Slope(Sc): .015 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 25 yrs.

P24(24 hour):	3.900 in.	Areal Value:	in.
P6(6 hour):	3.120 in.	Areal Value:	in.
P1(1 hour):	2.300 in.	Areal Value:	in.
P2(2 hour):	2.580 in.	Areal Value:	in.
P3(3 hour):	2.767 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(pervious area): 20. %  
Impervious cover: 7. % (FUTURE )

CN(s): 83 (pervious areas) CN\*(s): 86.11  
CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .474 (pervious areas)  
.949 (impervious areas)  
Runoff Supply Rate(a): .507 i in./hr. (function of i)  
Time of Concentration(Tc): .244 a-0.4 hrs. (function of a)  
Iterative Solution of Tc: 6.00 min.  
Rainfall Intensity (i) at Tc: 7.64 in./hr.  
Runoff Supply Rate (a) at Tc: 3.87 in./hr.  
Peak Discharge:  $1.008aA(\text{acres})$ : 21. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-86

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD6

Watershed Area (A): 5.30 Acres  
Length of Watercourse (Lc): 1040. ft.  
Length to Center of Gravity (Lca): 490. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.  
1040.00 16.00  
Mean Slope(Sc): .015 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 100 yrs.

P24(24 hour):	4.900 in.	Areal Value:	in.
P6(6 hour):	3.900 in.	Areal Value:	in.
P1(1 hour):	2.840 in.	Areal Value:	in.
P2(2 hour):	3.201 in.	Areal Value:	in.
P3(3 hour):	3.443 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(overvius area): 20. %  
Impervious cover: 7. % (FUTURE )

CN(s): 83 (overvius areas) CN\*(s): 87.42  
CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .575 (overvius areas)  
.959 (impervious areas)  
Runoff Supply Rate(q): .602 i in./hr. (function of i)  
Time of Concentration(Tc): .228 a-0.4 hrs. (function of a)  
Iterative Solution of Tc: 5.00 min.  
Rainfall Intensity (i) at Tc: 9.88 in./hr.  
Runoff Supply Rate (q) at Tc: 5.95 in./hr.  
Peak Discharge: 1.008cA(acres): 32. cfs.





PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-86  
DATE PREPARED: 2/21/87  
Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES  
Drainage Concentration Point: PD7

Watershed Area (A): 1.20 Acres  
Length of Watercourse (Lc): 900. ft.  
Length to Center of Gravity (Lca): 450. ft.

Change in Length(L)-ft. Change in Elevation(H<sub>v</sub>)-ft.  
900.00 13.50  
Mean Slope(Sc): .015 Ft./Ft.

Watershed Type(s): MODERATE URBAN (FUTURE )

Basin Factor(nb): .022 (FUTURE ) Flood Frequency: 25 yrs.

P24(24 hour):	3.900 in.	Areal Value:	in.
P6(6 hour):	3.120 in.	Areal Value:	in.
P1(1 hour):	2.300 in.	Areal Value:	in.
P2(2 hour):	2.580 in.	Areal Value:	in.
P3(3 hour):	2.767 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(pervious area): 20. %  
Impervious cover: 40. % (FUTURE )

CN(s): 83 (pervious areas) CN\*(s): 86.11  
CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s).(C): .474 (pervious areas)  
.949 (impervious areas)  
Runoff Supply Rate(q): .664 i in./hr. (function of i)  
Time of Concentration(Tc): .134 a-0.4 hrs. (function of a)  
Iterative Solution of Tc: 5.00 min.  
Rainfall Intensity (i) at Tc: 8.00 in./hr.  
Runoff Supply Rate (q) at Tc: 5.31 in./hr.  
Peak Discharge: 1.008qA(acres): 6. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-86

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD7

Watershed Area (A): 1.20 Acres  
Length of Watercourse (Lc): 900. ft.  
Length to Center of Gravity (Lca): 450. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

900.00 13.50  
Mean Slope(Sc): .015 Ft./Ft.

Watershed Type(s): MODERATE URBAN (FUTURE )

Basin Factor(nb): .022 (FUTURE ) Flood Frequency: 100 yrs.

P24(24 hour):	4.900 in.	Areal Value:	in.
P6(6 hour):	3.900 in.	Areal Value:	in.
P1(1 hour):	2.840 in.	Areal Value:	in.
P2(2 hour):	3.201 in.	Areal Value:	in.
P3(3 hour):	3.443 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(pervious area): 20. %  
Impervious cover: 40. % (FUTURE )

CN(s): 83 (pervious areas) CN\*(s): 87.42  
CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .575 (pervious areas)  
.959 (impervious areas)  
Runoff Supply Rate(q): .728 i in./hr. (function of i)  
Time of Concentration(Tc): .129 a-0.4 hrs. (function of a)  
Iterative Solution of Tc: 5.00 min.  
Rainfall Intensity (i) at Tc: 9.88 in./hr.  
Runoff Supply Rate (q) at Tc: 7.20 in./hr.  
Peak Discharge: 1.008qA(acres): 9. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-86

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PDB

Watershed Area (A): 5.70 Acres  
Length of Watercourse (Lc): 440. ft.  
Length to Center of Gravity (Lca): 210. ft.

Change in Length(L)-ft. Change in Elevation(H)<sup>1</sup>-ft.

440.00

7.00

Mean Slope(Sc): .016 Ft./Ft.

Watershed Type(s): MODERATE URBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 10 yrs.

P24(24 hour):	3.300 in.	Areal Value:	in.
P6(6 hour):	2.650 in.	Areal Value:	in.
P1(1 hour):	2.000 in.	Areal Value:	in.
P2(2 hour):	2.222 in.	Areal Value:	in.
P3(3 hour):	2.370 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density(perVIOUS area): 20. %

Impervious cover: 13. % (FUTURE )

CN(s): 83 (perVIOUS areas) CN\*(s): 85.08

CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .400 (perVIOUS areas)  
.942 (impervious areas)

Runoff Supply Rate(a): .470 i in./hr. (function of i)

Time of Concentration(Tc): .149 p-0.4 hrs. (function of a)

Iterative Solution of Tc: 5.00 min.

Rainfall Intensity (i) at Tc: 6.96 in./hr.

Runoff Supply Rate (a) at Tc: 3.27 in./hr.

Peak Discharge: 1.008aA(acres): 19. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-86

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PDB

Watershed Area (A): 5.70 Acres  
Length of Watercourse (Lc): 440. ft.  
Length to Center of Gravity (Lca): 210. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

440.00

7.00

Mean Slope(Sc): .016 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 25 yrs.

P24(24 hour):	3.900 in.	Areal Value:	in.
P6(6 hour):	3.120 in.	Areal Value:	in.
P1(1 hour):	2.300 in.	Areal Value:	in.
P2(2 hour):	2.580 in.	Areal Value:	in.
P3(3 hour):	2.767 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density(perVIOUS area): 20. %

Impervious cover: 13. % (FUTURE )

CN(s): 83 (perVIOUS areas) CN\*(s): 86.11

CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .474 (perVIOUS areas)  
.949 (impervious areas)

Runoff Supply Rate(q): .535 i in./hr. (function of i)

Time of Concentration(Tc): .141 a-0.4 hrs. (function of a)

Iterative Solution of Tc: 5.00 min.

Rainfall Intensity (i) at Tc: 8.00 in./hr.

Runoff Supply Rate (o) at Tc: 4.29 in./hr.

Peak Discharge: 1.008oA(acres): 25. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-86

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PDB

Watershed Area (A): 5.70 Acres  
Length of Watercourse (Lc): 440. ft.  
Length to Center of Gravity (Lca): 210. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

440.00 7.00  
Mean Slope(Sc): .016 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 100 yrs.

P24(24 hour):	4.900 in.	Areal Value:	in.
P6(6 hour):	3.900 in.	Areal Value:	in.
P1(1 hour):	2.840 in.	Areal Value:	in.
P2(2 hour):	3.201 in.	Areal Value:	in.
P3(3 hour):	3.443 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(pervious area): 20. %  
Impervious cover: 13. % (FUTURE )

CN(s): 83 (pervious areas) CN\*(s): 87.42  
CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (D): .575 (pervious areas)  
.959 (impervious areas)  
Runoff Supply Rate(q): .625 i in./hr. (function of i)  
Time of Concentration(Tc): .133 a-0.4 hrs. (function of a)  
Iterative Solution of Tc: 5.00 min.  
Rainfall Intensity (i) at Tc: 9.88 in./hr.  
Runoff Supply Rate (q) at Tc: 6.17 in./hr.  
Peak Discharge: 1.008qA(acres): 35. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-86

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD9

Watershed Area (A): 9.10 Acres  
Length of Watercourse (Lc): 900. ft.  
Length to Center of Gravity (Lca): 510. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

900.00 11.00  
Mean Slope(Sc): .012 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 10 yrs.

P24(24 hour):	3.300 in.	Areal Value:	in.
P6(6 hour):	2.650 in.	Areal Value:	in.
P1(1 hour):	2.000 in.	Areal Value:	in.
P2(2 hour):	2.222 in.	Areal Value:	in.
P3(3 hour):	2.370 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density(perVIOUS area): 20. %

Impervious cover: 13. % (FUTURE )

CN(s): 83 (perVIOUS areas) CN\*(s): 85.08

CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .400 (perVIOUS areas)  
.942 (impervious areas)

Runoff Supply Rate(a): .470 i in./hr. (function of i)

Time of Concentration(Tc): .267 a-0.4 hrs. (function of a)

Iterative Solution of Tc: 8.00 min.

Rainfall Intensity (i) at Tc: 5.98 in./hr.

Runoff Supply Rate (a) at Tc: 2.81 in./hr.

Peak Discharge: 1.008aA(acres): 26. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-86

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD9

Watershed Area (A): 9.10 Acres  
Length of Watercourse (Lc): 900. ft.  
Length to Center of Gravity (Lca): 510. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

900.00 11.00  
Mean Slope(Sc): .012 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 25 yrs.

P24(24 hour):	3.900 in.	Areal Value:	in.
P6(6 hour):	3.120 in.	Areal Value:	in.
P1(1 hour):	2.300 in.	Areal Value:	in.
P2(2 hour):	2.580 in.	Areal Value:	in.
P3(3 hour):	2.767 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(pervious area): 20. %  
Impervious cover: 13. % (FUTURE )

CN(s): 83 (pervious areas) CN\*(s): 86.11  
CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .474 (pervious areas)  
.949 (impervious areas)  
Runoff Supply Rate(o): .535 i in./hr. (function of i)  
Time of Concentration(Tc): .254 o-0.4 hrs. (function of o)  
Iterative Solution of Tc: 7.00 min.  
Rainfall Intensity (i) at Tc: 7.25 in./hr.  
Runoff Supply Rate (o) at Tc: 3.88 in./hr.  
Peak Discharge:  $1.008oA$ (acres): 36. cfs.



PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-86

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD9

Watershed Area (A): 9.10 Acres  
Length of Watercourse (Lc): 900. ft.  
Length to Center of Gravity (Lca): 510. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

900.00 11.00  
Mean Slope(Sc): .012 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 100 yrs.

P24(24 hour):	4.900 in.	Areal Value:	in.
P6(6 hour):	3.900 in.	Areal Value:	in.
P1(1 hour):	2.840 in.	Areal Value:	in.
P2(2 hour):	3.201 in.	Areal Value:	in.
P3(3 hour):	3.443 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(perVIOUS area): 20. %  
Impervious cover: 13. % (FUTURE )

CN(s): 83 (perVIOUS areas) CN\*(s): 87.42  
CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .575 (perVIOUS areas)  
.959 (impervious areas)

Runoff Supply Rate(a): .625 i in./hr. (function of i)  
Time of Concentration(Tc): .239 a-0.4 hrs. (function of a)  
Iterative Solution of Tc: 6.00 min.  
Rainfall Intensity (i) at Tc: 9.43 in./hr.  
Runoff Supply Rate (a) at Tc: 5.89 in./hr.  
Peak Discharge: 1.008aA(acres): 54. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-86

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD10

Watershed Area (A): 2.40 Acres  
 Length of Watercourse (Lc): 690. ft.  
 Length to Center of Gravity (Lca): 345. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

690.00 11.00  
 Mean Slope(Sc): .016 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 10 yrs.

P24(24 hour):	3.300 in.	Areal Value:	in.
P6(6 hour):	2.650 in.	Areal Value:	in.
P1(1 hour):	2.000 in.	Areal Value:	in.
P2(2 hour):	2.222 in.	Areal Value:	in.
P3(3 hour):	2.370 in.	Areal Value:	in.

Soil Group(s): 100. % B  
 Cover type(s): DESERT BRUSH  
 Cover Density(perVIOUS area): 20. %  
 Impervious cover: 22. % (FUTURE )

CN(s): 83 (perVIOUS areas) CN\*(s): 85.08  
 CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s).(C): .400 (perVIOUS areas)  
 .942 (impervious areas)  
 Runoff Supply Rate(c): .519 i in./hr. (function of i)  
 Time of Concentration(Tc): .190 a-0.4 hrs. (function of c)  
 Iterative Solution of Tc: 5.00 min.  
 Rainfall Intensity (i) at Tc: 6.96 in./hr.  
 Runoff Supply Rate (c) at Tc: 3.61 in./hr.  
 Peak Discharge: 1.008cP(acres): 9. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-86

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD10

Watershed Area (A): 2.40 Acres  
Length of Watercourse (Lc): 690. ft.  
Length to Center of Gravity (Lca): 345. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

690.00 11.00  
Mean Slope(Sc): .016 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 25 yrs.

P24(24 hour):	3.900 in.	Areal Value:	in.
P6(6 hour):	3.120 in.	Areal Value:	in.
P1(1 hour):	2.300 in.	Areal Value:	in.
P2(2 hour):	2.580 in.	Areal Value:	in.
P3(3 hour):	2.767 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(pervious area): 20. %  
Impervious cover: 22. % (FUTURE )

CN(s): 83 (pervious areas) CN\*(s): 86.11  
CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .474 (pervious areas)  
.949 (impervious areas)  
Runoff Supply Rate(q): .578 i in./hr. (function of i)  
Time of Concentration(Tc): .182 q-0.4 hrs. (function of q)  
Iterative Solution of Tc: 5.00 min.  
Rainfall Intensity (i) at Tc: 8.00 in./hr.  
Runoff Supply Rate (q) at Tc: 4.63 in./hr.  
Peak Discharge: 1.008qA(acres): 11. cfs.

PIMA COUNTY METHODD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-86

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD10

Watershed Area (A): 2.40 Acres  
 Length of Watercourse (Lc): 690. ft.  
 Length to Center of Gravity (Lca): 345. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

690.00 11.00  
 Mean Slope(Sc): .016 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 100 yrs.

P24(24 hour):	4.900 in.	Areal Value:	in.
P6(6 hour):	3.900 in.	Areal Value:	in.
P1(1 hour):	2.840 in.	Areal Value:	in.
P2(2 hour):	3.201 in.	Areal Value:	in.
P3(3 hour):	3.443 in.	Areal Value:	in.

Soil Group(s): 100. % B  
 Cover type(s): DESERT BRUSH  
 Cover Density(pervious area): 20. %  
 Impervious cover: 22. % (FUTURE )

CN(s): 83 (pervious areas) CN\*(s): 87.42  
 CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .575 (pervious areas)  
 .959 (impervious areas)  
 Runoff Supply Rate(q): .659 i in./hr. (function of i)  
 Time of Concentration(Tc): .173 a-0.4 hrs. (function of a)  
 Iterative Solution of Tc: 5.00 min.  
 Rainfall Intensity (i) at Tc: 9.88 in./hr.  
 Runoff Supply Rate (q) at Tc: 6.51 in./hr.  
 Peak Discharge: 1.008aA(acres): 16. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-86

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD11

Watershed Area (A): 3.10 Acres  
Length of Watercourse (Lc): 650. ft.  
Length to Center of Gravity (Lca): 325. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

650.00 7.50  
Mean Slope(Sc): .012 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 10 yrs.

P24(24 hour):	3.300 in.	Areal Value:	in.
P6(6 hour):	2.650 in.	Areal Value:	in.
P1(1 hour):	2.000 in.	Areal Value:	in.
P2(2 hour):	2.222 in.	Areal Value:	in.
P3(3 hour):	2.370 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(perVIOUS area): 20. %  
Impervious cover: 14. % (FUTURE )

CN(s): 83 (perVIOUS areas) CN\*(s): 85.08  
CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .400 (perVIOUS areas)  
.942 (impervious areas)  
Runoff Supply Rate(a): .476 i in./hr. (function of i)  
Time of Concentration(Tc): .216 a-0.4 hrs. (function of a)  
Iterative Solution of Tc: 6.00 min.  
Rainfall Intensity (i) at Tc: 6.64 in./hr.  
Runoff Supply Rate (a) at Tc: 3.16 in./hr.  
Peak Discharge: 1.008cA(acres): 10. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-86

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD11

Watershed Area (A): 3.10 Acres  
Length of Watercourse (Lc): 650. ft.  
Length to Center of Gravity (Lca): 325. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

650.00

7.50

Mean Slope(Sc): .012 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 25 yrs.

P24(24 hour):	3.900 in.	Areal Value:	in.
P6(6 hour):	3.120 in.	Areal Value:	in.
P1(1 hour):	2.300 in.	Areal Value:	in.
P2(2 hour):	2.580 in.	Areal Value:	in.
P3(3 hour):	2.767 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density(pervious area): 20. %

Impervious cover: 14. % (FUTURE )

CN(s): 83 (pervious areas) CN\*(s): 86.11

CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .474 (pervious areas)  
.949 (impervious areas)

Runoff Supply Rate(q): .540 i in./hr. (function of i)

Time of Concentration(Tc): .205 q-0.4 hrs. (function of q)

Iterative Solution of Tc: 5.00 min.

Rainfall Intensity (i) at Tc: 8.00 in./hr.

Runoff Supply Rate (q) at Tc: 4.32 in./hr.

Peak Discharge:  $1.008qA$ (acres): 14. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-86

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD11

Watershed Area (A): 3.10 Acres  
 Length of Watercourse (Lc): 650. ft.  
 Length to Center of Gravity (Lca): 325. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

650.00

7.50

Mean Slope(Sc): .012 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 100 yrs.

P24(24 hour):	4.900 in.	Areal Value:	in.
P6(6 hour):	3.900 in.	Areal Value:	in.
P1(1 hour):	2.840 in.	Areal Value:	in.
P2(2 hour):	3.201 in.	Areal Value:	in.
P3(3 hour):	3.443 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density(perVIOUS area): 20. %

Impervious cover: 14. % (FUTURE )

CN(s): 83 (perVIOUS areas) CN\*(s): 87.42

CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .575 (perVIOUS areas)  
 .959 (impervious areas)

Runoff Supply Rate(o): .628 i in./hr. (function of i)

Time of Concentration(Tc): .193 o-0.4 hrs. (function of o)

Iterative Solution of Tc: 5.00 min.

Rainfall Intensity (i) at Tc: 9.88 in./hr.

Runoff Supply Rate (o) at Tc: 6.21 in./hr.

Peak Discharge: 1.008oA(acres): 19. cfs.

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* WATER SURFACE PROFILES *
* VERSION OF NOVEMBER 1976 *
* UPDATED MAY 1984 *
* IBM-PC-XT VERSION *
* RUN DATE 01/01/80 TIME 01:19:58 *
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* U.S. ARMY CORPS OF ENGINEERS *
* THE HYDROLOGIC ENGINEERING CENTER *
* 609 SECOND STREET, SUITE D *
* DAVIS, CALIFORNIA 95616 *
* (916) 440-2105 (FTS) 448-2105 *
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X X XXXXXXX XXXX XXXX
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X X X X X X
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DRAINAGE AREA "A"  
EXISTING - SUBCRITICAL



THIS RUN EXECUTED 01/01/80 01:20:22

\*\*\*\*\*  
 HEC2 RELEASE DATED NOV 76 UPDATED MAY 1984  
 ERROR CORR - 01,02,03,04,05,06  
 MODIFICATION - 50,51,52,53,54,55,56  
 IBM-PC-XT VERSION 1.1  
 \*\*\*\*\*

T1 SAN JOAQUIN ESTATES - SUBCRITICAL  
 T2 100 YEAR EVENT  
 T3 SUBCRITICAL (D.A. "A")

*72.1 11/19/75*

J1	ICHECK	INQ	NINW	IDIR	STRT	METRIC	HVINS	D	WSEL	FQ
	0.	2.	0.	0.	.011500	.00	.0	572.	2406.000	.000
J2	NPROF	IPL0T	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	-1.000	1.000	.000	.000	.000	.000	.000	.000	.000	.000
J3	VARIABLE CODES FOR SUMMARY PRINTOUT									
	38.000	1.000	2.000	3.000	4.000	5.000	8.000	10.000	11.000	33.000
	57.000	43.000	.000	.000	.000	.000	.000	.000	.000	.000

NC	.040	.040	.040	.000	.000	.000	.000	.000	.000	.000	.000
BT	1.000	572.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
X1	3.000	7.000	.000	130.000	.000	.000	.000	.000	.000	.000	.000
GR	2407.000	.000	2406.000	30.000	2404.000	70.000	2403.000	80.000	2404.000	90.000	.000
GR	2406.000	102.000	2407.000	130.000	.000	.000	.000	.000	.000	.000	.000
BT	1.000	555.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
X1	2.000	7.000	.000	215.000	280.000	220.000	245.000	.000	.000	.000	.000
GR	2409.000	.000	2408.000	60.000	2406.000	80.000	2404.800	110.000	2406.000	130.000	.000
GR	2408.000	145.000	2409.200	215.000	.000	.000	.000	.000	.000	.000	.000
X1	1.000	12.000	.000	184.000	365.000	230.000	280.000	.000	.000	.000	.000
GR	2415.000	.000	2414.000	35.000	2413.000	65.000	2412.000	95.000	2411.000	103.000	.000
GR	2410.000	113.000	2408.000	128.000	2407.750	136.000	2408.000	144.000	2410.000	149.000	.000
GR	2412.000	159.000	2412.200	184.000	.000	.000	.000	.000	.000	.000	.000
EJ	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

\*PRDF 1

*no overbank flow area*

SECNO	DEPTH	CWSEL	CRIMS	WSELK	EG	HV	HL	DLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPMID	ENDST

\*SECNO 3.000

3.00	3.17	2406.17	.00	2406.00	2406.55	.38	.00	.00	2407.00
572.	0.	572.	0.	0.	115.	0.	0.	0.	2407.00
.00	.00	4.97	.00	.040	.040	.040	.000	2403.00	24.91
.011432	0.	0.	0.	0	0	5	.00	81.84	106.75

\*SECNO 2.000

2.00	3.10	2407.90	.00	.00	2408.10	.19	1.54	.00	2409.00
555.	0.	555.	0.	0.	157.	0.	1.	0.	2409.20
.02	.00	3.54	.00	.040	.040	.040	.000	2404.80	60.99
.003929	280.	245.	220.	4	0	0	.00	83.27	144.26

\*SECNO 1.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL.CWSEL

3693 PROBABLE MINIMUM SPECIFIC ENERGY

3720 CRITICAL DEPTH ASSUMED

1.00	2.76	2410.51	2410.51	.00	2411.38	.86	2.12	.00	2415.00
555.	0.	555.	0.	0.	74.	0.	2.	1.	2412.20
.03	.00	7.46	.00	.040	.040	.040	.000	2407.75	107.87
.020158	365.	280.	230.	20	11	0	.00	43.69	151.56

THIS RUN EXECUTED 01/01/80 01:24:01

\*\*\*\*\*  
 HEC2 RELEASE DATED NOV 76 UPDATED MAY 1984  
 ERROR CORR - 01,02,03,04,05,06  
 MODIFICATION - 50,51,52,53,54,55,56  
 IBM-PC-XT VERSION 1.1  
 \*\*\*\*\*

NOTE- ASTERISK (\*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

SUBCRITICAL (D.A. "A")

SUMMARY PRINTOUT

SECNO	CWSEL	CRWS	EG	TOPWID	10K*5	DEPTH	HV	HL	K*CHSL	ALPHA	Q
3.000	2406.17	.00	2406.55	81.84	114.32	3.17	.38	.00	.00	1.00	572.00
2.000	2407.90	.00	2408.10	83.27	39.29	3.10	.19	1.54	7.35	1.00	555.00
* 1.000	2410.51	2410.51	2411.38	43.69	201.58	2.76	.86	2.12	10.54	1.00	555.00

*Subcritical flows on Fig. 57*

SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECND= 1.000 PROFILE= 1 CRITICAL DEPTH ASSUMED  
CAUTION SECND= 1.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY  
CAUTION SECND= 1.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

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*****
* WATER SURFACE PROFILES *
* VERSION OF NOVEMBER 1976 *
* UPDATED MAY 1984 *
* IBM-PC-XT VERSION *
* RUN DATE 02/04/82 TIME 12:54:21 *
*****

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*****
* U.S. ARMY CORPS OF ENGINEERS *
* THE HYDROLOGIC ENGINEERING CENTER *
* 609 SECOND STREET, SUITE D *
* DAVIS, CALIFORNIA 95616 *
* (916) 440-2105 (FTS) 448-2105 *
*****

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X   X XXXXXXX XXXXX XXXXX
X   X X   X   X   X   X   X
X   X X   X   X   X   X   X
XXXXXXXX XXXX X   XXXXX XXXXX
X   X X   X   X   X   X   X
X   X X   X   X   X   X   X
X   X XXXXXXX XXXXX XXXXXXX

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DRAINAGE AREA "A"  
EXISTING - SUPERCRITICAL

THIS RUN EXECUTED 02/04/82 12:54:44

\*\*\*\*\*  
 HEC2 RELEASE DATED NOV 76 UPDATED MAY 1984  
 ERROR CORR - 01,02,03,04,05,06  
 MODIFICATION - 50,51,52,53,54,55,56  
 IBM-PC-XT VERSION 1.1  
 \*\*\*\*\*

T1 SAN JOAQUIN ESTATES - SUPERCRITICAL  
 T2 100 YEAR EVENT  
 T3 SUPERCRITICAL (D.A. "A")

J1	ICHECK	ING	NINV	IDIR	STR	METRIC	AVINS	Q	WSEL	FG
	0.	2.	0.	1.	.011500	.00	.0	572.	2408.500	.000
J2	WPROF	ISLOT	FRFVS	XSEDV	XSEDA	FN	ALLOD	ISW	DANLY	ITRADE
	-1.000	1.000	.000	.000	.000	.000	.000	.000	.000	.000
J3	VARIABLE CODES FOR SUMMARY PRINTOUT									
	38.000	1.000	2.000	3.000	4.000	5.000	8.000	10.000	11.000	33.000
	57.000	43.000	.000	.000	.000	.000	.000	.000	.000	.000
NC	.040	.040	.040	.000	.000	.000	.000	.000	.000	.000
GT	1.000	555.000	.000	.000	.000	.000	.000	.000	.000	.000
X1	<u>1.000</u>	12.000	.000	184.000	365.000	230.000	250.000	.000	.000	.000
GR	2415.000	.000	2414.000	35.000	2413.000	65.000	2412.000	95.000	2411.000	103.000
BR	2410.000	113.000	2408.000	186.000	2407.750	135.000	2408.000	144.000	2410.000	145.000
BR	2412.000	155.000	2413.000	184.000	.000	.000	.000	.000	.000	.000
X1	<u>2.000</u>	7.000	.000	215.000	150.000	220.000	245.000	.000	.000	.000
GR	2409.000	.000	2408.000	60.000	2406.000	80.000	2404.800	110.000	2406.000	130.000
BR	2408.000	145.000	2409.000	215.000	.000	.000	.000	.000	.000	.000
GT	1.000	572.000	.000	.000	.000	.000	.000	.000	.000	.000
X1	<u>3.000</u>	7.000	.000	130.000	.000	.000	.000	.000	.000	.000
GR	2407.000	.000	2405.000	30.000	2404.000	70.000	2403.000	80.000	2404.000	50.000
BR	2406.000	102.000	2407.000	130.000	.000	.000	.000	.000	.000	.000
EJ	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

\*PRGF 1

SECNO	DEPTH	DWSEL	CRWS	WSELK	EG	HV	HL	DLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	YNL	YNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

\*SECNO 1.000

3720 CRITICAL DEPTH ASSUMED

1.00	2.76	2410.51	2410.51	2408.50	2411.38	.87	.00	.00	2415.00
555.	0.	555.	0.	0.	74.	0.	0.	0.	2412.20
.00	.00	7.47	.00	.040	.040	.040	.000	2407.75	107.90
.020255	0.	0.	0.	0	23	5	.00	43.65	151.55

\*SECNO 2.000

3685 20 TRIALS ATTEMPTED WSEL,DWSEL

3693 PROBABLE MINIMUM SPECIFIC ENERGY

3720 CRITICAL DEPTH ASSUMED

2.00	2.15	2406.95	2406.95	.00	2407.61	.66	5.92	3.52	2409.00
555.	0.	555.	0.	0.	85.	0.	1.	0.	2409.20
.01	.00	6.50	.00	.040	.040	.040	.000	2404.80	70.51
.022090	365.	280.	230.	20	15	0	.00	66.61	137.12

\*SECNO 3.000

3685 20 TRIALS ATTEMPTED WSEL,DWSEL

3693 PROBABLE MINIMUM SPECIFIC ENERGY

3720 CRITICAL DEPTH ASSUMED

3.00	2.78	2405.78	2405.78	.00	2405.45	.67	5.40	3.65	2407.00
572.	0.	572.	0.	0.	67.	0.	1.	1.	2407.00
.02	.00	6.58	.00	.040	.040	.040	.000	2403.00	34.36
.022015	280.	245.	220.	20	11	0	.00	66.33	100.69

THIS RUN EXECUTED 02/04/82 12:58:32

\*\*\*\*\*  
 HEC2 RELEASE DATED NOV 76 UPDATED MAY 1984  
 ERROR CORR - 01,02,03,04,05,06  
 MODIFICATION - 50,51,52,53,54,55,56  
 IBM-PC-XT VERSION 1.1  
 \*\*\*\*\*

NOTE- ASTERISK (\*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

SUPERCritical (D.A. "A")

SUMMARY PRINTOUT

	SECD	OWSEL	ORWS	ES	TOPWID	10X6	DEPTH	HV	HL	K*CHSL	ALPHA	Q
*	1.000	2410.51	2410.51	2411.38	43.65	202.55	2.76	.87	.00	.00	1.00	555.00
*	2.000	2406.95	2406.95	2407.51	56.81	220.90	2.15	.66	5.92	-10.54	1.00	555.00
*	3.000	2405.78	2405.78	2406.45	66.23	220.15	2.78	.67	5.40	-7.35	1.00	572.00

*7.4 FPS*



SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 1.000 PROFILE= 1 CRITICAL DEPTH ASSUMED  
CAUTION SECNO= 2.000 PROFILE= 1 CRITICAL DEPTH ASSUMED  
CAUTION SECNO= 2.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY  
CAUTION SECNO= 2.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL  
CAUTION SECNO= 3.000 PROFILE= 1 CRITICAL DEPTH ASSUMED  
CAUTION SECNO= 3.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY  
CAUTION SECNO= 3.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

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*****
* WATER SURFACE PROFILES *
* VERSION OF NOVEMBER 1976 *
* UPDATED MAY 1984 *
* IBM-PC-XT VERSION *
* RUN DATE 01/01/80 TIME 01:58:37 *
*****

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*****
* U.S. ARMY CORPS OF ENGINEERS *
* THE HYDROLOGIC ENGINEERING CENTER *
* 609 SECOND STREET, SUITE D *
* DAVIS, CALIFORNIA 95616 *
* (916) 440-2105 (FTS) 448-2105 *
*****

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X X XXXXXXX XXXXX XXXXX
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X X X X X X
X X X X X X
X X XXXXXXX XXXXX XXXXXXX

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DRAINAGE AREA "D AND G"  
EXISTING - SUBCRITICAL



DT	1.000	128.000	.000	.000	.000	.000	.000	.000	.000	.000
X1	1.000	9.000	.000	165.000	220.000	200.000	210.000	.000	.000	.000
GR	2402.100	.000	2402.000	25.000	2400.000	50.000	2399.520	65.000	2400.000	80.000
BR	2402.000	100.000	2402.300	118.000	2402.000	142.000	2402.300	165.000	.000	.000
EJ	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
*PRDF 1										

SECNO	DEPTH	CWSEL	CRIMS	WSELK	EG	HV	HL	DLSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

\*SECNO 5.000

3265 DIVIDED FLOW

5.00	.66	2390.48	.00	2390.20	2390.57	.09	.00	.00	2391.00
224.	0.	224.	0.	0.	92.	0.	0.	0.	2390.60
.00	.00	2.43	.00	.040	.040	.040	.000	2389.82	26.06
.016018	0.	0.	0.	0	0	7	.00	248.98	287.78

\*SECNO 4.000

4.00	1.33	2392.33	.00	.00	2392.40	.07	1.83	.00	2394.60
224.	0.	224.	0.	0.	107.	0.	0.	1.	2393.00
.02	.00	2.10	.00	.040	.040	.040	.000	2391.00	79.72
.008593	105.	160.	230.	6	0	0	.00	224.14	303.85

\*SECNO 3.000

3265 DIVIDED FLOW

3685 20 TRIALS ATTEMPTED WSEL,CWSEL  
 3693 PROBABLE MINIMUM SPECIFIC ENERGY  
 3720 CRITICAL DEPTH ASSUMED

3.00	1.21	2394.51	2394.51	.00	2394.77	.26	.00	.00	2396.50
197.	0.	197.	0.	0.	48.	0.	0.	1.	2396.75
.02	.00	4.08	.00	.040	.040	.040	.000	2393.30	114.66
.030493	0.	0.	0.	20	15	0	.00	96.70	239.43

\*SECNO 2.000

2.00	1.62	2397.62	.00	.00	2397.84	.22	3.07	.00	2398.70
155.	0.	155.	0.	0.	42.	0.	1.	1.	2398.40
.03	.00	3.72	.00	.040	.040	.040	.000	2396.00	62.19
.011395	100.	165.	295.	4	0	0	.00	45.66	107.84

\*SECNO 1.000

1.00	1.11	2400.63	.00	.00	2400.90	.27	3.06	.00	2402.10
128.	0.	128.	0.	0.	31.	0.	1.	1.	2402.30
.05	.00	4.17	.00	.040	.040	.040	.000	2399.52	42.10
.020611	220.	210.	200.	4	0	0	.00	44.23	86.32

PROFILE FOR STREAM SUBCRITICAL (D.A. "D AND

PLOTTED POINTS (BY PRIORITY)-E-ENERGY,W-WATER SURFACE,I-INVERT,C-CRITICAL W.S.,L-LEFT BANK,R-RIGHT BANK,M-LOWER END STA

ELEVATION	2388.	2390.	2392.	2394.	2396.	2398.	2400.	2402.	2404.	2406.
SECNO	CUMDIS									
5.00	0. C	I. WE L	.	.	.	.	.	.	.	.
	20. C	I ER L	.	.	.	.	.	.	.	.
	40. C	.I ER L	.	.	.	.	.	.	.	.
	60. C	.I ER L	.	.	.	.	.	.	.	.
	80. C	.I ER L	.	.	.	.	.	.	.	.
	100. C	. I WE.R L	.	.	.	.	.	.	.	.
	120. C	. I WE R L	.	.	.	.	.	.	.	.
	140. C	. I .ER .L	.	.	.	.	.	.	.	.
4.00	160. C	. I .E R .L	.	.	.	.	.	.	.	.
3.00	180. .	.	I . WE	LR	.	.	.	.	.	.
	200. C	.	I . WE	LR	.	.	.	.	.	.
	220. C	.	I WE	LR	.	.	.	.	.	.
	240. C	.	.I WE	ML	.	.	.	.	.	.
	260. C	.	.I WE	ML	.	.	.	.	.	.
	280. C	.	.I WE	ML	.	.	.	.	.	.
	300. C	.	.I WE	ML	.	.	.	.	.	.
	320. C	.	.I WE	RL	.	.	.	.	.	.
2.00	340. C	.	.I WE	RL	.	.	.	.	.	.
	360. C	.	.I WE	RL	.	.	.	.	.	.
	380. C	.	.I WE	RL	.	.	.	.	.	.
	400. C	.	.I WE	ML	.	.	.	.	.	.
	420. C	.	.I WE	RL	.	.	.	.	.	.
	440. C	.	.I WE	RL	.	.	.	.	.	.
	460. C	.	.I WE	L	.	.	.	.	.	.
	480. C	.	.I WE	ML	.	.	.	.	.	.
	500. C	.	.I WE	LR	.	.	.	.	.	.
	520. C	.	.I WE	LR	.	.	.	.	.	.
1.00	540. C	.	.I WE	LR	.	.	.	.	.	.

THIS RUN EXECUTED 01/01/80 02:05:58

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HEC2 RELEASE DATED NOV 76 UPDATED MAY 1984
ERROR CORR - 01,02,03,04,05,06
MODIFICATION - 50,51,52,53,54,55,56
IBM-PC-XT VERSION 1.1
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NOTE- ASTERISK (\*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

SUBCRITICAL (D.A. \*D AND

SUMMARY PRINTOUT

SECNO	CWSEL	CRIWS	EG	TOPWID	10K*5	DEPTH	HV	HL	K*CHSL	ALPHA	Q
5.000	2390.48	.00	2390.57	248.98	160.18	.66	.09	.00	.00	1.00	224.00
4.000	2392.33	.00	2392.40	224.14	85.93	1.33	.07	1.83	7.37	1.00	224.00
* 3.000	2394.51	2394.51	2394.77	96.70	304.93	1.21	.26	.00	2300.05	1.00	197.00
2.000	2397.62	.00	2397.84	45.66	113.95	1.62	.22	3.07	16.35	1.00	155.00
1.000	2400.63	.00	2400.90	44.23	206.11	1.11	.27	3.06	16.75	1.00	128.00

SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 3.000 PROFILE= 1 CRITICAL DEPTH ASSUMED  
CAUTION SECNO= 3.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY  
CAUTION SECNO= 3.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL



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*****
* WATER SURFACE PROFILES *
* VERSION OF NOVEMBER 1976 *
* UPDATED MAY 1984 *
* IBM-PC-XT VERSION *
* RUN DATE 01/01/80 TIME 02:20:46 *
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* U.S. ARMY CORPS OF ENGINEERS *
* THE HYDROLOGIC ENGINEERING CENTER *
* 609 SECOND STREET, SUITE D *
* DAVIS, CALIFORNIA 95616 *
* (916) 440-2105 (FTS) 448-2105 *
*****

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X   X XXXXXXX XXXXX          XXXXX
X   X X      X   X          X   X
X   X X      X           X   X
XXXXXXX XXXX X           XXXXX XXXXX
X   X X      X           X
X   X X      X   X          X
X   X XXXXXXX XXXXX          XXXXXXX

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DRAINAGE AREA "D AND G"  
EXISTING - SUPERCRITICAL



XI	5.000	15.000	.000	290.000	.000	.000	.000	.000	.000	.000
GR	2391.000	.000	2390.000	50.000	2389.900	58.000	2390.000	62.000	2390.240	90.000
GR	2390.000	130.000	2389.900	145.000	2390.000	160.000	2390.300	170.000	2390.000	185.000
GR	2390.600	215.000	2390.000	248.000	2389.820	261.000	2390.000	279.000	2390.600	290.000
EJ	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

\*PRDF 1

SECNO	DEPTH	CWSEL	CRWS	WSELK	EG	HV	HL	LOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

\*SECNO 1.000

3720 CRITICAL DEPTH ASSUMED

1.00	1.04	2400.56	2400.56	2400.20	2400.90	.33	.00	.00	2402.10
128.	0.	128.	0.	0.	28.	0.	0.	0.	2402.30
.00	.00	4.63	.00	.040	.040	.040	.000	2399.52	42.96
.027729	0.	0.	0.	0	14	5	.00	42.67	85.63

\*SECNO 2.000

3685 20 TRIALS ATTEMPTED WSEL,CWSEL

3693 PROBABLE MINIMUM SPECIFIC ENERGY

3720 CRITICAL DEPTH ASSUMED

2.00	1.35	2397.35	2397.35	.00	2397.75	.40	5.63	.15	2398.70
155.	0.	155.	0.	0.	31.	0.	0.	0.	2398.40
.01	.00	5.06	.00	.040	.040	.040	.000	2396.00	66.97
.026069	220.	210.	200.	20	11	0	.00	39.43	106.40

\*SECNO 3.000

3265 DIVIDED FLOW

3685 20 TRIALS ATTEMPTED WSEL,CWSEL

3693 PROBABLE MINIMUM SPECIFIC ENERGY

3720 CRITICAL DEPTH ASSUMED

3.00	1.21	2394.51	2394.51	.00	2394.77	.26	4.69	3.75	2396.50
197.	0.	197.	0.	0.	48.	0.	0.	0.	2396.75
.02	.00	4.08	.00	.040	.040	.040	.000	2393.30	114.66
.030493	100.	165.	295.	20	15	0	.00	96.70	239.43

\*SECNO 4.000

3265 DIVIDED FLOW

3685 20 TRIALS ATTEMPTED WSEL,CWSEL

3710 WSEL ASSUMED BASED ON MIN DIFF

4.00	.95	2391.95	2392.15	.00	2392.53	.58	.00	.00	2394.60
224.	0.	224.	0.	0.	37.	0.	0.	0.	2393.00
.02	.00	6.13	.00	.040	.040	.040	.000	2391.00	132.19
.121913	0.	0.	0.	20	10	0	.00	112.31	276.79

SECNO	DEPTH	CMSEL	CRIMS	WSELK	EG	HV	HL	QLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

\*SECNO 5.000

3265 DIVIDED FLOW

3685 20 TRIALS ATTEMPTED WSEL,CMSEL  
 3693 PROBABLE MINIMUM SPECIFIC ENERGY  
 3720 CRITICAL DEPTH ASSUMED

5.00	.57	2390.39	2390.39	.00	2390.55	.16	9.66	12.00	2391.00
224.	0.	224.	0.	0.	71.	0.	0.	1.	2390.60
.04	.00	3.17	.00	.040	.040	.040	.000	2389.82	30.57
.035955	105.	160.	230.	20	14	0	.00	233.36	286.12

PROFILE FOR STREAM SUPERCRITICAL (D.A. "D A

PLOTTED POINTS (BY PRIORITY)-E-ENERGY, W-WATER SURFACE, I-INVERT, C-CRITICAL W.S., L-LEFT BANK, R-RIGHT BANK, M-LOWER END STA

ELEVATION	2388.	2390.	2392.	2394.	2396.	2398.	2400.	2402.	2404.	2406.
SECNO	CUMDIS									
1.00	0.	.	.	.	.	.	I . WE	.LR	.	.
	20.	.	.	.	.	.	I . WE	LR	.	.
	40.	.	.	.	.	.	I . WE	LR .	.	.
	60.	.	.	.	.	.	I . WE	ML	.	.
	80.	.	.	.	.	.	I . WE	ML	.	.
	100.	.	.	.	.	.	I . WE	L	.	.
	120.	.	.	.	.	.	I . WE	RL	.	.
	140.	.	.	.	.	.	I . WE	RL	.	.
	160.	.	.	.	.	.	I . WE	MRL	.	.
	180.	.	.	.	.	.	I . WE	RL	.	.
	200.	.	.	.	.	.	I . WE	RL	.	.
2.00	220.	.	.	.	.	.	I . WE	RL	.	.
	240.	.	.	.	.	.	I . WE	RL	.	.
	260.	.	.	.	.	.	I . WE	RL	.	.
	280.	.	.	.	.	.	I . WE	L	.	.
	300.	.	.	.	.	.	I . WE	ML	.	.
	320.	.	.	.	.	.	I . WE	ML	.	.
	340.	.	.	.	.	.	I . WE	ML	.	.
	360.	.	.	.	.	.	I . WE	LR	.	.
3.00	380.	.	.	.	.	.	I . WE	LR	.	.
4.00	400.	.	I WCE R	.	L	.	.	.	.	.
	420.	.	I WCE R	.	L	.	.	.	.	.
	440.	.	I WCE R	.	L	.	.	.	.	.
	460.	.	I W E R	L	.	.	.	.	.	.
	480.	.	I W E R	L	.	.	.	.	.	.
	500.	.	I W E R	L	.	.	.	.	.	.
	520.	.	I W E R	L	.	.	.	.	.	.
5.00	540.	.	I . WE	L	.	.	.	.	.	.

THIS RUN EXECUTED 01/01/80 02:28:40

\*\*\*\*\*  
 HEC2 RELEASE DATED NOV 76 UPDATED MAY 1984  
 ERROR CORR - 01,02,03,04,05,06  
 MODIFICATION - 50,51,52,53,54,55,56  
 IBM-PC-XT VERSION 1.1  
 \*\*\*\*\*

NOTE- ASTERISK (\*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

SUPERCRITICAL (D.A. "D A

SUMMARY PRINTOUT

	SECNO	CWSEL	CRIWS	ES	TOPWID	10K*5	DEPTH	HV	HL	K*CHSL	ALPHA	Q
*	1.000	2400.56	2400.56	2400.90	42.67	277.29	1.04	.33	.00	.00	1.00	128.00
*	2.000	2397.35	2397.35	2397.75	39.43	260.69	1.35	.40	5.63	-16.76	1.00	155.00
*	3.000	2394.51	2394.51	2394.77	96.70	304.93	1.21	.26	4.69	-16.36	1.00	197.00
*	4.000	2391.95	2392.15	2392.53	112.31	1219.13	.95	.58	.00	-2300.05	1.00	224.00
*	5.000	2390.39	2390.39	2390.55	233.36	359.55	.57	.16	9.66	-7.37	1.00	224.00

## SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION	SECNO=	1.000	PROFILE= 1	CRITICAL DEPTH ASSUMED
CAUTION	SECNO=	2.000	PROFILE= 1	CRITICAL DEPTH ASSUMED
CAUTION	SECNO=	2.000	PROFILE= 1	PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION	SECNO=	2.000	PROFILE= 1	20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION	SECNO=	3.000	PROFILE= 1	CRITICAL DEPTH ASSUMED
CAUTION	SECNO=	3.000	PROFILE= 1	PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION	SECNO=	3.000	PROFILE= 1	20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION	SECNO=	4.000	PROFILE= 1	WSEL ASSUMED BASED ON MIN DIFF
CAUTION	SECNO=	4.000	PROFILE= 1	20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION	SECNO=	5.000	PROFILE= 1	CRITICAL DEPTH ASSUMED
CAUTION	SECNO=	5.000	PROFILE= 1	PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION	SECNO=	5.000	PROFILE= 1	20 TRIALS ATTEMPTED TO BALANCE WSEL



\*\*\*\*\*  
 \* WATER SURFACE PROFILES \*  
 \* VERSION OF NOVEMBER 1976 \*  
 \* UPDATED MAY 1984 \*  
 \* IBM-PC-XT VERSION \*  
 \* RUN DATE 02/26/82 TIME 15:59:09 \*  
 \*\*\*\*\*

\*\*\*\*\*  
 \* U.S. ARMY CORPS OF ENGINEERS \*  
 \* THE HYDROLOGIC ENGINEERING CENTER \*  
 \* 609 SECOND STREET, SUITE D \*  
 \* DAVIS, CALIFORNIA 95616 \*  
 \* (916) 440-2105 (FTS) 448-2105 \*  
 \*\*\*\*\*

```

X   X   XXXXXX   XXXX   XXXX
X   X   X       X   X   X   X
X   X   X       X       X
XXXXXX XXXX   X       XXXXX XXXXX
X   X   X       X       X
X   X   X       X   X   X
X   X   XXXXXX   XXXX   XXXXXXX
  
```

DRAINAGE AREA "C"

EXISTING - SUBCRITICAL

*need*

*runs for D.A. "c"*

*- flow distrib.  
 - div. flow on each section  
 → analysis should det.  
 be fore hand how much  
 flow in each part of  
 then det. flood limits*

*- HEC-2 cross  
 section data don't  
 agree w/ Fig. 5*

\*\*\*\*\*  
 HEC2 RELEASE DATED NOV 76 UPDATED MAY 1984  
 ERROR CORR - 01.02.03.04.05.06  
 MODIFICATION - 50.51.52.53.54.55.56  
 IBM-PC-XT VERSION 1.1  
 \*\*\*\*\*

T1 SAN JOAQUIN ESTATES - SUBCRITICAL  
 T2 100 YEAR EVENT  
 T3 "D"-EXIST. SUBCRIT

J1	ICHECK	IND	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0.	2.	0.	0.	.012700	.00	.0	402.	2403.500	.000

J2	NPROF	IPL0T	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	-1.000	1.000	.000	.000	.000	.000	.000	.000	.000	.000

J3 VARIABLE CODES FOR SUMMARY PRINTOUT

38.000	1.000	2.000	3.000	4.000	5.000	8.000	10.000	11.000	33.000
57.000	43.000	.000	.000	.000	.000	.000	.000	.000	.000

15 for flow distrib. printout

NC	.025	.025	.025	.000	.000	.000	.000	.000	.000	.000
BT	1.000	402.000	.000	.000	.000	.000	.000	.000	.000	.000
X1	4.000	14.000	119.000	234.000	.000	.000	.000	.000	.000	.000
GR	2406.100	.000	2406.930	10.000	2406.210	60.000	2405.520	83.000	2404.840	119.000
GR	2404.200	177.000	2402.710	183.000	2404.340	224.000	2404.400	234.000	2404.620	284.000
GR	2404.100	334.000	2402.760	384.000	2403.400	459.000	2404.100	519.000	.000	.000
X1	3.000	19.000	120.000	295.000	46.000	46.000	46.000	.000	.000	.000
GR	2407.400	.000	2408.180	19.000	2406.740	41.000	2406.910	63.000	2406.480	87.000
GR	2406.000	104.000	2405.850	120.000	2403.960	178.000	2404.600	185.000	2403.290	232.000
GR	2404.600	238.000	2404.900	282.000	2405.000	295.000	2404.430	345.000	2403.760	395.000
GR	2403.800	445.000	2403.760	480.000	2404.140	530.000	2404.500	550.000	.000	.000
X1	2.000	18.000	152.000	238.000	40.000	40.000	40.000	.000	.000	.000
GR	2407.700	.000	2407.500	24.000	2407.060	49.000	2407.680	65.000	2406.030	83.000
GR	2405.900	96.000	2405.720	115.000	2405.100	142.000	2404.760	152.000	2404.460	175.000
GR	2403.800	200.000	2405.610	238.000	2405.740	258.000	2405.060	308.000	2404.640	358.000
GR	2403.800	408.000	2404.540	443.000	2404.980	493.000	.000	.000	.000	.000
X1	1.000	14.000	93.000	175.000	35.000	35.000	35.000	.000	.000	.000
GR	2406.700	.000	2406.220	44.000	2406.600	58.000	2405.220	70.000	2405.180	93.000
GR	2404.900	118.000	2404.240	140.000	2405.280	158.000	2406.780	175.000	2406.400	225.000
GR	2404.600	275.000	2404.800	325.000	2404.880	360.000	2404.900	410.000	.000	.000
EJ	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

\*PROF 1

cross sec data does not match topo - elev. off

SECNO	DEPTH	CWSEL	CRWS	WSELK	EG	HV	HL	GLSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

\*SECNO 4.000

3265 DIVIDED FLOW

3720 CRITICAL DEPTH ASSUMED

4.00	1.08	2403.79	2403.79	2403.50	2404.06	.27	.00	.00	2404.84
402.	0.	66.	336.	0.	17.	79.	0.	0.	2404.40
.00	.00	3.90	4.25	.025	.025	.025	.000	2402.71	178.66
.009913	0.	0.	0.	0	11	0	.00	177.86	492.14

\*SECNO 3.000

3265 DIVIDED FLOW

7185 MINIMUM SPECIFIC ENERGY

3720 CRITICAL DEPTH ASSUMED

3.00	1.06	2404.35	2404.35	.00	2404.56	.22	.48	.00	2405.65
402.	0.	92.	310.	0.	26.	82.	0.	0.	2405.00
.00	.00	3.60	3.73	.025	.025	.025	.000	2403.29	166.18
.011142	46.	46.	46.	2	8	0	.00	248.80	541.40

\*SECNO 2.000

3265 DIVIDED FLOW

7185 MINIMUM SPECIFIC ENERGY

3720 CRITICAL DEPTH ASSUMED

2.00	1.08	2404.88	2404.88	.00	2405.11	.23	.40	.00	2404.76
402.	0.	135.	266.	0.	37.	67.	0.	0.	2405.61
.01	.85	3.67	3.96	.025	.025	.025	.000	2403.80	148.58
.009036	40.	40.	40.	2	5	0	.00	225.34	481.21

\*SECNO 1.000

3265 DIVIDED FLOW

3280 CROSS SECTION 1.00 EXTENDED .43 FEET

7185 MINIMUM SPECIFIC ENERGY

SECNO	DEPTH	CHSEL	CRWS	WSELK	EG	HV	HL	QLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XLN	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

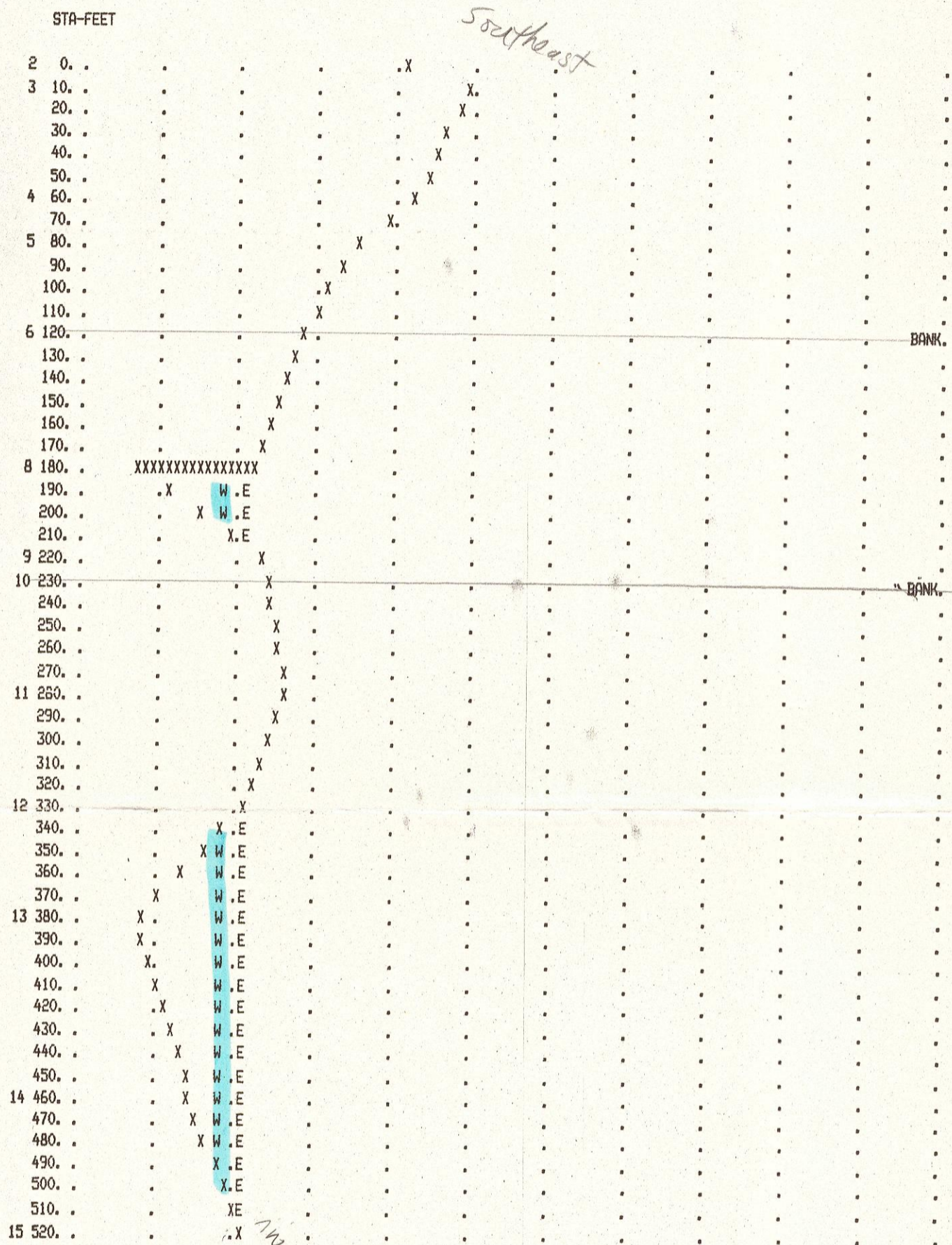
3720 CRITICAL DEPTH ASSUMED

1.00	1.09	2405.33	2405.33	.00	2405.55	.23	.35	.00	2405.18
402.	5.	135.	261.	3.	34.	70.	0.	1.	2406.78
.01	1.54	4.01	3.75	.025	.025	.025	.000	2404.24	69.07
.010888	35.	35.	35.	0	5	0	.00	240.94	410.00

CROSS SECTION 4.00  
 STREAM "D"-EXIST. SUBCRIT  
 DISCHARGE= 402.

PLOTTED POINTS (BY PRIORITY)-B=BOTTOM BRIDGE, T=TOP BRIDGE, X=GROUND, W=WATER SUR, E=ENERGY GRADIENT, C=CRITICAL WSEL

ELEV 2402. 2403. 2404. 2405. 2406. 2407. 2408. 2409. 2410. 2411. 2412.



NRD= 0 ELLC= 9999999.00 ELTRD= 9999999.00

EL(I), STA(I)	2402	2403	2404	2405	2406	2407	2408	2409	2410	2411	2412
2406.10	.00	2406.93	10.00	2406.21	60.00	2405.52	83.00	2404.84	119.00		
2404.20	177.00	2402.71	183.00	2404.34	224.00	2404.40	234.00	2404.62	284.00		
2404.10	334.00	2402.75	384.00	2403.40	459.00	2404.10	519.00				

CROSS SECTION 3.00  
 STREAM "D"-EXIST. SUBCRIT  
 DISCHARGE= 402.

PLOTTED POINTS (BY PRIORITY)-B=BOTTOM BRIDGE, T=TOP BRIDGE, X=GROUND, W=WATER SUR, E=ENERGY GRADIENT, C=CRITICAL WSEL

ELEV 2403. 2404. 2405. 2406. 2407. 2408. 2409. 2410. 2411. 2412. 2413.

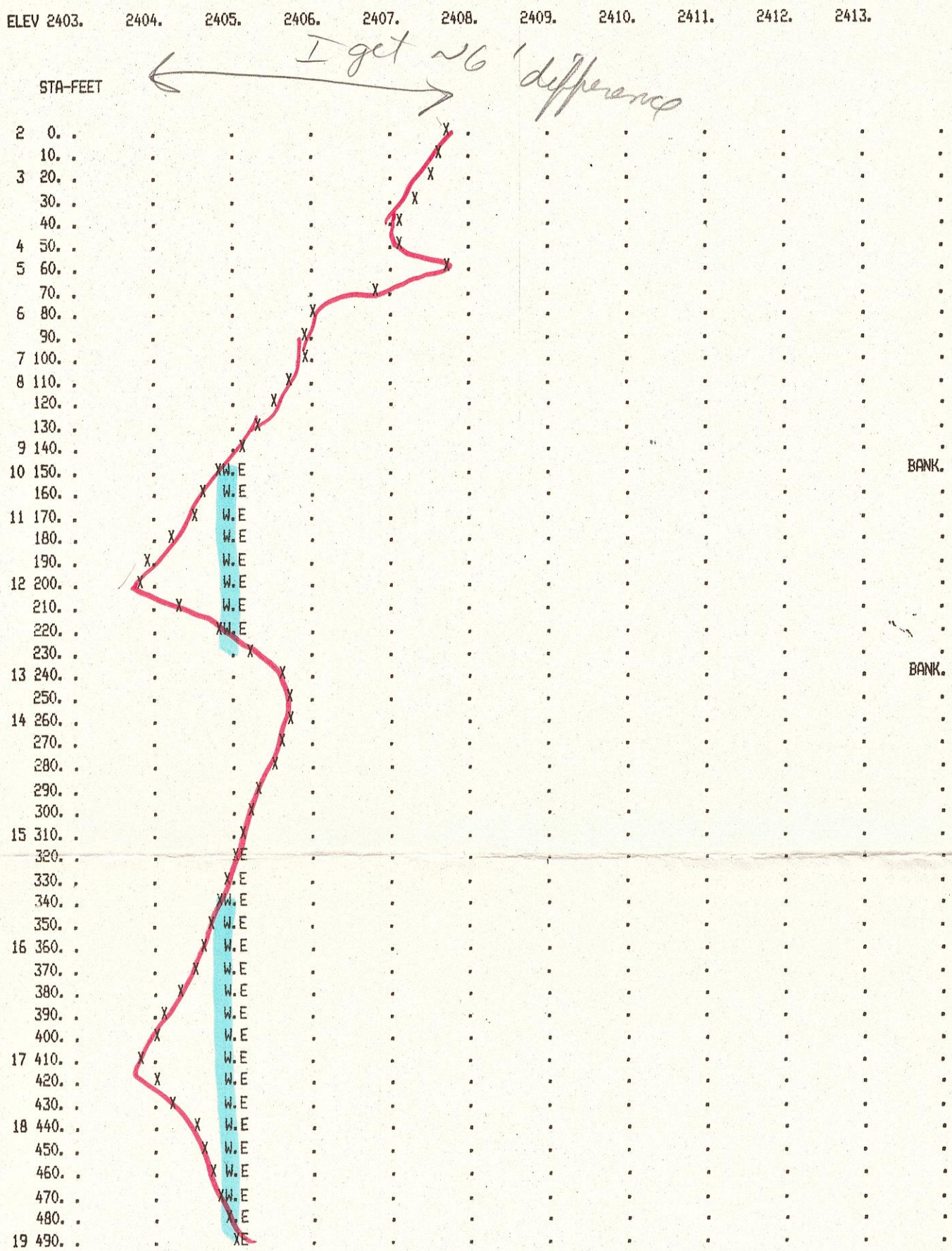
STA-FEET	2403.	2404.	2405.	2406.	2407.	2408.	2409.	2410.	2411.	2412.	2413.
2 0.	.	.	.	.	.	X	.	.	.	.	.
10.	.	.	.	.	.	X	.	.	.	.	.
3 20.	.	.	.	.	.	.	X	.	.	.	.
30.	.	.	.	.	.	X	.	.	.	.	.
4 40.	.	.	.	.	X	.	.	.	.	.	.
50.	.	.	.	.	X	.	.	.	.	.	.
5 60.	.	.	.	.	X	.	.	.	.	.	.
70.	.	.	.	.	X	.	.	.	.	.	.
80.	.	.	.	.	X	.	.	.	.	.	.
6 90.	.	.	.	.	X	.	.	.	.	.	.
7 100.	.	.	.	.	X	.	.	.	.	.	.
110.	.	.	.	.	X	.	.	.	.	.	BANK.
8 120.	.	.	.	.	X	.	.	.	.	.	.
130.	.	.	.	X	.	.	.	.	.	.	.
140.	.	.	X	.	.	.	.	.	.	.	.
150.	.	X	.	.	.	.	.	.	.	.	.
160.	.	XE	.	.	.	.	.	.	.	.	.
170.	.	XW E	.	.	.	.	.	.	.	.	.
10 180.	.	XXXXXXX	.	.	.	.	.	.	.	.	.
190.	.	X E	.	.	.	.	.	.	.	.	.
200.	.	X W E	.	.	.	.	.	.	.	.	.
210.	.	X W E	.	.	.	.	.	.	.	.	.
220.	X	X W E	.	.	.	.	.	.	.	.	.
11 230.	X	X W E	.	.	.	.	.	.	.	.	.
12 240.	.	X	.	.	.	.	.	.	.	.	.
250.	.	X	.	.	.	.	.	.	.	.	.
260.	.	X	.	.	.	.	.	.	.	.	.
270.	.	X	.	.	.	.	.	.	.	.	.
13 280.	.	X	.	.	.	.	.	.	.	.	BANK.
14 290.	.	X	.	.	.	.	.	.	.	.	.
300.	.	X	.	.	.	.	.	.	.	.	.
310.	.	X	.	.	.	.	.	.	.	.	.
320.	.	X	.	.	.	.	.	.	.	.	.
330.	.	XE	.	.	.	.	.	.	.	.	.
15 340.	.	X E	.	.	.	.	.	.	.	.	.
350.	.	X E	.	.	.	.	.	.	.	.	.
360.	.	XW E	.	.	.	.	.	.	.	.	.
370.	.	X W E	.	.	.	.	.	.	.	.	.
380.	X	X W E	.	.	.	.	.	.	.	.	.
16 390.	X	X W E	.	.	.	.	.	.	.	.	.
400.	X	X W E	.	.	.	.	.	.	.	.	.
410.	X	X W E	.	.	.	.	.	.	.	.	.
420.	X	X W E	.	.	.	.	.	.	.	.	.
430.	X	X W E	.	.	.	.	.	.	.	.	.
17 440.	X	X W E	.	.	.	.	.	.	.	.	.
450.	X	X W E	.	.	.	.	.	.	.	.	.
460.	X	X W E	.	.	.	.	.	.	.	.	.
470.	X	X W E	.	.	.	.	.	.	.	.	.
18 480.	X	X W E	.	.	.	.	.	.	.	.	.
490.	X	X W E	.	.	.	.	.	.	.	.	.
500.	X	X W E	.	.	.	.	.	.	.	.	.
510.	X	X W E	.	.	.	.	.	.	.	.	.
520.	X	X W E	.	.	.	.	.	.	.	.	.
19 530.	X	X W E	.	.	.	.	.	.	.	.	.
540.	X	X E	.	.	.	.	.	.	.	.	.
20 550.	.	XE	.	.	.	.	.	.	.	.	.

NRD= 0 ELLC= 9999999.00 ELTRD= 9999999.00

EL(I). STA(I)									
2407.40	.00	2408.18	19.00	2406.74	41.00	2406.91	63.00	2405.48	87.00
2406.00	104.00	2405.85	120.00	2403.96	178.00	2404.60	185.00	2403.29	232.00
2404.60	238.00	2404.90	282.00	2405.00	295.00	2404.43	345.00	2403.76	395.00
2403.80	445.00	2403.76	480.00	2404.14	530.00	2404.50	550.00		

CROSS SECTION 2.00  
 STREAM "D"-EXIST. SUBCRIT  
 DISCHARGE= 402.

PLOTTED POINTS (BY PRIORITY)-B=BOTTOM BRIDGE, T=TOP BRIDGE, X=GROUND, W=WATER SUR, E=ENERGY GRADIENT, C=CRITICAL WSEL



NRD= 0 ELLC= 9999999.00 ELTRD= 9999999.00

EL (I). STA (I)									
2407.70	.00	2407.50	24.00	2407.06	49.00	2407.68	65.00	2406.03	83.00
2405.90	96.00	2405.72	115.00	2405.10	142.00	2404.76	152.00	2404.46	175.00
2403.80	200.00	2405.61	238.00	2405.74	258.00	2405.06	308.00	2404.64	358.00
2403.80	408.00	2404.54	443.00	2404.98	493.00				

CROSS SECTION 1.00  
 STREAM "D"-EXIST.SUBCRIT  
 DISCHARGE= 402.

PLOTTED POINTS (BY PRIORITY)-B=BOTTOM BRIDGE,T=TOP BRIDGE,X=GROUND,W=WATER SUR,E=ENERGY GRADIENT,C=CRITICAL WSEL

ELEV 2404. 2405. 2406. 2407. 2408. 2409. 2410. 2411. 2412. 2413. 2414.

STA-FEET	2404.	2405.	2406.	2407.	2408.	2409.	2410.	2411.	2412.	2413.	2414.
2 0.				X							
5.				X							
10.				X							
15.				X							
20.				X							
25.				X							
30.				X							
35.				X							
40.				X							
3 45.				X							
50.				X							
55.				X							
4 60.				X							
65.				X							
5 70.		XW	E								
75.		XW	E								
80.		XW	E								
85.		XW	E								
90.		XW	E								
6 95.		XW	E								BANK.
100.		XW	E								
105.		XW	E								
110.		XW	E								
115.		XW	E								
7 120.		XW	E								
125.		XW	E								
130.		XW	E								
135.		XW	E								
8 140.		XW	E								
145.		XW	E								
150.		XW	E								
155.		XW	E								
9 160.		XW	E								
165.		XW	E								
170.		XW	E								
10 175.				X							BANK.
180.				X							
185.				X							
190.				X							
195.				X							
200.				X							
205.				X							
210.				X							
215.				X							
220.				X							
11 225.				X							
230.				X							
235.				X							
240.				X							
245.				X							
250.				X							
255.		X	E								
260.		X	E								
265.		XW	E								
270.		XW	E								
12 275.	X	W	E								
280.	X	W	E								
285.	X	W	E								
290.	X	W	E								
295.	X	W	E								
300.	X	W	E								
305.	X	W	E								
310.	X	W	E								
315.	X	W	E								
320.	X	W	E								
13 325.	X	W	E								
330.	X	W	E								
335.	X	W	E								
340.	X	W	E								
345.	X	W	E								
350.	X	W	E								
355.	X	W	E								
14 360.	X	W	E								
365.	X	W	E								
370.	X	W	E								
375.	X	W	E								
380.	X	W	E								
385.	X	W	E								
390.	X	W	E								
395.	X	W	E								
400.	X	W	E								
405.	X	W	E								
15 410.	X	W	E								

NRD= 0 ELLC= 9999999.00 ELTRD= 9999999.00

EL (1). STA (1)	2406.70	.00	2406.22	44.00	2406.60	58.00	2405.22	70.00	2405.18	93.00
	2404.90	118.00	2404.24	140.00	2405.28	158.00	2406.78	175.00	2406.40	225.00
	2404.80	275.00	2404.80	325.00	2404.88	360.00	2404.90	410.00		



THIS RUN EXECUTED 02/26/82 16:06:49

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*****  
HEC2 RELEASE DATED NOV 76 UPDATED MAY 1984  
ERROR CORR - 01,02,03,04,05,06  
MODIFICATION - 50,51,52,53,54,55,56  
IBM-PC-XT VERSION 1.1  
*****
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NOTE- ASTERISK (\*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

"D"-EXIST.SUBCRIT

SUMMARY PRINTOUT

	SECNO	CWSEL	CRWS	EG	TOPWID	10K*S	DEPTH	HV	HL	K*CHSL	ALPHA	Q
*	4.000	2403.79	2403.79	2404.06	177.86	99.13	1.08	.27	.00	.00	1.00	402.00
*	3.000	2404.35	2404.35	2404.56	248.80	111.42	1.06	.22	.48	12.61	1.00	402.00
*	2.000	2404.88	2404.88	2405.11	225.34	90.36	1.08	.23	.40	12.75	1.01	402.00
*	1.000	2405.33	2405.33	2405.55	240.94	108.88	1.09	.23	.35	12.57	1.03	402.00

SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 4.000 PROFILE= 1 CRITICAL DEPTH ASSUMED  
CAUTION SECNO= 3.000 PROFILE= 1 CRITICAL DEPTH ASSUMED  
CAUTION SECNO= 3.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY  
CAUTION SECNO= 2.000 PROFILE= 1 CRITICAL DEPTH ASSUMED  
CAUTION SECNO= 2.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY  
CAUTION SECNO= 1.000 PROFILE= 1 CRITICAL DEPTH ASSUMED  
CAUTION SECNO= 1.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

```

*****
* WATER SURFACE PROFILES *
* VERSION OF NOVEMBER 1976 *
* UPDATED MAY 1984 *
* IBM-PC-XT VERSION *
* RUN DATE 02/26/82 TIME 16:21:02 *
*****

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*****
* U.S. ARMY CORPS OF ENGINEERS *
* THE HYDROLOGIC ENGINEERING CENTER *
* 609 SECOND STREET, SUITE D *
* DAVIS, CALIFORNIA 95616 *
* (916) 440-2105 (FTS) 448-2105 *
*****

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X X XXXXXXXX XXXXX XXXXX
X X X X X X X
X X X X X X
XXXXXXXX XXXX X XXXXX XXXXX
X X X X X X
X X X X X X
X X XXXXXXXX XXXXX XXXXXXXX

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DRAINAGE AREA "C"  
EXISTING - SUPERCRITICAL

THIS RUN EXECUTED 02/26/82 16:21:24

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 HEC2 RELEASE DATED NOV 76 UPDATED MAY 1984  
 ERROR CORR - 01.02.03.04.05.06  
 MODIFICATION - 50.51.52.53.54.55.56  
 IBM-PC-XT VERSION 1.1  
 \*\*\*\*\*

T1 SAN JOAQUIN ESTATES - SUPERCRITICAL  
 T2 100 YEAR EVENT  
 T3 "D"-EXIST.SUPERCRIT

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FG
	0.	2.	0.	1.	.012700	.00	.0	402.	2405.400	.000
J2	NPROF	IPL0T	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	-1.000	1.000	.000	.000	.000	.000	.000	.000	.000	.000
J3	VARIABLE CODES FOR SUMMARY PRINTOUT									
	38.000	1.000	2.000	3.000	4.000	5.000	8.000	10.000	11.000	33.000

	57.000	43.000	.000	.000	.000	.000	.000	.000	.000	.000
--	--------	--------	------	------	------	------	------	------	------	------

NE	.025	.025	.025	.000	.000	.000	.000	.000	.000	.000	.000
GT	1.000	402.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
X1	1.000	14.000	93.000	175.000	35.000	35.000	35.000	.000	.000	.000	.000
GR	2406.700	.000	2406.220	44.000	2406.600	58.000	2405.220	70.000	2405.180	93.000	.000
GR	2404.900	118.000	2404.240	140.000	2405.280	158.000	2406.780	175.000	2406.400	225.000	.000
GR	2404.800	275.000	2404.800	325.000	2404.880	360.000	2404.900	410.000	.000	.000	.000
X1	2.000	18.000	152.000	238.000	40.000	40.000	40.000	.000	.000	.000	.000
GR	2407.700	.000	2407.500	24.000	2407.060	45.000	2407.680	65.000	2406.030	83.000	.000
GR	2405.900	96.000	2405.720	115.000	2405.100	142.000	2404.760	152.000	2404.460	175.000	.000
GR	2403.800	200.000	2405.610	238.000	2405.740	258.000	2405.060	308.000	2404.640	358.000	.000
GR	2403.800	408.000	2404.540	443.000	2404.980	493.000	.000	.000	.000	.000	.000
X1	3.000	19.000	120.000	295.000	46.000	46.000	46.000	.000	.000	.000	.000
GR	2407.400	.000	2408.180	19.000	2406.740	41.000	2406.910	63.000	2406.480	87.000	.000
GR	2406.000	104.000	2405.850	120.000	2403.960	178.000	2404.600	185.000	2403.290	232.000	.000
GR	2404.600	238.000	2404.900	282.000	2405.000	295.000	2404.430	345.000	2403.760	395.000	.000
GR	2403.800	445.000	2403.760	480.000	2404.140	530.000	2404.500	550.000	.000	.000	.000
X1	4.000	14.000	119.000	234.000	.000	.000	.000	.000	.000	.000	.000
GR	2406.100	.000	2406.930	10.000	2406.210	60.000	2405.520	83.000	2404.840	119.000	.000
GR	2404.200	177.000	2402.710	183.000	2404.340	224.000	2404.400	234.000	2404.620	284.000	.000
GR	2404.100	334.000	2402.760	384.000	2403.400	459.000	2404.100	519.000	.000	.000	.000
EJ	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

\*PRDF 1

SECNO	DEPTH	CWSEL	CRWS	WSELK	EG	HV	HL	QLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	YNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

\*SECNO 1.000

3265 DIVIDED FLOW

3280 CROSS SECTION 1.00 EXTENDED .41 FEET

1.00	1.07	2405.31	2405.34	2405.40	2405.56	.25	.00	.00	2405.18
402.	4.	138.	261.	2.	33.	66.	0.	0.	2406.78
.00	1.48	4.21	3.93	.025	.025	.025	.000	2404.24	69.25
.012677	0.	0.	0.	0	10	4	.00	239.84	410.00

\*SECNO 2.000

3265 DIVIDED FLOW

2.00	1.01	2404.61	2404.68	.00	2405.11	.30	.45	.00	2404.76
402.	0.	134.	268.	0.	33.	59.	0.	0.	2405.61
.00	.07	4.09	4.54	.025	.025	.025	.000	2403.80	150.28
.012791	35.	35.	35.	2	5	0	.00	208.96	474.63

\*SECNO 3.000

3265 DIVIDED FLOW

3.00	1.02	2404.31	2404.34	.00	2404.57	.26	.54	.00	2405.85
402.	0.	94.	308.	0.	23.	75.	0.	0.	2405.00
.00	.00	4.01	4.12	.025	.025	.025	.000	2403.29	167.33
.014414	40.	40.	40.	2	8	0	.00	240.82	539.32

\*SECNO 4.000

3265 DIVIDED FLOW

3685 20 TRIALS ATTEMPTED WSEL.CWSEL  
 3693 PROBABLE MINIMUM SPECIFIC ENERGY  
 3720 CRITICAL DEPTH ASSUMED

4.00	1.07	2403.78	2403.78	.00	2404.06	.28	.55	.34	2404.84
402.	0.	65.	336.	0.	17.	78.	0.	1.	2404.40
.01	.00	3.94	4.28	.025	.025	.025	.000	2402.71	178.68
.010136	46.	46.	46.	20	8	0	.00	177.19	491.76

THIS RUN EXECUTED 02/26/82 16:28:37

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*****
HEC2 RELEASE DATED NOV 76 UPDATED MAY 1984
ERROR CORR - 01.02.03.04.05.06
MODIFICATION - 50.51.52.53.54.55.56
IBM-PC-YT VERSION 1.1
*****

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NOTE- ASTERISK (\*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

"D"-EXIST, SUPERCRIT

SUMMARY PRINTOUT

SECD	DWSEL	CRIWS	EG	TOPWID	10X*5	DEPTH	HV	HL	K*CHSL	ALPHA	Q
1.000	2405.31	2405.34	2405.56	239.84	126.77	1.07	.25	.00	.00	1.03	402.00
2.000	2404.81	2404.88	2405.11	208.96	127.91	1.01	.30	.45	-12.57	1.01	402.00
3.000	2404.31	2404.34	2404.57	240.82	144.14	1.02	.26	.54	-12.75	1.00	402.00
* 4.000	2403.78	2403.78	2404.06	177.19	101.36	1.07	.28	.55	-12.61	1.00	402.00

SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 4.000 PROFILE= 1 CRITICAL DEPTH ASSUMED  
CAUTION SECNO= 4.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY  
CAUTION SECNO= 4.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

\*\*\*\*\*  
 \* WATER SURFACE PROFILES \*  
 \* VERSION OF NOVEMBER 1976 \*  
 \* UPDATED MAY 1984 \*  
 \* IBM-PC-XT VERSION \*  
 \* RUN DATE 02/28/82 TIME 09:36:13 \*  
 \*\*\*\*\*

\*\*\*\*\*  
 \* U.S. ARMY CORPS OF ENGINEERS \*  
 \* THE HYDROLOGIC ENGINEERING CENTER \*  
 \* 609 SECOND STREET, SUITE D \*  
 \* DAVIS, CALIFORNIA 95616 \*  
 \* (916) 440-2105 (FTS) 448-2105 \*  
 \*\*\*\*\*

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X   X  XXXXXXXX  XXXXX          XXXXX
X   X  X          X   X          X   X
X   X  X          X              X
XXXXXXXX  XXXX   X              XXXXX  XXXXX
X   X  X          X              X
X   X  X          X   X          X
X   X  XXXXXXXX  XXXXX          XXXXXXXX
  
```

DRAINAGEWAY "D"  
 POST-DEVELOPMENT - SUBCRITICAL



\*\*\*\*\*  
 HEC2 RELEASE DATED NOV 76 UPDATED MAY 1984  
 ERROR CORR - 01.02.03.04.05.06  
 MODIFICATION - 50.51.52.53.54.55.56  
 IBM-PC-XT VERSION 1.1  
 \*\*\*\*\*

T1 SAN JOAQUIN ESTATES - SUBCRITICAL  
 T2 100 YEAR EVENT  
 T3 "D" (POST-DEV) SUBCRIT

J1	ICHECK	ING	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0.	2.	0.	0.	.012700	.00	.0	402.	2403.500	.000
J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	-1.000	1.000	.000	.000	.000	.000	.000	.000	.000	.000

J3 VARIABLE CODES FOR SUMMARY PRINTOUT

38.000	1.000	2.000	3.000	4.000	5.000	8.000	10.000	11.000	33.000
57.000	43.000	.000	.000	.000	.000	.000	.000	.000	.000

QT	1.000	402.000	.000	.000	.000	.000	.000	.000	.000	.000
NC	.016	.016	.016	.600	.000	.000	.000	.000	.000	.000
X1	5.000	4.000	.000	27.000	.000	.000	.000	.000	.000	.000
GR	2402.000	.000	2399.550	2.500	2399.550	24.500	2402.050	27.000	.000	.000
NC	.025	.025	.025	.600	.000	.000	.000	.000	.000	.000
X1	4.000	10.000	177.000	352.000	215.000	120.000	150.000	.000	.000	.000
GR	2406.100	.000	2406.930	10.000	2406.210	60.000	2405.520	83.000	2404.840	119.000
GR	2402.700	177.000	2403.210	234.000	2401.790	292.000	2399.700	340.000	2403.700	352.000
X1	3.000	15.000	185.000	415.000	46.000	46.000	46.000	.000	.000	.000
GR	2407.400	.000	2408.180	19.000	2406.740	41.000	2406.910	63.000	2406.480	87.000
GR	2406.000	104.000	2405.850	120.000	2403.960	178.000	2404.600	185.000	2403.290	232.000
GR	2404.600	238.000	2404.900	282.000	2404.290	307.000	2402.350	352.000	2399.940	404.500
GR	2403.400	415.000	.000	.000	.000	.000	.000	.000	.000	.000
X1	2.000	17.000	329.000	432.000	40.000	40.000	40.000	.000	.000	.000
GR	2407.700	.000	2407.500	24.000	2407.060	49.000	2407.680	65.000	2406.030	83.000
GR	2405.900	96.000	2405.720	115.000	2405.100	142.000	2404.760	152.000	2404.460	175.000
GR	2403.800	200.000	2405.610	238.000	2405.740	258.000	2404.400	329.000	2403.120	363.000
GR	2400.300	421.500	2403.780	432.000	.000	.000	.000	.000	.000	.000

*OK for quite channel*

*why changed:*

NC	.025	.025	.025	.000	.000	.000	.000	.000	.000	.000
X1	1.000	14.000	93.000	175.000	35.000	160.000	35.000	.000	.000	.000
GR	2406.700	.000	2406.220	44.000	2406.600	58.000	2405.220	70.000	2405.180	93.000
GR	2404.900	118.000	2404.240	140.000	2405.280	158.000	2406.780	175.000	2406.400	225.000
GR	2404.800	275.000	2404.800	325.000	2404.880	360.000	2404.900	410.000	.000	.000
EJ	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

\*PROF 1

SECNO	DEPTH	CWSEL	CRIMS	WSELK	EG	HV	HL	GLDSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CDRAR	TOPWID	ENDST

CCHV= .600 CEHV= .000

\*SECNO 5.000

3720 CRITICAL DEPTH ASSUMED

5.00	2.10	2401.65	2401.65	2403.50	2402.63	.98	.00	.00	2402.00
402.	0.	402.	0.	0.	51.	0.	0.	0.	2402.05
.00	.00	7.93	.00	.016	.016	.016	.000	2399.55	.36
.003298	0.	0.	0.	0	11	0	.00	26.25	26.60

CCHV= .600 CEHV= .000

\*SECNO 4.000

3301 HV CHANGED MORE THAN HVINS

4.00	3.63	2403.33	.00	.00	2403.39	.05	.21	.55	2402.70
402.	4.	398.	0.	5.	214.	0.	0.	0.	2403.70
.02	.75	1.86	.00	.025	.025	.025	.000	2399.70	159.79
.000743	215.	150.	120.	4	0	0	.00	191.11	350.91

\*SECNO 3.000

3265 DIVIDED FLOW

3.00	3.36	2403.30	.00	.00	2403.43	.13	.04	.00	2404.60
402.	0.	402.	0.	0.	141.	0.	1.	1.	2403.40
.03	.00	2.85	.00	.025	.025	.025	.000	2399.94	231.50
.001188	46.	46.	46.	2	0	0	.00	85.40	414.71

\*SECNO 2.000

2.00	2.97	2403.27	.00	.00	2403.50	.23	.07	.00	2404.40
402.	0.	402.	0.	0.	105.	0.	1.	1.	2403.78
.03	.00	3.84	.00	.025	.025	.025	.000	2400.30	359.04
.002523	40.	40.	40.	2	0	0	.00	71.41	430.46

\*SECNO 1.000

3265 DIVIDED FLOW

SECND	DEPTH	CWSEL	CRWS	WSELK	EG	HV	HL	QLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VRDB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3280 CROSS SECTION 1.00 EXTENDED .43 FEET

3685 20 TRIALS ATTEMPTED WSEL.CWSEL  
 3693 PROBABLE MINIMUM SPECIFIC ENERGY  
 3720 CRITICAL DEPTH ASSUMED

1.00	1.09	2405.33	2405.33	.00	2405.55	.22	.35	.00	2405.18
402.	5.	136.	261.	3.	34.	70.	1.	1.	2406.78
.04	1.55	3.99	3.73	.025	.025	.025	.000	2404.24	69.05
.010706	35.	35.	160.	20	19	0	.00	241.06	410.00

CROSS SECTION 5.00  
 STREAM "D" (POST-DEV) SUBCRIT  
 DISCHARGE= 402.

PLOTTED POINTS (BY PRIORITY)-B=BOTTOM BRIDGE, T=TOP BRIDGE, X=GROUND, W=WATER SUR, E=ENERGY GRADIENT, C=CRITICAL WSEL

ELEV	2399.	2400.	2401.	2402.	2403.	2404.	2405.	2406.	2407.	2408.	2409.
STA-FEET											
2	0.	.	.	X	E	.	.	.	.	.	BANK.
	1.	.	.	X W	E	.	.	.	.	.	.
	1.	.	X	W	E	.	.	.	.	.	.
	2.	.	.	W	E	.	.	.	.	.	.
	2.	X	.	W	E	.	.	.	.	.	.
3	3.	X	.	W	E	.	.	.	.	.	.
	3.	X	.	W	E	.	.	.	.	.	.
	4.	X	.	W	E	.	.	.	.	.	.
	4.	X	.	W	E	.	.	.	.	.	.
	5.	X	.	W	E	.	.	.	.	.	.
	5.	X	.	W	E	.	.	.	.	.	.
	6.	X	.	W	E	.	.	.	.	.	.
	6.	X	.	W	E	.	.	.	.	.	.
	7.	X	.	W	E	.	.	.	.	.	.
	7.	X	.	W	E	.	.	.	.	.	.
	8.	X	.	W	E	.	.	.	.	.	.
	8.	X	.	W	E	.	.	.	.	.	.
	9.	X	.	W	E	.	.	.	.	.	.
	9.	X	.	W	E	.	.	.	.	.	.
	10.	X	.	W	E	.	.	.	.	.	.
	10.	X	.	W	E	.	.	.	.	.	.
	11.	X	.	W	E	.	.	.	.	.	.
	11.	X	.	W	E	.	.	.	.	.	.
	12.	X	.	W	E	.	.	.	.	.	.
	12.	X	.	W	E	.	.	.	.	.	.
	13.	X	.	W	E	.	.	.	.	.	.
	13.	X	.	W	E	.	.	.	.	.	.
	14.	X	.	W	E	.	.	.	.	.	.
	14.	X	.	W	E	.	.	.	.	.	.
	15.	X	.	W	E	.	.	.	.	.	.
	15.	X	.	W	E	.	.	.	.	.	.
	16.	X	.	W	E	.	.	.	.	.	.
	16.	X	.	W	E	.	.	.	.	.	.
	17.	X	.	W	E	.	.	.	.	.	.
	17.	X	.	W	E	.	.	.	.	.	.
	18.	X	.	W	E	.	.	.	.	.	.
	18.	X	.	W	E	.	.	.	.	.	.
	19.	X	.	W	E	.	.	.	.	.	.
	19.	X	.	W	E	.	.	.	.	.	.
	20.	X	.	W	E	.	.	.	.	.	.
	20.	X	.	W	E	.	.	.	.	.	.
	21.	X	.	W	E	.	.	.	.	.	.
	21.	X	.	W	E	.	.	.	.	.	.
	22.	X	.	W	E	.	.	.	.	.	.
	22.	X	.	W	E	.	.	.	.	.	.
	23.	X	.	W	E	.	.	.	.	.	.
	23.	X	.	W	E	.	.	.	.	.	.
	24.	X	.	W	E	.	.	.	.	.	.
	24.	X	.	W	E	.	.	.	.	.	.
4	25.	X	.	W	E	.	.	.	.	.	.
	25.	.	X	W	E	.	.	.	.	.	.
	26.	.	X	W	E	.	.	.	.	.	.
	26.	.	.	X W	E	.	.	.	.	.	.
	27.	.	.	X W	E	.	.	.	.	.	.
5	27.	.	.	.	X	E	.	.	.	.	BANK.

NRD= 0 ELLD= 9999999.00 ELTRD= 9999999.00

EL (I), STA (I)  
 2402.00 .00 2399.55 2.50 2399.55 24.50 2402.05 27.00

CROSS SECTION 4.00  
 STREAM "D" (POST-DEV) SUBCRIT  
 DISCHARGE= 402.

PLOTTED POINTS (BY PRIORITY)-B=BOTTOM BRIDGE, T=TOP BRIDGE, X=GROUND, W=WATER SUR, E=ENERGY GRADIENT, C=CRITICAL WSEL

ELEV	2399.	2400.	2401.	2402.	2403.	2404.	2405.	2406.	2407.	2408.	2409.
STA- FEET											
2 0.	.	.	.	.	.	.	.	X	.	.	.
3 10.	.	.	.	.	.	.	.	.	X	.	.
20.	.	.	.	.	.	.	.	.	X	.	.
30.	.	.	.	.	.	.	.	.	X	.	.
40.	.	.	.	.	.	.	.	.	X	.	.
50.	.	.	.	.	.	.	.	.	X	.	.
4 60.	.	.	.	.	.	.	.	.	X	.	.
70.	.	.	.	.	.	.	.	.	X	.	.
5 80.	.	.	.	.	.	.	.	.	X	.	.
90.	.	.	.	.	.	.	.	.	X	.	.
100.	.	.	.	.	.	.	.	.	X	.	.
110.	.	.	.	.	.	.	.	.	X	.	.
6 120.	.	.	.	.	.	.	.	.	X	.	.
130.	.	.	.	.	.	.	.	.	X	.	.
140.	.	.	.	.	.	.	.	.	X	.	.
150.	.	.	.	.	.	.	.	.	X	.	.
160.	.	.	.	.	.	.	.	.	X	.	.
170.	.	.	.	.	.	.	.	.	X	.	.
7 180.	.	.	.	.	X	WE	.	.	.	.	BANK.
190.	.	.	.	.	X	WE	.	.	.	.	BANK.
200.	.	.	.	.	X	WE	.	.	.	.	BANK.
210.	.	.	.	.	X	WE	.	.	.	.	BANK.
220.	.	.	.	.	X	WE	.	.	.	.	BANK.
8 230.	.	.	.	.	X	WE	.	.	.	.	BANK.
240.	.	.	.	.	X	WE	.	.	.	.	BANK.
250.	.	.	.	.	X	WE	.	.	.	.	BANK.
260.	.	.	.	.	X	WE	.	.	.	.	BANK.
270.	.	.	.	.	X	WE	.	.	.	.	BANK.
280.	.	.	.	.	X	WE	.	.	.	.	BANK.
9 290.	.	.	.	.	X	WE	.	.	.	.	BANK.
300.	.	.	.	.	X	WE	.	.	.	.	BANK.
310.	.	.	X	.	.	WE	.	.	.	.	BANK.
320.	.	.	X	.	.	WE	.	.	.	.	BANK.
330.	.	X	.	.	.	WE	.	.	.	.	BANK.
10 340.	X	.	.	.	.	WE	.	.	.	.	BANK.
11 350.	.	.	.	.	.	X	.	.	.	.	BANK.

NRD= 0 ELLC= 9999999.00 ELTRD= 9999999.00

EL (I), STA (I)										
2406.10	.00	2406.93	10.00	2406.21	60.00	2405.52	83.00	2404.84	119.00	
2402.70	177.00	2403.21	234.00	2401.79	292.00	2399.70	340.00	2403.70	352.00	







CROSS SECTION 1.00  
 STREAM "D" (POST-DEV) SUBCRIT  
 DISCHARGE= 402.

PLOTTED POINTS (BY PRIORITY)-B=BOTTOM BRIDGE, T=TOP BRIDGE, X=GROUND, W=WATER SUR, E=ENERGY GRADIENT, C=CRITICAL WSEL

ELEV	2404.	2405.	2406.	2407.	2408.	2409.	2410.	2411.	2412.	2413.	2414.
STA- FEET											
2 0.				X							
5.				X							
10.				X							
15.				X							
20.				X							
25.				X							
30.				X							
35.				X							
40.				X							
3 45.				X							
50.				X							
55.				X							
4 60.				X							
65.				X							
5 70.		XW	E								
75.		XW	E								
80.		XW	E								
85.		XW	E								
90.		XW	E								
6 95.		XW	E								BANK.
100.		XW	E								
105.		XW	E								
110.		XW	E								
115.		XW	E								
7 120.		XW	E								
125.		XW	E								
130.		XW	E								
135.		XW	E								
8 140.		XW	E								
145.		XW	E								
150.		XW	E								
155.		XW	E								
9 160.		XW	E								
165.		XW	E								
170.		XW	E								
10 175.				X							BANK.
180.				X							
185.				X							
190.				X							
195.				X							
200.				X							
205.				X							
210.				X							
215.				X							
220.				X							
11 225.				X							
230.				X							
235.				X							
240.				X							
245.				X							
250.				X							
255.		X	E								
260.		X	E								
265.		XW	E								
270.		XW	E								
12 275.		XW	E								
280.		XW	E								
285.		XW	E								
290.		XW	E								
295.		XW	E								
300.		XW	E								
305.		XW	E								
310.		XW	E								
315.		XW	E								
320.		XW	E								
13 325.		XW	E								
330.		XW	E								
335.		XW	E								
340.		XW	E								
345.		XW	E								
350.		XW	E								
355.		XW	E								
14 360.		XW	E								
365.		XW	E								
370.		XW	E								
375.		XW	E								
380.		XW	E								
385.		XW	E								
390.		XW	E								
395.		XW	E								
400.		XW	E								
405.		XW	E								
15 410.		XW	E								

NRD= 0 ELLC= 9999999.00 ELTRD= 9999999.00

EL (I), STA (I)									
2406.70	.00	2406.22	44.00	2406.60	58.00	2405.22	70.00	2405.18	93.00
2404.90	118.00	2404.24	140.00	2405.28	158.00	2406.78	175.00	2406.40	225.00
2404.80	275.00	2404.80	325.00	2404.88	360.00	2404.90	410.00		

PROFILE FOR STREAM "D" (POST-DEV) SUBCRIT

PLOTTED POINTS (BY PRIORITY)-E-ENERGY, W-WATER SURFACE, I-INVERT, C-CRITICAL W.S., L-LEFT BANK, R-RIGHT BANK, M-LOWER END STA

ELEVATION	2399.	2400.	2401.	2402.	2403.	2404.	2405.	2406.	2407.	2408.	
SECNO	CUMDIS										
5.00	0.	I	.	.	W	LR	E	.	.	.	
	10.	C	I	.	W	LMR	E	.	.	.	
	20.	C	I	.	W	LMR	E	.	.	.	
	30.	C	I	.	W	LMR	E	.	.	.	
	40.	C	I	.	W	LR	E	.	.	.	
	50.	C	I	.	W	R	E	.	.	.	
	60.	C	I	.	W	R	E	.	.	.	
	70.	C	I	.	L	W	R	E	.	.	
	80.	C	I	.	L	W	R	E	.	.	
	90.	C	I	.	L	W	R	E	.	.	
	100.	C	I	.	L	W	E	.	.	.	
	110.	C	I	.	L	W	E	R	.	.	
	120.	C	I	.	L	W	E	R	.	.	
	130.	C	I	.	L	W	E	R	.	.	
	140.	C	I	.	L	W	E	R	.	.	
4.00	150.	C	I	.	L	W	E	R	.	.	
	160.	C	I	.	L	W	E	R	.	.	
	170.	C	I	.	W	E	L	R	.	.	
	180.	C	I	.	W	E	R	L	.	.	
	190.	C	I	.	W	E	L	.	.	.	
3.00	200.	C	I	.	W	E	L	.	.	.	
	210.	C	I	.	W	E	R	L	.	.	
	220.	C	I	.	W	E	R	L	.	.	
	230.	C	I	.	W	E	R	L	.	.	
2.00	240.	C	I	.	W	E	R	L	.	.	
	250.	C	.	I	W	E	L	.	.	.	
	260.	C	.	.	I	W	E	L	R	.	
	270.	C	.	.	I	M	W	L	E	R	
1.00	280.	.	.	.	.	I	M	W	L	E	R

THIS RUN EXECUTED 02/28/82 09:45:06

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*****
HEC2 RELEASE DATED NOV 76 UPDATED MAY 1984
ERROR CORR - 01,02,03,04,05,06
MODIFICATION - 50,51,52,53,54,55,56
IBM-PC-XT VERSION 1.1
*****

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NOTE- ASTERISK (\*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

"D" (POST-DEV) SUBCRIT

SUMMARY PRINTOUT

	SECNO	CWSEL	CRWS	EG	TOPWID	10K*6	DEPTH	HV	HL	K*CHSL	ALPHA	Q
*	5.000	2401.65	2401.65	2402.63	26.25	32.98	2.10	.98	.00	.00	1.00	402.00
	4.000	2403.33	.00	2403.33	191.11	7.43	3.63	.05	.21	1.00	1.02	402.00
	3.000	2403.30	.00	2403.43	85.40	11.88	3.36	.13	.04	5.22	1.00	402.00
	2.000	2403.27	.00	2403.50	71.41	25.23	2.97	.23	.07	9.00	1.00	402.00
*	1.000	2405.33	2405.33	2405.55	241.06	107.06	1.09	.22	.35	112.57	1.03	402.00

SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECND= 5.000 PROFILE= 1 CRITICAL DEPTH ASSUMED

CAUTION SECND= 1.000 PROFILE= 1 CRITICAL DEPTH ASSUMED

CAUTION SECND= 1.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY

CAUTION SECND= 1.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

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*****
* WATER SURFACE PROFILES *
* VERSION OF NOVEMBER 1976 *
* UPDATED MAY 1984 *
* IBM-PC-XT VERSION *
* RUN DATE 03/01/82 TIME 02:02:01 *
*****

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*****
* U.S. ARMY CORPS OF ENGINEERS *
* THE HYDROLOGIC ENGINEERING CENTER **
* 609 SECOND STREET, SUITE D **
* DAVIS, CALIFORNIA 95616 **
* (916) 440-2105 (FTS) 448-2105 **
*****

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X X XXXXXXXX XXXXX XXXXX
X X X X X X X X
X X X X X X X
XXXXXXXX XXXX X XXXXX XXXXX
X X X X X X
X X X X X X
X X XXXXXXXX XXXXX XXXXXXXX

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DRAINAGEWAY "D"  
 POST-DEVELOPMENT - SUPERCRITICAL

THIS RUN EXECUTED 03/01/82 02:02:25

\*\*\*\*\*  
 HEC2 RELEASE DATED NOV 76 UPDATED MAY 1984  
 ERROR CORR - 01.02.03.04.05.06  
 MODIFICATION - 50.51.52.53.54.55.56  
 IBM-PC-XT VERSION 1.1  
 \*\*\*\*\*

T1 SAN JOAQUIN ESTATES - SUPERCRITICAL  
 T2 100 YEAR EVENT  
 T3 "D" (POST-DEV) SUPERCRIT

J1	ICHECK	IND	NINV	IDIR	STRT	METRIC	HVING	Q	WSEL	FD
	0.	2.	0.	1.	.012700	.00	.0	402.	2405.300	.000

J2	NPROF	IPLDT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	-1.000	1.000	.000	.000	.000	.000	.000	.000	.000	.000

J3 VARIABLE CODES FOR SUMMARY PRINTOUT

	38.000	1.000	2.000	3.000	4.000	5.000	8.000	10.000	11.000	33.000
	57.000	43.000	.000	.000	.000	.000	.000	.000	.000	.000

GT	1.000	402.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
NC	.025	.025	.025	.000	.000	.000	.000	.000	.000	.000	.000
X1	1.000	14.000	93.000	175.000	35.000	160.000	35.000	.000	.000	.000	.000
GR	2406.700	.000	2406.220	44.000	2406.600	58.000	2405.220	70.000	2405.180	93.000	.000
GR	2404.900	118.000	2404.240	140.000	2405.280	158.000	2406.780	175.000	2405.400	225.000	.000
GR	2404.800	275.000	2404.800	325.000	2404.880	360.000	2404.900	410.000	.000	.000	.000
NC	.025	.025	.025	.600	.000	.000	.000	.000	.000	.000	.000
X1	2.000	17.000	152.000	238.000	40.000	40.000	40.000	.000	.000	.000	.000
GR	2407.700	.000	2407.500	24.000	2407.060	49.000	2407.680	65.000	2406.030	83.000	.000
GR	2405.900	96.000	2405.720	115.000	2405.100	142.000	2404.760	152.000	2404.460	175.000	.000
GR	2403.800	200.000	2405.610	238.000	2405.740	258.000	2404.400	329.000	2403.120	353.000	.000
GR	2400.300	421.500	2403.760	432.000	.000	.000	.000	.000	.000	.000	.000
X1	3.000	16.000	120.000	282.000	46.000	46.000	46.000	.000	.000	.000	.000
GR	2407.400	.000	2408.180	19.000	2406.740	41.000	2406.910	63.000	2406.480	87.000	.000
GR	2406.000	104.000	2405.850	120.000	2403.960	178.000	2404.600	185.000	2403.290	232.000	.000
GR	2404.600	238.000	2404.900	282.000	2404.290	307.000	2402.350	352.000	2399.940	404.500	.000
GR	2403.400	415.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
X1	4.000	13.000	119.000	234.000	215.000	120.000	150.000	.000	.000	.000	.000
GR	2406.100	.000	2406.930	10.000	2406.210	60.000	2405.520	83.000	2404.840	119.000	.000
GR	2404.200	177.000	2402.710	183.000	2404.340	224.000	2404.400	234.000	2401.790	292.000	.000
GR	2400.700	322.000	2399.710	340.000	2403.710	352.000	.000	.000	.000	.000	.000



SECNO	DEPTH	DWSEL	CRWS	WSELX	EG	HV	HL	QLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	YNL	YNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CDRAR	TOPWID	ENDST

\*PRDF 1

\*SECNO 1.000

3265 DIVIDED FLOW

3280 CROSS SECTION 1.00 EXTENDED .40 FEET

1.00	1.06	2405.30	2405.32	2405.30	2405.56	.25	.00	.00	2405.18
402.	4.	138.	261.	2.	32.	66.	0.	0.	2406.78
.00	1.47	4.24	3.95	.025	.025	.025	.000	2404.24	69.28
.012905	0.	0.	0.	0	8	4	.00	239.71	410.00

DCHV= .600 DCHV= .000

\*SECNO 2.000

3301 HV CHANGED MORE THAN HVINS

2.00	2.13	2402.43	2402.65	.00	2403.30	.86	1.89	.37	2404.76
402.	0.	0.	402.	0.	0.	54.	0.	0.	2405.61
.01	.00	.00	7.46	.025	.025	.025	.000	2400.30	377.32
.014626	35.	35.	160.	4	17	0	.00	50.61	427.93

\*SECNO 3.000

3.00	2.28	2402.22	2402.23	.00	2402.83	.61	.47	.00	2405.85
402.	0.	0.	402.	0.	0.	64.	0.	0.	2404.90
.01	.00	.00	6.28	.025	.025	.025	.000	2399.94	355.02
.009498	40.	40.	40.	0	8	0	.00	56.38	411.39

\*SECNO 4.000

3685 20 TRIALS ATTEMPTED WSEL,DWSEL  
 3693 PROBABLE MINIMUM SPECIFIC ENERGY  
 3720 CRITICAL DEPTH ASSUMED

4.00	2.34	2402.05	2402.05	.00	2402.62	.57	.38	.11	2404.84
402.	0.	0.	402.	0.	0.	67.	0.	1.	2404.40
.01	.00	.00	6.04	.025	.025	.025	.000	2399.71	286.15
.007123	46.	46.	46.	20	8	0	.00	60.88	347.03



SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	GLOSS	BANK ELEV
Q	QLOB	QCH	GROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VRGB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CDRAR	TOPWID	ENDST

CCHV= .600 CEHV= .000

#SECNO 5.000

3685 20 TRIALS ATTEMPTED WSEL.CWSEL

3693 PROBABLE MINIMUM SPECIFIC ENERGY

3720 CRITICAL DEPTH ASSUMED

5.00	2.10	2401.65	2401.65	.00	2402.63	.98	.63	.93	2402.00
402.	0.	402.	0.	0.	51.	0.	1.	1.	2402.05
.01	.00	7.94	.00	.015	.016	.016	.000	2399.55	.36
.003313	215.	150.	120.	20	11	0	.00	26.24	26.60

PROFILE FOR STREAM "D" (POST-DEV) SUPERCRIT

PLOTTED POINTS (BY PRIORITY)-E-ENERGY, W-WATER SURFACE, I-INVERT, C-CRITICAL W.S., L-LEFT BANK, R-RIGHT BANK, M-LOWER END STA

ELEVATION	2399.	2400.	2401.	2402.	2403.	2404.	2405.	2406.	2407.	2408.			
SECNO	CUMDIS												
1.00	0.	.	.	.	.	.	I	M.	LW	E	.	R	.
	10.	.	.	.	.	.I	.	WC	E.	L	.	R	.
	20.	.	.	.	I	.	WC	E	.	L	.	R	.
	30.	.	.	I.	.	WC	E	M.	.	L	.	R	.
2.00	40.	.	I	.	.	WC	E	M.	.	L	.	R	.
	50.	.	I	.	.	WC	E	M.	.	L	.	R	.
	60.	.	I	.	.	WC	E	M.	.	L	.	R	.
	70.	.	I	.	.	WC	E	M.	.	L	.	R	.
3.00	80.	.	I.	.	W	E	M.	.	R.	L	.	.	.
	90.	.	I.	.	W	E	M.	.	R.	L	.	.	.
	100.	.	I.	.	WC	E	M.	.	R.	L	.	.	.
	110.	.	I.	.	WC	E	M.	.	R.	L	.	.	.
4.00	120.	.	I.	.	WC	E	M.	.	R.	L	.	.	.
	130.	.	I.	.	WC	E	M.	.	R.	L	.	.	.
	140.	.	I.	.	WC	E	M.	.	R.	L	.	.	.
	150.	.	I.	.	WC	E	M.	.	R.	L	.	.	.
	160.	.	I.	.	WC	E	M.	.	R.	L	.	.	.
	170.	.	I.	.	WC	E	M.	.	R.	L	.	.	.
	180.	.	I.	.	WC	E	M.	.	R.	L	.	.	.
	190.	.	I.	.	WC	E	M.	.	R.	L	.	.	.
	200.	.	I.	.	WC	E	M.	.	R.	L	.	.	.
	210.	.	I.	.	WC	E	M.	.	R.	L	.	.	.
	220.	.	I.	.	WC	E	M.	.	R.	L	.	.	.
	230.	.	I.	.	WC	E	M.	.	R.	L	.	.	.
	240.	.	I.	.	WC	E	M.	.	R.	L	.	.	.
	250.	.	I.	.	WC	E	M.	.	R.	L	.	.	.
	260.	.	I.	.	WC	E	M.	.	R.	L	.	.	.
	270.	.	I.	.	WC	E	M.	.	R.	L	.	.	.
5.00	280.	.	I.	.	WC	E	M.	.	R.	L	.	.	.

THIS RUN EXECUTED 03/01/82 02:10:55

\*\*\*\*\*  
 HEC2 RELEASE DATED NOV 76 UPDATED MAY 1984  
 ERROR CORR - 01.02.03.04.05.06  
 MODIFICATION - 50.51.52.53.54.55.56  
 IBM-PC-XT VERSION 1.1  
 \*\*\*\*\*

NOTE- ASTERISK (\*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

"D" (POST-DEV) SUPERCRIT

SUMMARY PRINTOUT

SECS	DWSL	CRWS	SS	TOPWID	10K*6	DEPTH	HV	HL	K*DWSL	ALPHA	G
1.000	2405.30	2405.32	2405.55	235.71	125.05	1.06	.25	.00	.00	1.03	402.00
2.000	2402.43	2402.65	2403.30	50.61	145.25	2.13	.86	1.89	-112.57	1.00	402.00
3.000	2402.22	2402.23	2402.63	56.38	94.56	2.28	.61	.47	-9.00	1.00	402.00
* 4.000	2402.05	2402.05	2402.62	60.68	71.23	2.34	.57	.38	-5.00	1.00	402.00
* 5.000	2401.65	2401.65	2402.63	26.24	33.13	2.10	.98	.63	-1.07	1.00	402.00

SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION	SECNO=	4.000	PROFILE= 1	CRITICAL DEPTH ASSUMED
CAUTION	SECNO=	4.000	PROFILE= 1	PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION	SECNO=	4.000	PROFILE= 1	20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION	SECNO=	5.000	PROFILE= 1	CRITICAL DEPTH ASSUMED
CAUTION	SECNO=	5.000	PROFILE= 1	PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION	SECNO=	5.000	PROFILE= 1	20 TRIALS ATTEMPTED TO BALANCE WSEL

File → San Joaquin Est. Mo.

COO-87-13

8 OCT 87

Don:

RE: MEETING WITH ED MOORE -  
LOWELL JOHNSON PROBLEM  
SAN JOAQUIN ESTATES.

A meeting has been scheduled  
with Mr. Moore, Lowell and  
others for 8am, Wednesday the  
14th to discuss "Permits".

I would like for you to attend  
this meeting with me. If these  
plans change, I'll let you know.

Thank!

Bill A



---

# MEMORANDUM

DEPARTMENT OF PLANNING AND DEVELOPMENT SERVICES

---

DATE: 10.23.87

TO: Oscar Cavaletto  
Inspections

FROM: Susan E. Horvath  
Subdivision Coordinator

SUBJECT: Co12- 75-17B  
SAN JOAQUIN ESTATES, LOTS 269-287 ONLY  
Book 28 Page 5

-----

We have been requested to release assurances for the above referenced subdivision. Please respond by 11.3.87

Thank you.

SEH/cc

cc: ~~Don Brooks~~, Flood Plain  
Erich Korsten, Subdivision Engineer

encl: REQUEST LETTER



OK ready  
10-28-87 Wednesday  
for Inspector

ASSURANCE RELEASE CHECKLIST

- TO: Subdivision Coordination Office, 9th floor
  - RE: Release of Assurance Agreement concerning Trust no. 3267 STEWART TITLE
  - 1. At this time we are requesting a ( ) full (X) partial release of the Assurance Agreement, dated 6/15/76, Recorded \_\_\_\_\_ in docket 5306 at pages 825-828.
  - 2. The County Case number is Col2- 75-17B
  - 3. The subdivision name is SAN JOAQUIN ESTATES as recorded at Book 28 Page 5. This release concerns lots 269-287.
  - 4. A copy of the Assurance Agreement (X) is enclosed.
  - 5. The Servicing Water Company is CITY OF TUCSON
  - 6. The streets for this subdivision are ( ) private (X) public.
  - 7. There (X) are ( ) are not public improvements to be accepted into the Pima County Maintenance System associated with these lots.
  - 8. The sewers for this subdivision are ( ) public (X) private. SEPTIC EACH individual LOT
  - 9. The private sewer T.D.# is: \_\_\_\_\_  
or  
An after paving inspection has been requested from Wastewater Mgmt ( )
  - 10. The name, address and telephone number of who is responsible for fixing any problems or to contact for any questions is: Lowell Johnson 577-8775
  - 11. The Engineer for this subdivision is JACK TRIMBLE. The Letter of Certification ( ) is enclosed.  
or  
There ( ) is not a note on the Final Plat requesting a Letter of Certification.
  - 12. The title company is STEWART TITLE AND TRUST. The release should be sent to the following address: 3777 E. Broadway Attn: Mary Behlin.  
85733-2200
- \* List all streets, drainageways and retention/detention basins which are to be accepted.

Rev. 6/86

\* URSA WAY  
URSA PLACE  
DRAINAGEWAY D



CDD-87-13



# MEMORANDUM

DEPARTMENT OF TRANSPORTATION AND FLOOD CONTROL DISTRICT

DATE: October 19, 1987

TO: San Joaquin Estates File

FROM:  Don Brooks  
Subdivision Engineer

SUBJECT: Meeting held October 15, 1987

On Thursday, October 15 I met with Lowell Johnson, the developer of San Joaquin Estates, his attorney, his engineer (Jack Trimble, Trimble Engineering), and an additional representative of his, and Robert Young from the Improvement Plans & Hydrology Section. This meeting was a follow-up to a meeting held with Ed Moore on October 14.

Mr. Johnson requested a letter from this office indicating that the one foot no access easement would not be abandoned along San Joaquin Road and that escrow or improvements to San Joaquin would be required by this Department. I advised that Mr. Johnson that I would provide him with such a letter pursuant to his sending us a written request.

Mr. Johnson informed me that his development could not financially bear the cost of escrow along San Joaquin Road, improvements to San Joaquin Road, and the 50% financial participation in pavement improvements to San Joaquin Road south of his property line as stipulated by plat note 20.

During the course of our meeting I advised Mr. Johnson that the \$30.00 per front foot escrow requirement would not be enforced, however the roadway improvements to San Joaquin would be required. A discussion of the amount of improvement necessary to San Joaquin Road followed, and I advised Mr. Johnson that the paving would have to meet minimum Pima County standards. Mr. Johnson protested the results of the preliminary soils analysis and pavement section design (approximately 17 inches). Robert Young and myself explained to Mr. Johnson that the pavement design is based on soils conditions and the estimated 20 year traffic use. We advised him that traffic estimates may have been exaggerated if the functional classification of major arterial was used for the pavement design. We agreed to meet at a future date after he obtains additional soils analysis and pavement design data.

Persuant to Mr. Huckelberry's recommendation during a meeting held with Ed Moore, plat note 20 will be further investigated, but the issuance of zoning permits will not be contingent upon satisfaction of this requirement. Instead, we are to hold assurances while we are investigating this matter.

Additionally, Mr. Johnson stated that a subdivision across the street, Saguaro Estates, was not required to provide monies for escrow, or improve-

(Continued)



San Joaquin Estates File  
October 19, 1987  
page 2

ments to San Joaquin Road. He questioned the uniformity and consistency with which these obligations have been enforced on developments. I advised him that we would look into the matter and it has been referred to Felipe Sanchez for action.

DLB:cg

cc: Robert Young




COO-87-13

# MEMORANDUM

DEPARTMENT OF TRANSPORTATION AND FLOOD CONTROL DISTRICT

DATE: October 14, 1987

TO: San Joaquin Estates Files

FROM:  Donald L. Brooks  
Subdivision Engineer

SUBJECT: Meeting of 10/14/87

At 8:00 a.m. on the above-referenced date I met with Mr. Lowell Johnson, his attorney, a representative of his, Tom Trimble, Bob Johnson, Planning & Development Services, Charles Huckelberry, Assistant County Manager, Bill Howells, Director of Transportation, and Ed Moore, Supervisor. The subject of the discussion was Mr. Johnson's attempts to receive permits for installation of mobile homes, utilities and septics for specific lots within San Joaquin. Mr. Johnson felt that he has been treated unfairly and unequally and should be issued permits. Outstanding plat notes require that an agreement for completion of a 50% obligation on improvements to San Joaquin Road be made prior to request for zoning permits, additionally other notes specifically require D.O.T. and Flood Control approval related to completion of onsite drainage and paving improvements.

The meeting was rather lengthy and numerous topics were discussed. Overall results of the meeting were as follows:

1. Occupancy permits cannot be issued until the zoning improvements have been satisfied. Because the State regulates occupancy and utility permits, the county is forced to hold the zoning permits and therefore the building permits.
2. Per Ed Moore's directive, Robert Johnson et al will evaluate the feasibility of revising procedures so as to permit the installation of mobile homes, without occupancy prior to release of the entire subdivision.
3. I agreed to meet with the developer, his attorney, and representatives on Thursday, October 15 at 2:30 to discuss the \$30.00 per front foot escrow requirements for San Joaquin Road. I indicated to Mr. Johnson that should he be making improvements to San Joaquin Road the escrow could be reduced or eliminated in proportion thereto.

The interrelationship between County and State regarding phasing of permits and type of permits on mobile homes could be changed. However, Had Mr. Johnson completed all improvements, or at least those improvements relevant to lots which he is requesting permit releases on, and had Mr. Johnson proceeded with the development of his project with completion of requirements prior to request for occupancy or building permits these problems would not have arisen.

DLB:cg

cc: Joanne Hershenhorn  
Bill Howells

~~CO-87-13A~~  
COO-89-12A

DRAINAGE REPORT FOR  
PHASE IIIA OF  
SAN JOAQUIN ESTATES

1st subm.

Not Appr.  
3.29.89  
J. Hershenhorn

Appr. 4-3-89  
J.H.

Approved 4.3.89  
Subj. to: min. structural frame elev.  
on lot III of 2395.5 ft.

J.H.

SEE  
4/3/1989  
ADDENDUM

\* See nylar rolled plan  
in vertical file



CMG DRAINAGE  
ENGINEERING, INC.

*map reference:  
J-9, Landis*

DRAINAGE REPORT FOR  
PHASE IIIA OF  
SAN JOAQUIN ESTATES

Prepared by:

CMG DRAINAGE ENGINEERING, INC.  
201 N. STONE AVENUE, STE. 200  
TUCSON, AZ 85701  
882-4244

*rec'd. J.H.  
3.21.89*

For:

MR. LOWELL JOHNSON  
1115 W. SAN LUCAS CIRCLE  
TUCSON, AZ 85704

MARCH 13, 1989



1. Provide ~~topo~~ aerial w/ mapped watersheds.  
I'm getting slightly diff. boundaries from ones shown  
on topo map. I see 2 minor breakouts near top  
of wds.

OK - see addendum

## TABLE OF CONTENTS

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## LIST OF APPENDICES

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- APPENDIX B - HYDRAULIC COMPUTATION SHEETS



## I. INTRODUCTION

This report presents the results of a drainage study for Phase IIIA of San Joaquin Estates which is located within Section 24, Township 14 South, Range 11 East, G&S, RB&M, Pima County, Arizona. A location map for the subject property is shown on Figure 1 of this report. Phase IIIA is approximately 20 acres in size and is bounded on the east by San Joaquin Road, on the west by the Central Arizona Project (CAP), and <sup>15</sup> on north of the 29-foot wide drainage easement which lies just north of and parallels Constellation Way. The subject property was originally platted as a part of the larger San Joaquin Estates subdivision. The property is owned by Mr. Lowell Johnson and is platted for development as 1-acre mobile home lots.

This report addresses the offsite and onsite drainage which impacts the parcel and presents an analysis for the with-project drainage design plan for the development.



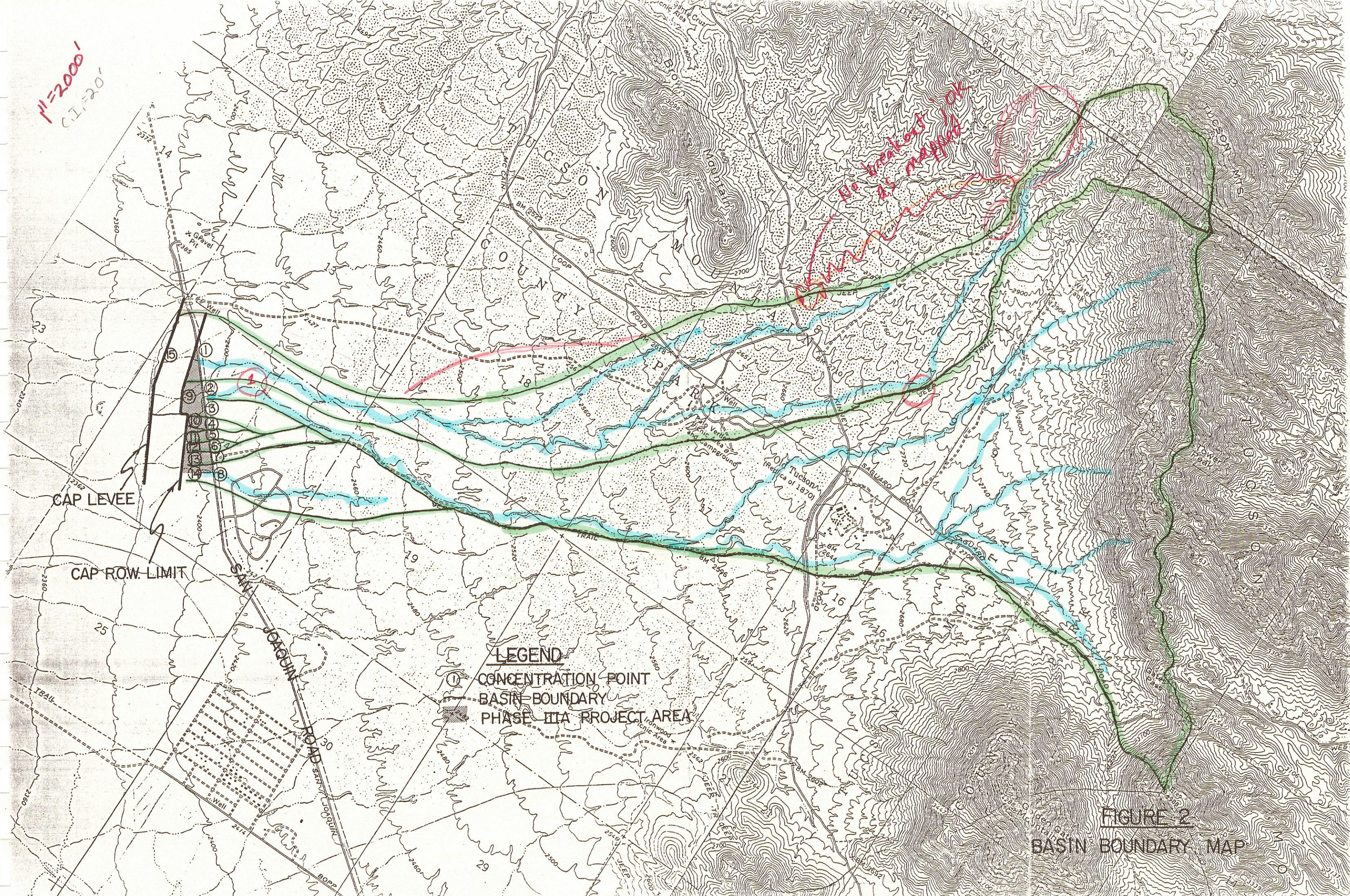


## II. HYDROLOGY AND EXISTING CONDITIONS FLOODPLAIN DELINEATIONS

Peak discharge determinations were made for flows entering and exiting the project area. The basin boundaries and points of concentration for watersheds draining to the subject property are shown on Figure 2 of this report. Concentration points #1 through #8 on Figure 2 are located along San Joaquin Road which forms the upstream boundary of the project. Concentration points #9 through #14 are located along the CAP right-of-way limit which forms the downstream limit of the project. Concentration point #15 is located at the CAP levee which is located approximately 700 feet downstream of the project. Basin delineations for the areas shown on Figure 2 were developed using 7.5-minute U.S.G.S. quadrangles. Delineation of the smaller basins located along San Joaquin Road was aided by the use of 1"=400' scale aerial photography.

The basins tributary to the project area are located within and adjacent to the Tucson Mountain County Park. Developed areas outside the park which are tributary to the project consist of low-density suburban ranch residential areas. Soils within the tributary basin areas consist of D soils in the upper mountain areas and B soils in the lower elevations. The basins tributary to this project are characterized by poorly defined channels which are broad and shallow with dense vegetation within and along the channels. For this reason, a basin factor of 0.050 was used in all peak discharge computations. Table 1 shows the watershed areas and 100-year peak discharges computed for the concentration points shown in Figure 2. Hydrologic data sheets for the peak discharges shown in Table 1 are contained in Appendix A of this report.

M=2000'  
I=20'



**LEGEND**

- ① CONCENTRATION POINT
- BASIN BOUNDARY
- PHASE III PROJECT AREA

FIGURE 2  
BASIN BOUNDARY MAP

TABLE 1 - SUMMARY OF RESULTS OF HYDROLOGIC ANALYSIS

Concentration Point #	Drainage Area (acres)	100-Year Peak Discharge (cfs)
1	1266.0	1531
2	2368.0	2558
3	24.6	94
4	5.7	25
5	6.4	28
6	3.4	17
7	28.0	91
8	168.8	447
9	2404.7	2562
10	7.8	32
11	9.7	37
12	6.9	30
13	32.9	99
14	173.1	426
15	3716.3	3803

974 cfs (split)

(fig) dist

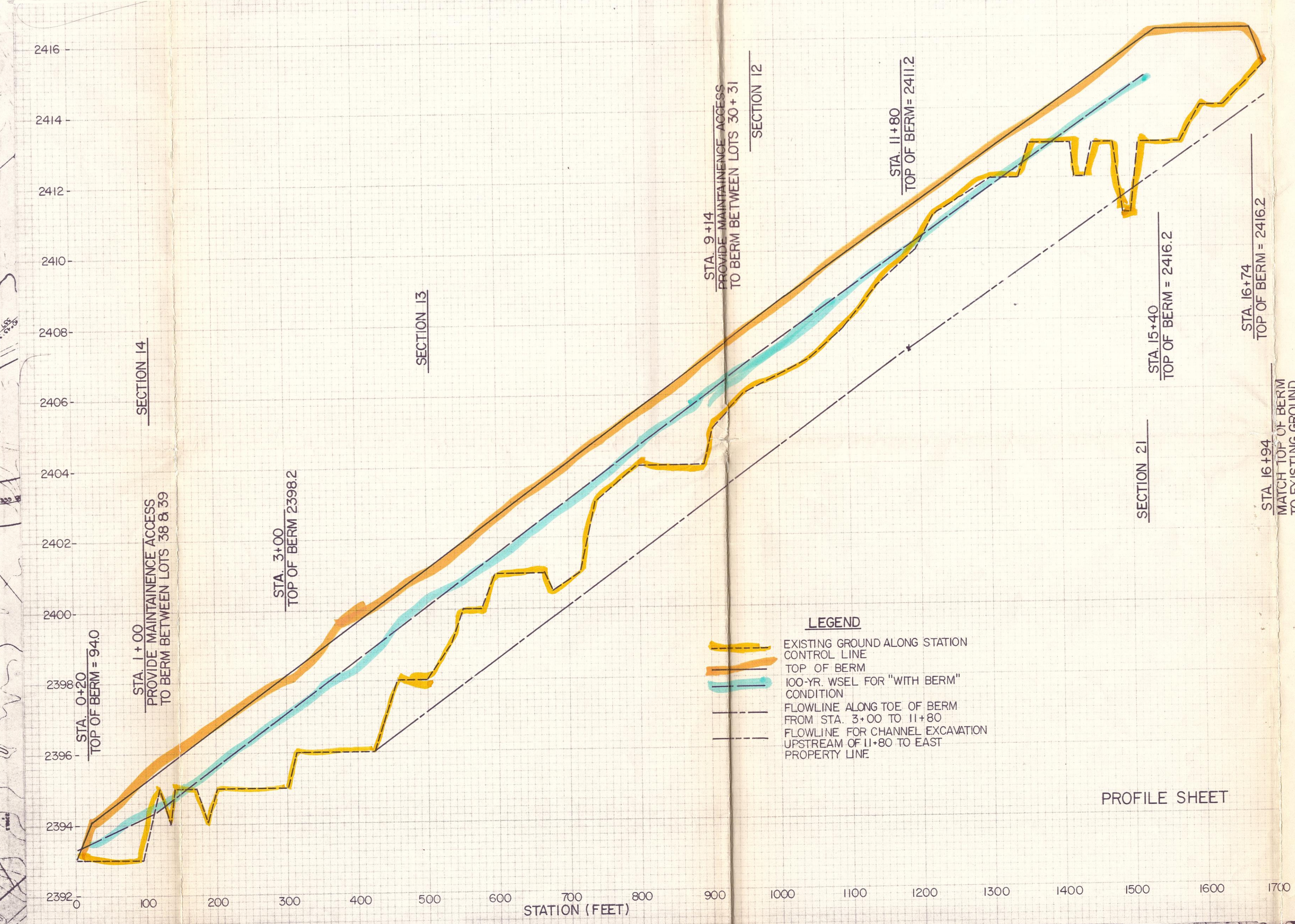
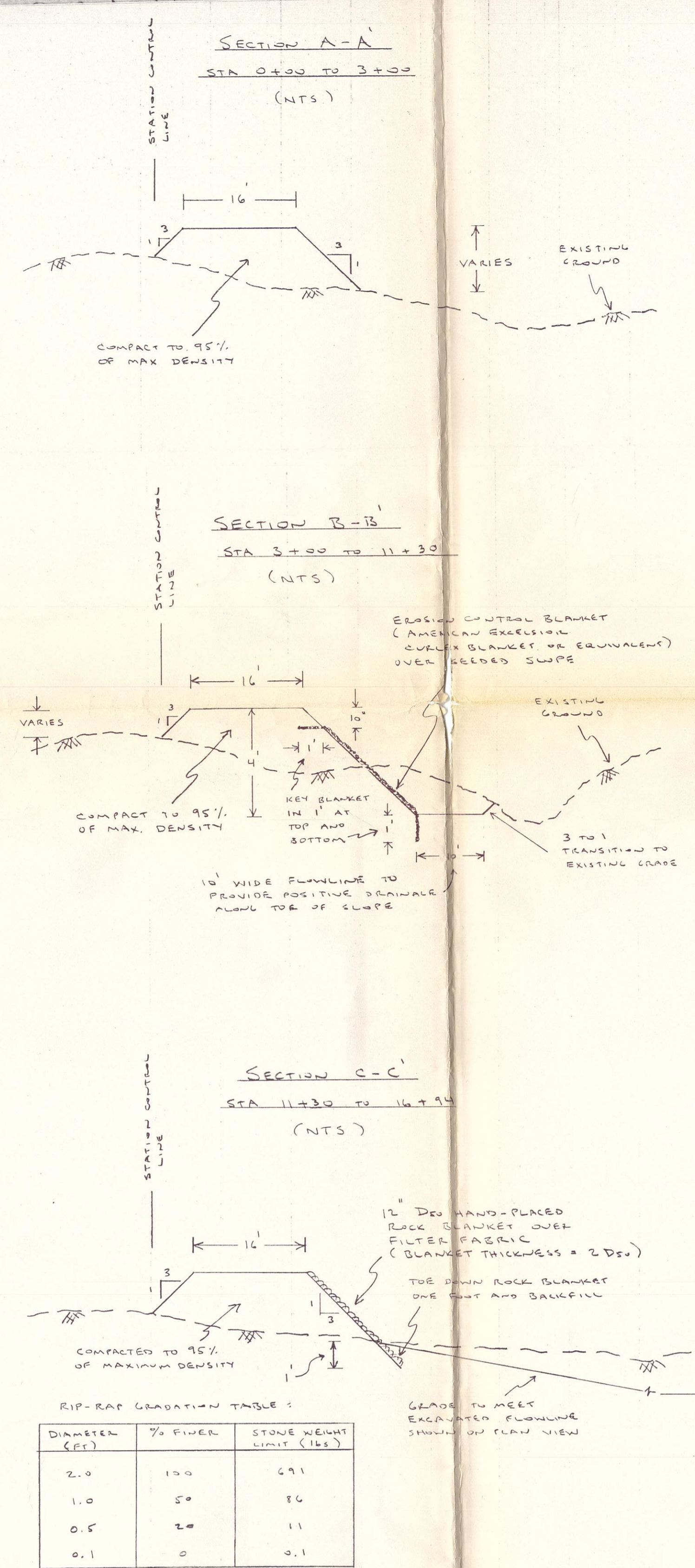
Manning's ok to rate split for  
purposes of this project but  
not to be used for design of  
anything else.

Existing conditions floodplain delineations were performed for all onsite areas subject to inundation by 100-year peak discharges of 100 cfs or greater. The floodplain delineations were performed using 1"=80', 1-foot contour interval mapping of the project area. The locations of the 100-year floodlimits and the cross sections used in their development are shown on Figure 3. The floodplain delineations shown on Figure 3 were developed from normal depth ratings of the cross sections shown using Manning's equation. A Manning's roughness coefficient of .045 was used to reflect the vegetated condition of the channels. Hydraulic data for the cross sections shown in Figure 3 are contained in Appendix B of this report.

In developing the floodlimits shown on Figure 3, it was necessary to account for a split flow condition which exists on the channel tributary to Concentration point #2. This condition occurs at a point located approximately 1400 feet upstream of San Joaquin Road (see Figure 3 for location). *Also ID on Fig. 2* The south branch of the split drains to Concentration point #2 while the north branch drains to Concentration point #1. Cross section #1 on Figure 3, which is located at the split, was rated for the 100-year peak discharge of 2558 cfs determined for Concentration point #2. The results of the rating for cross section #1 indicate that of the 100-year discharge of 2558, 970 cfs flows down the south branch to Concentration point #2 while 1588 cfs flows down the north branch to Concentration point #1. The peak discharges used to generate the floodlimits shown on Figure 3 reflect the above flow division.

Manning's to rate  
flow split

FIGURE 4  
PROPOSED DRAINAGE DESIGN, PLAN



LEGEND

- EXISTING GROUND ALONG STATION CONTROL LINE
- TOP OF BERM
- 100-YR WSEL FOR "WITH BERM" CONDITION
- FLOWLINE ALONG TOE OF BERM FROM STA 3+00 TO 11+80
- FLOWLINE FOR CHANNEL EXCAVATION UPSTREAM OF 11+80 TO EAST PROPERTY LINE

PROFILE SHEET

Flows collecting at Concentration point #15 are impounded behind the CAP levee. Two overchute structures convey these flows through the levee and over the canal. Each overchute structures consists of five, 72-inch diameter pipes. Modified puls routing of the 100-year hydrograph for Concentration point #15 indicates a 100-year ponded water surface elevation of 2388.04. The project area is located outside of the resulting ponding limits. The modified puls routing was performed using the procedure as outlined in the Pima County Stormwater Detention/Retention Manual. Storage data for the impoundment area was developed from the 1"=80', 1-foot contour interval mapping. Outflow data for the overchute structures was developed using the Federal Highway Administration HEC-5 headwater nomograph for corrugated metal pipes under inlet control. Data sheets for the modified puls routing are contained in Appendix B of this report.

### III. DRAINAGE DESIGN PLAN

Figure 3 shows the site plan for the project and the proposed drainage design. The subject property is not located within a critical or balanced basin and is therefore not subject to detention requirements as described in the Pima County Stormwater Detention/Retention Manual (PCSDRM) adopted February 1987. The property is also planned for development at one residence per acre and is therefore not subject to threshold retention requirements as described in the PCSDRM. ✓

Because of the rural nature of the area and the low-density of development proposed for this project, **no improvements will be made to collect and confine flows in improved channels.** Grading within the project will be such that **existing flow patterns and floodlimits are maintained.** **Minimum finished floor elevations and recommended mobile home placement locations are shown on Figure 3 for lots which are affected by 100-year flooding as determined by this report.**

The areas shown to the north of Lots 112 and 115 on Figure 3 will be combined and sold as a single parcel. For this reason, minimum finished floor elevations and recommended mobile home placement locations are only shown for two sites within this area. Because of the extensive nature of flooding predicted for this area, **it is recommended that mobile homes be placed at the locations shown on Figure 3 and that they be placed on concrete caisson supports buried to a depth of 8 feet below grade.** A detail of the design of the recommended support system for these locations is contained in Appendix B of this report.



1' minimum  
upstream  
side  
also

2' min  
of water  
50-100 cfs

All-weather access will be provided to all lots within this project. Sections D1 and D2 on Figure 3 show the locations of two dip crossings along the streets within the project. Cutoff walls 20 feet wide and buried 3 feet below grade will be placed on the downstream side of each of the above crossings as shown on Figure 3. Manning's ratings of these 2 sections indicate flow depths of less than 1 foot. Hydraulic data for these sections is contained in Appendix B of this report.

All-weather access will also be provided along San Joaquin Road when design profiles for the roadway are developed. Under design conditions, flows collecting at Concentration points #7 and #8 will be conveyed across San Joaquin Road in a single dip crossing. The design conditions 100-year water surface elevations for Section 6, 7, and 8 (shown in parentheses on Figure 3) reflect the proposed design.

1. need aerial to feel more confident w/ Q's across rd.
2. this report not to be used for design of San Joaquin Rd. N. of Milky Way Drive.

#### IV. SUMMARY

1. This report presents the results of a drainage study for Phase IIIA of San Joaquin Estates. A location map for the subject property is shown on Figure 1 of this report.
2. Peak discharge determinations were made for flows entering and exiting the project area. The basin boundaries and points of concentration for watersheds draining to the subject property are shown on Figure 2 of this report.
3. Existing conditions floodplain delineations were performed for all onsite areas subject to inundation by 100-year peak discharges of 100 cfs or greater. The floodplain delineations were performed using 1"=80', 1-foot contour interval mapping of the project area. The locations of the 100-year floodlimits and the cross sections used in their development are shown on Figure 3.
4. Modified puls routing of the 100-year hydrograph for flows concentrating behind the CAP levee indicates a 100-year ponded water surface elevation of 2388.04. The project area is located outside of the resulting ponding limits.
5. Grading with<sup>^</sup> the subject property will be such that existing flow patterns and floodlimits are maintained. Minimum finished floor elevations and recommended mobile home placement locations are shown on Figure 3 for lots which are affected by 100-year flooding as determined by this report.

6. It is recommended that mobile homes be placed at the locations shown on Figure 3 for those lots affected by 100-year flooding as determined by this report.
  
7. Because of the extensive nature of flooding predicted for the area to the north of Lots 112 and 115, it is recommended that mobile homes placed at the locations shown on Figure 3 be placed on concrete caisson supports buried to a depth of 8 feet below grade.
  
8. All-weather access will be provided to all lots within this project. Cutoff walls 20 feet wide and buried 3 feet below grade will be placed on the downstream side of each of the dip crossings as shown on Figure 3 (Sections D1 and D2).

APPENDIX A  
HYDROLOGIC DATA SHEETS

*Appendix A*

PROJECT NAME AND LOCATION: SAN JOAQUINE ESTATES (FILE:89015.F01)

DRAINAGE CONCENTRATION POINT: 1

WATERSHED AREA (A): ~~1266.00~~ <sup>1273</sup> acres ✓

LENGTH OF WATERCOURSE (Lc): 31158. ft ✓

LENGTH TO CENTER OF GRAVITY (Lca): 15579. ft ✓

INCREMENTAL CHANGE IN LENGTH (Li) - ft      INCREMENTAL CHANGE IN ELEV (Hi) - ft

2318.	800.0 ✓
2833.	200.0 ✓
4377.	200.0 ✓
4892.	140.0 ✓
7210.	140.0 ✓
9528.	130.0 ✓

MEAN SLOPE (Sc): .0249 ft      BASIN FACTOR (Nb): .0500

WATERSHED TYPE(S): VALLEY/MOUNTAIN

RAINFALL VALUES ✓

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
P 1	1.36	1.74	1.99	2.32	2.61	2.91
P 2	1.51	1.95	2.24	2.61	2.95	3.28
P 3	1.61	2.08	2.40	2.80	3.17	3.53
P 6	1.80	2.34	2.70	3.16	3.58	4.00
P24	2.22	2.90	3.36	3.95	4.48	5.01

SOIL GROUPS ✓

70. % B, CN= 82, COVER TYPE= DESERT BRUSH , COVER DENSITY= 25 %  
30. % D, CN= 91, COVER TYPE= DESERT BRUSH , COVER DENSITY= 25 %

IMPERVIOUS COVER= 1. % ✓

RAINFALL/RUNOFF AND PEAK DISCHARGE DATA

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
RUNOFF SUPPLY RATE (q/i):	.250	.383	.455	.530	.585	.629
Tc ( FUNCTION OF i ) :	184.41	155.53	145.21	136.63	131.36	127.58
SOLUTION OF Tc (MINUTES):	273	180	150	125	109	99
RAINFL INT. @ Tc (IN/HR):	.376	.694	.926	1.259	1.588	1.908
RUNOFF RATE @ Tc (IN/HR):	.094	.266	.422	.667	.929	1.200
PEAK DISCHARGE (CFS) :	120.	340.	538.	852.	1185.	<del>1531.</del>

1540

PROJECT NAME AND LOCATION: SAN JOAQUIN ESTATES

DRAINAGE CONCENTRATION POINT: 2

WATERSHED AREA (A): <sup>2425</sup>~~2368~~.00 acres ✓

LENGTH OF WATERCOURSE (Lc): 30128. ft ✓

LENGTH TO CENTER OF GRAVITY (Lca): 20600. ft ✓

INCREMENTAL CHANGE IN LENGTH (Li) - ft      INCREMENTAL CHANGE IN ELEV (Hi) - ft

1288.	600.0 ✓
1545.	300.0 ✓
2833.	200.0 ✓
2832.	100.0 ✓
8755.	140.0 ✓
12875.	160.0 ✓

MEAN SLOPE (Sc): .0195 ft      BASIN FACTOR (Nb): .0500

WATERSHED TYPE(S): VALLEY/MOUNTAIN

RAINFALL VALUES

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
P 1	1.36	1.74	1.99	2.32	2.61	2.91
P 2	1.51	1.95	2.24	2.61	2.95	3.28
P 3	1.61	2.08	2.40	2.80	3.17	3.53
P 6	1.80	2.34	2.70	3.16	3.58	4.00
P24	2.22	2.90	3.36	3.95	4.48	5.01

SOIL GROUPS

50. % B, CN= 82, COVER TYPE= DESERT BRUSH , COVER DENSITY= 25 %  
50. % D, CN= 91, COVER TYPE= DESERT BRUSH , COVER DENSITY= 25 %

IMPERVIOUS COVER= 1. %

RAINFALL/RUNOFF AND PEAK DISCHARGE DATA

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
RUNOFF SUPPLY RATE (q/i):	.297	.431	.502	.574	.626	.667
Tc ( FUNCTION OF i ) :	204.63	176.29	165.95	157.26	151.90	148.05
SOLUTION OF Tc (MINUTES):	319	218	183	154	136	123
RAINFL INT. @ Tc (IN/HR):	.331	.588	.787	1.058	1.325	1.605
RUNOFF RATE @ Tc (IN/HR):	.098	.254	.395	.607	.830	1.071
PEAK DISCHARGE (CFS) :	234.	605.	943.	1450.	1980.	<del>2528.</del>

2619

2 w/ breakout from 2: 2855 cfs

PROJECT NAME AND LOCATION: SAN JOAQUIN ESTATES

DRAINAGE CONCENTRATION POINT: 3

WATERSHED AREA (A): 24.60 acres ✓

LENGTH OF WATERCOURSE (Lc): 2350. ft ✓

LENGTH TO CENTER OF GRAVITY (Lca): 1175. ft

INCREMENTAL CHANGE IN LENGTH (Li) - ft      INCREMENTAL CHANGE IN ELEV (Hi) - ft

2350.      35.0 ✓

MEAN SLOPE (Sc): .0149 ft      BASIN FACTOR (Nb): .0500

WATERSHED TYPE(S): VALLEY

RAINFALL VALUES

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
P 1	1.36	1.74	1.99	2.32	2.61	2.91
P 2	1.51	1.95	2.24	2.61	2.95	3.28
P 3	1.61	2.08	2.40	2.80	3.17	3.53
P 6	1.80	2.34	2.70	3.16	3.58	4.00
P24	2.22	2.90	3.36	3.95	4.48	5.01

SOIL GROUPS

100. % B, CN= 82, COVER TYPE= DESERT BRUSH , COVER DENSITY= 25 %

IMPERVIOUS COVER= 5. %

RAINFALL/RUNOFF AND PEAK DISCHARGE DATA

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
RUNOFF SUPPLY RATE (q/i):	.210	.336	.408	.484	.541	.587
Tc ( FUNCTION OF i ) :	51.56	42.71	39.55	36.93	35.33	34.18
SOLUTION OF Tc (MINUTES):	41	28	24	20	18	16
RAINFL INT. @ Tc (IN/HR):	1.759	2.857	3.590	4.615	5.490	6.449
RUNOFF RATE @ Tc (IN/HR):	.370	.961	1.464	2.233	2.968	3.786
PEAK DISCHARGE (CFS) :	9.	24.	36.	55.	74.	94.

PROJECT NAME AND LOCATION: SAN JOAQUIN ESTATES

DRAINAGE CONCENTRATION POINT: 4

WATERSHED AREA (A): 5.70 acres ✓

LENGTH OF WATERCOURSE (Lc): 1100. ft ✓

LENGTH TO CENTER OF GRAVITY (Lca): 550. ft

INCREMENTAL CHANGE IN LENGTH (Li) - ft      INCREMENTAL CHANGE IN ELEV (Hi) - ft

1100.      10.0

MEAN SLOPE (Sc): .0091 ft      BASIN FACTOR (Nb): .0500

WATERSHED TYPE(S): VALLEY

RAINFALL VALUES

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
P 1	1.36	1.74	1.99	2.32	2.61	2.91
P 2	1.51	1.95	2.24	2.61	2.95	3.28
P 3	1.61	2.08	2.40	2.80	3.17	3.53
P 6	1.80	2.34	2.70	3.16	3.58	4.00
P24	2.22	2.90	3.36	3.95	4.48	5.01

SOIL GROUPS

100. % B, CN= 82, COVER TYPE= DESERT BRUSH . COVER DENSITY= 25 %

IMPERVIOUS COVER= 5. % ✓

RAINFALL/RUNOFF AND PEAK DISCHARGE DATA

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
RUNOFF SUPPLY RATE (q/i):	.210	.336	.408	.484	.541	.587
Tc (FUNCTION OF i) :	39.84	33.00	30.56	28.53	27.30	26.41
SOLUTION OF Tc (MINUTES):	29	20	17	15	13	12
RAINFL INT. @ Tc (IN/HR):	2.196	3.466	4.308	5.287	6.379	7.321
RUNOFF RATE @ Tc (IN/HR):	.461	1.166	1.756	2.558	3.448	4.298
PEAK DISCHARGE (CFS) :	3.	7.	10.	15.	20.	25.



PROJECT NAME AND LOCATION: SAN JOAQUIN ESTATES

DRAINAGE CONCENTRATION POINT: 5

WATERSHED AREA (A): 6.40 acres ✓

LENGTH OF WATERCOURSE (Lc): 1500. ft ✓

LENGTH TO CENTER OF GRAVITY (Lca): 750. ft

INCREMENTAL CHANGE IN LENGTH (Li) - ft      INCREMENTAL CHANGE IN ELEV (Hi) - ft

1500.      20.0 ✓

MEAN SLOPE (Sc): .0133 ft      BASIN FACTOR (Nb): .0500

WATERSHED TYPE(S): VALLEY

RAINFALL VALUES ✓

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
P 1	1.36	1.74	1.99	2.32	2.61	2.91
P 2	1.51	1.95	2.24	2.61	2.95	3.28
P 3	1.61	2.08	2.40	2.80	3.17	3.53
P 6	1.80	2.34	2.70	3.16	3.58	4.00
P24	2.22	2.90	3.36	3.95	4.48	5.01

SOIL GROUPS

100. % B, CN= 82, COVER TYPE= DESERT BRUSH , COVER DENSITY= 25 %

IMPERVIOUS COVER= 5. %

RAINFALL/RUNOFF AND PEAK DISCHARGE DATA

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
RUNOFF SUPPLY RATE (q/i):	.210	.336	.408	.484	.541	.587
Tc ( FUNCTION OF i ) :	41.17	34.10	31.58	29.49	28.21	27.29
SOLUTION OF Tc (MINUTES):	31	21	18	15	14	12
RAINFL INT. @ Tc (IN/HR):	2.100	3.362	4.189	5.287	6.196	7.321
RUNOFF RATE @ Tc (IN/HR):	.441	1.131	1.708	2.558	3.350	4.298
PEAK DISCHARGE (CFS) :	3.	7.	11.	17.	22.	28.

PROJECT NAME AND LOCATION: SAN JOAQUIN ESTATES

DRAINAGE CONCENTRATION POINT: 6

WATERSHED AREA (A): 3.40 acres ✓

LENGTH OF WATERCOURSE (Lc): 800. ft ✓

LENGTH TO CENTER OF GRAVITY (Lca): 400. ft

INCREMENTAL CHANGE IN LENGTH (Li) - ft      INCREMENTAL CHANGE IN ELEV (Hi) - ft

800.      10.0 ✓

MEAN SLOPE (Sc): .0125 ft      BASIN FACTOR (Nb): .0500

WATERSHED TYPE(S): VALLEY

#### RAINFALL VALUES

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
P 1	1.36	1.74	1.99	2.32	2.61	2.91
P 2	1.51	1.95	2.24	2.61	2.95	3.28
P 3	1.61	2.08	2.40	2.80	3.17	3.53
P 6	1.80	2.34	2.70	3.16	3.58	4.00
P24	2.22	2.90	3.36	3.95	4.48	5.01

#### SOIL GROUPS

100. % B, CN= 82, COVER TYPE= DESERT BRUSH , COVER DENSITY= 25 %

IMPERVIOUS COVER= 5. %

#### RAINFALL/RUNOFF AND PEAK DISCHARGE DATA

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
RUNOFF SUPPLY RATE (q/i):	.210	.336	.408	.484	.541	.587
Tc ( FUNCTION OF i ) :	28.97	24.00	22.22	20.75	19.85	19.21
SOLUTION OF Tc (MINUTES):	19	14	12	10	9	8
RAINFL INT. @ Tc (IN/HR):	2.782	4.128	5.027	6.261	7.425	8.686
RUNOFF RATE @ Tc (IN/HR):	.584	1.389	2.049	3.029	4.014	5.100
PEAK DISCHARGE (CFS) :	2.	5.	7.	10.	14.	17.

PROJECT NAME AND LOCATION: SAN JOAQUIN ESTATES

DRAINAGE CONCENTRATION POINT: 7

WATERSHED AREA (A): 28.00 acres ✓

LENGTH OF WATERCOURSE (Lc): 3300. ft ✓

LENGTH TO CENTER OF GRAVITY (Lca): 1650. ft

INCREMENTAL CHANGE IN LENGTH (Li) - ft      INCREMENTAL CHANGE IN ELEV (Hi) - ft

3300.      45.0 ✓

MEAN SLOPE (Sc): .0136 ft      BASIN FACTOR (Nb): .0500

WATERSHED TYPE(S): VALLEY

RAINFALL VALUES

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
P 1	1.36	1.74	1.99	2.32	2.61	2.91
P 2	1.51	1.95	2.24	2.61	2.95	3.28
P 3	1.61	2.08	2.40	2.80	3.17	3.53
P 6	1.80	2.34	2.70	3.16	3.58	4.00
P24	2.22	2.90	3.36	3.95	4.48	5.01

SOIL GROUPS

100. % B, CN= 82, COVER TYPE= DESERT BRUSH , COVER DENSITY= 25 %

IMPERVIOUS COVER= 5. %

RAINFALL/RUNOFF AND PEAK DISCHARGE DATA

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
RUNOFF SUPPLY RATE (q/i):	.210	.336	.408	.484	.541	.587
Tc ( FUNCTION OF i ) :	65.48	54.24	50.23	46.90	44.87	43.41
SOLUTION OF Tc (MINUTES):	57	39	33	27	24	22
RAINFL INT. @ Tc (IN/HR):	1.418	2.334	2.952	3.896	4.706	5.491
RUNOFF RATE @ Tc (IN/HR):	.298	.785	1.204	1.885	2.544	3.224
PEAK DISCHARGE (CFS) :	8.	22.	34.	53.	72.	91.

PROJECT NAME AND LOCATION: SAN JOAQUIN ESTATES

DRAINAGE CONCENTRATION POINT: 8

WATERSHED AREA (A): 168.80 acres

LENGTH OF WATERCOURSE (Lc): 5800. ft

LENGTH TO CENTER OF GRAVITY (Lca): 2900. ft

INCREMENTAL CHANGE IN LENGTH (Li) - ft      INCREMENTAL CHANGE IN ELEV (Hi) - ft

5800.

95.0

MEAN SLOPE (Sc): .0164 ft

BASIN FACTOR (Nb): .0500

WATERSHED TYPE(S): VALLEY

RAINFALL VALUES

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
P 1	1.36	1.74	1.99	2.32	2.61	2.91
P 2	1.51	1.95	2.24	2.61	2.95	3.28
P 3	1.61	2.08	2.40	2.80	3.17	3.53
P 6	1.80	2.34	2.70	3.16	3.58	4.00
P24	2.22	2.90	3.36	3.95	4.48	5.01

SOIL GROUPS

100. % B, CN= 82. COVER TYPE= DESERT BRUSH , COVER DENSITY= 25 %

IMPERVIOUS COVER= 5. %

RAINFALL/RUNOFF AND PEAK DISCHARGE DATA

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
RUNOFF SUPPLY RATE (q/i):	.210	.336	.408	.484	.541	.587
Tc ( FUNCTION OF i ) :	85.36	70.70	65.47	61.14	58.48	56.58
SOLUTION OF Tc (MINUTES):	85	56	46	39	35	31
RAINFL INT. @ Tc (IN/HR):	1.006	1.829	2.394	3.108	3.739	4.474
RUNOFF RATE @ Tc (IN/HR):	.211	.615	.976	1.504	2.021	2.627
PEAK DISCHARGE (CFS) :	36.	105.	166.	256.	344.	447.

PROJECT NAME AND LOCATION: SAN JOAQUIN ESTATES

DRAINAGE CONCENTRATION POINT: 9

WATERSHED AREA (A): 2404.70 acres ✓

LENGTH OF WATERCOURSE (Lc): 30688. ft ✓

LENGTH TO CENTER OF GRAVITY (Lca): 20880. ft

INCREMENTAL CHANGE IN LENGTH (Li) - ft      INCREMENTAL CHANGE IN ELEV (Hi) - ft

1288.	600.0
1545.	300.0
2833.	200.0
2832.	100.0 ✓
8755.	140.0
13435.	165.0

MEAN SLOPE (Sc): .0192 ft      BASIN FACTOR (Nb): .0500

WATERSHED TYPE(S): VALLEY/MOUNTAIN

RAINFALL VALUES

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
P 1	1.36	1.74	1.99	2.32	2.61	2.91
P 2	1.51	1.95	2.24	2.61	2.95	3.28
P 3	1.61	2.08	2.40	2.80	3.17	3.53
P 6	1.80	2.34	2.70	3.16	3.58	4.00
P24	2.22	2.90	3.36	3.95	4.48	5.01

SOIL GROUPS

50. % B, CN= 82, COVER TYPE= DESERT BRUSH , COVER DENSITY= 25 %  
50. % D, CN= 91, COVER TYPE= DESERT BRUSH , COVER DENSITY= 25 %

IMPERVIOUS COVER= 1. %

RAINFALL/RUNOFF AND PEAK DISCHARGE DATA

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
RUNOFF SUPPLY RATE (q/i):	.297	.431	.502	.574	.626	.667
Tc ( FUNCTION OF i ) :	207.89	179.10	168.59	159.77	154.32	150.41
SOLUTION OF Tc (MINUTES):	326	224	187	158	139	125
RAINFL INT. @ Tc (IN/HR):	.325	.575	.773	1.036	1.302	1.584
RUNOFF RATE @ Tc (IN/HR):	.096	.248	.388	.595	.815	1.057
PEAK DISCHARGE (CFS) :	234.	601.	940.	1442.	1975.	2562.

PROJECT NAME AND LOCATION: SAN JOAQUIN ESTATES

DRAINAGE CONCENTRATION POINT: 10

WATERSHED AREA (A): 7.80 acres ✓

LENGTH OF WATERCOURSE (Lc): 1620. ft ✓

LENGTH TO CENTER OF GRAVITY (Lca): 810. ft

INCREMENTAL CHANGE IN LENGTH (Li) - ft      INCREMENTAL CHANGE IN ELEV (Hi) - ft  
1620.      18.0

MEAN SLOPE (Sc): .0111 ft      BASIN FACTOR (Nb): .0500

WATERSHED TYPE(S): VALLEY

#### RAINFALL VALUES

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
P 1	1.36	1.74	1.99	2.32	2.61	2.91
P 2	1.51	1.95	2.24	2.61	2.95	3.28
P 3	1.61	2.08	2.40	2.80	3.17	3.53
P 6	1.80	2.34	2.70	3.16	3.58	4.00
P24	2.22	2.90	3.36	3.95	4.48	5.01

#### SOIL GROUPS

100. % B, CN= 82, COVER TYPE= DESERT BRUSH , COVER DENSITY= 25 %

IMPERVIOUS COVER= 5. %

#### RAINFALL/RUNOFF AND PEAK DISCHARGE DATA

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
RUNOFF SUPPLY RATE (q/i):	.210	.336	.408	.484	.541	.587
Tc ( FUNCTION OF i ) :	46.38	38.41	35.57	33.22	31.78	30.74
SOLUTION OF Tc (MINUTES):	36	25	21	18	16	14
RAINFL INT. @ Tc (IN/HR):	1.923	3.048	3.850	4.870	5.804	6.865
RUNOFF RATE @ Tc (IN/HR):	.404	1.026	1.569	2.356	3.138	4.042
PEAK DISCHARGE (CFS) :	3.	8.	12.	19.	25.	32.

PROJECT NAME AND LOCATION: SAN JOAQUIN ESTATES

DRAINAGE CONCENTRATION POINT: 11

WATERSHED AREA (A): 9.70 acres /

LENGTH OF WATERCOURSE (Lc): 2100. ft.

LENGTH TO CENTER OF GRAVITY (Lca): 1050. ft

INCREMENTAL CHANGE IN LENGTH (Li) - ft      INCREMENTAL CHANGE IN ELEV (Hi) - ft

2100.

28.0

MEAN SLOPE (Sc): .0133 ft      BASIN FACTOR (Nb): .0500

WATERSHED TYPE(S): VALLEY

#### RAINFALL VALUES

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
P 1	1.36	1.74	1.99	2.32	2.61	2.91
P 2	1.51	1.95	2.24	2.61	2.95	3.28
P 3	1.61	2.08	2.40	2.80	3.17	3.53
P 6	1.80	2.34	2.70	3.16	3.58	4.00
P24	2.22	2.90	3.36	3.95	4.48	5.01

#### SOIL GROUPS

100. % B, CN= 82, COVER TYPE= DESERT BRUSH , COVER DENSITY= 25 %

IMPERVIOUS COVER= 5. %

#### RAINFALL/RUNOFF AND PEAK DISCHARGE DATA

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
RUNOFF SUPPLY RATE (q/i):	.210	.336	.408	.484	.541	.587
Tc ( FUNCTION OF i ) :	50.38	41.73	38.64	36.08	34.52	33.40
SOLUTION OF Tc (MINUTES):	40	27	23	20	17	16
RAINFL INT. @ Tc (IN/HR):	1.787	2.926	3.670	4.615	5.647	6.449
RUNOFF RATE @ Tc (IN/HR):	.375	.985	1.496	2.233	3.053	3.786
PEAK DISCHARGE (CFS) :	4.	10.	15.	22.	30.	37.

PROJECT NAME AND LOCATION: SAN JOAQUIN ESTATES

DRAINAGE CONCENTRATION POINT: 12

WATERSHED AREA (A): 6.90 acres

LENGTH OF WATERCOURSE (Lc): 1440. ft ✓

LENGTH TO CENTER OF GRAVITY (Lca): 720. ft

INCREMENTAL CHANGE IN LENGTH (Li) - ft      INCREMENTAL CHANGE IN ELEV (Hi) - ft

1440.      20.0

MEAN SLOPE (Sc): .0139 ft      BASIN FACTOR (Nb): .0500

WATERSHED TYPE(S): VALLEY

RAINFALL VALUES

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
P 1	1.36	1.74	1.99	2.32	2.61	2.91
P 2	1.51	1.95	2.24	2.61	2.95	3.28
P 3	1.61	2.08	2.40	2.80	3.17	3.53
P 6	1.80	2.34	2.70	3.16	3.58	4.00
P24	2.22	2.90	3.36	3.95	4.48	5.01

SOIL GROUPS

100. % B, CN= 82, COVER TYPE= DESERT BRUSH , COVER DENSITY= 25 %

IMPERVIOUS COVER= 5. %

RAINFALL/RUNOFF AND PEAK DISCHARGE DATA

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
RUNOFF SUPPLY RATE (q/i):	.210	.336	.408	.484	.541	.587
Tc ( FUNCTION OF i ) :	39.52	32.73	30.32	28.31	27.08	26.20
SOLUTION OF Tc (MINUTES):	29	20	17	15	13	12
RAINFL INT. @ Tc (IN/HR):	2.196	3.466	4.308	5.287	6.379	7.321
RUNOFF RATE @ Tc (IN/HR):	.461	1.166	1.756	2.558	3.448	4.298
PEAK DISCHARGE (CFS) :	3.	8.	12.	18.	24.	30.



PROJECT NAME AND LOCATION: SAN JOAQUIN ESTATES

DRAINAGE CONCENTRATION POINT: 13

WATERSHED AREA (A): 32.90 acres

LENGTH OF WATERCOURSE (Lc): 3980. ft

LENGTH TO CENTER OF GRAVITY (Lca): 1990. ft

INCREMENTAL CHANGE IN LENGTH (Li) - ft      INCREMENTAL CHANGE IN ELEV (Hi) - ft

3980.      55.0

MEAN SLOPE (Sc): .0138 ft      BASIN FACTOR (Nb): .0500

WATERSHED TYPE(S): VALLEY

RAINFALL VALUES

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
P 1	1.36	1.74	1.99	2.32	2.61	2.91
P 2	1.51	1.95	2.24	2.61	2.95	3.28
P 3	1.61	2.08	2.40	2.80	3.17	3.53
P 6	1.80	2.34	2.70	3.16	3.58	4.00
P24	2.22	2.90	3.36	3.95	4.48	5.01

SOIL GROUPS

100. % B, CN= 82, COVER TYPE= DESERT BRUSH , COVER DENSITY= 25 %

IMPERVIOUS COVER= 5. %

RAINFALL/RUNOFF AND PEAK DISCHARGE DATA

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
RUNOFF SUPPLY RATE (q/i):	.210	.336	.408	.484	.541	.587
Tc ( FUNCTION OF i ) :	72.89	60.37	55.91	52.20	49.94	48.32
SOLUTION OF Tc (MINUTES):	67	45	38	32	28	25
RAINFL INT. @ Tc (IN/HR):	1.237	2.125	2.713	3.502	4.288	5.084
RUNOFF RATE @ Tc (IN/HR):	.260	.715	1.106	1.694	2.318	2.985
PEAK DISCHARGE (CFS) :	9.	24.	37.	56.	77.	99.

PROJECT NAME AND LOCATION: SAN JOAQUIN ESTATES

DRAINAGE CONCENTRATION POINT: 14

WATERSHED AREA (A): 173.10 acres

LENGTH OF WATERCOURSE (Lc): 6600. ft.

LENGTH TO CENTER OF GRAVITY (Lca): 3300. ft

INCREMENTAL CHANGE IN LENGTH (Li) - ft      INCREMENTAL CHANGE IN ELEV (Hi) - ft

6600.

107.0

MEAN SLOPE (Sc): .0162 ft      BASIN FACTOR (Nb): .0500

WATERSHED TYPE(S): VALLEY

#### RAINFALL VALUES

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
P 1	1.36	1.74	1.99	2.32	2.61	2.91
P 2	1.51	1.95	2.24	2.61	2.95	3.28
P 3	1.61	2.08	2.40	2.80	3.17	3.53
P 6	1.80	2.34	2.70	3.16	3.58	4.00
P24	2.22	2.90	3.36	3.95	4.48	5.01

#### SOIL GROUPS

100. % B, CN= 82, COVER TYPE= DESERT BRUSH , COVER DENSITY= 25 %

IMPERVIOUS COVER= 5. %

#### RAINFALL/RUNOFF AND PEAK DISCHARGE DATA

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
RUNOFF SUPPLY RATE (q/i):	.210	.336	.408	.484	.541	.587
Tc ( FUNCTION OF i ) :	92.62	76.71	71.04	66.34	63.46	61.40
SOLUTION OF Tc (MINUTES):	97	63	52	44	38	35
RAINFL INT. @ Tc (IN/HR):	.900	1.669	2.194	2.852	3.556	4.154
RUNOFF RATE @ Tc (IN/HR):	.189	.561	.895	1.380	1.922	2.439
PEAK DISCHARGE (CFS) :	33.	98.	156.	241.	335.	426.

PROJECT NAME AND LOCATION: SAN JOAQUIN ESTATES

DRAINAGE CONCENTRATION POINT: 15

WATERSHED AREA (A): <sup>~3780</sup> ~~3716.30~~ acres ✓

LENGTH OF WATERCOURSE (Lc): 31188. ft ✓

LENGTH TO CENTER OF GRAVITY (Lca): 21130. ft

INCREMENTAL CHANGE IN LENGTH (Li) - ft      INCREMENTAL CHANGE IN ELEV (Hi) - ft

1288.	600.0
1545.	300.0
2833.	200.0
2832.	100.0
8755.	140.0
13935.	175.0

MEAN SLOPE (Sc): .0193 ft      BASIN FACTOR (Nb): .0500

WATERSHED TYPE(S): VALLEY/MOUNTAIN

RAINFALL VALUES

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
P 1	1.36	1.74	1.99	2.32	2.61	2.91
P 2	1.51	1.95	2.24	2.61	2.95	3.28
P 3	1.61	2.08	2.40	2.80	3.17	3.53
P 6	1.80	2.34	2.70	3.16	3.58	4.00
P24	2.22	2.90	3.36	3.95	4.48	5.01

SOIL GROUPS

57. % B, CN= 82, COVER TYPE= DESERT BRUSH , COVER DENSITY= 25 %  
43. % D, CN= 91, COVER TYPE= DESERT BRUSH , COVER DENSITY= 25 %

IMPERVIOUS COVER= 1. %

RAINFALL/RUNOFF AND PEAK DISCHARGE DATA

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
RUNOFF SUPPLY RATE (q/i):	.281	.415	.485	.559	.611	.654
Tc ( FUNCTION OF i ) :	214.08	183.19	171.98	162.59	156.81	152.65
SOLUTION OF Tc (MINUTES):	341	231	193	162	142	128
RAINFL INT. @ Tc (IN/HR):	.313	.560	.752	1.015	1.279	1.552
RUNOFF RATE @ Tc (IN/HR):	.088	.232	.365	.567	.782	1.015
PEAK DISCHARGE (CFS) :	329.	869.	1367.	2125.	2929.	<del>3805.</del>

3869

PROJECT NAME AND LOCATION: SAN JOAQUIN ESTATES

DRAINAGE CONCENTRATION POINT: 7 & 8 COMBINED

WATERSHED AREA (A): 196.80 acres ✓

LENGTH OF WATERCOURSE (Lc): 5800. ft

LENGTH TO CENTER OF GRAVITY (Lca): 2900. ft

INCREMENTAL CHANGE IN LENGTH (Li) - ft      INCREMENTAL CHANGE IN ELEV (Hi) - ft

5800.      95.0

MEAN SLOPE (Sc): .0164 ft      BASIN FACTOR (Nb): .0500

WATERSHED TYPE(S): VALLEY

#### RAINFALL VALUES

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
P 1	1.36	1.74	1.99	2.32	2.61	2.91
P 2	1.51	1.95	2.24	2.61	2.95	3.28
P 3	1.61	2.08	2.40	2.80	3.17	3.53
P 6	1.80	2.34	2.70	3.16	3.58	4.00
P24	2.22	2.90	3.36	3.95	4.48	5.01

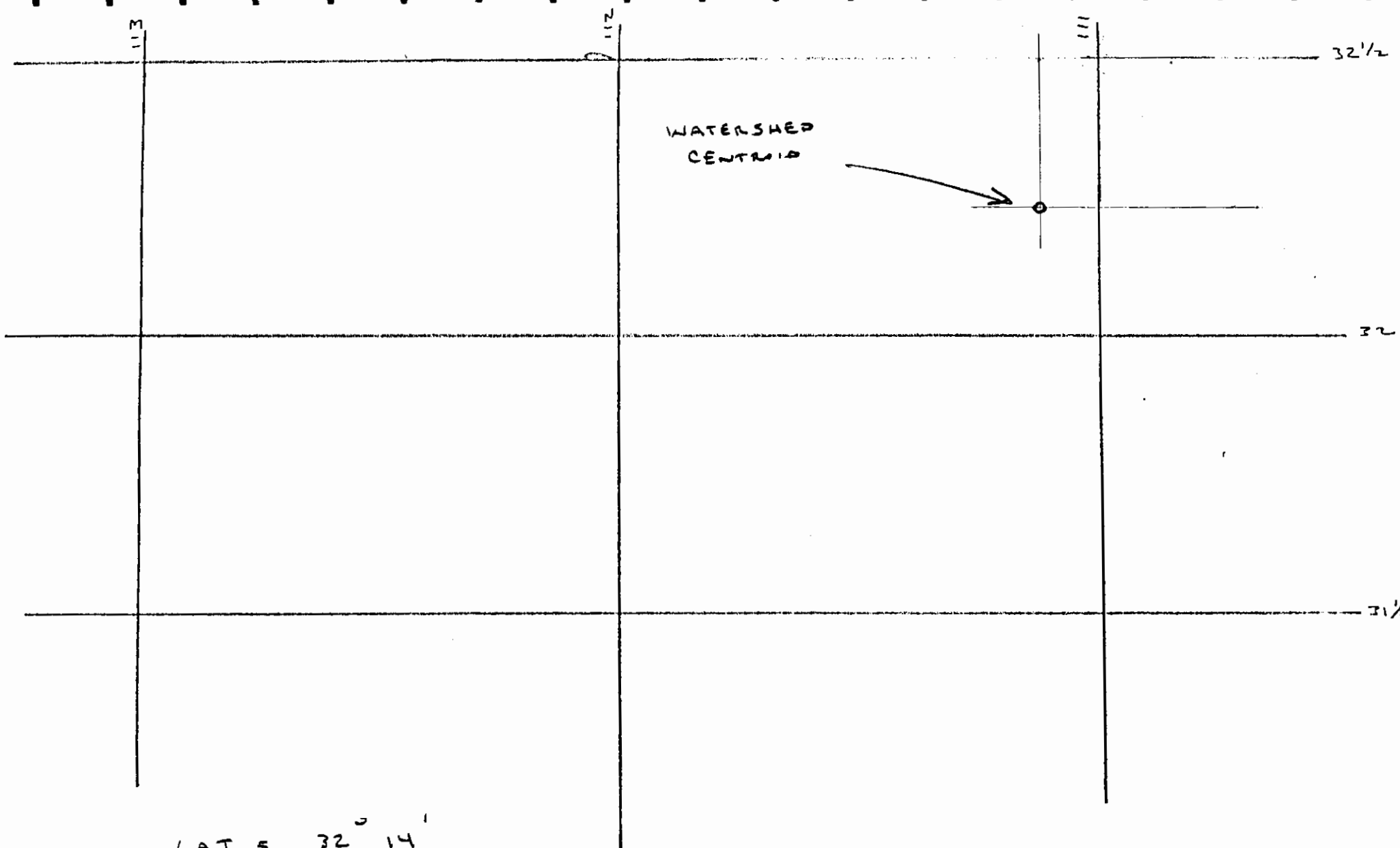
#### SOIL GROUPS

100. % B, CN= 82, COVER TYPE= DESERT BRUSH , COVER DENSITY= 25 %

IMPERVIOUS COVER= 5. %

#### RAINFALL/RUNOFF AND PEAK DISCHARGE DATA

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
RUNOFF SUPPLY RATE (q/i):	.210	.336	.408	.484	.541	.587
Tc ( FUNCTION OF i ) :	85.36	70.70	65.47	61.14	58.48	56.58
SOLUTION OF Tc (MINUTES):	85	56	46	39	35	31
RAINFL INT. @ Tc (IN/HR):	1.006	1.829	2.394	3.108	3.739	4.474
RUNOFF RATE @ Tc (IN/HR):	.211	.615	.976	1.504	2.021	2.627
PEAK DISCHARGE (CFS) :	42.	122.	194.	298.	401.	521.



LAT. = 32° 14'  
LONG. = 111° 7 1/2'

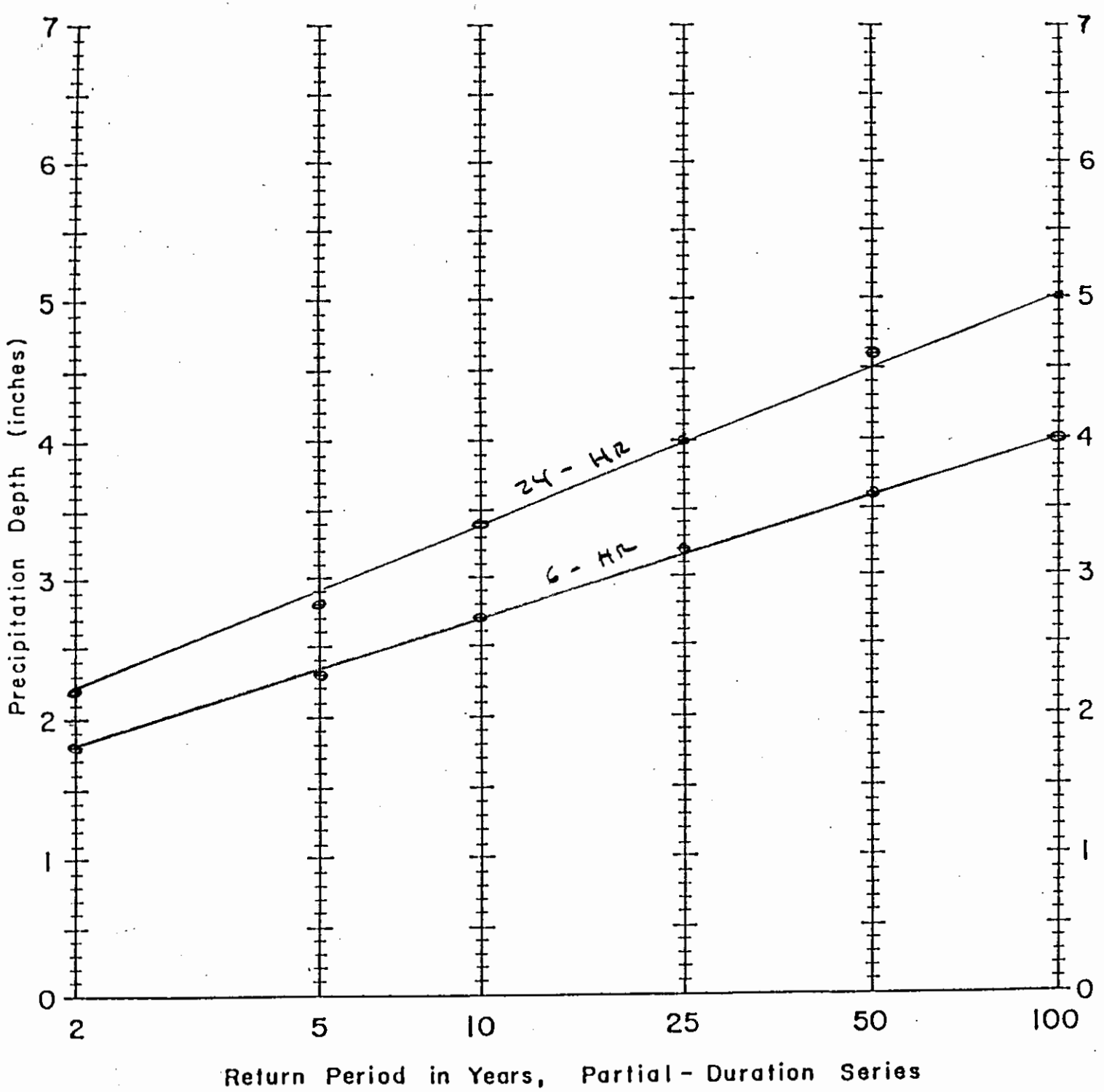
89015  
1

✓

Return Period (Years)	Precipitation Values (inches)			
	6 Hour Duration		24 Hour Duration	
	MAP VALUE	CORRECTED VALUE	MAP VALUE	CORRECTED VALUE
2	1.8	1.80	2.2	2.22
5	2.3	2.34	2.8	2.90
10	2.7	2.70	3.4	3.36
25	3.2	3.16	4.0	3.95
50	3.6	3.58	4.6	4.48
100	4.0	4.00	5.0	5.01

Latitude 32° 14'

Longitude 111° 7 1/2' ✓



Precipitation Depth Versus Return Period For  
Partial - Duration Series

APPENDIX B

HYDRAULIC COMPUTATION SHEETS

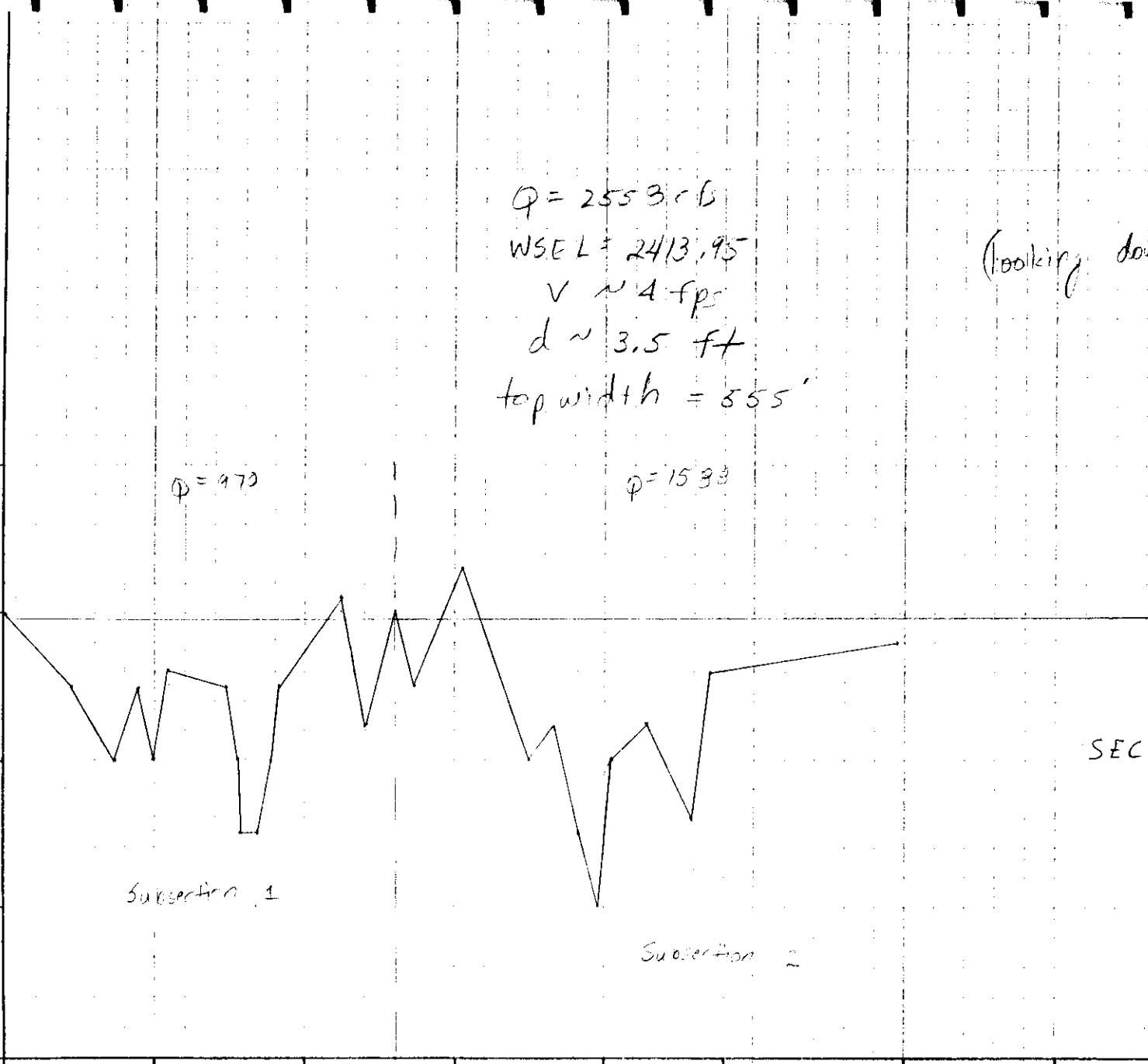
10000 m<sup>2</sup> above  
break in upstream water table  
(Pseudo result)  
- pseudo rating of section below  
4.5 m above curb top, suggest  
location for metal barrier



$Q = 2553 \text{ cfs}$   
 $WSEL = 2413.95'$   
 $V \sim 4 \text{ fps}$   
 $d \sim 3.5 \text{ ft}$   
top width = 855'

(looking downstream)

2416  
2414  
2412  
2410  
2408



$\phi = 970$

$\phi = 1533$

Subsection 1

Subsection 2

SEC # 1

0 100 200 300 400 500 600 700

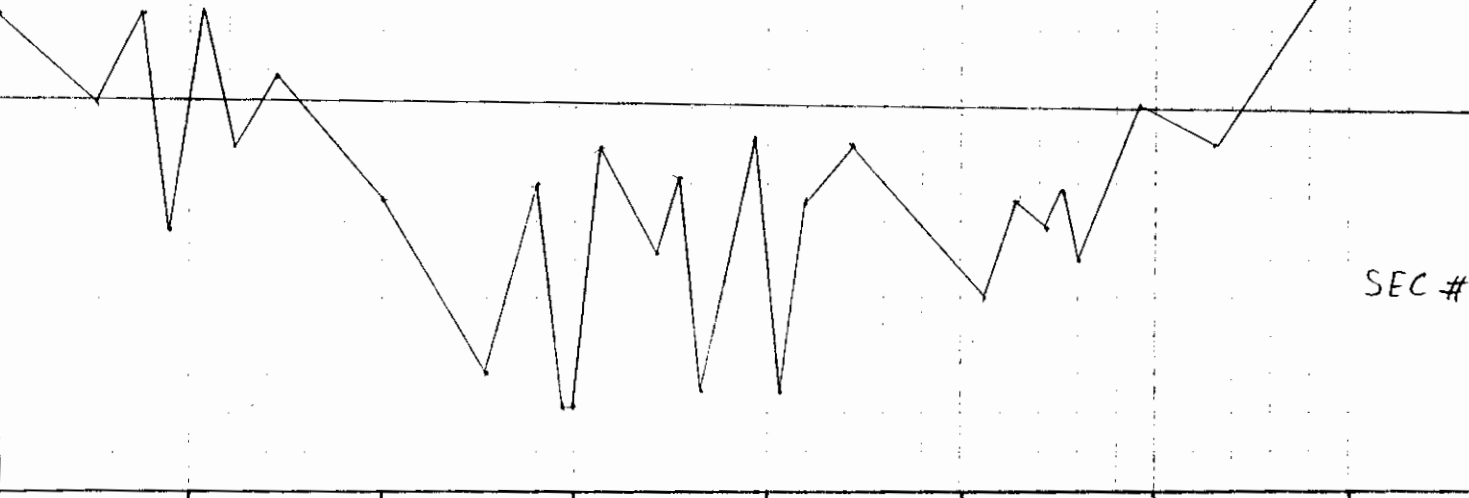
Q=3119 cfs  
WSEL= 2394.1  
vel = 4.9 fps  
top width = 530 ft.  
depth ~ 3.5 ft

✓

2398  
2396  
2394  
2392  
91  
2390

SEC #2

0 100 200 300 400 500 600 700 800 900



Q=3118 cfs  
vel=3.4 f/s  
WSEL=2388.72  
top width=337



2391

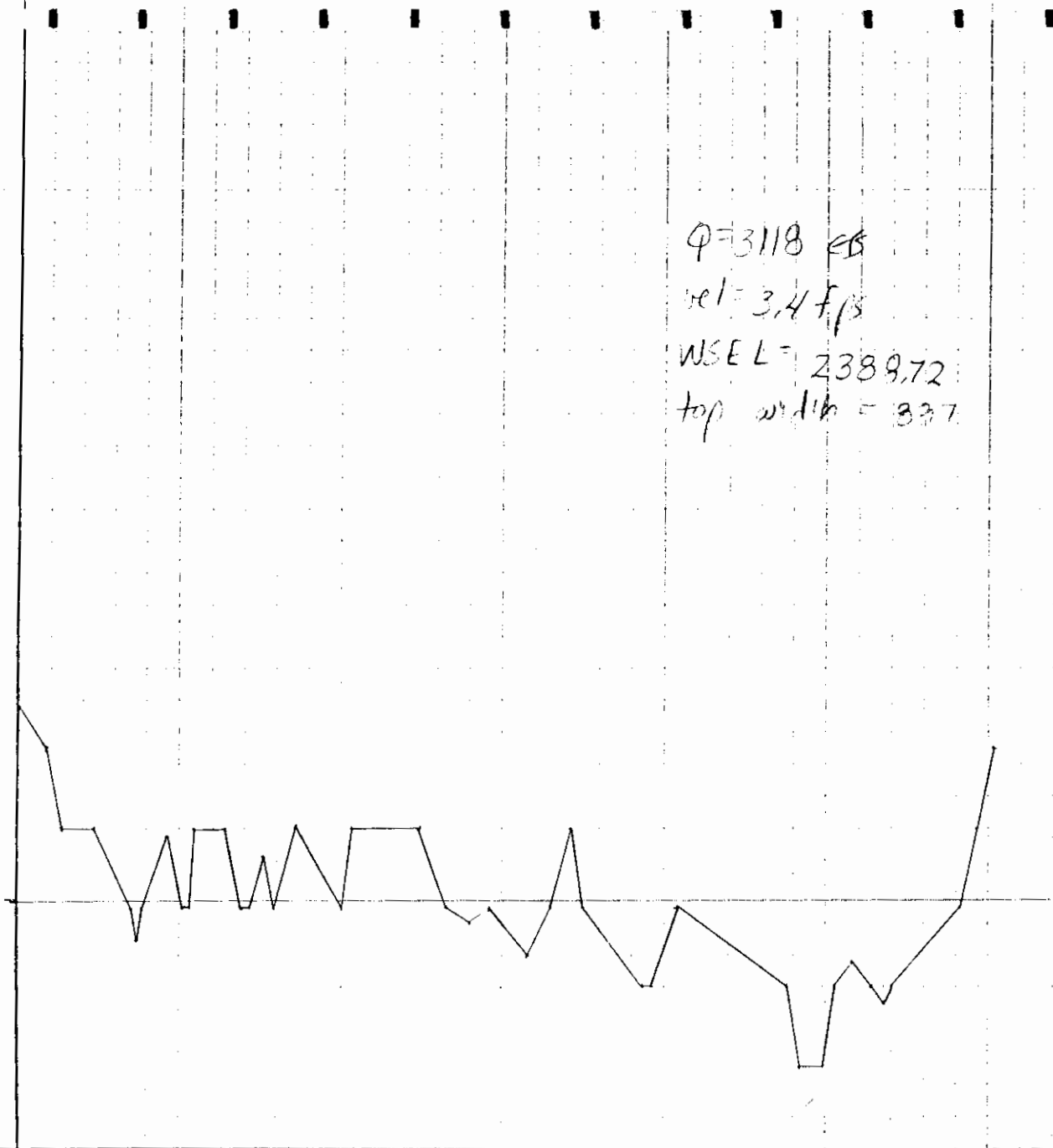
2389

2387

2385

SEC #3

0 200 400 600 800 1000 1200 1400 1600



bottom of struc.  
framb  
(NOT FFE)

$$Q = 974 \text{ cfs}$$
$$WSEL \approx 2395$$
$$V = 3.4 \text{ fps}$$
$$y \approx 3.2'$$

2396

2394

2392

2390

0

100

200

300

400

500

600

700

800

900

may need to  
raise FFE on  
lot 111 to 95.5  
min

SEC #4

$Q = 975 \text{ cfs}$

WSEL = 2390.5'

vel  $\sim 2.5 \text{ fps}$

$y \sim 2.5'$



2394

2392

2390

2388

0

100

200

300

400

500

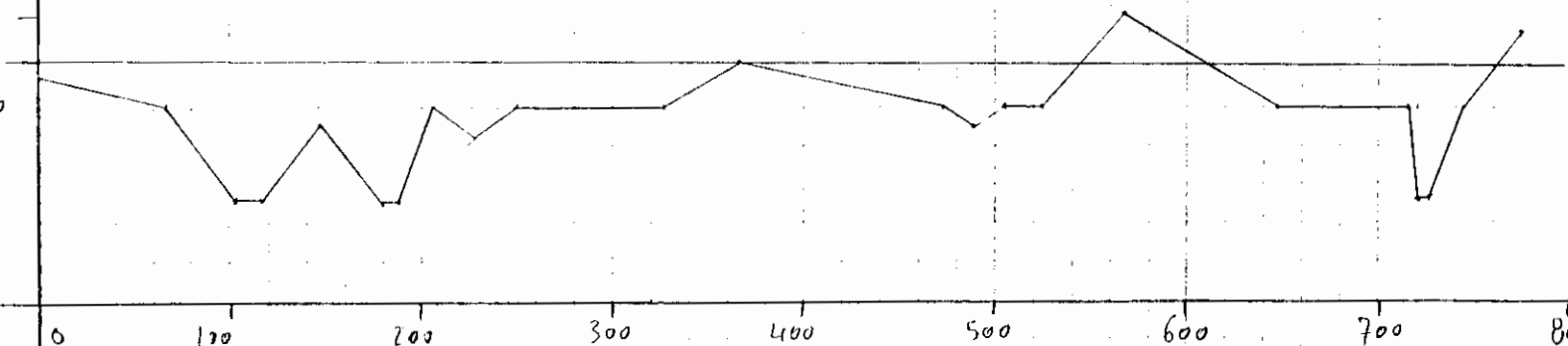
600

700

800

900

SEC # 5

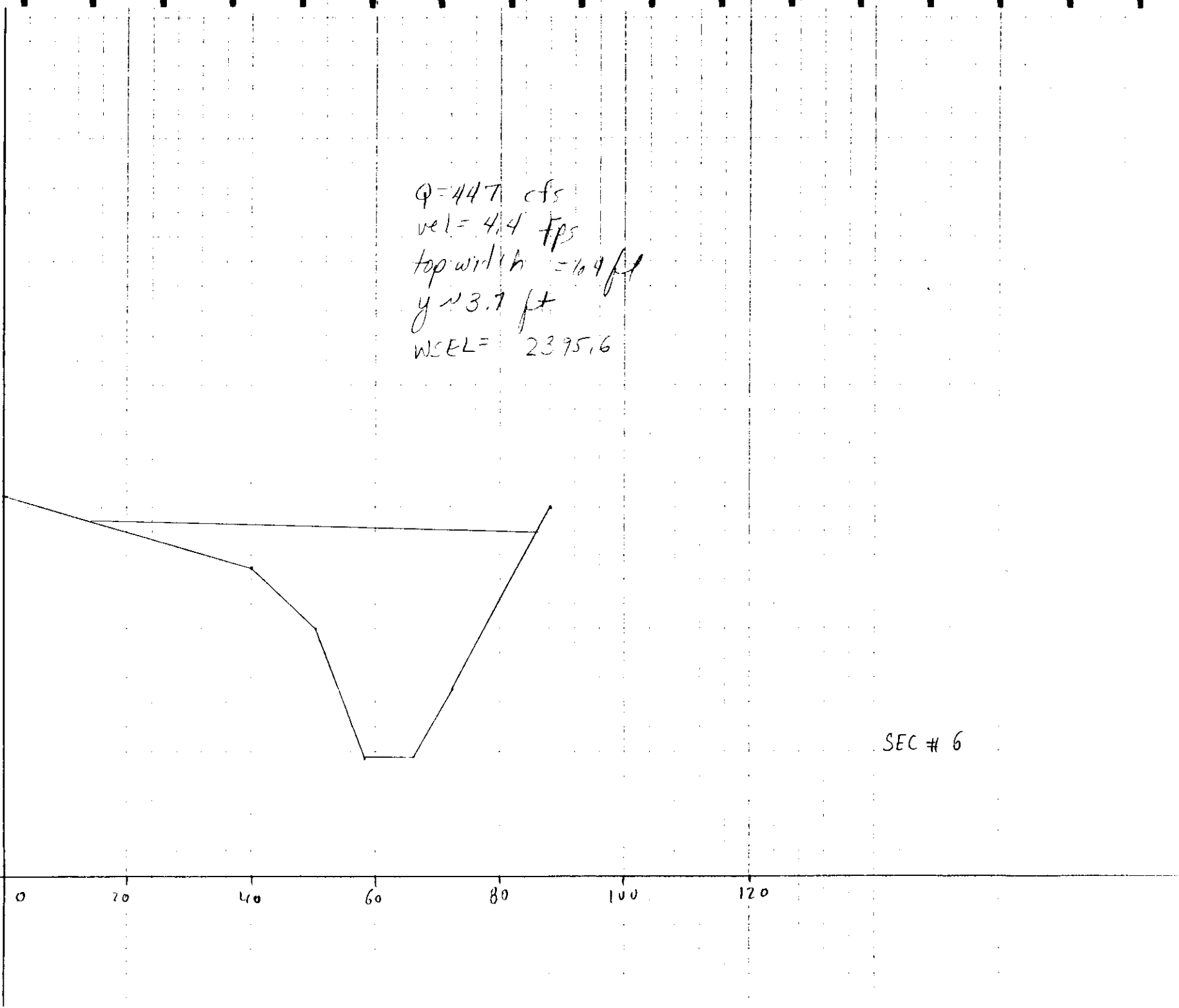


Q = 447 cfs  
vel = 4.4 fps  
top width = 109 ft  
y = 3.7 ft  
WSEL = 2395.6

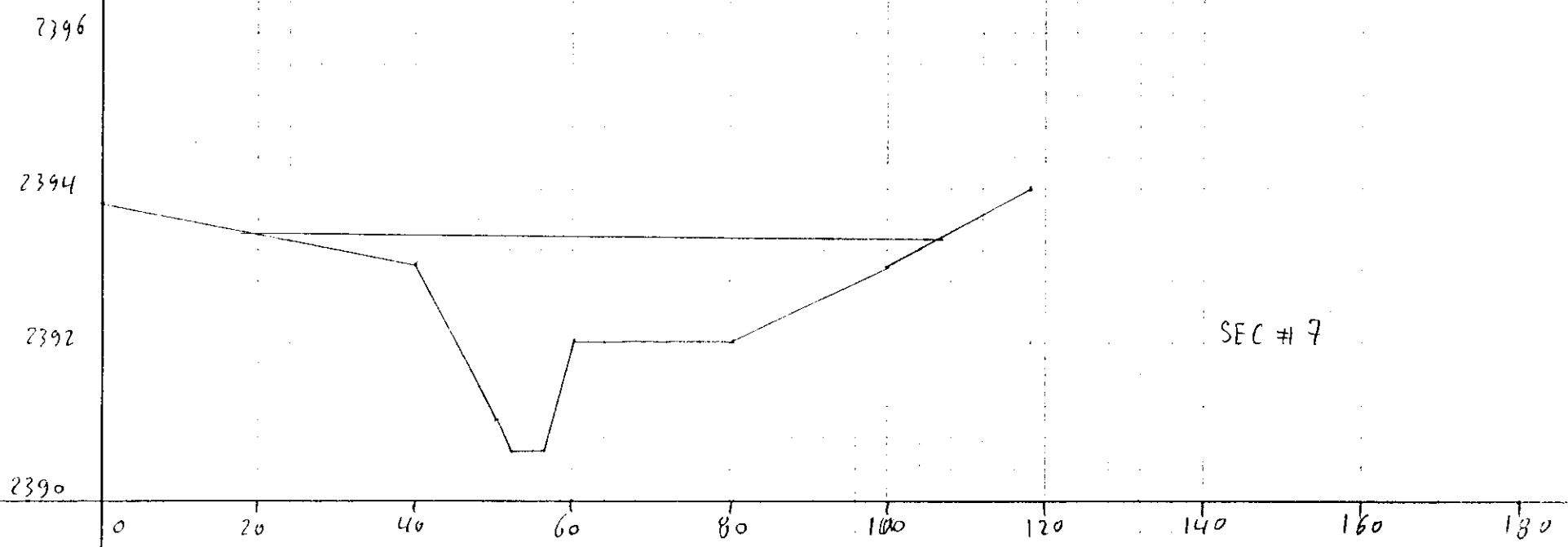
2398  
2396  
2394  
2392  
2390

0 70 140 60 80 100 120

SEC # 6



$Q = 447 \text{ cfs}$   
 $WSEL \approx 2393.7$   
 $v = 3.7 \text{ fps}$   
 $d \approx 3.5 \text{ ft}$   
 $\text{top width} = 109 \text{ ft}$



SEC # 7

Q = 447 cfs  
WSEL = 2392.3 ft  
vel ~ 3 fps  
y ~ 3.75 ft  
top width ~ 160'



2394

2392

2390

2388

0

20

40

60

80

100

120

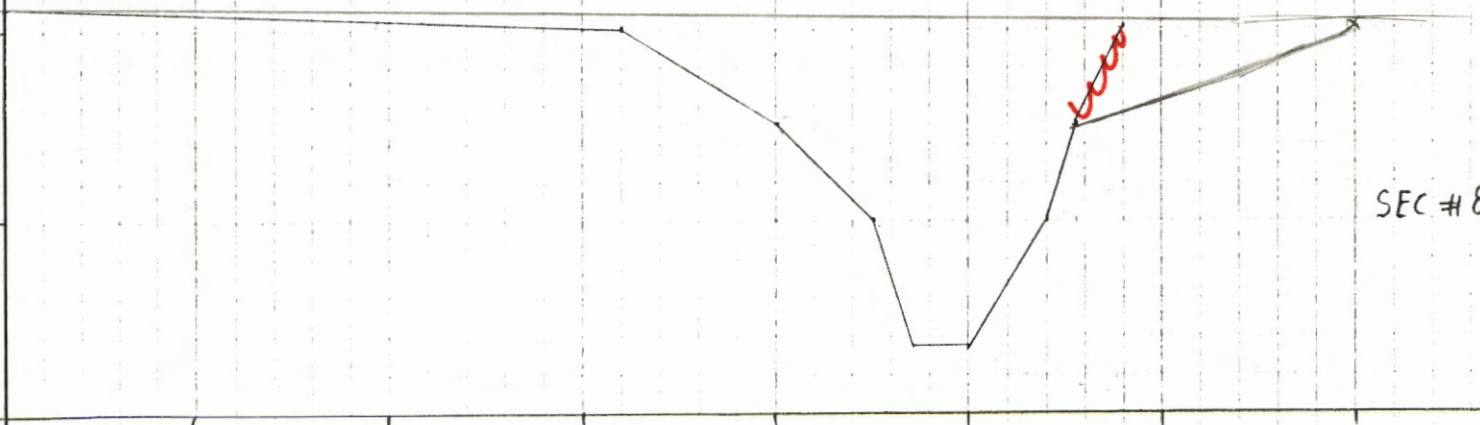
140

160

180

SWP

SEC # 8





SECTION D1 \*

\* BASED ON STREET IMPROVEMENT PLANS

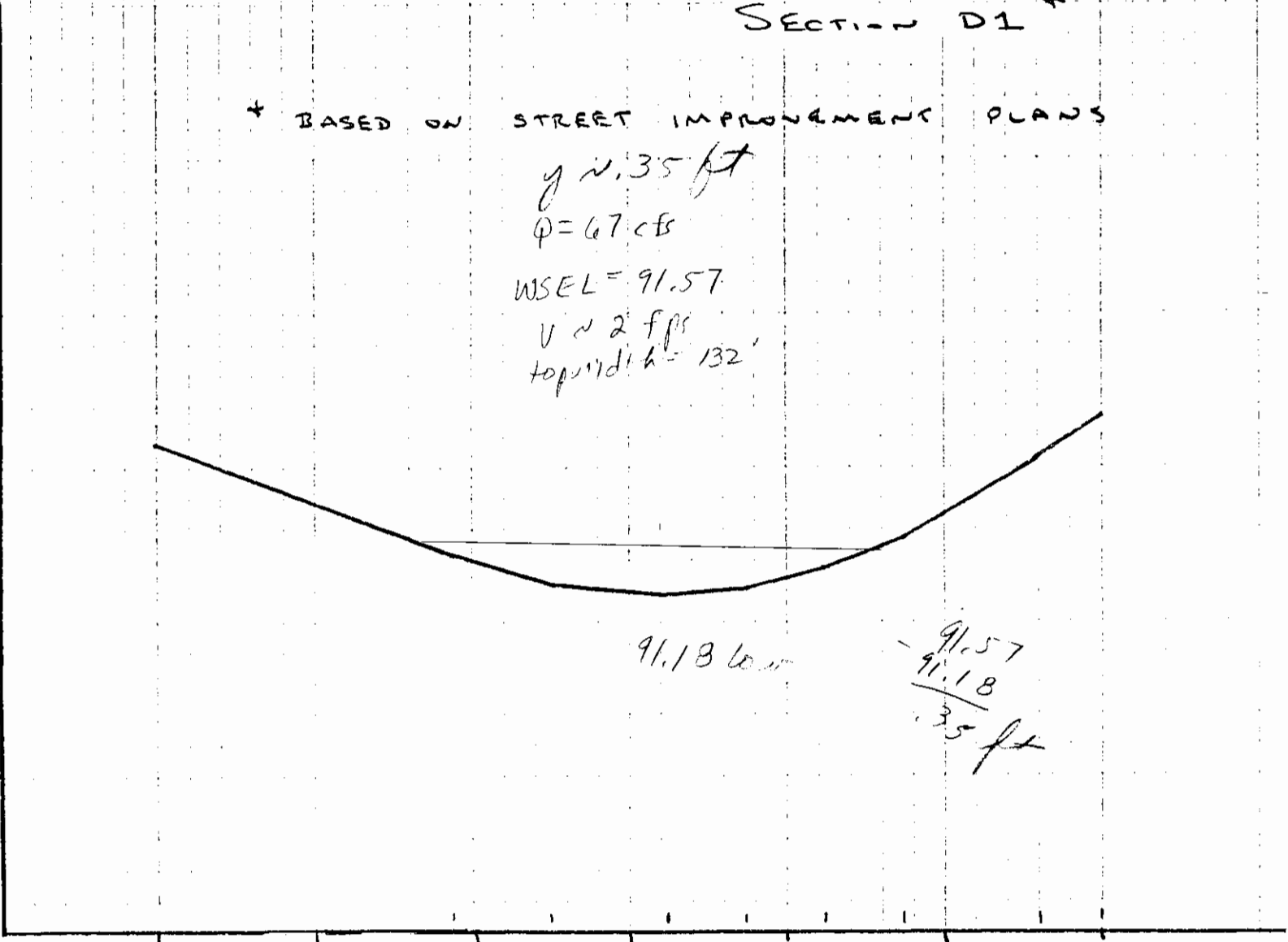
$y \approx 3.5$  ft  
 $Q = 67$  cfs  
WSEL = 91.57  
 $V \approx 2$  fps  
top width = 132'

93  
92  
91  
90

0 40 80 120 160 200 240

91.18 lower

$$\begin{array}{r} 91.57 \\ - 91.18 \\ \hline 0.35 \text{ ft} \end{array}$$



SECTION DZ\*

\* BASED ON STREET IMPROVEMENT PLANS

$Q = 32 \text{ cfs}$   
WEEL = 92.73 ft  
 $V = 1.7 \text{ ft/s}$   
top width = 96 ft

2394

2393

2392

2391

92.73  
- 92.43  
-----  
.30 depth

0

20

40

60

80

100

120

140

SAMPLE INPUT CROSS-SECTION FOR PROGRAM "NORMAL" WITH INPUT LEGEND

A SAMPLE INPUT FILE TO PROGRAM "NORMAL" IS SHOWN BELOW. THE INPUT FILE IS FOR A SINGLE CROSS-SECTION:

LINE #	1	2	3	4	5	6	7	8	9	10
1	SAMPLE WASH									
2	SAMPLE CROSS-SECTION									
3	.01	500	10	3	.060	-.025	.060			
4	67.5	0.0	67.0	65.0	66.0	77.5	65.0	-104.0	62.0	113.0
5	60.0	115.0	60.0	135.0	65.0	-158.0	66.0	170.0	69.0	-190.0

LINE #	COLUMN #	VARIABLE
1-2	1-10	TITLE CARDS
3	1	SLOPE (FT\FT)
3	2	DISCHARGE (CFS) OR WATER SURFACE ELEVATION (FT)
3	3	INTEGER NUMBER OF POINTS IN CROSS-SECTION
3	4	INTEGER NUMBER OF SUB-SECTIONS IN CROSS-SECTION (IF THIS VALUE IS NEGATIVE THEN THE VALUE OF LINE 3, COLUMN 2 IS USED AS THE WATER SURFACE ELEVATION AND THE PROGRAM SOLVES FOR THE DISCHARGE AT THAT ELEVATION OTHERWISE THE PROGRAM SOLVES FOR WATER SURFACE ELEVATION)
3	5-10	MANNING'S "n" VALUES (ONE FOR EACH SUB-SECTION). CHANNEL "n" VALUES SHOULD BE INPUT AS NEGATIVE.
3	9	NUMBER OF POINTS IN CROSS-SECTION
4-5	1-10	X-SECTION DATA (ELEV., STA., PAIRS). STATIONS WHICH MARK THE DIVISION BETWEEN SUB-SECTIONS SHOULD BE ENTERED AS NEGATIVE

ALL DATA ARE ENTERED IN FIELDS OF EIGHT CHARACTERS EXCEPT TITLE CARDS

MANNING RATING FOR SAN JOAQUIN ESTATES WASHES

1

.01300	2558.00	26	2	.04500	.04500					
2414.00	.00	2413.00	48.00	2412.00	74.00	2413.00	90.00	2412.20	100.00	
2413.20	108.00	2413.00	150.00	2412.00	156.00	2411.00	157.00	2411.00	168.00	
2412.00	176.00	2413.00	182.00	2414.20	226.00	2412.50	240.00	2414.00	-260.00	
2413.00	274.00	2414.60	306.00	2412.00	350.00	2412.50	366.00	2411.00	384.00	
2410.00	396.00	2412.00	404.00	2412.50	428.00	2411.20	458.00	2413.20	470.00	
2413.60	-594.00									

MANNING RATING FOR SAN JOAQUIN ESTATES WASHES

2

.01670	3118.40	28	1	.04500						
2395.00	.00	2394.10	52.00	2395.00	78.00	2392.70	92.00	2395.00	108.00	
2393.60	122.00	2394.30	144.00	2393.00	200.00	2391.20	256.00	2393.20	280.00	
2390.90	294.00	2390.90	300.00	2393.60	314.00	2392.50	344.00	2393.30	358.00	
2391.00	368.00	2393.70	394.00	2391.00	410.00	2393.00	420.00	2393.60	446.00	
2392.00	512.00	2393.00	530.00	2392.70	544.00	2393.10	554.00	2392.40	560.00	
2394.00	592.00	2393.60	630.00	2396.30	-720.00					

MANNING RATING FOR SAN JOAQUIN ESTATES WASHES

3

.01000	3118.00	41	1	.04500						
2390.50	.00	2390.00	32.00	2389.00	56.00	2389.00	92.00	2388.00	142.00	
2387.60	146.00	2388.00	152.00	2388.90	188.00	2388.00	204.00	2388.00	212.00	
2389.00	216.00	2389.00	256.00	2388.00	276.00	2388.00	286.00	2388.70	304.00	
2388.00	318.00	2389.00	340.00	2388.00	400.00	2389.00	414.00	2389.00	500.00	
2388.00	536.00	2387.80	560.00	2388.00	588.00	2387.40	632.00	2388.00	664.00	
2389.00	684.00	2388.00	700.00	2387.00	772.00	2387.00	786.00	2388.00	812.00	
2387.00	952.00	2386.00	966.00	2386.00	998.00	2387.00	1010.00	2387.30	1034.00	
2387.00	1056.00	2386.80	1070.00	2387.00	1080.00	2388.00	1168.00	2389.00	1188.00	
2390.00	-1208.00									

MANNING RATING FOR SAN JOAQUIN ESTATES WASHES

4

.01500	974.00	22	1	.04500						
2395.00	.00	2393.70	54.00	2394.40	72.00	2394.00	116.00	2393.00	120.00	
2394.00	134.00	2394.00	141.00	2392.40	156.00	2394.00	168.00	2395.10	230.00	
2394.50	240.00	2395.10	250.00	2393.50	264.00	2395.00	276.00	2395.30	500.00	
2395.00	520.00	2394.00	580.00	2393.00	584.00	2393.00	588.00	2394.00	594.00	
2395.00	626.00	2395.30	-646.00							

MANNING RATING FOR SAN JOAQUIN ESTATES WASHES

5

.01300	974.00	23	1	.04500						
2390.30	.00	2390.00	68.00	2389.00	102.00	2389.00	118.00	2389.80	148.00	
2389.00	180.00	2389.00	188.00	2390.00	208.00	2389.70	228.00	2390.00	250.00	
2390.00	328.00	2390.50	368.00	2390.00	472.00	2389.80	488.00	2390.00	504.00	
2390.00	524.00	2391.00	568.00	2390.00	648.00	2390.00	714.00	2389.00	720.00	
2389.00	726.00	2390.00	742.00	2390.80	-772.00					

MANNING RATING FOR SAN JOAQUIN ESTATES WASHES

6

.00960	447.00	7	1	.04500						
2396.20	.00	2395.00	40.00	2394.00	50.00	2391.90	58.00	2391.90	66.00	
2393.00	72.00	2396.00	-88.00							

MANNING RATING FOR SAN JOAQUIN ESTATES WASHES

7

.01100	447.00	10	1	.04500						
2393.80	.00	2393.00	40.00	2391.00	50.00	2390.60	52.00	2390.60	56.00	
2392.00	60.00	2392.00	76.00	2392.00	80.00	2393.00	100.00	2394.00	-118.00	

MANNING RATING FOR SAN JOAQUIN ESTATES WASHES

8

.00950	447.00	9	1	.04500						
2392.20	.00	2392.00	64.00	2391.00	80.00	2390.00	90.00	2388.70	94.00	
2388.70	100.00	2390.00	108.00	2391.00	111.00	2392.00	-160.00			

MANNING RATING FOR SAN JOAQUIN ESTATES WASHES

D1

92.15 .00 91.43 75.00 91.24 100.00 91.18 130.00 91.22 150.00  
91.35 170.00 91.54 190.00 92.06 225.00 92.33 -240.00

MANNING RATING FOR SAN JOAQUIN ESTATES WASHES  
D2

.01390 32.00 8 1 .03500  
93.00 .00 92.61 30.00 92.44 60.00 92.43 68.00 92.47 90.00  
92.65 110.00 92.90 130.00 93.25 -150.00

MANNING RATING FOR SAN JOAQUIN ESTATES WASHES

6 ( FOR CP# 7 AND CP# 8 COMBINED )

.00960 521.00 7 1 .04500  
2396.20 .00 2395.00 40.00 2394.00 50.00 2391.90 58.00 2391.90 66.00  
2393.00 72.00 2396.00 -88.00

MANNING RATING FOR SAN JOAQUIN ESTATES WASHES

7 ( FOR CP# 7 AND CP# 8 COMBINED )

.01100 521.00 10 1 .04500  
2393.80 .00 2393.00 40.00 2391.00 50.00 2390.60 52.00 2390.60 56.00  
2392.00 60.00 2392.00 76.00 2392.00 80.00 2393.00 100.00 2394.00 -118.00

MANNING RATING FOR SAN JOAQUIN ESTATES WASHES

8 ( FOR CP# 7 AND CP# 8 COMBINED )

.00950 521.00 9 1 .04500  
2392.20 .00 2392.00 64.00 2391.00 80.00 2390.00 90.00 2388.70 94.00  
2388.70 100.00 2390.00 108.00 2391.00 111.00 2392.00 -160.00

MANNING RATING FOR SAN JOAQUIN ESTATES WASHES

CROSS-SECTION - 1

DISCHARGE = 2558. WSEL = 2413.95 SLOPE = .0130

SECTION AND SUBSECTION HYDRAULIC DATA

---

	TOTAL SECTION	SUBSECTION #:	
		1	2
DISCHARGE (CFS) =	2557.64	970.22	1587.42
VELOCITY (FT/S) =	4.08	3.83	4.26
AREA (SQUARE FT) =	626.12	253.29	372.83
TOPWIDTH (FT) =	555.27	245.89	309.38
DEPTH (FT) =	3.95	2.95	3.95
HYD. DEPTH (FT) =	1.13	1.03	1.21
WET. PERIM. (FT) =	556.89	246.84	310.06
HYD. RADIUS (FT) =	1.12	1.03	1.20
FROUDE NUMBER =	.68	.67	.68
MANNINGS N VALUE =	.0448	.0450	.0450
SUBSECTION 1 = STATION .00 TO STATION 260.00			
SUBSECTION 2 = STATION 260.00 TO STATION 594.00			

MANNING RATING FOR SAN JOAQUIN ESTATES WASHES

CROSS-SECTION - 2

DISCHARGE = 3116. WSEL = 2394.08 SLOPE = .0167

SECTION AND SUBSECTION HYDRAULIC DATA

---

	TOTAL SECTION	SUBSECTION #: 1
DISCHARGE (CFS) =	3115.51	3115.51
VELOCITY (FT/S) =	4.84	4.84
AREA (SQUARE FT) =	643.20	643.20
TOPWIDTH (FT) =	530.09	530.09
DEPTH (FT) =	3.95	3.18
HYD. DEPTH (FT) =	1.21	1.21
WET. PERIM. (FT) =	531.93	531.93
HYD. RADIUS (FT) =	1.21	1.21
FROUDE NUMBER =	.77	.77
MANNINGS N VALUE =	.0450	.0450

SUBSECTION 1 = STATION .00 TO STATION 720.00

MANNING RATING FOR SAN JOAQUIN ESTATES WASHES

CROSS-SECTION - 3

DISCHARGE = 3118. WSEL = 2388.72 SLOPE = .0100

SECTION AND SUBSECTION HYDRAULIC DATA

---

	TOTAL SECTION	SUBSECTION #: 1
DISCHARGE (CFS) =	3118.05	3118.05
VELOCITY (FT/S) =	3.39	3.39
AREA (SQUARE FT) =	921.00	921.00
TOPWIDTH (FT) =	886.78	886.78
DEPTH (FT) =	3.95	2.72
HYD. DEPTH (FT) =	1.04	1.04
WET. PERIM. (FT) =	887.24	887.24
HYD. RADIUS (FT) =	1.04	1.04
FROUDE NUMBER =	.59	.59
MANNINGS N VALUE =	.0450	.0450

SUBSECTION 1 = STATION .00 TO STATION 1208.00



MANNING RATING FOR SAN JOAQUIN ESTATES WASHES

CROSS-SECTION - 4

DISCHARGE = 974. WSEL = 2394.99 SLOPE = .0150

SECTION AND SUBSECTION HYDRAULIC DATA

---

	TOTAL SECTION	SUBSECTION #: 1
DISCHARGE (CFS) =	973.83	973.83
VELOCITY (FT/S) =	3.40	3.40
AREA (SQUARE FT) =	286.03	286.03
TOPWIDTH (FT) =	369.45	369.45
DEPTH (FT) =	3.95	2.59
HYD. DEPTH (FT) =	.77	.77
WET. PERIM. (FT) =	370.28	370.28
HYD. RADIUS (FT) =	.77	.77
FROUDE NUMBER =	.68	.68
MANNINGS N VALUE =	.0450	.0450

SUBSECTION 1 = STATION .00 TO STATION 646.00

MANNING RATING FOR SAN JOAQUIN ESTATES WASHER

CROSS-SECTION - 5

DISCHARGE = 975. WSEL = 2390.46 SLOPE = .0130

SECTION AND SUBSECTION HYDRAULIC DATA

---

	TOTAL SECTION	SUBSECTION #: 1
DISCHARGE (CFS) =	974.71	974.71
VELOCITY (FT/S) =	2.54	2.54
AREA (SQUARE FT) =	383.11	383.11
TOPWIDTH (FT) =	689.31	689.31
DEPTH (FT) =	3.95	1.48
HYD. DEPTH (FT) =	.56	.56
WET. PERIM. (FT) =	689.51	689.51
HYD. RADIUS (FT) =	.56	.56
FROUDE NUMBER =	.60	.60
MANNINGS N VALUE =	.0450	.0450
SUBSECTION 1 = STATION .00 TO STATION 772.00		

MANNING RATING FOR SAN JOAQUIN ESTATES WASHES

CROSS-SECTION - 6

DISCHARGE = 447. WSEL = 2395.56 SLOPE = .0096

SECTION AND SUBSECTION HYDRAULIC DATA

---

	TOTAL SECTION	SUBSECTION #: 1
DISCHARGE (CFS) =	446.99	446.99
VELOCITY (FT/S) =	4.37	4.37
AREA (SQUARE FT) =	102.19	102.19
TOPWIDTH (FT) =	64.36	64.36
DEPTH (FT) =	3.95	3.66
HYD. DEPTH (FT) =	1.59	1.59
WET. PERIM. (FT) =	65.03	65.03
HYD. RADIUS (FT) =	1.57	1.57
FROUDE NUMBER =	.61	.61
MANNINGS N VALUE =	.0450	.0450
SUBSECTION 1 = STATION .00 TO STATION 88.00		

MANNING RATING FOR SAN JOAQUIN ESTATES WASHES

CROSS-SECTION - 8

DISCHARGE = 447. WSEL = 2392.31 SLOPE = .0095

SECTION AND SUBSECTION HYDRAULIC DATA

---

	TOTAL SECTION	SUBSECTION #: 1
DISCHARGE (CFS) =	446.91	446.91
VELOCITY (FT/S) =	3.04	3.04
AREA (SQUARE FT) =	147.16	147.16
TOPWIDTH (FT) =	160.00	160.00
DEPTH (FT) =	3.95	3.61
HYD. DEPTH (FT) =	.92	.92
WET. PERIM. (FT) =	160.56	160.56
HYD. RADIUS (FT) =	.92	.92
FROUDE NUMBER =	.56	.56
MANNINGS N VALUE =	.0450	.0450

SUBSECTION 1 = STATION .00 TO STATION 160.00

MANNING RATING FOR SAN JOAQUIN ESTATES WASHES

CROSS-SECTION - D1

DISCHARGE = 67. WSEL = 91.57 SLOPE = .0133

*min flow 21.18*

SECTION AND SUBSECTION HYDRAULIC DATA

	TOTAL SECTION	SUBSECTION #: 1
DISCHARGE (CFS) =	67.06	67.06
VELOCITY (FT/S) =	1.98	1.98
AREA (SQUARE FT) =	33.95	33.95
TOPWIDTH (FT) =	132.41	132.41
DEPTH (FT) =	3.95	.39
HYD. DEPTH (FT) =	.26	.26
WET. PERIM. (FT) =	132.42	132.42
HYD. RADIUS (FT) =	.26	.26
FROUDE NUMBER =	.69	.69
MANNINGS N VALUE =	.0350	.0350
SUBSECTION 1 = STATION .00 TO STATION 240.00		

MANNING RATING FOR SAN JOAQUIN ESTATES WASHES

CROSS-SECTION - D2

DISCHARGE = 32. WSEL = 92.73 SLOPE = .0139

SECTION AND SUBSECTION HYDRAULIC DATA

---

	TOTAL SECTION	SUBSECTION #: 1
DISCHARGE (CFS) =	32.00	32.00
VELOCITY (FT/S) =	1.69	1.69
AREA (SQUARE FT) =	18.93	18.93
TOPWIDTH (FT) =	96.40	96.40
DEPTH (FT) =	3.95	.30
HYD. DEPTH (FT) =	.20	.20
WET. PERIM. (FT) =	96.40	96.40
HYD. RADIUS (FT) =	.20	.20
FROUDE NUMBER =	.67	.67
MANNINGS N VALUE =	.0350	.0350
SUBSECTION 1 = STATION .00 TO STATION 150.00		

MANNING RATING FOR SAN JOAQUIN ESTATES WASHES

CROSS-SECTION - 6 ( FOR CP# 7 AND CP# 8 COMBINED )

DISCHARGE = 521. WSEL = 2395.79 SLOPE = .0096

SECTION AND SUBSECTION HYDRAULIC DATA

---

	TOTAL SECTION	SUBSECTION #: 1
DISCHARGE (CFS) =	521.20	521.20
VELOCITY (FT/S) =	4.42	4.42
AREA (SQUARE FT) =	117.94	117.94
TOPWIDTH (FT) =	73.22	73.22
DEPTH (FT) =	3.95	3.89
HYD. DEPTH (FT) =	1.61	1.61
WET. PERIM. (FT) =	73.91	73.91
HYD. RADIUS (FT) =	1.60	1.60
FROUDE NUMBER =	.61	.61
MANNINGS N VALUE =	.0450	.0450

SUBSECTION 1 = STATION .00 TO STATION 88.00

MANNING RATING FOR SAN JOAQUIN ESTATES WASHES

CROSS-SECTION - 7

DISCHARGE = 447. WSEL = 2393.71 SLOPE = .0110

SECTION AND SUBSECTION HYDRAULIC DATA

---

	TOTAL SECTION	SUBSECTION #: 1
DISCHARGE (CFS) =	446.96	446.96
VELOCITY (FT/S) =	3.71	3.71
AREA (SQUARE FT) =	120.53	120.53
TOPWIDTH (FT) =	108.28	108.28
DEPTH (FT) =	3.95	3.11
HYD. DEPTH (FT) =	1.11	1.11
WET. PERIM. (FT) =	108.80	108.80
HYD. RADIUS (FT) =	1.11	1.11
FROUDE NUMBER =	.62	.62
MANNINGS N VALUE =	.0450	.0450

SUBSECTION 1 = STATION .00 TO STATION 118.00



MANNING RATING FOR SAN JOAQUIN ESTATES WASHES

CROSS-SECTION - 7 ( FOR CP# 7 AND CP# 8 COMBINED )

DISCHARGE = 521. WSEL = 2393.84 SLOPE = .0110

SECTION AND SUBSECTION HYDRAULIC DATA

---

	TOTAL SECTION	SUBSECTION #: 1
DISCHARGE (CFS) =	521.06	521.06
VELOCITY (FT/S) =	3.85	3.85
AREA (SQUARE FT) =	135.44	135.44
TOPWIDTH (FT) =	115.17	115.17
DEPTH (FT) =	3.95	3.24
HYD. DEPTH (FT) =	1.18	1.18
WET. PERIM. (FT) =	115.70	115.70
HYD. RADIUS (FT) =	1.17	1.17
FROUDE NUMBER =	.63	.63
MANNINGS N VALUE =	.0450	.0450

SUBSECTION 1 = STATION .00 TO STATION 118.00

MANNING RATING FOR SAN JOAQUIN ESTATES WASHES

CROSS-SECTION - 8 ( FOR CP# 7 AND CP# 8 COMBINED )

DISCHARGE = 521. WSEL = 2392.40 SLOPE = .0095

SECTION AND SUBSECTION HYDRAULIC DATA

---

	TOTAL SECTION	SUBSECTION #: 1
DISCHARGE (CFS) =	520.98	520.98
VELOCITY (FT/S) =	3.23	3.23
AREA (SQUARE FT) =	161.34	161.34
TOPWIDTH (FT) =	160.00	160.00
DEPTH (FT) =	3.95	3.70
HYD. DEPTH (FT) =	1.01	1.01
WET. PERIM. (FT) =	160.56	160.56
HYD. RADIUS (FT) =	1.00	1.00
FROUDE NUMBER =	.57	.57
MANNINGS N VALUE =	.0450	.0450
SUBSECTION 1 = STATION .00 TO STATION 160.00		



CAP LEVEL STORAGE DATA

ELEV	A (ACRES)	ΔV (AC. FT)	ΣV (AC. FT)
2380	0	0	0
2383	10.4 *	10.4	10.4
2385	17.3	27.4	37.8
2387	28.2 *	45.1	82.9
2389	39.1 *	67.6	149.9
2390	44.5	41.8	191.7

A = SURFACE AREA (\* INTERPOLATED)

ΔV = INCREMENTAL VOLUME BY CONIC METHOD

ΣV = SUM OF INCREMENTAL VOLUMES

$Q_{in} = 38000 @ CP 15 ✓$

$@ \text{dia } 85 \frac{(220' \times 220') \times 5'}{2} = 1,540,000 \text{ ft}^3 = 35.3 \text{ acft}$

CAP OVERCHUTE STRUCTURE  
OUTFLOW DATA

2 - STRUCTURES ✓

5 - 72" DIA PIPES AT EACH STRUCTURE ✓

INVERT ~ 2380 ✓

FROM HEC-5 INVERT CONTROL CHART FOR  
CMPs:

ELEV	HW (FT)	HW/D (FT)	Q/PIPE (CFS)	TOTAL Q (CFS)
2380	0	0	0	0
2383	3	0.5	65 ✓	650
2385	5	0.83	150 ✓	1500
2387	7	1.17	240 ✓	2400
2389	9	1.5 ✓	310 ✓	3100
2390	10	1.67 ✓	350 ✓	3500

$$V = \frac{Q}{A} = \frac{240}{27.4} = 8.76 \text{ ft/s}$$

100  
27.4 ft

CP#15, 100-YEAR HYDROGRAPH

CAP LEVEE STORAGE

## WORKING TABLE:

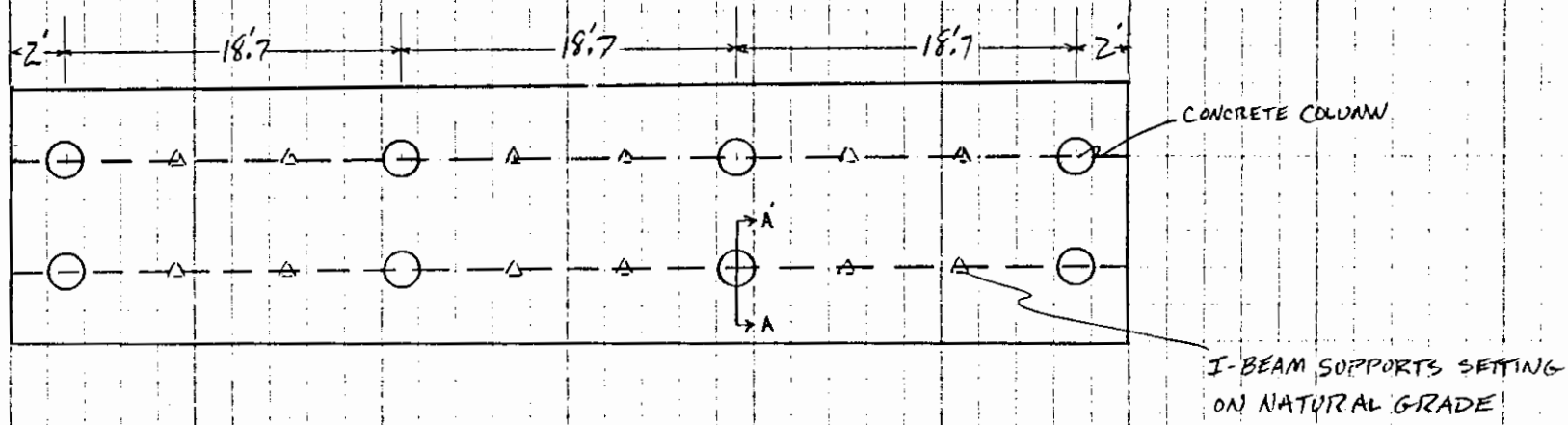
STAGE (ft)	OUTFLOW (cfs)	O/2 (cfs)	STORAGE (ac-ft)	S/DT (cfs)	S/DT+O/2 (cfs)
2380.00	.00	.00	.00	.00	.00
2383.00	650.00	325.00	10.40	1510.08	1835.08
2385.00	1500.00	750.00	37.80	5488.56	6238.56
2387.00	2400.00	1200.00	82.90	12037.08	13237.08
2389.00	3100.00	1550.00	149.90	21765.48	23315.48
2390.00	3500.00	1750.00	191.70	27834.84	29584.84

## ROUTING TABLE:

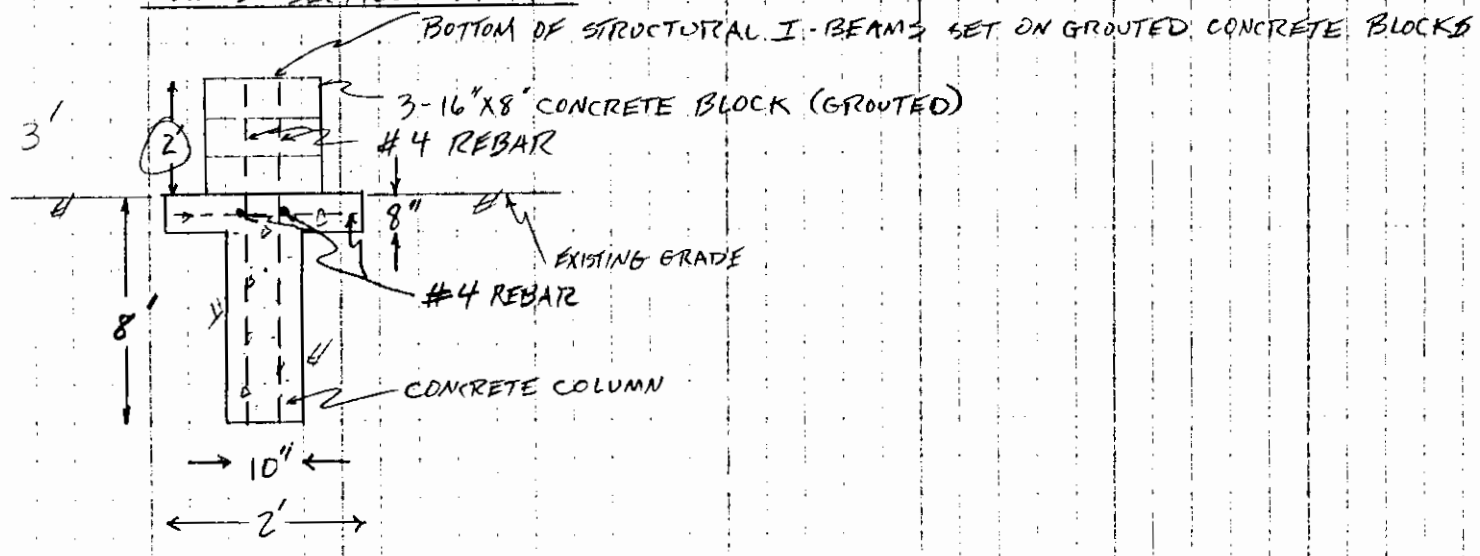
STEP	TIME (min)	INFLOW (cfs)	S/DT+O/2 (cfs)	OUTFLOW (cfs)	STORAGE (ac-ft)	STAGE (ft)
0	.00	.00	.00	.00	.00	2380.00
1	5.00	44.25	22.13	7.84	.13	2380.04
2	10.00	88.51	80.67	28.57	.46	2380.13
3	15.00	188.54	190.62	67.52	1.08	2380.31
4	20.00	298.30	366.52	129.82	2.08	2380.60
5	25.00	421.74	596.72	211.36	3.38	2380.98
6	30.00	550.97	871.71	308.77	4.94	2381.43
7	35.00	690.01	1183.43	419.18	6.71	2381.93
8	40.00	836.94	1527.73	541.13	8.66	2382.50
9	45.00	998.26	1904.19	663.34	10.83	2383.03
10	50.00	1180.59	2330.28	745.59	13.48	2383.22
11	55.00	1363.83	2856.90	847.24	16.76	2383.46
12	60.00	1549.70	3466.42	964.90	20.55	2383.74
13	65.00	1739.46	4146.11	1096.10	24.78	2384.05
14	70.00	1960.74	4900.11	1241.64	29.47	2384.39
15	75.00	2182.01	5729.85	1401.80	34.63	2384.77
16	80.00	2466.26	6652.18	1553.19	40.47	2385.12
17	85.00	2753.03	7708.63	1689.05	47.27	2385.42
18	90.00	3021.09	8906.64	1843.11	54.99	2385.76
19	95.00	3284.85	10216.50	2011.56	63.43	2386.14
20	100.00	3506.24	11600.49	2189.54	72.35	2386.53
21	105.00	3706.27	13017.21	2371.72	81.48	2386.94
22	110.00	3803.00	14400.12	2480.78	90.63	2387.23
23	115.00	3598.99	15620.33	2565.53	98.74	2387.47
24	120.00	3458.59	16583.59	2632.43	105.15	2387.66
25	125.00	3308.12	17334.52	2684.59	110.14	2387.81
26	130.00	3158.43	17883.20	2722.70	113.79	2387.92
27	135.00	3011.51	18245.47	2747.86	116.20	2387.99
28	140.00	2865.21	18435.97	2761.09	117.46	2388.03
29	145.00	2727.14	18471.06	2763.53	117.69	2388.04
30	150.00	2589.06	18365.63	2756.21	116.99	2388.02
31	155.00	2457.52	18132.71	2740.03	115.45	2387.97
32	160.00	2326.53	17784.71	2715.86	113.13	2387.90
33	165.00	2216.11	17340.17	2684.98	110.18	2387.81

# PLAN VIEW AND CROSS-SECTION OF MOBILE HOME SUPPORT COLUMNS

## PLAN VIEW



## CROSS-SECTION A-A'



File 600-89-12

To: Sunburst Investment  
4441 N. Camino Del Rey  
Tucson, Arizona 85718

Date:

Attn: Lowell Johnson

Job No.: 88-297

REQUEST FOR PAVEMENT DESIGN DATA

Project: San Joaquin Estates III

Location: San Joaquin Road

Governing Agency (PCDOT, City, ADOT): PCDOT

Road Classification: Collector

Minimum Structural Number  $\overline{SN}$ : 1.75

Design Life (years): 20

Serviceability Index: 2.5

EQUIVALENT 18K SINGLE AXLE LOAD APPL'S  
OVER DESIGN LIFE PERIOD 300,000

REGIONAL FACTOR 1.7

DESIGN CRITERIA/MANUAL/PROCEDURES ADOT Materials Prel. Eng. & Design Manual

Structural Coefficient for 2" Asphaltic Concrete .8

Structural Coefficient for 3" Asphaltic Concrete 1.2

Structural Coefficient for Aggregate Base Course .12

Completed By: Ant Sudduth Date: 10-11-88

Agency/Company: PCDOT Phone: 882-2622

To: Sunburst Investment  
4441 N. Camino Del Rey  
Tucson, Arizona 85718

Date:

Attn: Lowell Johnson

Job No.: 88-297

REQUEST FOR PAVEMENT DESIGN DATA

Project: San Joaquin Estates III

Location: Constellation Way

Governing Agency (PCDOT, City, ADOT): PCDOT

Road Classification: Local Street

Minimum Structural Number  $\overline{SN}$ : 1.3

Design Life (years): 20

Serviceability Index: 2.0

EQUIVALENT 18K SINGLE AXLE LOAD APPL'S  
OVER DESIGN LIFE PERIOD 11,000

REGIONAL FACTOR 1.7

DESIGN CRITERIA/MANUAL/PROCEDURES ADOT Manual

Structural Coefficient for 2" Asphaltic Concrete .8

Structural Coefficient for 3" Asphaltic Concrete 1.2

Structural Coefficient for Aggregate Base Course .2

Completed By: Sub. [Signature] Date: 10-11-88

Agency/Company: PCDOT Phone: 882-2822



To: Sunburst Investment  
4441 N. Camino Del Rey  
Tucson, Arizona 85718

Date:

Attn: Lowell Johnson

Job No.: 88-297

REQUEST FOR PAVEMENT DESIGN DATA

Project: San Joaquin Estates III

Location: Mercury Drive

Governing Agency (PCDOT City, ADOT): PCDD-

Road Classification: Local Street

Minimum Structural Number SN: 13

Design Life (years): 20

Serviceability Index: 2.0

EQUIVALENT 18K SINGLE AXLE LOAD APPL'S  
OVER DESIGN LIFE PERIOD 14,000

REGIONAL FACTOR 1.7

DESIGN CRITERIA/MANUAL/PROCEDURES AC- Material

Structural Coefficient for 2" Asphaltic Concrete .8

Structural Coefficient for 3" Asphaltic Concrete 1.2

Structural Coefficient for Aggregate Base Course .12

Completed By: Mark S. Sudduth Date: 10-11-88

Agency/Company: PCDOT Phone: 882-2622

To: Sunburst Investment  
4441 N. Camino Del Rey  
Tucson, Arizona 85718

Date:

Attn: Lowell Johnson

Job No.: 88-297

REQUEST FOR PAVEMENT DESIGN DATA

Project: San Joaquin Estates III

Location: Calle Anasazi

Governing Agency (PCDOT, City, ADOT): PCDOT

Road Classification: Local street

Minimum Structural Number  $\overline{SN}$ : 1.3

Design Life (years): 20

Serviceability Index: 2.0

EQUIVALENT 18K SINGLE AXLE LOAD APPL'S  
OVER DESIGN LIFE PERIOD 14,000

REGIONAL FACTOR 1.7

DESIGN CRITERIA/MANUAL/PROCEDURES ASPHALT

Structural Coefficient for 2" Asphaltic Concrete .8

Structural Coefficient for 3" Asphaltic Concrete .2

Structural Coefficient for Aggregate Base Course .12

Completed By: Sub Investment Date: 10-11-88

Agency/Company: PCDOT Phone: 88-2622

To: Sunburst Investment  
4441 N. Camino Del Rey  
Tucson, Arizona 85718

Date:

Attn: Lowell Johnson

Job No.: 88-297

REQUEST FOR PAVEMENT DESIGN DATA

Project: San Joaquin Estates III

Location: Milky Way Drive

Governing Agency (PCDOT, City, ADOT): PCDO-

Road Classification: Local Street

Minimum Structural Number  $\overline{SN}$ : 1.3

Design Life (years): 20

Serviceability Index: 2.0

EQUIVALENT 18K SINGLE AXLE LOAD APPL'S  
OVER DESIGN LIFE PERIOD 33,000

REGIONAL FACTOR 1.7

DESIGN CRITERIA/MANUAL/PROCEDURES ADOT Material

Structural Coefficient for 2" Asphaltic Concrete .9

Structural Coefficient for 3" Asphaltic Concrete 1.2

Structural Coefficient for Aggregate Base Course .12

Completed By: Lowell Johnson Date: 0-11-88

Agency/Company: PCDO Phone: 882-2612

~~COO-87-13A~~

COO-89-12B

see mylar rolled plan  
in vertical file

DRAINAGE REPORT FOR PHASE IV  
OF SAN JOAQUIN ESTATES

Approved  
4.4.89  
J.H.

~~approved Subj. to  
approval of Ph. III-A 3.30.89  
J. Herkenhorn  
S.E.~~



**CMG DRAINAGE  
ENGINEERING, INC.**

DRAINAGE REPORT FOR PHASE IV  
OF SAN JOAQUIN ESTATES

Prepared by:

CMG DRAINAGE ENGINEERING, INC.  
201 N. STONE AVE., STE. 200  
TUCSON, AZ 85701

*rec'd. J.H.  
3-21-89*

Prepared for:

MR. LOWELL JOHNSON  
1115 W. SAN LUCAS CIRCLE  
TUCSON, AZ 85704



March 17, 1989

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III. DRAINAGE DESIGN PLAN	7
IV. SUMMARY	9

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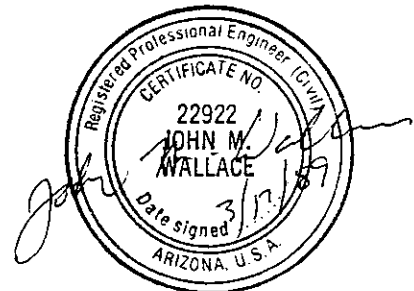
FIGURE 1 - PROJECT LOCATION MAP	2
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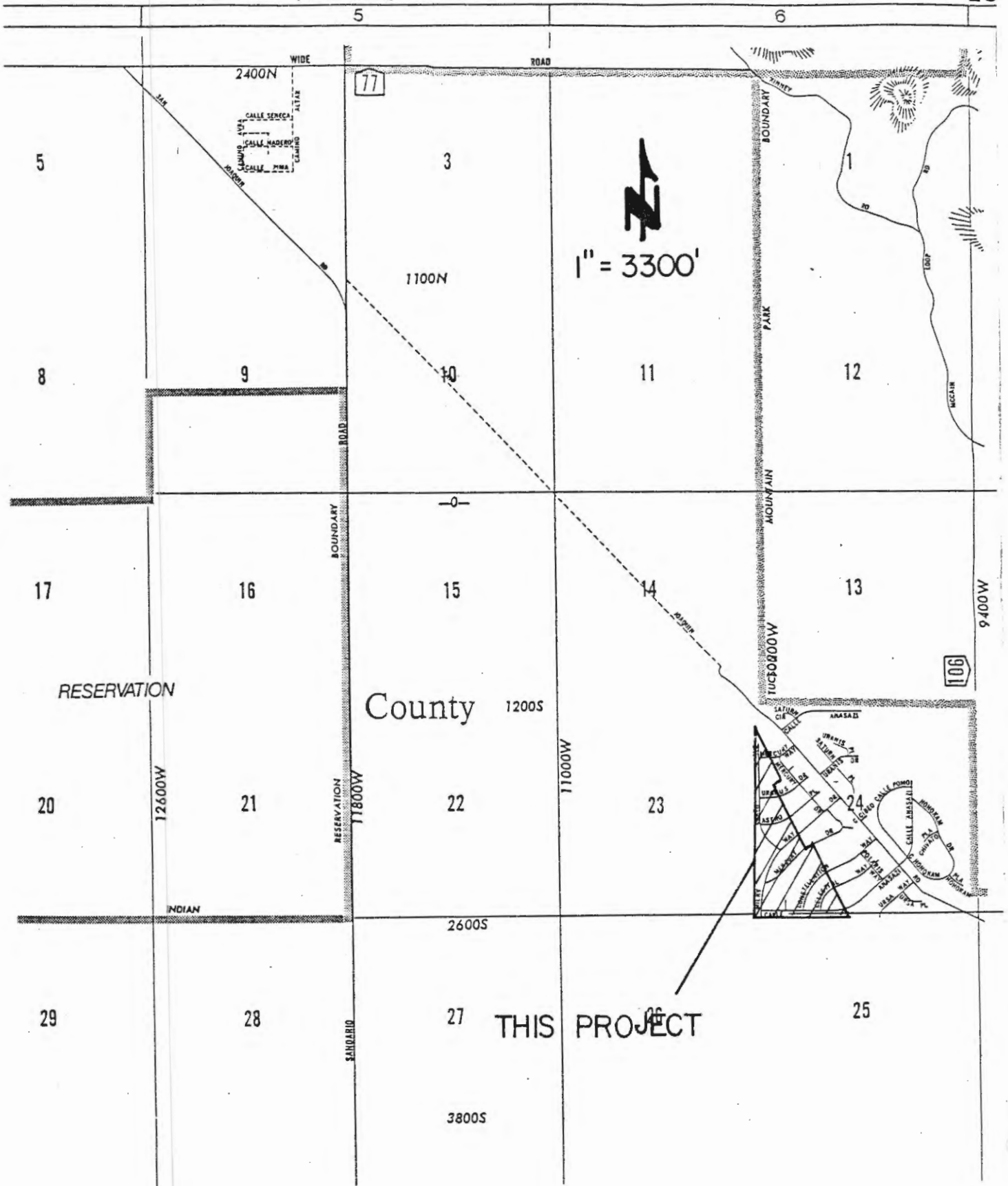
APPENDIX A - HYDROLOGIC DATA SHEETS
APPENDIX B - HYDRAULIC COMPUTATION SHEETS



## I. INTRODUCTION

This report presents the results of a drainage study for Phase IV of San Joaquin Estates which is located within Section 24, Township 14 South, Range 11 East, G&S, RB&M, Pima County, Arizona. A location map for the subject property is shown on Figure 1 of this report. Phase IV is approximately 185 acres in size and is bounded on the east by the Central Arizona Project (CAP), on the west side by Earth Avenue and Milky Way, and on the south by Calle Anasazi. The project area includes the platted lots on the west side of Earth Avenue and Milky Way and on the south side of Calle Anasazi. A location map for the subject property is shown on Figure 1 of this report. The property is owned by Mr. Lowell Johnson and is platted for development as one acre mobile home lots.

This report addresses the off-site and on-site drainage which impacts the parcel and presents an analysis for the with-project drainage design plan for the development.



**FIGURE 1**  
**PROJECT LOCATION MAP**



## II. HYDROLOGY AND FLOODPLAIN DELINEATIONS

As mentioned in Section I, the CAP forms the eastern boundary of the project. The construction of the CAP has resulted in the interception of the offsite drainage which previously impacted the project area. The only offsite runoff which impacts the project is that which is conveyed across the CAP by way of two 5-celled 72-inch diameter pipe overchute structures. The locations of these structures are shown on Figure 2. An analysis of flows routed through the CAP overchute structures was performed as a part of a previous report prepared by CMG Drainage Engineering for Phase III-A of San Joaquin Estates entitled "Drainage Report for Phase III-A of San Joaquin Estates." The results of the above analysis indicated a 100-year peak discharge of 1382 cfs through each of the two structures. Data sheets for the routing analysis are reproduced in Appendix B of this report.

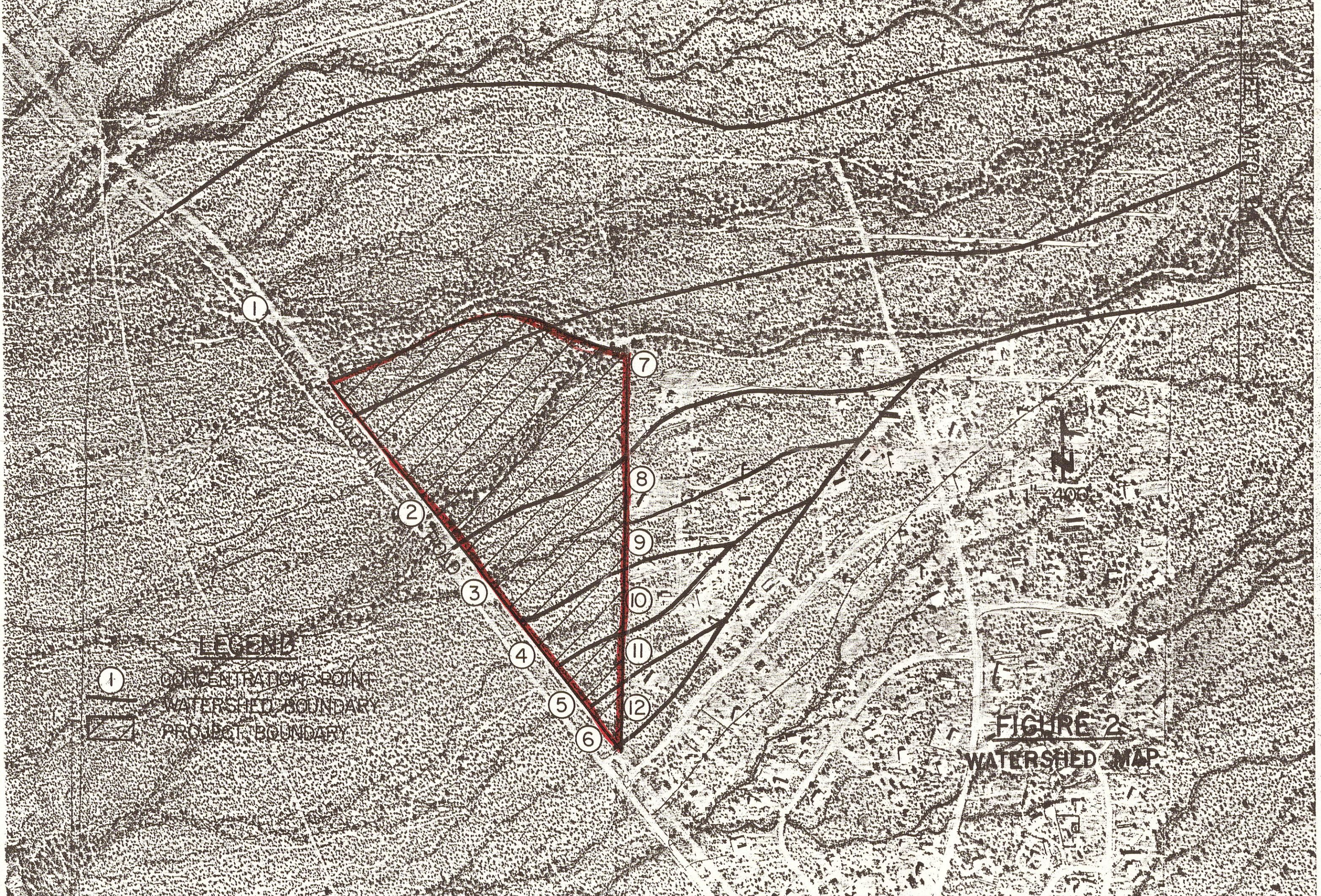
*needs to be approved by CMG*

The existing condition and design or "with-project" onsite drainage subareas are shown on Figure 2. Subarea delineations are shown for both conditions because the proposed street improvements will result in some changes in flow patterns within the project. The existing condition onsite drainage within the project consists of a number of small, poorly defined cut-off channel braids, none of which has a drainage area the size of the largest design condition basin which produces a 100-year peak discharge of 103 cfs. For this reason peak discharge determinations for the existing conditions onsite subareas were not made. Peak discharge determinations were made for the design condition onsite subareas as shown on Figure 2 using the method as described in the Hydrology Manual for Engineering Design and Floodplain Management within Pima County, Arizona. Soils

**LEGEND**  
① CONCENTRATION POINT  
— WATERSHED BOUNDARY  
▨ PROJECT BOUNDARY

**FIGURE 2**  
**WATERSHED MAP**

May 31-1989



within the onsite areas are hydrologic group B. The onsite subareas are characterized by poorly defined channels and dense vegetation. For this reason a basin factor of 0.050 was used in all peak discharge computations. Table 1 summarizes the results of the hydrologic analysis for the design condition onsite subareas. Hydrologic data sheets for the discharges shown in Table 1 are contained in Appendix A of this report.

Floodplain delineations were performed for all onsite areas subject to inundation by 100-year peak discharges of 100 cfs or greater. The floodplain delineations were performed using 1"=80', 1-foot contour interval mapping of the project area. The location of the 100-year floodlimits and the cross sections used in their development are shown on Figure 2. The floodplain delineations shown on Figure 2 were developed from normal depth ratings of the cross sections shown using Manning's equation. A Manning's roughness coefficient of .045 was used to reflect the vegetated condition of the channels except along the skewed <sup>(conveyance)</sup> segments of Sections 1 and 4, which are located immediately downstream of the CAP overchute structures. Along these above-referenced skewed segments a value of 0.1 was used to reflect the low conveyance capacity associated with the portions of the cross sections considered to be outside of the main zone of flow expansion downstream of the overchutes. Hydraulic data for the cross sections shown in Figure 2 are contained in Appendix B of this report.

TABLE 1 - SUMMARY OF RESULTS OF HYDRAULIC ANALYSIS

*Onsite Det Waterway*

Concentration Point	Drainage Area (Acres)	100-Year Peak Discharge (cfs)
1	13.95	64
2	14.60	61
3	24.45	103

### III. DRAINAGE DESIGN PLAN

Figure 2 shows the site plan for the project and the proposed drainage design. The subject property is not located within a critical or balanced basin and is therefore not subject to detention requirements as described in the Pima County Stormwater Detention/Retention Manual (PCSDRM) adopted February, 1987. The property is also planned for development at one residence per acre and is therefore not subject to threshold retention requirements as described in the PCSDRM.

No improvements will be made to collect and confine flows in improved channels because of the rural nature of the area, the low density of development proposed for this project and the relatively low peak runoff rates.

All mobile homes placed within the 100-year floodplain resulting from flows of 100 cfs or greater will have structural frame bottoms elevated at least 1 foot above the highest adjacent 100-year flood elevation, and will otherwise conform with Article X of the Pima County Floodplain Management Ordinance (May 7, 1985). In addition to the above requirement, it is recommended that no mobile homes be placed within the areas indicated on Figure 2 as being high hazard areas. These areas represent the portions of the 100-year floodplains created by the CAP overchute structures which are considered to be the main conveyance areas and the areas of highest flood and erosion potential.

All-weather access will be provided to all lots within this project. Flows generated at the three design condition concentration points shown on

Figure 2 will be conveyed across the indicated roadways within dip crossings. Sections D1, D2, and D3 show the locations of the dip crossings. Cutoff walls 20 feet wide and buried 3 feet below grade will be placed on the downstream side of each of the above crossings as shown on Figure 2. *upstream COW's needed* Manning's ratings of these three sections indicate flow depths of less than 1 foot. Hydraulic data for these sections is contained in Appendix B of this report. As shown on Figure 2, a number of the lots in this area are to be sold as groups. The list below shows the lot groupings:

- Lots 132 and 138
- Lots 133, 134 and 137
- Lots 135 and 136
- Lots 72 through 84, 90 through 93, and 119 through 124

As a condition of the sale of the above lot groups, subsequent lot splitting will be prohibited. As a result of the above groupings, all-weather access will be provided to the four lot groupings via Milky Way since one lot in each group fronts on Milky Way. For this reason, all-weather access was not evaluated for Earth Avenue as currently platted, which crosses the 100-year floodplains downstream of the CAP overchute structures.

#### IV. SUMMARY

1. This report presents the results of a drainage study for Phase IV of San Joaquin Estates. A location map for the subject property is shown on Figure 1 of this report.
2. Two 5-celled 72-inch diameter pipe overchute structures convey offsite runoff across the CAP and into the project area. The results of an analysis performed as a part of a previous report for Phase III-A of this project indicated a 100-year peak discharge of 1382 cfs through each of the structures.
3. The existing condition and design or "with-project" onsite drainage subareas are shown on Figure 2. Subarea delineations are shown for both conditions because the proposed street improvements will result in some changes in flow patterns within the project. Peak discharge determinations were made for the design condition onsite subareas.
4. Floodplain delineations were performed for all onsite areas subject to inundation by 100-year peak discharges of 100 cfs or greater. The floodplain delineations were performed using 1"=80', 1-foot contour interval mapping of the project area. The locations of the 100-year floodlimits and the cross sections used in their development are shown on Figure 2.
5. All mobile homes placed within the 100-year floodplain resulting from flows of 100 cfs or greater will have structural frame bottoms elevated at least 1 foot above the highest adjacent 100-year flood elevation and

will otherwise conform with Article X of the Pima County Floodplain Management Ordinance.

6. It is recommended that no mobile homes be placed within the areas indicated on Figure 2 as being high hazard areas. These areas represent the portions of the 100-year floodplains created by the CAP overchute structures which are considered to be the main conveyance areas and the areas of highest flood and erosion potential.
7. All-weather access will be provided to all lots within this project. Cutoff walls 20 feet wide and buried 3 feet below grade will be placed on the downstream side of each of the three dip crossings shown on Figure 2.
8. All-weather access was not evaluated for Earth Avenue as currently platted because proposed sale of lots combinations along this roadway will provide all-weather access via Milky Way.



APPENDIX A  
HYDROLOGIC DATA SHEETS

PROJECT NAME AND LOCATION: SANJOAQUIN ESTATE, SECOND PHASE, FILE: SANJOAX.DAT

DRAINAGE CONCENTRATION POINT: 1

WATERSHED AREA (A): 12.95 acres

LENGTH OF WATERCOURSE (Lc): 1620. ft

LENGTH TO CENTER OF GRAVITY (Lca): 810. ft

INCREMENTAL CHANGE IN LENGTH (Li) - ft      INCREMENTAL CHANGE IN ELEV (Hi) - ft

1620.      19.0

MEAN SLOPE (Sc): .0117 ft      BASIN FACTOR (Nb): .0500

WATERSHED TYPE(S): VALLEY

#### RAINFALL VALUES

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
P 1	1.36	1.74	1.99	2.32	2.61	2.91
P 2	1.51	1.95	2.24	2.61	2.95	3.28
P 3	1.61	2.08	2.40	2.80	3.17	3.53
P 5	1.80	2.34	2.70	3.16	3.62	4.00
P24	2.22	2.90	3.36	3.95	4.48	5.01

#### SOIL GROUPS

100. % B, CN= 82, COVER TYPE= DESERT BRUSH , COVER DENSITY= 25 %

IMPERVIOUS COVER= 20. %

#### RAINFALL/RUNOFF AND PEAK DISCHARGE DATA

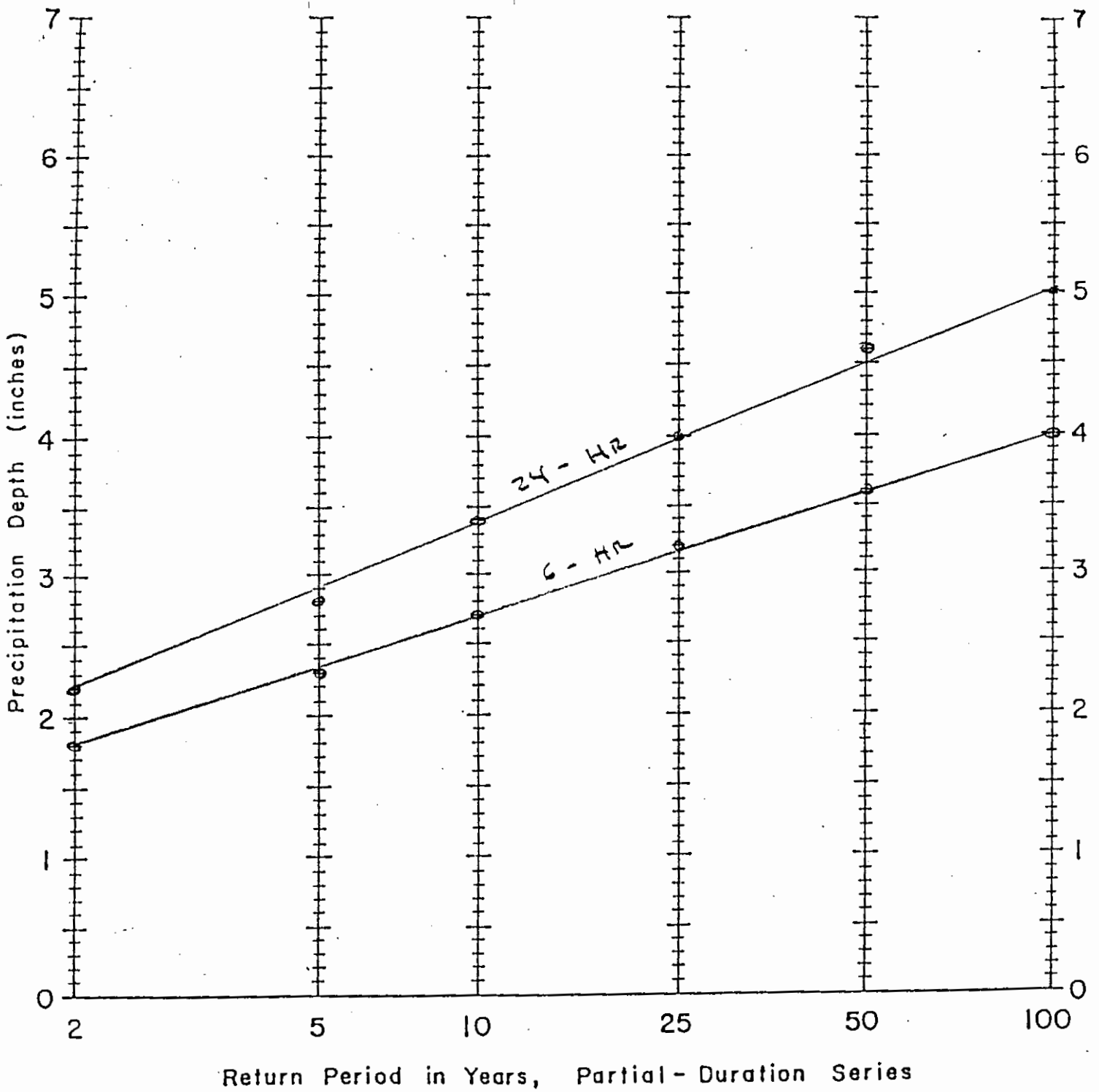
	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
RUNOFF SUPPLY RATE (q/i):	.322	.431	.492	.557	.606	.646
Tc ( FUNCTION OF i ) :	39.28	34.05	32.25	30.72	29.71	29.96
SOLUTION OF Tc (MINUTES):	29	21	18	16	15	13
RAINF. INT. @ Tc (IN/HR):	2.237	3.352	4.189	5.148	5.967	7.089
RUNOFF RATE @ Tc (IN/HR):	.719	1.448	2.061	2.859	3.512	4.579
PEAK DISCHARGE (CFS) :	10.	20.	29.	40.	51.	64.





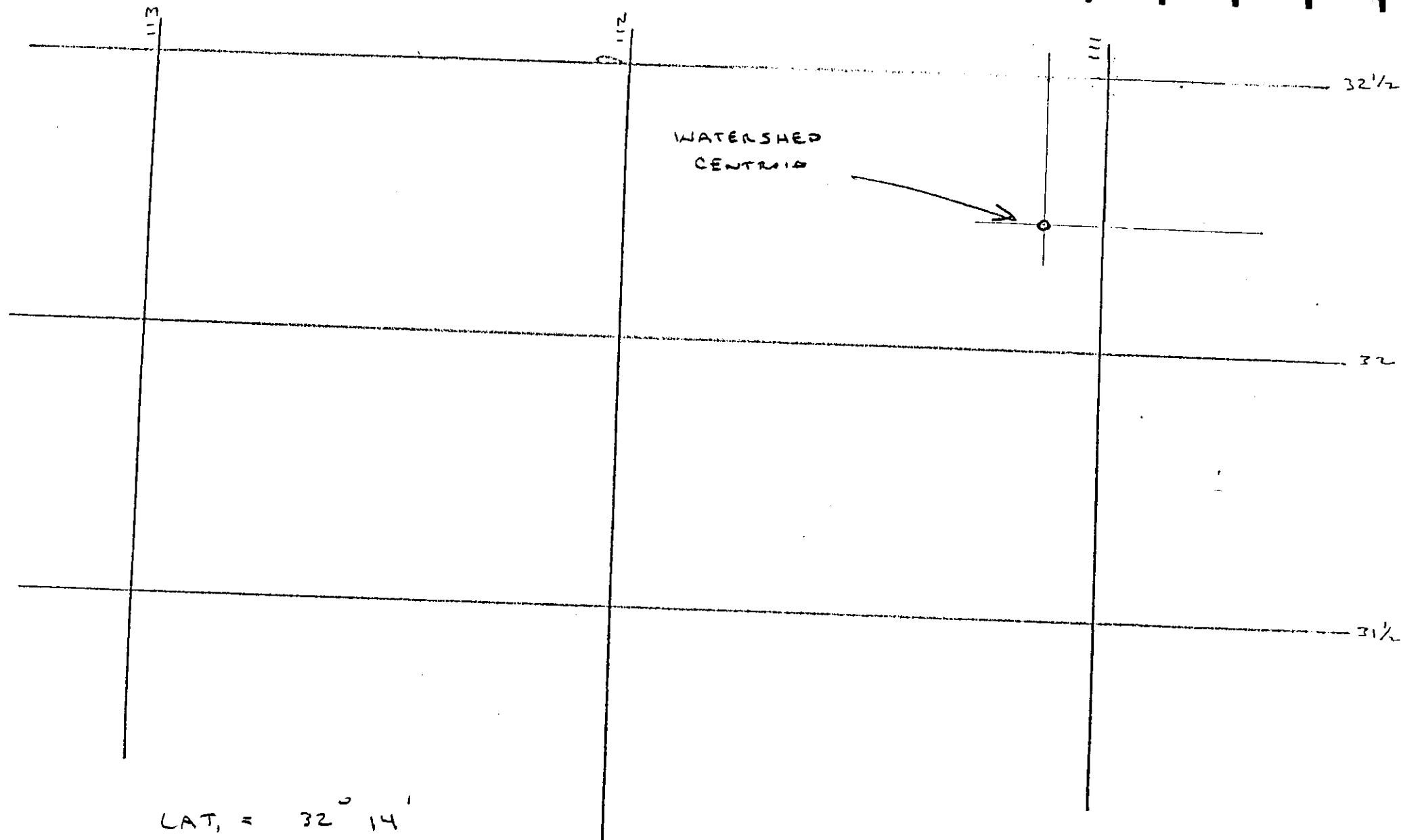
Latitude 32° 14'

Longitude 111 7 1/2'



Precipitation Depth Versus Return Period For  
Partial - Duration Series

Return Period (Years)	Precipitation Values (inches)			
	6 Hour Duration		24 Hour Duration	
	MAP VALUE	CORRECTED VALUE	MAP VALUE	CORRECTED VALUE
	2	1.8	1.80	2.2
5	2.3	2.34	2.8	2.90
10	2.7	2.70	3.4	3.36
25	3.2	3.16	4.0	3.95
50	3.6	3.58	4.6	4.48
100	4.0	4.00	5.0	5.01



LAT. =  $32^{\circ} 14'$   
LONG. =  $111^{\circ} 7\frac{1}{2}'$

51068

APPENDIX B  
HYDRAULIC COMPUTATION SHEETS



CAP LEVEL STORAGE DATA

ELEV	A (ACRES)	$\Delta V$ (AC. FT)	$\Sigma V$ (AC. FT)
2380	0	0	0
2383	10.4 *	10.4	10.4
2385	17.3	27.4	37.8
2387	28.2 *	45.1	82.9
2389	39.1 *	67.6	149.9
2390	44.5	41.8	191.7

A = SURFACE AREA (\* INTERPOLATED)

$\Delta V$  = INCREMENTAL VOLUME BY CONIC METHOD

$\Sigma V$  = SUM OF INCREMENTAL VOLUMES

*need to verify per  
Ph. III A Report*

CAP OVERCHUTE STRUCTURE  
OUTFLOW DATA

2 - STRUCTURES

5 - 72" DIA PIPES AT EACH STRUCTURE

INVERT ~ 2380

FROM HEC-5 INLET CONTROL CHART FOR  
CMP3:

ELEV	HW (FT)	HW/D (FT)	Q/PIPE (CFS)	TOTAL Q (CFS)
2380	0	0	0	0
2383	3	0.5	65	650
2385	5	0.83	150	1500
2387	7	1.17	240	2400
2389	9	1.5	310	3100
2390	10	1.67	350	3500

CP#15, 100-YEAR HYDROGRAPH

CAP LEVEE STORAGE

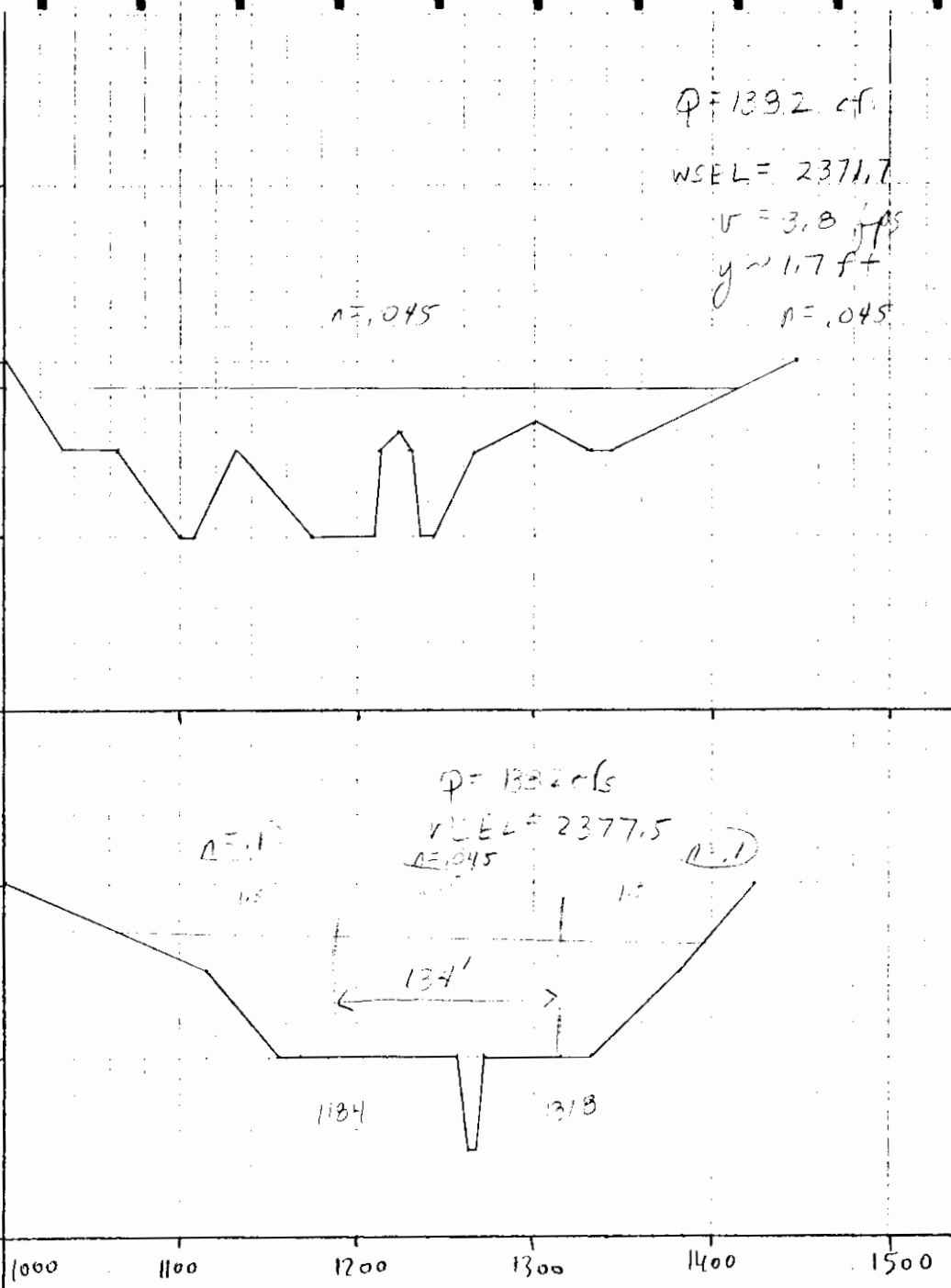
## WORKING TABLE:

STAGE (ft)	OUTFLOW (cfs)	O/2 (cfs)	STORAGE (ac-ft)	S/DT (cfs)	S/DT+O/2 (cfs)
2380.00	.00	.00	.00	.00	.00
2383.00	650.00	325.00	10.40	1510.08	1835.08
2385.00	1500.00	750.00	37.80	5488.56	6238.56
2387.00	2400.00	1200.00	82.90	12037.08	13237.08
2389.00	3100.00	1550.00	149.90	21765.48	23315.48
2390.00	3500.00	1750.00	191.70	27834.84	29584.84

## ROUTING TABLE:

STEP	TIME (min)	INFLOW (cfs)	S/DT+O/2 (cfs)	OUTFLOW (cfs)	STORAGE (ac-ft)	STAGE (ft)
0	.00	.00	.00	.00	.00	2380.00
1	5.00	44.25	22.13	7.84	.13	2380.04
2	10.00	88.51	80.67	28.57	.46	2380.13
3	15.00	188.54	190.62	67.52	1.08	2380.31
4	20.00	298.30	366.52	129.82	2.08	2380.60
5	25.00	421.74	596.72	211.36	3.38	2380.98
6	30.00	550.97	871.71	308.77	4.94	2381.43
7	35.00	690.01	1183.43	419.18	6.71	2381.93
8	40.00	836.94	1527.73	541.13	8.66	2382.50
9	45.00	998.26	1904.19	663.34	10.83	2383.03
10	50.00	1180.59	2330.28	745.59	13.48	2383.22
11	55.00	1363.83	2856.90	847.24	16.76	2383.46
12	60.00	1549.70	3466.42	964.90	20.55	2383.74
13	65.00	1739.46	4146.11	1096.10	24.78	2384.05
14	70.00	1960.74	4900.11	1241.64	29.47	2384.39
15	75.00	2182.01	5729.85	1401.80	34.63	2384.77
16	80.00	2466.26	6652.18	1553.19	40.47	2385.12
17	85.00	2753.03	7708.63	1689.05	47.27	2385.42
18	90.00	3021.09	8906.64	1843.11	54.99	2385.76
19	95.00	3284.85	10216.50	2011.56	63.43	2386.14
20	100.00	3506.24	11600.49	2189.54	72.35	2386.53
21	105.00	3706.27	13017.21	2371.72	81.48	2386.94
22	110.00	3803.00	14400.12	2480.78	90.63	2387.23
23	115.00	3598.99	15620.33	2565.53	98.74	2387.47
24	120.00	3458.59	16583.59	2632.43	105.15	2387.66
25	125.00	3308.12	17334.52	2684.59	110.14	2387.81
26	130.00	3158.43	17883.20	2722.70	113.79	2387.92
27	135.00	3011.51	18245.47	2747.86	116.20	2387.99
28	140.00	2865.21	18435.97	2761.09	117.46	2388.03
29	145.00	2727.14	18471.06	2763.53	117.69	2388.04
30	150.00	2589.06	18365.63	2756.21	116.99	2388.02
31	155.00	2457.52	18132.71	2740.03	115.45	2387.97
32	160.00	2326.53	17784.71	2715.86	113.13	2387.90
33	165.00	2216.11	17340.17	2684.98	110.18	2387.81

2374  
2372  
2370  
2368  
2378  
2376  
2374



top width  $b = 405'$

SEC. # 2

134' - approx of flow area  
 dimension of width  
 at top 1' - approx of flow area  
 (2376.25) - approx of flow area  
 - expansion, little  
 faster than 1'

SEC. # 1

2379

2377

2375

900 1000 1100 1200 1300 1400 1500 1600

$n = .1$   
 $y = 1.4$

$n = .045$   
 $y = 2.4$

$n = .1$   
 $y = .4$

132'

1100 - 1232

$Q = 1382$  cfs  
WSEL = 2378.2 ft

top width = 336'

SEC. # 4

2368

2366

2364

2362

1200 1300 1400 1500 1600 1700 1800 1900 2000

$n = .045$

WSEL = 2365.3  
 $Q = 1332$  cfs  
 $V = 3.4$  ft  
 $y = 1.8$  ft  
 $n = .045$

SEC. # 3

$Q = 103 \text{ cfs}$   
 $V = 1.7 \text{ fps}$   
 $y = 1.4 \text{ ft}$   
 $WSEL = 2361.4'$

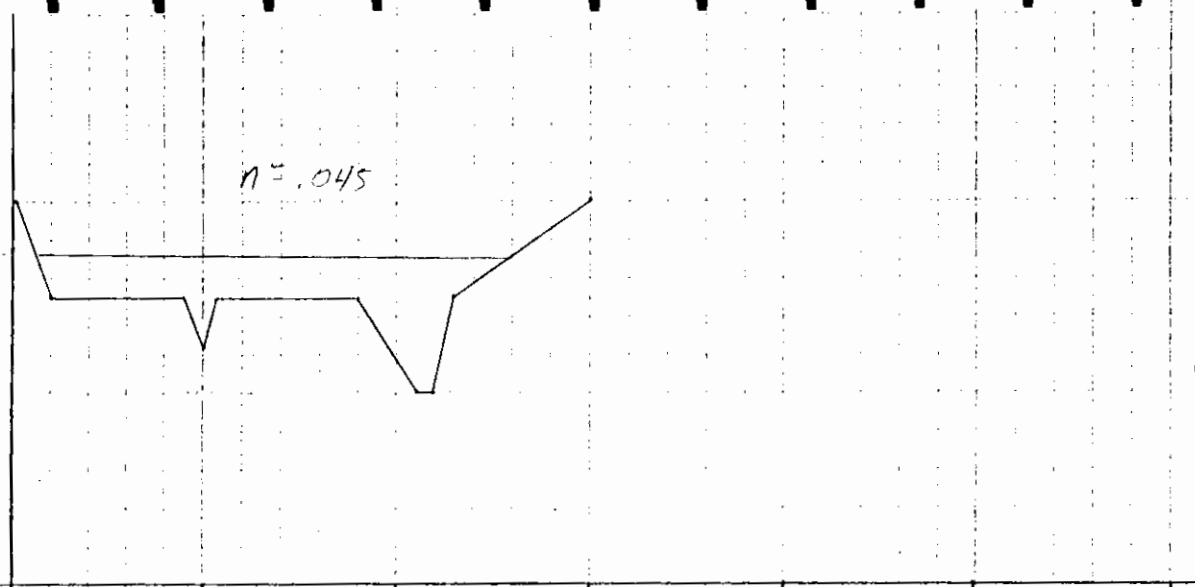
SEC. # 6

$Q = 1332 \text{ cfs}$   
 $V = 3.3 \text{ fps}$   
 $y = 3.1 \text{ ft}$   
 $WSEL = 2372.9$

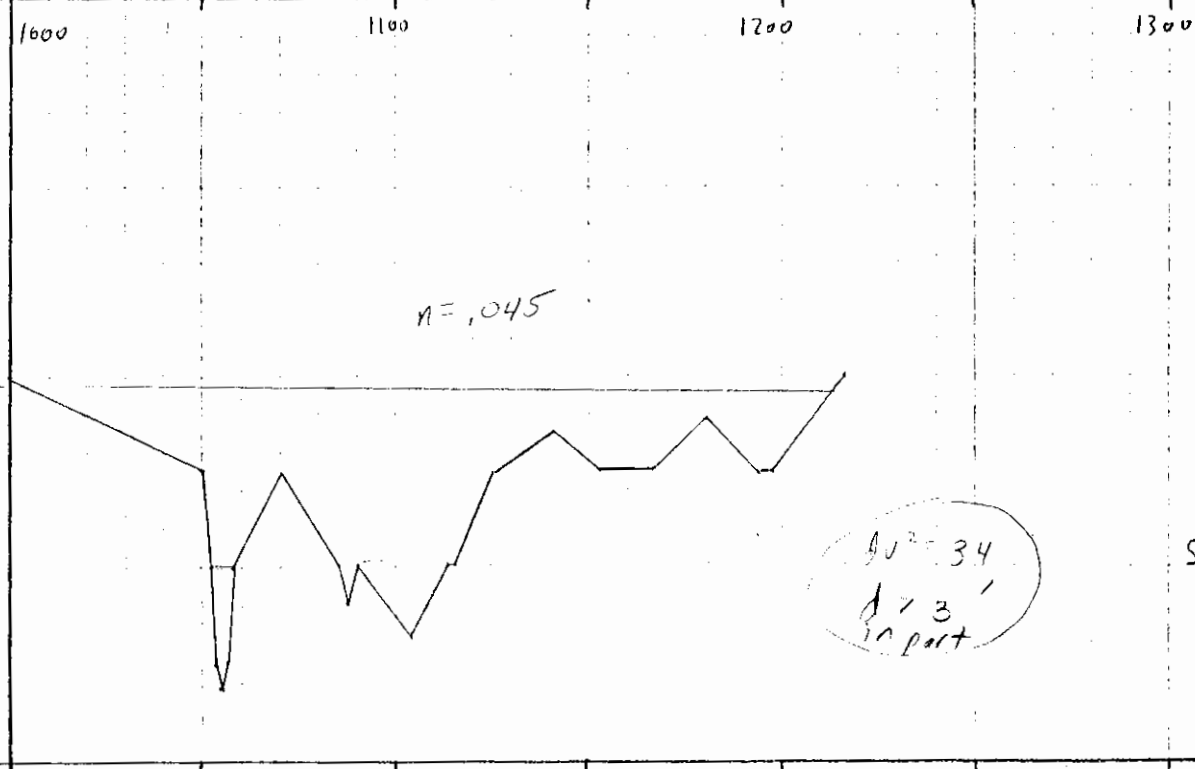
SEC. # 5

$AV^2 = 34$   
 $d = 3'$   
 $10 \text{ feet}$

2364  
 2362  
 2360  
 2358



2373  
 2371  
 2369



2365

$Q = 64 \text{ cf}$

$WSEL = 61.25$

$g = 1.5 \text{ ft}$

$n = .03$

2363

2361

2359

SEC. # D1

2600

2700

2800

2900

3000

2360

$n = .045$

$Q = 100 \text{ cf}$

$V = 1.5 \text{ ft}$

$L = 19 \text{ ft}$

$WSEL = 2353.2$

2358

SEC. # 7

2356

1000

1100

1200

1300

2362

2360

2358

3500

3600

3700

3800

3900

$Q = 103$  *cf*  
 $WSEL = 5.711$  *ft*  
 $V = 2$  *ft*  
 $y = .7$  *ft*  
 $n = .03$

SEC. # D3

$n = .03$

$Q = 61.1$  *cf*  
 $WSEL = 5.97$  *ft*  
 $V = 2$  *ft*  
 $y = .5$  *ft*

SEC. # D2

2362

2360

2358

3200

3300

3400

3500

3600



SAMPLE INPUT CROSS-SECTION FOR PROGRAM "NORMAL" WITH INPUT LEGEND

A SAMPLE INPUT FILE TO PROGRAM "NORMAL" IS SHOWN BELOW. THE INPUT FILE IS FOR A SINGLE CROSS-SECTION:

LINE #	COLUMN #									
	1	2	3	4	5	6	7	8	9	10
1	SAMPLE WASH									
2	SAMPLE CROSS-SECTION									
3	.01	500	10	3	.060	-.025	.060			
4	67.5	0.0	67.0	65.0	66.0	77.5	65.0	-104.0	62.0	113.0
5	60.0	115.0	60.0	135.0	65.0	-158.0	66.0	170.0	69.0	-190.0

LINE #	COLUMN #	VARIABLE
1-2	1-10	TITLE CARDS
3	1	SLOPE (FT\FT)
3	2	DISCHARGE (CFS) OR WATER SURFACE ELEVATION (FT)
3	3	INTEGER NUMBER OF POINTS IN CROSS-SECTION
3	4	INTEGER NUMBER OF SUB-SECTIONS IN CROSS-SECTION (IF THIS VALUE IS NEGATIVE THEN THE VALUE OF LINE 3. COLUMN 2 IS USED AS THE WATER SURFACE ELEVATION AND THE PROGRAM SOLVES FOR THE DISCHARGE AT THAT ELEVATION OTHERWISE THE PROGRAM SOLVES FOR WATER SURFACE ELEVATION)
3	5-10	MANNING'S "n" VALUES (ONE FOR EACH SUB-SECTION). CHANNEL "n" VALUES SHOULD BE INPUT AS NEGATIVE.
3	9	NUMBER OF POINTS IN CROSS-SECTION
4-5	1-10	X-SECTION DATA (ELEV., STA., PAIRS). STATIONS WHICH MARK THE DIVISION BETWEEN SUB-SECTIONS SHOULD BE ENTERED AS NEGATIVE

ALL DATA ARE ENTERED IN FIELDS OF EIGHT CHARACTERS EXCEPT TITLE CARDS



PHASE IV SAN JOAQUIN ESTATES (89015)

CROSS-SECTION - 1

DISCHARGE = 1382. WSEL = 2377.49 SLOPE = .0143

SECTION AND SUBSECTION HYDRAULIC DATA

---

	TOTAL SECTION	SUBSECTION #:		
		1	2	3
DISCHARGE (CFS) =	1382.05	141.62	1116.36	124.07
VELOCITY (FT/S) =	3.63	1.48	5.32	1.64
AREA (SQUARE FT) =	381.05	95.43	209.85	75.77
TOPWIDTH (FT) =	344.63	125.01	134.00	85.62
DEPTH (FT) =	2.49	1.49	2.49	1.49
HYD. DEPTH (FT) =	1.11	.76	1.57	.88
WET. PERIM. (FT) =	344.91	125.02	134.25	85.64
HYD. RADIUS (FT) =	1.10	.76	1.36	.88
FROUDE NUMBER =	.61	.30	.75	.31
MANNINGS N VALUE =	.0524	.1000	.0450	.1000

SUBSECTION 1 = STATION 1000.00 TO STATION 1184.00  
 SUBSECTION 2 = STATION 1184.00 TO STATION 1318.00  
 SUBSECTION 3 = STATION 1318.00 TO STATION 1426.00

PHASE IV SAN JOAQUIN ESTATES (89015)

CROSS-SECTION - 2

DISCHARGE = 1382. WSEL = 2371.69 SLOPE = .0153

SECTION AND SUBSECTION HYDRAULIC DATA

	TOTAL SECTION	SUBSECTION #: 1
DISCHARGE (CFS) =	1382.21	1382.21
VELOCITY (FT/S) =	3.80	3.80
AREA (SQUARE FT) =	363.69	363.69
TOPWIDTH (FT) =	404.77	404.77
DEPTH (FT) =	1.69	1.69
HYD. DEPTH (FT) =	.90	.90
WET. PERIM. (FT) =	405.19	405.19
HYD. RADIUS (FT) =	.90	.90
FROUDE NUMBER =	.71	.71
MANNINGS N VALUE =	.0450	.0450

SUBSECTION 1 = STATION 1000.00 TO STATION 1448.00

*Handwritten notes:*  
11/11/2015  
24.5  
L3

PHASE IV SAN JOAQUIN ESTATES (89015)

CROSS-SECTION - 3

DISCHARGE = 1382. WSEL = 2365.83 SLOPE = .0125

SECTION AND SUBSECTION HYDRAULIC DATA

---

	TOTAL SECTION	SUBSECTION #: 1
DISCHARGE (CFS) =	1382.20	1382.20
VELOCITY (FT/S) =	3.40	3.40
AREA (SQUARE FT) =	407.04	407.04
TOPWIDTH (FT) =	461.23	461.23
DEPTH (FT) =	1.83	1.83
HYD. DEPTH (FT) =	.88	.88
WET. PERIM. (FT) =	461.41	461.41
HYD. RADIUS (FT) =	.88	.88
FROUDE NUMBER =	.64	.64
MANNINGS N VALUE =	.0450	.0450

SUBSECTION 1 = STATION 1308.00 TO STATION 1840.00

PHASE IV SAN JOAQUIN ESTATES (89015)

CROSS-SECTION - 4

DISCHARGE = 1382. WSEL = 2378.24 SLOPE = .0167

SECTION AND SUBSECTION HYDRAULIC DATA

---

	TOTAL SECTION	SUBSECTION #:		
		1	2	3
DISCHARGE (CFS) =	1382.05	155.92	1151.84	74.29
VELOCITY (FT/S) =	3.84	1.71	5.68	1.13
AREA (SQUARE FT) =	359.87	91.19	202.91	65.77
TOPWIDTH (FT) =	386.26	108.53	132.00	145.73
DEPTH (FT) =	2.24	1.34	2.24	.44
HYD. DEPTH (FT) =	.93	.84	1.54	.45
WET. PERIM. (FT) =	386.56	108.54	132.28	145.74
HYD. RADIUS (FT) =	.93	.84	1.53	.45
FROUDE NUMBER =	.70	.33	.81	.30
MANNINGS N VALUE =	.0477	.1000	.0450	.1000

SUBSECTION 1 = STATION 964.00 TO STATION 1100.00

SUBSECTION 2 = STATION 1100.00 TO STATION 1232.00

SUBSECTION 3 = STATION 1232.00 TO STATION 1408.00

PHASE IV SAN JOAQUIN ESTATES (89015)

CROSS-SECTION - 5

DISCHARGE = 1382. WSEL = 2372.85 SLOPE = .0100

SECTION AND SUBSECTION HYDRAULIC DATA

---

	TOTAL SECTION	SUBSECTION #: 1
DISCHARGE (CFS) =	1382.11	1382.11
VELOCITY (FT/S) =	3.32	3.32
AREA (SQUARE FT) =	416.78	416.78
TOPWIDTH (FT) =	413.35	413.35
DEPTH (FT) =	3.15	3.15
HYD. DEPTH (FT) =	1.01	1.01
WET. PERIM. (FT) =	414.14	414.14
HYD. RADIUS (FT) =	1.01	1.01
FROUDE NUMBER =	.58	.58
MANNINGS N VALUE =	.0450	.0450

SUBSECTION 1 = STATION 1000.00 TO STATION 1434.00

PHASE IV SAN JOAQUIN ESTATES (89015)

CROSS-SECTION - 6

DISCHARGE = 103. WSEL = 2361.36 SLOPE = .0083

SECTION AND SUBSECTION HYDRAULIC DATA

---

	TOTAL SECTION	SUBSECTION #: 1
DISCHARGE (CFS) =	103.08	103.08
VELOCITY (FT/S) =	1.72	1.72
AREA (SQUARE FT) =	60.01	60.01
TOPWIDTH (FT) =	138.80	138.80
DEPTH (FT) =	1.36	1.36
HYD. DEPTH (FT) =	.43	.43
WET. PERIM. (FT) =	139.06	139.06
HYD. RADIUS (FT) =	.43	.43
FROUDE NUMBER =	.46	.46
MANNINGS N VALUE =	.0450	.0450

SUBSECTION 1 = STATION 1000.00 TO STATION 1200.00



PHASE IV SAN JOAQUIN ESTATES (89015)

CROSS-SECTION - 7

DISCHARGE = 103. WSEL = 2358.24 SLOPE = .0100

SECTION AND SUBSECTION HYDRAULIC DATA

---

	TOTAL SECTION	SUBSECTION #: 1
DISCHARGE (CFS) =	103.03	103.03
VELOCITY (FT/S) =	1.48	1.48
AREA (SQUARE FT) =	69.67	69.67
TOPWIDTH (FT) =	232.20	232.20
DEPTH (FT) =	.94	.94
HYD. DEPTH (FT) =	.30	.30
WET. PERIM. (FT) =	232.35	232.35
HYD. RADIUS (FT) =	.30	.30
FROUDE NUMBER =	.48	.48
MANNINGS N VALUE =	.0450	.0450

SUBSECTION 1 = STATION 1000.00 TO STATION 1264.00

PHASE IV SAN JOAQUIN ESTATES (89015)

CROSS-SECTION - D1

DISCHARGE = 64. WSEL = 61.25 SLOPE = .0104

SECTION AND SUBSECTION HYDRAULIC DATA

---

	TOTAL SECTION	SUBSECTION #: 1
DISCHARGE (CFS) =	64.00	64.00
VELOCITY (FT/S) =	2.16	2.16
AREA (SQUARE FT) =	29.57	29.57
TOPWIDTH (FT) =	105.40	105.40
DEPTH (FT) =	.48	.48
HYD. DEPTH (FT) =	.28	.28
WET. PERIM. (FT) =	105.41	105.41
HYD. RADIUS (FT) =	.28	.28
FROUDE NUMBER =	.72	.72
MANNINGS N VALUE =	.0300	.0300

SUBSECTION 1 = STATION 2690.00 TO STATION 3023.00

PHASE IV SAN JOAQUIN ESTATES (89015)

CROSS-SECTION - D2

DISCHARGE = 61. WSEL = 59.70 SLOPE = .0100

SECTION AND SUBSECTION HYDRAULIC DATA

---

	TOTAL SECTION	SUBSECTION #: 1
DISCHARGE (CFS) =	61.00	61.00
VELOCITY (FT/S) =	1.99	1.99
AREA (SQUARE FT) =	30.63	30.63
TOPWIDTH (FT) =	120.08	120.08
DEPTH (FT) =	.50	.50
HYD. DEPTH (FT) =	.26	.26
WET. PERIM. (FT) =	120.08	120.08
HYD. RADIUS (FT) =	.26	.26
FROUDE NUMBER =	.69	.69
MANNINGS N VALUE =	.0300	.0300

SUBSECTION 1 = STATION 3200.00 TO STATION 3500.00

PHASE IV SAN JOAQUIN ESTATES (89015)

CROSS-SECTION - D3

DISCHARGE = 103. WSEL = 59.11 SLOPE = .0078

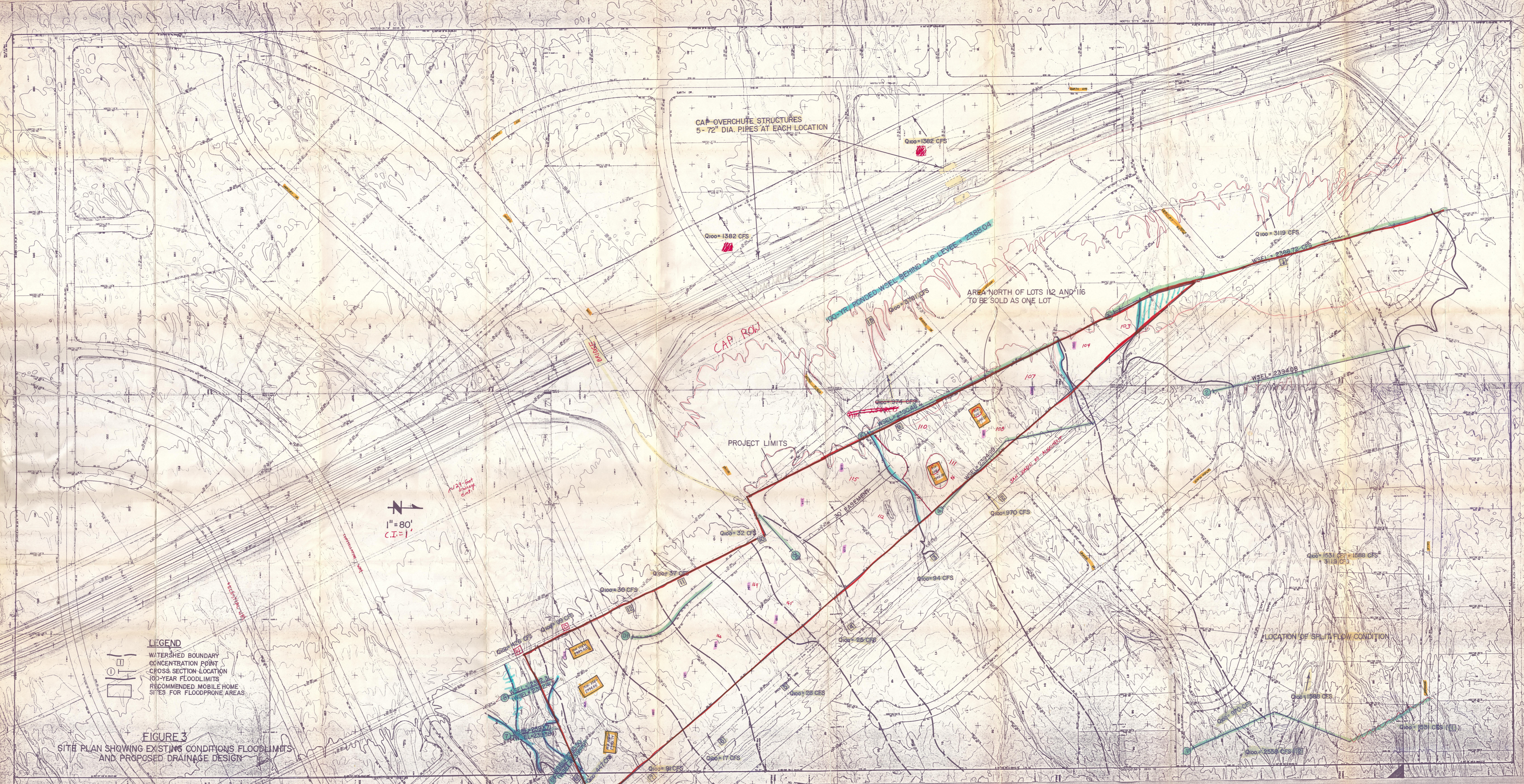
SECTION AND SUBSECTION HYDRAULIC DATA

---

	TOTAL SECTION	SUBSECTION #: 1
DISCHARGE (CFS) =	103.01	103.01
VELOCITY (FT/S) =	2.11	2.11
AREA (SQUARE FT) =	48.73	48.73
TOPWIDTH (FT) =	144.99	144.99
DEPTH (FT) =	.68	.68
HYD. DEPTH (FT) =	.34	.34
WET. PERIM. (FT) =	144.99	144.99
HYD. RADIUS (FT) =	.34	.34
FROUDE NUMBER =	.64	.64
MANNINGS N VALUE =	.0300	.0300

SUBSECTION 1 = STATION 3500.00 TO STATION 3794.00

March 13, 1989



CAP-OVERCHUTE STRUCTURES  
5-72" DIA. PIPES AT EACH LOCATION

AREA NORTH OF LOTS 112 AND 116  
TO BE SOLD AS ONE LOT

PROJECT LIMITS

1" = 80'  
C.I. = 1'

**LEGEND**

- WATERSHED BOUNDARY
- CONCENTRATION POINT
- ⊕ CROSS SECTION LOCATION
- 100-YEAR FLOODLIMITS
- RECOMMENDED MOBILE HOME SITES FOR FLOODPRONE AREAS

**FIGURE 3**  
SITE PLAN SHOWING EXISTING CONDITIONS FLOODLIMITS  
AND PROPOSED DRAINAGE DESIGN

1841-61 10/20/11

COO-89-12C

File  
Engineer's Copy

DRAINAGE REPORT FOR  
PHASE V-A OF SAN JOAQUIN ESTATES

Lots 28-5

Approved 6.12.89  
J. Hershenhorn  
Subd. Eng.

rec'd. 6-1-89

J.H.

\* See Mylar rolled plan  
in vertical file



**CMG DRAINAGE  
ENGINEERING, INC.**

DRAINAGE REPORT FOR  
PHASE V-A OF SAN JOAQUIN ESTATES

*Lots 28-59*

Prepared by:

CMG DRAINAGE ENGINEERING, INC.  
201 N. STONE AVENUE, STE. 200  
TUCSON, AZ 85701

For:

MR. LOWELL JOHNSON  
4441 N. CAMINO DEL REY  
TUCSON, AZ 85718

MAY 31, 1989



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## I. INTRODUCTION

This report presents the results of a drainage study for a parcel of land described as being a portion of the northwest  $\frac{1}{4}$  of Section 24, Township 14 South, Range 11 East, G&S, RB&M, Pima County, Arizona. A location map for the subject property is shown on Figure 1 of this report. The project is approximately 36 acres in size and is bounded on the south and west by San Joaquin Road. The subject property was originally platted as a part of the larger San Joaquin Estates Subdivision. The property is owned by Mr. Lowell Johnson and is platted for development as 1-acre mobile home lots.

This report addresses the offsite and onsite drainage which impacts the parcel and presents an analysis for the with-project drainage design plan for the development.



## II. HYDROLOGY AND EXISTING CONDITIONS FLOODPLAIN DELINEATIONS

Peak discharge determinations were made for flows entering and exiting the project area. The basin boundaries and points of concentration for watersheds draining to the subject property are shown on Figures 2 and 2A of this report. Concentration Points #1 through #6 on Figure 2 are located along San Joaquin Road which forms the downstream boundary of the project. Concentration Points #7 through #12 are located along the east property boundary which forms the upstream limit of the project. Basin delineations for the areas shown on Figures 2 and 2A were developed using the aerial photography upon which the figures are based and on 7.5-minute U.S.G.S. quadrangles.

The basins tributary to the project area are located within and adjacent to the Tucson Mountain County Park. Developed areas outside the park which are tributary to the project consist of low-density, suburban ranch residential areas. Soils within the tributary basin areas consist of D soils in the upper mountain areas and B soils in the lower elevations. The basins tributary to this project are characterized by poorly-defined channels which are broad and shallow with dense vegetation within and along the channels. For this reason, a basin factor of 0.050 was used in all peak discharge computations. Table 1 shows the watershed areas and 100-year peak discharges computed for the concentration points shown in Figure 2. Hydrologic data sheets for the peak discharges shown in Table 1 are contained in Appendix A of this report.

10-20-83

1" = 1000'



POTENTIAL FLOW  
BREAKOVER

TO CP#287  
(FIGURE 2)  
MATCH LINE TO CP#287  
(FIGURE 2)

FIGURE 2A  
WATERSHED MAP FOR  
UPSTREAM AREAS



TABLE 1 - SUMMARY OF RESULTS OF HYDROLOGIC ANALYSIS

Drainage Concentration Point #	100-Year Area (acres)	Peak Discharges (cfs)
1	1273.0	1540
2	2425.0	2619
2*	2603.0	2855
3	24.6	94
4	5.7	25
5	6.4	28
6	3.4	17
7	2404.0	2668
7*	2582.0	2891
8	9.4	42
9	5.9	27
10	2.4	12
11	4.5	20
12	2.3	12

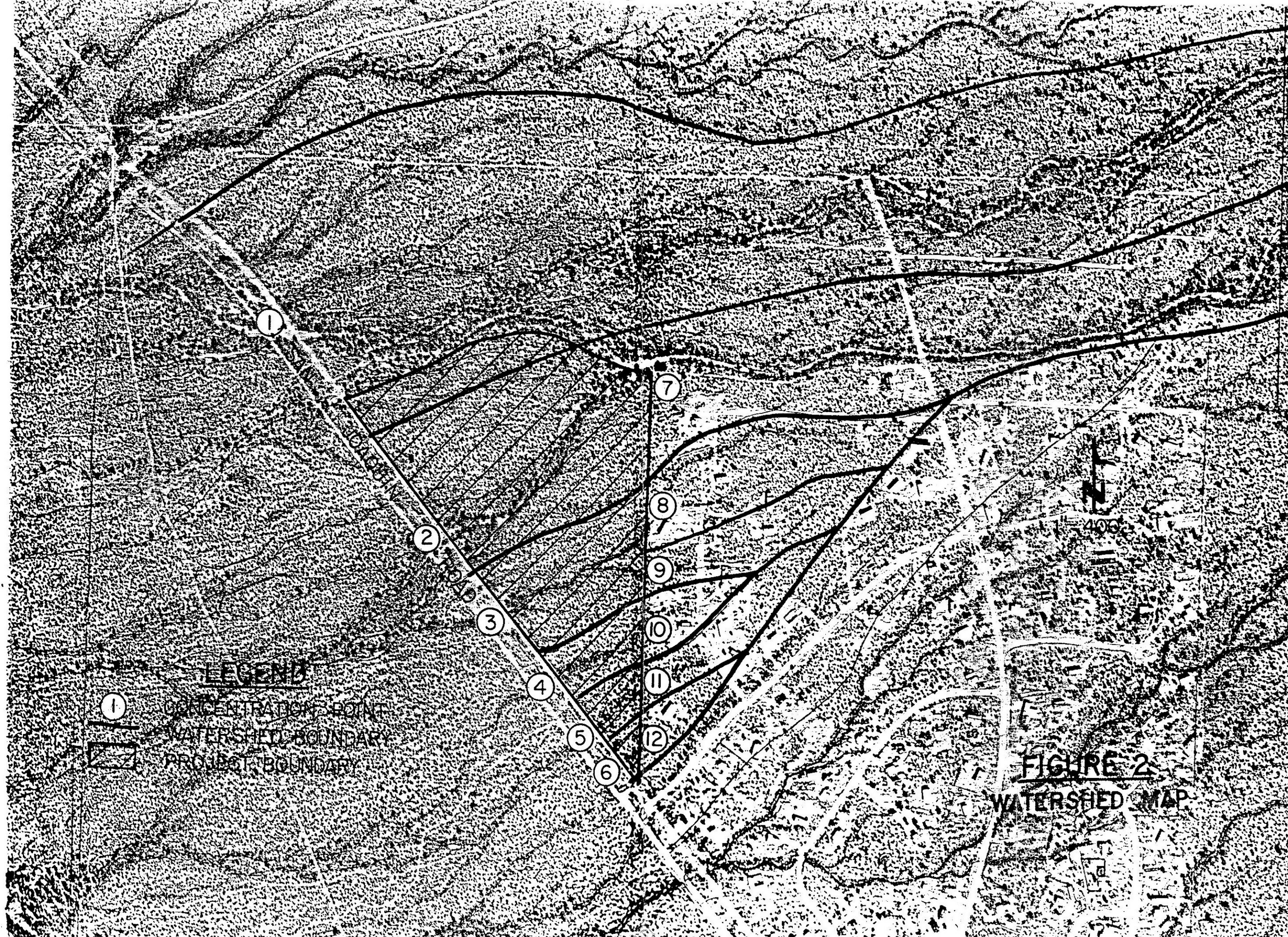
\*with upstream flow breakover

A potential flow breakover was identified on the 1' = 1000' scale aerial photo used to develop Figure 2A. The location of this area is shown on the photo. Field investigation of this site indicates that there is the potential for division of flow at this location. Based on field investigation, it was estimated that as much as 50% of the flow arriving at the breakout point could be diverted from the basin tributary to Concentration Point #1 to the basin tributary to Concentration Points #2 and #7. Second hydrologic data sheets for Concentration Points #2 and #7 were developed by increasing the drainage areas by 178 acres. The additional area represents one-half of the total area concentrating immediately upstream of the flow breakout. The revised discharges at Concentration Points #2 and #7 were used, where applicable, in the determination of existing flooding conditions.

Existing conditions floodplain delineations were performed for all onsite areas subject to inundation by 100-year peak discharges of 100 cfs or greater. The floodplain delineations were performed using 1" = 80', 1-foot contour interval mapping of the project area. The locations of the 100-year floodlimits and the cross sections used in their development are shown on Figure 3. The floodplain delineations shown on Figure 3 were developed from normal depth ratings of the cross sections shown using Manning's equation. A Manning's roughness coefficient of .045 was used to reflect the vegetated condition of the channel. Hydraulic data for the cross sections shown in Figure 3 are contained in Appendix B of this report.

**LEGEND**  
① CONCENTRATION POINT  
--- WATERSHED BOUNDARY  
▭ PROJECT BOUNDARY

**FIGURE 2**  
**WATERSHED MAP**



In developing the floodlimits shown on Figure 3, it was necessary to account for a split flow condition which exists on the channel tributary to Concentration Points #2 and #7. This condition occurs at a point located approximately 1400 feet upstream of San Joaquin Road (see Figure 3 for location). The south branch of the split drains <sup>from 1 (15400 cfs)</sup> to Concentration Points #2 and #7 while the north branch drains to Concentration Point #1. Section 21 on Figure 3, which is located at the split, was rated for the 100-year peak discharges of 2891 cfs and 2668 cfs determined for Concentration Point #7. The results of the rating for Section 21 indicate that of the 100-year discharge of 2891 cfs (i.e. accounting for the potential upstream flow breakover discussed earlier), 1266 cfs flows down the south branch to Concentration Point #2. Of the 100-year discharge of 2668 cfs (i.e. not accounting for the potential upstream flow breakover discussed earlier), 1523 cfs flows down the north branch and combines with the 100-year peak discharge for Concentration Point #1. (The lower of the two peak discharges developed for Concentration Point #7 was used to determine the north branch flow quantity because this flow is subsequently combined with the Concentration Point #1 peak discharge which already accounts for the potential flow breakover area.) The peak discharges used to generate the floodlimits shown on Figure 3 reflect the above flow division.



### III. DRAINAGE DESIGN PLAN

Figure 4 shows the site plan for the project and the proposed drainage design.

The subject property is not located within a critical or balanced basin and is therefore not subject to detention requirements as described in the Pima County Stormwater Detention/Retention Manual (PCSDRM) adopted February 1987. The property is also planned for development at one residence per acre and is therefore not subject to threshold retention requirements as described in the PCSDRM.

The primary component of the proposed drainage design for this project is the construction of a berm along the north perimeter of the project. The purpose of the proposed berm is: (a) to collect and convey all flows concentrating at the location of the split flow condition (i.e. at Section 21 on Figure 3) into the north branch of the split, and (b) to confine flows along the wash tributary to Concentration Point #1 to the area to the north of the project (i.e. to the north of the berm). **Construction of the berm will effectively eliminate flooding within the project area from 100-year flows of 100 cfs or greater.**

The location of the proposed berm and the "with-berm" 100-year floodplain are shown on Figure 4. Figure 4 also shows the profiles for the top of the berm, the with-berm 100-year water surface profile, and the existing ground profile along the alignment of the berm. The proposed top-of-berm profile provides 1 foot of freeboard for the 100-year event. Hydraulic data for the with-berm condition are contained in Appendix B of this

report. The berm will consist of compacted fill varying in height to a maximum of approximately 4 feet. The berm will have 3:1 sideslopes on the stream- and backsides and a 16-foot topwidth which will provide for vehicular access for maintenance purposes.

Figure 4 shows three typical cross sections for the berm. The downstream-most segment of the berm from station 0+00 to 3+00 is defined by Section A-A' on Figure 4. The primary function of this segment of the berm is to provide for spreading of the flows confined by the berm back to existing conditions. Since the berm is outside of the main flow path, flow velocities along this segment of the berm will be relatively low. For this reason it was felt that erosion protection of the stream-side slope of the berm would not be necessary.

Section B-B' on Figure 4 shows the typical section of the berm from station 3+00 to 11+30. The cross section along this segment will include excavation of a flowline with a 10-foot bottomwidth to provide for positive drainage along the toe of the stream-side slope. The profile for the flowline is shown in Figure 4. Review of the hydraulic data sheets for the design condition analyses for the cross sections along this segment (i.e. 12 and 13) indicate velocities and depths of flow of approximately 5.0 ft/s and 3.5 feet, respectively. The design of this segment of the berm will include placement of an erosion control blanket along the stream-side slope to mitigate the erosion potential posed by the relatively low velocities and flow depths, and to facilitate vegetation of the stream-side slope.

Section C-C' on Figure 4 shows the typical section of the berm from station 11+30 to 16+94. The primary function of this segment of the berm is to direct the flows concentrating at the east property line to the north side of the berm. Because the alignment of this segment of the berm will result in contraction of the flows concentrating at this location, the stream-side slope of this segment of the berm will be protected against erosion by a hand-laced rock blanket layed over filter fabric. The rock blanket will be 2-feet thick with a median rock diameter of 1 foot and will be buried 1 foot below existing grade at the toe of the stream-side slope. The rock will be angular and graded in accordance with the table shown along with section C-C'.

In addition to constructing the berm and providing the erosion control measures described above, it is recommended that mobile homes placed on the lots adjacent to the berm (i.e. Lots 28 through 31 and 37 through 39) be placed on concrete caisson supports. The caisson supports should be buried to a depth of 3 feet below the elevation of the adjacent channel flowline to the north of the berm for those homes placed within 100 feet of the berm, or at the elevation of the adjacent channel flowline for those homes placed more than 100 feet from the berm. A detail of the design of the recommended caisson support system is contained in Appendix B of this report. In addition to being placed on concrete caisson support systems, mobile homes placed on lots adjacent to the berm will have structural frame bottoms elevated to the level of the top-of-berm adjacent to the structure at a minimum. Elevation of the structural frame bottom in this manner will provide a minimum of 1 foot of freeboard above the 100-year water surface elevation for flows on the north side of the berm.

#### IV. SUMMARY

1. This report presents the results of a drainage study for Phase VA of San Joaquin Estates. A location map for the subject property is shown on Figure 1 of this report.
2. Peak discharge determinations were made for flows entering and exiting the project area. The basin boundaries and points of concentration for watersheds draining to the subject property are shown on Figures 2 and 2A of this report.
3. Existing conditions floodplain delineations were performed for all onsite areas subject to inundation by 100-year peak discharges of 100 cfs or greater. The floodplain delineations were performed using 1" = 80', 1-foot contour interval mapping of the project area. The locations of the 100-year floodlimits and the cross sections used in their development are shown on Figure 3.
4. The subject property is not located within a critical or balanced basin and is therefore not subject to detention requirements as described in the Pima County Stormwater Detention/Retention Manual (PCSDRM) adopted February 1987. The property is also planned for development at one residence per acre and is therefore not subject to threshold retention requirements as described in the PCSDRM.
5. The primary component of the proposed drainage design for this project is the construction of a berm along the north perimeter of the project. The purpose of the proposed berm is: (a) to collect and

convey all flows concentrating at the location of the split flow condition (i.e. at Section 21 on Figure 3) into the north branch of the split, and (b) to confine flows along the wash tributary to Concentration Point #1 to the area to the north of the project (i.e. to the north of the berm). Construction of the berm will effectively eliminate flooding within the project area by 100-year flows of 100 cfs or greater. However, those homes which are placed in the lots adjacent to the berm will be placed on concrete caisson supports and will have finished floors elevated a minimum of one foot above the adjacent 100-year water surface elevation to the north of the berm.

APPENDIX A  
HYDROLOGIC DATA SHEETS

PROJECT NAME AND LOCATION: SAN JOAQUIN ESTATES (FILE:89015.PQI)

DRAINAGE CONCENTRATION POINT: 1

WATERSHED AREA (A): 1273.00 acres

LENGTH OF WATERCOURSE (Lc): 31158. ft

LENGTH TO CENTER OF GRAVITY (Lca): 15579. ft

INCREMENTAL CHANGE IN LENGTH (Li) - ft      INCREMENTAL CHANGE IN ELEV (Hi) - ft

2318.	800.0
2833.	200.0
4377.	200.0
4892.	140.0
7210.	140.0
9528.	130.0

MEAN SLOPE (S<sub>c</sub>): .0249 ft      BASIN FACTOR (N<sub>b</sub>): .0500

WATERSHED TYPE(S): VALLEY/MOUNTAIN

#### RAINFALL VALUES

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
P 1	1.36	1.74	1.99	2.32	2.61	2.91
P 2	1.51	1.95	2.24	2.61	2.95	3.28
P 3	1.61	2.08	2.40	2.80	3.17	3.53
P 6	1.80	2.34	2.70	3.16	3.58	4.00
P24	2.22	2.90	3.36	3.95	4.48	5.01

#### SOIL GROUPS

70. % B, CN= 82, COVER TYPE= DESERT BRUSH , COVER DENSITY= 25 %  
30. % D, CN= 91, COVER TYPE= DESERT BRUSH , COVER DENSITY= 25 %

IMPERVIOUS COVER= 1. %

#### RAINFALL/RUNOFF AND PEAK DISCHARGE DATA

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
RUNOFF SUPPLY RATE (q/i):	.250	.383	.455	.530	.585	.629
T <sub>c</sub> (FUNCTION OF i) :	184.41	155.53	145.21	136.63	131.36	127.58
SOLUTION OF T <sub>c</sub> (MINUTES):	273	180	150	125	109	99
RAINFL INT. @ T <sub>c</sub> (IN/HR):	.376	.694	.926	1.259	1.588	1.908
RUNOFF RATE @ T <sub>c</sub> (IN/HR):	.094	.266	.422	.667	.929	1.200
PEAK DISCHARGE (CFS) :	121.	341.	541.	856.	1192.	1540.

PROJECT NAME AND LOCATION: SAN JOAQUIN ESTATES

DRAINAGE CONCENTRATION POINT: 2

WATERSHED AREA (A): 2425.00 acres

LENGTH OF WATERCOURSE (Lc): 30128. ft

LENGTH TO CENTER OF GRAVITY (Lca): 20600. ft

INCREMENTAL CHANGE IN LENGTH (Li) - ft      INCREMENTAL CHANGE IN ELEV (Hi) - ft

1288.	600.0
1545.	300.0
2833.	200.0
2832.	100.0
8755.	140.0
12875.	160.0

MEAN SLOPE (Sc): .0195 ft      BASIN FACTOR (Nb): .0500

WATERSHED TYPE(S): VALLEY/MOUNTAIN

RAINFALL VALUES

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
P 1	1.36	1.74	1.99	2.32	2.61	2.91
P 2	1.51	1.95	2.24	2.61	2.95	3.28
P 3	1.61	2.08	2.40	2.80	3.17	3.53
P 6	1.80	2.34	2.70	3.16	3.58	4.00
P24	2.22	2.90	3.36	3.95	4.48	5.01

SOIL GROUPS

50. % B, CN= 82, COVER TYPE= DESERT BRUSH , COVER DENSITY= 25 %  
50. % D, CN= 91, COVER TYPE= DESERT BRUSH , COVER DENSITY= 25 %

IMPERVIOUS COVER= 1. %

RAINFALL/RUNOFF AND PEAK DISCHARGE DATA

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
RUNOFF SUPPLY RATE (q/i):	.297	.431	.502	.574	.626	.667
Tc ( FUNCTION OF i ) :	204.63	176.29	165.95	157.26	151.90	148.05
SOLUTION OF Tc (MINUTES):	319	218	183	154	136	123
RAINFL INT. @ Tc (IN/HR):	.331	.588	.787	1.058	1.325	1.605
RUNOFF RATE @ Tc (IN/HR):	.098	.254	.395	.607	.830	1.071
PEAK DISCHARGE (CFS) :	240.	620.	966.	1484.	2028.	2619.



PROJECT NAME AND LOCATION: SAN JOAQUIN ESTATES

DRAINAGE CONCENTRATION POINT: 2, WITH FLOW BREAKOVER FROM AREA 1

WATERSHED AREA (A): 2603.00 acres

LENGTH OF WATERCOURSE (Lc): 30128. ft

LENGTH TO CENTER OF GRAVITY (Lca): 20600. ft

INCREMENTAL CHANGE IN LENGTH (Li) - ft      INCREMENTAL CHANGE IN ELEV (Hi) - ft

1288.	600.0
1545.	300.0
2833.	200.0
2832.	100.0
8755.	140.0
12875.	160.0

MEAN SLOPE (Sc): .0195 ft      BASIN FACTOR (Nb): .0500

WATERSHED TYPE(S): VALLEY/MOUNTAIN

#### RAINFALL VALUES

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
P 1	1.36	1.74	1.99	2.32	2.61	2.91
P 2	1.51	1.95	2.24	2.61	2.95	3.28
P 3	1.61	2.08	2.40	2.80	3.17	3.53
P 6	1.80	2.34	2.70	3.16	3.58	4.00
P24	2.22	2.90	3.36	3.95	4.48	5.01

#### SOIL GROUPS

47. % B, CN= 82, COVER TYPE= DESERT BRUSH , COVER DENSITY= 25 %  
53. % D, CN= 91, COVER TYPE= DESERT BRUSH , COVER DENSITY= 25 %

IMPERVIOUS COVER= 1. %

#### RAINFALL/RUNOFF AND PEAK DISCHARGE DATA

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
RUNOFF SUPPLY RATE (q/i):	.304	.439	.509	.580	.632	.673
Tc ( FUNCTION OF i ) :	202.73	175.12	165.03	156.55	151.31	147.54
SOLUTION OF Tc (MINUTES):	314	216	181	153	135	122
RAINFL INT. @ Tc (IN/HR):	.335	.593	.795	1.064	1.334	1.616
RUNOFF RATE @ Tc (IN/HR):	.102	.260	.404	.618	.843	1.088
PEAK DISCHARGE (CFS) :	267.	682.	1061.	1620.	2212.	2855.

PROJECT NAME AND LOCATION: SAN JOAQUIN ESTATES

DRAINAGE CONCENTRATION POINT: 3

WATERSHED AREA (A): 24.60 acres

LENGTH OF WATERCOURSE (Lc): 2350. ft

LENGTH TO CENTER OF GRAVITY (Lca): 1175. ft

INCREMENTAL CHANGE IN LENGTH (Li) - ft      INCREMENTAL CHANGE IN ELEV (Hi) - ft

2350.      35.0

MEAN SLOPE (Sc): .0149 ft      BASIN FACTOR (Nb): .0500

WATERSHED TYPE(S): VALLEY

RAINFALL VALUES

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
P 1	1.36	1.74	1.99	2.32	2.61	2.91
P 2	1.51	1.95	2.24	2.61	2.95	3.28
P 3	1.61	2.08	2.40	2.80	3.17	3.53
P 6	1.80	2.34	2.70	3.16	3.58	4.00
P24	2.22	2.90	3.36	3.95	4.48	5.01

SOIL GROUPS

100. % B, CN= 82, COVER TYPE= DESERT BRUSH , COVER DENSITY= 25 %

IMPERVIOUS COVER= 5. %

RAINFALL/RUNOFF AND PEAK DISCHARGE DATA

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
RUNOFF SUPPLY RATE (q/i):	.210	.336	.408	.484	.541	.587
Tc ( FUNCTION OF i ) :	51.56	42.71	39.55	36.93	35.33	34.18
SOLUTION OF Tc (MINUTES):	41	28	24	20	18	16
RAINFL INT. @ Tc (IN/HR):	1.759	2.857	3.590	4.615	5.490	6.449
RUNOFF RATE @ Tc (IN/HR):	.370	.961	1.464	2.233	2.968	3.786
PEAK DISCHARGE (CFS) :	9.	24.	36.	55.	74.	94.

PROJECT NAME AND LOCATION: SAN JOAQUIN ESTATES

DRAINAGE CONCENTRATION POINT: 4

WATERSHED AREA (A): 5.70 acres

LENGTH OF WATERCOURSE (Lc): 1100. ft

LENGTH TO CENTER OF GRAVITY (Lca): 550. ft

INCREMENTAL CHANGE IN LENGTH (Li) - ft      INCREMENTAL CHANGE IN ELEV (Hi) - ft

1100.      10.0

MEAN SLOPE (Sc): .0091 ft      BASIN FACTOR (Nb): .0500

WATERSHED TYPE(S): VALLEY

RAINFALL VALUES

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
P 1	1.36	1.74	1.99	2.32	2.61	2.91
P 2	1.51	1.95	2.24	2.61	2.95	3.28
P 3	1.61	2.08	2.40	2.80	3.17	3.53
P 6	1.80	2.34	2.70	3.16	3.58	4.00
P24	2.22	2.90	3.36	3.95	4.48	5.01

SOIL GROUPS

100. % B, CN= 82, COVER TYPE= DESERT BRUSH , COVER DENSITY= 25 %

IMPERVIOUS COVER= 5. %

RAINFALL/RUNOFF AND PEAK DISCHARGE DATA

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
RUNOFF SUPPLY RATE (q/i):	.210	.336	.408	.484	.541	.587
Tc ( FUNCTION OF i ) :	39.84	33.00	30.56	28.53	27.30	26.41
SOLUTION OF Tc (MINUTES):	29	20	17	15	13	12
RAINFL INT. @ Tc (IN/HR):	2.196	3.466	4.308	5.287	6.379	7.321
RUNOFF RATE @ Tc (IN/HR):	.461	1.166	1.756	2.558	3.448	4.298
PEAK DISCHARGE (CFS) :	3.	7.	10.	15.	20.	25.

PROJECT NAME AND LOCATION: SAN JOAQUIN ESTATES

DRAINAGE CONCENTRATION POINT: 5

WATERSHED AREA (A): 6.40 acres

LENGTH OF WATERCOURSE (Lc): 1500. ft

LENGTH TO CENTER OF GRAVITY (Lca): 750. ft

INCREMENTAL CHANGE IN LENGTH (Li) - ft      INCREMENTAL CHANGE IN ELEV (Hi) - ft  
1500.      20.0

MEAN SLOPE (Sc): .0133 ft      BASIN FACTOR (Nb): .0500

WATERSHED TYPE(S): VALLEY

RAINFALL VALUES

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
P 1	1.36	1.74	1.99	2.32	2.61	2.91
P 2	1.51	1.95	2.24	2.61	2.95	3.28
P 3	1.61	2.08	2.40	2.80	3.17	3.53
P 6	1.80	2.34	2.70	3.16	3.58	4.00
P24	2.22	2.90	3.36	3.95	4.48	5.01

SOIL GROUPS

100. % B, CN= 82, COVER TYPE= DESERT BRUSH , COVER DENSITY= 25 %  
IMPERVIOUS COVER= 5. %

RAINFALL/RUNOFF AND PEAK DISCHARGE DATA

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
RUNOFF SUPPLY RATE (q/i):	.210	.336	.408	.484	.541	.587
Tc ( FUNCTION OF i ) :	41.17	34.10	31.58	29.49	28.21	27.29
SOLUTION OF Tc (MINUTES):	31	21	18	15	14	12
RAINFL INT. @ Tc (IN/HR):	2.100	3.362	4.189	5.287	6.196	7.321
RUNOFF RATE @ Tc (IN/HR):	.441	1.131	1.708	2.558	3.350	4.298
PEAK DISCHARGE (CFS) :	3.	7.	11.	17.	22.	28.

PROJECT NAME AND LOCATION: SAN JOAQUIN ESTATES

DRAINAGE CONCENTRATION POINT: 6

WATERSHED AREA (A): 3.40 acres

LENGTH OF WATERCOURSE (Lc): 800. ft

LENGTH TO CENTER OF GRAVITY (Lca): 400. ft

INCREMENTAL CHANGE IN LENGTH (Li) - ft      INCREMENTAL CHANGE IN ELEV (Hi) - ft  
800.      10.0

MEAN SLOPE (Sc): .0125 ft      BASIN FACTOR (Nb): .0500

WATERSHED TYPE(S): VALLEY

RAINFALL VALUES

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
P 1	1.36	1.74	1.99	2.32	2.61	2.91
P 2	1.51	1.95	2.24	2.61	2.95	3.28
P 3	1.61	2.08	2.40	2.80	3.17	3.53
P 6	1.80	2.34	2.70	3.16	3.58	4.00
P24	2.22	2.90	3.36	3.95	4.48	5.01

SOIL GROUPS

100. % B, CN= 82, COVER TYPE= DESERT BRUSH , COVER DENSITY= 25 %  
IMPERVIOUS COVER= 5. %

RAINFALL/RUNOFF AND PEAK DISCHARGE DATA

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
RUNOFF SUPPLY RATE (q/i):	.210	.336	.408	.484	.541	.587
Tc ( FUNCTION OF i ) :	28.97	24.00	22.22	20.75	19.85	19.21
SOLUTION OF Tc (MINUTES):	19	14	12	10	9	8
RAINFL INT. @ Tc (IN/HR):	2.782	4.128	5.027	6.261	7.425	8.686
RUNOFF RATE @ Tc (IN/HR):	.584	1.389	2.049	3.029	4.014	5.100
PEAK DISCHARGE (CFS) :	2.	5.	7.	10.	14.	17.

PROJECT NAME AND LOCATION: SAN JOAQUIN ESTATES

DRAINAGE CONCENTRATION POINT: 7

WATERSHED AREA (A): 2404.00 acres

LENGTH OF WATERCOURSE (Lc): 29048. ft

LENGTH TO CENTER OF GRAVITY (Lca): 20060. ft

INCREMENTAL CHANGE IN LENGTH (Li) - ft      INCREMENTAL CHANGE IN ELEV (Hi) - ft

1288.	600.0
1545.	300.0
2833.	200.0
2832.	100.0
8755.	140.0
11795.	140.0

MEAN SLOPE (Sc): .0194 ft      BASIN FACTOR (Nb): .0500

WATERSHED TYPE(S): VALLEY/MOUNTAIN

RAINFALL VALUES

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
P 1	1.36	1.74	1.99	2.32	2.61	2.91
P 2	1.51	1.95	2.24	2.61	2.95	3.28
P 3	1.61	2.08	2.40	2.80	3.17	3.53
P 6	1.80	2.34	2.70	3.16	3.58	4.00
P24	2.22	2.90	3.36	3.95	4.48	5.01

SOIL GROUPS

50. % B, CN= 82, COVER TYPE= DESERT BRUSH , COVER DENSITY= 25 %  
50. % D, CN= 91, COVER TYPE= DESERT BRUSH , COVER DENSITY= 25 %

IMPERVIOUS COVER= 1. %

RAINFALL/RUNOFF AND PEAK DISCHARGE DATA

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
RUNOFF SUPPLY RATE (q/i):	.297	.431	.502	.574	.626	.667
Tc (FUNCTION OF i) :	201.18	173.32	163.15	154.62	149.34	145.55
SOLUTION OF Tc (MINUTES):	311	213	178	150	132	119
RAINFL INT. @ Tc (IN/HR):	.337	.600	.806	1.081	1.359	1.650
RUNOFF RATE @ Tc (IN/HR):	.100	.259	.404	.621	.851	1.101
PEAK DISCHARGE (CFS) :	243.	627.	980.	1504.	2061.	2668.

PROJECT NAME AND LOCATION: SAN JOAQUIN ESTATES

DRAINAGE CONCENTRATION POINT: 7, WITH FLOW BREAKOVER FROM AREA 1

WATERSHED AREA (A): 2582.00 acres

LENGTH OF WATERCOURSE (Lc): 29048. ft

LENGTH TO CENTER OF GRAVITY (Lca): 20060. ft

INCREMENTAL CHANGE IN LENGTH (Li) - ft      INCREMENTAL CHANGE IN ELEV (Hi) - ft

1288.	600.0
1545.	300.0
2833.	200.0
2832.	100.0
8755.	140.0
11795.	140.0

MEAN SLOPE (Sc): .0194 ft      BASIN FACTOR (Nb): .0500

WATERSHED TYPE(S): VALLEY/MOUNTAIN

#### RAINFALL VALUES

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
P 1	1.36	1.74	1.99	2.32	2.61	2.91
P 2	1.51	1.95	2.24	2.61	2.95	3.28
P 3	1.61	2.08	2.40	2.80	3.17	3.53
P 6	1.80	2.34	2.70	3.16	3.58	4.00
P24	2.22	2.90	3.36	3.95	4.48	5.01

#### SOIL GROUPS

47. % B, CN= 82, COVER TYPE= DESERT BRUSH , COVER DENSITY= 25 %  
53. % D, CN= 91, COVER TYPE= DESERT BRUSH , COVER DENSITY= 25 %

IMPERVIOUS COVER= 1. %

#### RAINFALL/RUNOFF AND PEAK DISCHARGE DATA

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
RUNOFF SUPPLY RATE (q/i):	.304	.439	.509	.580	.632	.673
Tc ( FUNCTION OF i ) :	199.32	172.18	162.25	153.91	148.76	145.05
SOLUTION OF Tc (MINUTES):	307	211	177	149	132	119
RAINFL INT. @ Tc (IN/HR):	.341	.605	.810	1.087	1.359	1.650
RUNOFF RATE @ Tc (IN/HR):	.104	.265	.412	.631	.859	1.111
PEAK DISCHARGE (CFS) :	270.	690.	1072.	1643.	2235.	2891.

PROJECT NAME AND LOCATION: SAN JOAQUIN ESTATES

DRAINAGE CONCENTRATION POINT: 8

WATERSHED AREA (A): 9.40 acres

LENGTH OF WATERCOURSE (Lc): 1450. ft

LENGTH TO CENTER OF GRAVITY (Lca): 725. ft

INCREMENTAL CHANGE IN LENGTH (Li) - ft      INCREMENTAL CHANGE IN ELEV (Hi) - ft

1450.      25.0

MEAN SLOPE (Sc): .0172 ft      BASIN FACTOR (Nb): .0500

WATERSHED TYPE(S): VALLEY

RAINFALL VALUES

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
P 1	1.36	1.74	1.99	2.32	2.61	2.91
P 2	1.51	1.95	2.24	2.61	2.95	3.28
P 3	1.61	2.08	2.40	2.80	3.17	3.53
P 6	1.80	2.34	2.70	3.16	3.58	4.00
P24	2.22	2.90	3.36	3.95	4.48	5.01

SOIL GROUPS

100. % B, CN= 82, COVER TYPE= DESERT BRUSH , COVER DENSITY= 25 %  
IMPERVIOUS COVER= 5. %

RAINFALL/RUNOFF AND PEAK DISCHARGE DATA

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
RUNOFF SUPPLY RATE (q/i):	.210	.336	.408	.484	.541	.587
Tc (FUNCTION OF i) :	36.40	30.15	27.92	26.07	24.94	24.13
SOLUTION OF Tc (MINUTES):	26	18	15	13	12	11
RAINFL INT. @ Tc (IN/HR):	2.332	3.658	4.548	5.658	6.588	7.583
RUNOFF RATE @ Tc (IN/HR):	.490	1.231	1.854	2.738	3.562	4.452
PEAK DISCHARGE (CFS) :	5.	12.	18.	26.	34.	42.



PROJECT NAME AND LOCATION: SAN JOAQUIN ESTATES

DRAINAGE CONCENTRATION POINT: 9

WATERSHED AREA (A): 5.90 acres

LENGTH OF WATERCOURSE (Lc): 1200. ft

LENGTH TO CENTER OF GRAVITY (Lca): 600. ft

INCREMENTAL CHANGE IN LENGTH (Li) - ft      INCREMENTAL CHANGE IN ELEV (Hi) - ft

1200.      20.0

MEAN SLOPE (Sc): .0167 ft      BASIN FACTOR (Nb): .0500

WATERSHED TYPE(S): VALLEY

RAINFALL VALUES

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
P 1	1.36	1.74	1.99	2.32	2.61	2.91
P 2	1.51	1.95	2.24	2.61	2.95	3.28
P 3	1.61	2.08	2.40	2.80	3.17	3.53
P 6	1.80	2.34	2.70	3.16	3.58	4.00
P24	2.22	2.90	3.36	3.95	4.48	5.01

SOIL GROUPS

100. % B, CN= 82, COVER TYPE= DESERT BRUSH , COVER DENSITY= 25 %

IMPERVIOUS COVER= 5. %

RAINFALL/RUNOFF AND PEAK DISCHARGE DATA

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
RUNOFF SUPPLY RATE (q/i):	.210	.336	.408	.484	.541	.587
Tc ( FUNCTION OF i ) :	32.94	27.28	25.26	23.59	22.57	21.83
SOLUTION OF Tc (MINUTES):	23	16	14	12	10	10
RAINFL INT. @ Tc (IN/HR):	2.509	3.867	4.727	5.844	7.059	7.844
RUNOFF RATE @ Tc (IN/HR):	.527	1.301	1.927	2.828	3.816	4.605
PEAK DISCHARGE (CFS) :	3.	8.	11.	17.	23.	27.



PROJECT NAME AND LOCATION: SAN JOAQUIN ESTATES

DRAINAGE CONCENTRATION POINT: 11

WATERSHED AREA (A): 4.50 acres

LENGTH OF WATERCOURSE (Lc): 1200. ft

LENGTH TO CENTER OF GRAVITY (Lca): 600. ft

INCREMENTAL CHANGE IN LENGTH (Li) - ft      INCREMENTAL CHANGE IN ELEV (Hi) - ft  
1200.      16.0

MEAN SLOPE (Sc): .0133 ft      BASIN FACTOR (Nb): .0500

WATERSHED TYPE(S): VALLEY

RAINFALL VALUES

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
P 1	1.36	1.74	1.99	2.32	2.61	2.91
P 2	1.51	1.95	2.24	2.61	2.95	3.28
P 3	1.61	2.08	2.40	2.80	3.17	3.53
P 6	1.80	2.34	2.70	3.16	3.58	4.00
P24	2.22	2.90	3.36	3.95	4.48	5.01

SOIL GROUPS

100. % B, CN= 82, COVER TYPE= DESERT BRUSH , COVER DENSITY= 25 %

IMPERVIOUS COVER= 5. %

RAINFALL/RUNOFF AND PEAK DISCHARGE DATA

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
RUNOFF SUPPLY RATE (q/i):	.210	.336	.408	.484	.541	.587
Tc ( FUNCTION OF i ) :	36.01	29.83	27.62	25.79	24.67	23.87
SOLUTION OF Tc (MINUTES):	26	18	15	13	12	11
RAINFL INT. @ Tc (IN/HR):	2.332	3.658	4.548	5.658	6.588	7.583
RUNOFF RATE @ Tc (IN/HR):	.490	1.231	1.854	2.738	3.562	4.452
PEAK DISCHARGE (CFS) :	2.	6.	8.	12.	16.	20.

PROJECT NAME AND LOCATION: SAN JOAQUIN ESTATES

DRAINAGE CONCENTRATION POINT: 12

WATERSHED AREA (A): 2.30 acres

LENGTH OF WATERCOURSE (Lc): 600. ft

LENGTH TO CENTER OF GRAVITY (Lca): 300. ft

INCREMENTAL CHANGE IN LENGTH (Li) - ft      INCREMENTAL CHANGE IN ELEV (Hi) - ft  
600.      7.5

MEAN SLOPE (Sc): .0125 ft      BASIN FACTOR (Nb): .0500

WATERSHED TYPE(S): VALLEY

RAINFALL VALUES

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
P 1	1.36	1.74	1.99	2.32	2.61	2.91
P 2	1.51	1.95	2.24	2.61	2.95	3.28
P 3	1.61	2.08	2.40	2.80	3.17	3.53
P 6	1.80	2.34	2.70	3.16	3.58	4.00
P24	2.22	2.90	3.36	3.95	4.48	5.01

SOIL GROUPS

100. % B, CN= 82, COVER TYPE= DESERT BRUSH , COVER DENSITY= 25 %  
IMPERVIOUS COVER= 5. %

RAINFALL/RUNOFF AND PEAK DISCHARGE DATA

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
RUNOFF SUPPLY RATE (q/i):	.210	.336	.408	.484	.541	.587
Tc (FUNCTION OF i) :	24.38	20.19	18.70	17.46	16.70	16.16
SOLUTION OF Tc (MINUTES):	16	11	10	8	7	7
RAINFL INT. @ Tc (IN/HR):	3.028	4.546	5.386	6.934	8.235	9.151
RUNOFF RATE @ Tc (IN/HR):	.636	1.530	2.196	3.355	4.452	5.373
PEAK DISCHARGE (CFS) :	1.	4.	5.	8.	10.	12.

PROJECT NAME AND LOCATION: SAN JOAQUIN ESTATES

DRAINAGE CONCENTRATION POINT: 1 (FOR "WITH BERM" CONDITION)

WATERSHED AREA (A): 3698.00 acres

LENGTH OF WATERCOURSE (Lc): 30548. ft

LENGTH TO CENTER OF GRAVITY (Lca): 20810. ft

INCREMENTAL CHANGE IN LENGTH (Li) - ft      INCREMENTAL CHANGE IN ELEV (Hi) - ft

1288.	600.0
1545.	300.0
2833.	200.0
2832.	100.0
8755.	140.0
13295.	165.0

MEAN SLOPE (Sc): .0193 ft      BASIN FACTOR (Nb): .0500

WATERSHED TYPE(S): VALLEY/MOUNTAIN

RAINFALL VALUES

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
P 1	1.36	1.74	1.99	2.32	2.61	2.91
P 2	1.51	1.95	2.24	2.61	2.95	3.28
P 3	1.61	2.08	2.40	2.80	3.17	3.53
P 6	1.80	2.34	2.70	3.16	3.58	4.00
P24	2.22	2.90	3.36	3.95	4.48	5.01

SOIL GROUPS

57. % B, CN= 82, COVER TYPE= DESERT BRUSH , COVER DENSITY= 25 %  
43. % D, CN= 91, COVER TYPE= DESERT BRUSH , COVER DENSITY= 25 %

IMPERVIOUS COVER= 1. %

RAINFALL/RUNOFF AND PEAK DISCHARGE DATA

	EVENT					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
RUNOFF SUPPLY RATE (q/i):	.281	.415	.485	.559	.611	.654
Tc (FUNCTION OF i) :	211.47	180.96	169.89	160.62	154.90	150.79
SOLUTION OF Tc (MINUTES):	335	227	189	159	140	126
RAINFL INT. @ Tc (IN/HR):	.318	.568	.766	1.031	1.294	1.573
RUNOFF RATE @ Tc (IN/HR):	.089	.236	.372	.576	.791	1.029
PEAK DISCHARGE (CFS) :	333.	878.	1385.	2147.	2949.	3835.

APPENDIX B  
HYDRAULIC COMPUTATION SHEETS

MANNING RATING FOR SAN JOAQUIN ESTATES WASHES  
 CROSS-SECTION - 11 (INPUT:89015.NMI)

STA:	.00	24.00	34.00	60.00	90.00	110.00	136.00
ELEV:	2415.20	2415.00	2414.30	2414.50	2414.00	2414.00	2413.40
STA:	142.00	150.00	154.00	194.00	212.00	226.00	232.00
ELEV:	2414.00	2413.80	2414.00	2414.40	2414.00	2413.00	2413.00
STA:	234.00	242.00	250.00	258.00	284.00	314.00	330.00
ELEV:	2414.00	2414.20	2414.00	2413.50	2414.00	2414.00	2413.00
STA:	336.00	344.00	354.00	356.00	360.00	362.00	366.00
ELEV:	2412.50	2413.00	2413.00	2412.00	2411.70	2412.00	2413.00
STA:	390.00	430.00	450.00	502.00			
ELEV:	2413.70	2413.00	2414.00	2415.00			

DISCHARGE = 1540. WSEL = 2414.73 SLOPE = .0130

SECTION AND SUBSECTION HYDRAULIC DATA

	TOTAL SECTION	SUBSECTION #: 1
DISCHARGE (CFS) =	1540.18	1540.18
VELOCITY (FT/S) =	3.59	3.59
AREA (SQUARE FT) =	429.04	429.04
TOPWIDTH (FT) =	459.96	459.96
DEPTH (FT) =	3.03	3.03
HYD. DEPTH (FT) =	.93	.93
WET. PERIM. (FT) =	460.83	460.83
HYD. RADIUS (FT) =	.93	.93
FROUDE NUMBER =	.66	.66
MANNINGS N VALUE =	.0450	.0450

SUBSECTION 1 = STATION .00 TO STATION 502.00

MANNING RATING FOR SAN JOAQUIN ESTATES WASHES  
 CROSS-SECTION - 12

STA:	.00	126.00	196.00	204.00	214.00	228.00	246.00
ELEV:	2407.00	2406.00	2406.00	2404.90	2406.00	2406.00	2403.60
STA:	264.00	276.00	290.00	316.00	338.00	346.00	356.00
ELEV:	2405.00	2403.70	2406.10	2405.10	2406.00	2404.00	2405.20
STA:	368.00	376.00	400.00	406.00	450.00	496.00	570.00
ELEV:	2403.90	2405.00	2405.70	2404.50	2406.10	2405.20	2406.20
STA:	600.00	606.00	616.00	650.00	666.00	676.00	688.00
ELEV:	2405.00	2403.30	2405.00	2406.10	2406.00	2404.70	2406.00
STA:	824.00	896.00					
ELEV:	2407.00	2408.20					

DISCHARGE = 3063. WSEL = 2406.70 SLOPE = .0130

SECTION AND SUBSECTION HYDRAULIC DATA

	TOTAL SECTION	SUBSECTION #: 1
DISCHARGE (CFS) =	3063.20	3063.20
VELOCITY (FT/S) =	3.90	3.90
AREA (SQUARE FT) =	786.18	786.18
TOPWIDTH (FT) =	744.94	744.94
DEPTH (FT) =	3.40	3.40
HYD. DEPTH (FT) =	1.06	1.06
WET. PERIM. (FT) =	746.82	746.82
HYD. RADIUS (FT) =	1.05	1.05
FROUDE NUMBER =	.67	.67
MANNINGS N VALUE =	.0450	.0450
SUBSECTION 1 = STATION .00 TO STATION 896.00		



MANNING RATING FOR SAN JOAQUIN ESTATES WASHES  
 CROSS-SECTION - 13

STA:	.00	28.00	88.00	90.00	100.00	104.00	112.00
ELEV:	2400.80	2400.60	2399.00	2397.80	2399.50	2397.70	2399.20
STA:	120.00	128.00	166.00	178.00	190.00	250.00	260.00
ELEV:	2398.00	2400.00	2400.00	2398.20	2400.00	2398.20	2399.10
STA:	268.00	272.00	286.00	316.00	332.00	342.00	350.00
ELEV:	2397.00	2396.70	2398.00	2399.00	2399.00	2396.80	2398.00
STA:	380.00	420.00	480.00	520.00	550.00	558.00	584.00
ELEV:	2399.00	2399.40	2399.00	2398.00	2398.00	2396.90	2398.70
STA:	610.00	620.00	632.00	641.00	700.00	736.00	808.00
ELEV:	2397.80	2398.60	2397.80	2399.00	2399.20	2398.50	2401.00

DISCHARGE = 3066. WSEL = 2399.76 SLOPE = .0154

SECTION AND SUBSECTION HYDRAULIC DATA

	TOTAL SECTION	SUBSECTION #: 1
DISCHARGE (CFS) =	3065.56	3065.56
VELOCITY (FT/S) =	4.30	4.30
AREA (SQUARE FT) =	713.56	713.56
TOPWIDTH (FT) =	662.11	662.11
DEPTH (FT) =	3.06	3.06
HYD. DEPTH (FT) =	1.08	1.08
WET. PERIM. (FT) =	664.77	664.77
HYD. RADIUS (FT) =	1.07	1.07
FROUDE NUMBER =	.73	.73
MANNINGS N VALUE =	.0450	.0450

SUBSECTION 1 = STATION .00 TO STATION 808.00

MANNING RATING FOR SAN JOAQUIN ESTATES WASHES  
 CROSS-SECTION - 14

STA:	.00	52.00	78.00	92.00	108.00	122.00	144.00
ELEV:	2395.00	2394.10	2395.00	2392.70	2395.00	2393.60	2394.30
STA:	200.00	256.00	280.00	294.00	300.00	314.00	344.00
ELEV:	2393.00	2391.20	2393.20	2390.90	2390.90	2393.60	2392.50
STA:	358.00	368.00	394.00	410.00	420.00	446.00	512.00
ELEV:	2393.30	2391.00	2393.70	2391.00	2393.00	2393.60	2392.00
STA:	530.00	544.00	554.00	560.00	592.00	630.00	720.00
ELEV:	2393.00	2392.70	2393.10	2392.40	2394.00	2393.60	2396.30

DISCHARGE = 3061. WSEL = 2394.06 SLOPE = .0167

SECTION AND SUBSECTION HYDRAULIC DATA

	TOTAL SECTION	SUBSECTION #: 1
DISCHARGE (CFS) =	3060.56	3060.56
VELOCITY (FT/S) =	4.82	4.82
AREA (SQUARE FT) =	635.45	635.45
TOPWIDTH (FT) =	528.18	528.18
DEPTH (FT) =	3.16	3.16
HYD. DEPTH (FT) =	1.20	1.20
WET. PERIM. (FT) =	530.01	530.01
HYD. RADIUS (FT) =	1.20	1.20
FROUDE NUMBER =	.77	.77
MANNINGS N VALUE =	.0450	.0450
SUBSECTION 1 = STATION .00 TO STATION 720.00		

MANNING RATING FOR SAN JOAQUIN ESTATES WASHES  
 CROSS-SECTION - 15

STA:	.00	32.00	56.00	92.00	142.00	146.00	152.00
ELEV:	2390.50	2390.00	2389.00	2389.00	2388.00	2387.60	2388.00
STA:	188.00	204.00	212.00	216.00	256.00	276.00	286.00
ELEV:	2388.90	2388.00	2388.00	2389.00	2389.00	2388.00	2388.00
STA:	304.00	318.00	340.00	400.00	414.00	500.00	536.00
ELEV:	2388.70	2388.00	2389.00	2388.00	2389.00	2389.00	2388.00
STA:	560.00	588.00	632.00	664.00	684.00	700.00	772.00
ELEV:	2387.80	2388.00	2387.40	2388.00	2389.00	2388.00	2387.00
STA:	786.00	812.00	952.00	966.00	998.00	1010.00	1034.00
ELEV:	2387.00	2388.00	2387.00	2386.00	2386.00	2387.00	2387.30
STA:	1056.00	1070.00	1080.00	1168.00	1188.00	1208.00	
ELEV:	2387.00	2386.80	2387.00	2388.00	2389.00	2390.00	

DISCHARGE = 3063. WSEL = 2388.71 SLOPE = .0100

SECTION AND SUBSECTION HYDRAULIC DATA

	TOTAL SECTION	SUBSECTION #: 1
DISCHARGE (CFS) =	3063.26	3063.26
VELOCITY (FT/S) =	3.37	3.37
AREA (SQUARE FT) =	909.55	909.55
TOPWIDTH (FT) =	882.64	882.64
DEPTH (FT) =	2.71	2.71
HYD. DEPTH (FT) =	1.03	1.03
WET. PERIM. (FT) =	883.09	883.09
HYD. RADIUS (FT) =	1.03	1.03
FROUDE NUMBER =	.58	.58
MANNINGS N VALUE =	.0450	.0450

SUBSECTION 1 = STATION .00 TO STATION 1208.00

MANNING RATING FOR SAN JOAQUIN ESTATES WASHES  
 CROSS-SECTION - 21 , FOR Q100 @ CP2 W/ U/S BREAKOVER FROM AREA 1

STA:	.00	50.00	108.00	120.00	132.00	138.00	146.00
ELEV:	2416.00	2415.00	2414.00	2414.00	2413.80	2414.00	2414.00
STA:	164.00	180.00	194.00	210.00	216.00	222.00	236.00
ELEV:	2414.30	2414.00	2414.50	2414.00	2413.90	2414.00	2414.40
STA:	252.00	260.00	282.00	310.00	328.00	336.00	364.00
ELEV:	2414.00	2413.50	2413.10	2413.90	2413.10	2413.00	2413.00
STA:	372.00	376.00	380.00	382.00	392.00	398.00	402.00
ELEV:	2412.00	2411.50	2412.00	2413.00	2414.00	2413.00	2412.20
STA:	406.00	412.00	420.00	428.00	432.00	436.00	446.00
ELEV:	2413.00	2414.00	2414.10	2414.00	2413.80	2414.00	2414.00
STA:	454.00	460.00	470.00	482.00	486.00	512.00	568.00
ELEV:	2413.20	2414.00	2414.40	2414.00	2414.00	2414.80	2424.30
STA:	576.00	620.00					
ELEV:	2415.00	2415.20					

DISCHARGE = 2891. WSEL = 2415.24 SLOPE = .0130

SECTION AND SUBSECTION HYDRAULIC DATA

	TOTAL SECTION	SUBSECTION #:	
		1	2
DISCHARGE (CFS) =	2890.77	1266.08	1624.69
VELOCITY (FT/S) =	4.41	4.10	4.69
AREA (SQUARE FT) =	655.58	308.84	346.74
TOPWIDTH (FT) =	520.55	271.78	248.77
DEPTH (FT) =	3.74	2.14	3.74
HYD. DEPTH (FT) =	1.26	1.14	1.39
WET. PERIM. (FT) =	521.66	271.86	249.80
HYD. RADIUS (FT) =	1.26	1.14	1.39
FROUDE NUMBER =	.69	.68	.70
MANNINGS N VALUE =	.0448	.0450	.0450
SUBSECTION 1 = STATION	.00	TO	STATION 310.00
SUBSECTION 2 = STATION	310.00	TO	STATION 620.00

MANNING RATING FOR SAN JOAQUIN ESTATES WASHES  
 CROSS-SECTION - 21 , FOR Q100 @ CP2 W/OUT U/S BREAKOVER FROM AREA 1

STA:	.00	50.00	108.00	120.00	132.00	138.00	146.00
ELEV:	2416.00	2415.00	2414.00	2414.00	2413.80	2414.00	2414.00
STA:	164.00	180.00	194.00	210.00	216.00	222.00	236.00
ELEV:	2414.30	2414.00	2414.50	2414.00	2413.90	2414.00	2414.40
STA:	252.00	260.00	282.00	310.00	328.00	336.00	364.00
ELEV:	2414.00	2413.50	2413.10	2413.90	2413.10	2413.00	2413.00
STA:	372.00	376.00	380.00	382.00	392.00	398.00	402.00
ELEV:	2412.00	2411.50	2412.00	2413.00	2414.00	2413.00	2412.20
STA:	406.00	412.00	420.00	428.00	432.00	436.00	446.00
ELEV:	2413.00	2414.00	2414.10	2414.00	2413.80	2414.00	2414.00
STA:	454.00	460.00	470.00	482.00	486.00	512.00	568.00
ELEV:	2413.20	2414.00	2414.40	2414.00	2414.00	2414.80	2424.30
STA:	576.00	620.00					
ELEV:	2415.00	2415.20					

DISCHARGE = 2668. WSEL = 2415.16 SLOPE = .0130

SECTION AND SUBSECTION HYDRAULIC DATA

	TOTAL SECTION	SUBSECTION #:	
		1	2
DISCHARGE (CFS) =	2668.23	1145.36	1522.86
VELOCITY (FT/S) =	4.32	3.96	4.63
AREA (SQUARE FT) =	618.14	289.27	328.87
TOPWIDTH (FT) =	508.32	268.15	240.17
DEPTH (FT) =	3.66	2.06	3.66
HYD. DEPTH (FT) =	1.22	1.08	1.37
WET. PERIM. (FT) =	509.39	268.23	241.16
HYD. RADIUS (FT) =	1.21	1.08	1.36
FROUDE NUMBER =	.69	.67	.70
MANNINGS N VALUE =	.0447	.0450	.0450
SUBSECTION 1 = STATION	.00	TO STATION	310.00
SUBSECTION 2 = STATION	310.00	TO STATION	620.00

MANNING RATING FOR SAN JOAQUIN ESTATES WASHES  
 CROSS-SECTION - 22

STA:	.00	30.00	140.00	212.00	220.00	232.00	250.00
ELEV:	2410.00	2409.00	2408.00	2408.00	2405.60	2407.40	2407.00
STA:	254.00	278.00	300.00	328.00	330.00	340.00	360.00
ELEV:	2406.00	2406.00	2406.80	2405.80	2407.00	2408.00	2408.80

DISCHARGE = 1266. WSEL = 2408.55 SLOPE = .0120

SECTION AND SUBSECTION HYDRAULIC DATA

	TOTAL SECTION	SUBSECTION #: 1
DISCHARGE (CFS) =	1266.47	1266.47
VELOCITY (FT/S) =	3.98	3.98
AREA (SQUARE FT) =	318.17	318.17
TOPWIDTH (FT) =	274.62	274.62
DEPTH (FT) =	2.95	2.95
HYD. DEPTH (FT) =	1.16	1.16
WET. PERIM. (FT) =	275.66	275.66
HYD. RADIUS (FT) =	1.15	1.15
FROUDE NUMBER =	.65	.65
MANNINGS N VALUE =	.0450	.0450

SUBSECTION 1 = STATION .00 TO STATION 360.00

MANNING RATING FOR SAN JOAQUIN ESTATES WASHES  
 CROSS-SECTION - 23

STA:	.00	60.00	116.00	170.00	174.00	180.00	240.00
ELEV:	2404.00	2403.00	2403.00	2402.00	2401.30	2402.00	2402.00
STA:	242.00	246.00	254.00	266.00	300.00	338.00	350.00
ELEV:	2401.00	2400.40	2400.40	2402.00	2402.50	2402.00	2401.00
STA:	364.00	390.00	430.00	440.00	460.00	480.00	526.00
ELEV:	2402.00	2401.00	2402.00	2401.00	2402.00	2400.70	2403.00

DISCHARGE = 1266. WSEL = 2402.72 SLOPE = .0120

SECTION AND SUBSECTION HYDRAULIC DATA

	TOTAL SECTION	SUBSECTION #: 1
DISCHARGE (CFS) =	1265.89	1265.89
VELOCITY (FT/S) =	3.46	3.46
AREA (SQUARE FT) =	365.43	365.43
TOPWIDTH (FT) =	389.15	389.15
DEPTH (FT) =	2.32	2.32
HYD. DEPTH (FT) =	.94	.94
WET. PERIM. (FT) =	389.93	389.93
HYD. RADIUS (FT) =	.94	.94
FROUDE NUMBER =	.63	.63
MANNINGS N VALUE =	.0450	.0450
SUBSECTION 1 = STATION .00 TO STATION 526.00		

MANNING RATING FOR SAN JOAQUIN ESTATES WASHES  
 CROSS-SECTION - 24

STA:	.00	110.00	114.00	128.00	140.00	150.00	166.00
ELEV:	2399.00	2398.00	2397.50	2399.00	2397.00	2397.50	2397.00
STA:	186.00	194.00	218.00	250.00	260.00	280.00	310.00
ELEV:	2398.70	2398.00	2398.50	2397.90	2399.00	2398.00	2399.20
STA:	330.00	394.00	404.00	408.00	504.00		
ELEV:	2399.00	2399.00	2397.40	2398.00	2399.00		

DISCHARGE = 1267. WSEL = 2399.05 SLOPE = .0270

SECTION AND SUBSECTION HYDRAULIC DATA

	TOTAL SECTION	SUBSECTION #: 1
DISCHARGE (CFS) =	1266.64	1266.64
VELOCITY (FT/S) =	4.05	4.05
AREA (SQUARE FT) =	313.02	313.02
TOPWIDTH (FT) =	485.23	485.23
DEPTH (FT) =	2.05	2.05
HYD. DEPTH (FT) =	.65	.65
WET. PERIM. (FT) =	485.93	485.93
HYD. RADIUS (FT) =	.64	.64
FROUDE NUMBER =	.89	.89
MANNINGS N VALUE =	.0450	.0450
SUBSECTION 1 = STATION .00 TO STATION 504.00		



MANNING RATING FOR SAN JOAQUIN ESTATES WASHES  
 CROSS-SECTION - 25

STA:	.00	54.00	72.00	116.00	120.00	134.00	141.00
ELEV:	2395.00	2393.70	2394.40	2394.00	2393.00	2394.00	2394.00
STA:	156.00	168.00	230.00	240.00	250.00	264.00	276.00
ELEV:	2392.40	2394.00	2395.10	2394.50	2395.10	2393.50	2395.00
STA:	500.00	520.00	580.00	584.00	588.00	594.00	626.00
ELEV:	2395.30	2395.00	2394.00	2393.00	2393.00	2394.00	2395.00
STA:	646.00						
ELEV:	2395.30						

DISCHARGE = 1265. WSEL = 2395.23 SLOPE = .0150

SECTION AND SUBSECTION HYDRAULIC DATA

	TOTAL SECTION	SUBSECTION #: 1
DISCHARGE (CFS) =	1264.74	1264.74
VELOCITY (FT/S) =	3.14	3.14
AREA (SQUARE FT) =	402.54	402.54
TOPWIDTH (FT) =	586.93	586.93
DEPTH (FT) =	2.83	2.83
HYD. DEPTH (FT) =	.69	.69
WET. PERIM. (FT) =	587.77	587.77
HYD. RADIUS (FT) =	.68	.68
FROUDE NUMBER =	.67	.67
MANNINGS N VALUE =	.0450	.0450

SUBSECTION 1 = STATION .00 TO STATION 646.00

MANNING RATING FOR SAN JOAQUIN ESTATES WASHES  
 CROSS-SECTION - 12 , WITH BERM

STA:	234.00	246.00	264.00	276.00	290.00	316.00	338.00
ELEV:	2405.20	2403.60	2405.00	2403.70	2406.10	2405.10	2406.00
STA:	346.00	356.00	368.00	376.00	400.00	406.00	450.00
ELEV:	2404.00	2405.20	2403.90	2405.00	2405.70	2404.50	2406.10
STA:	496.00	570.00	600.00	606.00	616.00	650.00	666.00
ELEV:	2405.20	2406.20	2405.00	2403.30	2405.00	2406.10	2406.00
STA:	676.00	688.00	824.00	896.00			
ELEV:	2404.70	2406.00	2407.00	2408.20			

DISCHARGE = 3835. WSEL = 2406.96 SLOPE = .0130

SECTION AND SUBSECTION HYDRAULIC DATA

	TOTAL SECTION	SUBSECTION #: 1
DISCHARGE (CFS) =	3835.05 <sup>3835</sup>	3835.05
VELOCITY (FT/S) =	4.70 (3.4)	4.70
AREA (SQUARE FT) =	816.65	816.65
TOPWIDTH (FT) =	584.69	584.69
DEPTH (FT) =	3.66 (3.4)	3.66
HYD. DEPTH (FT) =	1.40	1.40
WET. PERIM. (FT) =	586.38	586.38
HYD. RADIUS (FT) =	1.39	1.39
FROUDE NUMBER =	.70	.70
MANNINGS N VALUE =	.0450	.0450

SUBSECTION 1 = STATION 234.00 TO STATION 896.00

MANNING RATING FOR SAN JOAQUIN ESTATES WASHES  
 CROSS-SECTION - 13 , WITH BERM

STA:	284.00	286.00	316.00	332.00	342.00	350.00	380.00
ELEV:	2397.80	2398.00	2399.00	2399.00	2396.80	2398.00	2399.00
STA:	420.00	480.00	520.00	550.00	558.00	584.00	610.00
ELEV:	2399.40	2399.00	2398.00	2398.00	2396.90	2398.70	2397.80
STA:	620.00	632.00	641.00	700.00	736.00	808.00	
ELEV:	2398.60	2397.80	2399.00	2399.20	2398.50	2401.00	

DISCHARGE = 3834. WSEL = 2400.15 SLOPE = .0154

SECTION AND SUBSECTION HYDRAULIC DATA

	TOTAL SECTION		SUBSECTION #:
			1
DISCHARGE (CFS) =	3833.51	<i>3065</i>	3833.51
VELOCITY (FT/S) =	5.26	<i>4.3</i>	5.26
AREA (SQUARE FT) =	728.12		728.12
TOPWIDTH (FT) =	499.38		499.38
DEPTH (FT) =	3.34	<i>3.06</i>	3.34
HYD. DEPTH (FT) =	1.46		1.46
WET. PERIM. (FT) =	500.09		500.09
HYD. RADIUS (FT) =	1.46		1.46
FROUDE NUMBER =	.77		.77
MANNINGS N VALUE =	.0450		.0450
SUBSECTION 1 = STATION 284.00 TO STATION 808.00			

MANNING RATING FOR SAN JOAQUIN ESTATES WASHES  
 CROSS-SECTION - 14 , WITH BERM

STA:	142.00	144.00	200.00	256.00	280.00	294.00	300.00
ELEV:	2394.20	2394.30	2393.00	2391.20	2393.20	2390.90	2390.90
STA:	314.00	344.00	358.00	368.00	394.00	410.00	420.00
ELEV:	2393.60	2392.50	2393.30	2391.00	2393.70	2391.00	2393.00
STA:	446.00	512.00	530.00	544.00	554.00	560.00	592.00
ELEV:	2393.60	2392.00	2393.00	2392.70	2393.10	2392.40	2394.00
STA:	630.00	720.00					
ELEV:	2393.60	2396.30					

DISCHARGE = 3835. WSEL = 2394.26 SLOPE = .0167

SECTION AND SUBSECTION HYDRAULIC DATA

	TOTAL SECTION	SUBSECTION #:
		1
DISCHARGE (CFS) =	3834.81 <i>3000</i>	3834.81
VELOCITY (FT/S) =	5.36 <i>4.8</i>	5.36
AREA (SQUARE FT) =	715.70	715.70
TOPWIDTH (FT) =	507.19	507.19
DEPTH (FT) =	3.36 <i>3.16</i>	3.36
HYD. DEPTH (FT) =	1.41	1.41
WET. PERIM. (FT) =	508.79	508.79
HYD. RADIUS (FT) =	1.41	1.41
FROUDE NUMBER =	.79	.79
MANNINGS N VALUE =	.0450	.0450
SUBSECTION 1 = STATION 142.00 TO STATION 720.00		

MANNING RATING FOR SAN JOAQUIN ESTATES WASHES  
 CROSS-SECTION - 15 , WITH BERM

STA:	.00	32.00	56.00	92.00	142.00	146.00	152.00
ELEV:	2390.50	2390.00	2389.00	2389.00	2388.00	2387.60	2388.00
STA:	188.00	204.00	212.00	216.00	256.00	276.00	286.00
ELEV:	2388.90	2388.00	2388.00	2389.00	2389.00	2388.00	2388.00
STA:	304.00	318.00	340.00	400.00	414.00	500.00	536.00
ELEV:	2388.70	2388.00	2389.00	2388.00	2389.00	2389.00	2388.00
STA:	560.00	588.00	632.00	664.00	684.00	700.00	772.00
ELEV:	2387.80	2388.00	2387.40	2388.00	2389.00	2388.00	2387.00
STA:	786.00	812.00	952.00	966.00	998.00	1010.00	1034.00
ELEV:	2387.00	2388.00	2387.00	2386.00	2386.00	2387.00	2387.30
STA:	1056.00	1070.00	1080.00	1168.00	1188.00	1208.00	
ELEV:	2387.00	2386.80	2387.00	2388.00	2389.00	2390.00	

DISCHARGE = 3834. WSEL = 2388.88 SLOPE = .0100

SECTION AND SUBSECTION HYDRAULIC DATA

	TOTAL SECTION		SUBSECTION #:
			1
DISCHARGE (CFS) =	3834.40	3834.40	3834.40
VELOCITY (FT/S) =	3.60	3.60	3.60
AREA (SQUARE FT) =	1066.21	1066.21	1066.21
TOPWIDTH (FT) =	937.68	937.68	937.68
DEPTH (FT) =	2.88	2.88	2.88
HYD. DEPTH (FT) =	1.14	1.14	1.14
WET. PERIM. (FT) =	938.20	938.20	938.20
HYD. RADIUS (FT) =	1.14	1.14	1.14
FROUDE NUMBER =	.59	.59	.59
MANNINGS N VALUE =	.0450	.0450	.0450

SUBSECTION 1 = STATION .00 TO STATION 1208.00

MANNING RATING FOR SAN JOAQUIN ESTATES WASHES  
 CROSS-SECTION - 21 , WITH BERM

STA:	218.00	350.00	464.00	470.00	482.00	486.00	512.00
ELEV:	2413.00	2412.90	2412.90	2414.40	2414.00	2414.00	2414.80
STA:	568.00	576.00	620.00				
ELEV:	2424.30	2415.00	2415.20				

DISCHARGE = 2891. WSEL = 2414.92 SLOPE = .0130

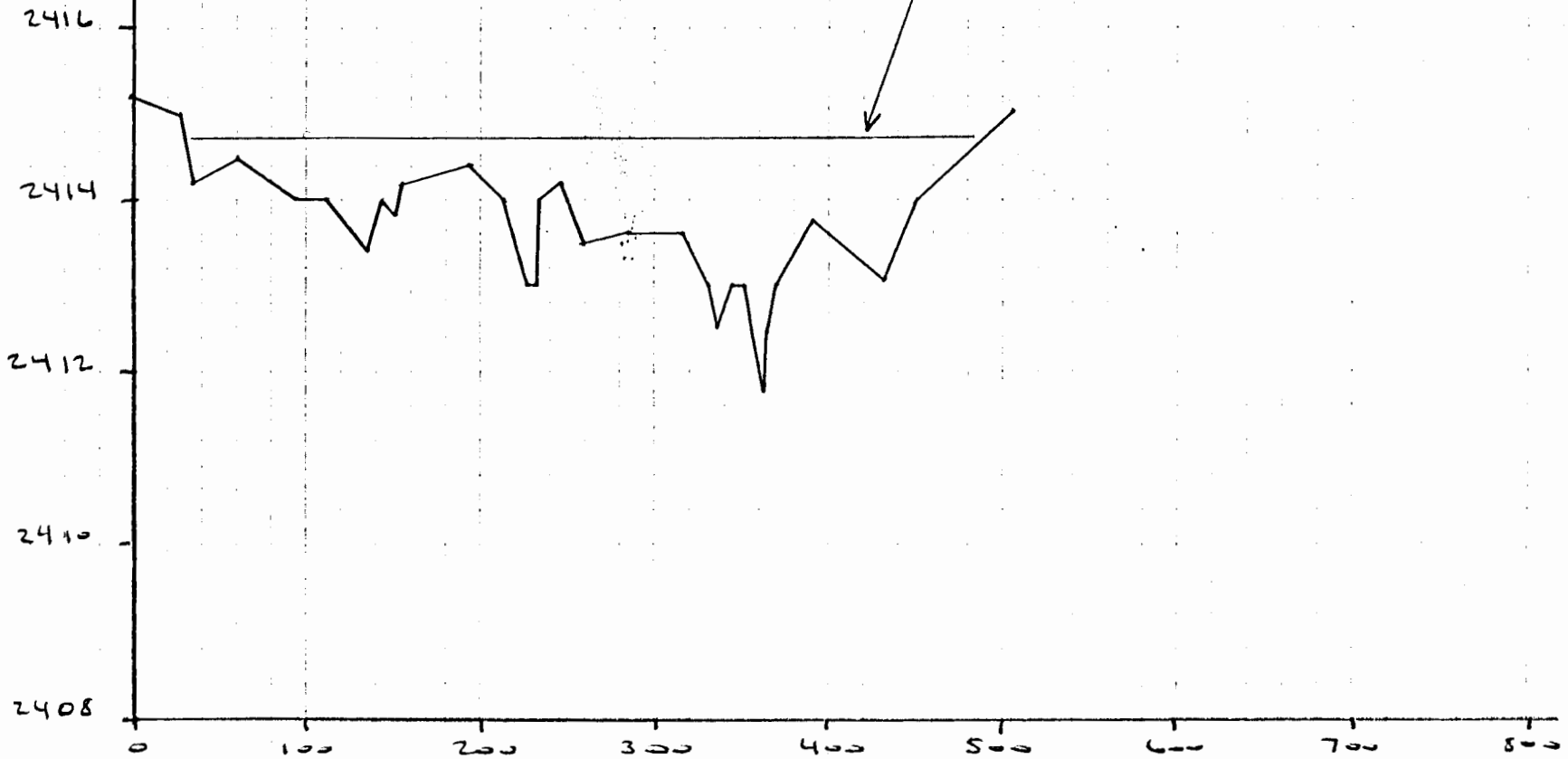
SECTION AND SUBSECTION HYDRAULIC DATA

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	TOTAL SECTION	SUBSECTION #: 1
DISCHARGE (CFS) =	2891.10	2891.10
VELOCITY (FT/S) =	5.52	5.52
AREA (SQUARE FT) =	523.60	523.60
TOPWIDTH (FT) =	294.70	294.70
DEPTH (FT) =	2.02	2.02
HYD. DEPTH (FT) =	1.78	1.78
WET. PERIM. (FT) =	294.92	294.92
HYD. RADIUS (FT) =	1.78	1.78
FROUDE NUMBER =	.73	.73
MANNINGS N VALUE =	.0450	.0450
SUBSECTION 1 = STATION 218.00 TO STATION 620.00		

SECTION 11

EXISTING COND. WSEL = 2414.73



SECTION 12

EXISTING WSEL = 2406.70

2410

2408

2406

2404

2402

0

100

200

300

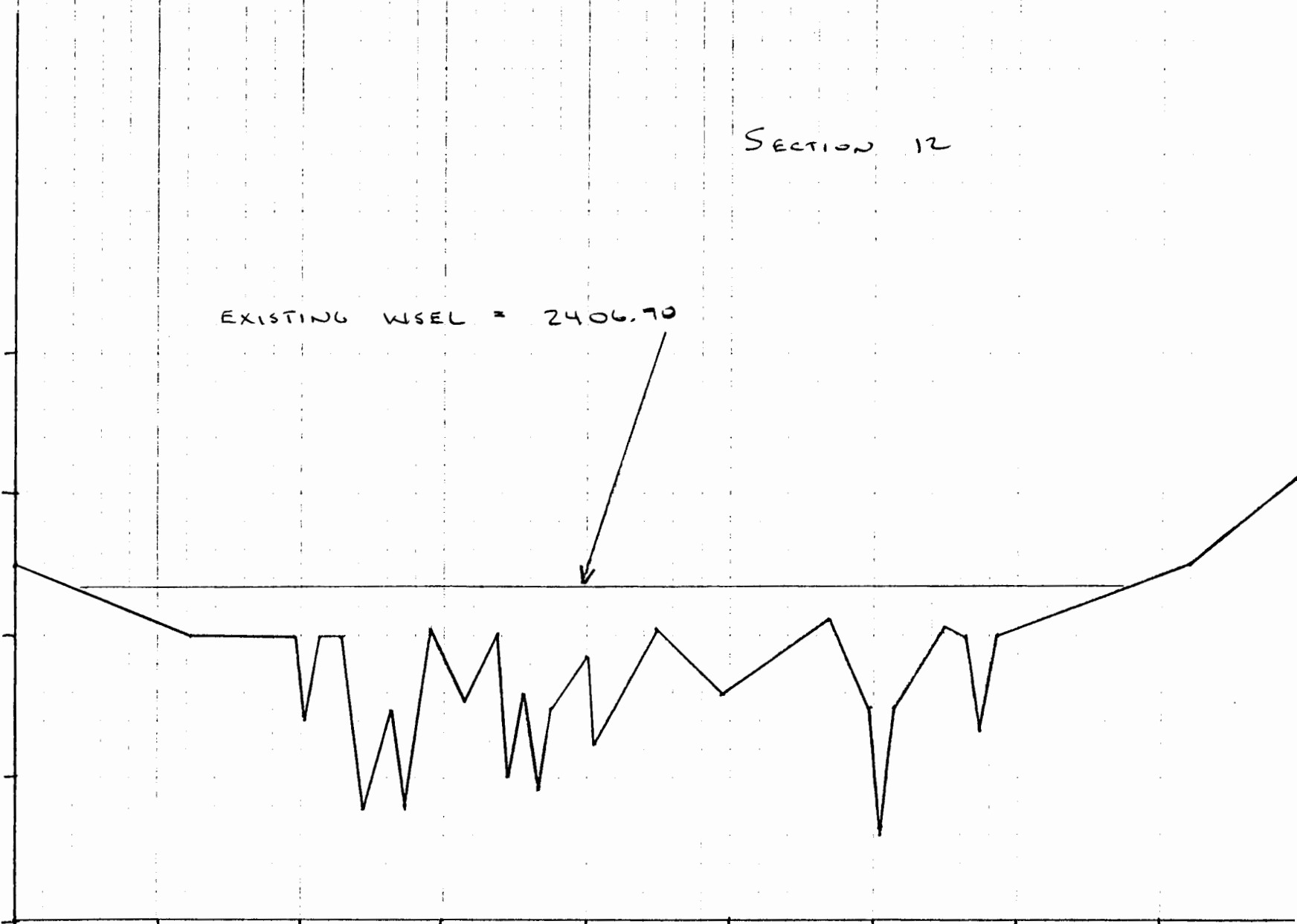
400

500

600

700

800





SECTION 13

EXISTING WSEL = 2399.76

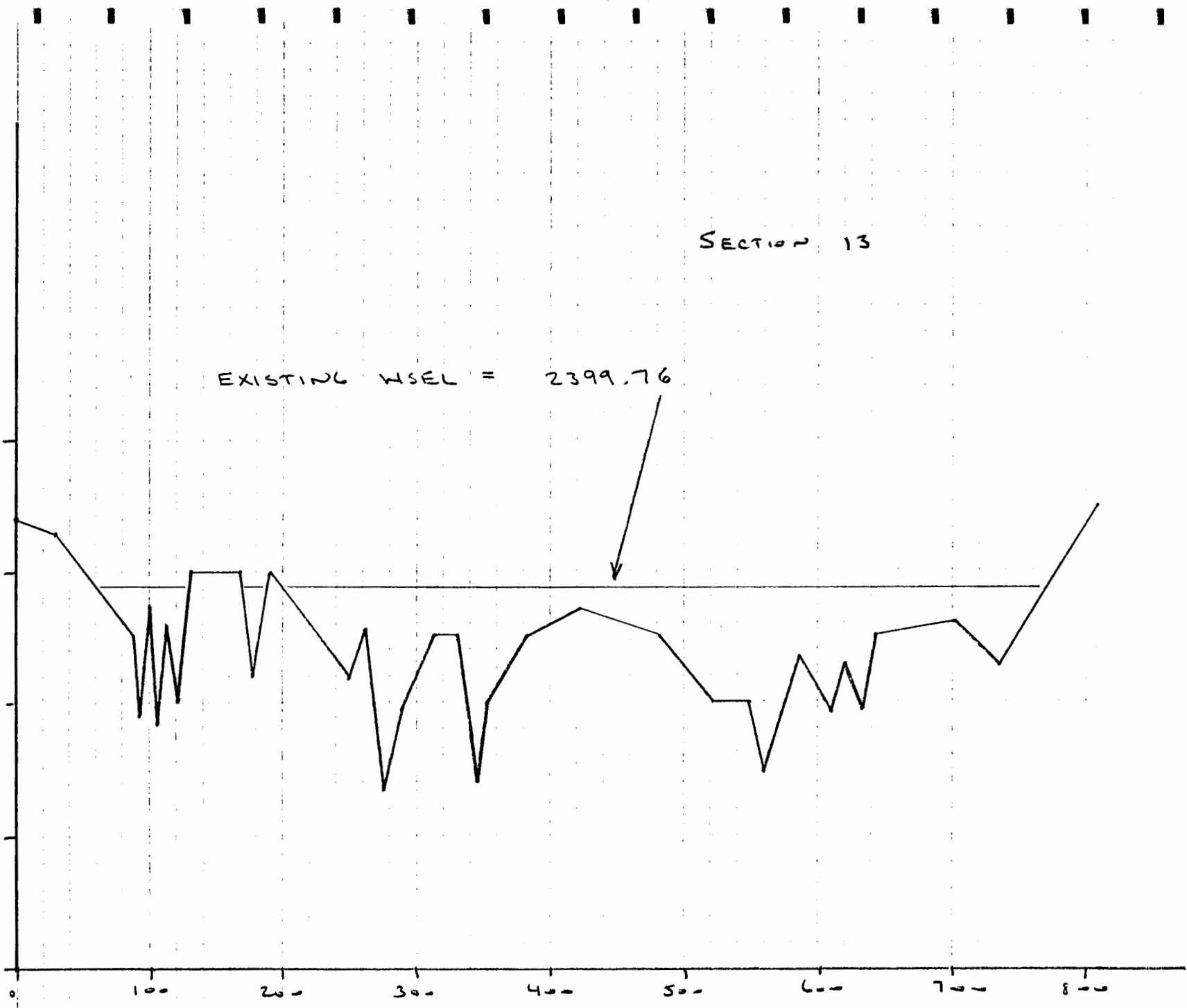
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2400

2398

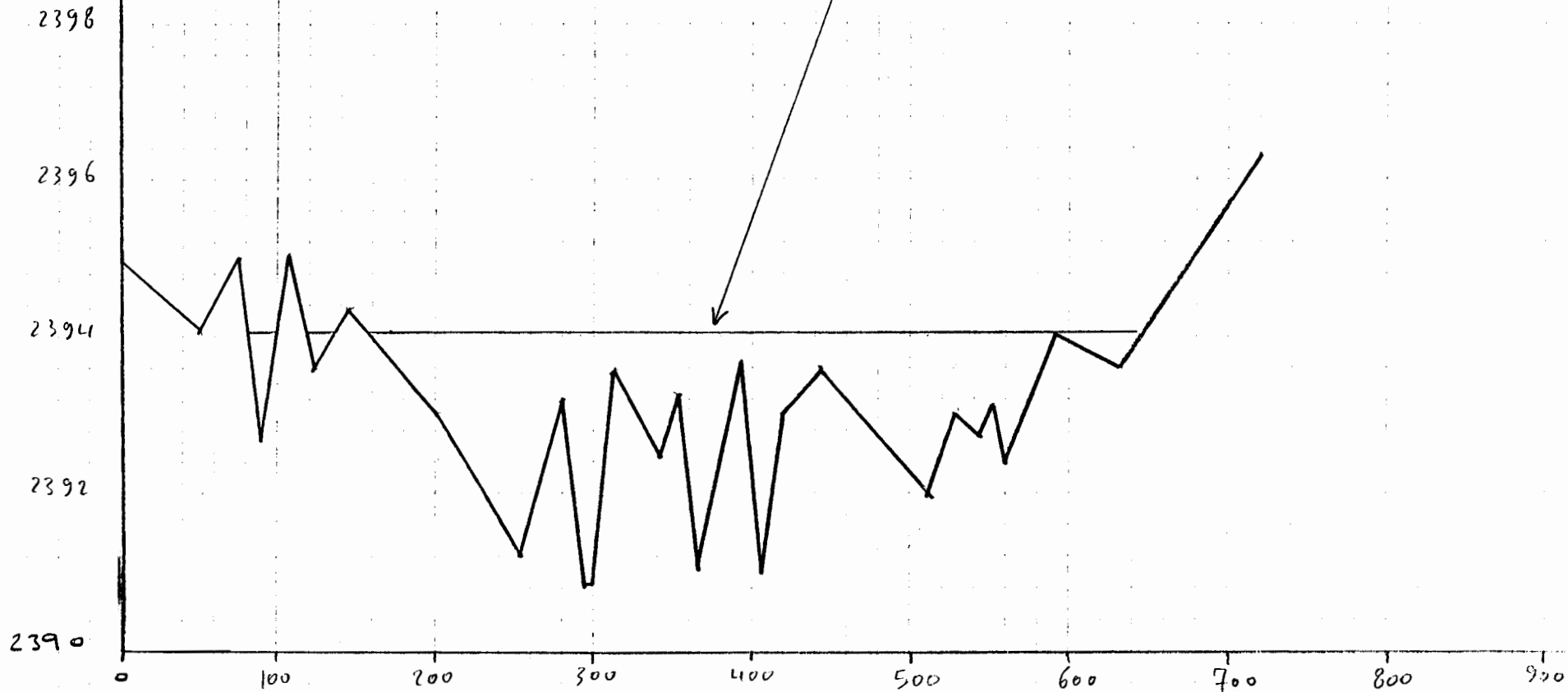
2396

2394



SECTION 14

EXISTING WSEL = 2394.06



SECTION 15

EXISTING WSEL = 2388.71

2391

2389

2387

0

200

400

600

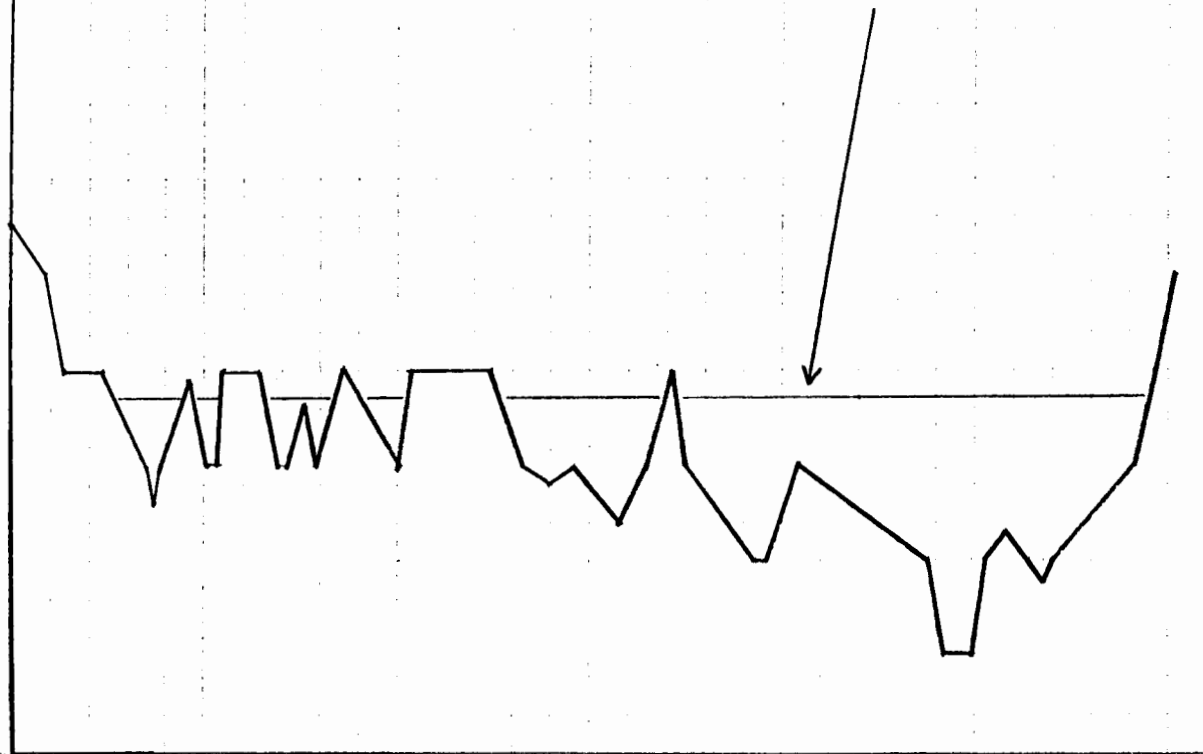
800

1000

1200

1400

1600



SECTION 21

EXISTING WSEL = 2415.24

2417

2415

2413

2411

100

200

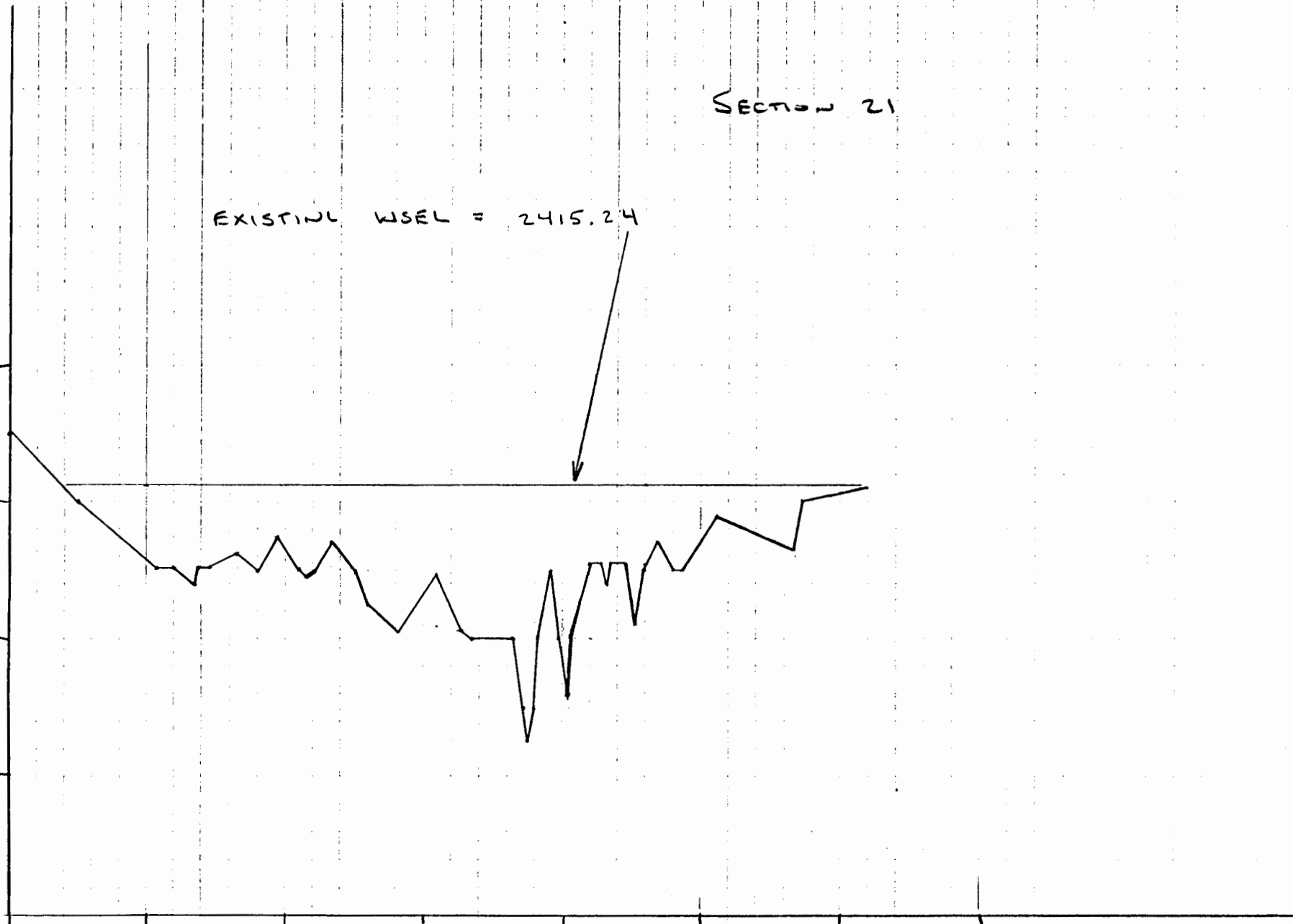
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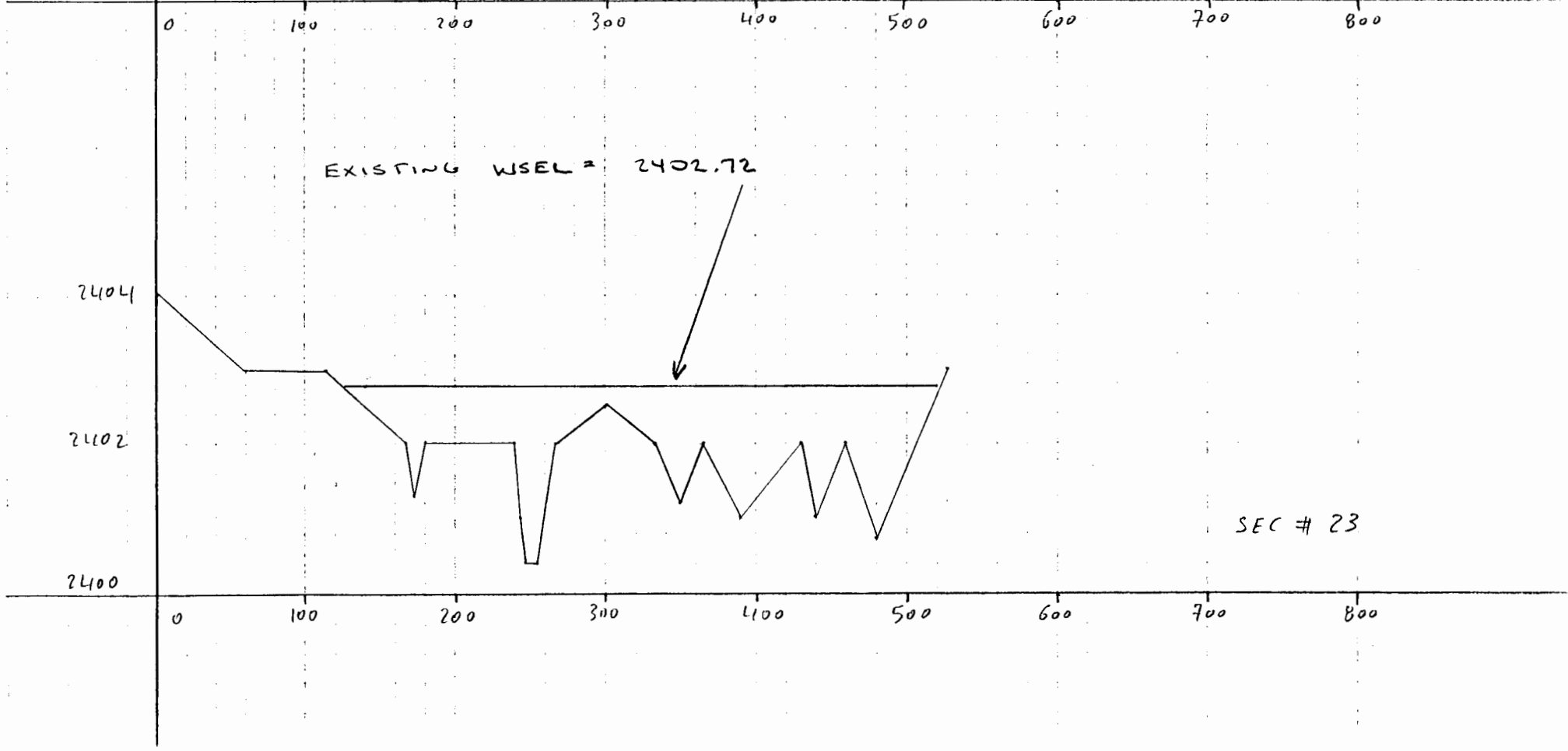
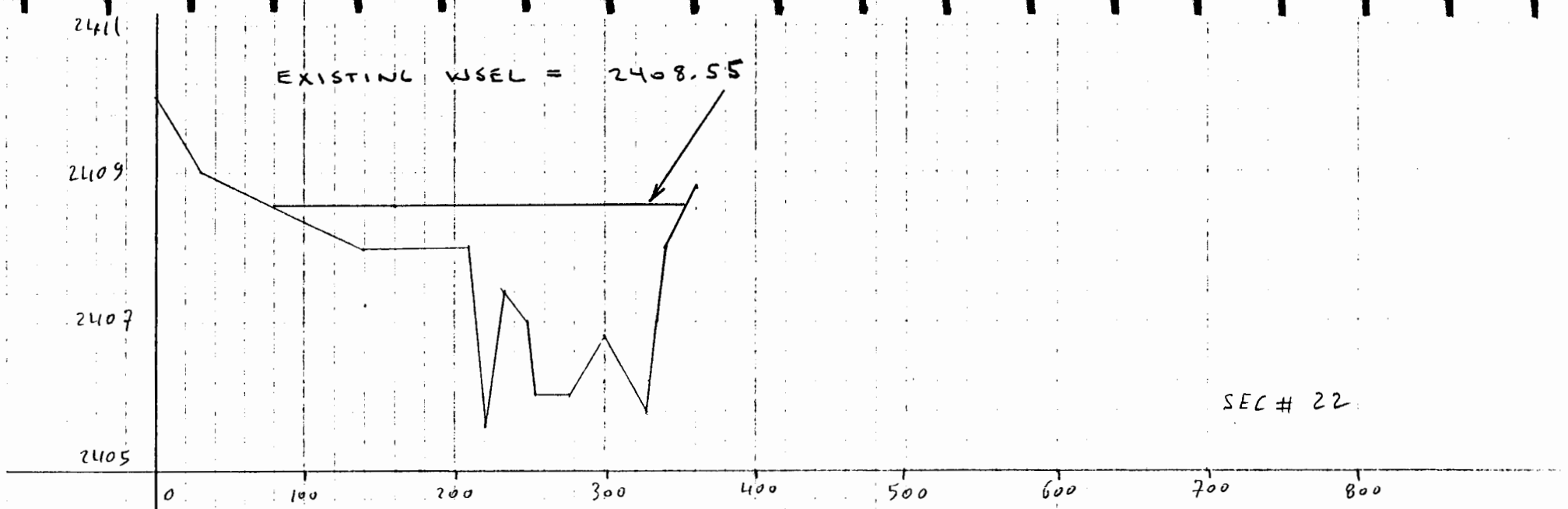
400

500

600

700





EXISTING WSEL = 2399.05

2400

2398

2396

0 100 200 300 400 500 600 700 800

SEC # 24

EXISTING WSEL = 2395.23

2396

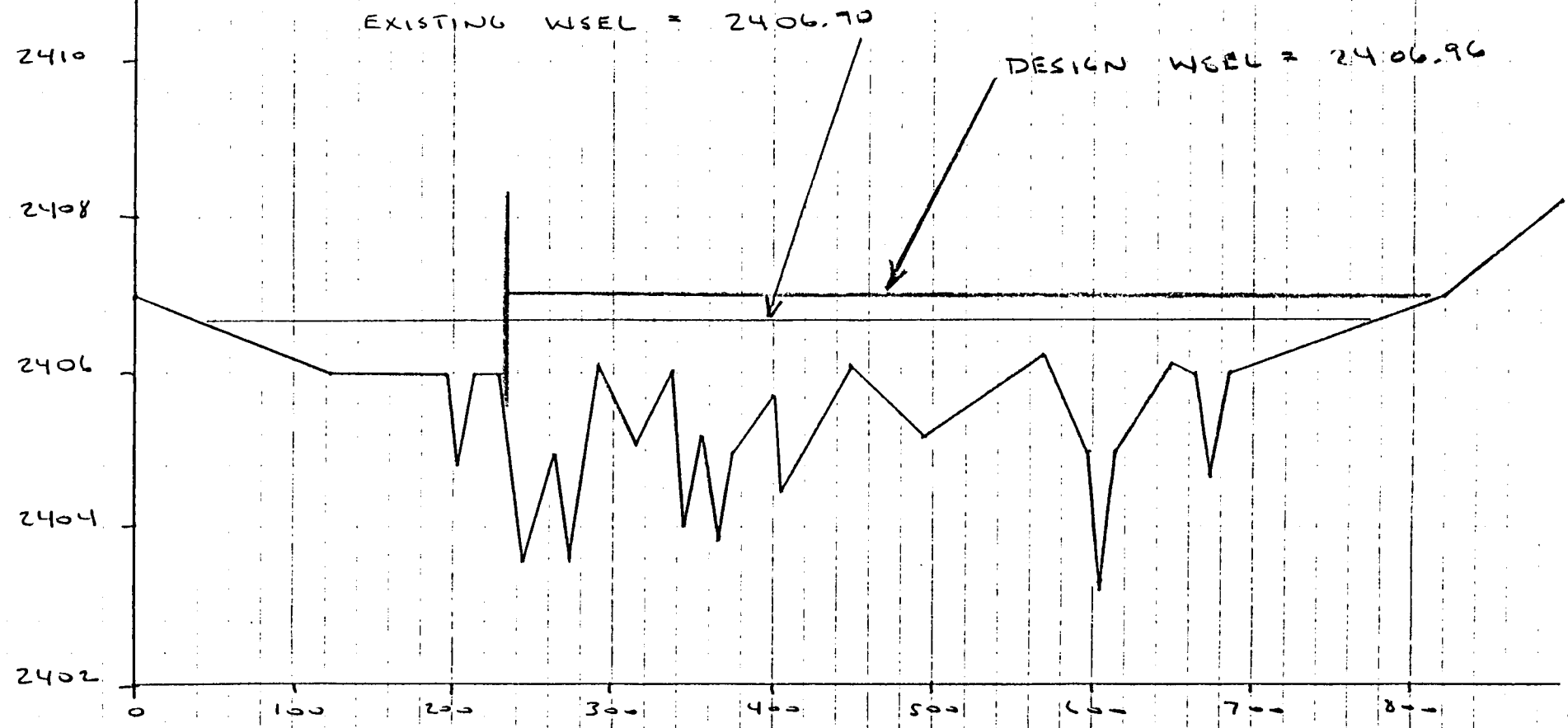
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2392

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SEC # 25

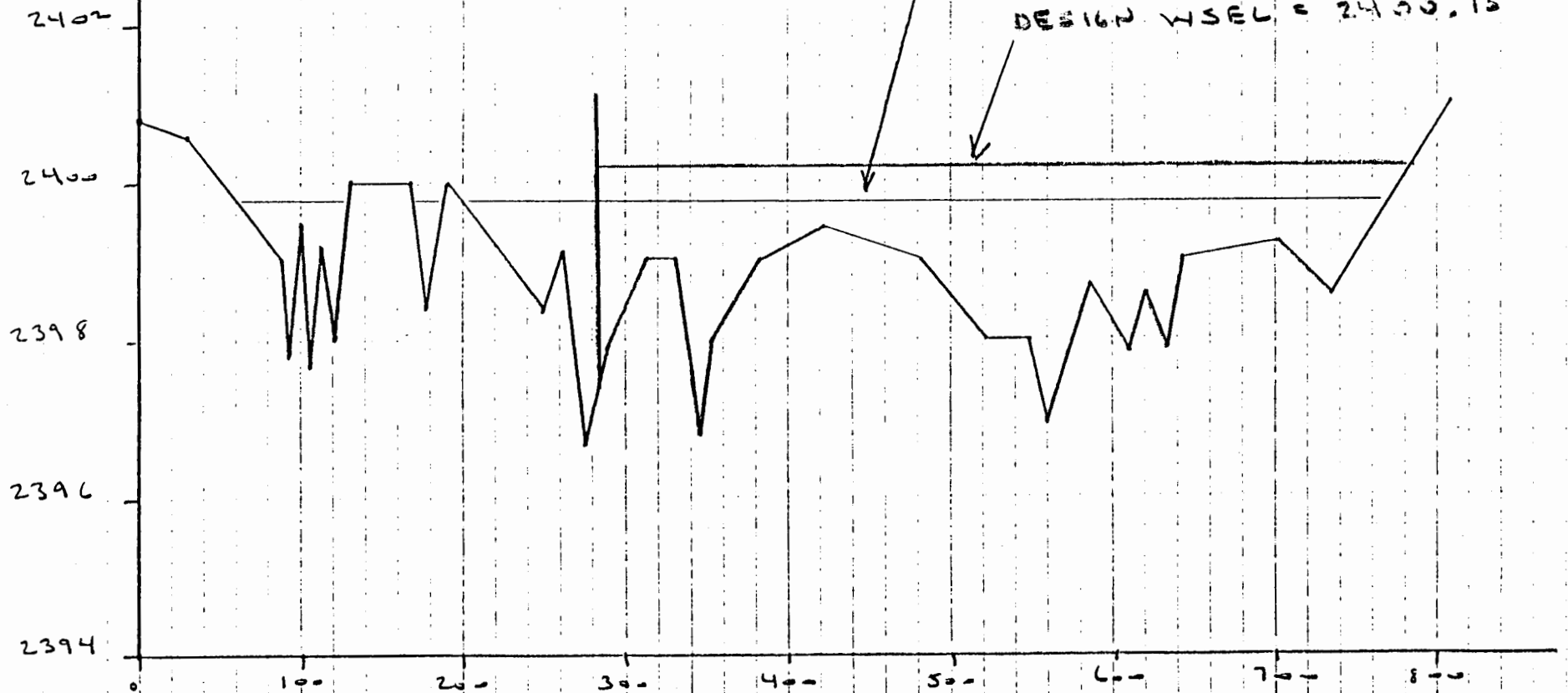
SECTION 12



SECTION 13

EXISTING WSEL = 2399.76

DESIGN WSEL = 2400.15





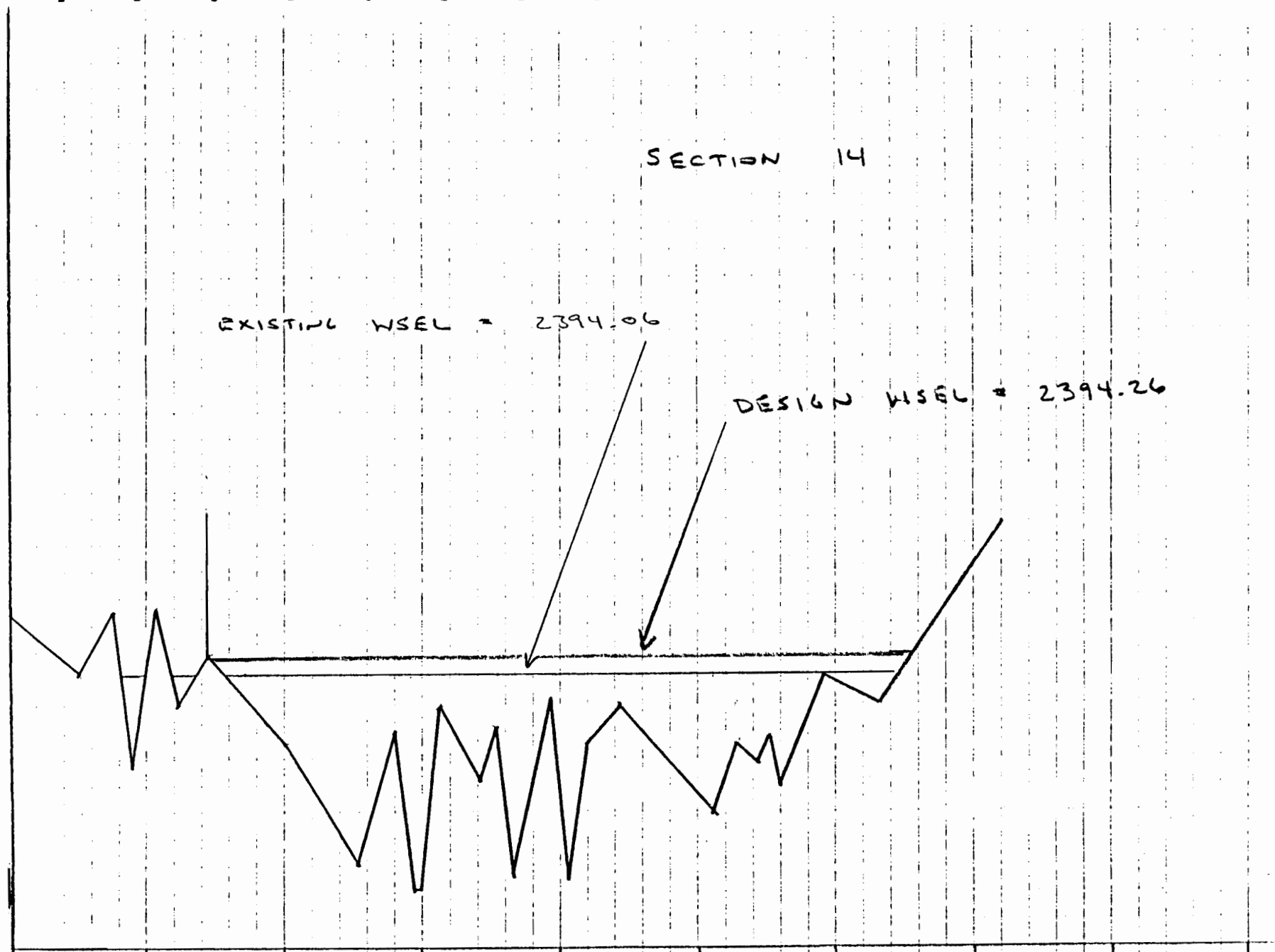
SECTION 14

EXISTING WSEL = 2394.06

DESIGN WSEL = 2394.26

2398  
2396  
2394  
2392  
2390

0 100 200 300 400 500 600 700 800 900



SECTION 15

EXISTING WSEL = 2388.71

DESIGN WSEL = 2388.88

2391

2389

2387

0

200

400

600

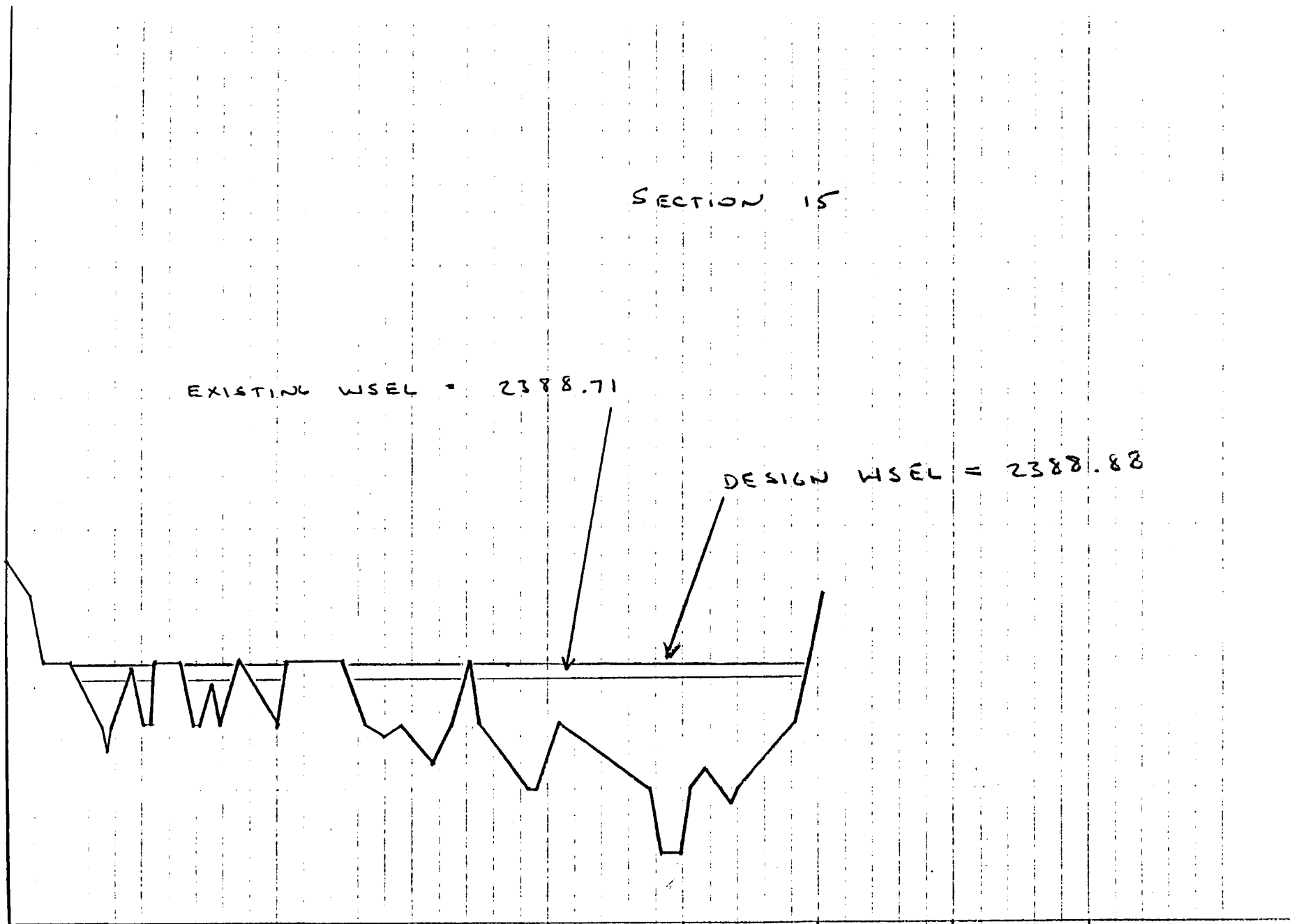
800

1000

1200

1400

1600



SECTION 21

EXISTING WSEL = 2415.24

DESIGN WSEL = 2414.92

2417

2415

2413

2411

100

200

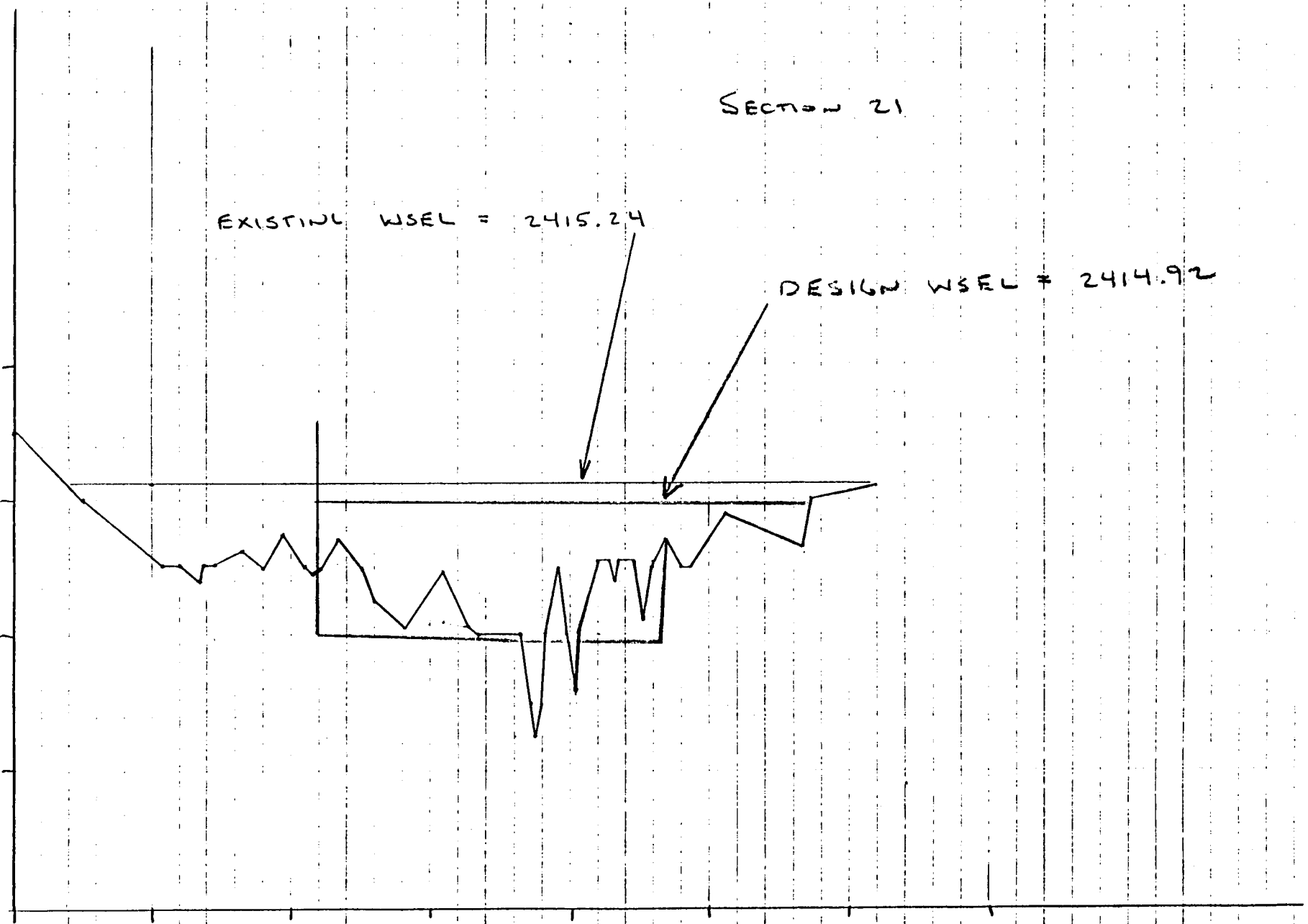
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400

500

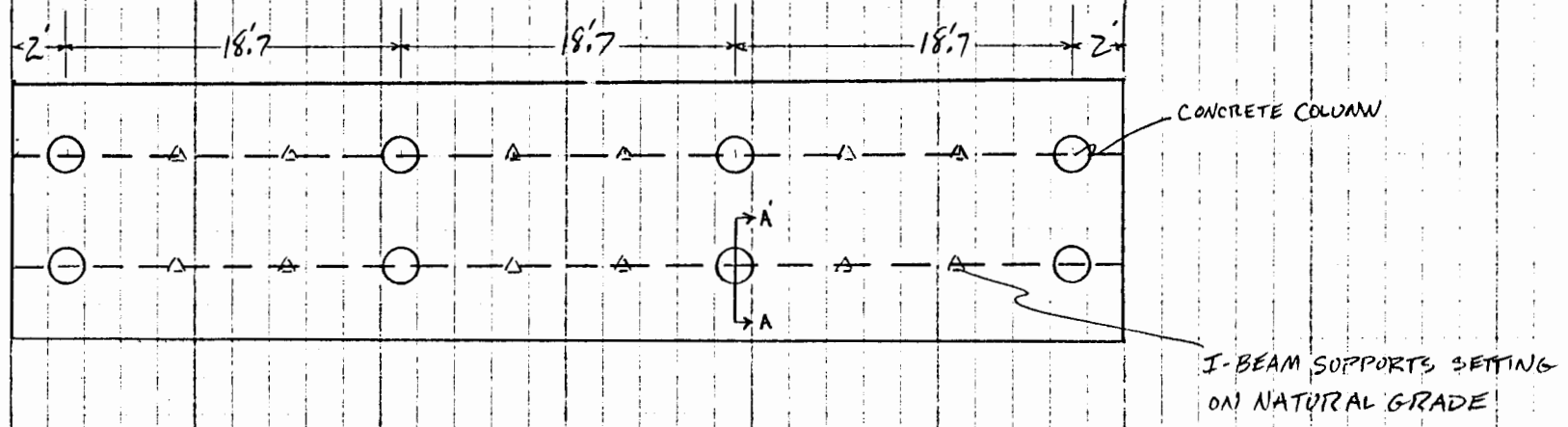
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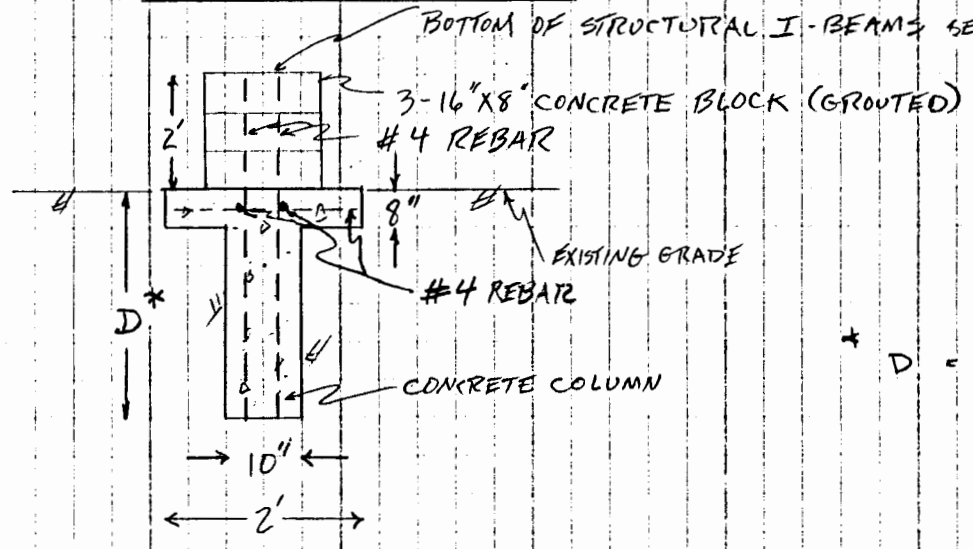


PLAN VIEW AND CROSS-SECTION OF MOBILE HOME SUPPORT COLUMNS  
FOR LOTS 28-31 AND 37-39

PLAN VIEW



CROSS-SECTION A-A'



\* D = 3 FT BELOW ADJACENT CHANNEL FLOW LINE ELEVATION ON NORTH SIDE OF BERM IF HOME LOCATED WITHIN 100 FT OF BERM  
OR

AT ADJACENT CHANNEL FLOW LINE ELEVATION ON NORTH SIDE OF BERM IF HOME LOCATED MORE THAN 100 FT FROM BERM

**TRIMBLE ENGINEERING, INC.**

1656 North 15th Avenue  
TUCSON, ARIZONA 85705

**LETTER OF TRANSMITTAL**

(602) 623-8891

DATE 3/25/88	JOB NO. 340-86
ATTENTION JoAnn Hershenhorn	
RE:  San Joaquin Estates	

TO Pima County Transportation and Flood Control  
1313 S. Mission Road  
Tucson, Arizona 85713-1398

WE ARE SENDING YOU  Attached  Under separate cover via Delivery the following items:

- Shop drawings     Prints     Plans     Samples     Specifications  
 Copy of letter     Change order     Report

COPIES	DATE	NO.	DESCRIPTION
1	3/87	23	Hydrology Report - Phase I
1	4/28/87		Hydrology Report Addendum - Phase I
1	4/15/87	2	Hydrology Report Review Letter - Phase I
1	4/4/87	2	Hydrology Report Review Letter - Phase I

THESE ARE TRANSMITTED as checked below:

- For approval     Approved as submitted     Resubmit \_\_\_\_\_ copies for approval  
 For your use     Approved as noted     Submit \_\_\_\_\_ copies for distribution  
 As requested     Returned for corrections     Return \_\_\_\_\_ corrected prints  
 For review and comment     \_\_\_\_\_  
 FOR BIDS DUE \_\_\_\_\_ 19 \_\_\_\_\_     PRINTS RETURNED AFTER LOAN TO US

REMARKS



COPY TO \_\_\_\_\_ file \_\_\_\_\_ SIGNED: Jay Mosley

*If enclosures are not as noted, kindly notify us at once.*

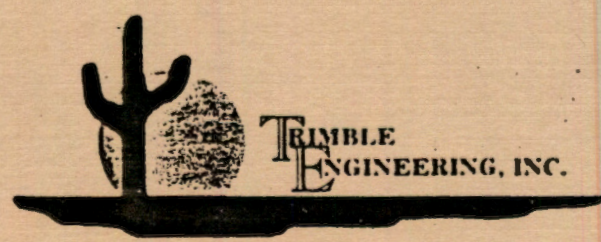
C00-87-13

HYDROLOGY REPORT  
FOR  
SAN JOAQUIN ESTATES-IMPROVEMENT PLANS  
LOTS 268 THROUGH 290

SUBMITTED TO PIMA COUNTY  
FLOODPLAIN SECTION

MARCH, 1987

See mylar rolled plan  
in vertical file



Hydrology Report  
for  
San Joaquin Estates - Improvement Plans  
Lots 268 thru 290

Being a Proposed Development Located in the Southeast Quarter  
of Section 24, Township 14 South, Range 11 East,  
Gila and Salt River Base and Meridian,  
Pima County, Arizona.

March, 1987

Prepared By:

Trimble Engineering, Inc.  
1656 N. 15th Avenue  
Tucson, Arizona 85705

TEI #340-86

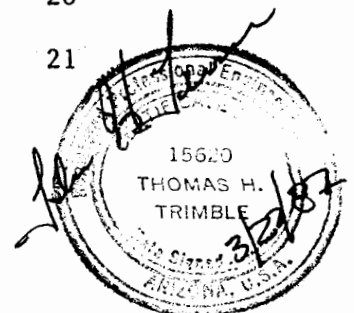


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## INTRODUCTION

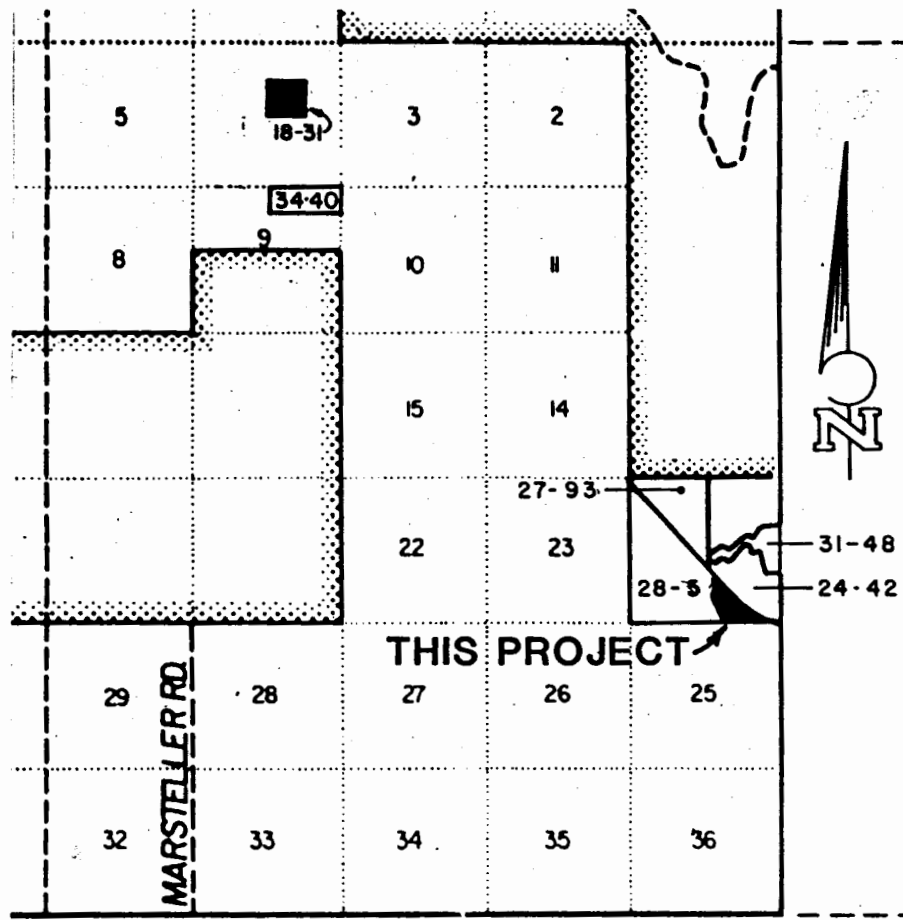
The project is located in the Southeast Quarter of Section 24, Township 14 South, Range 11 East, Gila and Salt River Base and Meridian, Pima County, Arizona (see Figure 1). The site is bounded on the northeast by San Joaquin Road; on the south by undeveloped land; on the southwest by the future location of the Tucson Aqueduct (Reach 5) of the Central Arizona Project; and on the northwest by undeveloped land.

Offsite drainage impacts the project site from several watersheds whose headwaters lie to the northeast of the project site. The only development within these offsite watersheds is the Tucson Saguaro Estates Subdivision immediately across San Joaquin Road adjacent to this project. The remaining area of these offsite watersheds is undeveloped.

This project is the eastern portion only of the previously recorded San Joaquin Subdivision, Lots 268 thru 290, Book 28 of Maps on Page 5. The central and western portion of this project will be acquired for or rendered undeveloped (respectively) by the Tucson Aqueduct (Reach 5) of the Central Arizona Project. This report will address the manner in which the existing offsite and the post-development onsite drainage will be conveyed across this project to points of discharge at the common boundary between this project and the CAP right-of-way.

This development will convert the existing 51.5 acres (59.09 acres if the western right-of-way of San Joaquin Road is included) between the Tucson Aqueduct and San Joaquin Road into a mobile home subdivision. Drainage across

the site will be conveyed either in improved drainage channels or in earthen drainage ditches along the streets of the subdivision. The project is to be completed in two phases using the Design Certification option as presented in a letter dated July 22, 1986 from Mr. Chuck Huckleberry, Director of the Pima County Transportation and Flood Control District.



LOCATION PLAN  
 TOWNSHIP 14 SOUTH, RANGE 11 EAST

FIGURE 1

## OBJECTIVES

The objectives of this study are to:

1. Define the offsite watersheds which affect this proposed development and determine their peak discharges for storms with return frequencies of 10, 25 and 100 years.
2. Delineate and compute the post-development onsite drainage conditions and peak discharges for 10, 25 and 100 year events.
3. Assimilate the previously mentioned information and recommend specific design requirements to insure that the proposed development and all downstream land owners will be adequately protected during a 100 year storm event.

## PROCEDURES

1. The offsite watersheds were delineated by planimeter using a Cooper Aerial photograph taken at 1" = 400 (December 22, 1986) and U.S.G.S., 7.5 Minute Brown Mountain quadrangle.
2. The onsite drainage conditions were determined from topographic information provided by Cella Barr & Associates, Inc.
3. Detailed topographic information at the drainage channel inlets and street entrances was obtained from survey work completed by Trimble Engineering, Inc., in February, 1987
4. Peak discharges for the 10, 25 and 100 year events for offsite and post-development onsite watersheds were obtained using methods described in the Pima County Hydrology Manual (Pima County Department of Transportation-Flood Control District 1979).
5. The 100 year water surface elevations for the existing natural channels and the post-development channels were sized using Manning's equation and the appropriate 100 year peak discharges.
6. A cross-section was taken across the paved onsite streets to insure that they will have enough capacity to convey the post-development onsite and existing offsite 100 year peak discharges.
7. A HEC-II computer program was utilized to determine the adequacy of the drainage channel inlet designs, and the 100 year flood limits of several existing washes which cross the site.

## REFERENCES

1. Brater, E.F. and H.W. King, 1976, "Handbook of Hydraulics", 6th Edition, McGraw-Hill Book Company, New York.
2. Cella Barr & Associates, 1983, Topographic Survey.
3. Cooper Aerial Survey Company, Aerial photographs scale 1" = 400', December 22, 1986, No. 2-14 and 3-14.
4. Henderson, F.M., 1966, "Open Channel Flow", MacMillan Publishing Co., Inc., New York.
5. Pima County Department of Transportation and Flood Control District, 1979, "Hydrology Manual for Engineering Design and Floodplain Management within Pima County, Arizona".
6. Pima County Department of Transportation and Flood Control District, 1984, "Drainage and Channel Design Standards for Local Drainage for Floodplain Management within Pima County, Arizona".
7. Trimble Engineering, Inc., 1987, Topographic Survey.
8. U.S. Army Corps. of Engineers, Water Resources Support Center, 1982, "HEC-2 Water Surface Profiles, Computer Program 723-X6-L202A" Davis, California.

9. U.S. Department of Transportation, Hydraulics Branch, Federal Highway Administration, 1978, "Hydraulic Design of Energy Dissipators for Culverts and Channels", Hydraulic Engineering Circular No. 14.
  
10. U.S.G.S. 7.5 Minute Topographic Quadrangle, Brown Mountain, 1975.

## OFFSITE HYDROLOGY

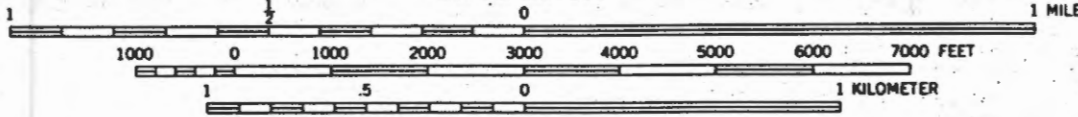
There are eight offsite drainage areas (labeled A through H) which generate drainage that will impact the northeastern property line of this project (see Figures 2 and 3). All of these offsite watersheds are primarily undeveloped (they have impervious cover percentages of 5% or less) and all have headwaters which lie to the northeast of this project. None of the drainage channels within these offsite watersheds have been improved or significantly altered within the adjacent Tucson Saguaro Estates Subdivision to the northeast, and the peak discharge generated by each area crosses San Joaquin Road unimpeded in minor dip sections.

Also, it must be mentioned that the drainage within these offsite watersheds is very complex with many converging and diverging channels with potential sheetflooding areas between the defined channel reaches. Since these existing, natural channels have been formed by the peak discharges generated by storms of low magnitude, it can be assumed that there will be some break out of flow across the offsite watershed boundaries during the 100 year event. Therefore, any channels or ditches which will convey offsite flow across this project site will be designed with an extra margin of capacity.

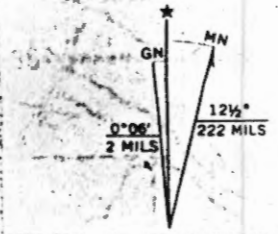
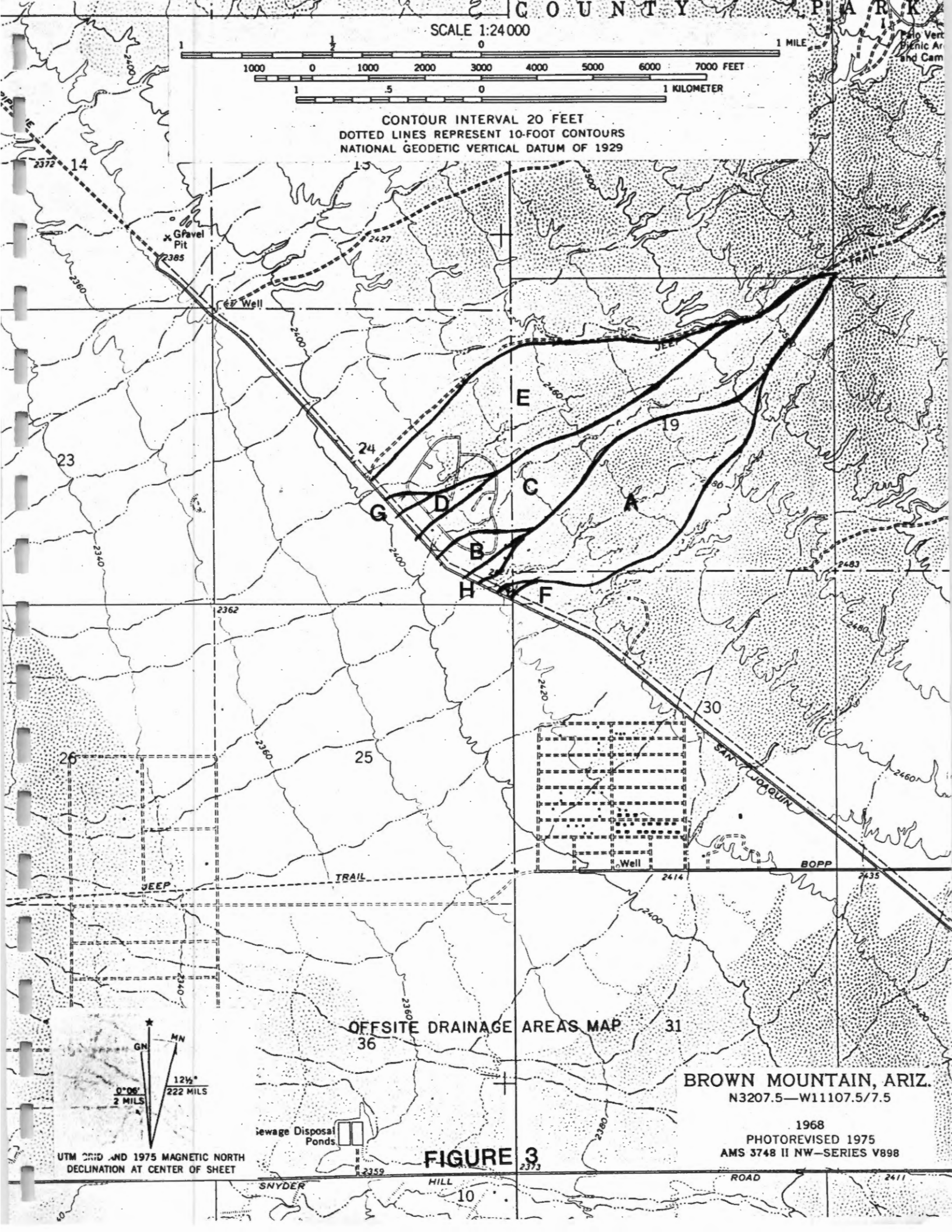
The 10, 25 and 100 year peak discharges generated by offsite drainage areas A through H are presented in Figure 4. This drainage from these offsite watersheds will be conveyed across the site in their existing natural channels; in earthen drainage ditches adjacent to the paved roads within the subdivision; or in improved drainage channels. This drainage will be discharged into the undeveloped land to the south or into the CAP right-of-way to the west and southwest, at or near their existing, natural flow paths.



SCALE 1:24 000



CONTOUR INTERVAL 20 FEET  
 DOTTED LINES REPRESENT 10-FOOT CONTOURS  
 NATIONAL GEODETIC VERTICAL DATUM OF 1929



UTM GRID AND 1975 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

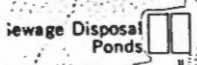


FIGURE 3

OFFSITE DRAINAGE AREAS MAP

BROWN MOUNTAIN, ARIZ.  
 N3207.5—W11107.5/7.5

1968  
 PHOTOREVISED 1975  
 AMS 3748 II NW—SERIES V898

SNYDER HILL ROAD

PEAK DISCHARGE SUMMARY TABLE

<u>Drainage Area</u>	<u>10 year (CFS)</u>	<u>25 year (CFS)</u>	<u>100 year (CFS)</u>
A. Offsite:			
A	220	331	555
B	35	52	80
C	156	235	402
D	57	83	128
E	238	358	600
F	5	7	12
G	19	27	42
H	9	12	18
B. Onsite Post-Development:			
PD1	15	21	34
PD2	17	24	36
PD3	11	14	22
PD4	6	7	11
PD5	21	28	42
PD6	15	21	32
PD7	5	6	9
PD8	19	25	35
PD9	26	36	54
PD10	9	11	16
PD11	10	14	19

FIGURE 4

## ONSITE HYDROLOGY

The existing 51.5 acre natural desert brush site is to be developed into a mobile home subdivision (see Figure 5). Construction of this project is to be in two phases with development to begin initially in Phase I which includes all lots to the south of drainageway "D". Drainage across the proposed lots will essentially remain as natural since very little grading will be done on each lot. However, any drainage which discharges towards an onsite paved street will be collected in earthen drainage ditches along either side of the street. Onsite drainage not intercepted by these street drainage ditches will exit the southern and western boundaries of the site in their natural, existing channels.

The post-development site has been divided into eleven drainage areas (see Figure 5). The 10, 25 and 100 year peak discharges generated by these eleven drainage areas, labeled PD1 through PD11, have been presented in Figure 4.

A HEC-II water surface profile computer program was used to compute the 100 year flood limits for the natural drainage channels which receive runoff from offsite drainage areas A, D and G (see the computer program output in the Appendix). Both of these drainage channels will be left for the most part undisturbed after the development of this subdivision. The 100 year flood limits and water surface elevations (all of which are subcritical) for each cross-section are presented in Figure 5.

The drainage generated onsite by post-development watersheds PD1 through PD11 will either exit the southern or southwestern property lines in it's existing

natural channels or it will be conveyed offsite via earthen drainage ditches along either side of the onsite streets. Three separate drainage ditch configurations will be used along various streets depending upon the specific peak discharge and flowline slopes present (see Figure 6 for the drainage ditch configurations and capacity calculations). All of the drainage ditches have been designed with excess capacity to accommodate any breakout across the offsite or onsite drainage area boundaries. They have also been designed to convey the 100 year peak discharge at depths of less than one foot. All the driveways will cross these drainage ditches at dip sections. The finished floor elevations of the various lots will be set at a minimum of one foot above the greatest adjacent 100 year surface elevation in these drainage ditches or the onsite improved drainageways.

The 100 year peak discharge of 402 CFS from offsite drainage area C will be conveyed through the site via a 22 foot wide (bottom width) gunite-lined, trapezoidal drainage channel. This channel (labeled drainageway "D"), is located between Ursa Way and Calle Anasazi (see Figure 5). A Manning's analysis of a typical cross-section taken across this 2.5 foot deep drainage channel (Figure 7), revealed that the 100 year flow in the channel will be 1.54 feet and will be supercritical. The capacity of this channel at a depth of 2.5 feet will be 935 CFS.

The inlet to this drainageway will extend diagonally across Lot 251 from the southwest lot corner to the northwest lot corner (see Figure 8 for a detail of this inlet). A 3 to 1, 3.5 foot deep, cobble lined slope (with the top of bank matching existing topography as much as possible) will direct the 100

year peak discharge into the 22 foot wide (bottom width) gunite channel. In addition, a small portion of the northeastern corner of Lot 274 will also serve as a collector for the 402 CFS from drainage area C.

The slope across this inlet will vary from .5% along the toe of the cobble slope across Lot 251, to 3.2% toward the channel inlet near the southeastern corner of Lot 251. No grading will be done within the San Joaquin Road right-of-way and the elevations along the eastern property line of Lot 251 will be left at existing levels. Only some minor grading within the right-of-way will be required near the northeastern corner of Lot 274.

A HEC-2 computer program was used to compute the existing and post-development 100 year water surface elevations and flood limits across San Joaquin Road and the proposed drainage channel inlet (see the Appendix for the computer program outputs). The locations of the various cross-sections and the 100 year flood limits produced by the HEC-II runs are presented in Figure 8. The post development super-critical HEC-2 run shows that the 100 year flow velocities in the right over bank for cross-sections 2, 3 and 4 (against the 3:1 cobble lined slope) will be a maximum of 7.44 feet per second. Therefore, 10 inch cobble bank protection will provide sufficient erosion protection.

Cross-section 1.0 of both HEC-2 computer runs shows that there will be some break out across the watershed boundaries near the entrance to Calle Anasazi. For this reason, the capacity of both the ditches along Calle Anasazi have been designated to accommodate a Q100 of 191 CFS. This is 182 CFS greater than the onsite 100 year peak discharge draining into Calle Anasazi. This is also 73% of the 261 CFS in this right flow channel in cross-section 1.0.

21/11/06  
CALLE ANASAZI  
CAPACITY

An analysis of the superelevation which will occur at the bend in drainageway "D" (Figure 9) shows that the 100 year water surface will rise 0.36 feet on the outside of the bend. Since this rise is still 0.2 feet below the critical depth, no cross slope will be required.

Since flow in drainageway "D" is supercritical, it will be necessary to lessen the velocity of the flow in the channel at the channel outlet to, at or below the velocities in the existing, natural channels. Therefore, the channel outlet at the western property line will be flared to a total bottom width of 200 feet (see Figure 10). This 200 foot wide trapezoidal channel with 3 to 1 cobble-lined slopes will convey the 100 year peak discharge (402 CFS) at a depth of 0.52 feet and a velocity of 3.83 feet per second. This is equivalent to the velocities for the flow in the existing cross-sections across San Joaquin Road (see the supercritical HEC-2 computer output in the Appendix) which are predominantly from 3.93 fps to 4.54 fps.

Drainageway "B" which lies at the northern end of Phase II of this project will be designed immediately prior to the development of the second phase. It is anticipated that this drainageway, which receives 600 CFS from offsite drainage area E and 19 CFS from onsite drainage area PD11, will need to be designed similar to drainageway "D" of Phase I, however, drainageway "B" will be wider and shallower since more area is available for the drainageway.

CONVEYANCE CAPACITIES OF DRAINAGE DITCHES ALONG STREETS:

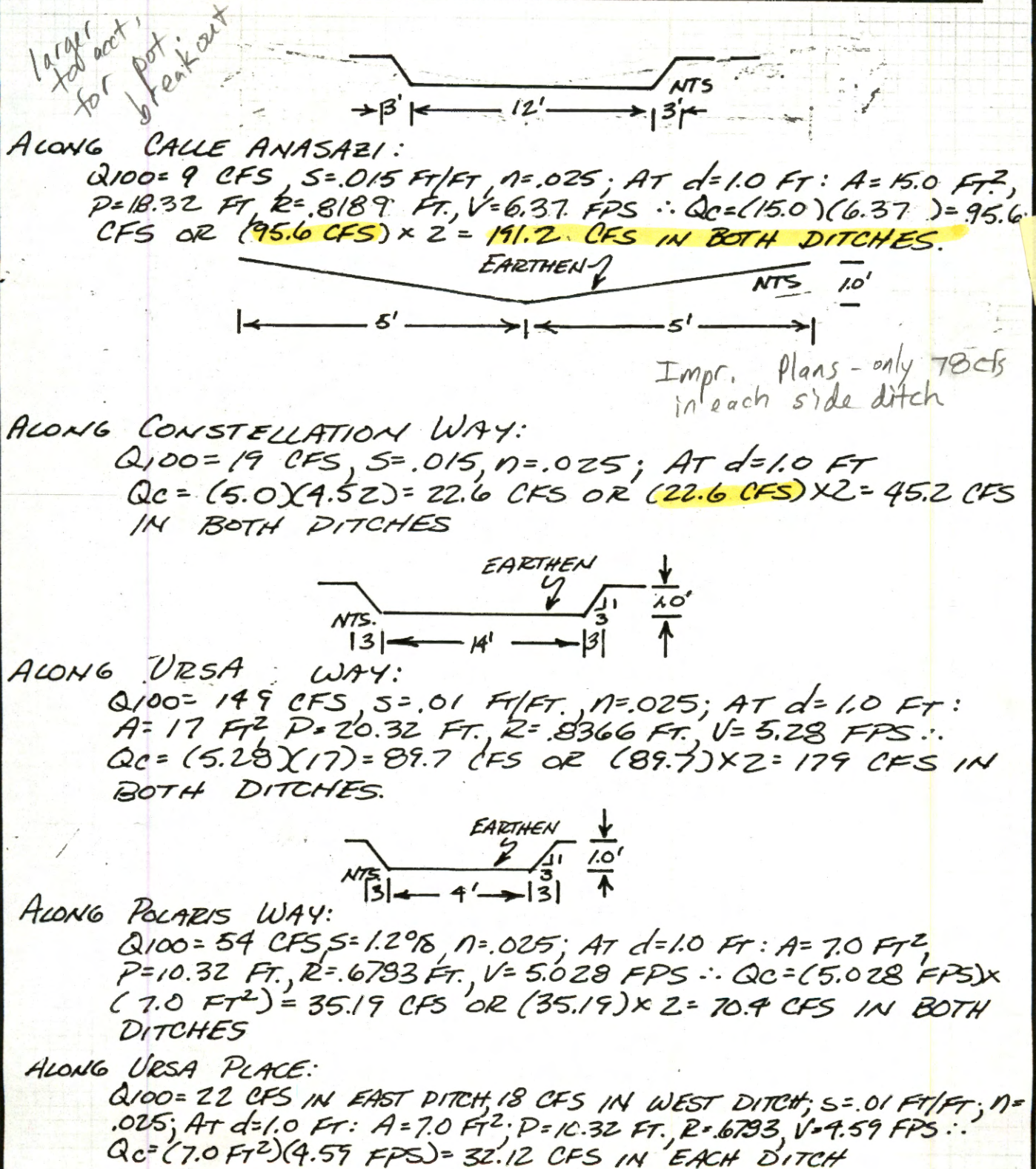


FIGURE 6

PROJECT SAN JOE DIN

JOB NO. TEI-340-86

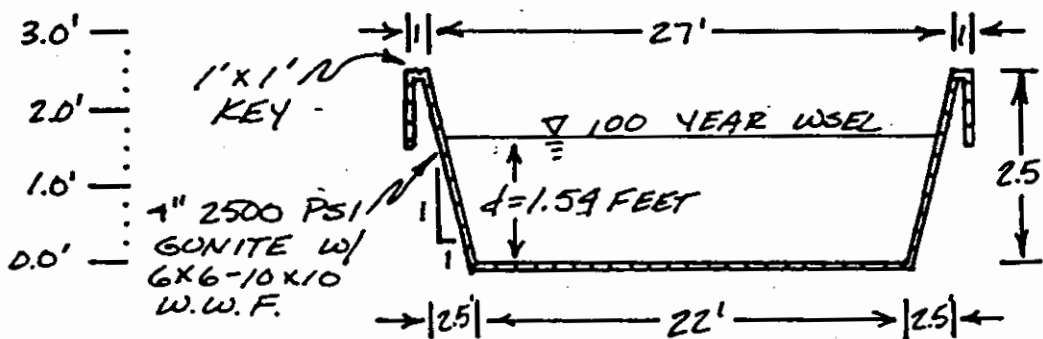
DESIGNED BY JDM DATE 1/15/87

CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_



SHEET 1 OF 1

### TYPICAL CHANNEL CROSS SECTION - DRAINAGEWAY "D":



Q<sub>100</sub> = 4.18 CFS (402 FROM "C" +  
 S = .01 FT./FT. 18 FROM 1/2 OF  
 PD6)

SCALE  
 HORZ. 1" = 10'  
 VERT. 1" = 2.5'

MANNINGS,  
 TRAPEZOIDAL  
 CHANNEL

MANNINGS,  
 TRAPEZOIDAL  
 CHANNEL

WASH:  
 TEI-340-86  
 LOCATION:  
 DRAINAGEWAY "D"  
 FLOOD FREQUENCY:  
 100 YR  
 DATE:

WASH:  
 TEI-340-86  
 LOCATION:  
 DRAINAGEWAY "D"  
 FLOOD FREQUENCY:  
 @CAPACITY  
 DATE:

BY: JDM

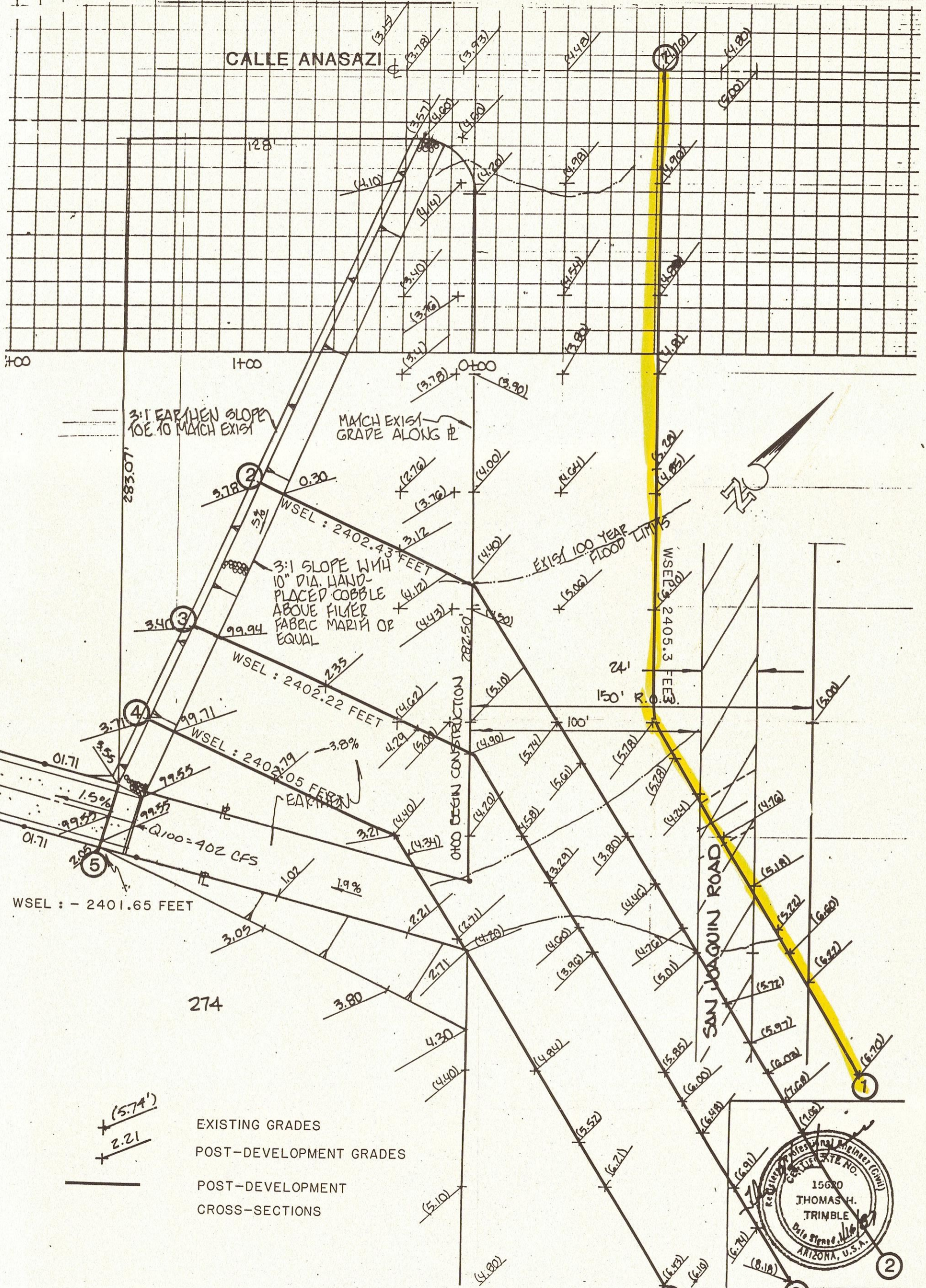
BY: JDM

N=0.0160  
 H/V=1.00 FT/FT  
 b=22.00 FT  
 D=1.54 FT  
 S=0.0100 FT/FT  
 K=21.02  
 V=11.50 FPS  
 E=3.60 FT  
 DM=1.45 FT  
 FR=1.40  
 Sc=0.0035 FT/FT  
 Dc=2.16 FT

N=0.0160  
 H/V=1.00 FT/FT  
 b=22.00 FT  
 D=2.50 FT  
 Q=935. CFS  
 S=0.0100 FT/FT  
 K=12.99  
 V=15.26 FPS  
 E=6.12 FT  
 DM=2.27 FT  
 FR=1.79  
 Sc=0.0031 FT/FT  
 Dc=3.61 FT

FIGURE 7





274

(5.74')  
2.21

EXISTING GRADES  
POST-DEVELOPMENT GRADES  
POST-DEVELOPMENT  
CROSS-SECTIONS

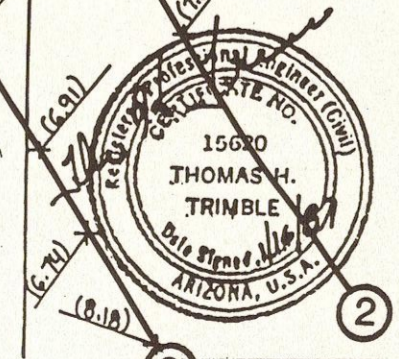


FIGURE 8

DETAIL OF INLET TO DRAINAGEWAY "D"

SCALE 1"=40'

PROJECT \_\_\_\_\_

JOB NO. TEI-340-96

DESIGNED BY JDM DATE \_\_\_\_\_

CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_



SHEET 1 OF 1

DRAINAGEWAY "D" - BEND CALCULATIONS:

(FROM PIMA COUNTY, 1984):

$Q_{100} = 418$  CFS (402 CFS FROM "C" + 16 FROM PDG)

$n = .016$

$S = .01$  FT/FT

FROM MANNING'S ANALYSIS:

$D = 1.54$  FT.  $FR = 1.68$

$V = 11.5$  FPS  $D_c = 2.16$  FT.

FOR  $FR > .86$  - RADIUS OF CURVATURE  $\geq 4 \left[ \frac{V^2 W}{g} \right]$

$$r_c \geq 4 \left[ \frac{(11.5)^2 (25.08')}{(32.2)(1.54)} \right]$$

$$r_c \geq 267.5 \text{ FT}$$

$$\text{DESIGN } r_c = 295.5'$$

SUPERELEVATION AT BEND (W/O BANKING):

$$\Delta y = \frac{V^2 W}{g r_c} = \left[ \frac{(11.5)^2 (25.08')}{(32.2)(295.5')} \right] = .36 \text{ FT.}$$

TOTAL DEPTH DUE TO SUPERELEVATION - 1.9 FT.

NO CROSS SLOPE NEEDED SINCE SUPERELEVATION DEPTH DOES NOT EXCEED CRITICAL DEPTH AND NO HYDRAULIC JUMP WILL OCCUR

FIGURE 9

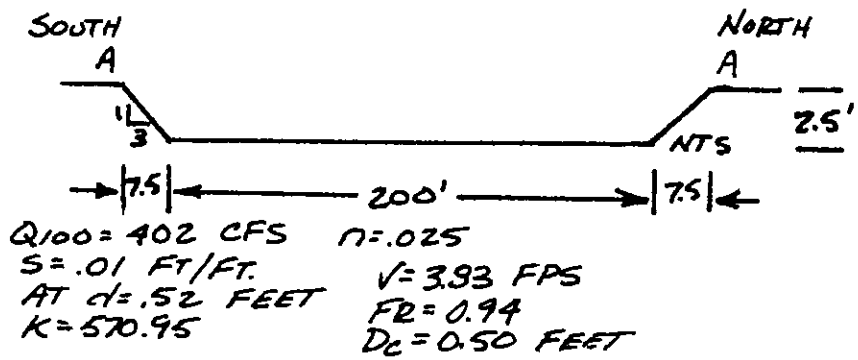
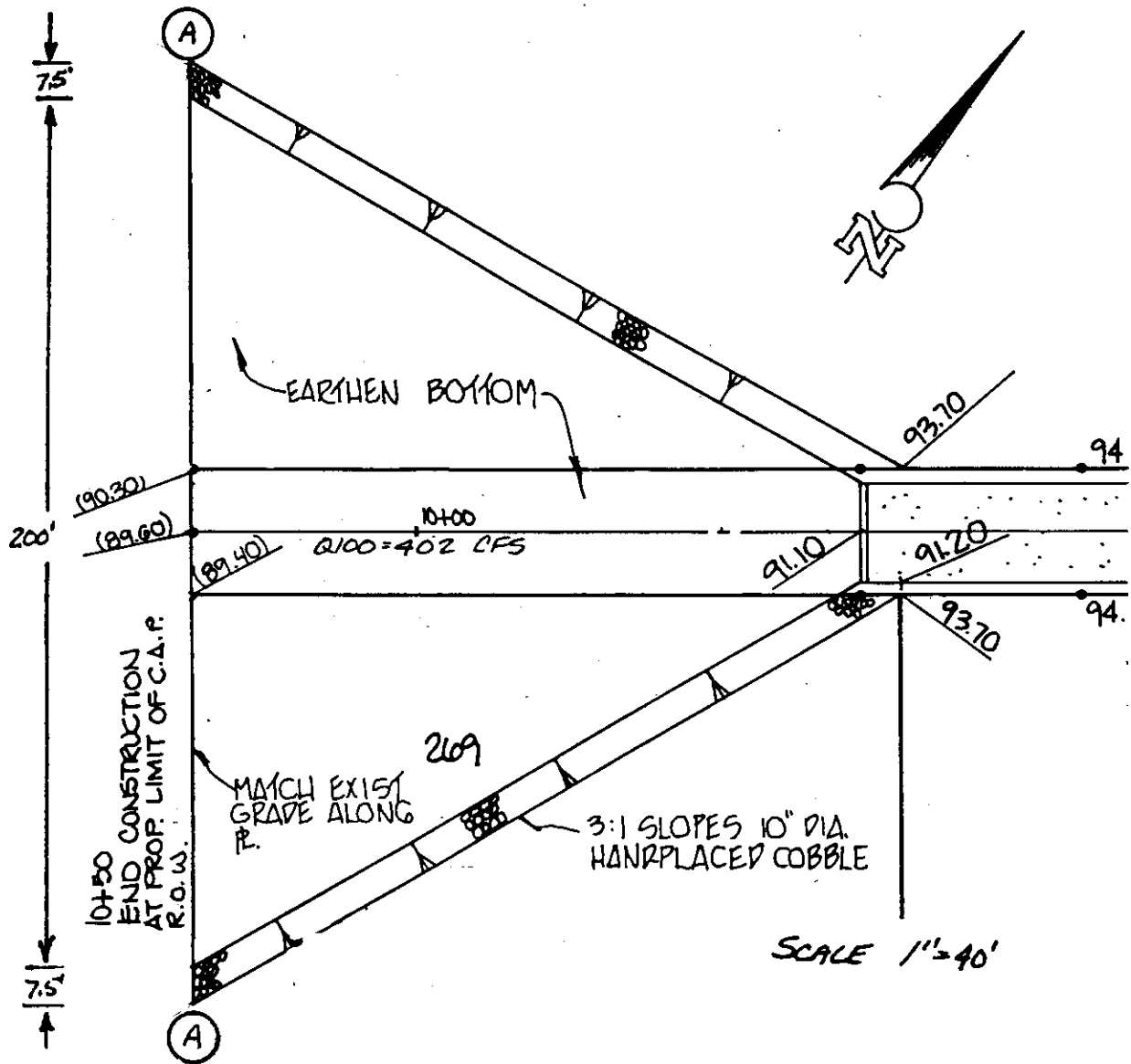


FIGURE 10  
DETAIL OF OUTLET TO DRAINAGEWAY "D"

## CONCLUSIONS

This report has shown that the proposed subdivision will be adequately protected during the 100 year storm event and that this development will not adversely impact downstream landowners. The finished floor elevations for the various lots have been set at a minimum of one foot above the adjacent drainage ditch top of bank or the greatest adjacent 100 year water surface elevation in one of the drainage channels. It has also been demonstrated that the numerous drainage ditches along the onsite streets, and the improved drainage channel will have more than adequate capacity to convey the appropriate 100 year peak discharge. In addition, the improved drainage channel will have a flaired outlet constructed at the western property line to reduce the velocity of the flow discharging out of the drainageway to, at or below the velocities in the existing, natural channels.

A P P E N D I X

Rainfall Data  
Soils Map  
Hydrologic Computation Sheets  
HEC-2 Computer Program Output

RAINFALL DATA SHEET

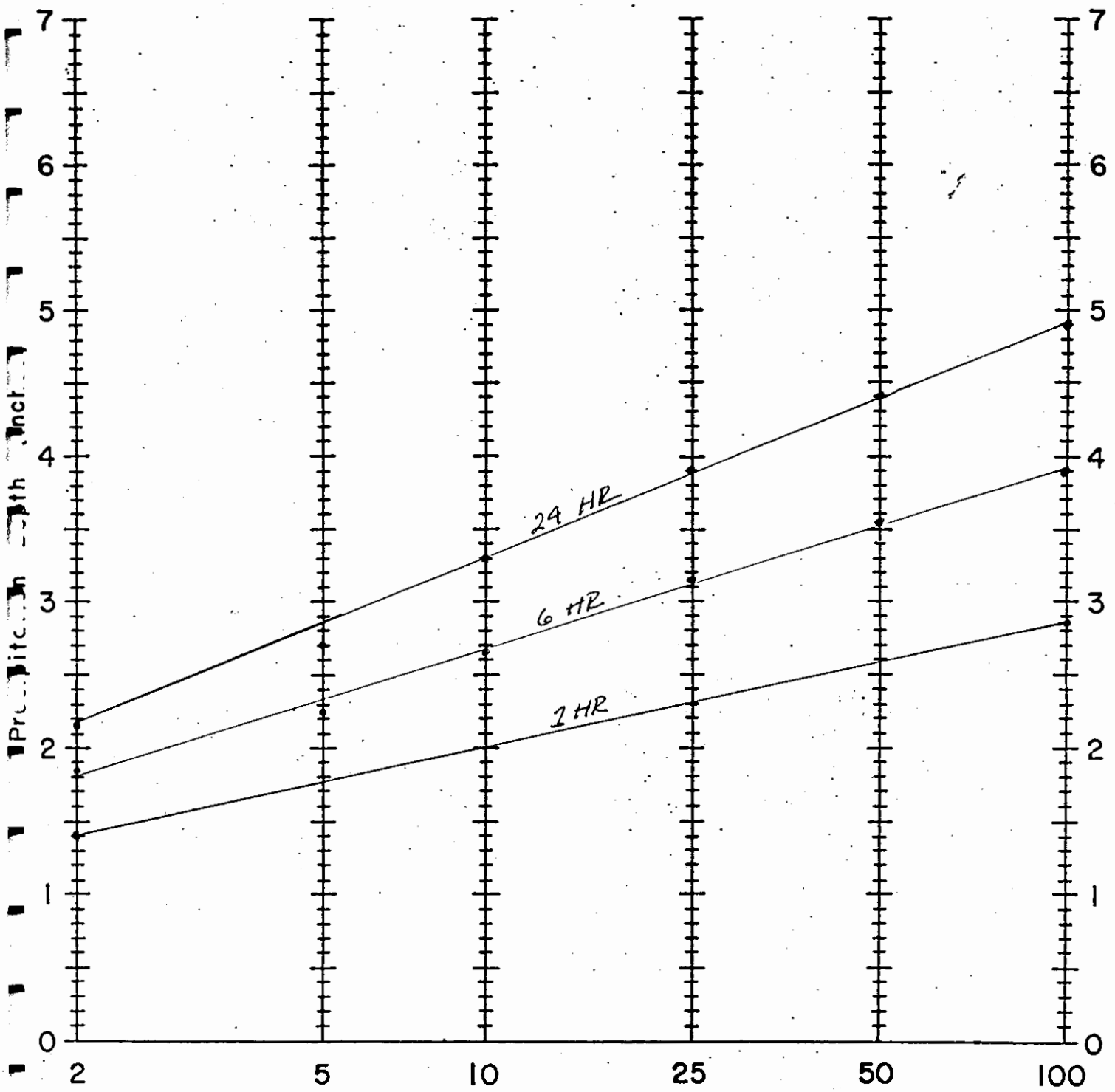
Return Period (Years)	Precipitation Values (inches)			
	6 Hour Duration		24 Hour Duration	
	Map Value	Corrected Value	Map Value	Corrected Value
2	1.85	1.80	2.15	2.17
5	2.25	2.35	2.70	2.85
10	2.65	2.65	3.30	3.30
25	3.15	3.12	3.90	3.90
50	3.55	3.52	4.40	4.40
100	3.90	3.90	4.90	4.90

$$Y_2 = -0.011 + .942 (1.80)^2 / 2.17 = 1.395'' = 1.40''$$

$$Y_{100} = .494 + .755 (3.90)^2 / 4.90 = 2.84''$$

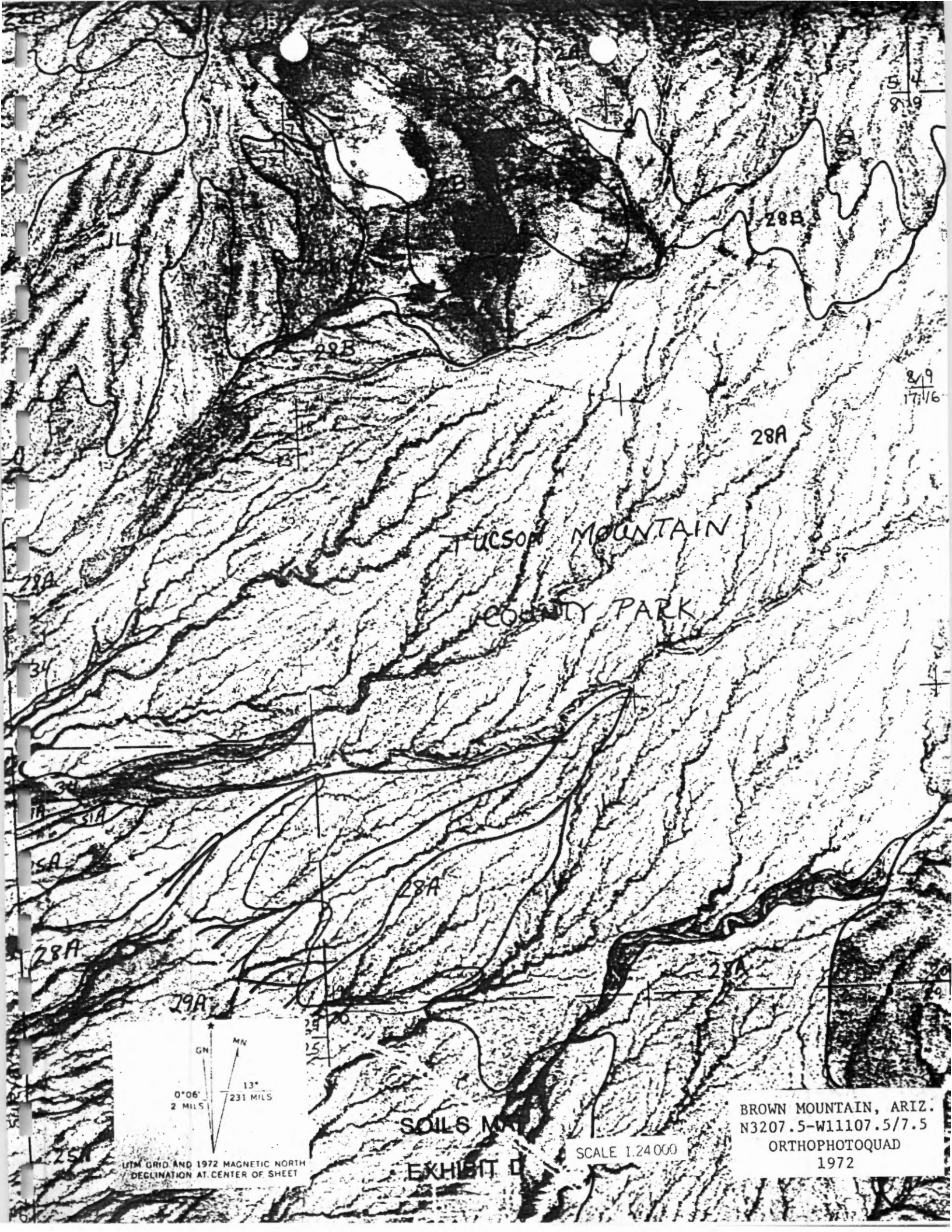
Latitude 32° 10'

Longitude 111° 10'

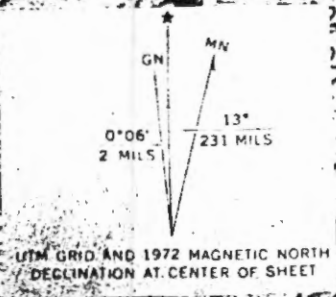


Return Period in Years, Partial - Duration Series

Precipitation Depth Versus Return Period For Partial - Duration Series



TUCSON MOUNTAIN  
COUNTY PARK



UTM GRID AND 1972 MAGNETIC NORTH  
DECLINATION AT CENTER OF SHEET

SOILS MAP  
EXHIBIT D

SCALE 1:24,000

BROWN MOUNTAIN, ARIZ.  
N3207.5-W11107.5/7.5  
ORTHOPHOTOQUAD  
1972



PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES  
 Drainage Concentration Point: OFFSITE A

Watershed Area (A): 182.00 Acres  
 Length of Watercourse (Lc): 6800. ft.  
 Length to Center of Gravity (Lca): 3200. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.  
 6800.00 102.00  
 Mean Slope(Sc): .015 Ft./Ft.

Watershed Type(s): FOOTHILLS (EXISTING)

Basin Factor(nb): .035 (EXISTING) Flood Frequency: 10 yrs.

P24(24 hour):	3.300 in.	Areal Value:	in.
P6(6 hour):	2.650 in.	Areal Value:	in.
P1(1 hour):	2.000 in.	Areal Value:	in.
P2(2 hour):	2.222 in.	Areal Value:	in.
P3(3 hour):	2.370 in.	Areal Value:	in.

Soil Group(s): 100. % B  
 Cover type(s): DESERT BUSH  
 Cover Density(perVIOUS area): 20. %  
 Impervious cover: 0. % (EXISTING)

CN(s): 83 (perVIOUS areas) CN\*(s): 55.05  
 Cx(s): 99 (impervious areas) Cx\*(s): 99.00

Runoff to Rainfall Ratio(s), (D): .400 (perVIOUS areas)  
 .942 (impervious areas)  
 Runoff Supply Rate(c): .405 in./hr. (function of i)  
 Time of Concentration(Tc): .857 h-0.4 hrs. (function of c)  
 Iterative Solution of Tc: 33.00 min.  
 Rainfall Intensity (i) at Tc: 2.95 in./hr.  
 Runoff Supply Rate (c) at Tc: 1.20 in./hr.  
 Peak Discharge: 1.005cA(acres): 220. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES  
Drainage Concentration Point: OFFSITE A

Watershed Area (A): 182.00 Acres  
Length of Watercourse (Lc): 6800. ft.  
Length to Center of Gravity (Lca): 3200. ft.

Change in Length(L)-ft. Change in Elevation(H<sup>s</sup>)-ft.

6800.00 102.00  
Mean Slope(S<sub>c</sub>): .015 Ft./Ft.

Watershed Type(s): FOOTHILLS (EXISTING)

Basin Factor(nb): .035 (EXISTING) Flood Frequency: 25 yrs.

P24(24 hour):	3.900 in.	Areal Value:	in.
P6(6 hour):	3.120 in.	Areal Value:	in.
P1(1 hour):	2.300 in.	Areal Value:	in.
P2(2 hour):	2.580 in.	Areal Value:	in.
P3(3 hour):	2.787 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(perVIOUS area): 20. %  
Impervious cover: 1. % (EXISTING)

CN(s): 53 (perVIOUS areas) CN\*(s): 86.11  
Cv(s): 59 (impervious areas) Cv\*(s): 59.00

Runoff to Rainfall Ratio(s), (C): .474 (perVIOUS areas)  
.949 (impervious areas)  
Runoff Supply Rate(c): .478 i in./hr. (function of i)  
Time of Concentration(Tc): .802 c-0.4 hrs. (function of c)  
Iterative Solution of Tc: 28.00 min.  
Rainfall Intensity (i) at Tc: 3.77 in./hr.  
Runoff Supply Rate (c) at Tc: 1.80 in./hr.  
Peak Discharge: 1.008cA(acres): 331. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES  
 Drainage Concentration Point: OFFSITE A

Watershed Area (A): 182.00 Acres  
 Length of Watercourse (Lc): 6800. ft.  
 Length to Center of Gravity (Lca): 3200. ft.

Change in Length(L)-ft. Change in Elevation(H<sup>1</sup>)-ft.

6800.00 102.00  
 Mean Slope(S<sub>c</sub>): .015 Ft./Ft.

Watershed Type(s): FOOT HILLS (EXISTING)

Basin Factor(nb): .035 (EXISTING) Flood Frequency: 100 yrs.

P24(24 hour):	4.900 in.	Areal Value:	in.
P6(6 hour):	3.900 in.	Areal Value:	in.
P1(1 hour):	2.840 in.	Areal Value:	in.
P2(2 hour):	3.201 in.	Areal Value:	in.
P3(3 hour):	3.443 in.	Areal Value:	in.

Soil Group(s): 100. % B  
 Cover type(s): DESERT BRUSH  
 Cover Density(perVIOUS area): 20. %  
 Impervious cover: 1. % (EXISTING)

CN(s): 83 (perVIOUS areas) CN\*(s): 87.42  
 CN(s): 99 (Impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .575 (perVIOUS areas)  
 .559 (Impervious areas)

Runoff Supply Rate(c): .575 in./hr. (function of i)  
 Time of Concentration(T<sub>c</sub>): .742 h-0.4 hrs. (function of c)  
 Iterative Solution of T<sub>c</sub>: 23.00 min.  
 Rainfall Intensity (i) at T<sub>c</sub>: 5.23 in./hr.  
 Runoff Supply Rate (c) at T<sub>c</sub>: 3.02 in./hr.  
 Peak Discharge: 1.008cA(acres): 555. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MUSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: OFFSITE B

Watershed Area (A): 15.80 Acres  
 Length of Watercourse (Lc): 1840. ft.  
 Length to Center of Gravity (Lca): 740. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

1840.00

28.50

Mean Slope(Sc): .015 Ft./Ft.

Watershed Type(s): SUBURBAN (EXISTING)

Basin Factor(nb): .034 (EXISTING) Flood Frequency: 10 yrs.

R24(24 hour):	3.300 in.	Areal Value:	in.
R6(6 hour):	2.650 in.	Areal Value:	in.
R1(1 hour):	2.000 in.	Areal Value:	in.
R2(2 hour):	2.222 in.	Areal Value:	in.
R3(3 hour):	2.370 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density(perVIOUS area): 20. %

impervious cover: 5. % (EXISTING)

LN(s): 83 (perVIOUS areas) CN\*(s): 85.08

DN(s): 99 (impervious areas) CR\*(s): 99.00

Runoff to Rainfall Ratio(s), (D): .400 (perVIOUS areas)  
 .942 (impervious areas)

Runoff Supply Rate(c): .427 in./hr. (function of i)

Time of Concentration(Tc): .350 c-0.4 hrs. (function of c)

Iterative Solution of Tc: 11.00 min.

Rainfall Intensity (i) at Tc: 5.22 in./hr.

Runoff Supply Rate (c) at Tc: 2.23 in./hr.

Peak Discharge: 1.008cA(acres): 35. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: OFFSITE B

Watershed Area (A): 15.80 Acres  
Length of Watercourse (Lc): 1840. ft.  
Length to Center of Gravity (Lca): 740. ft.

Change in Length(L)-ft. Change in Elevation(H)<sup>f</sup>-ft.

1840.00 28.50  
Mean Slope(Sc): .015 Ft./Ft.

Watershed Type(s): SUBURBAN (EXISTING)

Basin Factor(nb): .034 (EXISTING) Flood Frequency: 25 yrs.

P24(24 hour):	3.900 in.	Areal Value:	in.
P6(6 hour):	3.120 in.	Areal Value:	in.
P1(1 hour):	2.300 in.	Areal Value:	in.
P2(2 hour):	2.580 in.	Areal Value:	in.
P3(3 hour):	2.767 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(pervious area): 20. %  
Impervious cover: 5. % (EXISTING)

CN(s): 83 (pervious areas) CN\*(s): 88.11  
CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .474 (pervious areas)  
.949 (impervious areas)  
Runoff Supply Rate(q): .497 i in./hr. (function of i)  
Time of Concentration(Tc): .330 a-0.4 hrs. (function of a)  
Iterative Solution of Tc: 9.00 min.  
Rainfall Intensity (i) at Tc: 6.53 in./hr.  
Runoff Supply Rate (q) at Tc: 3.25 in./hr.  
Peak Discharge: 1.008qA(acres): 52. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: OFFSITE B

Watershed Area (A): 15.80 Acres  
Length of Watercourse (Lc): 1840. ft.  
Length to Center of Gravity (Lca): 740. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

1840.00 28.50  
Mean Slope(Sc): .015 Ft./Ft.

Watershed Type(s): SUBURBAN (EXISTING)

Basin Factor(nb): .034 (EXISTING) Flood Frequency: 100 yrs.

P24(24 hour):	4.900 in.	Areal Value:	in.
P6(6 hour):	3.900 in.	Areal Value:	in.
P1(1 hour):	2.840 in.	Areal Value:	in.
P2(2 hour):	3.201 in.	Areal Value:	in.
P3(3 hour):	3.443 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density(perVIOUS area): 20. %

Impervious cover: 5. % (EXISTING)

CN(s): 83 (perVIOUS areas) CN\*(s): 87.42

CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .575 (perVIOUS areas)  
.959 (impervious areas)

Runoff Supply Rate(o): .594 i in./hr. (function of i)

Time of Concentration(Tc): .307 o-0.4 hrs. (function of o)

Iterative Solution of Tc: 8.00 min.

Rainfall Intensity (i) at Tc: 6.49 in./hr.

Runoff Supply Rate (o) at Tc: 5.04 in./hr.

Peak Discharge: 1.008oA(acres): 80. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: OFFSITE C

Watershed Area (A): 148.00 Acres  
Length of Watercourse (Lc): 8800. ft.  
Length to Center of Gravity (Lca): 4100. ft.

Change in Length(L)-ft. Change in Elevation(H<sub>f</sub>)-ft.

8800.00 130.00  
Mean Slope(S<sub>c</sub>): .015 Ft./Ft.

Watershed Type(s): SUBURBAN (EXISTING)

Basin Factor(nb): .035 (EXISTING) Flood Frequency: 10 yrs.

P24(24 hour):	3.300 in.	Areal Value:	in.
P6(6 hour):	2.650 in.	Areal Value:	in.
P1(1 hour):	2.000 in.	Areal Value:	in.
P2(2 hour):	2.222 in.	Areal Value:	in.
P3(3 hour):	2.370 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density(perVIOUS area): 20. %

Impervious cover: 1. % (EXISTING)

CN(s): 83 (perVIOUS areas) CN\*(s): 85.08

CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .400 (perVIOUS areas)

.942 (impervious areas)

Runoff Supply Rate(a): .405 i in./hr. (function of i)

Time of Concentration(T<sub>c</sub>): 1.003 a-0.4 hrs. (function of a)

Iterative Solution of T<sub>c</sub>: 41.00 min.

Rainfall Intensity (i) at T<sub>c</sub>: 2.58 in./hr.

Runoff Supply Rate (a) at T<sub>c</sub>: 1.05 in./hr.

Peak Discharge: 1.008aA(acres): 156. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES  
Drainage Concentration Point: OFFSITE C

Watershed Area (A): 148.00 Acres  
Length of Watercourse (Lc): 8800. ft.  
Length to Center of Gravity (Lca): 4100. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

8800.00 130.00  
Mean Slope(Sc): .015 Ft./Ft.

Watershed Type(s): FOOTHILLS (EXISTING)

Basin Factor(nb): .035 (EXISTING) Flood Frequency: 25 yrs.

P24(24 hour):	3.900 in.	Areal Value:	in.
P6(6 hour):	3.120 in.	Areal Value:	in.
P1(1 hour):	2.300 in.	Areal Value:	in.
P2(2 hour):	2.580 in.	Areal Value:	in.
P3(3 hour):	2.767 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(perVIOUS area): 20. %  
Impervious cover: 1. % (EXISTING)

CN(s): 83 (perVIOUS areas) CN\*(s): 86.11  
CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (D): .474 (perVIOUS areas)  
.949 (impervious areas)  
Runoff Supply Rate(c): .478 i in./hr. (function of i)  
Time of Concentration(Tc): .939 a-0.4 hrs. (function of a)  
Iterative Solution of Tc: 35.00 min.  
Rainfall Intensity (i) at Tc: 3.29 in./hr.  
Runoff Supply Rate (c) at Tc: 1.57 in./hr.  
Peak Discharge: 1.0080A(acres): 235. cfs.



PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: OFFSITE C

Watershed Area (A): 148.00 Acres  
Length of Watercourse (Lc): 8800. ft.  
Length to Center of Gravity (Lca): 4100. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

8800.00 130.00  
Mean Slope(Sc): .015 Ft./Ft.

Watershed Type(s): FOOTHILLS (EXISTING)

Basin Factor(nb): .035 (EXISTING) Flood Frequency: 100 yrs.

P24(24 hour): 4.900 in.	Areal Value:	in.
P6(6 hour): 3.900 in.	Areal Value:	in.
P1(1 hour): 2.840 in.	Areal Value:	in.
P2(2 hour): 3.201 in.	Areal Value:	in.
P3(3 hour): 3.443 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density(perVIOUS area): 20. %

Impervious cover: 1. % (EXISTING)

CN(s): 83 (perVIOUS areas) CN\*(s): 67.42

CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .575 (perVIOUS areas)  
.959 (impervious areas)

Runoff Supply Rate(a): .579 i in./hr. (function of i)

Time of Concentration(Tc): .870 c-0.4 hrs. (function of a)

Iterative Solution of Tc: 28.00 min.

Rainfall Intensity (i) at Tc: 4.66 in./hr.

Runoff Supply Rate (c) at Tc: 2.69 in./hr.

Peak Discharge: 1.008qA(acres): 402. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: OFFSITE D

Watershed Area (A): 25.20 Acres  
Length of Watercourse (Lc): 2010. ft.  
Length to Center of Gravity (Lca): 880. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

2010.00

37.00

Mean Slope(Sc): .018 Ft./Ft.

Watershed Type(s): SUBURBAN (EXISTING)

Basin Factor(nb): .034 (EXISTING) Flood Frequency: 10 yrs.

P24(24 hour):	3.300 in.	Areal Value:	in.
P6(6 hour):	2.650 in.	Areal Value:	in.
P1(1 hour):	2.000 in.	Areal Value:	in.
P2(2 hour):	2.222 in.	Areal Value:	in.
P3(3 hour):	2.370 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density(pervious area): 20. %

Impervious cover: 5. % (EXISTING)

CN(s): 83 (pervious areas) CN\*(s): 85.08

CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .400 (pervious areas)

.942 (impervious areas)

Runoff Supply Rate(a): .427 i in./hr. (function of i)

Time of Concentration(Tc): .354 a-0.4 hrs. (function of a)

Iterative Solution of Tc: 11.00 min.

Rainfall Intensity (i) at Tc: 5.22 in./hr.

Runoff Supply Rate (a) at Tc: 2.23 in./hr.

Peak Discharge:  $1.008aA$ (acres): 57. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: OFFSITE D

Watershed Area (A): 25.20 Acres  
 Length of Watercourse (Lc): 2010. ft.  
 Length to Center of Gravity (Lca): 880. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

2010.00

37.00

Mean Slope(Sc): .018 Ft./Ft.

Watershed Type(s): SUBURBAN (EXISTING)

Basin Factor(nb): .034 (EXISTING) Flood Frequency: 25 yrs.

P24(24 hour):	3.900 in.	Areal Value:	in.
P6(6 hour):	3.120 in.	Areal Value:	in.
P1(1 hour):	2.300 in.	Areal Value:	in.
P2(2 hour):	2.580 in.	Areal Value:	in.
P3(3 hour):	2.767 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density(perVIOUS area): 20. %

Impervious cover: 5. % (EXISTING)

CN(s): 83 (perVIOUS areas) CN\*(s): 86.11

CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .474 (perVIOUS areas)

.949 (impervious areas)

Runoff Supply Rate(c): .497 i in./hr. (function of i)

Time of Concentration(Tc): .333 c-0.4 hrs. (function of c)

Iterative Solution of Tc: 9.00 min.

Rainfall Intensity (i) at Tc: 6.53 in./hr.

Runoff Supply Rate (c) at Tc: 3.25 in./hr.

Peak Discharge: 1.008cA(acres): 83. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: OFFSITE D

Watershed Area (A): 25.20 Acres  
Length of Watercourse (Lc): 2010. ft.  
Length to Center of Gravity (Lca): 880. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

2010.00 37.00  
Mean Slope(Sc): .018 Ft./Ft.

Watershed Type(s): SUBURBAN (EXISTING)

Basin Factor(nb): .034 (EXISTING) Flood Frequency: 100 yrs.

P24(24 hour):	4.900 in.	Areal Value:	in.
P6(6 hour):	3.900 in.	Areal Value:	in.
P1(1 hour):	2.840 in.	Areal Value:	in.
P2(2 hour):	3.201 in.	Areal Value:	in.
P3(3 hour):	3.443 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density(perVIOUS area): 20. %

Impervious cover: 5. % (EXISTING)

CN(s): 83 (perVIOUS areas) CN\*(s): 87.42

CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .575 (perVIOUS areas)  
.959 (impervious areas)

Runoff Supply Rate(a): .594 i in./hr. (function of i)

Time of Concentration(Tc): .310 a-0.4 hrs. (function of a)

Iterative Solution of Tc: 8.00 min.

Rainfall Intensity (i) at Tc: 8.49 in./hr.

Runoff Supply Rate (a) at Tc: 5.04 in./hr.

Peak Discharge: 1.008Q<sub>A</sub>(acres): 128. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: OFFSITE E

Watershed Area (A): 197.00 Acres  
Length of Watercourse (Lc): 7200. ft.  
Length to Center of Gravity (Lca): 3200. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

7200.00

116.00

Mean Slope(Sc): .016 Ft./Ft.

Watershed Type(s): FOOTHILLS (EXISTING)

Basin Factor(nb): .035 (EXISTING) Flood Frequency: 10 yrs.

P24(24 hour):	3.300 in.	Areal Value:	in.
P6(6 hour):	2.650 in.	Areal Value:	in.
P1(1 hour):	2.000 in.	Areal Value:	in.
P2(2 hour):	2.222 in.	Areal Value:	in.
P3(3 hour):	2.370 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density(perVIOUS area): 20. %

Impervious cover: 1. % (EXISTING)

CN(s): 83 (perVIOUS areas) CN\*(s): 85.08

CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .400 (perVIOUS areas)

.942 (impervious areas)

Runoff Supply Rate(a): .405 i in./hr. (function of i)

Time of Concentration(Tc): .847 a-0.4 hrs. (function of a)

Iterative Solution of Tc: 33.00 min.

Rainfall Intensity (i) at Tc: 2.96 in./hr.

Runoff Supply Rate (a) at Tc: 1.20 in./hr.

Peak Discharge:  $1.008QA$ (acres): 238. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: OFFSITE E

Watershed Area (A): 197.00 Acres  
Length of Watercourse (Lc): 7200. ft.  
Length to Center of Gravity (Lca): 3200. ft.

Change in Length(L)-ft. Change in Elevation(H<sub>V</sub>)-ft.

7200.00 116.00  
Mean Slope(S<sub>c</sub>): .016 Ft./Ft.

Watershed Type(s): FOOTHILLS (EXISTING)

Basin Factor(nb): .035 (EXISTING) Flood Frequency: 25 yrs.

P24(24 hour):	3.900 in.	Areal Value:	in.
P6(6 hour):	3.120 in.	Areal Value:	in.
P1(1 hour):	2.300 in.	Areal Value:	in.
P2(2 hour):	2.580 in.	Areal Value:	in.
P3(3 hour):	2.767 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(pervious area): 20. %  
Impervious cover: 1. % (EXISTING)

CN(s): 83 (pervious areas) CN\*(s): 86.11  
CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .474 (pervious areas)  
.949 (impervious areas)  
Runoff Supply Rate(a): .478 i in./hr. (function of i)  
Time of Concentration(T<sub>c</sub>): .793 a-0.4 hrs. (function of a)  
Iterative Solution of T<sub>c</sub>: 28.00 min.  
Rainfall Intensity (i) at T<sub>c</sub>: 3.77 in./hr.  
Runoff Supply Rate (a) at T<sub>c</sub>: 1.80 in./hr.  
Peak Discharge: 1.008aA(acres): 358. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: OFFSITE E

Watershed Area (A): 197.00 Acres  
Length of Watercourse (Lc): 7200. ft.  
Length to Center of Gravity (Lca): 3200. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

7200.00 116.00  
Mean Slope(Sc): .016 Ft./Ft.

Watershed Type(s): FOOTHILLS (EXISTING)

Basin Factor(nb): .035 (EXISTING) Flood Frequency: 100 yrs.

P24(24 hour):	4.900 in.	Areal Value:	in.
P6(6 hour):	3.900 in.	Areal Value:	in.
P1(1 hour):	2.840 in.	Areal Value:	in.
P2(2 hour):	3.201 in.	Areal Value:	in.
P3(3 hour):	3.443 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density(perVIOUS area): 20. %

Impervious cover: 1. % (EXISTING)

CN(s): 83 (perVIOUS areas) CN\*(s): 87.42

CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .575 (perVIOUS areas)  
.959 (impervious areas)

Runoff Supply Rate(a): .579 i in./hr. (function of i)

Time of Concentration(Tc): .735 a-0.4 hrs. (function of a)

Iterative Solution of Tc: 23.00 min.

Rainfall Intensity (i) at Tc: 5.23 in./hr.

Runoff Supply Rate (a) at Tc: 3.02 in./hr.

Peak Discharge: 1.008qA(acres): 600. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES  
Drainage Concentration Point: OFFSITE F

Watershed Area (A): 2.10 Acres  
Length of Watercourse (Lc): 800. ft.  
Length to Center of Gravity (Lca): 350. ft.

Change in Length(L)-ft. Change in Elevation(H)<sup>1</sup>-ft.

800.00 8.00  
Mean Slope(Sc): .010 Ft./Ft.

Watershed Type(s): FOOTHILLS (EXISTING)

Basin Factor(nb): .035 (EXISTING) Flood Frequency: 10 yrs.

P24(24 hour):	3.300 in.	Areal Value:	in.
P6(6 hour):	2.650 in.	Areal Value:	in.
P1(1 hour):	2.000 in.	Areal Value:	in.
P2(2 hour):	2.222 in.	Areal Value:	in.
P3(3 hour):	2.370 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(perVIOUS area): 20. %  
Impervious cover: 1. % (EXISTING)

CN(s): 83 (perVIOUS areas) CN\*(s): 85.08  
CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .400 (perVIOUS areas)  
.942 (impervious areas)  
Runoff Supply Rate(o): .405 i in./hr. (function of i)  
Time of Concentration(Tc): .273 a-0.4 hrs. (function of a)  
Iterative Solution of Tc: 8.00 min.  
Rainfall Intensity (i) at Tc: 5.98 in./hr.  
Runoff Supply Rate (o) at Tc: 2.42 in./hr.  
Peak Discharge: 1.008qA(acres): 5. cfs.



PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: OFFSITE F

Watershed Area (A): 2.10 Acres  
Length of Watercourse (Lc): 800. ft.  
Length to Center of Gravity (Lca): 350. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

800.00

8.00

Mean Slope(Sc): .010 Ft./Ft.

Watershed Type(s): FOOTHILLS (EXISTING)

Basin Factor(nb): .035 (EXISTING) Flood Frequency: 25 yrs.

P24(24 hour):	3.900 in.	Areal Value:	in.
P6(6 hour):	3.120 in.	Areal Value:	in.
P1(1 hour):	2.300 in.	Areal Value:	in.
P2(2 hour):	2.580 in.	Areal Value:	in.
P3(3 hour):	2.767 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density(pervious area): 20. %

Impervious cover: 1. % (EXISTING)

CN(s): 83 (pervious areas) CN\*(s): 86.11

CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .474 (pervious areas)  
.949 (impervious areas)

Runoff Supply Rate(o): .478 i in./hr. (function of i)

Time of Concentration(Tc): .255 a-0.4 hrs. (function of a)

Iterative Solution of Tc: 7.00 min.

Rainfall Intensity (i) at Tc: 7.25 in./hr.

Runoff Supply Rate (o) at Tc: 3.47 in./hr.

Peak Discharge:  $1.008oA$ (acres): 7. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: OFFSITE F

Watershed Area (A): 2.10 Acres  
Length of Watercourse (Lc): 800. ft.  
Length to Center of Gravity (Lca): 350. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

800.00 8.00  
Mean Slope(Sc): .010 Ft./Ft.

Watershed Type(s): FOOTHILLS (EXISTING)

Basin Factor(nb): .035 (EXISTING) Flood Frequency: 100 yrs.

P24(24 hour):	4.900 in.	Areal Value:	in.
P6(6 hour):	3.900 in.	Areal Value:	in.
P1(1 hour):	2.840 in.	Areal Value:	in.
P2(2 hour):	3.201 in.	Areal Value:	in.
P3(3 hour):	3.443 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(perVIOUS area): 20. %  
Impervious cover: 1. % (EXISTING)

CN(s): 83 (perVIOUS areas) CN\*(s): 87.42  
CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .575 (perVIOUS areas)  
.959 (impervious areas)  
Runoff Supply Rate(c): .579 i in./hr. (function of i)  
Time of Concentration(Tc): .237 c-0.4 hrs. (function of c)  
Iterative Solution of Tc: 6.00 min.  
Rainfall Intensity (i) at Tc: 9.43 in./hr.  
Runoff Supply Rate (c) at Tc: 5.46 in./hr.  
Peak Discharge: 1.008qA(acres): 12. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: OFFSITE G

Watershed Area (A): 7.50 Acres  
Length of Watercourse (Lc): 1115. ft.  
Length to Center of Gravity (Lca): 410. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

1115.00

15.00

Mean Slope(Sc): .013 Ft./Ft.

Watershed Type(s): SUBURBAN (EXISTING)

Basin Factor(nb): .034 (EXISTING) Flood Frequency: 10 yrs.

P24(24 hour):	3.300 in.	Areal Value:	in.
P6(6 hour):	2.650 in.	Areal Value:	in.
P1(1 hour):	2.000 in.	Areal Value:	in.
P2(2 hour):	2.222 in.	Areal Value:	in.
P3(3 hour):	2.370 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density(perVIOUS area): 20. %

Impervious cover: 5. % (EXISTING)

CN(s): 83 (perVIOUS areas) CN\*(s): 85.08

CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .400 (perVIOUS areas)

.942 (impervious areas)

Runoff Supply Rate(o): .427 i in./hr. (function of i)

Time of Concentration(Tc): .267 a-0.4 hrs. (function of a)

Iterative Solution of Tc: 8.00 min.

Rainfall Intensity (i) at Tc: 5.98 in./hr.

Runoff Supply Rate (o) at Tc: 2.55 in./hr.

Peak Discharge: 1.008oA(acres): 19. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: OFFSITE G

Watershed Area (A): 7.50 Acres  
Length of Watercourse (Lc): 1115. ft.  
Length to Center of Gravity (Lca): 410. ft.

Change in Length(L)-ft. Change in Elevation(H<sub>v</sub>)-ft.

1115.00

15.00

Mean Slope(S<sub>c</sub>): .013 Ft./Ft.

Watershed Type(s): SUBURBAN (EXISTING)

Basin Factor(nb): .034 (EXISTING) Flood Frequency: 100 yrs.

P24(24 hour):	4.900 in.	Areal Value:	in.
P6(6 hour):	3.900 in.	Areal Value:	in.
P1(1 hour):	2.840 in.	Areal Value:	in.
P2(2 hour):	3.201 in.	Areal Value:	in.
P3(3 hour):	3.443 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density(pervious area): 20. %

Impervious cover: 5. % (EXISTING)

CN(s): 83 (pervious areas) CN\*(s): 87.42

CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .575 (pervious areas)  
.959 (impervious areas)

Runoff Supply Rate(q): .594 i in./hr. (function of i)

Time of Concentration(T<sub>c</sub>): .234 q-0.4 hrs. (function of q)

Iterative Solution of T<sub>c</sub>: 6.00 min.

Rainfall Intensity (i) at T<sub>c</sub>: 9.43 in./hr.

Runoff Supply Rate (q) at T<sub>c</sub>: 5.60 in./hr.

Peak Discharge: 1.008qA(acres): 42. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: OFFSITE H

Watershed Area (A): 3.10 Acres  
Length of Watercourse (Lc): 900. ft.  
Length to Center of Gravity (Lca): 440. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

900.00

16.00

Mean Slope(Sc): .018 Ft./Ft.

Watershed Type(s): SUBURBAN

(EXISTING)

Basin Factor(nb): .034 (EXISTING) Flood Frequency: 10 yrs.

P24(24 hour):	3.300 in.	Areal Value:	in.
P6(6 hour):	2.650 in.	Areal Value:	in.
P1(1 hour):	2.000 in.	Areal Value:	in.
P2(2 hour):	2.222 in.	Areal Value:	in.
P3(3 hour):	2.370 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density(perVIOUS area): 20. %

ImperVIOUS cover: 5. % (EXISTING)

CN(s): 83 (perVIOUS areas) CN\*(s): 85.08

CN(s): 99 (imperVIOUS areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .400 (perVIOUS areas)  
.942 (imperVIOUS areas)

Runoff Supply Rate(o): .427 i in./hr. (function of i)

Time of Concentration(Tc): .229 a-0.4 hrs. (function of a)

Iterative Solution of Tc: 6.00 min.

Rainfall Intensity (i) at Tc: 6.64 in./hr.

Runoff Supply Rate (o) at Tc: 2.83 in./hr.

Peak Discharge:  $1.008oA$ (acres): 9. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87  
DATE PREPARED: 2/21/87  
Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES  
Drainage Concentration Point: OFFSITE H

Watershed Area (A): 3.10 Acres  
Length of Watercourse (Lc): 900. ft.  
Length to Center of Gravity (Lca): 440. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft./f

900.00 16.00

Mean Slope(Sc): .018 Ft./Ft.

Watershed Type(s): SUBURBAN (EXISTING)

Basin Factor(nb): .034 (EXISTING) Flood Frequency: 25 yrs.

P24(24 hour):	3.900 in.	Areal Value:	in.
P6(6 hour):	3.120 in.	Areal Value:	in.
P1(1 hour):	2.300 in.	Areal Value:	in.
P2(2 hour):	2.580 in.	Areal Value:	in.
P3(3 hour):	2.767 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(pervious area): 20. %  
Impervious cover: 5. % (EXISTING)

CN(s): 83 (pervious areas) CN\*(s): 86.11  
CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s). (C): .474 (pervious areas)  
.949 (impervious areas)  
Runoff Supply Rate(a): .497 i in./hr. (function of i)  
Time of Concentration(Tc): .215 a-0.4 hrs. (function of a)  
Iterative Solution of Tc: 6.00 min.  
Rainfall Intensity (i) at Tc: 7.64 in./hr.  
Runoff Supply Rate (a) at Tc: 3.80 in./hr.  
Peak Discharge: 1.008aA(acres): 12. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: OFFSITE H

Watershed Area (A): 3.10 Acres  
Length of Watercourse (Lc): 900. ft.  
Length to Center of Gravity (Lca): 440. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

900.00

16.00

Mean Slope(Sc): .018 Ft./Ft.

Watershed Type(s): SUBURBAN

(EXISTING)

Basin Factor(nb): .034 (EXISTING) Flood Frequency: 100 yrs.

P24(24 hour):	4.900 in.	Areal Value:	in.
P6(6 hour):	3.900 in.	Areal Value:	in.
P1(1 hour):	2.840 in.	Areal Value:	in.
P2(2 hour):	3.201 in.	Areal Value:	in.
P3(3 hour):	3.443 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density(perVIOUS area): 20. %

Impervious cover: 5. % (EXISTING)

CN(s): 83 (perVIOUS areas) CN\*(s): 87.42

CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .575 (perVIOUS areas)  
.959 (impervious areas)

Runoff Supply Rate(a): .594 i in./hr. (function of i)

Time of Concentration(Tc): .201 a-0.4 hrs. (function of a)

Iterative Solution of Tc: 5.00 min.

Rainfall Intensity (i) at Tc: 9.88 in./hr.

Runoff Supply Rate (a) at Tc: 5.87 in./hr.

Peak Discharge: 1.008aA(acres): 18. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD1

Watershed Area (A): 6.90 Acres  
Length of Watercourse (Lc): 950. ft.  
Length to Center of Gravity (Lca): 690. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

950.00 6.00  
Mean Slope(Sc): .006 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 10 yrs.

P24(24 hour):	3.300 in.	Areal Value:	in.
P6(6 hour):	2.650 in.	Areal Value:	in.
P1(1 hour):	2.000 in.	Areal Value:	in.
P2(2 hour):	2.222 in.	Areal Value:	in.
P3(3 hour):	2.370 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(pervious area): 20. %  
Impervious cover: 8. % (FUTURE )

CN(s): 83 (pervious areas) CN\*(s): 85.08  
CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .400 (pervious areas)  
.942 (impervious areas)  
Runoff Supply Rate(o): .440 i in./hr. (function of i)  
Time of Concentration(Tc): .398 o-0.4 hrs. (function of o)  
Iterative Solution of Tc: 13.00 min.  
Rainfall Intensity (i) at Tc: 4.88 in./hr.  
Runoff Supply Rate (o) at Tc: 2.15 in./hr.  
Peak Discharge: 1.008oA(acres): 15. cfs.



PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD1

Watershed Area (A): 6.90 Acres  
Length of Watercourse (Lc): 950. ft.  
Length to Center of Gravity (Lca): 690. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

950.00 6.00  
Mean Slope(Sc): .006 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 25 yrs.

P24(24 hour):	3.900 in.	Areal Value:	in.
P6(6 hour):	3.120 in.	Areal Value:	in.
P1(1 hour):	2.300 in.	Areal Value:	in.
P2(2 hour):	2.580 in.	Areal Value:	in.
P3(3 hour):	2.767 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(pervious area): 20. %  
Impervious cover: 8. % (FUTURE )

CN(s): 83 (pervious areas) CN\*(s): 86.11  
CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .474 (pervious areas)  
.949 (impervious areas)  
Runoff Supply Rate(o): .509 i in./hr. (function of i)  
Time of Concentration(Tc): .375 a-0.4 hrs. (function of a)  
Iterative Solution of Tc: 11.00 min.  
Rainfall Intensity (i) at Tc: 6.00 in./hr.  
Runoff Supply Rate (o) at Tc: 3.06 in./hr.  
Peak Discharge: 1.008oA(acres): 21. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD1

Watershed Area (A): 6.90 Acres  
Length of Watercourse (Lc): 950. ft.  
Length to Center of Gravity (Lca): 690. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

950.00 6.00  
Mean Slope(Sc): .006 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 100 yrs.

P24(24 hour):	4.900 in.	Areal Value:	in.
P6(6 hour):	3.900 in.	Areal Value:	in.
P1(1 hour):	2.840 in.	Areal Value:	in.
P2(2 hour):	3.201 in.	Areal Value:	in.
P3(3 hour):	3.443 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(pervious area): 20. %  
Impervious cover: 8. % (FUTURE )

CN(s): 83 (pervious areas) CN\*(s): 87.42  
CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .575 (pervious areas)  
.959 (impervious areas)  
Runoff Supply Rate(q): .604 i in./hr. (function of i)  
Time of Concentration(Tc): .351 p-0.4 hrs. (function of q)  
Iterative Solution of Tc: 9.00 min.  
Rainfall Intensity (i) at Tc: 8.07 in./hr.  
Runoff Supply Rate (q) at Tc: 4.87 in./hr.  
Peak Discharge: 1.008qA(acres): 34. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD2

Watershed Area (A): 6.30 Acres  
 Length of Watercourse (Lc): 1310. ft.  
 Length to Center of Gravity (Lca): 650. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

1310.00

19.00

Mean Slope(Sc): .015 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 10 yrs.

P24(24 hour):	3.300 in.	Areal Value:	in.
P6(6 hour):	2.650 in.	Areal Value:	in.
P1(1 hour):	2.000 in.	Areal Value:	in.
P2(2 hour):	2.222 in.	Areal Value:	in.
P3(3 hour):	2.370 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density(pervious area): 20. %

Impervious cover: 14. % (FUTURE )

CN(s): 83 (pervious areas) CN\*(s): 85.08

CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .400 (pervious areas)

.942 (impervious areas)

Runoff Supply Rate(c): .476 i in./hr. (function of i)

Time of Concentration(Tc): .299 a-0.4 hrs. (function of a)

Iterative Solution of Tc: 9.00 min.

Rainfall Intensity (i) at Tc: 5.68 in./hr.

Runoff Supply Rate (c) at Tc: 2.70 in./hr.

Peak Discharge: 1.008cA(acres): 17. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD2

Watershed Area (A): 6.30 Acres  
Length of Watercourse (Lc): 1310. ft.  
Length to Center of Gravity (Lca): 650. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

1310.00 19.00  
Mean Slope(Sc): .015 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 25 yrs.

P24(24 hour):	3.900 in.	Areal Value:	in.
P6(6 hour):	3.120 in.	Areal Value:	in.
P1(1 hour):	2.300 in.	Areal Value:	in.
P2(2 hour):	2.580 in.	Areal Value:	in.
P3(3 hour):	2.767 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density( pervious area): 20. %

Impervious cover: 14. % (FUTURE )

CN(s): 83 (pervious areas) CN\*(s): 86.11

CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .474 (pervious areas)  
.949 (impervious areas)

Runoff Supply Rate(o): .540 i in./hr. (function of i)

Time of Concentration(Tc): .284 a-0.4 hrs. (function of a)

Iterative Solution of Tc: 8.00 min.

Rainfall Intensity (i) at Tc: 6.88 in./hr.

Runoff Supply Rate (o) at Tc: 3.71 in./hr.

Peak Discharge: 1.008qA(acres): 24. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD2

Watershed Area (A): 6.30 Acres  
Length of Watercourse (Lc): 1310. ft.  
Length to Center of Gravity (Lca): 650. ft.

Change in Length(L)-ft. Change in Elevation(H<sub>f</sub>)-ft.

1310.00 19.00  
Mean Slope(S<sub>c</sub>): .015 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 100 yrs.

P24(24 hour):	4.900 in.	Areal Value:	in.
P6(6 hour):	3.900 in.	Areal Value:	in.
P1(1 hour):	2.840 in.	Areal Value:	in.
P2(2 hour):	3.201 in.	Areal Value:	in.
P3(3 hour):	3.443 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density(pervious area): 20. %

Impervious cover: 14. % (FUTURE )

CN(s): 83 (pervious areas) CN\*(s): 87.42

CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .575 (pervious areas)  
.959 (impervious areas)

Runoff Supply Rate(a): .628 i in./hr. (function of i)

Time of Concentration(T<sub>c</sub>): .268 a-0.4 hrs. (function of a)

Iterative Solution of T<sub>c</sub>: 7.00 min.

Rainfall Intensity (i) at T<sub>c</sub>: 8.95 in./hr.

Runoff Supply Rate (a) at T<sub>c</sub>: 5.62 in./hr.

Peak Discharge: 1.008qA(acres): 36. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD3

Watershed Area (A): 3.40 Acres  
Length of Watercourse (Lc): 960. ft.  
Length to Center of Gravity (Lca): 540. ft.

Change in Length(L)-ft. Change in Elevation(H)<sup>f</sup>-ft.

960.00

14.00

Mean Slope(Sc): .015 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 10 yrs.

P24(24 hour):	3.300 in.	Areal Value:	in.
P6(6 hour):	2.650 in.	Areal Value:	in.
P1(1 hour):	2.000 in.	Areal Value:	in.
P2(2 hour):	2.222 in.	Areal Value:	in.
P3(3 hour):	2.370 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density(pervious area): 20. %

Impervious cover: 16. % (FUTURE )

CN(s): 83 (pervious areas) CN\*(s): 85.08

CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .400 (pervious areas)  
.942 (impervious areas)

Runoff Supply Rate(o): .486 i in./hr. (function of i)

Time of Concentration(Tc): .255 o-0.4 hrs. (function of o)

Iterative Solution of Tc: 7.00 min.

Rainfall Intensity (i) at Tc: 6.30 in./hr.

Runoff Supply Rate (c) at Tc: 3.06 in./hr.

Peak Discharge: 1.008cA(acres): 11. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD3

Watershed Area (A): 3.40 Acres  
 Length of Watercourse (Lc): 960. ft.  
 Length to Center of Gravity (Lca): 540. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

960.00 14.00  
 Mean Slope(Sc): .015 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 25 yrs.

P24(24 hour):	3.900 in.	Areal Value:	in.
P6(6 hour):	3.120 in.	Areal Value:	in.
P1(1 hour):	2.300 in.	Areal Value:	in.
P2(2 hour):	2.580 in.	Areal Value:	in.
P3(3 hour):	2.767 in.	Areal Value:	in.

Soil Group(s): 100. % B  
 Cover type(s): DESERT BRUSH  
 Cover Density(pervious area): 20. %  
 Impervious cover: 16. % (FUTURE )

CN(s): 83 (pervious areas) CN\*(s): 86.11  
 CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .474 (pervious areas)  
 .949 (impervious areas)  
 Runoff Supply Rate(a): .550 i in./hr. (function of i)  
 Time of Concentration(Tc): .243 a-0.4 hrs. (function of a)  
 Iterative Solution of Tc: 6.00 min.  
 Rainfall Intensity (i) at Tc: 7.64 in./hr.  
 Runoff Supply Rate (a) at Tc: 4.20 in./hr.  
 Peak Discharge: 1.008qA(acres): 14. cfs.







PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD4

Watershed Area (A): 1.70 Acres  
Length of Watercourse (Lc): 450. ft.  
Length to Center of Gravity (Lca): 170. ft.

Change in Length(L)-ft. Change in Elevation(H<sub>1</sub>)-ft.

450.00 9.00  
Mean Slope(Sc): .020 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 25 yrs.

P24(24 hour):	3.900 in.	Areal Value:	in.
P6(6 hour):	3.120 in.	Areal Value:	in.
P1(1 hour):	2.300 in.	Areal Value:	in.
P2(2 hour):	2.580 in.	Areal Value:	in.
P3(3 hour):	2.767 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density(perVIOUS area): 20. %

ImperVIOUS cover: 12. % (FUTURE )

CN(s): 83 (perVIOUS areas) CN\*(s): 86.11

CN(s): 99 (imperVIOUS areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .474 (perVIOUS areas)  
.949 (imperVIOUS areas)

Runoff Supply Rate(a): .531 i in./hr. (function of i)

Time of Concentration(Tc): .122 a-0.4 hrs. (function of a)

Iterative Solution of Tc: 5.00 min.

Rainfall Intensity (i) at Tc: 8.00 in./hr.

Runoff Supply Rate (a) at Tc: 4.25 in./hr.

Peak Discharge: 1.008qA(acres): 7. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD4

Watershed Area (A): 1.70 Acres  
 Length of Watercourse (Lc): 450. ft.  
 Length to Center of Gravity (Lca): 170. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

450.00

9.00

Mean Slope(Sc): .020 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 100 yrs.

P24(24 hour):	4.900 in.	Areal Value:	in.
P6(6 hour):	3.900 in.	Areal Value:	in.
P1(1 hour):	2.840 in.	Areal Value:	in.
P2(2 hour):	3.201 in.	Areal Value:	in.
P3(3 hour):	3.443 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density(pervious area): 20. %

Impervious cover: 12. % (FUTURE )

CN(s): 83 (pervious areas) CN\*(s): 87.42

CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .575 (pervious areas)  
 .959 (impervious areas)

Runoff Supply Rate(q): .621 i in./hr. (function of i)

Time of Concentration(Tc): .115 q-0.4 hrs. (function of q)

Iterative Solution of Tc: 5.00 min.

Rainfall Intensity (i) at Tc: 9.88 in./hr.

Runoff Supply Rate (q) at Tc: 6.14 in./hr.

Peak Discharge: 1.008qA(acres): 11. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-87

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PDS

Watershed Area (A): 6.70 Acres  
Length of Watercourse (Lc): 1010. ft.  
Length to Center of Gravity (Lca): 580. ft.

Change in Length(L)-ft. Change in Elevation(H<sub>L</sub>)-ft.

1010.00 17.00  
Mean Slope(S<sub>c</sub>): .017 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 10 yrs.

P24(24 hour):	3.300 in.	Areal Value:	in.
P6(6 hour):	2.650 in.	Areal Value:	in.
P1(1 hour):	2.000 in.	Areal Value:	in.
P2(2 hour):	2.222 in.	Areal Value:	in.
P3(3 hour):	2.370 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(perVIOUS area): 20. %  
Impervious cover: 16. % (FUTURE )

CN(s): 83 (perVIOUS areas) CN\*(s): 85.08  
CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s),(C): .400 (perVIOUS areas)  
.942 (impervious areas)  
Runoff Supply Rate(a): .486 i in./hr. (function of i)  
Time of Concentration(T<sub>c</sub>): .250 a-0.4 hrs. (function of a)  
Iterative Solution of T<sub>c</sub>: 7.00 min.  
Rainfall Intensity (i) at T<sub>c</sub>: 6.30 in./hr.  
Runoff Supply Rate (a) at T<sub>c</sub>: 3.06 in./hr.  
Peak Discharge: 1.008qA(acres): 21. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-86

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PDS

Watershed Area (A): 6.70 Acres  
Length of Watercourse (Lc): 1010. ft.  
Length to Center of Gravity (Lca): 580. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

1010.00 17.00  
Mean Slope(Sc): .017 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 25 yrs.

P24(24 hour):	3.900 in.	Areal Value:	in.
P6(6 hour):	3.120 in.	Areal Value:	in.
P1(1 hour):	2.300 in.	Areal Value:	in.
P2(2 hour):	2.580 in.	Areal Value:	in.
P3(3 hour):	2.767 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(perVIOUS area): 20. %  
Impervious cover: 16. % (FUTURE )

CN(s): 83 (perVIOUS areas) CN\*(s): 86.11  
CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .474 (perVIOUS areas)  
.949 (impervious areas)  
Runoff Supply Rate(o): .550 i in./hr. (function of i)  
Time of Concentration(Tc): .238 o-0.4 hrs. (function of o)  
Iterative Solution of Tc: 6.00 min.  
Rainfall Intensity (i) at Tc: 7.64 in./hr.  
Runoff Supply Rate (o) at Tc: 4.20 in./hr.  
Peak Discharge: 1.008cA(acres): 28. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-86

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD5

Watershed Area (A): 6.70 Acres  
Length of Watercourse (Lc): 1010. ft.  
Length to Center of Gravity (Lca): 580. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

1010.00

17.00

Mean Slope(Sc): .017 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 100 yrs.

P24(24 hour):	4.900 in.	Areal Value:	in.
P6(6 hour):	3.900 in.	Areal Value:	in.
P1(1 hour):	2.840 in.	Areal Value:	in.
P2(2 hour):	3.201 in.	Areal Value:	in.
P3(3 hour):	3.443 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density(perVIOUS area): 20. %

Impervious cover: 16. % (FUTURE )

CN(s): 83 (perVIOUS areas) CN\*(s): 87.42

CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .575 (perVIOUS areas)  
.959 (impervious areas)

Runoff Supply Rate(q): .636 i in./hr. (function of i)

Time of Concentration(Tc): .224 a-0.4 hrs. (function of a)

Iterative Solution of Tc: 5.00 min.

Rainfall Intensity (i) at Tc: 9.88 in./hr.

Runoff Supply Rate (q) at Tc: 6.29 in./hr.

Peak Discharge: 1.008qA(acres): 42. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-86

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD6

Watershed Area (A): 5.30 Acres  
Length of Watercourse (Lc): 1040. ft.  
Length to Center of Gravity (Lca): 490. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

1040.00

16.00

Mean Slope(Sc): .015 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 10 yrs.

P24(24 hour):	3.300 in.	Areal Value:	in.
P6(6 hour):	2.650 in.	Areal Value:	in.
P1(1 hour):	2.000 in.	Areal Value:	in.
P2(2 hour):	2.222 in.	Areal Value:	in.
P3(3 hour):	2.370 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density(pervious area): 20. %

Impervious cover: 7. % (FUTURE )

CN(s): 83 (pervious areas) CN\*(s): 85.08

CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .400 (pervious areas)  
.942 (impervious areas)

Runoff Supply Rate(c): .438 i in./hr. (function of i)

Time of Concentration(Tc): .259 c-0.4 hrs. (function of c)

Iterative Solution of Tc: 7.00 min.

Rainfall Intensity (i) at Tc: 6.30 in./hr.

Runoff Supply Rate (c) at Tc: 2.76 in./hr.

Peak Discharge: 1.008cA(acres): 15. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-86

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD6

Watershed Area (A): 5.30 Acres  
Length of Watercourse (Lc): 1040. ft.  
Length to Center of Gravity (Lca): 490. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

1040.00 16.00  
Mean Slope(Sc): .015 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 25 yrs.

P24(24 hour):	3.900 in.	Areal Value:	in.
P6(6 hour):	3.120 in.	Areal Value:	in.
P1(1 hour):	2.300 in.	Areal Value:	in.
P2(2 hour):	2.580 in.	Areal Value:	in.
P3(3 hour):	2.767 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(pervious area): 20. %  
Impervious cover: 7. % (FUTURE )

CN(s): 83 (pervious areas) CN\*(s): 86.11  
CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .474 (pervious areas)  
.949 (impervious areas)  
Runoff Supply Rate(q): .507 i in./hr. (function of i)  
Time of Concentration(Tc): .244 a-0.4 hrs. (function of a)  
Iterative Solution of Tc: 6.00 min.  
Rainfall Intensity (i) at Tc: 7.64 in./hr.  
Runoff Supply Rate (q) at Tc: 3.87 in./hr.  
Peak Discharge:  $1.008qA$ (acres): 21. cfs.



PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-86

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PDE

Watershed Area (A): 5.30 Acres  
Length of Watercourse (Lc): 1040. ft.  
Length to Center of Gravity (Lca): 490. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

1040.00 16.00  
Mean Slope(Sc): .015 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 100 yrs.

P24(24 hour):	4.900 in.	Areal Value:	in.
P6(6 hour):	3.900 in.	Areal Value:	in.
P1(1 hour):	2.840 in.	Areal Value:	in.
P2(2 hour):	3.201 in.	Areal Value:	in.
P3(3 hour):	3.443 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(pervious area): 20. %  
Impervious cover: 7. % (FUTURE )

CN(s): 83 (pervious areas) CN\*(s): 87.42  
CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .575 (pervious areas)  
.559 (impervious areas)

Runoff Supply Rate(q): .602 i in./hr. (function of i)  
Time of Concentration(Tc): .228 a-0.4 hrs. (function of a)  
Iterative Solution of Tc: 5.00 min.  
Rainfall Intensity (i) at Tc: 9.88 in./hr.  
Runoff Supply Rate (q) at Tc: 5.95 in./hr.  
Peak Discharge:  $1.008oA$ (acres): 32. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-86

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD7

Watershed Area (A): 1.20 Acres  
Length of Watercourse (Lc): 900. ft.  
Length to Center of Gravity (Lca): 450. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

900.00 13.50  
Mean Slope(Sc): .015 Ft./Ft.

Watershed Type(s): MODERATE URBAN (FUTURE )

Basin Factor(nb): .022 (FUTURE ) Flood Frequency: 10 yrs.

P24(24 hour):	3.300 in.	Areal Value:	in.
P6(6 hour):	2.650 in.	Areal Value:	in.
P1(1 hour):	2.000 in.	Areal Value:	in.
P2(2 hour):	2.222 in.	Areal Value:	in.
P3(3 hour):	2.370 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density(pervious area): 20. %

Impervious cover: 40. % (FUTURE )

CN(s): 83 (pervious areas) CN\*(s): 85.08

CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .400 (pervious areas)  
.942 (impervious areas)

Runoff Supply Rate(a): .617 i in./hr. (function of i)

Time of Concentration(Tc): .138 a-0.4 hrs. (function of a)

Iterative Solution of Tc: 5.00 min.

Rainfall Intensity (i) at Tc: 6.96 in./hr.

Runoff Supply Rate (a) at Tc: 4.29 in./hr.

Peak Discharge: 1.008a(acres): 5. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-86

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD7

Watershed Area (A): 1.20 Acres  
Length of Watercourse (Lc): 900. ft.  
Length to Center of Gravity (Lca): 450. ft.

Change in Length(L)-ft. Change in Elevation(H)<sup>1</sup>-ft.

900.00 13.50  
Mean Slope(Sc): .015 Ft./Ft.

Watershed Type(s): MODERATE URBAN (FUTURE )

Basin Factor(nb): .022 (FUTURE ) Flood Frequency: 25 yrs.

P24(24 hour):	3.900 in.	Areal Value:	in.
P6(6 hour):	3.120 in.	Areal Value:	in.
P1(1 hour):	2.300 in.	Areal Value:	in.
P2(2 hour):	2.580 in.	Areal Value:	in.
P3(3 hour):	2.767 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(pervious area): 20. %  
Impervious cover: 40. % (FUTURE )

CN(s): 83 (pervious areas) CN\*(s): 86.11  
CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .474 (pervious areas)  
.949 (impervious areas)  
Runoff Supply Rate(a): .664 i in./hr. (function of i)  
Time of Concentration(Tc): .134 a-0.4 hrs. (function of a)  
Iterative Solution of Tc: 5.00 min.  
Rainfall Intensity (i) at Tc: 8.00 in./hr.  
Runoff Supply Rate (a) at Tc: 5.31 in./hr.  
Peak Discharge: 1.008qA(acres): 6. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-86

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD7

Watershed Area (A): 1.20 Acres  
Length of Watercourse (Lc): 900. ft.  
Length to Center of Gravity (Lca): 450. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

900.00 13.50  
Mean Slope(Sc): .015 Ft./Ft.

Watershed Type(s): MODERATE URBAN (FUTURE )

Basin Factor(nb): .022 (FUTURE ) Flood Frequency: 100 yrs.

P24(24 hour):	4.900 in.	Areal Value:	in.
P6(6 hour):	3.900 in.	Areal Value:	in.
P1(1 hour):	2.840 in.	Areal Value:	in.
P2(2 hour):	3.201 in.	Areal Value:	in.
P3(3 hour):	3.443 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(pervious area): 20. %  
Impervious cover: 40. % (FUTURE )

CN(s): 83 (pervious areas) CN\*(s): 87.42  
CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s).(C): .575 (pervious areas)  
.959 (impervious areas)  
Runoff Supply Rate(q): .728 i in./hr. (function of i)  
Time of Concentration(Tc): .129 a-0.4 hrs. (function of a)  
Iterative Solution of Tc: 3.00 min.  
Rainfall Intensity (i) at Tc: 9.88 in./hr.  
Runoff Supply Rate (q) at Tc: 7.20 in./hr.  
Peak Discharge:  $1.008qA$ (acres): 9. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-86

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PDB

Watershed Area (A): 5.70 Acres  
Length of Watercourse (Lc): 440. ft.  
Length to Center of Gravity (Lca): 210. ft.

Change in Length(L)-ft.                      Change in Elevation(H)-ft.  
440.00    7.00  
Mean Slope(Sc): .016 Ft./Ft.

Watershed Type(s): MODERATE URBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 10 yrs.

P24(24 hour):	3.300 in.	Areal Value:	in.
P6(6 hour):	2.650 in.	Areal Value:	in.
P1(1 hour):	2.000 in.	Areal Value:	in.
P2(2 hour):	2.222 in.	Areal Value:	in.
P3(3 hour):	2.370 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(pervious area): 20. %  
Impervious cover: 13. % (FUTURE )

CN(s): 83 (pervious areas) CN\*(s): 85.08  
CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .400 (pervious areas)  
.942 (impervious areas)  
Runoff Supply Rate(d): .470 i in./hr. (function of i)  
Time of Concentration(Tc): .149 d-0.4 hrs. (function of d)  
Iterative Solution of Tc: 5.00 min.  
Rainfall Intensity (i) at Tc: 6.96 in./hr.  
Runoff Supply Rate (c) at Tc: 3.27 in./hr.  
Peak Discharge:  $1.008dA$ (acres): 19. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-86

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PDB

Watershed Area (A): 5.70 Acres  
Length of Watercourse (Lc): 440. ft.  
Length to Center of Gravity (Lca): 210. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

440.00 7.00  
Mean Slope(Sc): .016 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 25 yrs.

P24(24 hour):	3.900 in.	Areal Value:	in.
P6(6 hour):	3.120 in.	Areal Value:	in.
P1(1 hour):	2.300 in.	Areal Value:	in.
P2(2 hour):	2.580 in.	Areal Value:	in.
P3(3 hour):	2.767 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(pervious area): 20. %  
Impervious cover: 13. % (FUTURE )

CN(s): 83 (pervious areas) CN\*(s): 86.11  
CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .474 (pervious areas)  
.949 (impervious areas)  
Runoff Supply Rate(q): .535 i in./hr. (function of i)  
Time of Concentration(Tc): .141 q-0.4 hrs. (function of q)  
Iterative Solution of Tc: 5.00 min.  
Rainfall Intensity (i) at Tc: 8.00 in./hr.  
Runoff Supply Rate (q) at Tc: 4.29 in./hr.  
Peak Discharge: 1.008cA(acres): 25. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-86

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PDB

Watershed Area (A): 5.70 Acres  
 Length of Watercourse (Lc): 440. ft.  
 Length to Center of Gravity (Lca): 210. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

440.00

7.00

Mean Slope(Sc): .016 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 100 yrs.

P24(24 hour):	4.900 in.	Areal Value:	in.
P6(6 hour):	3.900 in.	Areal Value:	in.
P1(1 hour):	2.840 in.	Areal Value:	in.
P2(2 hour):	3.201 in.	Areal Value:	in.
P3(3 hour):	3.443 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density(overvius area): 20. %

Impervious cover: 13. % (FUTURE )

CN(s): 83 (overvius areas) CN\*(s): 87.42

CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .575 (overvius areas)

.959 (impervious areas)

Runoff Supply Rate(q): .625 i in./hr. (function of i)

Time of Concentration(Tc): .133 d-0.4 hrs. (function of d)

Iterative Solution of Tc: 5.00 min.

Rainfall Intensity (i) at Tc: 9.88 in./hr.

Runoff Supply Rate (q) at Tc: 6.17 in./hr.

Peak Discharge: 1.008qA(acres): 35. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-86

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD9

Watershed Area (A): 9.10 Acres  
Length of Watercourse (Lc): 900. ft.  
Length to Center of Gravity (Lca): 510. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

900.00 11.00  
Mean Slope(Sc): .012 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 10 yrs.

P24(24 hour):	3.300 in.	Areal Value:	in.
P6(6 hour):	2.650 in.	Areal Value:	in.
P1(1 hour):	2.000 in.	Areal Value:	in.
P2(2 hour):	2.222 in.	Areal Value:	in.
P3(3 hour):	2.370 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(pervious area): 20. %  
Impervious cover: 13. % (FUTURE )

CN(s): 83 (pervious areas) CN\*(s): 85.08  
CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .400 (pervious areas)  
.942 (impervious areas)  
Runoff Supply Rate(o): .470 i in./hr. (function of i)  
Time of Concentration(Tc): .267 o-0.4 hrs. (function of o)  
Iterative Solution of Tc: 8.00 min.  
Rainfall Intensity (i) at Tc: 5.98 in./hr.  
Runoff Supply Rate (o) at Tc: 2.81 in./hr.  
Peak Discharge: 1.008oA(acres): 26. cfs.



PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-86

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD9

Watershed Area (A): 9.10 Acres  
Length of Watercourse (Lc): 900. ft.  
Length to Center of Gravity (Lca): 510. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

900.00 11.00  
Mean Slope(Sc): .012 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 25 yrs.

P24(24 hour):	3.900 in.	Areal Value:	in.
P6(6 hour):	3.120 in.	Areal Value:	in.
P1(1 hour):	2.300 in.	Areal Value:	in.
P2(2 hour):	2.580 in.	Areal Value:	in.
P3(3 hour):	2.767 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density(pervious area): 20. %

Impervious cover: 13. % (FUTURE )

CN(s): 83 (pervious areas) CN\*(s): 86.11

CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (D): .474 (pervious areas)

.949 (impervious areas)

Runoff Supply Rate(q): .535 i in./hr. (function of i)

Time of Concentration(Tc): .254 a-0.4 hrs. (function of a)

Iterative Solution of Tc: 7.00 min.

Rainfall Intensity (i) at Tc: 7.25 in./hr.

Runoff Supply Rate (q) at Tc: 3.68 in./hr.

Peak Discharge: 1.008qA(acres): 36. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-86

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD9

Watershed Area (A): 9.10 Acres  
Length of Watercourse (Lc): 900. ft.  
Length to Center of Gravity (Lca): 510. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

900.00 11.00  
Mean Slope(Sc): .012 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 100 yrs.

P24(24 hour):	4.900 in.	Areal Value:	in.
P6(6 hour):	3.900 in.	Areal Value:	in.
P1(1 hour):	2.840 in.	Areal Value:	in.
P2(2 hour):	3.201 in.	Areal Value:	in.
P3(3 hour):	3.443 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(pervious area): 20. %  
Impervious cover: 13. % (FUTURE )

CN(s): 83 (pervious areas) CN\*(s): 87.42  
CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .575 (pervious areas)  
.959 (impervious areas)

Runoff Supply Rate(q): .625 i in./hr. (function of i)  
Time of Concentration(Tc): .239 q-0.4 hrs. (function of q)  
Iterative Solution of Tc: 6.00 min.  
Rainfall Intensity (i) at Tc: 9.43 in./hr.  
Runoff Supply Rate (q) at Tc: 5.89 in./hr.  
Peak Discharge:  $1.008qA$ (acres): 54. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-86

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD10

Watershed Area (A): 2.40 Acres  
 Length of Watercourse (Lc): 690. ft.  
 Length to Center of Gravity (Lca): 345. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

690.00

11.00

Mean Slope(Sc): .016 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 10 yrs.

P24 (24 hour):	3.300 in.	Areal Value:	in.
P6 (6 hour):	2.650 in.	Areal Value:	in.
P1 (1 hour):	2.000 in.	Areal Value:	in.
P2 (2 hour):	2.222 in.	Areal Value:	in.
P3 (3 hour):	2.370 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density(perVIOUS area): 20. %

Impervious cover: 22. % (FUTURE )

CN(s): 63 (perVIOUS areas) CN\*(s): 65.08

CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (D): .400 (perVIOUS areas)

.942 (impervious areas)

Runoff Supply Rate(o): .519 i in./hr. (function of i)

Time of Concentration(Tc): .190 a-0.4 hrs. (function of a)

Iterative Solution of Tc: 5.00 min.

Rainfall Intensity (i) at Tc: 6.96 in./hr.

Runoff Supply Rate (c) at Tc: 3.61 in./hr.

Peak Discharge: 1.008cA(acres): 9. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-86

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD10

Watershed Area (A): 2.40 Acres  
Length of Watercourse (Lc): 690. ft.  
Length to Center of Gravity (Lca): 345. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

690.00 11.00  
Mean Slope(Sc): .016 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 25 yrs.

P24(24 hour):	3.900 in.	Areal Value:	in.
P6(6 hour):	3.120 in.	Areal Value:	in.
P1(1 hour):	2.300 in.	Areal Value:	in.
P2(2 hour):	2.580 in.	Areal Value:	in.
P3(3 hour):	2.767 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(pervious area): 20. %  
Impervious cover: 22. % (FUTURE )

CN(s): 83 (pervious areas) CN\*(s): 86.11  
CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .474 (pervious areas)  
.949 (impervious areas)  
Runoff Supply Rate(q): .578 i in./hr. (function of i)  
Time of Concentration(Tc): .182 q-0.4 hrs. (function of q)  
Iterative Solution of Tc: 5.00 min.  
Rainfall Intensity (i) at Tc: 8.00 in./hr.  
Runoff Supply Rate (q) at Tc: 4.63 in./hr.  
Peak Discharge: 1.008qA(acres): 11. cfs.

PIMA COUNTY METHODD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-86

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD10

Watershed Area (A): 2.40 Acres  
Length of Watercourse (Lc): 690. ft.  
Length to Center of Gravity (Lca): 345. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

690.00 11.00  
Mean Slope(Sc): .016 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 100 yrs.

P24(24 hour):	4.900 in.	Areal Value:	in.
P6(6 hour):	3.900 in.	Areal Value:	in.
P1(1 hour):	2.840 in.	Areal Value:	in.
P2(2 hour):	3.201 in.	Areal Value:	in.
P3(3 hour):	3.443 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(pervious area): 20. %  
Impervious cover: 22. % (FUTURE )

CN(s): 83 (pervious areas) CN\*(s): 87.42  
CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .575 (pervious areas)  
.959 (impervious areas)  
Runoff Supply Rate(a): .659 i in./hr. (function of i)  
Time of Concentration(Tc): .173 a-0.4 hrs. (function of a)  
Iterative Solution of Tc: 5.00 min.  
Rainfall Intensity (i) at Tc: 9.88 in./hr.  
Runoff Supply Rate (a) at Tc: 6.51 in./hr.  
Peak Discharge: 1.008aA(acres): 16. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-86

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD11

Watershed Area (A): 3.10 Acres  
Length of Watercourse (Lc): 650. ft.  
Length to Center of Gravity (Lca): 325. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

650.00 7.50  
Mean Slope(Sc): .012 Ft./Ft.

Watershed Type(s): SUBURBAN (FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 10 yrs.

P24(24 hour):	3.300 in.	Areal Value:	in.
P6(6 hour):	2.650 in.	Areal Value:	in.
P1(1 hour):	2.000 in.	Areal Value:	in.
P2(2 hour):	2.222 in.	Areal Value:	in.
P3(3 hour):	2.370 in.	Areal Value:	in.

Soil Group(s): 100. % B  
Cover type(s): DESERT BRUSH  
Cover Density(pervious area): 20. %  
Impervious cover: 14. % (FUTURE )

CN(s): 83 (pervious areas) CN\*(s): 85.08  
CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .400 (pervious areas)  
.942 (impervious areas)  
Runoff Supply Rate(q): .476 i in./hr. (function of i)  
Time of Concentration(Tc): .216 a-0.4 hrs. (function of a)  
Iterative Solution of Tc: 6.00 min.  
Rainfall Intensity (i) at Tc: 6.64 in./hr.  
Runoff Supply Rate (o) at Tc: 3.16 in./hr.  
Peak Discharge:  $1.008qA$ (acres): 10. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-86

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD11

Watershed Area (A): 3.10 Acres  
Length of Watercourse (Lc): 650. ft.  
Length to Center of Gravity (Lca): 325. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

650.00

7.50

Mean Slope(Sc): .012 Ft./Ft.

Watershed Type(s): SUBURBAN

(FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 25 yrs.

P24(24 hour):	3.900 in.	Areal Value:	in.
P6(6 hour):	3.120 in.	Areal Value:	in.
P1(1 hour):	2.300 in.	Areal Value:	in.
P2(2 hour):	2.580 in.	Areal Value:	in.
P3(3 hour):	2.767 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density(pervious area): 20. %

Impervious cover: 14. % (FUTURE )

CN(s): 83 (pervious areas) CN\*(s): 86.11

CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .474 (pervious areas)  
.949 (impervious areas)

Runoff Supply Rate(a): .540 i in./hr. (function of i)

Time of Concentration(Tc): .205 a-0.4 hrs. (function of a)

Iterative Solution of Tc: 5.00 min.

Rainfall Intensity (i) at Tc: 8.00 in./hr.

Runoff Supply Rate (a) at Tc: 4.32 in./hr.

Peak Discharge:  $1.008qA$ (acres): 14. cfs.

PIMA COUNTY METHOD PEAK DISCHARGE COMPUTATION

JOB NO. TEI-340-86

DATE PREPARED: 2/21/87

Prepared by: JAY MOSLEY

Name and Location: SAN JOAQUIN ESTATES

Drainage Concentration Point: PD11

Watershed Area (A): 3.10 Acres  
Length of Watercourse (Lc): 650. ft.  
Length to Center of Gravity (Lca): 325. ft.

Change in Length(L)-ft. Change in Elevation(H)-ft.

650.00

7.50

Mean Slope(Sc): .012 Ft./Ft.

Watershed Type(s): SUBURBAN

(FUTURE )

Basin Factor(nb): .034 (FUTURE ) Flood Frequency: 100 yrs.

P24(24 hour):	4.900 in.	Areal Value:	in.
P6(6 hour):	3.900 in.	Areal Value:	in.
P1(1 hour):	2.840 in.	Areal Value:	in.
P2(2 hour):	3.201 in.	Areal Value:	in.
P3(3 hour):	3.443 in.	Areal Value:	in.

Soil Group(s): 100. % B

Cover type(s): DESERT BRUSH

Cover Density(perVIOUS area): 20. %

Impervious cover: 14. % (FUTURE )

CN(s): 83 (perVIOUS areas) CN\*(s): 87.42

CN(s): 99 (impervious areas) CN\*(s): 99.00

Runoff to Rainfall Ratio(s), (C): .575 (perVIOUS areas)  
.959 (impervious areas)

Runoff Supply Rate(a): .628 i in./hr. (function of i)

Time of Concentration(Tc): .193 a-0.4 hrs. (function of a)

Iterative Solution of Tc: 5.00 min.

Rainfall Intensity (i) at Tc: 9.88 in./hr.

Runoff Supply Rate (a) at Tc: 6.21 in./hr.

Peak Discharge: 1.008aA(acres): 19. cfs.



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*****
* WATER SURFACE PROFILES *
* VERSION OF NOVEMBER 1976 *
* UPDATED MAY 1984 *
* IBM-PC-XT VERSION *
* RUN DATE 01/01/80 TIME 01:19:58 *
*****

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*****
* U.S. ARMY CORPS OF ENGINEERS *
* THE HYDROLOGIC ENGINEERING CENTER *
* 609 SECOND STREET, SUITE D *
* DAVIS, CALIFORNIA 95616 *
* (916) 440-2105 (FTS) 448-2105 *
*****

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X   X XXXXXXX XXXX      XXXX
X   X X      X   X      X   X
X   X X      X           X
XXXXXXXX XXXX X           XXXX XXXX
X   X X      X           X
X   X X      X   X      X
X   X XXXXXXX XXXX      XXXXXXX

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DRAINAGE AREA "A"  
EXISTING - SUBCRITICAL

THIS RUN EXECUTED 01/01/80 01:20:22

\*\*\*\*\*  
 HEC2 RELEASE DATED NOV 76 UPDATED MAY 1984  
 ERROR CORR - 01,02,03,04,05,06  
 MODIFICATION - 50,51,52,53,54,55,56  
 IBM-PC-XT VERSION 1.1  
 \*\*\*\*\*

T1 SAN JOAQUIN ESTATES - SUBCRITICAL  
 T2 100 YEAR EVENT  
 T3 SUBCRITICAL (D.A. "A")

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0.	2.	0.	0.	.011500	.00	.0	572.	2406.000	.000
J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	-1.000	1.000	.000	.000	.000	.000	.000	.000	.000	.000
J3	VARIABLE CODES FOR SUMMARY PRINTOUT									
	38.000	1.000	2.000	3.000	4.000	5.000	8.000	10.000	11.000	33.000
	57.000	43.000	.000	.000	.000	.000	.000	.000	.000	.000
NC	.040	.040	.040	.000	.000	.000	.000	.000	.000	.000
QT	1.000	572.000	.000	.000	.000	.000	.000	.000	.000	.000
X1	3.000	7.000	.000	130.000	.000	.000	.000	.000	.000	.000
GR	2407.000	.000	2406.000	30.000	2404.000	70.000	2403.000	80.000	2404.000	90.000
GR	2406.000	102.000	2407.000	130.000	.000	.000	.000	.000	.000	.000
QT	1.000	555.000	.000	.000	.000	.000	.000	.000	.000	.000
X1	2.000	7.000	.000	215.000	280.000	220.000	245.000	.000	.000	.000
GR	2409.000	.000	2408.000	60.000	2406.000	80.000	2404.800	110.000	2406.000	130.000
GR	2408.000	145.000	2409.200	215.000	.000	.000	.000	.000	.000	.000
X1	1.000	12.000	.000	184.000	355.000	230.000	280.000	.000	.000	.000
GR	2415.000	.000	2414.000	35.000	2413.000	65.000	2412.000	95.000	2411.000	103.000
GR	2410.000	113.000	2408.000	128.000	2407.750	136.000	2408.000	144.000	2410.000	149.000
GR	2412.000	159.000	2412.200	184.000	.000	.000	.000	.000	.000	.000
EJ	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

\*PROF 1

SECND	DEPTH	CWSEL	CRIMS	WSELK	EG	HV	HL	DLOSS	BANK	ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT	
TIME	VLOB	VCH	VROB	XNL	YNCH	XNR	WTN	ELMIN	SSTA	
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST	

\*SECND 3.000

3.00	3.17	2406.17	.00	2406.00	2406.55	.38	.00	.00	2407.00	
572.	0.	572.	0.	0.	115.	0.	0.	0.	2407.00	
.00	.00	4.97	.00	.040	.040	.040	.000	2403.00	24.91	
.011432	0.	0.	0.	0	0	5	.00	81.84	106.75	

\*SECND 2.000

2.00	3.10	2407.90	.00	.00	2408.10	.19	1.54	.00	2409.00	
555.	0.	555.	0.	0.	157.	0.	1.	0.	2409.20	
.02	.00	3.54	.00	.040	.040	.040	.000	2404.80	60.99	
.003929	280.	245.	220.	4	0	0	.00	83.27	144.26	

\*SECND 1.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL

3693 PROBABLE MINIMUM SPECIFIC ENERGY

3720 CRITICAL DEPTH ASSUMED

1.00	2.76	2410.51	2410.51	.00	2411.38	.86	2.12	.00	2415.00	
555.	0.	555.	0.	0.	74.	0.	2.	1.	2412.20	
.03	.00	7.46	.00	.040	.040	.040	.000	2407.75	107.87	
.020158	365.	280.	230.	20	11	0	.00	43.69	151.56	

THIS RUN EXECUTED 01/01/80 01:24:01

\*\*\*\*\*  
 MEC2 RELEASE DATED NOV 76 UPDATED MAY 1984  
 ERROR CORR - 01,02,03,04,05,06  
 MODIFICATION - 50,51,52,53,54,55,56  
 IBM-PC-XT VERSION 1.1  
 \*\*\*\*\*

NOTE- ASTERISK (\*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

SUBCRITICAL (D.A. "A")

SUMMARY PRINTOUT

SECNO	CWSEL	CRWS	EG	TOPWID	10K*S	DEPTH	HV	HL	K*CHSL	ALPHA	Q
3.000	2406.17	.00	2406.55	81.84	114.32	3.17	.38	.00	.00	1.00	572.00
2.000	2407.90	.00	2408.10	83.27	39.29	3.10	.19	1.54	7.35	1.00	555.00
* 1.000	2410.51	2410.51	2411.38	43.69	201.58	2.76	.86	2.12	10.54	1.00	555.00

SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECND= 1.000 PROFILE= 1 CRITICAL DEPTH ASSUMED  
CAUTION SECND= 1.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY  
CAUTION SECND= 1.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

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*****
* WATER SURFACE PROFILES *
* VERSION OF NOVEMBER 1976 *
* UPDATED MAY 1984 *
* IBM-PC-XT VERSION *
* RUN DATE 02/04/82 TIME 12:54:21 *
*****

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*****
* U.S. ARMY CORPS OF ENGINEERS *
* THE HYDROLOGIC ENGINEERING CENTER *
* 609 SECOND STREET, SUITE D *
* DAVIS, CALIFORNIA 95616 *
* (916) 440-2105 (FTS) 448-2105 *
*****

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X   X XXXXXXXX XXXXX XXXXX
X   X X      X   X   X   X
X   X X      X           X
XXXXXXXX XXXX   X       XXXXX XXXXX
X   X X      X           X
X   X X      X   X   X   X
X   X XXXXXXXX XXXXX XXXXXXXX

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DRAINAGE AREA "A"  
EXISTING - SUPERCRITICAL

THIS RUN EXECUTED 02/04/82 12:54:44

\*\*\*\*\*  
 HEC2 RELEASE DATED NOV 76 UPDATED MAY 1984  
 ERROR CORR - 01,02,03,04,05,06  
 MODIFICATION - 50,51,52,53,54,55,56  
 IBM-PC-XT VERSION 1.1  
 \*\*\*\*\*

T1 SAN JOAQUIN ESTATES - SUPERCRITICAL  
 T2 100 YEAR EVENT  
 T3 SUPERCRITICAL (D.A. "A")

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FD
	0.	2.	0.	1.	.011500	.00	.0	572.	2408.500	.000.
J2	NPROF	IPLDT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRADE
	-1.000	1.000	.000	.000	.000	.000	.000	.000	.000	.000
J3	VARIABLE CODES FOR SUMMARY PRINTOUT									
	38.000	1.000	2.000	3.000	4.000	5.000	8.000	10.000	11.000	33.000
	57.000	43.000	.000	.000	.000	.000	.000	.000	.000	.000
NC	.040	.040	.040	.000	.000	.000	.000	.000	.000	.000
QT	1.000	555.000	.000	.000	.000	.000	.000	.000	.000	.000
X1	1.000	12.000	.000	184.000	365.000	230.000	280.000	.000	.000	.000
GR	2415.000	.000	2414.000	35.000	2413.000	65.000	2412.000	95.000	2411.000	103.000
GR	2410.000	113.000	2408.000	128.000	2407.750	136.000	2408.000	144.000	2410.000	149.000
GR	2412.000	159.000	2412.200	184.000	.000	.000	.000	.000	.000	.000
X1	2.000	7.000	.000	215.000	280.000	220.000	245.000	.000	.000	.000
GR	2409.000	.000	2408.000	60.000	2406.000	80.000	2404.800	110.000	2406.000	130.000
GR	2408.000	145.000	2409.200	215.000	.000	.000	.000	.000	.000	.000
QT	1.000	572.000	.000	.000	.000	.000	.000	.000	.000	.000
X1	3.000	7.000	.000	130.000	.000	.000	.000	.000	.000	.000
GR	2407.000	.000	2406.000	30.000	2404.000	70.000	2403.000	80.000	2404.000	90.000
GR	2406.000	102.000	2407.000	130.000	.000	.000	.000	.000	.000	.000
EJ	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

\*PROF 1

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	DLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VRDB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICDNT	CORAR	TOPWID	ENDST

\*SECNO 1.000

3720 CRITICAL DEPTH ASSUMED

1.00	2.76	2410.51	2410.51	2408.50	2411.38	.87	.00	.00	2415.00
555.	0.	555.	0.	0.	74.	0.	0.	0.	2412.20
.00	.00	7.47	.00	.040	.040	.040	.000	2407.75	107.90
.020255	0.	0.	0.	0	23	5	.00	43.65	151.55

\*SECNO 2.000

3685 20 TRIALS ATTEMPTED WSEL,CWSEL

3693 PROBABLE MINIMUM SPECIFIC ENERGY

3720 CRITICAL DEPTH ASSUMED

2.00	2.15	2406.95	2406.95	.00	2407.61	.66	5.92	3.52	2409.00
555.	0.	555.	0.	0.	85.	0.	1.	0.	2409.20
.01	.00	6.50	.00	.040	.040	.040	.000	2404.80	70.51
.022050	365.	280.	230.	20	15	0	.00	66.61	137.12

\*SECNO 3.000

3685 20 TRIALS ATTEMPTED WSEL,CWSEL

3693 PROBABLE MINIMUM SPECIFIC ENERGY

3720 CRITICAL DEPTH ASSUMED

3.00	2.78	2405.78	2405.78	.00	2406.45	.67	5.40	3.65	2407.00
572.	0.	572.	0.	0.	87.	0.	1.	1.	2407.00
.02	.00	6.58	.00	.040	.040	.040	.000	2403.00	34.36
.022015	280.	245.	220.	20	11	0	.00	66.33	100.69



THIS RUN EXECUTED 02/04/82 12:58:32

\*\*\*\*\*  
 HEC2 RELEASE DATED NOV 76 UPDATED MAY 1984  
 ERROR CORR - 01,02,03,04,05,06  
 MODIFICATION - 50,51,52,53,54,55,56  
 IBM-PC-XT VERSION 1.1  
 \*\*\*\*\*

NOTE- ASTERISK (\*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

SUPERCritical (D.A. "A")

SUMMARY PRINTOUT

	SECNO	CWSEL	CRIWS	EG	TOPWID	10K*G	DEPTH	HV	HL	K*CHSL	ALPHA	Q
*	1.000	2410.51	2410.51	2411.38	43.65	202.55	2.76	.87	.00	.00	1.00	555.00
*	2.000	2406.95	2406.95	2407.61	66.61	220.90	2.15	.66	5.92	-10.54	1.00	555.00
*	3.000	2405.78	2405.78	2406.45	66.33	220.15	2.78	.67	5.40	-7.35	1.00	572.00

SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 1.000 PROFILE= 1 CRITICAL DEPTH ASSUMED  
CAUTION SECNO= 2.000 PROFILE= 1 CRITICAL DEPTH ASSUMED  
CAUTION SECNO= 2.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY  
CAUTION SECNO= 2.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL  
  
CAUTION SECNO= 3.000 PROFILE= 1 CRITICAL DEPTH ASSUMED  
CAUTION SECNO= 3.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY  
CAUTION SECNO= 3.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

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*****
* WATER SURFACE PROFILES *
* VERSION OF NOVEMBER 1976 *
* UPDATED MAY 1984 *
* IBM-PC-XT VERSION *
* RUN DATE 01/01/80 TIME 01:58:37 *
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*****
* U.S. ARMY CORPS OF ENGINEERS *
* THE HYDROLOGIC ENGINEERING CENTER *
* 609 SECOND STREET, SUITE D *
* DAVIS, CALIFORNIA 95616 *
* (916) 440-2105 (FTS) 448-2105 *
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X X X X X X
X X X X X X
X X XXXXXX XXXX XXXXXX

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DRAINAGE AREA "D AND G"

EXISTING - SUBCRITICAL



QT	1.000	128.000	.000	.000	.000	.000	.000	.000	.000	.000
X1	1.000	9.000	.000	165.000	220.000	200.000	210.000	.000	.000	.000
GR	2402.100	.000	2402.000	25.000	2400.000	50.000	2399.520	65.000	2400.000	80.000
GR	2402.000	100.000	2402.300	118.000	2402.000	142.000	2402.300	165.000	.000	.000
EJ	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

\*PRDF 1

SECNO	DEPTH	CWSEL	CRIMS	WSELK	EG	HV	HL	QLOSS	BANK ELEV
B	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICDNT	CORAR	TOPWID	ENDST

\*SECNO 5.000

3265 DIVIDED FLOW

5.00	.66	2390.48	.00	2390.20	2390.57	.09	.00	.00	2391.00
224.	0.	224.	0.	0.	92.	0.	0.	0.	2390.60
.00	.00	2.43	.00	.040	.040	.040	.000	2389.82	26.06
.016018	0.	0.	0.	0	0	7	.00	248.98	287.78

\*SECNO 4.000

4.00	1.33	2392.33	.00	.00	2392.40	.07	1.83	.00	2394.60
224.	0.	224.	0.	0.	107.	0.	0.	1.	2393.00
.02	.00	2.10	.00	.040	.040	.040	.000	2391.00	79.72
.008593	105.	160.	230.	6	0	0	.00	224.14	303.85

\*SECNO 3.000

3265 DIVIDED FLOW

3685 20 TRIALS ATTEMPTED WSEL,CWSEL  
 3693 PROBABLE MINIMUM SPECIFIC ENERGY  
 3720 CRITICAL DEPTH ASSUMED

3.00	1.21	2394.51	2394.51	.00	2394.77	.26	.00	.00	2396.50
197.	0.	197.	0.	0.	48.	0.	0.	1.	2396.75
.02	.00	4.08	.00	.040	.040	.040	.000	2393.30	114.66
.030493	0.	0.	0.	20	15	0	.00	96.70	239.43

\*SECNO 2.000

2.00	1.62	2397.62	.00	.00	2397.84	.22	3.07	.00	2398.70
155.	0.	155.	0.	0.	42.	0.	1.	1.	2398.40
.03	.00	3.72	.00	.040	.040	.040	.000	2396.00	62.19
.011395	100.	165.	295.	4	0	0	.00	45.66	107.84

\*SECNO 1.000

1.00	1.11	2400.63	.00	.00	2400.90	.27	3.06	.00	2402.10
128.	0.	128.	0.	0.	31.	0.	1.	1.	2402.30
.05	.00	4.17	.00	.040	.040	.040	.000	2399.52	42.10
.020611	220.	210.	200.	4	0	0	.00	44.23	86.32

PROFILE FOR STREAM SUBCRITICAL (D.A. "D AND

PLOTTED POINTS (BY PRIORITY)-E-ENERGY, W-WATER SURFACE, I-INVERT, C-CRITICAL W.S., L-LEFT BANK, R-RIGHT BANK, M-LOWER END STA

ELEVATION	2388.	2390.	2392.	2394.	2396.	2398.	2400.	2402.	2404.	2406.
SECD	CUMDIS									
5.00	0. C	I. WE L	.	.	.	.	.	.	.	.
	20. C	I ER L	.	.	.	.	.	.	.	.
	40. C	.I ER L	.	.	.	.	.	.	.	.
	60. C	.I ER L	.	.	.	.	.	.	.	.
	80. C	.I ER L	.	.	.	.	.	.	.	.
	100. C	.I WE R L	.	.	.	.	.	.	.	.
	120. C	.I WE R L	.	.	.	.	.	.	.	.
	140. C	.I ER L	.	.	.	.	.	.	.	.
4.00	160. C	.I ER L	.	.	.	.	.	.	.	.
3.00	180. .	.	I. WE	LR	.	.	.	.	.	.
	200. C	.	I. WE	LR	.	.	.	.	.	.
	220. C	.	I WE	LR	.	.	.	.	.	.
	240. C	.	.I WE	ML	.	.	.	.	.	.
	260. C	.	.I WE	ML	.	.	.	.	.	.
	280. C	.	.I WE	ML	.	.	.	.	.	.
	300. C	.	.I WE	ML	.	.	.	.	.	.
	320. C	.	.I WE	RL	.	.	.	.	.	.
2.00	340. C	.	.I WE	RL	.	.	.	.	.	.
	360. C	.	.I WE	RL	.	.	.	.	.	.
	380. C	.	.I WE	RL	.	.	.	.	.	.
	400. C	.	.I WE	ML	.	.	.	.	.	.
	420. C	.	.I WE	RL	.	.	.	.	.	.
	440. C	.	.I WE	RL	.	.	.	.	.	.
	460. C	.	.I WE	L	.	.	.	.	.	.
	480. C	.	.I WE	ML	.	.	.	.	.	.
	500. C	.	.I WE	LR	.	.	.	.	.	.
	520. C	.	.I WE	LR	.	.	.	.	.	.
1.00	540. C	.	.I WE	LR	.	.	.	.	.	.

THIS RUN EXECUTED 01/01/80 02:05:58

\*\*\*\*\*  
 HEC2 RELEASE DATED NOV 76 UPDATED MAY 1984  
 ERROR CORR - 01,02,03,04,05,06  
 MODIFICATION - 50,51,52,53,54,55,56  
 IBM-PC-XT VERSION 1.1  
 \*\*\*\*\*

NOTE- ASTERISK (\*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

SUBCRITICAL (D.A. \*D AND

SUMMARY PRINTOUT

SECNO	CHSEL	CRWS	EB	TOPWID	10X*5	DEPTH	HV	HL	K*CHSL	ALPHA	Q
5.000	2390.48	.00	2390.57	248.98	160.18	.66	.09	.00	.00	1.00	224.00
4.000	2392.33	.00	2392.40	224.14	85.93	1.33	.07	1.83	7.37	1.00	224.00
* 3.000	2394.51	2394.51	2394.77	96.70	304.93	1.21	.26	.00	2300.05	1.00	197.00
2.000	2397.62	.00	2397.84	45.66	113.95	1.62	.22	3.07	16.36	1.00	155.00
1.000	2400.63	.00	2400.90	44.23	206.11	1.11	.27	3.06	16.76	1.00	128.00



SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 3.000 PROFILE= 1 CRITICAL DEPTH ASSUMED  
CAUTION SECNO= 3.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY  
CAUTION SECNO= 3.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE MSEL

\*\*\*\*\*  
\* WATER SURFACE PROFILES \*  
\* VERSION OF NOVEMBER 1976 \*  
\* UPDATED MAY 1984 \*  
\* IBM-PC-XT VERSION \*  
\* RUN DATE 01/01/80 TIME 02:20:46 \*  
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\*\*\*\*\*  
\* U.S. ARMY CORPS OF ENGINEERS \*  
\* THE HYDROLOGIC ENGINEERING CENTER \*  
\* 609 SECOND STREET, SUITE D \*  
\* DAVIS, CALIFORNIA 95616 \*  
\* (916) 440-2105 (FTS) 448-2105 \*  
\*\*\*\*\*

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X   X  XXXXXXXX  XXXXX          XXXXX
X   X  X        X   X          X   X
X   X  X        X                X
XXXXXXXX  XXXX  X          XXXXX  XXXXX
X   X  X        X                X
X   X  X        X   X          X
X   X  XXXXXXXX  XXXXX          XXXXXXXX

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DRAINAGE AREA "D AND G"  
EXISTING - SUPERCRITICAL





SECNO	DEPTH	CWSEL	CRIMS	WSELK	EG	HV	HL	LOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTH	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

#SECNO 1.000

3720 CRITICAL DEPTH ASSUMED

1.00	1.04	2400.56	2400.56	2400.20	2400.90	.33	.00	.00	2402.10
128.	0.	128.	0.	0.	28.	0.	0.	0.	2402.30
.00	.00	4.63	.00	.040	.040	.040	.000	2399.52	42.96
.027729	0.	0.	0.	0	14	5	.00	42.67	85.63

#SECNO 2.000

3685 20 TRIALS ATTEMPTED WSEL,CWSEL  
 3693 PROBABLE MINIMUM SPECIFIC ENERGY  
 3720 CRITICAL DEPTH ASSUMED

2.00	1.35	2397.35	2397.35	.00	2397.75	.40	5.63	.15	2398.70
155.	0.	155.	0.	0.	31.	0.	0.	0.	2398.40
.01	.00	5.06	.00	.040	.040	.040	.000	2396.00	66.97
.026069	220.	210.	200.	20	11	0	.00	39.43	106.40

#SECNO 3.000

3265 DIVIDED FLOW

3685 20 TRIALS ATTEMPTED WSEL,CWSEL  
 3693 PROBABLE MINIMUM SPECIFIC ENERGY  
 3720 CRITICAL DEPTH ASSUMED

3.00	1.21	2394.51	2394.51	.00	2394.77	.26	4.69	3.75	2396.50
197.	0.	197.	0.	0.	48.	0.	0.	0.	2396.75
.02	.00	4.08	.00	.040	.040	.040	.000	2393.30	114.66
.030493	100.	165.	295.	20	15	0	.00	96.70	239.43

#SECNO 4.000

3265 DIVIDED FLOW

3685 20 TRIALS ATTEMPTED WSEL,CWSEL  
 3710 WSEL ASSUMED BASED ON MIN DIFF

4.00	.95	2391.95	2392.15	.00	2392.53	.58	.00	.00	2394.60
224.	0.	224.	0.	0.	37.	0.	0.	0.	2393.00
.02	.00	6.13	.00	.040	.040	.040	.000	2391.00	132.19
.121913	0.	0.	0.	20	10	0	.00	112.31	276.79

SECNO	DEPTH	CWSEL	CRIMS	WSELK	EG	HV	HL	QLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	IDCNT	CDRAR	TOPWID	ENDST

\*SECNO 5.000

3265 DIVIDED FLOW

3685 20 TRIALS ATTEMPTED WSEL, CWSEL  
 3693 PROBABLE MINIMUM SPECIFIC ENERGY  
 3720 CRITICAL DEPTH ASSUMED

5.00	.57	2390.39	2390.39	.00	2390.55	.16	9.66	12.00	2391.00
224.	0.	224.	0.	0.	71.	0.	0.	1.	2390.60
.04	.00	3.17	.00	.040	.040	.040	.000	2389.82	30.57
.035955	105.	160.	230.	20	14	0	.00	233.36	286.12

PROFILE FOR STREAM SUPERCRITICAL (D.A. "D A

PLOTTED POINTS (BY PRIORITY)-E-ENERGY, W-WATER SURFACE, I-INVERT, C-CRITICAL W.S., L-LEFT BANK, R-RIGHT BANK, M-LOWER END STA

ELEVATION	2388.	2390.	2392.	2394.	2396.	2398.	2400.	2402.	2404.	2406.
SECNO	CONDIS									
1.00	0.	.	.	.	.	.	.	I . WE	.LR	.
	20.	.	.	.	.	.	.	I . WE	LR	.
	40.	.	.	.	.	.	.	I WE	LR.	.
	60.	.	.	.	.	.	.	I WE	ML	.
	80.	.	.	.	.	.	.	I WE	ML	.
	100.	.	.	.	.	.	.	I WE	L	.
	120.	.	.	.	.	.	.	I WE	RL	.
	140.	.	.	.	.	.	.	I WE	RL.	.
	160.	.	.	.	.	.	.	I WE	MRL.	.
	180.	.	.	.	.	.	.	I WE	RL	.
	200.	.	.	.	.	.	.	I WE	RL	.
2.00	220.	.	.	.	.	.	.	I WE	RL	.
	240.	.	.	.	.	.	.	I WE	RL	.
	260.	.	.	.	.	.	.	I WE	RL	.
	280.	.	.	.	.	.	.	I WE	L.	.
	300.	.	.	.	.	.	.	I WE	ML.	.
	320.	.	.	.	.	.	.	I WE	ML	.
	340.	.	.	.	.	.	.	I WE	ML	.
	360.	.	.	.	.	.	.	I WE	LR	.
3.00	380.	.	.	.	.	.	.	I WE	LR	.
4.00	400.	.	.	I WCE R	.	L	.	.	.	.
	420.	.	.	I WCE R	.	L	.	.	.	.
	440.	.	.	I WCE R	.	L	.	.	.	.
	460.	.	.	I WE R	.	L	.	.	.	.
	480.	.	.	I WE R	.	L	.	.	.	.
	500.	.	.	I WE R	.	L	.	.	.	.
	520.	.	.	I WE R	.	L	.	.	.	.
5.00	540.	.	.	I WE L	.	.	.	.	.	.

THIS RUN EXECUTED 01/01/80 02:28:40

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HEC2 RELEASE DATED NOV 76 UPDATED MAY 1984
ERROR CORR - 01,02,03,04,05,06
MODIFICATION - 50,51,52,53,54,55,56
IBM-PC-XT VERSION 1.1
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NOTE- ASTERISK (\*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

SUPERCritical (D.A. "D A

SUMMARY PRINTOUT

	SECNO	CWSEL	CRWS	EG	TOPWID	10K*S	DEPTH	HV	HL	K*CHSL	ALPHA	Q
*	1.000	2400.56	2400.56	2400.90	42.67	277.29	1.04	.33	.00	.00	1.00	128.00
*	2.000	2397.35	2397.35	2397.75	39.43	260.69	1.35	.40	5.63	-16.76	1.00	155.00
*	3.000	2394.51	2394.51	2394.77	96.70	304.93	1.21	.26	4.69	-16.36	1.00	197.00
*	4.000	2391.95	2392.15	2392.53	112.31	1219.13	.95	.58	.00	-2300.05	1.00	224.00
*	5.000	2390.39	2390.39	2390.55	233.36	359.55	.57	.16	9.66	-7.37	1.00	224.00



## SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION	SECNO=	1.000	PROFILE= 1	CRITICAL DEPTH ASSUMED
CAUTION	SECNO=	2.000	PROFILE= 1	CRITICAL DEPTH ASSUMED
CAUTION	SECNO=	2.000	PROFILE= 1	PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION	SECNO=	2.000	PROFILE= 1	20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION	SECNO=	3.000	PROFILE= 1	CRITICAL DEPTH ASSUMED
CAUTION	SECNO=	3.000	PROFILE= 1	PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION	SECNO=	3.000	PROFILE= 1	20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION	SECNO=	4.000	PROFILE= 1	WSEL ASSUMED BASED ON MIN DIFF
CAUTION	SECNO=	4.000	PROFILE= 1	20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION	SECNO=	5.000	PROFILE= 1	CRITICAL DEPTH ASSUMED
CAUTION	SECNO=	5.000	PROFILE= 1	PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION	SECNO=	5.000	PROFILE= 1	20 TRIALS ATTEMPTED TO BALANCE WSEL

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*****
* WATER SURFACE PROFILES *
* VERSION OF NOVEMBER 1976 *
* UPDATED MAY 1984 *
* IBM-PC-XT VERSION *
* RUN DATE 02/26/82 TIME 15:59:09 *
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*****
* U.S. ARMY CORPS OF ENGINEERS *
* THE HYDROLOGIC ENGINEERING CENTER *
* 609 SECOND STREET, SUITE D *
* DAVIS, CALIFORNIA 95616 *
* (916) 440-2105 (FTS) 448-2105 *
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X X X X X
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DRAINAGE AREA "C"

EXISTING - SUBCRITICAL

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 HEC2 RELEASE DATED NOV 76 UPDATED MAY 1984  
 ERROR CORR - 01,02,03,04,05,06  
 MODIFICATION - 50,51,52,53,54,55,56  
 IBM-PC-XT VERSION 1.1  
 \*\*\*\*\*

T1 SAN JOAQUIN ESTATES - SUBCRITICAL  
 T2 100 YEAR EVENT  
 T3 \*D\*-EXIST.SUBCRIT

J1	ICHECK	IND	NINW	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0.	2.	0.	0.	.012700	.00	.0	402.	2403.500	.000

J2	NPROF	IPL0T	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	-1.000	1.000	.000	.000	.000	.000	.000	.000	.000	.000

J3 VARIABLE CODES FOR SUMMARY PRINTOUT

38.000	1.000	2.000	3.000	4.000	5.000	8.000	10.000	11.000	33.000
57.000	43.000	.000	.000	.000	.000	.000	.000	.000	.000

NC	.025	.025	.025	.000	.000	.000	.000	.000	.000	.000
QT	1.000	402.000	.000	.000	.000	.000	.000	.000	.000	.000
X1	4.000	14.000	119.000	234.000	.000	.000	.000	.000	.000	.000
GR	2405.100	.000	2405.930	10.000	2405.210	50.000	2405.520	83.000	2404.840	119.000
GR	2404.200	177.000	2402.710	183.000	2404.340	224.000	2404.400	234.000	2404.620	284.000
GR	2404.100	334.000	2402.750	384.000	2403.400	459.000	2404.100	519.000	.000	.000
X1	3.000	19.000	120.000	295.000	45.000	45.000	45.000	.000	.000	.000
GR	2407.400	.000	2408.180	19.000	2406.740	41.000	2406.910	63.000	2406.480	87.000
GR	2405.000	104.000	2405.850	120.000	2403.960	178.000	2404.600	185.000	2403.290	232.000
GR	2404.600	238.000	2404.900	282.000	2405.000	295.000	2404.430	345.000	2403.760	395.000
GR	2403.800	445.000	2403.750	480.000	2404.140	530.000	2404.500	550.000	.000	.000
X1	2.000	18.000	152.000	238.000	40.000	40.000	40.000	.000	.000	.000
GR	2407.700	.000	2407.500	24.000	2407.060	49.000	2407.680	65.000	2406.030	83.000
GR	2405.900	96.000	2405.720	115.000	2405.100	142.000	2404.760	152.000	2404.450	175.000
GR	2403.800	200.000	2405.510	238.000	2405.740	258.000	2405.060	308.000	2404.640	358.000
GR	2403.800	408.000	2404.540	443.000	2404.980	493.000	.000	.000	.000	.000
X1	1.000	14.000	93.000	175.000	35.000	35.000	35.000	.000	.000	.000
GR	2405.700	.000	2405.220	44.000	2405.600	58.000	2405.220	70.000	2405.180	93.000
GR	2404.900	118.000	2404.240	140.000	2405.280	158.000	2405.780	175.000	2405.400	225.000
GR	2404.800	275.000	2404.800	325.000	2404.880	360.000	2404.900	410.000	.000	.000
EJ	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

\*PROF 1

SECNO	DEPTH	CMSL	CRMS	WSELK	EG	HV	HL	LOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XLN	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

\*SECNO 4.000

3265 DIVIDED FLOW

3720 CRITICAL DEPTH ASSUMED

4.00	1.08	2403.79	2403.79	2403.50	2404.06	.27	.00	.00	2404.84
402.	0.	66.	336.	0.	17.	79.	0.	0.	2404.40
.00	.00	3.90	4.25	.025	.025	.025	.000	2402.71	178.66
.009913	0.	0.	0.	0	11	0	.00	177.86	492.14

\*SECNO 3.000

3265 DIVIDED FLOW

7185 MINIMUM SPECIFIC ENERGY

3720 CRITICAL DEPTH ASSUMED

3.00	1.06	2404.35	2404.35	.00	2404.56	.22	.48	.00	2405.85
402.	0.	92.	310.	0.	26.	82.	0.	0.	2405.00
.00	.00	3.60	3.79	.025	.025	.025	.000	2403.29	166.18
.011142	46.	46.	46.	2	8	0	.00	248.80	541.40

\*SECNO 2.000

3265 DIVIDED FLOW

7185 MINIMUM SPECIFIC ENERGY

3720 CRITICAL DEPTH ASSUMED

2.00	1.08	2404.88	2404.88	.00	2405.11	.23	.40	.00	2404.76
402.	0.	135.	266.	0.	37.	67.	0.	0.	2405.61
.01	.85	3.67	3.96	.025	.025	.025	.000	2403.80	148.58
.009036	40.	40.	40.	2	5	0	.00	225.34	481.21

\*SECNO 1.000

3265 DIVIDED FLOW

3280 CROSS SECTION 1.00 EXTENDED .43 FEET

7185 MINIMUM SPECIFIC ENERGY

SECNO	DEPTH	CASEL	CRWS	WSELK	EG	HV	HL	QLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CDRAR	TOPWID	ENDST

3720 CRITICAL DEPTH ASSUMED

1.00	1.09	2405.33	2405.33	.00	2405.55	.23	.35	.00	2405.18
402.	5.	136.	261.	3.	34.	70.	0.	1.	2406.78
.01	1.54	4.01	3.75	.025	.025	.025	.000	2404.24	69.07
.010888	35.	35.	35.	0	5	0	.00	240.94	410.00



CROSS SECTION 3.00  
 STREAM "D"-EXIST.SUBCRIT  
 DISCHARGE= 402.

PLOTTED POINTS (BY PRIORITY)-B=BOTTOM BRIDGE,T=TOP BRIDGE,X=GROUND,W=WATER SUR,E=ENERGY GRADIENT,C=CRITICAL WSEL

ELEV 2403. 2404. 2405. 2406. 2407. 2408. 2409. 2410. 2411. 2412. 2413.

STA-FEET	2403.	2404.	2405.	2406.	2407.	2408.	2409.	2410.	2411.	2412.	2413.
2 0.						X					
10.						X					
3 20.								X			
30.						X					
4 40.					X						
50.					X						
5 60.					X						
70.					X						
80.					X						
6 90.					X						
7 100.				X							
110.				X							
8 120.				X							BANK.
130.			X								
140.			X								
150.		X									
160.		XE									
170.		XW E									
10 180.		XXXXXX									
190.		X E									
200.		X W E									
210.	X	W E									
220.	X	W E									
11 230.	X	W E									
12 240.		X									
250.		X									
260.		X									
270.		X									
13 280.		X									
14 290.		X									BANK.
300.		X									
310.		X									
320.		X									
330.		XE									
15 340.		X E									
350.		X E									
360.		XW E									
370.		X W E									
380.		X W E									
16 390.		X W E									
400.		X W E									
410.		X W E									
420.		X W E									
430.		X W E									
17 440.		X W E									
450.		X W E									
460.		X W E									
470.		X W E									
18 480.		X W E									
490.		X W E									
500.		X W E									
510.		X W E									
520.		X W E									
19 530.		X W E									
540.		X E									
20 550.		XE									

NRD= 0 ELLC= 9999999.00 ELTRD= 9999999.00

EL (I), STA (I)	2403.	2404.	2405.	2406.	2407.	2408.	2409.	2410.	2411.	2412.	2413.
2407.40	.00	2408.18	19.00	2406.74	41.00	2406.91	63.00	2406.48	87.00		
2406.00	104.00	2405.85	120.00	2403.96	178.00	2404.60	185.00	2403.29	232.00		
2404.60	238.00	2404.90	282.00	2405.00	295.00	2404.43	345.00	2403.76	395.00		
2403.80	445.00	2403.76	480.00	2404.14	530.00	2404.50	550.00				

CROSS SECTION 4.00  
 STREAM "D"-EXIST.SUBCRIT  
 DISCHARGE= 402.

PLOTTED POINTS (BY PRIORITY)-B=BOTTOM BRIDGE.T=TOP BRIDGE.X=GROUND.W=WATER SUR.E=ENERGY GRADIENT.C=CRITICAL WSEL

ELEV	2402.	2403.	2404.	2405.	2406.	2407.	2408.	2409.	2410.	2411.	2412.
STA-FEET											
2	0.	.	.	.	.X	.	.	.	.	.	.
3	10.	.	.	.	.	.X.	.	.	.	.	.
	20.	.	.	.	.	.X.	.	.	.	.	.
	30.	.	.	.	.	.X	.	.	.	.	.
	40.	.	.	.	.	.X	.	.	.	.	.
	50.	.	.	.	.	.X	.	.	.	.	.
4	60.	.	.	.	.X	.	.	.	.	.	.
	70.	.	.	.	.X.	.	.	.	.	.	.
5	80.	.	.	.	.X	.	.	.	.	.	.
	90.	.	.	.	.X	.	.	.	.	.	.
	100.	.	.	.	.X	.	.	.	.	.	.
	110.	.	.	.	.X	.	.	.	.	.	.
6	120.	.	.	.X	.	.	.	.	.	.	BANK.
	130.	.	.	.X	.	.	.	.	.	.	.
	140.	.	.	.X	.	.	.	.	.	.	.
	150.	.	.	.X	.	.	.	.	.	.	.
	160.	.	.	.X	.	.	.	.	.	.	.
	170.	.	.	.X	.	.	.	.	.	.	.
8	180.	XXXXXXXXXXXXXXXXXX									
	190.	.X	W.E	.	.	.	.	.	.	.	.
	200.	.X	W.E	.	.	.	.	.	.	.	.
	210.	.	X.E	.	.	.	.	.	.	.	.
9	220.	.	.X	.	.	.	.	.	.	.	BANK.
10	230.	.	.X	.	.	.	.	.	.	.	BANK.
	240.	.	.X	.	.	.	.	.	.	.	.
	250.	.	.X	.	.	.	.	.	.	.	.
	260.	.	.X	.	.	.	.	.	.	.	.
	270.	.	.X	.	.	.	.	.	.	.	.
11	280.	.	.X	.	.	.	.	.	.	.	.
	290.	.	.X	.	.	.	.	.	.	.	.
	300.	.	.X	.	.	.	.	.	.	.	.
	310.	.	.X	.	.	.	.	.	.	.	.
	320.	.	.X	.	.	.	.	.	.	.	.
12	330.	.	.X	.	.	.	.	.	.	.	.
	340.	.	X.E	.	.	.	.	.	.	.	.
	350.	.	X.W.E	.	.	.	.	.	.	.	.
	360.	.X	W.E	.	.	.	.	.	.	.	.
	370.	.X	W.E	.	.	.	.	.	.	.	.
13	380.	.X	W.E	.	.	.	.	.	.	.	.
	390.	.X	W.E	.	.	.	.	.	.	.	.
	400.	.X	W.E	.	.	.	.	.	.	.	.
	410.	.X	W.E	.	.	.	.	.	.	.	.
	420.	.X	W.E	.	.	.	.	.	.	.	.
	430.	.X	W.E	.	.	.	.	.	.	.	.
	440.	.X	W.E	.	.	.	.	.	.	.	.
	450.	.X	W.E	.	.	.	.	.	.	.	.
14	460.	.X	W.E	.	.	.	.	.	.	.	.
	470.	.X	W.E	.	.	.	.	.	.	.	.
	480.	.X	W.E	.	.	.	.	.	.	.	.
	490.	.	X.E	.	.	.	.	.	.	.	.
	500.	.	X.E	.	.	.	.	.	.	.	.
	510.	.	XE	.	.	.	.	.	.	.	.
15	520.	.	.X	.	.	.	.	.	.	.	.

NRD= 0 ELLC= 9999999.00 ELTRD= 9999999.00

EL(I).STA(I)									
2406.10	.00	2406.93	10.00	2406.21	60.00	2405.52	83.00	2404.84	119.00
2404.20	177.00	2402.71	183.00	2404.34	224.00	2404.40	234.00	2404.62	284.00
2404.10	334.00	2402.75	384.00	2403.40	459.00	2404.10	519.00		





THIS RUN EXECUTED 02/26/82 16:06:49

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*****  
HEC2 RELEASE DATED NOV 76 UPDATED MAY 1984  
ERROR CORR - 01,02,03,04,05,06  
MODIFICATION - 50,51,52,53,54,55,56  
IBM-PC-XT VERSION 1.1  
*****
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NOTE- ASTERISK (\*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

"D"-EXIST.SUBCRIT

## SUMMARY PRINTOUT

	SECNO	CWSEL	CRIMS	EG	TOPWID	10K*S	DEPTH	HV	HL	K*CHSL	ALPHA	Q
*	4.000	2403.79	2403.79	2404.06	177.86	99.13	1.08	.27	.00	.00	1.00	402.00
*	3.000	2404.35	2404.35	2404.56	248.80	111.42	1.06	.22	.48	12.61	1.00	402.00
*	2.000	2404.88	2404.88	2405.11	225.34	90.36	1.08	.23	.40	12.75	1.01	402.00
*	1.000	2405.33	2405.33	2405.55	240.94	108.88	1.09	.23	.35	12.57	1.03	402.00

SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 4.000 PROFILE= 1 CRITICAL DEPTH ASSUMED  
CAUTION SECNO= 3.000 PROFILE= 1 CRITICAL DEPTH ASSUMED  
CAUTION SECNO= 3.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY  
CAUTION SECNO= 2.000 PROFILE= 1 CRITICAL DEPTH ASSUMED  
CAUTION SECNO= 2.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY  
CAUTION SECNO= 1.000 PROFILE= 1 CRITICAL DEPTH ASSUMED  
CAUTION SECNO= 1.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

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*****
* WATER SURFACE PROFILES *
* VERSION OF NOVEMBER 1976 *
* UPDATED MAY 1984 *
* IBM-PC-XT VERSION *
* RUN DATE 02/26/82 TIME 16:21:02 *
*****

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*****
* U.S. ARMY CORPS OF ENGINEERS *
* THE HYDROLOGIC ENGINEERING CENTER *
* 609 SECOND STREET, SUITE D *
* DAVIS, CALIFORNIA 95616 *
* (916) 440-2105 (FTS) 448-2105 *
*****

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X X XXXXXXX XXXX XXXX
X X X X X X X
X X X X X X
XXXXXXXX XXXX X XXXX XXXX
X X X X X X
X X X X X X
X X XXXXXXX XXXX XXXXXXX

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DRAINAGE AREA "C"  
EXISTING - SUPERCRITICAL

THIS RUN EXECUTED 02/26/82 16:21:24

\*\*\*\*\*  
 HEC2 RELEASE DATED NOV 76 UPDATED MAY 1984  
 ERROR CORR - 01,02,03,04,05,06  
 MODIFICATION - 50,51,52,53,54,55,56  
 IBM-PC-XT VERSION 1.1  
 \*\*\*\*\*

T1 SAN JOAQUIN ESTATES - SUPERCRITICAL  
 T2 100 YEAR EVENT  
 T3 "D"-EXIST.SUPERCRIT

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FD
	0.	2.	0.	1.	.012700	.00	.0	402.	2405.400	.000

J2	NPROF	IPLDT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	-1.000	1.000	.000	.000	.000	.000	.000	.000	.000	.000

J3 VARIABLE CODES FOR SUMMARY PRINTOUT

	38.000	1.000	2.000	3.000	4.000	5.000	8.000	10.000	11.000	33.000
	57.000	43.000	.000	.000	.000	.000	.000	.000	.000	.000

NC	.025	.025	.025	.000	.000	.000	.000	.000	.000	.000
QT	1.000	402.000	.000	.000	.000	.000	.000	.000	.000	.000
X1	1.000	14.000	93.000	175.000	35.000	35.000	35.000	.000	.000	.000
GR	2406.700	.000	2406.220	44.000	2406.600	58.000	2405.220	70.000	2405.160	93.000
GR	2404.900	118.000	2404.240	140.000	2405.280	158.000	2406.780	175.000	2406.400	225.000
GR	2404.800	275.000	2404.800	325.000	2404.880	360.000	2404.900	410.000	.000	.000
X1	2.000	18.000	152.000	238.000	40.000	40.000	40.000	.000	.000	.000
GR	2407.700	.000	2407.500	24.000	2407.060	49.000	2407.680	65.000	2406.030	83.000
GR	2405.900	96.000	2405.720	115.000	2405.100	142.000	2404.760	152.000	2404.460	175.000
GR	2403.800	200.000	2405.610	238.000	2405.740	258.000	2405.060	308.000	2404.640	358.000
GR	2403.800	408.000	2404.540	443.000	2404.980	493.000	.000	.000	.000	.000
X1	3.000	19.000	120.000	295.000	46.000	46.000	46.000	.000	.000	.000
GR	2407.400	.000	2408.180	19.000	2406.740	41.000	2406.910	63.000	2406.480	87.000
GR	2406.000	104.000	2405.850	120.000	2403.960	178.000	2404.600	185.000	2403.290	232.000
GR	2404.600	238.000	2404.900	282.000	2405.000	295.000	2404.430	345.000	2403.760	395.000
GR	2403.800	445.000	2403.760	480.000	2404.140	530.000	2404.500	550.000	.000	.000
X1	4.000	14.000	119.000	234.000	.000	.000	.000	.000	.000	.000
GR	2406.100	.000	2406.930	10.000	2406.210	60.000	2405.520	83.000	2404.840	119.000
GR	2404.200	177.000	2402.710	183.000	2404.340	224.000	2404.400	234.000	2404.620	284.000
GR	2404.100	334.000	2402.760	384.000	2403.400	459.000	2404.100	519.000	.000	.000
EJ	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

\*PROF 1

SECNO	DEPTH	CWSEL	CRWS	WSELK	EG	HV	HL	DLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	YNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICDNT	CORAR	TOPWID	ENDST

\*SECNO 1.000

3265 DIVIDED FLOW

3280 CROSS SECTION 1.00 EXTENDED .41 FEET

1.00	1.07	2405.31	2405.34	2405.40	2405.56	.25	.00	.00	2405.18
402.	4.	138.	261.	2.	33.	66.	0.	0.	2406.78
.00	1.48	4.21	3.93	.025	.025	.025	.000	2404.24	69.25
.012677	0.	0.	0.	0	10	4	.00	239.84	410.00

\*SECNO 2.000

3265 DIVIDED FLOW

2.00	1.01	2404.81	2404.88	.00	2405.11	.30	.45	.00	2404.76
402.	0.	134.	268.	0.	33.	59.	0.	0.	2405.61
.00	.07	4.09	4.54	.025	.025	.025	.000	2403.80	150.28
.012791	35.	35.	35.	2	5	0	.00	208.96	474.63

\*SECNO 3.000

3265 DIVIDED FLOW

3.00	1.02	2404.31	2404.34	.00	2404.57	.26	.54	.00	2405.85
402.	0.	94.	308.	0.	23.	75.	0.	0.	2405.00
.00	.00	4.01	4.12	.025	.025	.025	.000	2403.29	167.33
.014414	40.	40.	40.	2	8	0	.00	240.82	539.32

\*SECNO 4.000

3265 DIVIDED FLOW

3685 20 TRIALS ATTEMPTED WSEL,CWSEL  
 3693 PROBABLE MINIMUM SPECIFIC ENERGY  
 3720 CRITICAL DEPTH ASSUMED

4.00	1.07	2403.78	2403.78	.00	2404.06	.28	.55	.34	2404.84
402.	0.	66.	336.	0.	17.	78.	0.	1.	2404.40
.01	.00	3.94	4.28	.025	.025	.025	.000	2402.71	178.68
.010136	46.	46.	46.	20	8	0	.00	177.19	491.76

THIS RUN EXECUTED 02/26/82 16:28:37

\*\*\*\*\*  
HEC2 RELEASE DATED NOV 76 UPDATED MAY 1984  
ERROR CORR - 01,02,03,04,05,06  
MODIFICATION - 50,51,52,53,54,55,56  
IBM-PC-XT VERSION 1.1  
\*\*\*\*\*

NOTE- ASTERISK (\*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

"D"-EXIST, SUPERCRIT

## SUMMARY PRINTOUT

SECD	CWSEL	CRWS	EG	TOPWID	10K#S	DEPTH	HV	HL	K*CHSL	ALPHA	Q
1.000	2405.31	2405.34	2405.56	239.84	126.77	1.07	.25	.00	.00	1.03	402.00
2.000	2404.81	2404.88	2405.11	208.96	127.91	1.01	.30	.45	-12.57	1.01	402.00
3.000	2404.31	2404.34	2404.57	240.82	144.14	1.02	.26	.54	-12.75	1.00	402.00
* 4.000	2403.78	2403.78	2404.06	177.19	101.36	1.07	.28	.55	-12.61	1.00	402.00

SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 4.000 PROFILE= 1 CRITICAL DEPTH ASSUMED  
CAUTION SECNO= 4.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY  
CAUTION SECNO= 4.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL



```

*****
* WATER SURFACE PROFILES *
* VERSION OF NOVEMBER 1976 *
* UPDATED MAY 1984 *
* IBM-PC-XT VERSION *
* RUN DATE 02/28/82 TIME 09:36:13 *
*****

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*****
* U.S. ARMY CORPS OF ENGINEERS *
* THE HYDROLOGIC ENGINEERING CENTER *
* 609 SECOND STREET, SUITE D *
* DAVIS, CALIFORNIA 95616 *
* (916) 440-2105 (FTS) 448-2105 *
*****

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```

X   X XXXXXXXX XXXXX           XXXXX
X   X X         X   X         X   X
X   X X         X             X
XXXXXXXX XXXX   X             XXXXX XXXXX
X   X X         X             X
X   X X         X   X         X
X   X XXXXXXXX XXXXX           XXXXXXX

```

DRAINAGEWAY "D"

POST-DEVELOPMENT - SUBCRITICAL





SECNO	DEPTH	CWSEL	CRWS	WSELK	EG	HV	HL	DLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XML	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

CCHV= .600 CEHV= .000

\*SECNO 5.000

3720 CRITICAL DEPTH ASSUMED

5.00	2.10	2401.65	2401.65	2403.50	2402.63	.98	.00	.00	2402.00
402.	0.	402.	0.	0.	51.	0.	0.	0.	2402.05
.00	.00	7.93	.00	.016	.016	.016	.000	2399.55	.36
.003298	0.	0.	0.	0	11	0	.00	26.25	26.60

CCHV= .600 CEHV= .000

\*SECNO 4.000

3301 HV CHANGED MORE THAN HVINS

4.00	3.63	2403.33	.00	.00	2403.39	.05	.21	.55	2402.70
402.	4.	398.	0.	5.	214.	0.	0.	0.	2403.70
.02	.75	1.86	.00	.025	.025	.025	.000	2399.70	159.79
.000743	215.	150.	120.	4	0	0	.00	191.11	350.91

\*SECNO 3.000

3265 DIVIDED FLOW

3.00	3.36	2403.30	.00	.00	2403.43	.13	.04	.00	2404.60
402.	0.	402.	0.	0.	141.	0.	1.	1.	2403.40
.03	.00	2.85	.00	.025	.025	.025	.000	2399.94	231.50
.001188	46.	46.	46.	2	0	0	.00	85.40	414.71

\*SECNO 2.000

2.00	2.97	2403.27	.00	.00	2403.50	.23	.07	.00	2404.40
402.	0.	402.	0.	0.	105.	0.	1.	1.	2403.78
.03	.00	3.84	.00	.025	.025	.025	.000	2400.30	359.04
.002523	40.	40.	40.	2	0	0	.00	71.41	430.46

\*SECNO 1.000

3265 DIVIDED FLOW

SECND	DEPTH	CWSEL	CRWS	WSELK	EG	HV	HL	QLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3280 CROSS SECTION 1.00 EXTENDED .43 FEET

3685 20 TRIALS ATTEMPTED WSEL,CWSEL  
 3693 PROBABLE MINIMUM SPECIFIC ENERGY  
 3720 CRITICAL DEPTH ASSUMED

1.00	1.09	2405.33	2405.33	.00	2405.55	.22	.35	.00	2405.18
402.	5.	136.	261.	3.	34.	70.	1.	1.	2406.78
.04	1.55	3.99	3.73	.025	.025	.025	.000	2404.24	69.05
.010706	35.	35.	160.	20	19	0	.00	241.06	410.00

CROSS SECTION 5.00  
 STREAM "D" (POST-DEV) SUBCRIT  
 DISCHARGE= 402.

PLOTTED POINTS (BY PRIORITY)-B=BOTTOM BRIDGE, T=TOP BRIDGE, X=GROUND, W=WATER SUR, E=ENERGY GRADIENT, C=CRITICAL WSEL

ELEV	2399.	2400.	2401.	2402.	2403.	2404.	2405.	2406.	2407.	2408.	2409.
	STA-FEET										
2	0.	.	.	X	E	.	.	.	.	.	BANK.
	1.	.	.	X W	E	.	.	.	.	.	.
	1.	.	X	W	E	.	.	.	.	.	.
	2.	.	X	W	E	.	.	.	.	.	.
	2.	X	.	W	E	.	.	.	.	.	.
3	3.	X	.	W	E	.	.	.	.	.	.
	3.	X	.	W	E	.	.	.	.	.	.
	4.	X	.	W	E	.	.	.	.	.	.
	4.	X	.	W	E	.	.	.	.	.	.
	5.	X	.	W	E	.	.	.	.	.	.
	5.	X	.	W	E	.	.	.	.	.	.
	6.	X	.	W	E	.	.	.	.	.	.
	6.	X	.	W	E	.	.	.	.	.	.
	7.	X	.	W	E	.	.	.	.	.	.
	7.	X	.	W	E	.	.	.	.	.	.
	8.	X	.	W	E	.	.	.	.	.	.
	8.	X	.	W	E	.	.	.	.	.	.
	9.	X	.	W	E	.	.	.	.	.	.
	9.	X	.	W	E	.	.	.	.	.	.
	10.	X	.	W	E	.	.	.	.	.	.
	10.	X	.	W	E	.	.	.	.	.	.
	11.	X	.	W	E	.	.	.	.	.	.
	11.	X	.	W	E	.	.	.	.	.	.
	12.	X	.	W	E	.	.	.	.	.	.
	12.	X	.	W	E	.	.	.	.	.	.
	13.	X	.	W	E	.	.	.	.	.	.
	13.	X	.	W	E	.	.	.	.	.	.
	14.	X	.	W	E	.	.	.	.	.	.
	14.	X	.	W	E	.	.	.	.	.	.
	15.	X	.	W	E	.	.	.	.	.	.
	15.	X	.	W	E	.	.	.	.	.	.
	16.	X	.	W	E	.	.	.	.	.	.
	16.	X	.	W	E	.	.	.	.	.	.
	17.	X	.	W	E	.	.	.	.	.	.
	17.	X	.	W	E	.	.	.	.	.	.
	18.	X	.	W	E	.	.	.	.	.	.
	18.	X	.	W	E	.	.	.	.	.	.
	19.	X	.	W	E	.	.	.	.	.	.
	19.	X	.	W	E	.	.	.	.	.	.
	20.	X	.	W	E	.	.	.	.	.	.
	20.	X	.	W	E	.	.	.	.	.	.
	21.	X	.	W	E	.	.	.	.	.	.
	21.	X	.	W	E	.	.	.	.	.	.
	22.	X	.	W	E	.	.	.	.	.	.
	22.	X	.	W	E	.	.	.	.	.	.
	23.	X	.	W	E	.	.	.	.	.	.
	23.	X	.	W	E	.	.	.	.	.	.
	24.	X	.	W	E	.	.	.	.	.	.
	24.	X	.	W	E	.	.	.	.	.	.
4	25.	X	.	W	E	.	.	.	.	.	.
	25.	.	X	W	E	.	.	.	.	.	.
	26.	.	X	W	E	.	.	.	.	.	.
	26.	.	.	X W	E	.	.	.	.	.	.
5	27.	.	.	.	X	E	.	.	.	.	BANK.

NRD= 0 ELLC= 9999999.00 ELTRD= 9999999.00

EL (I), STA (I)  
 2402.00 .00 2399.55 2.50 2399.55 24.50 2402.05 27.00

CROSS SECTION 4.00  
 STREAM "D" (POST-DEV) SUBCRIT  
 DISCHARGE= 402.

PLOTTED POINTS (BY PRIORITY)-B=BOTTOM BRIDGE, T=TOP BRIDGE, X=GROUND, W=WATER SUR, E=ENERGY GRADIENT, C=CRITICAL WSEL

ELEV 2399. 2400. 2401. 2402. 2403. 2404. 2405. 2406. 2407. 2408. 2409.

STA-FEET	2399.	2400.	2401.	2402.	2403.	2404.	2405.	2406.	2407.	2408.	2409.
2 0.	.	.	.	.	.	.	.	X	.	.	.
3 10.	.	.	.	.	.	.	.	.	X.	.	.
20.	.	.	.	.	.	.	.	.	X.	.	.
30.	.	.	.	.	.	.	.	.	X	.	.
40.	.	.	.	.	.	.	.	.	X	.	.
50.	.	.	.	.	.	.	.	.	X	.	.
4 60.	.	.	.	.	.	.	.	.	X	.	.
70.	.	.	.	.	.	.	.	X.	.	.	.
5 80.	.	.	.	.	.	.	.	X	.	.	.
90.	.	.	.	.	.	.	.	X	.	.	.
100.	.	.	.	.	.	.	.	X	.	.	.
110.	.	.	.	.	.	.	.	X	.	.	.
6 120.	.	.	.	.	.	.	.	X	.	.	.
130.	.	.	.	.	.	.	X	.	.	.	.
140.	.	.	.	.	.	X	.	.	.	.	.
150.	.	.	.	.	.	X	.	.	.	.	.
160.	.	.	.	.	.	X	.	.	.	.	.
170.	.	.	.	.	X	WE	.	.	.	.	.
7 180.	.	.	.	.	X	WE	.	.	.	BANK.	.
190.	.	.	.	.	X	WE	.	.	.	.	.
200.	.	.	.	.	X	WE	.	.	.	.	.
210.	.	.	.	.	X	WE	.	.	.	.	.
220.	.	.	.	.	X	WE	.	.	.	.	.
8 230.	.	.	.	.	X	WE	.	.	.	.	.
240.	.	.	.	.	X	WE	.	.	.	.	.
250.	.	.	.	.	X	WE	.	.	.	.	.
260.	.	.	.	X	WE	.	.	.	.	.	.
270.	.	.	.	X	WE	.	.	.	.	.	.
280.	.	.	.	X	WE	.	.	.	.	.	.
9 290.	.	.	X	WE	.	.	.	.	.	.	.
300.	.	.	X	WE	.	.	.	.	.	.	.
310.	.	X	WE	.	.	.	.	.	.	.	.
320.	.	X	WE	.	.	.	.	.	.	.	.
330.	X	WE	.	.	.	.	.	.	.	.	.
10 340.	X	WE	.	.	.	.	.	.	.	.	.
11 350.	.	.	.	.	X	.	.	.	.	.	BANK.

NRD= 0 ELLC= 9999999.00 ELTRD= 9999999.00

EL (I), STA (I)	2406.10	.00	2406.93	10.00	2406.21	60.00	2405.52	83.00	2404.84	119.00
	2402.70	177.00	2403.21	234.00	2401.79	292.00	2399.70	340.00	2403.70	352.00





CROSS SECTION 2.00  
 STREAM "D" (POST-DEV) SUBCRIT  
 DISCHARGE= 402.

PLOTTED POINTS (BY PRIORITY)-B=BOTTOM BRIDGE, T=TOP BRIDGE, X=GROUND, W=WATER SUR, E=ENERGY GRADIENT, D=CRITICAL WSEL

ELEV	2400.	2401.	2402.	2403.	2404.	2405.	2406.	2407.	2408.	2409.	2410.
STA- FEET											
2 0.									X		
10.									X		
3 20.									X		
30.									X		
40.									X		
4 50.									X		
5 60.									X		
70.								X			
6 80.								X			
90.								X			
7 100.								X			
8 110.								X			
120.								X			
130.								X			
9 140.								X			
10 150.								X			
160.								X			
11 170.								X			
180.								X			
190.								X			
12 200.								X			
210.								X			
220.								X			
230.								X			
13 240.								X			
250.								X			
14 260.								X			
270.								X			
280.								X			
290.								X			
300.								X			
310.								X			
320.								X			
15 330.								X			BANK.
340.								X			
350.								X			
16 360.								X			
370.								X			
380.								X			
390.								X			
400.								X			
410.								X			
17 420.								X			
18 430.								X			BANK.

NRD= 0 ELLC= 9999999.00 ELTRD= 9999999.00

EL(I), STA(I)										
2407.70	.00	2407.50	24.00	2407.06	49.00	2407.68	65.00	2406.03	83.00	
2405.90	96.00	2405.72	115.00	2405.10	142.00	2404.75	152.00	2404.46	175.00	
2403.80	200.00	2405.61	238.00	2405.74	258.00	2404.40	329.00	2403.12	353.00	
2400.30	421.50	2403.78	432.00							

CROSS SECTION 1.00  
 STREAM "D" (POST-DEV) SUBCRIT  
 DISCHARGE= 402.

PLOTTED POINTS (BY PRIORITY)-B=BOTTOM BRIDGE, T=TOP BRIDGE, X=GROUND, W=WATER SUR, E=ENERGY GRADIENT, C=CRITICAL WSEL

ELEV	2404.	2405.	2406.	2407.	2408.	2409.	2410.	2411.	2412.	2413.	2414.
STA- FEET											
2	0.			X							
	5.			X							
	10.			X							
	15.			X							
	20.			X							
	25.			X							
	30.			X							
	35.			X							
	40.			X							
3	45.			X							
	50.			X							
	55.			X							
4	60.			X							
	65.			X							
5	70.			XW	E						
	75.			XW	E						
	80.			XW	E						
	85.			XW	E						
	90.			XW	E						
6	95.			XW	E						BANK.
	100.			XW	E						
	105.			XW	E						
	110.			XW	E						
	115.			XW	E						
7	120.			XW	E						
	125.			XW	E						
	130.			XW	E						
	135.			XW	E						
8	140.			XW	E						
	145.			XW	E						
	150.			XW	E						
	155.			XW	E						
9	160.			XW	E						
	165.			XW	E						
	170.			XW	E						
10	175.			XW	E						BANK.
	180.			XW	E						
	185.			XW	E						
	190.			XW	E						
	195.			XW	E						
	200.			XW	E						
	205.			XW	E						
	210.			XW	E						
	215.			XW	E						
	220.			XW	E						
11	225.			XW	E						
	230.			XW	E						
	235.			XW	E						
	240.			XW	E						
	245.			XW	E						
	250.			XW	E						
	255.			XW	E						
	260.			XW	E						
	265.			XW	E						
	270.			XW	E						
12	275.			XW	E						
	280.			XW	E						
	285.			XW	E						
	290.			XW	E						
	295.			XW	E						
	300.			XW	E						
	305.			XW	E						
	310.			XW	E						
	315.			XW	E						
	320.			XW	E						
13	325.			XW	E						
	330.			XW	E						
	335.			XW	E						
	340.			XW	E						
	345.			XW	E						
	350.			XW	E						
	355.			XW	E						
14	360.			XW	E						
	365.			XW	E						
	370.			XW	E						
	375.			XW	E						
	380.			XW	E						
	385.			XW	E						
	390.			XW	E						
	395.			XW	E						
	400.			XW	E						
	405.			XW	E						
15	410.			XW	E						

NRD= 0 ELLC= 9999999.00 ELTRD= 9999999.00

EL(I), STA(I)									
2406.70	.00	2406.22	44.00	2406.50	58.00	2405.22	70.00	2405.18	93.00
2404.90	118.00	2404.24	140.00	2405.28	158.00	2406.78	175.00	2406.40	225.00
2404.80	275.00	2404.80	325.00	2404.88	350.00	2404.90	410.00		

PROFILE FOR STREAM "D" (POST-DEV) SUBCRIT

PLOTTED POINTS (BY PRIORITY)-E-ENERGY, W-WATER SURFACE, I-INVERT, C-CRITICAL W.S., L-LEFT BANK, R-RIGHT BANK, M-LOWER END STA

ELEVATION	2399.	2400.	2401.	2402.	2403.	2404.	2405.	2406.	2407.	2408.
SECNO	CUMDIS									
5.00	0.	I		W LR E						
	10.	C I		W LMR E						
	20.	C I		W LMR E						
	30.	C I		W LMR E						
	40.	C I		W LMR E						
	50.	C I		W R E						
	60.	C I		W R E						
	70.	C I		LW RE						
	80.	C I		LW RE						
	90.	C I		LW RE						
	100.	C I		LW RE						
	110.	C I		LW ER						
	120.	C I		LW ER						
	130.	C I		LW ER						
	140.	C I		LW ER						
4.00	150.	C I		LW ER						
	160.	C I		LW ER						
	170.	C I		LW ER						
	180.	C I		LW ER						
	190.	C I		LW ER						
3.00	200.	C I		LW ER						
	210.	C I		LW ER						
	220.	C I		LW ER						
	230.	C I		LW ER						
2.00	240.	C I		LW ER						
	250.	C I		LW ER						
	260.	C I		LW ER						
	270.	C I		LW ER						
1.00	280.	C I		LW ER						

THIS RUN EXECUTED 02/28/82 09:45:06

\*\*\*\*\*  
 HEC2 RELEASE DATED NOV 76 UPDATED MAY 1984  
 ERROR CORR - 01,02,03,04,05,06  
 MODIFICATION - 50,51,52,53,54,55,56  
 IBM-PC-XT VERSION 1.1  
 \*\*\*\*\*

NOTE- ASTERISK (\*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

"D"(POST-DEV)SUBCRIT

SUMMARY PRINTOUT

	SECNO	CWSEL	CRIWS	EG	TOPWID	10K*S	DEPTH	HV	HL	K*CHSL	ALPHA	Q
*	5.000	2401.65	2401.65	2402.63	26.25	32.98	2.10	.98	.00	.00	1.00	402.00
	4.000	2403.33	.00	2403.39	191.11	7.43	3.63	.05	.21	1.00	1.02	402.00
	3.000	2403.30	.00	2403.43	85.40	11.88	3.36	.13	.04	5.22	1.00	402.00
	2.000	2403.27	.00	2403.50	71.41	25.23	2.97	.23	.07	9.00	1.00	402.00
*	1.000	2405.33	2405.33	2405.55	241.06	107.06	1.09	.22	.35	112.57	1.03	402.00

SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECND= 5.000 PROFILE= 1 CRITICAL DEPTH ASSUMED

CAUTION SECND= 1.000 PROFILE= 1 CRITICAL DEPTH ASSUMED

CAUTION SECND= 1.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY

CAUTION SECND= 1.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

```

*****
* WATER SURFACE PROFILES *
* VERSION OF NOVEMBER 1976 *
* UPDATED MAY 1984 *
* IBM-PC-XT VERSION *
* RUN DATE 03/01/82 TIME 02:02:01 *
*****

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*****
* U.S. ARMY CORPS OF ENGINEERS *
* THE HYDROLOGIC ENGINEERING CENTER *
* 609 SECOND STREET, SUITE D *
* DAVIS, CALIFORNIA 95616 *
* (916) 440-2105 (FTS) 448-2105 *
*****

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X X XXXXXXX XXXX XXXX
X X X X X X X X
X X X X X X
XXXXXXXX XXXX X XXXX XXXX
X X X X X X
X X X X X X
X X XXXXXXX XXXX XXXXXXX

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DRAINAGEWAY "D"

POST-DEVELOPMENT - SUPERCRITICAL

THIS RUN EXECUTED 03/01/82 02:02:25

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*****
HEC2 RELEASE DATED NOV 76 UPDATED MAY 1984
ERROR CORR - 01.02.03.04.05.06
MODIFICATION - 50.51.52.53.54.55.56
IBM-PC-XT VERSION 1.1
*****

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T1 SAN JOAQUIN ESTATES - SUPERCRITICAL
T2 100 YEAR EVENT
T3 "D" (POST-DEV) SUPERCRIT

```

J1	ICHECK	IND	NINV	IDIR	STRT	METRIC	HVING	Q	WSEL	FG
	0.	2.	0.	1.	.012700	.00	.0	402.	2405.300	.000
J2	NPROF	IPLDT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	-1.000	1.000	.000	.000	.000	.000	.000	.000	.000	.000
J3	VARIABLE CODES FOR SUMMARY PRINTOUT									
	38.000	1.000	2.000	3.000	4.000	5.000	8.000	10.000	11.000	33.000
	57.000	43.000	.000	.000	.000	.000	.000	.000	.000	.000
GT	1.000	402.000	.000	.000	.000	.000	.000	.000	.000	.000
NC	.025	.025	.025	.000	.000	.000	.000	.000	.000	.000
X1	1.000	14.000	93.000	175.000	35.000	150.000	35.000	.000	.000	.000
GR	2406.700	.000	2406.220	44.000	2406.600	58.000	2405.220	70.000	2405.180	93.000
GR	2404.900	118.000	2404.240	140.000	2405.280	158.000	2406.780	175.000	2406.400	225.000
GR	2404.800	275.000	2404.800	325.000	2404.880	360.000	2404.900	410.000	.000	.000
NC	.025	.025	.025	.600	.000	.000	.000	.000	.000	.000
X1	2.000	17.000	152.000	238.000	40.000	40.000	40.000	.000	.000	.000
GR	2407.700	.000	2407.500	24.000	2407.060	49.000	2407.680	65.000	2406.030	83.000
GR	2405.900	96.000	2405.720	115.000	2405.100	142.000	2404.760	152.000	2404.460	175.000
GR	2403.800	200.000	2405.610	238.000	2405.740	258.000	2404.400	329.000	2403.120	363.000
GR	2400.300	421.500	2403.780	432.000	.000	.000	.000	.000	.000	.000
X1	3.000	16.000	120.000	282.000	46.000	46.000	46.000	.000	.000	.000
GR	2407.400	.000	2408.180	19.000	2406.740	41.000	2406.910	63.000	2406.480	87.000
GR	2406.000	104.000	2405.850	120.000	2403.960	178.000	2404.600	185.000	2403.290	232.000
GR	2404.600	238.000	2404.900	282.000	2404.290	307.000	2402.350	352.000	2399.940	404.500
GR	2403.400	415.000	.000	.000	.000	.000	.000	.000	.000	.000
X1	4.000	13.000	119.000	234.000	215.000	120.000	150.000	.000	.000	.000
GR	2406.100	.000	2406.930	10.000	2406.210	60.000	2405.520	83.000	2404.840	119.000
GR	2404.200	177.000	2402.710	183.000	2404.340	224.000	2404.400	234.000	2401.790	292.000
GR	2400.700	322.000	2399.710	340.000	2403.710	352.000	.000	.000	.000	.000





SECNO	DEPTH	CWSEL	CRIMS	WSELK	EG	HV	HL	QLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLDB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

\*PROF 1

\*SECNO 1.000

3265 DIVIDED FLOW

3280 CROSS SECTION 1.00 EXTENDED .40 FEET

1.00	1.06	2405.30	2405.32	2405.30	2405.56	.25	.00	.00	2405.18
402.	4.	138.	261.	2.	32.	66.	0.	0.	2406.78
.00	1.47	4.24	3.95	.025	.025	.025	.000	2404.24	69.28
.012905	0.	0.	0.	0	8	4	.00	239.71	410.00

CCHV= .600 CEHV= .000

\*SECNO 2.000

3301 HV CHANGED MORE THAN HVINS

2.00	2.13	2402.43	2402.65	.00	2403.30	.86	1.89	.37	2404.76
402.	0.	0.	402.	0.	0.	54.	0.	0.	2405.61
.01	.00	.00	7.46	.025	.025	.025	.000	2400.30	377.32
.014626	35.	35.	160.	4	17	0	.00	50.61	427.93

\*SECNO 3.000

3.00	2.28	2402.22	2402.23	.00	2402.83	.61	.47	.00	2405.85
402.	0.	0.	402.	0.	0.	64.	0.	0.	2404.90
.01	.00	.00	6.28	.025	.025	.025	.000	2399.94	355.02
.009498	40.	40.	40.	0	8	0	.00	56.38	411.39

\*SECNO 4.000

3685 20 TRIALS ATTEMPTED WSEL.CWSEL  
 3693 PROBABLE MINIMUM SPECIFIC ENERGY  
 3720 CRITICAL DEPTH ASSUMED

4.00	2.34	2402.05	2402.05	.00	2402.62	.57	.38	.11	2404.84
402.	0.	0.	402.	0.	0.	67.	0.	1.	2404.40
.01	.00	.00	6.04	.025	.025	.025	.000	2399.71	286.15
.007123	46.	46.	46.	20	8	0	.00	60.88	347.03

SECNO	DEPTH	CWSEL	CRINS	WSELK	EG	HV	HL	DLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLDBR	ITRIAL	IDC	ICDNT	CORAR	TOPWID	ENDST

CCHV= .600 CEHV= .000

#SECNO 5.000

3685 20 TRIALS ATTEMPTED WSEL,CWSEL

3693 PROBABLE MINIMUM SPECIFIC ENERGY

3720 CRITICAL DEPTH ASSUMED

5.00	2.10	2401.65	2401.65	.00	2402.63	.98	.63	.93	2402.00
402.	0.	402.	0.	0.	51.	0.	1.	1.	2402.05
.01	.00	7.94	.00	.016	.016	.016	.000	2399.55	.36
.003313	215.	150.	120.	20	11	0	.00	26.24	26.60

PROFILE FOR STREAM "D"(POST-DEV) SUPERCRIT

PLOTTED POINTS (BY PRIORITY)-E-ENERGY.W-WATER SURFACE.I-INVERT.C-CRITICAL W.S..L-LEFT BANK,R-RIGHT BANK.M-LOWER END STA

ELEVATION SECNO	2399. CUMDIS	2400.	2401.	2402.	2403.	2404.	2405.	2406.	2407.	2408.
1.00	0.	.	.	.	.	.	I	M. LW E	.	R.
	10.	.	.	.	.	I	WC	E. L	.	R
	20.	.	.	I	.	WC	E	L.	.	R
	30.	.	I.	.	WC	E M.	L.	.	R.	.
2.00	40.	.	I	.	WC	E M.	L.	.	R	.
	50.	.	I	.	WC	E M.	L	R	.	.
	60.	.	I	.	WC	E M.	L	.	.	.
	70.	.	I	.	W	E. M	.	R	L	.
3.00	80.	.	I.	.	W	E. M	.	R.	L.	.
	90.	.	I.	.	W	E. M	.	R.	L	.
	100.	.	I.	.	WC	E. M	.	R.	L	.
	110.	.	I.	.	W	E. M	.	R	L	.
	120.	.	I	.	W	E. M	.	R	L	.
4.00	130.	.	I	.	W	E. M	.	R	L	.
	140.	.	I	.	W	E. M	.	R	L	.
	150.	.	I	.	W	E. M	.	R	L	.
	160.	.	I	.	W	E. M	.	R.	L	.
	170.	.	I	.	W.	E. M	.	R.L	.	.
	180.	.	I	.	W.	E. M	.	R L	.	.
	190.	.	I	.	W.	E. M	.	R L	.	.
	200.	.	I	.	W.	E. M.	.	R L	.	.
	210.	.	I	.	W.	E. M.	.	R L	.	.
	220.	.	I	.	W.	E. M	.	R L	.	.
	230.	.	I	.	W.	E. R L.	.	.	.	.
	240.	.	I	.	W.	MERL.	.	.	.	.
	250.	.	I	.	W.	M RE	.	.	.	.
	260.	.	I	.	W.	M L E	.	.	.	.
	270.	.	I	.	W.	M L E	.	.	.	.
5.00	280.	.	I	.	W	LR E	.	.	.	.

THIS RUN EXECUTED 03/01/82 02:10:55

\*\*\*\*\*  
 HEC2 RELEASE DATED NOV 76 UPDATED MAY 1984  
 ERROR CORR - 01.02.03.04.05.06  
 MODIFICATION - 50.51.52.53.54.55.56  
 IBM-PC-XT VERSION 1.1  
 \*\*\*\*\*

NOTE- ASTERISK (\*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

"D"(POST-DEV)SUPERCRIT

SUMMARY PRINTOUT

SECNO	DWSEL	CRWS	EG	TOPWID	10K*5	DEPTH	HV	HL	K*CHSL	ALPHA	Q
1.000	2405.30	2405.32	2405.56	239.71	129.05	1.06	.25	.00	.00	1.03	402.00
2.000	2402.43	2402.65	2403.30	50.61	146.26	2.13	.86	1.89	-112.57	1.00	402.00
3.000	2402.22	2402.23	2402.83	56.38	94.98	2.28	.61	.47	-9.00	1.00	402.00
* 4.000	2402.05	2402.05	2402.62	60.88	71.23	2.34	.57	.38	-5.00	1.00	402.00
* 5.000	2401.65	2401.65	2402.63	26.24	33.13	2.10	.98	.63	-1.07	1.00	402.00

SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 4.000 PROFILE= 1 CRITICAL DEPTH ASSUMED  
CAUTION SECNO= 4.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY  
CAUTION SECNO= 4.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 5.000 PROFILE= 1 CRITICAL DEPTH ASSUMED  
CAUTION SECNO= 5.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY  
CAUTION SECNO= 5.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

UNSUBDIVIDED GR

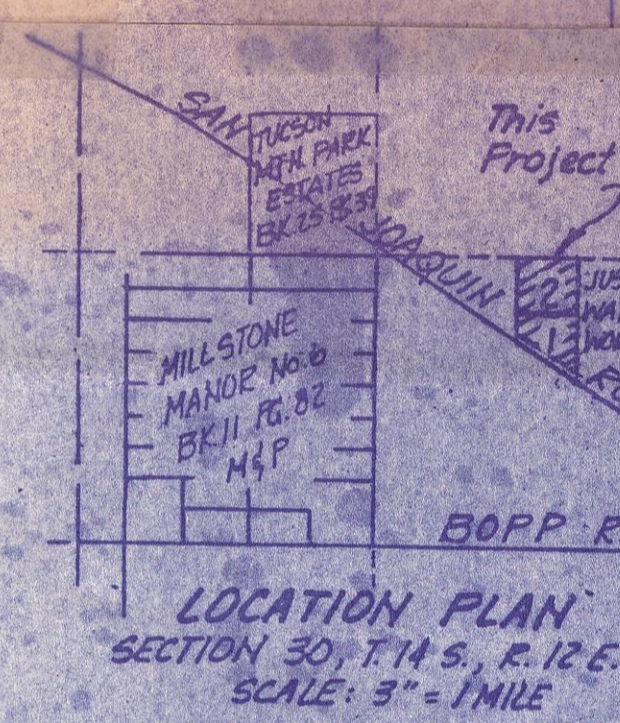
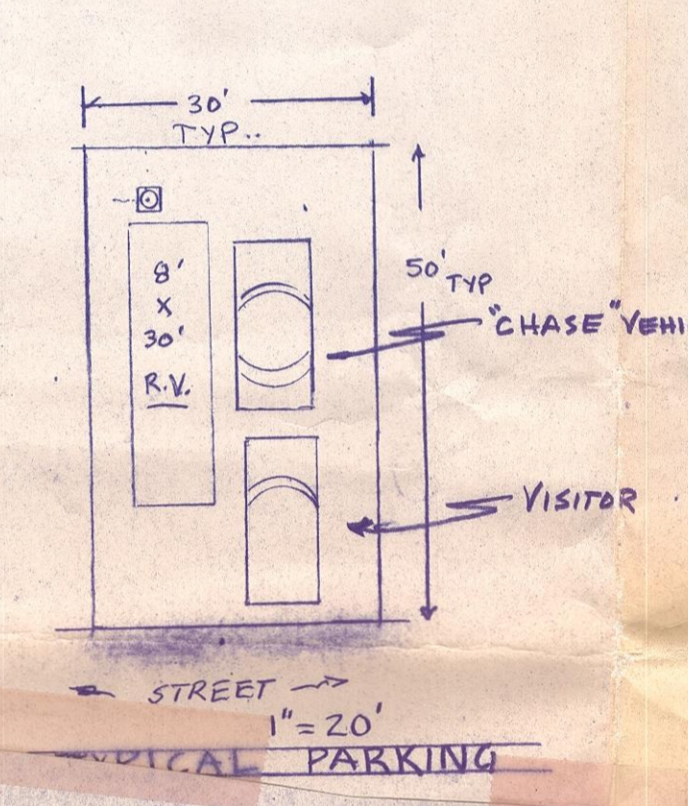


EASEMENT NOTES  
THE FOLLOWING NOTES ARE BASED ON ITEM NUMBERS AS DELINEATED IN SCHEDULE B OF THE PRELIMINARY TITLE REPORT, POLICY NUMBER 47262 OF TIGOR TITLE INSURANCE COMPANY OF CALIFORNIA:

- 1. THE EASEMENT AS DEFINED IN ITEM 6 DOES NOT AFFECT SUBJECT PROPERTY. (DOCKET 5978, PG. 1332)
- 2. THE EASEMENT AS DEFINED IN ITEM 6 DOES NOT AFFECT SUBJECT PROPERTY. (DOCKET 5015, PG. 1142)
- 3. THE EASEMENT AS DEFINED IN ITEM 7 DOES NOT AFFECT SUBJECT PROPERTY. (DOCKET 6657, PG. 231)
- 4. THE COVENANT RUNNING WITH LAND AND ONE FOOT IN ACCESS PROPERTY AS DEFINED IN ITEM 9 DOES NOT AFFECT SUBJECT PROPERTY. (DOCKET 5985, PG. 843)

RESTRICTIVE NOTES

- 1. EXISTING ZONING IS GR; CONDITIONALLY APPROVED ZONING IS 24.
- 2. PRIOR TO THE ISSUANCE OF ANY BUILDING PERMIT FOR ANY EXPANSION OF THIS PROJECT IN ACCORDANCE WITH SECTION 18.71.010-02, THE OWNER SHALL PROVIDE REVISED DEVELOPMENT PLANS FOR REVIEW AND APPROVAL BY PIMA COUNTY.
- 3. ALL REQUIRED PARKING SHALL BE OFF-STREET, ON-SITE.
- 4. AREAS AND SPACES DESIGNATED FOR REQUIRED PARKING SHALL NOT BE CONVERTED TO OTHER USES UNLESS IT CAN BE DEMONSTRATED THAT SUFFICIENT ON-SITE PARKING EXISTS.
- 5. PRIOR TO THE REQUEST FOR RELEASE OF OCCUPANCY PERMITS, AN ENGINEER MUST CERTIFY AS TO THE COMPLETION, FORM, LINE, AND SUBSTANTIAL CONFORMANCE TO APPROVED PLANS OF ALL PUBLIC AND PRIVATE ROADWAYS, DRAINAGE STRUCTURES, AND APPURTENANCES AS SHOWN ON THIS DEVELOPMENT PLAN.
- 6. A FLOODPLAIN USE PERMIT WILL BE REQUIRED FOR LOTS 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.
- 7. THE AREA WITHIN THE 100 YEAR FLOOD PRONE LIMITS REPRESENTS AN AREA WHICH IS SUBJECT TO FLOODING FROM THE REGULATORY FLOOD EVENT. ALL LAND WITHIN THIS DELINEATED FLOOD PRONE AREA SHALL BE RESTRICTED TO USES THAT ARE COMPATIBLE WITH THE CURRENT FLOODPLAIN AND SEWER MANAGEMENT ORDINANCES.
- 8. ALL DRAINAGEWAYS, DRAINAGE EASEMENTS AND DRAINAGE STRUCTURES SHOWN AND LABELED AS SUCH UPON THIS PLAN, WHICH ARE TO BE CONSTRUCTED IN CONJUNCTION WITH THE DEVELOPMENT OF THIS PROJECT, SHALL ENTIRELY CONTAIN THEIR RESPECTIVE 100 YEAR FLOOD LIMITS UPON COMPLETION OF CONSTRUCTION UNLESS CLEARLY LABELED OTHERWISE.
- 9. COVENANTS, CONDITIONS, AND RESTRICTIONS FOR THIS DEVELOPMENT ARE RECORDED IN DOCKET 5985 AT PAGE 843.



SCALE: 1" = 40' CONTOUR INTERVAL: 2'

LINE TABLE FOR 100 YEAR FLOOD PLAIN AREA

0	118.00
1	117.00
2	116.00
3	115.00
4	114.00
5	113.00
6	112.00
7	111.00
8	110.00
9	109.00
10	108.00
11	107.00
12	106.00
13	105.00
14	104.00
15	103.00
16	102.00
17	101.00
18	100.00
19	99.00
20	98.00
21	97.00
22	96.00
23	95.00
24	94.00
25	93.00
26	92.00
27	91.00
28	90.00
29	89.00
30	88.00
31	87.00
32	86.00
33	85.00
34	84.00
35	83.00
36	82.00
37	81.00
38	80.00
39	79.00
40	78.00
41	77.00
42	76.00
43	75.00
44	74.00
45	73.00
46	72.00
47	71.00
48	70.00
49	69.00
50	68.00
51	67.00
52	66.00
53	65.00
54	64.00
55	63.00
56	62.00
57	61.00
58	60.00
59	59.00
60	58.00
61	57.00
62	56.00
63	55.00
64	54.00
65	53.00
66	52.00
67	51.00
68	50.00
69	49.00
70	48.00
71	47.00
72	46.00
73	45.00
74	44.00
75	43.00
76	42.00
77	41.00
78	40.00
79	39.00
80	38.00
81	37.00
82	36.00
83	35.00
84	34.00
85	33.00
86	32.00
87	31.00
88	30.00
89	29.00
90	28.00
91	27.00
92	26.00
93	25.00
94	24.00
95	23.00
96	22.00
97	21.00
98	20.00
99	19.00
100	18.00

THIS DEVELOPMENT IS SUBJECT TO THE BOARD OF SUPERVISOR'S RETAINING CONDITIONS WITH CO9-82-98 AS APPROVED OR AMENDED ON

GENERAL NOTES

- 1. THE PROPOSED USE OF THIS PROJECT IS AN RV PARK AND IS PERMITTED IN ACCORDANCE WITH SECTION 18.11.
- 2. GROSS AREA OF DEVELOPMENT IS 17.32 ACRES, PART OF PUBLIC.
- 3. BASIS OF BEARING IS THE NORTH LINE OF THE SOUTHWEST ONE-QUARTER OF SECTION 28, TOWNSHIP 11N, RANGE 12E, EAST, 6E ESTABLISHED BY LYNN HANSEN, PLS 8041212, 5410 BEARING BEING N. 89° 51' 31" E.
- 4. BASIS OF ELEVATION IS R.V. COR. SEC. 20, T. 11N, R. 12E, S. 2461.8 FT.
- 5. ANY RELOCATION, RECONSTRUCTION, ETC. OF EXISTING UTILITIES AND/OR PUBLIC IMPROVEMENTS REQUIRED BY THIS DEVELOPMENT WILL BE AT NO EXPENSE TO THE PUBLIC.
- 6. SANITARY SEWER WILL BE ON-SITE AND SEPTIC SYSTEM.
- 7. APPROVAL OF THIS PLAN DOES NOT APPEAR OR APPROVE ANY LAND DIVISION THAT MAY BE CONTRARY TO STATE LAW. MOB DOES NOT CERTIFY THE EXISTENCE OR COMPLIANCE WITH ANY PRIVATE DEED RESTRICTIONS.
- 8. WATER SERVICE WILL BE BY TULSON WATER.

- LEGEND
- INDICATES FOUND 1/2" REBAR TAGGED "PLS 11313"
  - N/A INDICATES SANITARY SEWER MANHOLE
  - INDICATES SANITARY SEWER CLEANOUT
  - INDICATES 100-YEAR FLOOD PRONE LIMIT
  - INDICATES EXISTING CONTOUR
  - INDICATES DRAINAGE AREA BOUNDARY
  - x 42.5 INDICATES PROPOSED SEPT ELEVATION
  - INDICATES PROPOSED CHIP SEAL SURFACE FOR ROADWAY
  - INDICATES PROPOSED BY PARKING SITE AND NUMBER
  - INDICATES PROPOSED LEACH AREA
  - INDICATES PROPOSED SEWAGE DISTRIBUTION BOX FOR SEPTIC TANK

OWNER:  
NEAL JUSTIN  
3551 S. SAN JOAQUIN RD  
TULSON, AZ 85706

CO 9-82-98  
CO 13-76-1  
CO 12-90-26

DEVELOPMENT PLAN For  
SAN JOAQUIN R.V. PARK  
Located Within That Part of the W 1/2 of the E 1/4 of the S.E. 1/4 of Sec. 30, T. 11 S., R. 12 E., G. 6 E., Co. 9, Pima County, Arizona, Lying Within the City of Tucson, Arizona.

ARROW ENGINEERING  
7002 E. ARROWHEAD DR.  
TULSON, AZ 85716  
(602) 886-8288

HORIZ. 1" = 100' VERT. 1" = 10' FLD. BK. DESIGN W. SURVEYOR'S CHK. DATE: 11/11/03 JOB NO. 03-001