FINAL REPORT

Volume II of III
Appendices C

CAREFREE DRAINAGE MASTER PLAN

Prepared for

Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, AZ 85009

CONTRACT NO: FCD 2000C037

Prepared by

CH2MHILL

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Tempe, Arizona 85282-3397

September 2003

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Final Report

Volume II of III
Carefree Drainage Master Plan

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May 2004

Registered Professional Engineer (Civil)
CERTIFICATE No.
24971
TONY A.
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Date Signed 5-11-04
ARIZONA, U.S.A.

Prepared in partnership with
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Submitted to

Flood Control District of Maricopa County

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Appendix C
Flood Accessibility Emergency Routes Evaluation

FLOOD ACCESSIBILITY EMERGENCY ROUTES EVALUATION

Carefree Drainage Master Plan

Prepared for

Flood Control District of Maricopa County

Seal of the Town of Carefree Arizona

Prepared by

CH2MHILL

February 2003

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Flood Accessibility Emergency Routes Evaluation Carefree Drainage Master Plan

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COPIES: Jon Pearson/Town of Carefree

DATE: January 21, 2003

A flood accessibility evaluation of emergency routes was performed for the Town of Carefree (Town) as part of the Carefree Drainage Master Plan (DMP). Drainage crossings at streets were analyzed for depth and velocity of water flow over the roadway during the 100-year flood event.

Criteria

The following criteria were used for determination of the flood accessibility:

- Accessibility shall be performed for the 100-year runoff event
- Road overflows (Figure 1), or longitudinal flows at the roadway crown, of more than 1-foot deep are considered impassable.
- Improvements are desired in the Town such that no more than 30 single-family residential lots, or equivalent multifamily or commercial/industrial areas, are inaccessible due to design flood flows in any given wash; and, no lot is inaccessible for more than 10 hours

FIGURE 1. FLOW OVER ROADWAY DIP CROSSING GALLOWAY WASH AT PIMA ROAD

The term "inaccessible," as used in this report, refers to the time and flow rate of water flowing over the roadway during a runoff event. This does not include inaccessibility due to damage of the roadway, debris accumulation, or sedimentation over the roadway.

Existing Conditions Accessibility Evaluation

All drainage crossings of washes with greater than 15 cfs were analyzed for depth, velocity, and duration of flood flows over the roadway. Crossings were characterized as either passable or impassable based upon the aforementioned criteria. Over 120 roadway crossings will have water over the road, and of these sites, over 50 will be considered impassable. This results in over 50 percent of the residential parcels in the Town being inaccessible during a 100-year runoff event. Figure 3 shows a graphical representation of these sites.

Hydraulic Methodology

Flow information was obtained from the Carefree Drainage Master Plan Data Collection Report, dated November 2002. This report determined the flow amount expected at major roadway crossings, in addition to the Town's watershed hydrology. Crossings were analyzed for overtopping during the 100-year, future conditions event (greater of the 6-hour or 24-hour storm).

The following methods or software programs were used to obtain the depth and velocity information:

- Grade information at roadway sections and culverts was obtained through field surveys, or topographic contour mapping. Where no detailed topographic information was available, a generic dip section profile was used of either 200- or 400-feet in width. Any critical site identified by the generic profile was advanced for further survey, and a detailed survey was obtained. In general, the passability cutoff for both generic sections was approximately 250 cubic feet per second (cfs).
- Haestad Method's CulvertMaster software program or Federal Highway Administration's (FHWA's) HY-8 culvert analysis software program was used to obtain the amount of flow carried by culverts at crossings.
- Haestad Method's FlowMaster software program (using standard Manning's rating) was used to analyze flow over dip crossings (e.g., Figure 2).
- Various HEC-RAS models, created as part of the Carefree DMP, were used at crossings covered by floodplain mapping. This includes Galloway Wash, Galloway Wash Middle Branch, Stagecoach Pass Wash, Windmill Wash, Pima Wash, Unnamed Central Tributary to Cave Creek, Grapevine Wash, Rowe Wash, and Andora Hills Wash.
- Published floodplain elevations from FEMA in conjunction with existing crossing geometry were used to derive information at crossings where the HEC-RAS models were not available.

Calculation information for each drainage crossing analyzed as part of this study is included as Appendix B of this document.

Duration

Duration of impassable flow was obtained from examination of the design hydrograph at each crossing from the HEC-1 model created for the Town as part of the Data Collection Report (CH2M HILL, November 2002). Please note that the hydrology of the Town is based upon a

theoretical, design hydrograph, and actual flood hydrographs may have longer durations. No lot was found to be inaccessible in excess of the criteria of 10 hours.

Depth, Velocity, Duration Summary

Appendix A of this document contains a summary of the hydraulic properties, crossing structures, and hydrology of each of the crossings analyzed during this study. This information is additionally contained on Figure 4 of the appendix, along with the locations of these sites.

Proposed Improvements

Drainage features were identified during the Data Collection Phase of the project that are considered problematic. Each area fits into one of these general categories:

- Roadways that are impassable during flood events
- Localized or regional sedimentation
- Localized or regional erosion
- Damaged facilities
- Undersized facilities/drainage facilities not provided
- Erosion setback encroachments

Prioritization Procedure

As indicated in Appendix A, numerous sites are considered impassable during the 100-year event. However, the fact that a crossing is impassable alone does not adequately reflect all of the factors that determine the importance of improving each individual crossing.

Therefore, a prioritization procedure was developed with input from the Town. This procedure developed preliminary criteria elements and ranking of potential importance to the Town. The criteria elements were: required maintenance, public safety concern, severity of damage, recurrence interval frequency, and local impact (or number of affected lots or facilities). Additionally, the crossings were ranked as either passable or impassable; the quantity of flow alone does not give an individual crossing importance over another. This prioritization procedure is discussed in greater detail in the DMP Report.

The result of this procedure is a list of the sites that are regionally as well as locally significant and should be placed as a higher priority for improvement. For example, a crossing is considered to have a higher public safety and local impact significance if a large number of lots are cutoff during a flood event, as more residents are likely to attempt to cross the area. Although one crossing may have a higher depth and velocity of flow than another, it can be avoided if an alternate route exists. This access plan addresses community education and potential signage in subsequent sections of this document to help the public avoid these crossings and take alternate routes, in addition to improving the crossing in the future.

Advanced Design Sites

As a result of the prioritization procedure, seven impassable sites were advanced to the preliminary design phase, as shown in Table 1 and Figure 5. It is assumed for the purpose of this access plan that these sites will be improved in the near future.

TABLE 1
Impassable Sites to be advanced to Design Phase
Carefree Drainage Master Plan

Impassable Site Location	Identifier	Flow Amount, 100-year Future Event (cfs)
Rising Sun Road	#190	834
Pima Road near Short Putt Place	#JEF32	1260
Cave Creek Road near New River Road	#6	2462[b]
Cave Creek Road near Carefree Highway[a]	#2 and #3	566[b]
Tranquil Trail near Sundance Trail	#JEF35, JEF55	4379
Sombrero Road near Cow Track	#JEF44	2990
Golden Spur Lane	#JEF52	747

Reference Figure 5 for a map of these site locations

[a] *The road becomes impassible further to the south near the intersection of Carefree Highway and Cave Creek Road, as a result of the change in roadway profile and ponding water elevations*

[b] *Flow rate obtained from floodplain model*

Access Plan

An access plan was created based upon the results of the prioritization process and route evaluation. There are three proposed stages of the access plan, and these are reflected in Figures 6 through 8. The stages are:

- ***Access Plan Stage 1 – Improvement of the 7 advanced design sites.*** Figure 6 was created to reflect the access plan once these impassable sites are improved and upgraded to passable. Although many sites are shown on Figure 6 as accessible, 209 lots will still be without access.
- ***Access Plan Stage 2 – Improvement of 2 additional roadway crossings necessary to fulfill the project scope criteria.*** Figure 7 was created to show the two additional roadway crossings that must be improved to fulfill the project scope criteria that no more than 30 single-family lots (or equivalent) are inaccessible from a single crossing during the 100-year runoff event. A total of 104 lots will remain inaccessible.
- ***Access Plan Stage 3 – Complete Accessibility.*** Figure 8 represents the additional crossings that must be improved to provide complete accessibility to all lots within the Town during a 100-year storm event.

Figure 4 contains a detailed summary of the depths, velocities, and durations of flow at the roadway crossings.

Conclusions and Recommendations

Drainage crossings at streets within the Town were analyzed for depth, velocity, and duration of water flow over the roadway during the 100-year flood event. The maximum duration that any lot will be inaccessible, according to the design hydrograph, is slightly over 5 hours.

The Access Plan for the Town is composed of three stages: improvement of the seven advanced design sites, improvements necessary to meet the project scope criteria, and improvements resulting in complete accessibility. Table 2 summarizes the improvements.

TABLE 2
Improvement Summary
Carefree Access Plan

Access Plan Stage	Improvement Location	Add'l Parcels Accessible	% of Town Accessible**
Existing Conditions		1437	66.8%
Stage 1	Tranquil Tr. At Sundance	156	75.8%
	Cave Creek near Carefree Highway	36	68.5%
	Rising Sun Road	12	76.3%
	Pima Road near Short Putt Place	63	79.3%
	Cave Creek Road near New River Road	123	85.0%
	Sombrero Road near Cow Track	20	85.9%
	Golden Spur Lane	85	89.9%
Stage 2	Father Kino Trail	52	92.3%
	Carefree Hwy at Carefree Mountain Drive	53	94.7%
Stage 3	Various*	104	100%

*See Figure 8 for locations

**Based on parcel count, not acreage, approx. 2,150 total parcels in Town

Figure 6 contains the recommended crossing improvements for Stage 1 that will render approximately 90 percent of the Town with access during the 100-year flood event; however, 209 lots will remain inaccessible. This is the recommended improvement plan for the Town that takes into account the cost/benefit ratio for improvements.

Figure 7 contains Stage 2 of the access plan, which is the recommended improvements from Figure 6 plus the additional roadway crossings that must be improved to fulfill all of the project criteria. This results in approximately 95 percent of the Town accessible, with 104 lots remaining inaccessible.

Figure 8 contains the additional crossings that must be improved to provide complete accessibility to all lots in the Town.

In addition to the recommended crossing improvements, the following safety measures or further study are recommended for implementation in the Town.

Safety Improvements

Public Education

Due to the number of dip crossings within the Town, education of the Town's residents should be provided. In particular, the residents should be cautioned that other hazards besides depth of water exist during flood events, such as the road surface may not be intact under the water, and that debris or other road hazards may exist beneath the surface.

The public should be made aware of particularly dangerous crossings to be avoided, such as crossings where greater flow volumes, depths, and velocities exist, and where a greater probability of pavement damage exists. Additionally, as crossings are improved, the public should be made aware of the preferred routes of access.

Signage

There are certain crossings within the Town where improvement strictly for the purpose of access during flood events is not required because alternate routes exist. Because alternate routes are available, signage is recommended at these crossings indicating that the public should not attempt to cross that location when water is present over the roadway. These crossings are listed below and shown on Figure 5:

- Cow Track Drive at Paint Pony Drive (both intersections of these roads)
- Concho Lane at tributary to Galloway Wash
- Carefree Drive near Dog Leg Drive
- Celestial Street at tributary to Galloway Wash
- Double Eagle Drive at tributary to Galloway Wash
- Carefree Drive near Mule Train Road
- Grapevine Road near Horizon Drive
- Sundance Trail near Cave Creek Road
- Hum Road near Cave Creek Road
- Carefree Drive near Cave Creek Road
- Tranquil Trail near Cave Creek Road
- Primrose Path near Cave Creek Road
- Long Rifle Road near Cave Creek Road
- Carefree Highway near Whileaway Road
- Twilight Trail near Venus View
- Wildflower Road near Romping Road
- Carefree Drive near Lazy Burro Road
- Bivouac Trail near Carefree Drive
- Silver Saddle Drive at tributary to Galloway Wash
- Carefree Highway near Terravita
- Wildflower Road near Tree Lined Trail

Depth Markers

The installation of depth markers may provide an increased level of safety if installed at all crossings where flow over the road is anticipated. Additionally, depth markers can be coordinated with trailhead markers or information if the Town chooses to adopt trails along major wash corridors in the future.

Flood Warning System Gauges

The installation of stream flow gauges or precipitation gauges in the upper part of the watershed could be used to create a flood warning system for the Town. The Flood Control District of Maricopa County (FCDMC) operates and maintains the ALERT (Automated Local Evaluation in Real Time) system, which contributes to the early detection of flooding by measuring rainfall and streamflow using gauge sensors. If ALERT gauges were installed in the watershed, the lag time could be related to the crossings and a warning system developed. Coordination and implementation of this system should be accomplished through the FCDMC.

Distribution to Emergency Personnel

A copy of this report should be distributed to local emergency personnel as a general guide. Figure 4 is particularly useful as it summarizes the crossings that are anticipated to be impassable during major flood events. As improvements are made, a map should be distributed to emergency personnel indicating passable routes.

Limitations

Many assumptions are inherent to the hydrologic and hydraulic analyses used to calculate the depths, velocities, and durations used to determine the passability of roadway crossings. During flood flows over roadways, many other hazards exist at road crossings during flood events in addition to water flow quantity and duration. Additionally, it is impossible to predict the duration, intensity, and frequency of storms that may happen in the Carefree watershed in the future.

Although there are 16 other road crossings that currently violate the Town's new construction criteria fro flow depsth over the road during the 100-year flood, the depth at these crossings is below the threshold of 1.0 feet of depth used fro evaluating accesisbility in this study. The new construction criteria of 0.5 feet of depth over the road is not inteneded to be retroactive to all exosting crossings. This is true thorughout the unincorporated areas of Maricopa County as well. If these crossings are improved in the future they should be reconstructed to meet the new construction criteria.

References

Abt, S.R., Wittler, R.J., Taylor, A., and D.J. Love. Human Stability in a High Flood Hazard Zone. American Water Resources Association, Water Resources Bulletin, 25(4) 881-889. August 1989.

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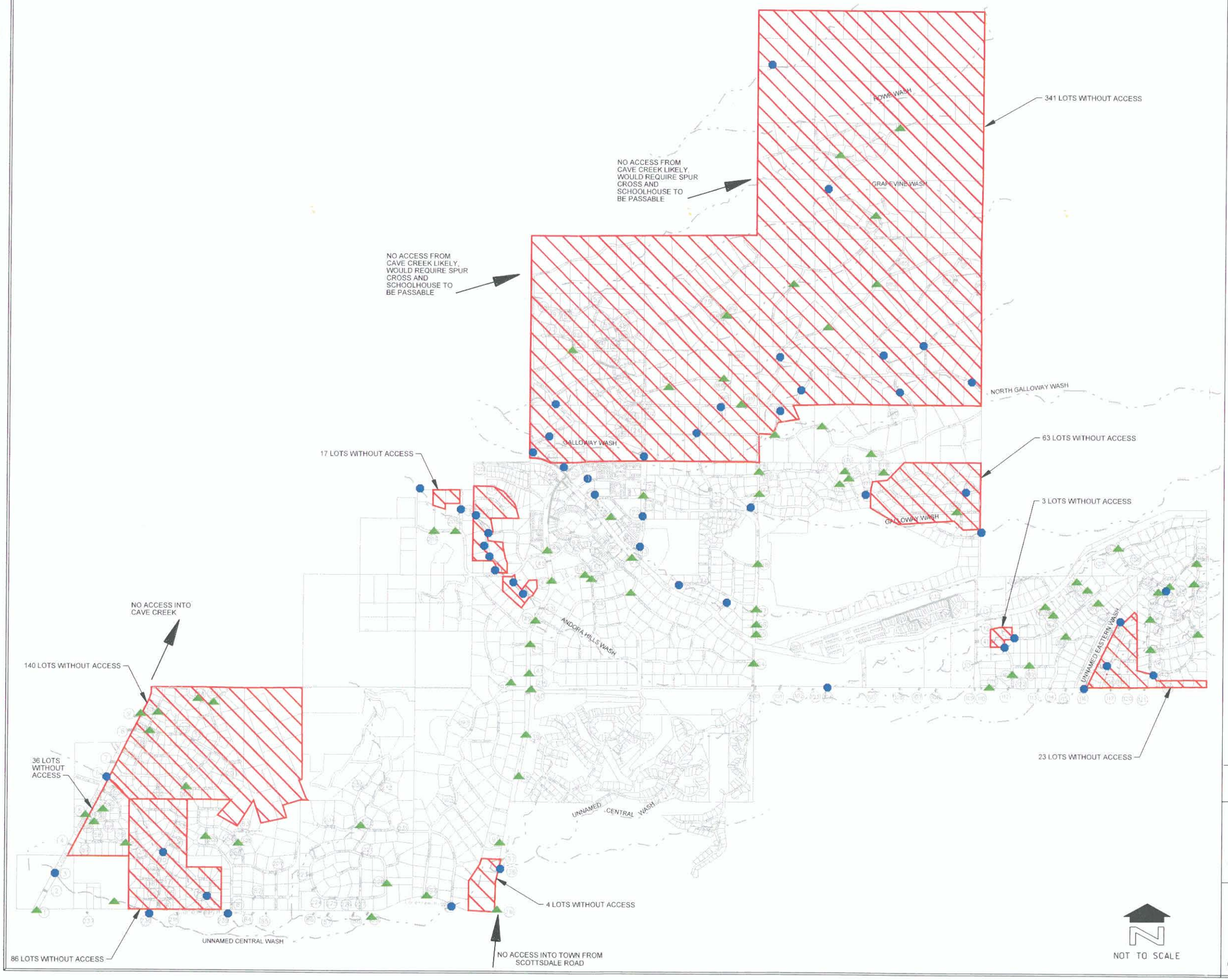

LEGEND

- PARCEL INACCESSIBLE DURING 100-YR. FLOOD EVENT
- FLOW OVER ROAD (PASSABLE, > 15 CFS)
- IMPASSABLE DURING 100-YR. EVENT (> 1' DEPTH OR D x V > 10)

NOTES

EXISTING CONDITIONS DURING 100-YR. FLOOD.

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

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FIGURE 3 - EXISTING CONDITIONS
100-YR. FLOOD EVENT ACCESS MAP
67% OF PARCELS ACCESSIBLE
CAREFREE DRAINAGE MASTER PLAN

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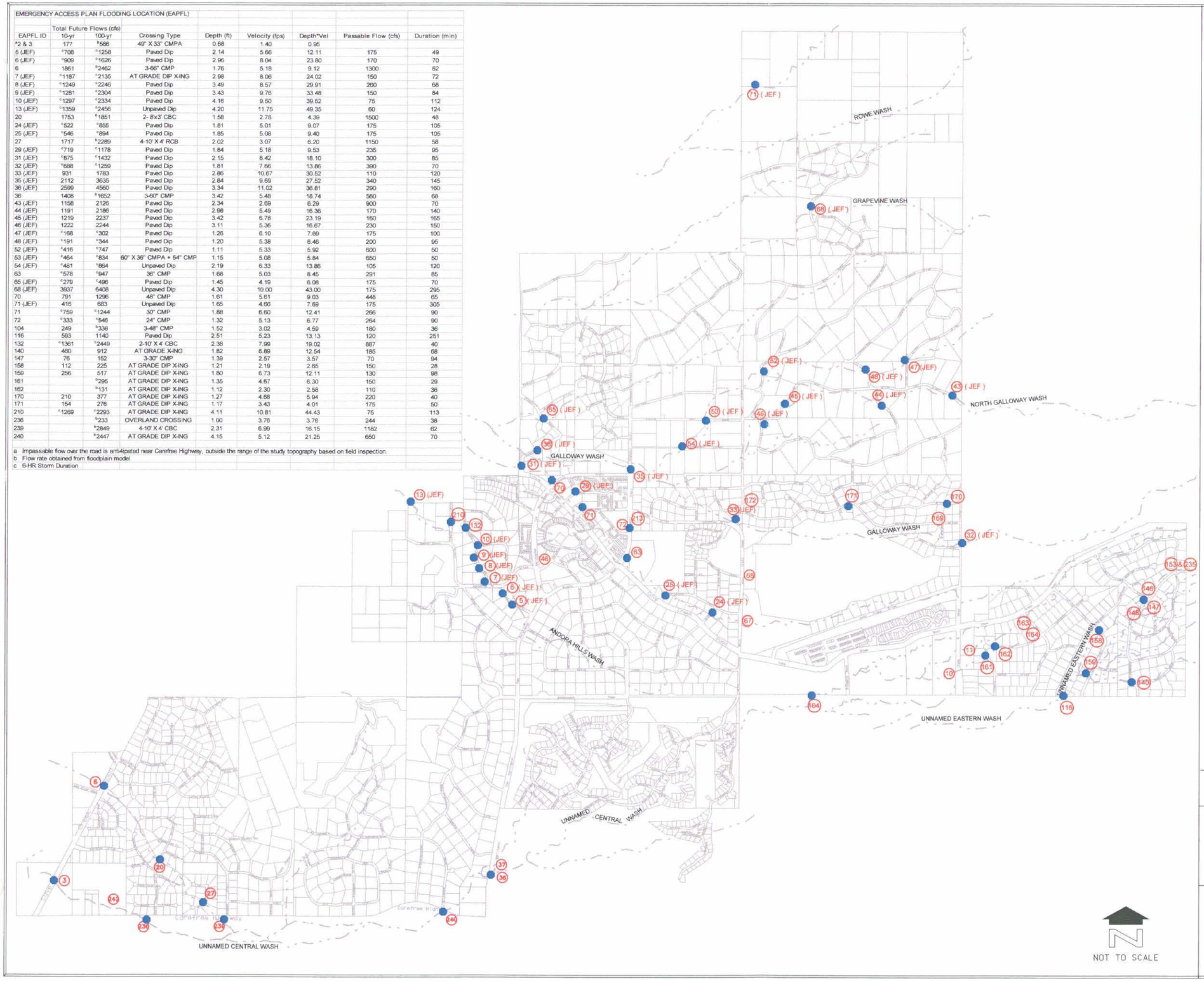
EMERGENCY ACCESS PLAN FLOODING LOCATION (EAPFL)

EAPFL ID	Total Future Flows (cfs) 10-yr	100-yr	Crossing Type	Depth (ft)	Velocity (fps)	Depth*Vel	Passable Flow (cfs)	Duration (min)
*2 & 3	177	[a]596	49" X 33" CMPA	0.68	1.40	0.95		
5 (JEF)	[c]708	[c]1258	Paved Dip	2.14	5.66	12.11	175	49
6 (JEF)	[c]909	[c]1626	Paved Dip	2.96	8.04	23.80	170	70
6	1861	[b]2462	3-66" CMP	1.76	5.18	9.12	1300	62
7 (JEF)	[c]1187	[c]2135	AT GRADE DIP X-ING	2.98	8.06	24.02	150	72
8 (JEF)	[c]1249	[c]2246	Paved Dip	3.49	8.57	29.91	260	68
9 (JEF)	[c]1281	[c]2304	Paved Dip	3.43	9.76	33.48	150	84
10 (JEF)	[c]1297	[c]2334	Paved Dip	4.16	9.50	39.52	75	112
13 (JEF)	[c]1359	[c]2456	Unpaved Dip	4.20	11.75	49.35	60	124
20	1753	[b]1851	2- 8'x3' CBC	1.58	2.78	4.39	1500	48
24 (JEF)	[c]522	[c]855	Paved Dip	1.81	5.01	9.07	175	105
25 (JEF)	[c]546	[c]894	Paved Dip	1.85	5.08	9.40	175	105
27	1717	[b]2289	4-10' X 4' RCB	2.02	3.07	6.20	1150	58
29 (JEF)	[c]719	[c]1178	Paved Dip	1.84	5.18	9.53	235	95
31 (JEF)	[c]875	[c]1432	Paved Dip	2.15	8.42	18.10	300	85
32 (JEF)	[c]688	[c]1259	Paved Dip	1.81	7.66	13.86	390	70
33 (JEF)	931	1783	Paved Dip	2.86	10.67	30.52	110	120
35 (JEF)	2112	3635	Paved Dip	2.84	9.69	27.52	340	145
36 (JEF)	2599	4560	Paved Dip	3.34	11.02	36.81	290	160
36	1408	[b]1652	3-60" CMP	3.42	5.46	18.74	560	68
43 (JEF)	1158	2126	Paved Dip	2.34	2.69	6.29	900	70
44 (JEF)	1191	2186	Paved Dip	2.98	5.49	16.36	170	140
45 (JEF)	1219	2237	Paved Dip	3.42	6.78	23.19	160	165
46 (JEF)	1222	2244	Paved Dip	3.11	5.36	16.67	230	150
47 (JEF)	[c]168	[c]302	Paved Dip	1.26	6.10	7.69	175	100
48 (JEF)	[c]191	[c]344	Paved Dip	1.20	5.38	6.46	200	95
52 (JEF)	[c]416	[c]747	Paved Dip	1.11	5.33	5.92	600	50
53 (JEF)	[c]464	[c]834	60" X 36" CMPA + 54" CMP	1.15	5.08	5.84	650	50
54 (JEF)	[c]481	[c]864	Unpaved Dip	2.19	6.33	13.86	105	120
63	[c]578	[c]947	36" CMP	1.68	5.03	8.45	291	85
65 (JEF)	[c]279	[c]496	Paved Dip	1.45	4.19	6.08	175	70
68 (JEF)	3937	6408	Unpaved Dip	4.30	10.00	43.00	175	295
70	791	1296	48" CMP	1.61	5.61	9.03	448	65
71 (JEF)	416	683	Unpaved Dip	1.65	4.66	7.69	175	305
71	[c]759	[c]1244	30" CMP	1.88	6.60	12.41	266	90
72	[c]333	[c]546	24" CMP	1.32	5.13	6.77	264	90
104	249	[b]338	3-48" CMP	1.52	3.02	4.59	180	36
116	593	1140	Paved Dip	2.51	5.23	13.13	120	251
132	[c]1361	[c]2449	2-10' X 4' CBC	2.38	7.99	19.02	887	40
140	460	912	AT GRADE X-ING	1.82	6.89	12.54	185	68
147	76	152	3-30" CMP	1.39	2.57	3.57	70	94
158	112	225	AT GRADE DIP X-ING	1.21	2.19	2.65	150	28
159	266	517	AT GRADE DIP X-ING	1.80	6.73	12.11	130	98
161		[b]295	AT GRADE DIP X-ING	1.35	4.67	6.30	150	29
162		[b]131	AT GRADE DIP X-ING	1.12	2.30	2.58	110	36
170	210	377	AT GRADE DIP X-ING	1.27	4.68	5.94	220	40
171	154	276	AT GRADE DIP X-ING	1.17	3.43	4.01	175	50
210	[c]1269	[c]2293	AT GRADE DIP X-ING	4.11	10.81	44.43	75	113
236		[b]233	OVERLAND CROSSING	1.00	3.76	3.76	244	38
239		[b]2849	4-10' X 4' CBC	2.31	6.99	16.15	1182	62
240		[b]2447	AT GRADE DIP X-ING	4.15	5.12	21.25	650	70

a Impassable flow over the road is anti4ipated near Carefree Highway, outside the range of the study topography based on field inspection.
b Flow rate obtained from floodplain model
c 6-HR Storm Duration



LEGEND

71 DRAINAGE FEATURE NUMBER IDENTIFIER

IMPASSABLE DURING 100-YR EVENT (>1' DEPTH OR D x V > 10)

NOTES

CULVERT LOCATIONS TAKEN FROM VARIOUS IMPROVEMENT PLANS, AS-BUILT PLANS, REPORTS, AND FIELD SURVEYS.

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

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FIGURE 4

100-YR. EVENT EXISTING CONDITIONS

IMPASSABLE ROAD CROSSINGS

CAREFREE DRAINAGE MASTER PLAN

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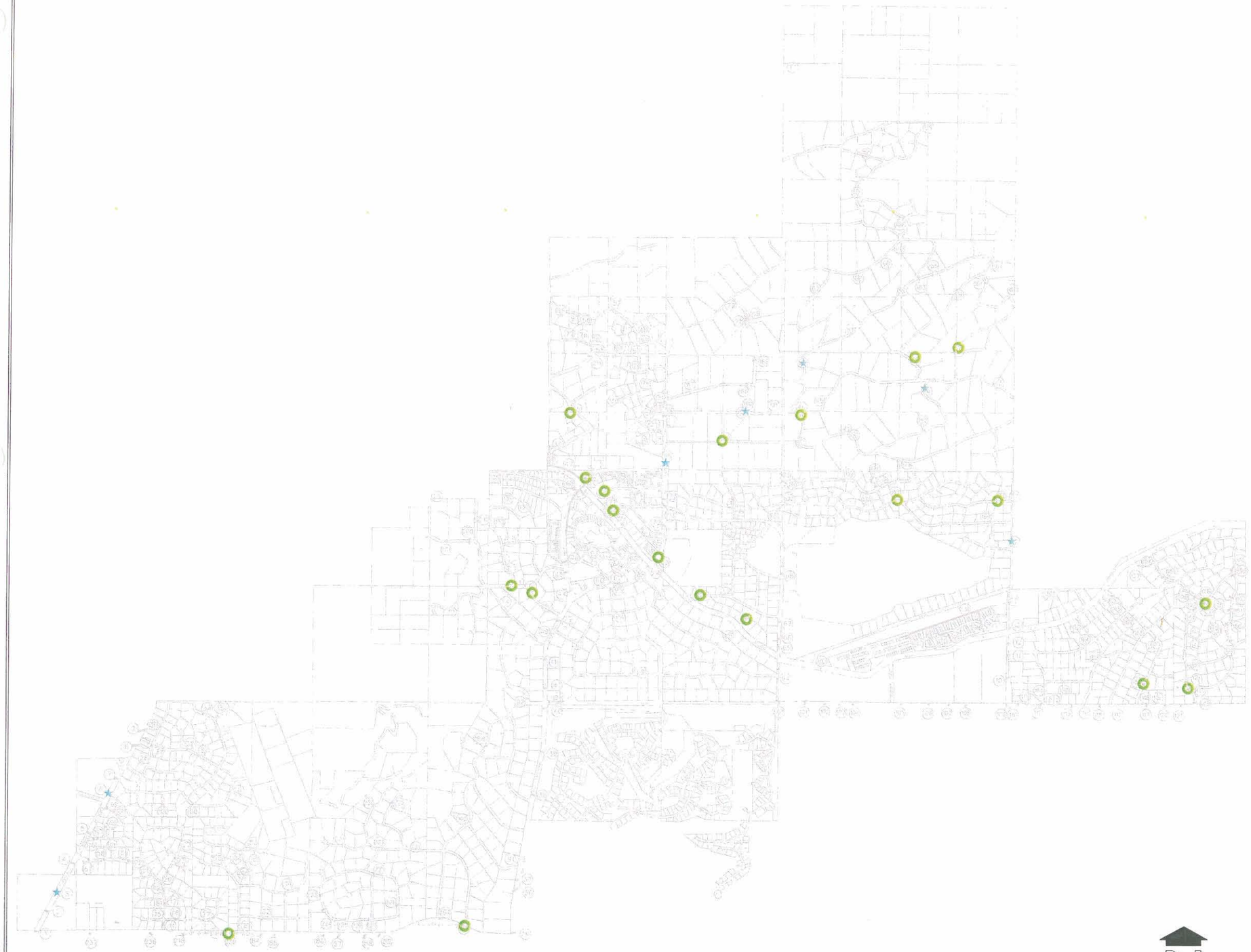

NOT TO SCALE

LEGEND

- ADVANCED STUDY SITES
- RECOMMENDED SIGNAGE LOCATIONS

NOTES

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

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FIGURE 5

PRELIMINARY DESIGN SITES AND
SIGNAGE LOCATIONS

CAREFREE DRAINAGE MASTER PLAN

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LEGEND

- IMPASSABLE DURING 100-YR. EVENT (> 1' DEPTH OR D x V > 10)
- IMPROVEMENTS MADE TO MAKE CROSSING PASSABLE
- PARCELS INACCESIBLE DURING 100-YR. FLOOD EVENT

NOTES

ASSUMPTIONS:

1. CAVE CREEK ROAD THROUGH CAVE CREEK WILL ALLOW ACCESS TO TOM DARLINGTON.
2. IMPROVEMENTS IDENTIFIED WITH GREEN CIRCLE HAVE BEEN UPGRADED AND ARE PASSABLE.

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

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FIGURE 6 - STAGE 1 IMPROVEMENTS
100-YR. FLOOD EVENT ACCESS PLAN
90% OF PARCELS ACCESSIBLE
CAREFREE DRAINAGE MASTER PLAN

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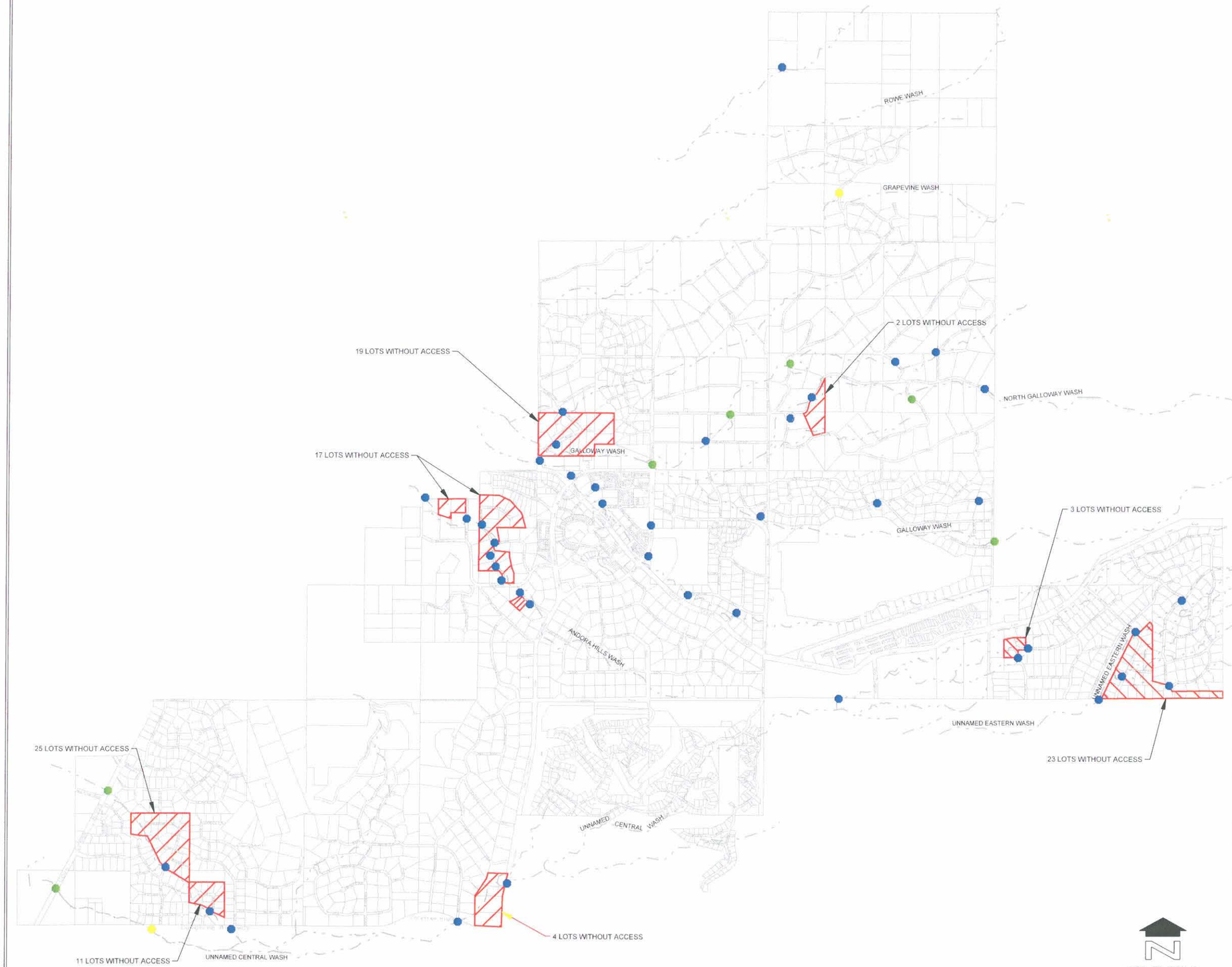

LEGEND

- IMPASSABLE DURING 100-YR. EVENT (> 1' DEPTH OR D x V > 10)
- IMPROVEMENTS MADE TO MAKE CROSSING PASSABLE
- IMPROVEMENTS THAT MEET PROJECT CRITERIA (SEE NOTES, BELOW)
- PARCELS INACCESIBLE DURING 100-YR. FLOOD EVENT

NOTES

ASSUMPTIONS:

1. CAVE CREEK ROAD THROUGH CAVE CREEK WILL ALLOW ACCESS TO TOM DARLINGTON.

2. IMPROVEMENTS IDENTIFIED WITH GREEN CIRCLE HAVE BEEN UPGRADED AND ARE PASSABLE.

PROJECT CRITERIA:

1. NO MORE THAN 30 SINGLE FAMILY RESIDENTIAL LOTS PER CROSSING OR EQUIVALENT, ARE INACCESSIBLE DUE TO 100-YEAR EVENT FLOOD FLOWS.

2. NO LOT IS INACCESSIBLE FOR MORE THAN 12 HOURS.

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

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FIGURE 7 - STAGE 2 IMPROVEMENTS
100-YR. EVENT ACCESS PLAN
95% OF PARCELS ACCESSIBLE
CAREFREE DRAINAGE MASTER PLAN

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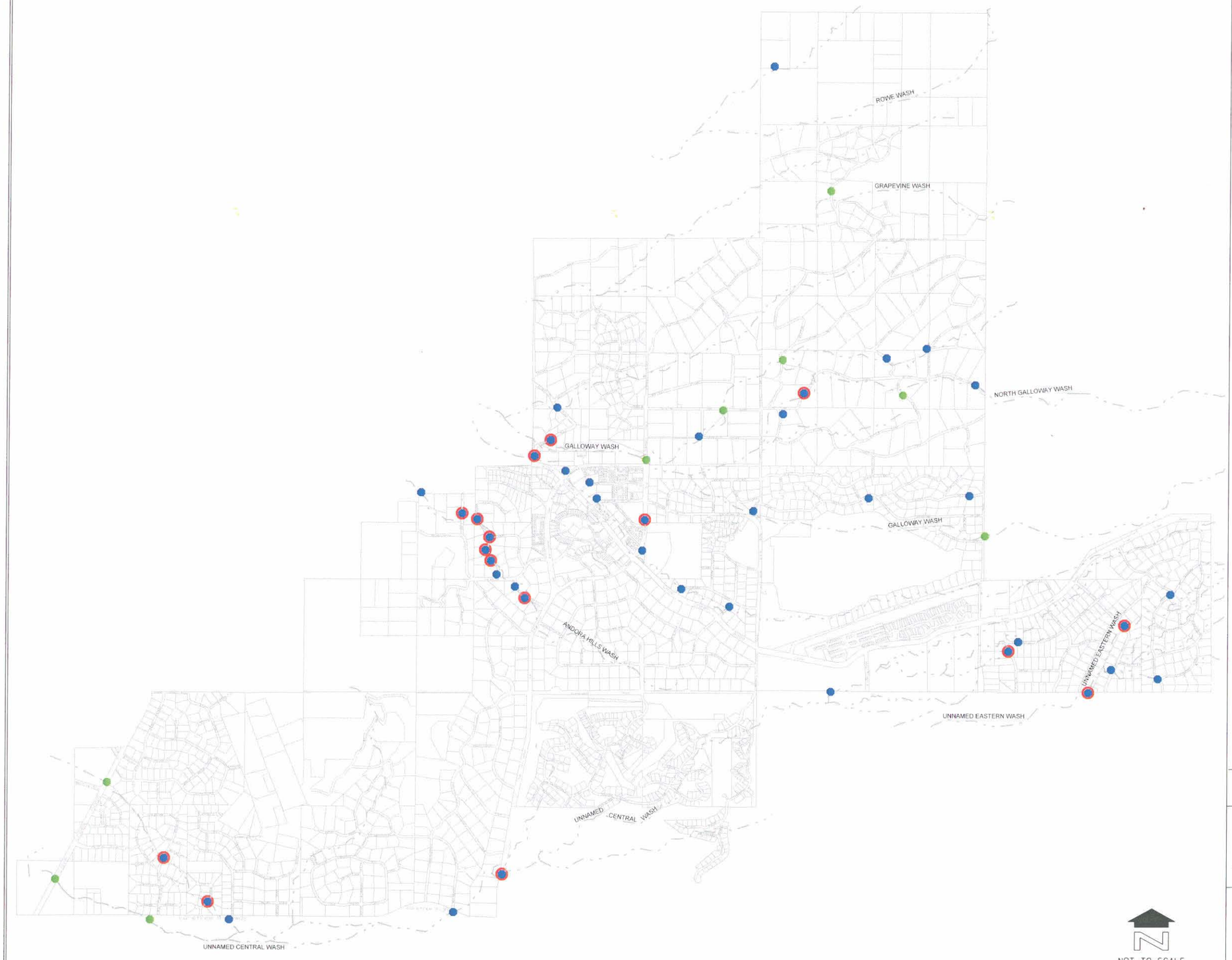

LEGEND

- IMPASSABLE DURING 100-YR. EVENT (> 1' DEPTH OR D x V > 10)
- IMPROVEMENTS MADE TO MAKE CROSSING PASSABLE
- IMPROVEMENTS NECCESARY FOR 100% ACCESSIBILITY, ALL PARCELS IN TOWN ACCESSIBLE

NOTES

ASSUMPTIONS:

1. CAVE CREEK ROAD THROUGH CAVE CREEK WILL ALLOW ACCESS TO TOM DARLINGTON.

2. IMPROVEMENTS IDENTIFIED WITH GREEN CIRCLE HAVE BEEN UPGRADED AND ARE PASSABLE.

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

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FIGURE 8 - STAGE 3 IMPROVEMENTS

100-YR. EVENT ACCESS PLAN

100% OF PARCELS ACCESSIBLE

CAREFREE DRAINAGE MASTER PLAN

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Appendix A - Table 2

EMERGENCY ACCESS PLAN FLOODING LOCATION (EAPFL)												
IMPASSABLE ROAD CROSSINGS										Hydrograph Used		
	Total Future Flows (cfs)			Overtopping	Overtopping	Overtopping	Culvert	Passable		For Duration		Pro-rated Flow Calculated By
EAPFL ID	10-yr	100-yr	Crossing Type	Depth (ft)	Velocity (fps)	Depth*Vel	Velocity(fps)	Flow[d] (cfs)	Duration (min)	Calculation	HEC-1 Model	Hydrograp Basin
[a] 2 & 3	177	[b]566	2-71" X 47" CMPA CULVERTS	0.68	1.40	0.95	9.00					
5 (JEF)	[c]708	[c]1258	AT GRADE CROSSING (PAVED)	2.14	5.66	12.11	n/a	175	49	AHW1- S320	AW1006F	
6 (JEF)	[c]909	[c]1626	AT GRADE CROSSING (PAVED)	2.96	8.04	23.80	n/a	170	70	C340R	AW1006F	
6	1861	[b]2462	3-66" CMP CULVERTS	1.76	5.18	9.12	13.88	1300	62	CP89	UC10024F	
7 (JEF)	[c]1187	[c]2135	AT GRADE CROSSING	2.98	8.06	24.02		150	72	C340R	AW1006F	
8 (JEF)	[c]1249	[c]2246	AT GRADE CROSSING (PAVED)	3.49	8.57	29.91	n/a	260	68	340350	AW1006F	
9 (JEF)	[c]1281	[c]2304	AT GRADE CROSSING (PAVED)	3.43	9.76	33.48	n/a	150	84	340350	AW1006F	
10 (JEF)	[c]1297	[c]2334	AT GRADE CROSSING (PAVED)	4.16	9.50	39.52	n/a	75	112	C350	AW1006F	
13 (JEF)	[c]1359	[c]2456	AT GRADE CROSSING	4.20	11.75	49.35	n/a	60	124	C350	AW1006F	
20	1753	[b]1851	2- 8'x3' CBC CULVERTS	1.58	2.78	4.39	11.72	1500	48	CP84	UC10024F	
24 (JEF)	[c]522	[c]855	AT GRADE CROSSING (PAVED)	1.81	5.01	9.07	n/a	175	105	GWW1_5	GW1006F	
25 (JEF)	[c]546	[c]894	AT GRADE CROSSING (PAVED)	1.85	5.08	9.40	n/a	175	105	GWW1_5	GW1006F	
27	1717	[b]2289	4-10' X 4' RCB CULVERTS	2.02	3.07	6.20	12.79	1150	58	CP84	UC10024F	
29 (JEF)	[c]719	[c]1178	AT GRADE CROSSING (PAVED)	1.84	5.18	9.53	n/a	235	95	GWW1_5	GW1006F	
31 (JEF)	[c]875	[c]1432	AT GRADE CROSSING (PAVED)	2.15	8.42	18.10	n/a	300	85	GWW1_5	GW1006F	
32 (JEF)	[c]688	[c]1259	AT GRADE CROSSING (PAVED)	1.81	7.66	13.86	n/a	390	70	GWW1_2	GW1006F	
33 (JEF)	931	1783	AT GRADE CROSSING (PAVED)	2.86	10.67	30.52	n/a	110	120	CP285	GW10024F	
35 (JEF)	2112	3635	AT GRADE CROSSING (PAVED)	2.84	9.69	27.52	n/a	340	145	CP286	GW10024F	
36 (JEF)	2599	4560	AT GRADE CROSSING (PAVED)	3.34	11.02	36.81	n/a	290	160	CP287	GW10024F	
36	1408	[b]1652	3-60" CMP CULVERT	3.42	5.48	18.74	12.55	560	68	CP3149	UC10024F	92.6% of UC50 and 100% of CP3149
43 (JEF)	1158	2126	AT GRADE CROSSING (PAVED)	2.34	2.69	6.29	n/a	900	70	GWW1_1	GW10024F	
44 (JEF)	1191	2186	AT GRADE CROSSING (PAVED)	2.98	5.49	16.36	n/a	170	140	GWW1_1	GW10024F	
45 (JEF)	1219	2237	AT GRADE CROSSING (PAVED)	3.42	6.78	23.19	n/a	160	165	CP286R	GW10024F	
46 (JEF)	1222	2244	AT GRADE CROSSING (PAVED)	3.11	5.36	16.67	n/a	230	150	CP286R	GW10024F	
47 (JEF)	[c]168	[c]302	AT GRADE CROSSING (PAVED)	1.26	6.10	7.69	n/a	175	100	GWW1_4	GW1006F	
48 (JEF)	[c]191	[c]344	AT GRADE CROSSING (PAVED)	1.20	5.38	6.46	n/a	200	95	GWW1_4	GW1006F	
52 (JEF)	[c]416	[c]747	AT GRADE CROSSING (PAVED)	1.11	5.33	5.92	n/a	600	50	GWW1_4	GW1006F	
53 (JEF)	[c]464	[c]834	60" X 36" CMPA + 54" CMP CULVERTS	1.15	5.08	5.84	9.39	650	50	GWW1_4	GW1006F	
54 (JEF)	[c]481	[c]864	AT GRADE CROSSING	2.19	6.33	13.86	n/a	105	120	GWW1_4	GW1006F	
63	[c]578	[c]947	36" CMP CULVERT	1.68	5.03	8.45	10.75	291	85	GWW1_5	GW1006F	
65 (JEF)	[c]279	[c]496	AT GRADE CROSSING (PAVED)	1.45	4.19	6.08	n/a	175	70	GWW1_6	GW1006F	
68 (JEF)	3937	6408	AT GRADE CROSSING	4.30	10.00	43.00	n/a	175	295	GVW2	GW10024F	
70	791	1296	48" CMP CULVERT	1.61	5.61	9.03	11.90	448	65	GWW1_5	GW10024F	
71 (JEF)	416	683	AT GRADE CROSSING	1.65	4.66	7.69	n/a	175	305	GVW1	GW10024F	
71	[c]759	1244	30" CMP CULVERT	1.88	6.60	12.41	9.37	266	90	GWW1_5	GW1006F	
72	[c]333	[c]546	24" CMP CULVERT	1.32	5.13	6.77	9.36	264	90	GWW1_5	GW1006F	
104	249	[b]338	3-48" CMP CULVERTS	1.52	3.02	4.59	7.95	180	36	CP2223	UC1006F	96.0% of UC29 and 100% of CP2223
116	593	1140	AT GRADE CROSSING (PAVED)	2.51	5.23	13.13	n/a	120	251	CSCP06	NS	10.1% of SCP06 and 100% of CSCP07
132	[c]1361	[c]2449	2-20' X 4' RCB	2.38	7.99	19.02	6.97	887	40	C350	AW1006F	
140	460	912	AT GRADE CROSSING	1.82	6.89	12.54	n/a	185	68	CSCP08	NS	52.2% of SCP7E and 100% of CSCP08
147	76	152	3-30" CMP CULVERTS	1.39	2.57	3.57	3.73	150	94	SCP-7a	NS	58.0 % of SCP7A
158	112	225	AT GRADE CROSSING	1.21	2.19	2.65	n/a	150	28	SCP-7a	NS	85.4 % of SCP7A
159	256	517	AT GRADE CROSSING	1.80	6.73	12.11	n/a	130	98	CSCP08	NS	100.0% of SCP7A
161		[b]295	AT GRADE CROSSING	1.35	4.67	6.30	n/a	150	29	SCP4B	NS	85.9% of SCP4B
162		[b]131	AT GRADE CROSSING	1.12	2.30	2.58	n/a	110	36	SCP4B	NS	58.2% of SCP4B
170 (37 JEF)	210	377	AT GRADE CROSSING	1.27	4.68	5.94	n/a	220	40	GWW132	GW10024F	
171	154	276	AT GRADE CROSSING	1.17	3.43	4.01	n/a	175	50	GWW133	GW10024F	
210	[c]1269	[c]2293	AT GRADE CROSSING (PAVED)	4.11	10.81	44.43	n/a	75	113	C350	AW1006F	
236		[b]233	AT GRADE CROSSING	1.00	3.76	3.76	n/a	244	38	RD84IN	UC10024F	
239		[b]2849	4-10' X 4' CBC	2.31	6.99	16.15	14.15	1182	62	CP84	UC10024F	
240		[b]2447	AT GRADE DIP CROSSING	4.15	5.12	21.25	n/a	650	70	CP5157	UC10024F	

a Impassable flow over the road is anticipated near Carefree Highway, outside the range of the study topography based on field inspection.
b Flow rate obtained from floodplain model
c 6-HR storm duration
d Passable flow is the total combined flow from the culvert (if applicable) plus the flow over the road that combined results in a flow less than 1 foot over the road.

Appendix B - Calculations

Presented Locations:

- Cave Creek North of Carefree Highway (#2 and #3)
- Bivouac Trail (JEF #5)
- Bivouac Trail Near Carefree Drive (JEF #6)
- Culvert No. 6, Unnamed Central Wash
- Carefree Drive at Lazy Burro Road (JEF #7)
- Lazy Burro Road Between Holiday Lane and Carefree Drive (JEF #8 and #9)
- Holiday Lane at Lazy Burro Road (JEF #10
- Military Road at Town Boundary with Cave Creek (JEF #13)
- Carefree Mountain Drive (#20)
- Long Rifle Road Near Cave Creek Road (JEF #24)
- Primrose Path Near Cave Creek Road (JEF #25)
- Los Reales Drive at Gated Community (#27)
- Hum Road Near Cave Creek Road (JEF #29)
- Scopa Trail North of Cave Creek Road (JEF #31)
- Pima Road North of Short Putt Place (JEF #32)
- Carefree Drive Between Mule Train and Pleasant Place (JEF #33)
- Tranquil Trail North of Sundance Trail (JEF #35 and #55)
- Tom Darlington (#36)
- Scopa Trail (JEF #36)
- Cow Track at Scottsdale Boundary (JEF #43)
- Sombrero Road (JEF #44)
- Cow Track Drive East of Paint Pony Drive (JEF #45)
- Silver Saddle Drive (JEF #47)
- Concho Lane
- Golden Star Lane

- Rising Sun Road (JEF #53)
- Celestial Street (JEF #54)
- Tranquil Trail at Cave Creek Road (#63)
- Grapevine Road North of Scopa Trail (JF #65)
- Father Keno Trail (JEF #68)
- Sundance Trail Near Cave Creek Road (#70)
- Carefree Drive Near Cave Creek Road (#71, JEF #27)
- Unnamed Road North of Grapevine Road (JEF #71)
- Tranquil Trail North of Happy Hollow Drive (#72)
- Stagecoach Pass Between Windmill Road and Mule Train Road (#104)
- Stagecoach Pass (#116)
- Lazy Burro Road at Terrace Estates Circle (#132)
- Wild Flower Road (#140)
- Wild Flower Road at Tree Lined Trail (#146)
- Twilight Trail (#158)
- Twilight Trail (#159)
- Placid Place (#161)
- Venus Drive (#162)
- Double Eagle Drive West of Pima Road (#170)
- Carefree Drive East of Foursome Way (#171)
- Piedra Grande Drive at Andora Hills Wash (#210)
- Carefree Highway West of Carefree Mountain Drive (#236)
- Terravita Way (#239)
- Carefree Highway East of Stagecoach Pass (#240)

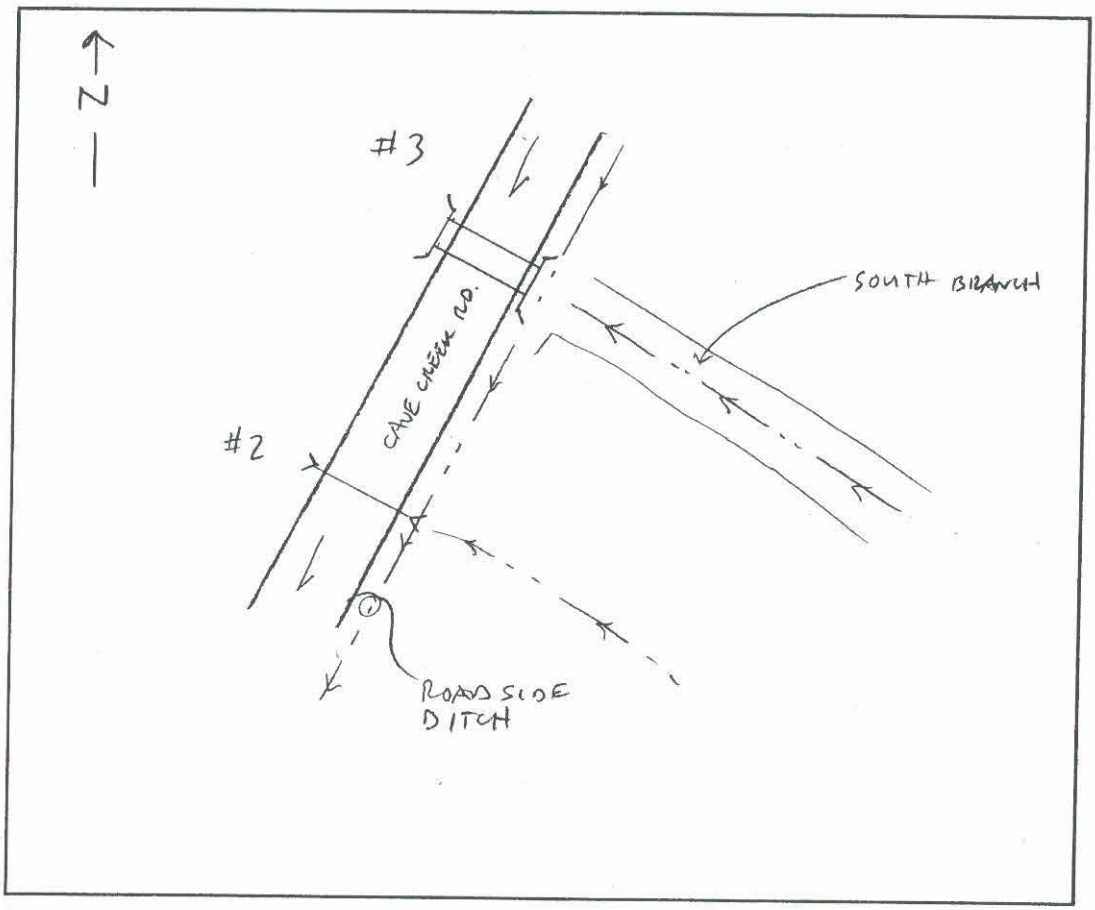
Cave Creek North of Carefree Highway (#2 and #3)

Carefree Drainage Master Plan
Field Survey Notes

Culvert Number: #2 & #3

Date of Survey: AS-BUILTS OBTAINED

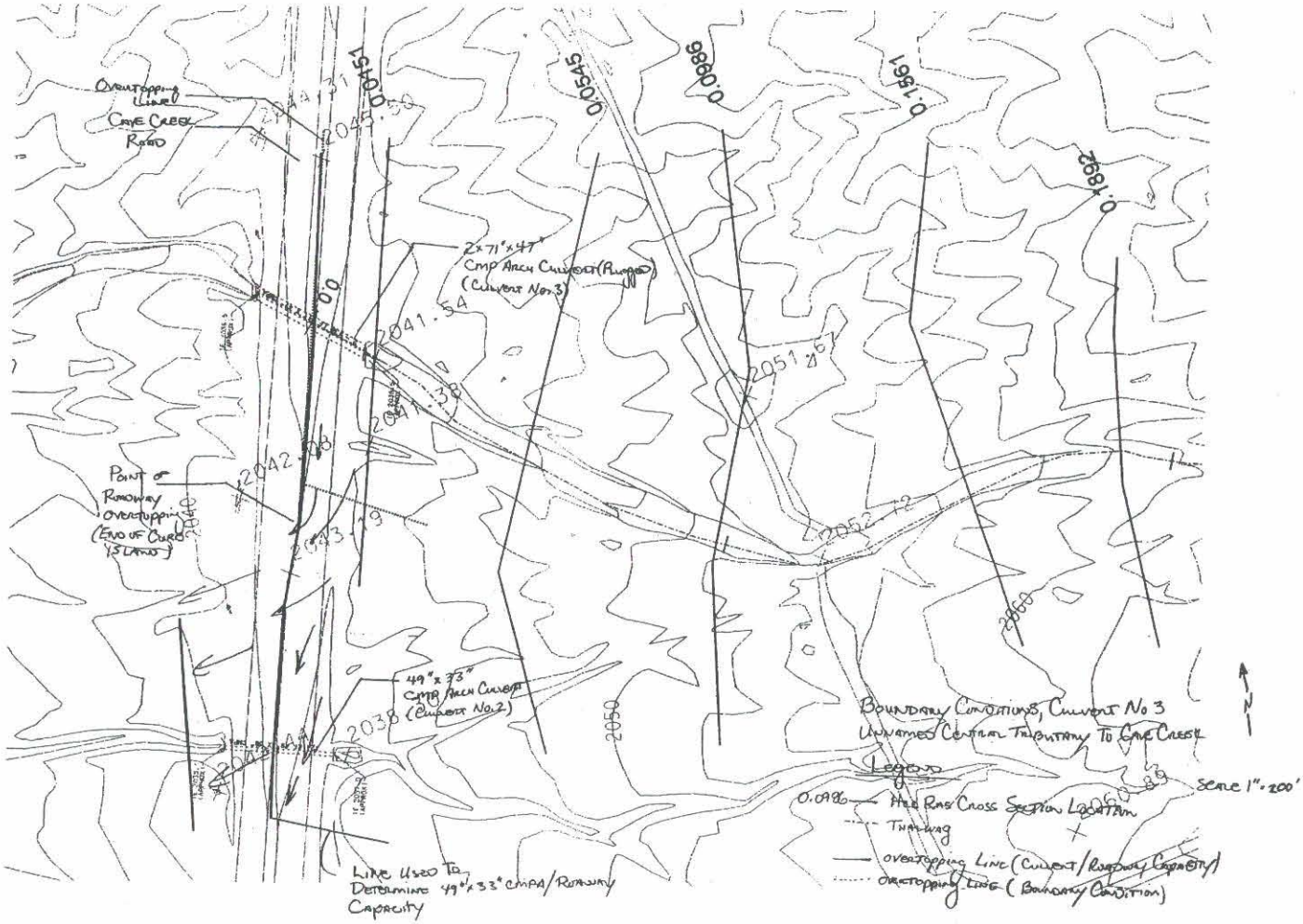
Location: CAVE CREEK ROAD AT UNNAMED CENTRAL TRIBUTARY TO CAVE CREEK - SOUTH BRANCH



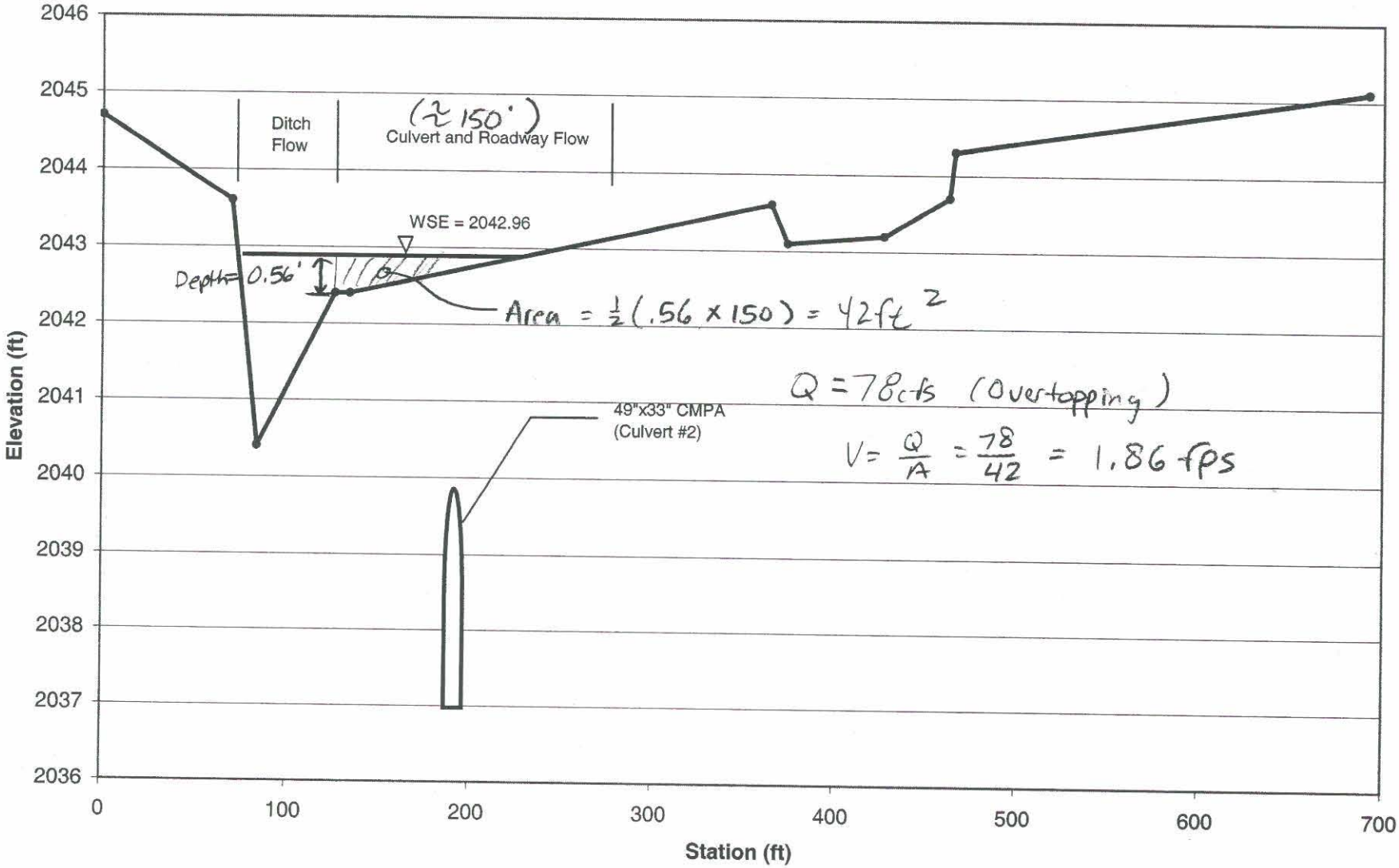
Material: #2 49"x33" CMPA #3 2-71"x47" CMPA

Headwall: YES

Notes: 2-71"x47" CMPA ARE ALMOST COMPLETELY FILLED WITH SEDIMENT, THE CULVERTS WILL BE IGNORED IN ANALYSIS. A RATING CURVE FOR BOTH THE ROAD SIDE DITCH AND THE CULVERT #2 AND ROAD OVERTOPPING WAS ESTABLISHED TO MORE APPROPRIATELY MODEL THE HYDRAULIC CHARACTERISTICS OF THIS STRUCTURE. FLOW AT #3 CULVERTS POND AT ROAD WAY AND SPILL INTO ROAD SIDE DITCH. DUE TO THE SLOPE OF CAVE CREEK ROAD, OVERTOPPING WILL NOT OCCUR DIRECTLY OVER #3 CULVERTS.


Overtopping Line
Cave Creek Road
2x71"x47" CMP Arch Culvert (Ruined) (Culvert No. 3)
Point of Roadway Overtopping (End of Curb Island)
49"x33" CMP Arch Culvert (Culvert No. 2)
Line Used To Determine 49"x33" CMPA/Roadway Capacity
Boundary Conditions, Culvert No 3
Unnamed Central Tributary To Cave Creek
Legend
Hec Ras Cross Section Location
Thalweg
Overtopping Line (Culvert/Roadway Capacity)
Overtopping Line (Boundary Condition)
Scale 1" = 200'
N

Cave Creek Overtopping at Culvert #2



Summary Table
Rating Analysis for Culvert #2 on Cave Creek Road

Ditch Section		Culvert and Roadway	
Water Surface Elevation (ft)	Discharge (cfs)	HW Elev. (ft)	Discharge (cfs)
2,042.12	144	2,036.95	0
2,042.16	153	2,038.10	10
2,042.20	163	2,038.69	20
2,042.24	172	2,039.19	30
2042.28	183	2,039.64	40
2042.32	193	2,040.06	50
2042.36	204	2,040.55	60
2042.4	195	2,041.77	70
2042.44	210	2,042.61	80
2042.48	225	2,042.74	90
2042.52	241	2,042.82	100
2042.56	257	2,042.88	110
2042.6	274	2,042.94	120
-	-	2042.96 *(1)	125 *(1)
2042.64	291	2,042.98	130
2042.68	308	2,043.03	140
2042.72	326	2,043.07	150
2042.76	344	2,043.10	160
2042.8	363	2,043.13	170
2042.84	382	2,043.16	180
2042.88	402	2,043.19	190
2042.92	422	2,043.22	200
2042.96	442	2043.24	210
2043	463	2,043.26	220
2043.04	484	2,043.28	230
2043.08	505	2,043.30	240
2043.12	527	2,043.32	250
2043.16	549	2,043.34	260
2043.2	572	2,043.35	270
2043.24	595	2,043.37	280
2043.28	618	2,043.39	290
2043.32	642	2,043.40	300 ← Impassable Flow (1' Depth) = 990 cfs
2043.36	666	2,043.42	310
2043.4	690 ←	2,043.43	320
2043.44	715	2,043.45	330
2043.48	740	2,043.46	340
2043.52	766	2,043.48	350
2043.56	792	2,043.49	360
2043.6	818	2,043.50	370
2043.64	835	2,043.51	380
2043.68	854	2,043.53	390
2043.72	800	2,043.54	400
2043.76	805	2,043.55	410
2043.8	812	2,043.56	420
2043.84	821	2,043.58	430
2043.88	830	2,043.59	440
2043.92	841	2,043.60	450
2043.96	853	2,043.61	460

Note :(1) This Value was obtained by interpolating between 2042.94 and 2042.98.

Approximate Headwater Elevation = 2042.96

Table
Rating Table for Irregular Channel

Project Description	
Worksheet	Cave Creek Ditch Capacity South
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Input Data	
Slope	0.005540 ft/ft

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Method	Improved Lotter's Method
Closed Channel Weighting Metho	Horton's Method

Attribute	Minimum	Maximum	Increment
Water Surface Elevation (ft)	2,040.80	2,045.00	0.04

Water Surface Elevation (ft)	Discharge (cfs)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
2,040.80	2.95	1.45	2.0	10.20	10.15
2,040.84	3.80	1.55	2.5	11.23	11.16
2,040.88	4.79	1.64	2.9	12.25	12.18
2,040.92	5.93	1.73	3.4	13.27	13.19
2,040.96	7.23	1.82	4.0	14.29	14.21
2,041.00	8.69	1.90	4.6	15.31	15.22
2,041.04	10.32	1.99	5.2	16.33	16.24
2,041.08	12.13	2.07	5.9	17.35	17.25
2,041.12	14.13	2.15	6.6	18.37	18.27
2,041.16	16.32	2.23	7.3	19.39	19.28
2,041.20	18.71	2.30	8.1	20.41	20.30
2,041.24	21.31	2.38	9.0	21.43	21.31
2,041.28	24.12	2.46	9.8	22.45	22.33
2,041.32	27.16	2.53	10.7	23.47	23.34
2,041.36	30.42	2.60	11.7	24.49	24.36
2,041.40	33.92	2.67	12.7	25.51	25.37
2,041.44	37.66	2.74	13.7	26.53	26.39
2,041.48	41.65	2.81	14.8	27.55	27.40
2,041.52	45.89	2.88	15.9	28.57	28.42
2,041.56	50.39	2.95	17.1	29.59	29.43
2,041.60	55.16	3.02	18.3	30.61	30.45
2,041.64	60.20	3.09	19.5	31.63	31.46
2,041.68	65.52	3.15	20.8	32.65	32.48
2,041.72	71.13	3.22	22.1	33.68	33.49
2,041.76	77.02	3.28	23.5	34.70	34.51
2,041.80	83.21	3.35	24.9	35.72	35.52
2,041.84	89.70	3.41	26.3	36.74	36.54
2,041.88	96.50	3.47	27.8	37.76	37.55
2,041.92	103.61	3.53	29.3	38.78	38.57
2,041.96	111.04	3.60	30.9	39.80	39.58
2,042.00	118.80	3.66	32.5	40.82	40.60
2,042.04	126.89	3.72	34.1	41.84	41.61
2,042.08	135.31	3.78	35.8	42.86	42.63
2,042.12	144.07	3.84	37.5	43.88	43.64

Table
Rating Table for Irregular Channel

Water Surface Elevation (ft)	Discharge (cfs)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
2,042.16	153.18	3.90	39.3	44.90	44.66
2,042.20	162.64	3.96	41.1	45.92	45.67
2,042.24	172.46	4.01	43.0	46.94	46.69
2,042.28	182.63	4.07	44.8	47.96	47.70
2,042.32	193.18	4.13	46.8	48.98	48.72
2,042.36	204.10	4.19	48.7	50.00	49.73
2,042.40	215.40	4.24	50.7	51.02	50.75
2,042.44	209.89	3.95	53.1	59.24	58.93
2,042.48	225.18	4.06	55.5	59.46	59.10
2,042.52	240.92	4.17	57.8	59.68	59.28
2,042.56	257.09	4.27	60.2	59.90	59.45
2,042.60	273.70	4.37	62.6	60.12	59.62
2,042.64	290.73	4.47	65.0	60.34	59.80
2,042.68	308.19	4.57	67.4	60.56	59.98
2,042.72	326.07	4.67	69.8	60.78	60.15
2,042.76	344.35	4.77	72.2	61.00	60.33
2,042.80	363.05	4.87	74.6	61.22	60.50
2,042.84	382.16	4.96	77.0	61.44	60.67
2,042.88	401.66	5.06	79.5	61.66	60.85
2,042.92	421.57	5.15	81.9	61.88	61.02
2,042.96	441.87	5.24	84.3	62.10	61.20
2,043.00	462.56	5.33	86.8	62.32	61.38
2,043.04	483.64	5.42	89.2	62.54	61.55
2,043.08	505.11	5.51	91.7	62.75	61.72
2,043.12	526.96	5.60	94.2	62.97	61.90
2,043.16	549.19	5.68	96.7	63.19	62.07
2,043.20	571.80	5.77	99.1	63.41	62.25
2,043.24	594.78	5.85	101.6	63.63	62.43
2,043.28	618.14	5.94	104.1	63.85	62.60
2,043.32	641.86	6.02	106.7	64.07	62.78
2,043.36	665.96	6.10	109.2	64.29	62.95
2,043.40	690.42	6.18	111.7	64.51	63.12
2,043.44	715.24	6.26	114.2	64.73	63.30
2,043.48	740.42	6.34	116.8	64.95	63.48
2,043.52	765.96	6.42	119.3	65.17	63.65
2,043.56	791.86	6.50	121.8	65.39	63.83
2,043.60	818.12	6.58	124.4	65.61	64.00
2,043.64	834.77	6.57	127.0	68.19	66.55
2,043.68	854.07	6.58	129.7	70.78	69.09
2,043.72	799.61	6.03	132.5	73.37	71.64
2,043.76	805.28	5.95	135.5	75.95	74.18
2,043.80	812.36	5.87	138.5	78.54	76.73
2,043.84	820.76	5.80	141.6	81.12	79.27
2,043.88	830.41	5.73	144.8	83.71	81.82
2,043.92	841.25	5.68	148.1	86.29	84.36
2,043.96	853.23	5.63	151.6	88.88	86.91
2,044.00	866.32	5.59	155.1	91.47	89.45
2,044.04	880.47	5.55	158.7	94.05	92.00
2,044.08	895.65	5.51	162.5	96.64	94.55
2,044.12	911.85	5.48	166.3	99.22	97.09
2,044.16	929.03	5.46	170.2	101.81	99.64
2,044.20	947.19	5.44	174.3	104.40	102.18
2,044.24	966.30	5.42	178.4	106.98	104.73
2,044.28	986.35	5.40	182.6	109.57	107.27

Table
Rating Table for Irregular Channel

Water Surface Elevation (ft)	Discharge (cfs)	Velocity (ft/s)	Flow Area (ft^2)	Wetted Perimeter (ft)	Top Width (ft)
2,044.32	1,007.34	5.39	187.0	112.15	109.82
2,044.36	1,029.26	5.38	191.4	114.74	112.36
2,044.40	1,052.10	5.37	196.0	117.32	114.91
2,044.44	1,075.85	5.36	200.6	119.91	117.45
2,044.48	1,100.52	5.36	205.4	122.50	120.00
2,044.52	1,126.09	5.36	210.2	125.08	122.55
2,044.56	1,152.58	5.36	215.2	127.67	125.09
2,044.60	1,179.97	5.36	220.2	130.25	127.64
2,044.64	1,208.28	5.36	225.4	132.84	130.18
2,044.68	1,237.49	5.37	230.6	135.42	132.73
2,044.72	1,276.27	5.41	236.0	136.76	134.00
2,044.76	1,324.46	5.49	241.3	136.84	134.00
2,044.80	1,373.33	5.57	246.7	136.92	134.00
2,044.84	1,422.89	5.65	252.1	137.00	134.00
2,044.88	1,473.13	5.72	257.4	137.08	134.00
2,044.92	1,524.04	5.80	262.8	137.16	134.00
2,044.96	1,575.61	5.88	268.1	137.24	134.00
2,045.00	1,627.84	5.95	273.5	137.32	134.00

Rating Table Report
Cave Creek Road Overtopping Analysis

Range Data:			
	Minimum	Maximum	Increment
Discharge	0.00	900.00	10.00 cfs

Discharge (cfs)	HW Elev. (ft)
0.00	2,036.95
10.00	2,038.10
20.00	2,038.69
30.00	2,039.19
40.00	2,039.64
50.00	2,040.06
60.00	2,040.55
70.00	2,041.77
80.00	2,042.61
90.00	2,042.74
100.00	2,042.82
110.00	2,042.88
120.00	2,042.94
130.00	2,042.98
140.00	2,043.03
150.00	2,043.07
160.00	2,043.10
170.00	2,043.13
180.00	2,043.16
190.00	2,043.19
200.00	2,043.22
210.00	2,043.24
220.00	2,043.26
230.00	2,043.28
240.00	2,043.30
250.00	2,043.32
260.00	2,043.34
270.00	2,043.35
280.00	2,043.37
290.00	2,043.39
300.00	2,043.40
310.00	2,043.42
320.00	2,043.43
330.00	2,043.45
340.00	2,043.46
350.00	2,043.48
360.00	2,043.49
370.00	2,043.50
380.00	2,043.51
390.00	2,043.53
400.00	2,043.54
410.00	2,043.55
420.00	2,043.56
430.00	2,043.58
440.00	2,043.59
450.00	2,043.60
460.00	2,043.61
470.00	2,043.62
480.00	2,043.63
490.00	2,043.64

Rating Table Report
Cave Creek Road Overtopping Analysis

Discharge (cfs)	HW Elev. (ft)
500.00	2,043.65
510.00	2,043.66
520.00	2,043.67
530.00	2,043.67
540.00	2,043.68
550.00	2,043.69
560.00	2,043.70
570.00	2,043.71
580.00	2,043.72
590.00	2,043.73
600.00	2,043.74
610.00	2,043.75
620.00	2,043.76
630.00	2,043.77
640.00	2,043.77
650.00	2,043.78
660.00	2,043.79
670.00	2,043.80
680.00	2,043.81
690.00	2,043.81
700.00	2,043.82
710.00	2,043.83
720.00	2,043.84
730.00	2,043.84
740.00	2,043.85
750.00	2,043.86
760.00	2,043.87
770.00	2,043.87
780.00	2,043.88
790.00	2,043.89
800.00	2,043.90
810.00	2,043.90
820.00	2,043.91
830.00	2,043.92
840.00	2,043.93
850.00	2,043.93
860.00	2,043.94
870.00	2,043.95
880.00	2,043.95
890.00	2,043.96
900.00	2,043.97

Culvert Designer/Analyzer Report
Cave Creek Road Overtopping Analysis

Analysis Component			
Storm Event	Design	Discharge	125.00 cfs

Peak Discharge Method: User-Specified			
Design Discharge	125.00 cfs	Check Discharge	125.00 cfs

Tailwater properties: Irregular Channel

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00	0+82	0.040
0+82	1+15	0.028
1+15	2+39	0.040

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00	2,041.30
0+42	2,041.00
0+82	2,040.00
0+97	2,035.40
1+15	2,039.20
1+68	2,039.60
2+30	2,039.90
2+39	2,040.20

Tailwater conditions for Design Storm.			
Discharge	125.00 cfs	Actual Depth	2.07 ft
Velocity	7.28 ft/s		

Name	Description	Discharge	HW Elev.	Velocity
Culvert-2	1-49 x 33 inch Arch	77.97 cfs	2,042.96 ft	9.30 ft/s
Weir	Roadway	47.10 cfs	2,042.96 ft	N/A
Total	----------	125.07 cfs	2,042.96 ft	N/A

Culvert Analysis Report
Culvert-2

Culvert Summary			
Computed Headwater Elevation	2,042.96 ft	Discharge	77.97 cfs
Inlet Control HW Elev.	2,041.74 ft	Tailwater Elevation	2,037.47 ft
Outlet Control HW Elev.	2,042.96 ft	Control Type	Outlet Control
Headwater Depth/Height	2.19		

Grades			
Upstream Invert	2,036.95 ft	Downstream Invert	2,035.07 ft
Length	124.00 ft	Constructed Slope	0.015161 ft/ft

Hydraulic Profile			
Profile	CompositeM2PressureProfile	Depth, Downstream	2.40 ft
Slope Type	Mild	Normal Depth	N/A ft
Flow Regime	Subcritical	Critical Depth	2.25 ft
Velocity Downstream	9.30 ft/s	Critical Slope	0.027494 ft/ft

Section			
Section Shape	Arch	Mannings Coefficient	0.025
Section Material	Steel and Aluminum Var CR	Span	4.08 ft
Section Size	49 x 33 inch	Rise	2.75 ft
Number Sections	1		

Outlet Control Properties			
Outlet Control HW Elev.	2,042.96 ft	Upstream Velocity Head	1.19 ft
Ke	0.50	Entrance Loss	0.60 ft

Inlet Control Properties			
Inlet Control HW Elev.	2,041.74 ft	Flow Control	Submerged
Inlet Type	90° headwall	Area Full	8.9 ft^2
K	0.00830	HDS 5 Chart	34
M	2.00000	HDS 5 Scale	1
C	0.03790	Equation Form	1
Y	0.69000		

Culvert Analysis Report
Weir

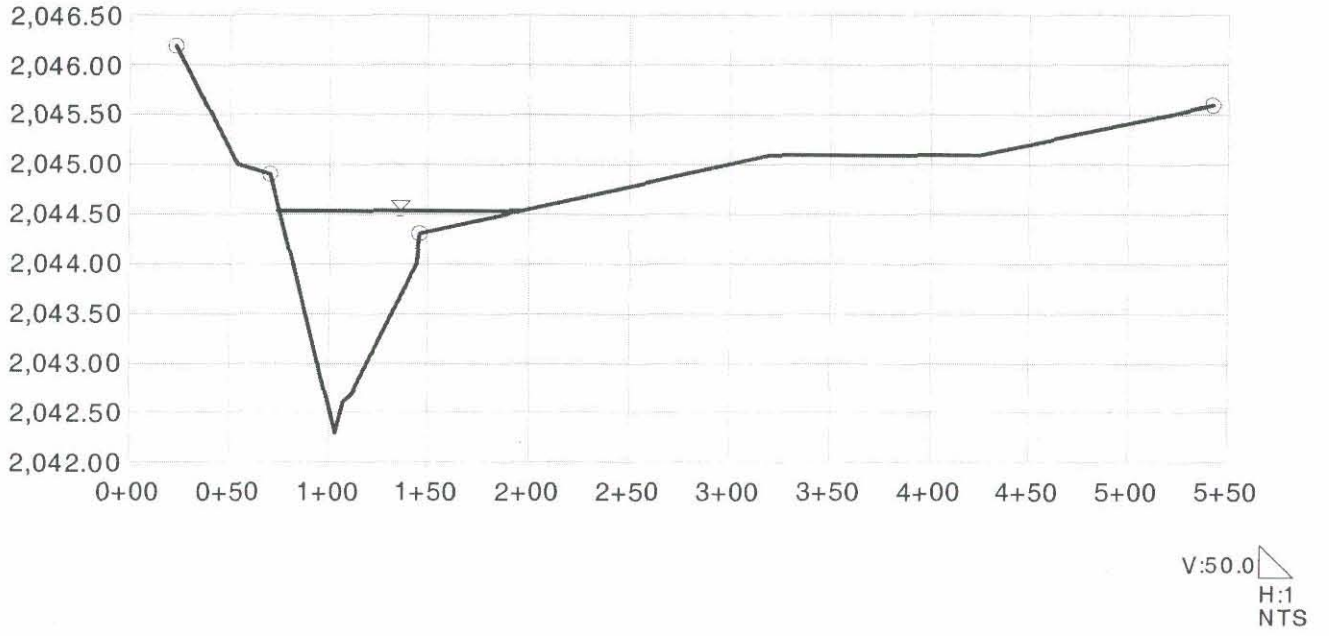
Hydraulic Component(s): Roadway			
Discharge	47.10 cfs	Allowable HW Elevation	2,042.96 ft
Roadway Width	110.00 ft	Overtopping Coefficient	2.92 US
Low Point	2,042.40 ft	Headwater Elevation	2,042.96 ft
Discharge Coefficient (Cr)	2.92	Submergence Factor (Kt)	1.00
Tailwater Elevation	2,037.47 ft		

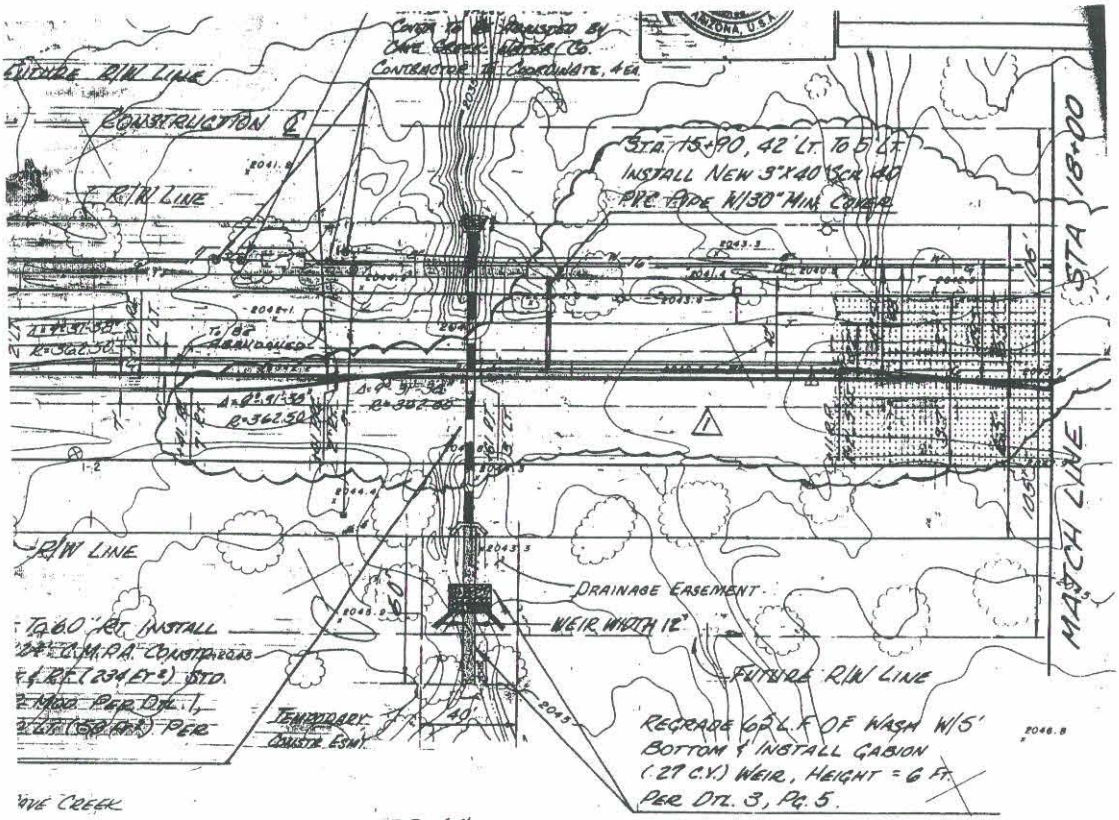
Sta (ft)	Elev. (ft)
134.00	2,042.40
365.00	2,043.60
374.00	2,043.10
427.00	2,043.20
463.00	2,043.70
466.00	2,044.30
692.00	2,045.10

Cross Section
Cross Section for Irregular Channel

Project Description	
Worksheet	#3 UC-South Boundary Condition 2nd Iteration
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.027	
Slope	0.004200	ft/ft
Water Surface Elevation	2,044.53	ft
Elevation Range	2,042.30 to 2,046.20	
Discharge	284.00	cfs

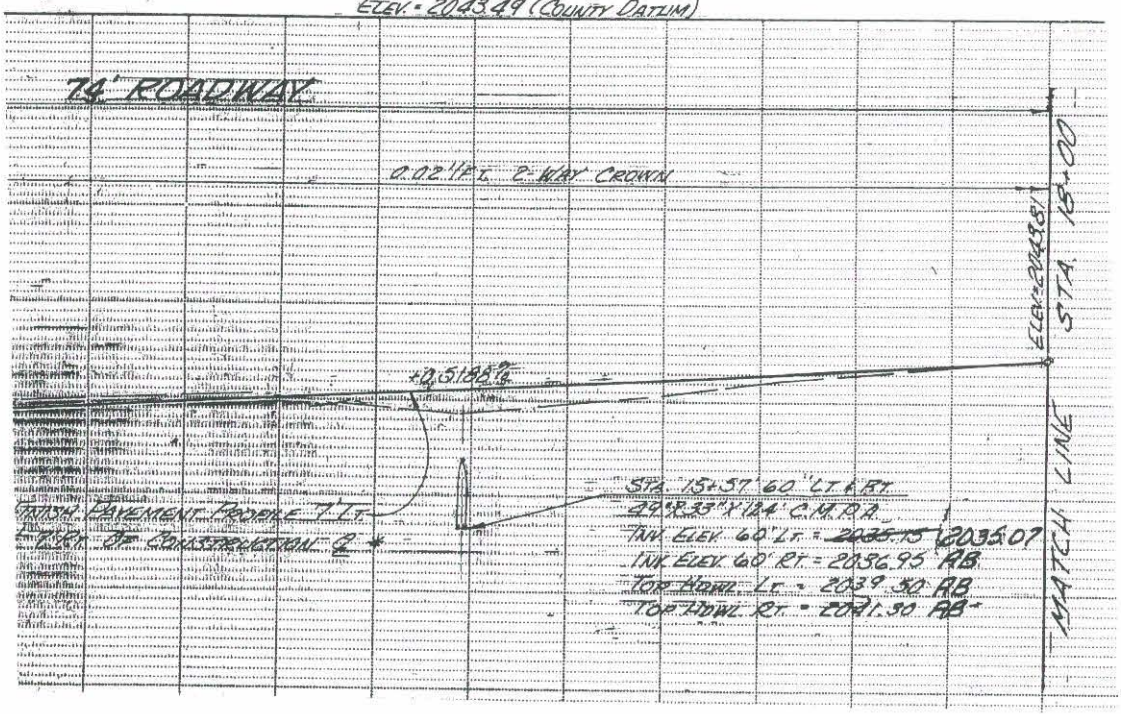




CAVE CREEK
CAREFREE PARTNERS

T.B.M. #2 STA. 14+25, 55' RT.
3/4" REBAR
ELEV. = 2043.49 (COUNTY DATUM)

SPEED = 55 M.P.H.



"As Built"

Title
CAVE CREEK ROAD IMPROVEMENTS
CAREFREE HIGHWAY TO SPUR CROSS ROAD
PROJECT NO. 68301

D.N.A. INC.
CIVIL ENGINEERING
LAND SURVEYING

DRAWN | DATE 3.20.84 | JOB 84-070 | SHT. of

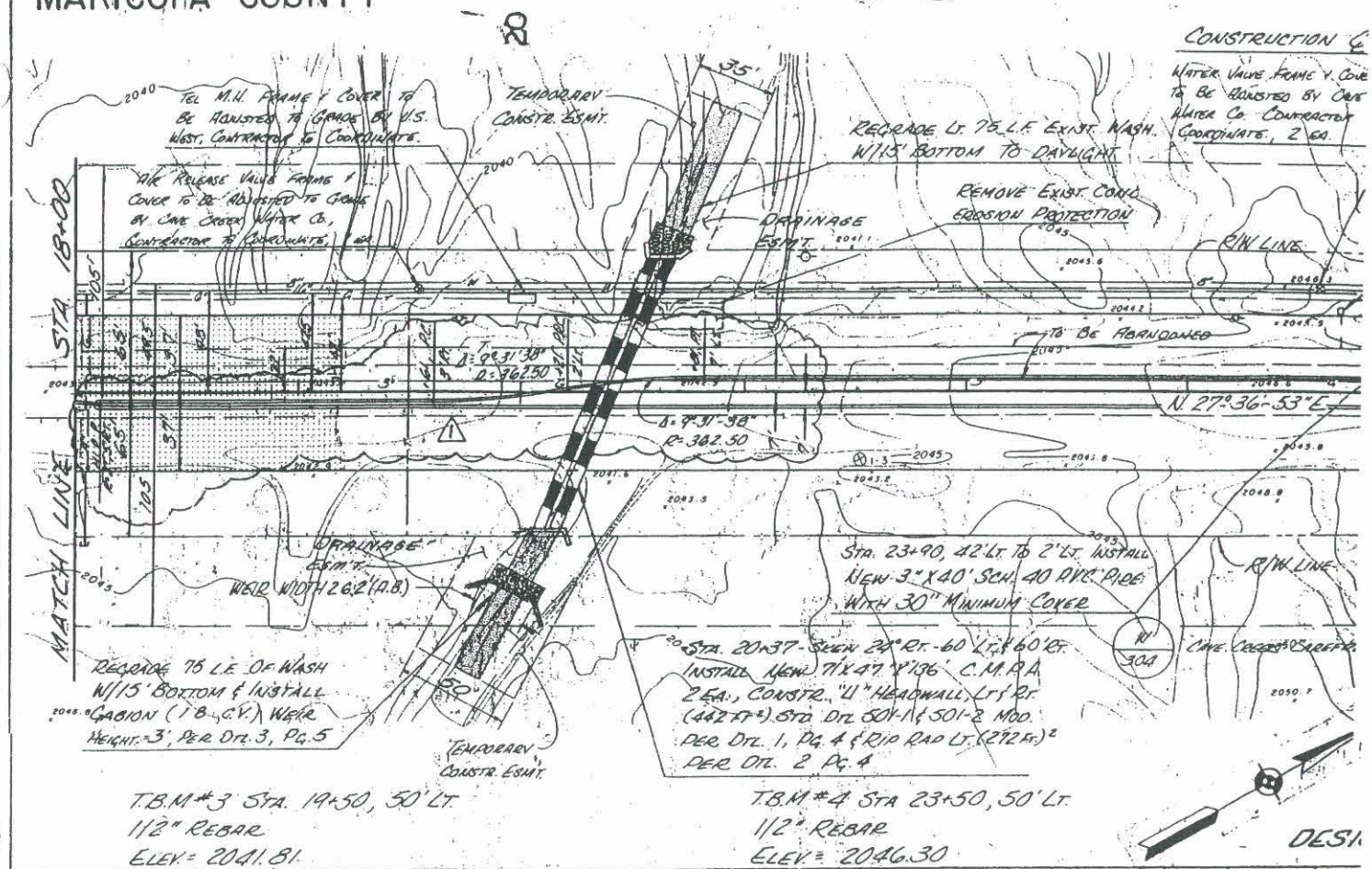
Description | Sheet | Of

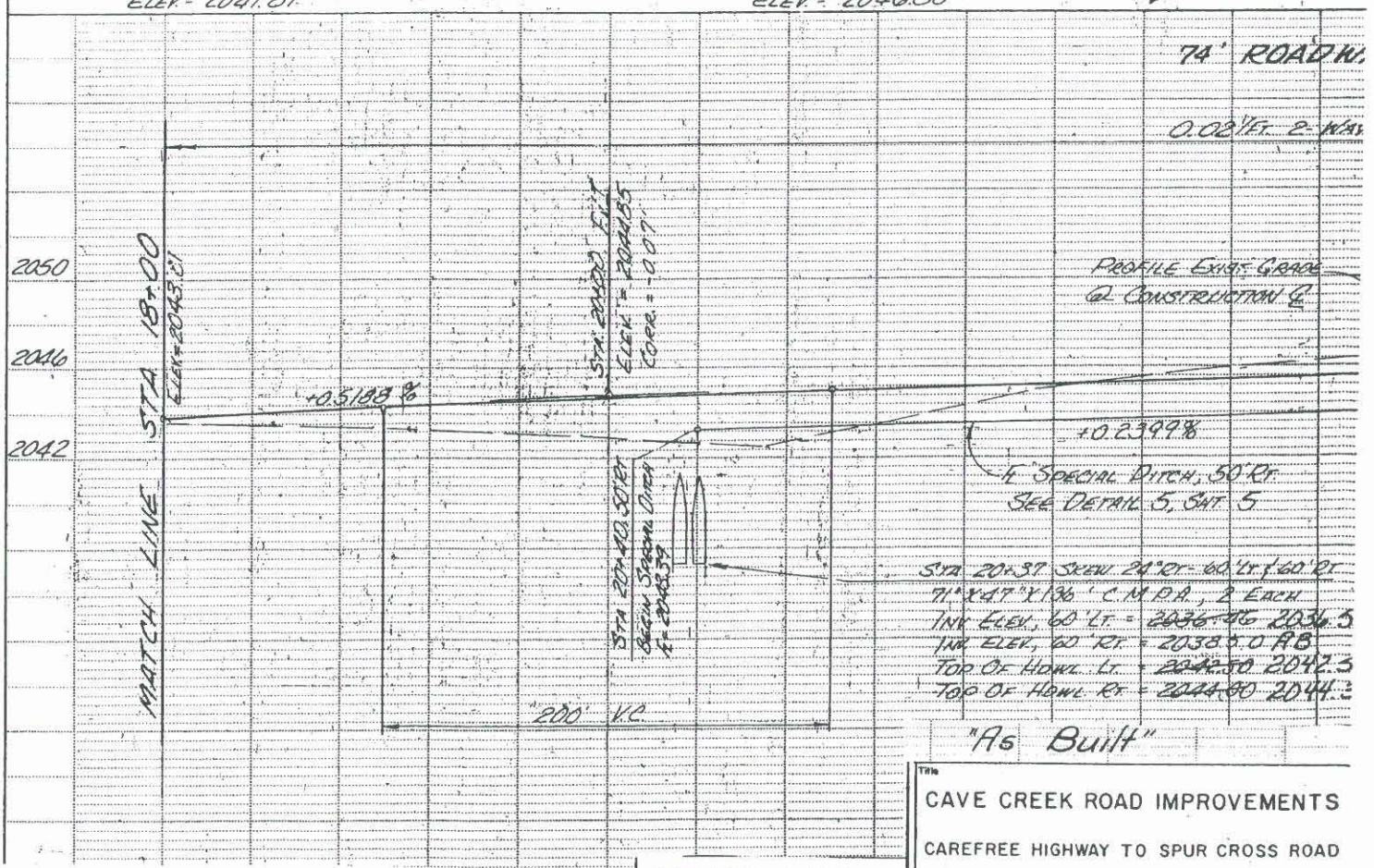
Culvert No. 2
(south of #3)

CAVE CREEK ROAD - CAREFREE HWY. TO SPUR CROSS RD.
MARICOPA COUNTY

W/300 TRI-C INVESTMENT

CONSTRUCTION ℄





PLAN

SURVEYED	
PLOTTED	
ALIGNMENT CHECKED	
RT. OF WAY CHECKED	
NOTE BOOK	
NO.	

TITLE

CAVE CREEK ROAD IMPROVEMENTS

CAREFREE HIGHWAY TO SPUR CROSS ROAD

PROJECT NO. 68301

D.N.A. INC.
CIVIL ENGINEERING
LAND SURVEYING

Description | Sheet | Of

Culvert No 3

Bivouac Trail (JEF #5)

Carefree Drainage Master Plan
Dip Crossing Notes

ID Number: JEF 5

Source of Data:

Location: BIVOUAC TRAIL

Material: PAVED DIP CROSSING

Protection:

Notes: GENERIC ROAD PROFILE USED FOR ANALYSIS

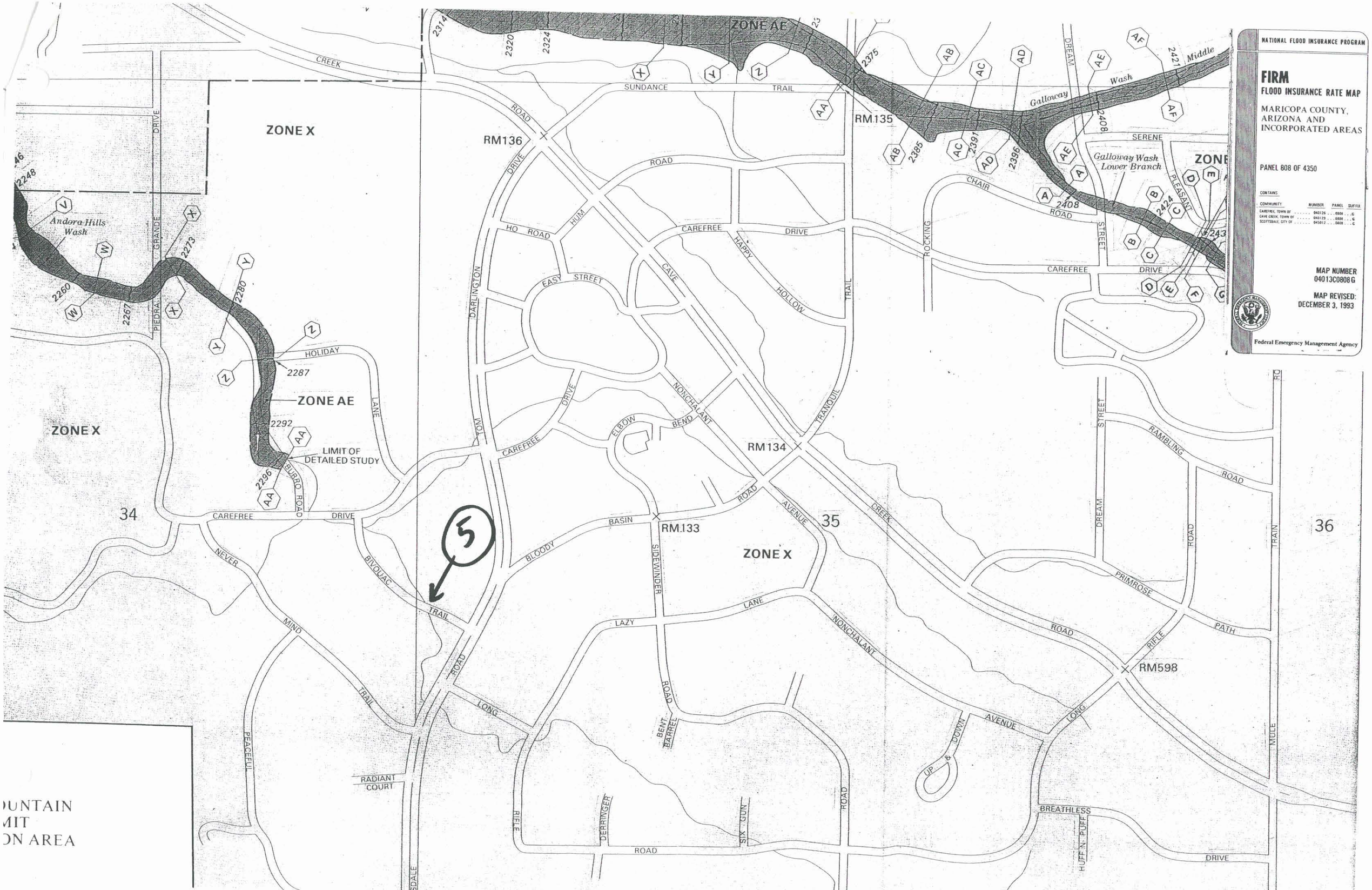

NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
MARICOPA COUNTY, ARIZONA AND INCORPORATED AREAS
PANEL 808 OF 4350
CONTAINS
COMMUNITY NUMBER PANEL SUFFIX
CAREFREE, TOWN OF 040126 0808 G
CAVE CREEK, TOWN OF 040129 0808 G
SCOTTSDALE, CITY OF 045012 0808 G
MAP NUMBER 04013C0808G
MAP REVISED: DECEMBER 3, 1993
Federal Emergency Management Agency
ZONE AE
ZONE X
RM136
RM135
RM134
RM133
RM598
Andora Hills Wash
Galloway Wash
Galloway Wash Lower Branch
Middle
LIMIT OF DETAILED STUDY
SUNDANCE TRAIL ROAD
CAREFREE DRIVE
HOLIDAY LANE
CREEK
DRIVE
GRANDE
PIEDRA
DARLINGTON
TOM
HUMPHREYS ROAD
EASY STREET
CAVE CREEK ROAD
HAPPY HOLLOW
NONCHALANT TRANQUIL
ELBOW BEND
BURRO ROAD
NEVER MIND
BIVOUAC TRAIL
BLOODY BASIN ROAD
SIDEWINDER ROAD
LAZY LANE
LONG TRAIL
BENT BARREL
DERRINGER
SIX GUN
RIFLE ROAD
RADIANT COURT
PEACEFUL
SCOTTSDALE
UP & DOWN
BREATHLESS
HUFF N PUFF
DRIVE
RAMBLING ROAD
PRIMROSE PATH
MULE TRAIN
DREAM
SERENE
PLEASANT
CHAIR ROAD
ROCKING
STREET
34
35
36
5

Table
Rating Table for Irregular Channel

BIVOUAC TRAIL

Project Description	
Worksheet	Generic 200 foot v
Flow Element	Irregular Channel
Method	Manning's Formul
Solve For	Channel Depth

Input Data	
Slope	010000 ft/ft

Options	
Current Roughness Metho	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	1,600.00	5.00

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00	0.00	0.00	0.0	0.00	0.00
5.00	0.26	1.20	4.2	31.60	31.60
10.00	0.34	1.43	7.0	40.99	40.98
15.00	0.40	1.58	9.5	47.72	47.71
20.00	0.44	1.70	11.8	53.15	53.15
25.00	0.48	1.80	13.9	57.79	57.78
30.00	0.52	1.88	16.0	61.88	61.87
35.00	0.55	1.95	17.9	65.56	65.55
40.00	0.57	2.02	19.8	68.93	68.92
45.00	0.60	2.08	21.6	72.04	72.03
50.00	0.62	2.14	23.4	74.95	74.94
55.00	0.65	2.19	25.1	77.67	77.66
60.00	0.67	2.24	26.8	80.25	80.24
65.00	0.69	2.28	28.5	82.70	82.68
70.00	0.71	2.32	30.1	85.03	85.01
75.00	0.73	2.36	31.7	87.25	87.24
80.00	0.74	2.40	33.3	89.39	89.38
85.00	0.76	2.44	34.8	91.45	91.43
90.00	0.78	2.48	36.4	93.43	93.42
95.00	0.79	2.51	37.9	95.34	95.33
100.00	0.81	2.54	39.4	97.19	97.18
105.00	0.82	2.57	40.8	98.99	98.97
110.00	0.84	2.60	42.3	100.73	100.72
115.00	0.85	2.63	43.7	102.42	102.41
120.00	0.87	2.66	45.1	104.07	104.06
125.00	0.88	2.69	46.5	105.68	105.66
130.00	0.89	2.71	47.9	107.24	107.23
135.00	0.91	2.74	49.3	108.77	108.76
140.00	0.92	2.76	50.6	110.27	110.25
145.00	0.93	2.79	52.0	111.73	111.71
150.00	0.94	2.81	53.3	113.16	113.14
155.00	0.95	2.84	54.7	114.56	114.54
160.00	0.97	2.86	56.0	115.93	115.91
165.00	0.98	2.88	57.3	117.27	117.26

Table
Rating Table for Irregular Channel

BIVOUAC TRAIL

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
170.00	0.99	2.90	58.6	118.59	118.58
175.00	1.00	2.92	59.9	119.89	119.87
180.00	1.01	2.95	61.0	120.35	120.33
185.00	1.02	2.98	62.1	120.71	120.69
190.00	1.03	3.01	63.1	121.06	121.04
195.00	1.03	3.04	64.2	121.41	121.40
200.00	1.04	3.06	65.3	121.76	121.74
205.00	1.05	3.09	66.3	122.11	122.09
210.00	1.06	3.12	67.4	122.45	122.43
215.00	1.07	3.14	68.4	122.79	122.77
220.00	1.08	3.17	69.4	123.12	123.10
225.00	1.09	3.19	70.4	123.45	123.43
230.00	1.09	3.22	71.4	123.78	123.76
235.00	1.10	3.24	72.5	124.10	124.08
240.00	1.11	3.27	73.4	124.42	124.40
245.00	1.12	3.29	74.4	124.74	124.72
250.00	1.13	3.31	75.4	125.06	125.04
255.00	1.13	3.34	76.4	125.37	125.35
260.00	1.14	3.36	77.4	125.68	125.66
265.00	1.15	3.38	78.3	125.99	125.96
270.00	1.16	3.40	79.3	126.29	126.27
275.00	1.16	3.43	80.3	126.60	126.57
280.00	1.17	3.45	81.2	126.90	126.87
285.00	1.18	3.47	82.1	127.19	127.17
290.00	1.19	3.49	83.1	127.49	127.46
295.00	1.19	3.51	84.0	127.78	127.76
300.00	1.20	3.53	84.9	128.07	128.05
305.00	1.21	3.55	85.9	128.36	128.33
310.00	1.22	3.57	86.8	128.65	128.62
315.00	1.22	3.59	87.7	128.93	128.90
320.00	1.23	3.61	88.6	129.21	129.19
325.00	1.24	3.63	89.5	129.50	129.47
330.00	1.24	3.65	90.4	129.77	129.75
335.00	1.25	3.67	91.3	130.05	130.02
340.00	1.26	3.69	92.2	130.33	130.30
345.00	1.26	3.71	93.1	130.60	130.57
350.00	1.27	3.72	94.0	130.87	130.84
355.00	1.28	3.74	94.9	131.14	131.11
360.00	1.28	3.76	95.7	131.41	131.38
365.00	1.29	3.78	96.6	131.67	131.64
370.00	1.30	3.80	97.5	131.94	131.91
375.00	1.30	3.81	98.4	132.20	132.17
380.00	1.31	3.83	99.2	132.46	132.43
385.00	1.32	3.85	100.1	132.72	132.69
390.00	1.32	3.86	100.9	132.98	132.95
395.00	1.33	3.88	101.8	133.24	133.20
400.00	1.34	3.90	102.6	133.49	133.46
405.00	1.34	3.91	103.5	133.75	133.71
410.00	1.35	3.93	104.3	134.00	133.96
415.00	1.36	3.95	105.2	134.25	134.21
420.00	1.36	3.96	106.0	134.50	134.46
425.00	1.37	3.98	106.8	134.75	134.71
430.00	1.37	3.99	107.7	134.99	134.96
435.00	1.38	4.01	108.5	135.24	135.20

IMPASSABLE

Table
Rating Table for Irregular Channel

BIVOUAC TRAIL

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
440.00	1.39	4.02	109.3	135.48	135.45
445.00	1.39	4.04	110.1	135.73	135.69
450.00	1.40	4.06	111.0	135.97	135.93
455.00	1.40	4.07	111.8	136.21	136.17
460.00	1.41	4.09	112.6	136.45	136.41
465.00	1.42	4.10	113.4	136.69	136.65
470.00	1.42	4.11	114.2	136.92	136.89
475.00	1.43	4.13	115.0	137.16	137.12
480.00	1.43	4.14	115.8	137.39	137.36
485.00	1.44	4.16	116.6	137.63	137.59
490.00	1.45	4.17	117.4	137.86	137.82
495.00	1.45	4.19	118.2	138.09	138.05
500.00	1.46	4.20	119.0	138.32	138.28
505.00	1.46	4.21	119.8	138.55	138.51
510.00	1.47	4.23	120.6	138.78	138.74
515.00	1.47	4.24	121.4	139.01	138.97
520.00	1.48	4.26	122.2	139.23	139.19
525.00	1.49	4.27	123.0	139.46	139.42
530.00	1.49	4.28	123.7	139.68	139.64
535.00	1.50	4.30	124.5	139.90	139.86
540.00	1.50	4.31	125.3	140.13	140.08
545.00	1.51	4.32	126.1	140.35	140.31
550.00	1.51	4.34	126.8	140.57	140.53
555.00	1.52	4.35	127.6	140.79	140.74
560.00	1.52	4.36	128.4	141.01	140.96
565.00	1.53	4.37	129.1	141.22	141.18
570.00	1.53	4.39	129.9	141.44	141.40
575.00	1.54	4.40	130.7	141.66	141.61
580.00	1.55	4.41	131.4	141.87	141.83
585.00	1.55	4.43	132.2	142.08	142.04
590.00	1.56	4.44	132.9	142.30	142.25
595.00	1.56	4.45	133.7	142.51	142.46
600.00	1.57	4.46	134.5	142.72	142.68
605.00	1.57	4.47	135.2	142.93	142.89
610.00	1.58	4.49	136.0	143.14	143.10
615.00	1.58	4.50	136.7	143.35	143.30
620.00	1.59	4.51	137.4	143.56	143.51
625.00	1.59	4.52	138.2	143.77	143.72
630.00	1.60	4.53	138.9	143.97	143.93
635.00	1.60	4.55	139.7	144.18	144.13
640.00	1.61	4.56	140.4	144.38	144.34
645.00	1.61	4.57	141.2	144.59	144.54
650.00	1.62	4.58	141.9	144.79	144.74
655.00	1.62	4.59	142.6	144.99	144.95
660.00	1.63	4.60	143.4	145.20	145.15
665.00	1.63	4.62	144.1	145.40	145.35
670.00	1.64	4.63	144.8	145.60	145.55
675.00	1.64	4.64	145.5	145.80	145.75
680.00	1.65	4.65	146.3	146.00	145.95
685.00	1.65	4.66	147.0	146.20	146.15
690.00	1.66	4.67	147.7	146.39	146.35
695.00	1.66	4.68	148.4	146.59	146.54
700.00	1.67	4.69	149.2	146.79	146.74
705.00	1.67	4.70	149.9	146.98	146.93

Table
Rating Table for Irregular Channel

BIVOUAC TRAIL

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
710.00	1.68	4.71	150.6	147.18	147.13
715.00	1.68	4.73	151.3	147.37	147.32
720.00	1.69	4.74	152.0	147.57	147.52
725.00	1.69	4.75	152.7	147.76	147.71
730.00	1.70	4.76	153.4	147.95	147.90
735.00	1.70	4.77	154.1	148.15	148.09
740.00	1.71	4.78	154.9	148.34	148.29
745.00	1.71	4.79	155.6	148.53	148.48
750.00	1.72	4.80	156.3	148.72	148.67
755.00	1.72	4.81	157.0	148.91	148.86
760.00	1.73	4.82	157.7	149.10	149.04
765.00	1.73	4.83	158.4	149.29	149.23
770.00	1.74	4.84	159.1	149.47	149.42
775.00	1.74	4.85	159.8	149.66	149.61
780.00	1.74	4.86	160.5	149.85	149.79
785.00	1.75	4.87	161.2	150.03	149.98
790.00	1.75	4.88	161.9	150.22	150.16
795.00	1.76	4.89	162.6	150.40	150.35
800.00	1.76	4.90	163.3	150.59	150.53
805.00	1.77	4.91	163.9	150.77	150.72
810.00	1.77	4.92	164.6	150.96	150.90
815.00	1.78	4.93	165.3	151.14	151.08
820.00	1.78	4.94	166.0	151.32	151.26
825.00	1.79	4.95	166.7	151.50	151.45
830.00	1.79	4.96	167.4	151.68	151.63
835.00	1.80	4.97	168.1	151.86	151.81
840.00	1.80	4.98	168.8	152.04	151.99
845.00	1.80	4.99	169.4	152.22	152.17
850.00	1.81	5.00	170.1	152.40	152.35
855.00	1.81	5.01	170.8	152.58	152.52
860.00	1.82	5.02	171.5	152.76	152.70
865.00	1.82	5.02	172.1	152.94	152.88
870.00	1.83	5.03	172.8	153.11	153.06
875.00	1.83	5.04	173.5	153.29	153.23
880.00	1.84	5.05	174.2	153.47	153.41
885.00	1.84	5.06	174.8	153.64	153.58
890.00	1.84	5.07	175.5	153.82	153.76
895.00	1.85	5.08	176.2	153.99	153.93
900.00	1.85	5.09	176.9	154.17	154.11
905.00	1.86	5.10	177.5	154.34	154.28
910.00	1.86	5.11	178.2	154.51	154.45
915.00	1.87	5.12	178.9	154.69	154.63
920.00	1.87	5.12	179.5	154.86	154.80
925.00	1.87	5.13	180.2	155.03	154.97
930.00	1.88	5.14	180.9	155.20	155.14
935.00	1.88	5.15	181.5	155.37	155.31
940.00	1.89	5.16	182.2	155.54	155.48
945.00	1.89	5.17	182.8	155.71	155.65
950.00	1.90	5.18	183.5	155.88	155.82
955.00	1.90	5.19	184.2	156.05	155.99
960.00	1.90	5.19	184.8	156.22	156.16
965.00	1.91	5.20	185.5	156.39	156.33
970.00	1.91	5.21	186.1	156.56	156.50
975.00	1.92	5.22	186.8	156.72	156.66

Table
Rating Table for Irregular Channel

BIVOUAC TRAIL

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
980.00	1.92	5.23	187.4	156.89	156.83
985.00	1.92	5.24	188.1	157.06	157.00
990.00	1.93	5.25	188.7	157.23	157.16
995.00	1.93	5.25	189.4	157.39	157.33
1,000.00	1.94	5.26	190.1	157.56	157.49
1,005.00	1.94	5.27	190.7	157.72	157.66
1,010.00	1.95	5.28	191.3	157.89	157.82
1,015.00	1.95	5.29	192.0	158.05	157.99
1,020.00	1.95	5.29	192.6	158.21	158.15
1,025.00	1.96	5.30	193.3	158.38	158.31
1,030.00	1.96	5.31	193.9	158.54	158.48
1,035.00	1.97	5.32	194.6	158.70	158.64
1,040.00	1.97	5.33	195.2	158.87	158.80
1,045.00	1.97	5.34	195.9	159.03	158.96
1,050.00	1.98	5.34	196.5	159.19	159.12
1,055.00	1.98	5.35	197.1	159.35	159.28
1,060.00	1.99	5.36	197.8	159.51	159.45
1,065.00	1.99	5.37	198.4	159.67	159.61
1,070.00	1.99	5.38	199.1	159.83	159.77
1,075.00	2.00	5.38	199.7	159.99	159.92
1,080.00	2.00	5.39	200.3	160.15	160.08
1,085.00	2.01	5.40	201.0	160.31	160.24
1,090.00	2.01	5.41	201.6	160.47	160.40
1,095.00	2.01	5.41	202.2	160.63	160.56
1,100.00	2.02	5.42	202.9	160.78	160.72
1,105.00	2.02	5.43	203.5	160.94	160.87
1,110.00	2.03	5.44	204.1	161.10	161.03
1,115.00	2.03	5.45	204.8	161.26	161.19
1,120.00	2.03	5.45	205.4	161.41	161.34
1,125.00	2.04	5.46	206.0	161.57	161.50
1,130.00	2.04	5.47	206.7	161.72	161.66
1,135.00	2.05	5.48	207.3	161.88	161.81
1,140.00	2.05	5.48	207.9	162.03	161.97
1,145.00	2.05	5.49	208.5	162.19	162.12
1,150.00	2.06	5.50	209.2	162.34	162.27
1,155.00	2.06	5.51	209.8	162.50	162.43
1,160.00	2.06	5.51	210.4	162.65	162.58
1,165.00	2.07	5.52	211.0	162.81	162.74
1,170.00	2.07	5.53	211.7	162.96	162.89
1,175.00	2.08	5.54	212.3	163.11	163.04
1,180.00	2.08	5.54	212.9	163.26	163.19
1,185.00	2.08	5.55	213.5	163.42	163.35
1,190.00	2.09	5.56	214.1	163.57	163.50
1,195.00	2.09	5.56	214.8	163.72	163.65
1,200.00	2.09	5.57	215.4	163.87	163.80
1,205.00	2.10	5.58	216.0	164.02	163.95
1,210.00	2.10	5.59	216.6	164.17	164.10
1,215.00	2.11	5.59	217.2	164.32	164.25
1,220.00	2.11	5.60	217.8	164.47	164.40
1,225.00	2.11	5.61	218.5	164.62	164.55
1,230.00	2.12	5.61	219.1	164.77	164.70
1,235.00	2.12	5.62	219.7	164.92	164.85
1,240.00	2.12	5.63	220.3	165.07	165.00
1,245.00	2.13	5.64	220.9	165.22	165.15

Table
Rating Table for Irregular Channel

BIVOUAC TRAIL

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
1,250.00	2.13	5.64	221.5	165.37	165.29
1,255.00	2.14	5.65	222.1	165.51	165.44
1,260.00	2.14	5.66	222.7	165.66	165.59
1,265.00	2.14	5.66	223.4	165.81	165.74
1,270.00	2.15	5.67	224.0	165.96	165.88
1,275.00	2.15	5.68	224.6	166.10	166.03
1,280.00	2.15	5.68	225.2	166.25	166.17
1,285.00	2.16	5.69	225.8	166.40	166.32
1,290.00	2.16	5.70	226.4	166.54	166.47
1,295.00	2.17	5.70	227.0	166.69	166.61
1,300.00	2.17	5.71	227.6	166.83	166.76
1,305.00	2.17	5.72	228.2	166.98	166.90
1,310.00	2.18	5.73	228.8	167.12	167.05
1,315.00	2.18	5.73	229.4	167.27	167.19
1,320.00	2.18	5.74	230.0	167.41	167.33
1,325.00	2.19	5.75	230.6	167.55	167.48
1,330.00	2.19	5.75	231.2	167.70	167.62
1,335.00	2.19	5.76	231.8	167.84	167.77
1,340.00	2.20	5.77	232.4	167.98	167.91
1,345.00	2.20	5.77	233.0	168.13	168.05
1,350.00	2.20	5.78	233.6	168.27	168.19
1,355.00	2.21	5.79	234.2	168.41	168.34
1,360.00	2.21	5.79	234.8	168.55	168.48
1,365.00	2.22	5.80	235.4	168.70	168.62
1,370.00	2.22	5.81	236.0	168.84	168.76
1,375.00	2.22	5.81	236.6	168.98	168.90
1,380.00	2.23	5.82	237.2	169.12	169.04
1,385.00	2.23	5.82	237.8	169.26	169.18
1,390.00	2.23	5.83	238.4	169.40	169.32
1,395.00	2.24	5.84	239.0	169.54	169.46
1,400.00	2.24	5.84	239.6	169.68	169.60
1,405.00	2.24	5.85	240.2	169.82	169.74
1,410.00	2.25	5.86	240.7	169.96	169.88
1,415.00	2.25	5.86	241.3	170.10	170.02
1,420.00	2.25	5.87	241.9	170.24	170.16
1,425.00	2.26	5.88	242.5	170.38	170.30
1,430.00	2.26	5.88	243.1	170.52	170.44
1,435.00	2.26	5.89	243.7	170.65	170.57
1,440.00	2.27	5.89	244.3	170.79	170.71
1,445.00	2.27	5.90	244.9	170.93	170.85
1,450.00	2.27	5.91	245.5	171.07	170.99
1,455.00	2.28	5.91	246.0	171.21	171.12
1,460.00	2.28	5.92	246.6	171.34	171.26
1,465.00	2.28	5.93	247.2	171.48	171.40
1,470.00	2.29	5.93	247.8	171.62	171.53
1,475.00	2.29	5.94	248.4	171.75	171.67
1,480.00	2.30	5.94	249.0	171.89	171.81
1,485.00	2.30	5.95	249.6	172.02	171.94
1,490.00	2.30	5.96	250.1	172.16	172.08
1,495.00	2.31	5.96	250.7	172.30	172.21
1,500.00	2.31	5.97	251.3	172.43	172.35
1,505.00	2.31	5.98	251.9	172.57	172.48
1,510.00	2.32	5.98	252.5	172.70	172.62
1,515.00	2.32	5.99	253.0	172.83	172.75

Table
Rating Table for Irregular Channel

BIVOUAC TRAIL

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
1,520.00	2.32	5.99	253.6	172.97	172.89
1,525.00	2.33	6.00	254.2	173.10	173.02
1,530.00	2.33	6.01	254.8	173.24	173.15
1,535.00	2.33	6.01	255.4	173.37	173.29
1,540.00	2.34	6.02	255.9	173.50	173.42
1,545.00	2.34	6.02	256.5	173.64	173.55
1,550.00	2.34	6.03	257.1	173.77	173.69
1,555.00	2.35	6.03	257.7	173.90	173.82
1,560.00	2.35	6.04	258.2	174.04	173.95
1,565.00	2.35	6.05	258.8	174.17	174.08
1,570.00	2.36	6.05	259.4	174.30	174.22
1,575.00	2.36	6.06	260.0	174.43	174.35
1,580.00	2.36	6.06	260.5	174.56	174.48
1,585.00	2.37	6.07	261.1	174.70	174.61
1,590.00	2.37	6.08	261.7	174.83	174.74
1,595.00	2.37	6.08	262.3	174.96	174.87
1,600.00	2.38	6.09	262.8	175.09	175.00

AW 100 YR, 6 HR
FUTURE

5 (JEF)

BIVOUAC TRAIL

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1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN  1998               *
*            VERSION 4.1               *
*                                      *
*  RUN DATE   27NOV02  TIME  08:23:52  *
*                                      *
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*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*           (916) 756-1104             *
*                                      *
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X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X       XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

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


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

  1           ID   ANDORA HILLS WASH FUTURE CONDITIONS
  2           ID
  3           ID    100-YEAR 6-HOUR MODEL  FILENAME: AW1006F.DAT
  4           ID      MODIFIED BY JEF, INC. FOR CAREFREE AREA DRAINAGE MASTER PLAN
  5           ID      MODIFICATIONS INCLUDE:
  6           ID      1)  CHANGES TO WATERSHED DELINATION BETWEEN S320 AND S340L
  7           ID          EXAMINATION OF AERIAL PHOTOGRAPHS REVEALED AREA WITHIN
  8           ID          S320 THAT ACTUALLY FLOWS THROUGH S340L NEAR THE SW CORNER
  9           ID          OF S340L OFF THE BLACK MOUNTAIN HILLS.
 10           ID      2)  ADDITION OF NEW COMBINATION BLOCKS TO SEPARATE COMBINATIONS WITH
 11           ID          MORE THAN TWO HYDROGRAPHS IN THE ORIGINAL MODEL.
 12           ID      3)  FUTURE CONDITIONS LAND USE INTERPRETED FROM FUTURE LAND USE IN
 13           ID          CAVE CREEK WATERCOURSE MASTER PLAN BY TETRA TECH, 2001
 14           ID
 15           ID    BASED ON:
 16           ID
 17           ID        Cave Creek Above Carefree Highway FPD Study       File: AW100-6.IH1
 18           ID          by  GVSCE for Maricopa County FCD 95-28    Original: 06-17-96     mcg
 19           ID          Project:           84                        Revised:
 20           ID
 21           ID        Andora Hills Wash sub-watershed model
 22           ID          100-year, 6-hr rainfall with FCDMC Design Manual distribution
 23           ID          Green & Ampt Loss Rate Method
 24           ID          NMIN = 2
 25           ID          Clark Unit Hydrograph
 26           ID          Modified Puls, normal depth channel routing
              *
              *
              *
 27           IT       2                     900
 28           IO       5       2
 29           IN      15
              *
              *DIAGRAM
              *
              *  Depth-Area reduction factors taken from Table 2.2 of FCDMC Design Manual
              *
              *  6-hr rainfall distributions per Table 2.4 and Figure 2.17 of Design Manual
              *
 30           JD    3.40    0.01
 31           PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
 32           PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
 33           PC   0.962   0.972   0.983   0.991   1.000
 34           JD    3.38    0.50
 35           JD    3.30    2.80
 36           PC   0.000   0.009   0.016   0.025   0.034   0.042   0.051   0.059   0.067   0.076
 37           PC   0.087   0.100   0.120   0.163   0.252   0.451   0.694   0.837   0.900   0.938
 38           PC   0.950   0.963   0.975   0.988   1.000
              *
              *
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 39           KK    S320
 40           KM   SUB-BASIN AHW1
```

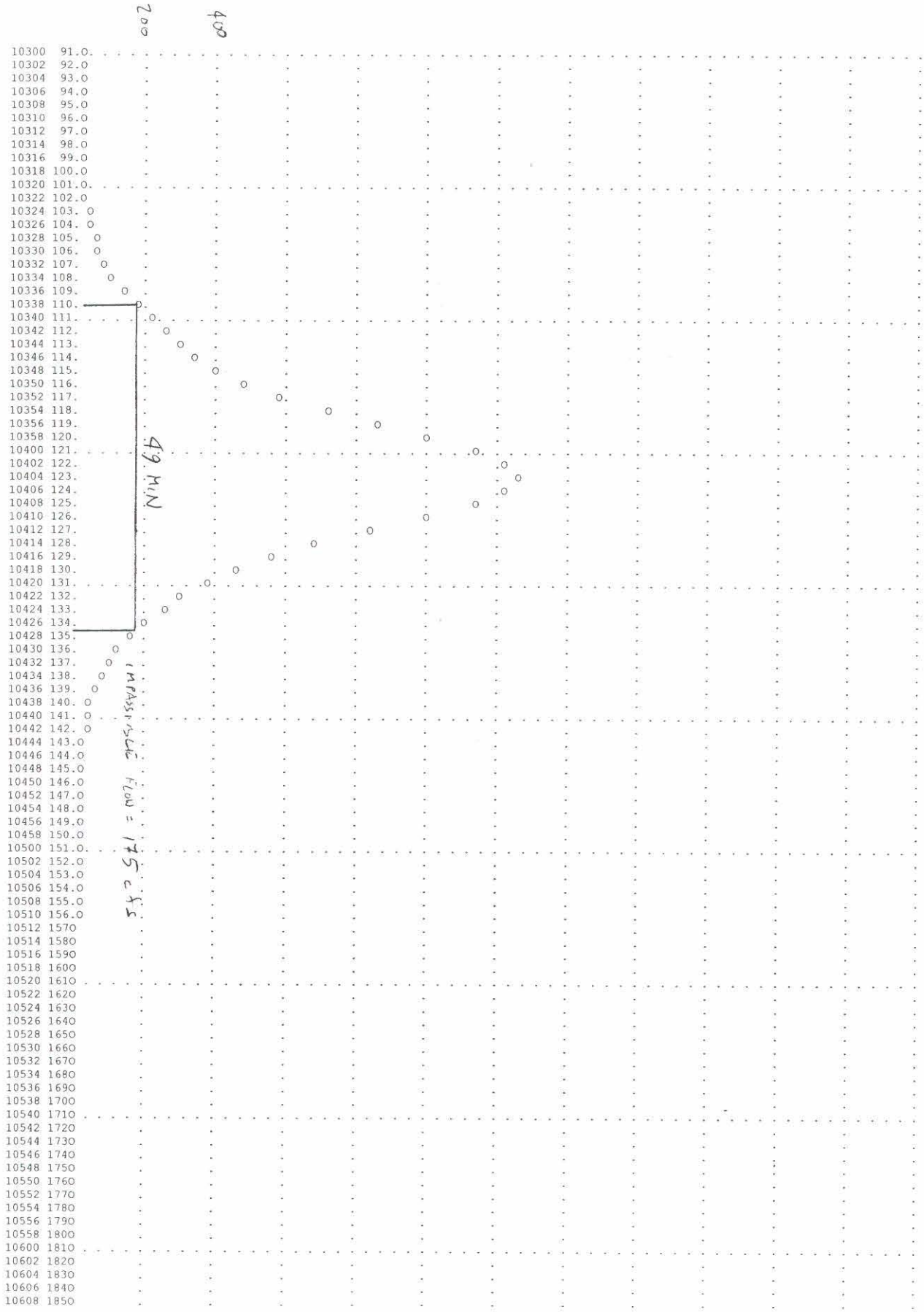
BIVOUAC TRAIL

1 STATION S320

(O) OUTFLOW

DAHRMN	PER	0.	200.	400.	600.	800.	1000.	1200.	1400.	0.	0.	0.	0.	0.
10000	10													
10002	20													
10004	30													
10006	40													
10008	50													
10010	60													
10012	70													
10014	80													
10016	90													
10018	100													
10020	110													
10022	120													
10024	130													
10026	140													
10028	150													
10030	160													
10032	170													
10034	180													
10036	190													
10038	200													
10040	210													
10042	220													
10044	230													
10046	240													
10048	250													
10050	260													
10052	270													
10054	280													
10056	290													
10058	300													
10100	310													
10102	320													
10104	330													
10106	340													
10108	350													
10110	360													
10112	370													
10114	380													
10116	390													
10118	400													
10120	410													
10122	420													
10124	430													
10126	440													
10128	450													
10130	460													
10132	470													
10134	480													
10136	490													
10138	500													
10140	510													
10142	520													
10144	530													
10146	540													
10148	550													
10150	560													
10152	570													
10154	580													
10156	590													
10158	600													
10200	610													
10202	620													
10204	630													
10206	640													
10208	650													
10210	660													
10212	670													
10214	680													
10216	690													
10218	700													
10220	710													
10222	720													
10224	730													
10226	740													
10228	750													
10230	760													
10232	77.0													
10234	78.0													
10236	79.0													
10238	80.0													
10240	81.0													
10242	82.0													
10244	83.0													
10246	84.0													
10248	85.0													
10250	86.0													
10252	87.0													
10254	88.0													
10256	89.0													
10258	90.0													

BIVOUAC TRAIL



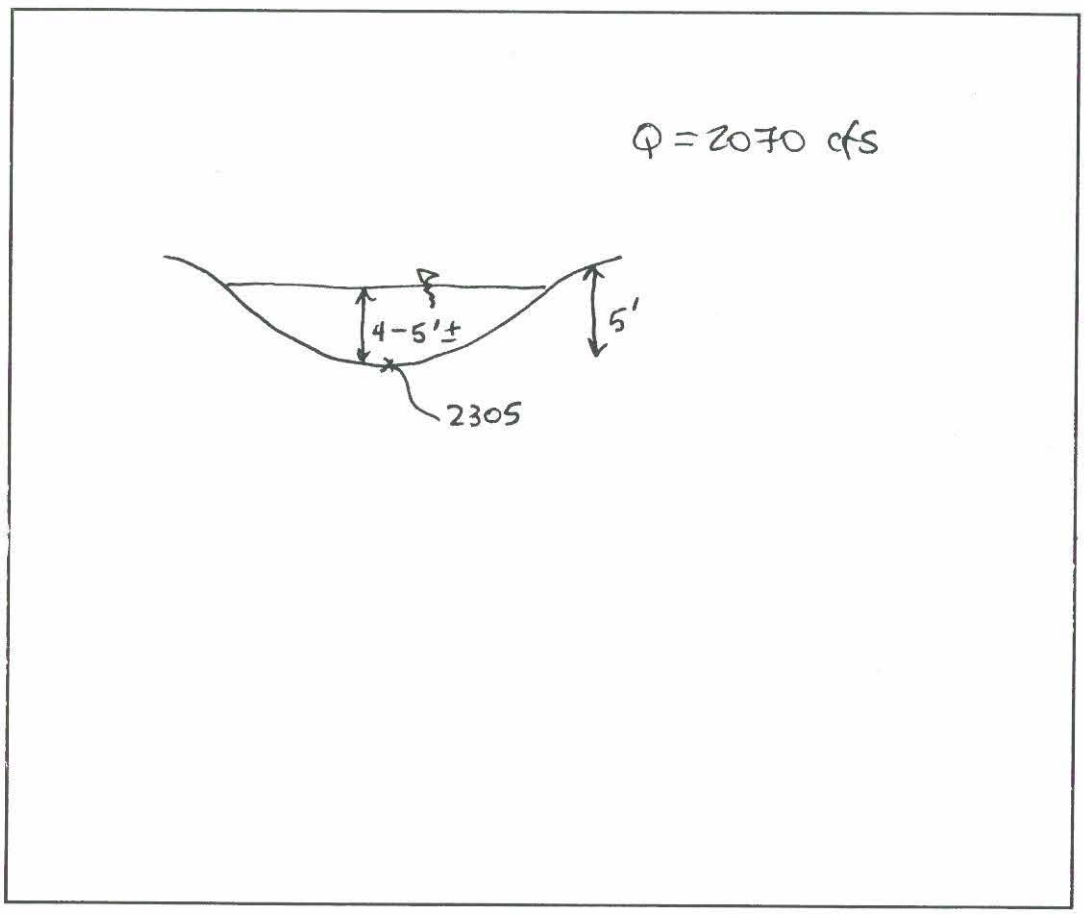
Bivouac Trail Near Carefree Drive (JEF #6)

Carefree Drainage Master Plan
Dip Crossing Notes

ID Number: JEF 6

Source of Data: Topo from Andora Hills & Galloway (attached)

Location: Bivouac near Carefree Drive



Material: Paved Dip Crossing

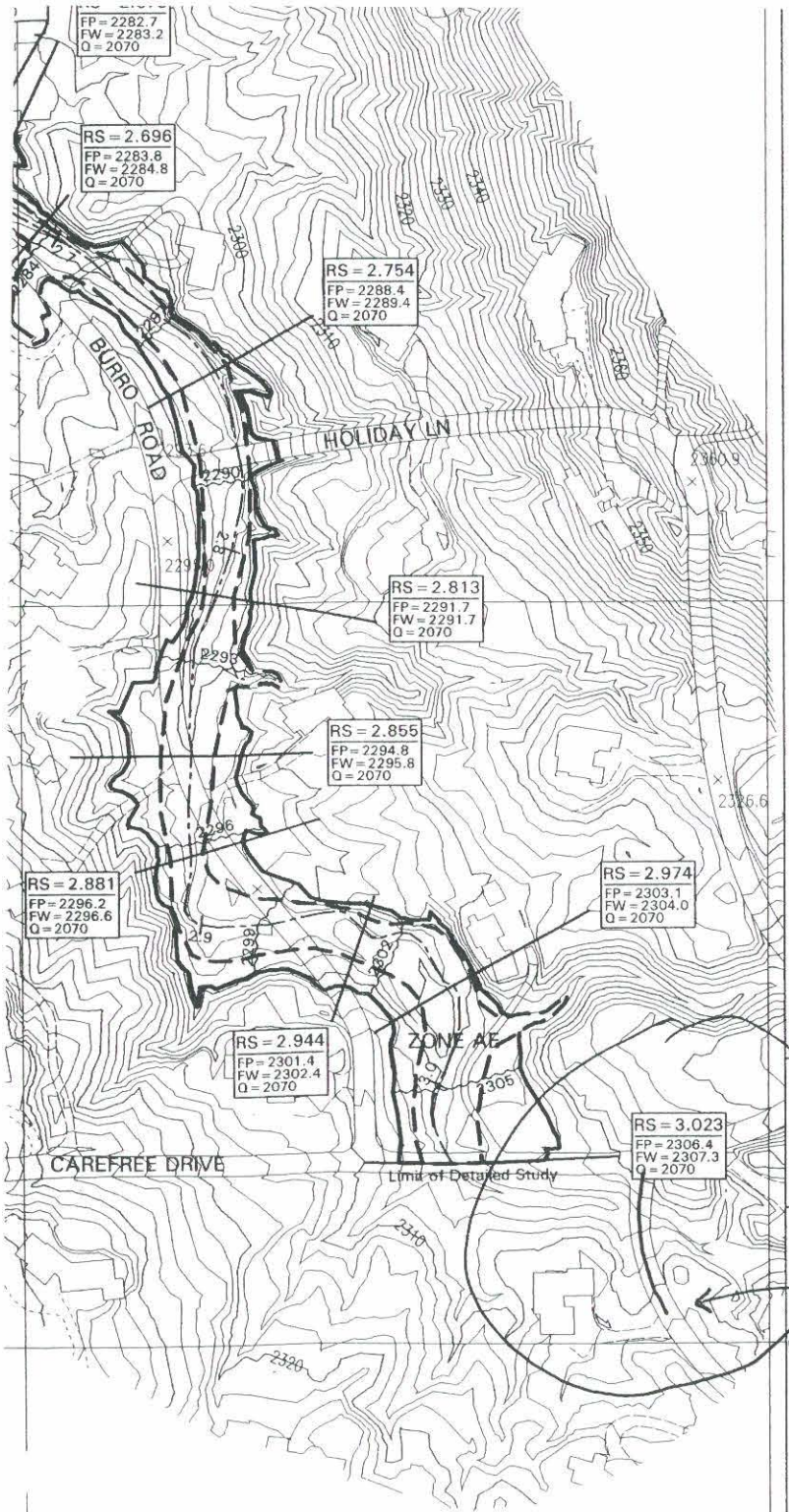
Protection:

Notes: Depth approximated based on similiar depths in channel 200' downstream. Geometry similiar, flow rate the same

BIVOUAC TRAIL NEAR CAREFREE DRIVE

39.7 , 2308.96
96.0 , 2306.00
119.6 , 2306.00
164.2 , 2310.00

S = 0.0138

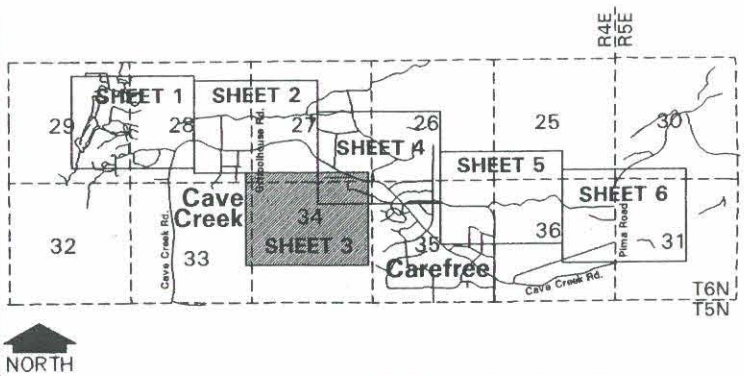


JEF 6

NOTES

1. THE HYDRAULIC BASE LINE IS CROSS SECTION STATION 10,000 UNLESS NOTED OTHERWISE.
2. HORIZONTAL PROJECTION IS ARIZONA STATEPLANE, CENTRAL ZONE, NORTH AMERICAN DATUM OF 1983.
3. ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929. CONVERSION FACTOR: 1988 NGVD = 2.05 + 1929 NGVD

INDEX MAP



200 0' 200 400

SCALE: 1" = 200 FEET

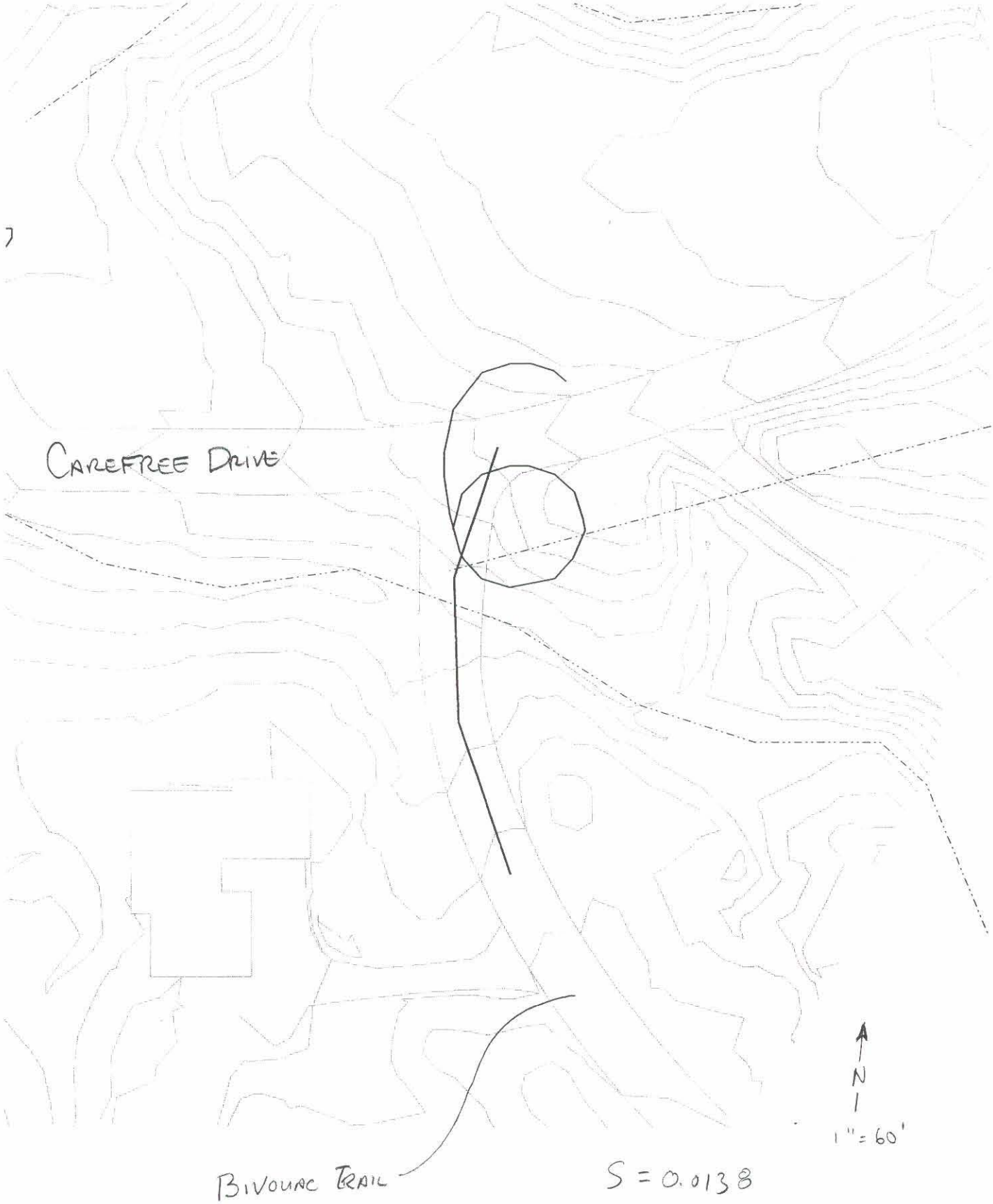
CONTOUR INTERVAL = 2 FEET

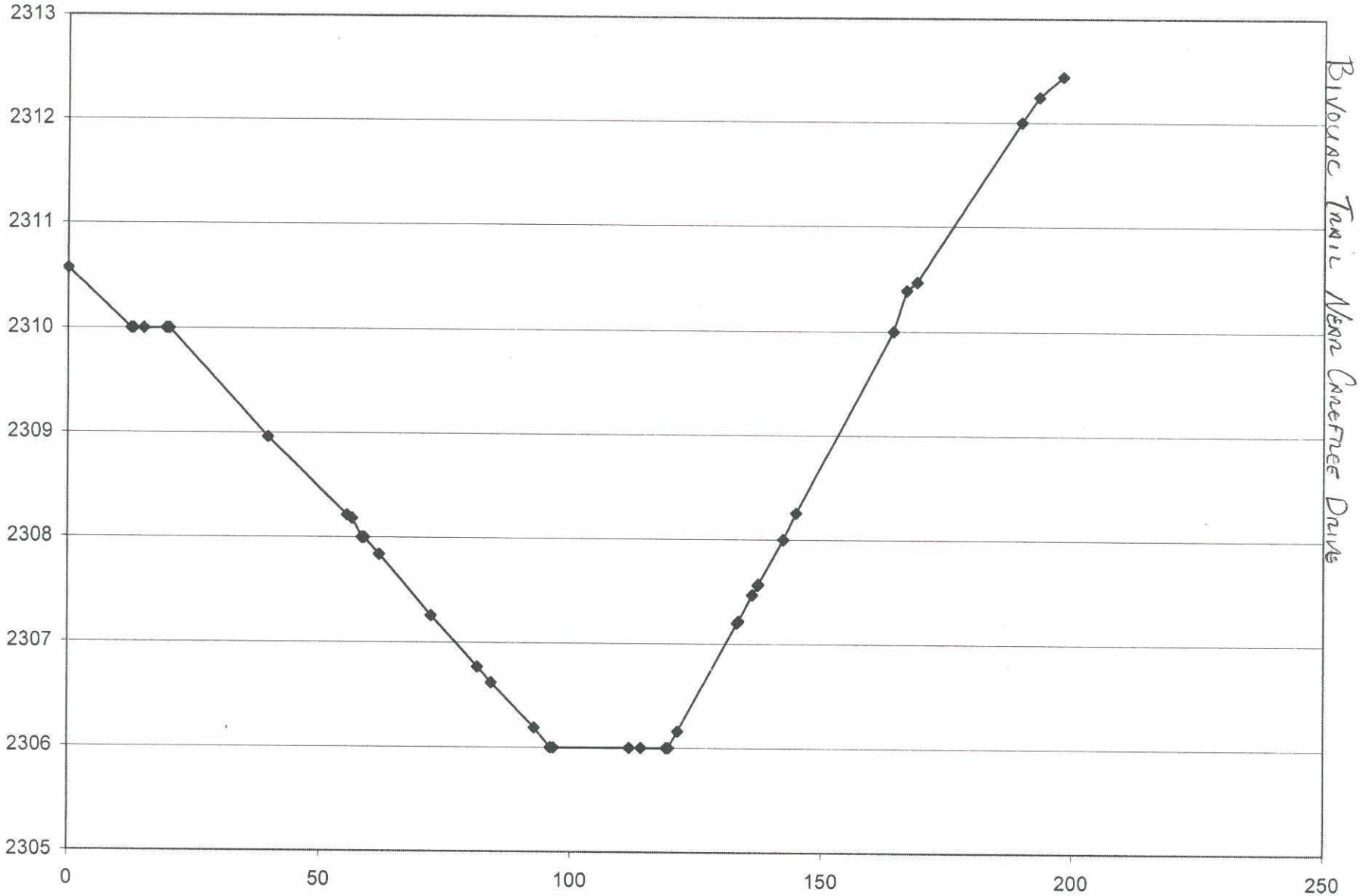
REGISTERED LAND SURVEYOR
CERTIFICATE NO.
24530
DAVID A.
RHINE
Date Signed
ARIZONA, U.S.A.

Registered Professional Engineer (Civ
CERTIFICATE NO.
23969
FRANK EDWARD

JE FULLER
HYDROLOGY & GEOMORPHOLOGY, INC.

in association with


CAREFREE DRIVE
N
1" = 60'
BIVOUAC TRAIL
S = 0.0138


2313
2312
2311
2310
2309
2308
2307
2306
2305
0
50
100
150
200
250
BIVOUAC TRAIL NEAR CANEFLEE DRIVE

Worksheet
Worksheet for Irregular Channel

BIVOUAC TRAIL NEAR CAREFREE DRIVE

Project Description	
Worksheet	JEF 6
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data		
Slope	013800	ft/ft
Discharg	,626.00	cfs

Options	
Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Results		
Mannings Coefficie	0.032	
Water Surface Elev	2,308.96	ft
Elevation Range	06.00 to 2,310.00	
Flow Area	202.3	ft²
Wetted Perimeter	113.15	ft
Top Width	112.93	ft
Actual Depth	2.96	ft
Critical Elevation	2,309.04	ft
Critical Slope	0.012192	ft/ft
Velocity	8.04	ft/s
Velocity Head	1.00	ft
Specific Energy	2,309.97	ft
Froude Number	1.06	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.26863689e-2 ft.

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+40	1+64	0.032

Natural Channel Points

Station (ft)	Elevation (ft)
0+40	2,308.96
0+96	2,306.00
1+20	2,306.00
1+64	2,310.00

Table
Rating Table for Irregular Channel

BIVOUAC TRAIL NEAR CAREFREE DRIVE

Project Description

Worksheet	JEF 6
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data

Slope	013800	ft/ft

Options

Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	1,700.00	5.00

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00	2,306.00	0.00	0.0	0.00	0.00
5.00	2,306.14	1.39	3.6	27.82	27.81
10.00	2,306.21	1.78	5.6	29.93	29.92
15.00	2,306.26	2.05	7.3	31.60	31.58
20.00	2,306.31	2.26	8.8	33.04	33.02
25.00	2,306.35	2.44	10.3	34.31	34.29
30.00	2,306.39	2.59	11.6	35.47	35.45
35.00	2,306.43	2.72	12.9	36.55	36.52
40.00	2,306.46	2.84	14.1	37.55	37.51
45.00	2,306.49	2.95	15.3	38.49	38.45
50.00	2,306.52	3.04	16.4	39.38	39.34
55.00	2,306.55	3.14	17.5	40.23	40.19
60.00	2,306.58	3.22	18.6	41.04	41.00
65.00	2,306.60	3.30	19.7	41.82	41.77
70.00	2,306.63	3.38	20.7	42.56	42.52
75.00	2,306.65	3.45	21.8	43.28	43.24
80.00	2,306.67	3.52	22.8	43.98	43.93
85.00	2,306.70	3.58	23.7	44.65	44.60
90.00	2,306.72	3.64	24.7	45.31	45.26
95.00	2,306.74	3.70	25.7	45.94	45.89
100.00	2,306.76	3.76	26.6	46.56	46.51
105.00	2,306.78	3.81	27.5	47.16	47.11
110.00	2,306.80	3.86	28.5	47.75	47.69
115.00	2,306.82	3.91	29.4	48.32	48.27
120.00	2,306.84	3.96	30.3	48.88	48.82
125.00	2,306.85	4.01	31.2	49.43	49.37
130.00	2,306.87	4.06	32.0	49.97	49.91
135.00	2,306.89	4.10	32.9	50.49	50.43
140.00	2,306.91	4.14	33.8	51.01	50.94
145.00	2,306.92	4.19	34.6	51.51	51.45
150.00	2,306.94	4.23	35.5	52.01	51.94
155.00	2,306.96	4.27	36.3	52.50	52.43
160.00	2,306.97	4.31	37.2	52.97	52.91
165.00	2,306.99	4.34	38.0	53.44	53.37

Table
Rating Table for Irregular Channel

BIVOUAC TRAIL NEAR CAREFREE DRIVE

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
170.00	2,307.00	4.38	38.8	53.91	53.84
175.00	2,307.02	4.42	39.6	54.36	54.29
180.00	2,307.03	4.45	40.4	54.81	54.74
185.00	2,307.05	4.49	41.2	55.25	55.18
190.00	2,307.06	4.52	42.0	55.69	55.61
195.00	2,307.08	4.55	42.8	56.12	56.04
200.00	2,307.09	4.59	43.6	56.54	56.46
205.00	2,307.10	4.62	44.4	56.95	56.88
210.00	2,307.12	4.65	45.2	57.37	57.29
215.00	2,307.13	4.68	45.9	57.77	57.69
220.00	2,307.14	4.71	46.7	58.17	58.09
225.00	2,307.16	4.74	47.5	58.57	58.49
230.00	2,307.17	4.77	48.2	58.96	58.88
235.00	2,307.18	4.80	49.0	59.34	59.26
240.00	2,307.19	4.83	49.7	59.73	59.64
245.00	2,307.21	4.85	50.5	60.10	60.02
250.00	2,307.22	4.88	51.2	60.48	60.39
255.00	2,307.23	4.91	51.9	60.84	60.76
260.00	2,307.24	4.94	52.7	61.21	61.12
265.00	2,307.26	4.96	53.4	61.57	61.48
270.00	2,307.27	4.99	54.1	61.93	61.84
275.00	2,307.28	5.01	54.9	62.28	62.19
280.00	2,307.29	5.04	55.6	62.63	62.54
285.00	2,307.30	5.06	56.3	62.97	62.88
290.00	2,307.31	5.09	57.0	63.32	63.22
295.00	2,307.32	5.11	57.7	63.66	63.56
300.00	2,307.34	5.13	58.4	63.99	63.90
305.00	2,307.35	5.16	59.1	64.32	64.23
310.00	2,307.36	5.18	59.8	64.65	64.56
315.00	2,307.37	5.20	60.5	64.98	64.88
320.00	2,307.38	5.23	61.2	65.30	65.21
325.00	2,307.39	5.25	61.9	65.63	65.53
330.00	2,307.40	5.27	62.6	65.94	65.84
335.00	2,307.41	5.29	63.3	66.26	66.16
340.00	2,307.42	5.31	64.0	66.57	66.47
345.00	2,307.43	5.33	64.7	66.88	66.78
350.00	2,307.44	5.36	65.4	67.19	67.09
355.00	2,307.45	5.38	66.0	67.49	67.39
360.00	2,307.46	5.40	66.7	67.80	67.69
365.00	2,307.47	5.42	67.4	68.10	67.99
370.00	2,307.48	5.44	68.1	68.39	68.29
375.00	2,307.49	5.46	68.7	68.69	68.58
380.00	2,307.50	5.48	69.4	68.98	68.88
385.00	2,307.51	5.50	70.1	69.27	69.17
390.00	2,307.52	5.51	70.7	69.56	69.46
395.00	2,307.53	5.53	71.4	69.85	69.74
400.00	2,307.54	5.55	72.0	70.13	70.03
405.00	2,307.55	5.57	72.7	70.42	70.31
410.00	2,307.56	5.59	73.3	70.70	70.59
415.00	2,307.57	5.61	74.0	70.98	70.87
420.00	2,307.58	5.63	74.6	71.25	71.14
425.00	2,307.58	5.64	75.3	71.53	71.42
430.00	2,307.59	5.66	75.9	71.80	71.69
435.00	2,307.60	5.68	76.6	72.07	71.96

IMPASSABLE

Table
Rating Table for Irregular Channel

BIVOUAC TRAIL NEAR CAREFREE DRIVE

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
440.00	2,307.61	5.70	77.2	72.34	72.23
445.00	2,307.62	5.72	77.9	72.61	72.49
450.00	2,307.63	5.73	78.5	72.87	72.76
455.00	2,307.64	5.75	79.1	73.14	73.02
460.00	2,307.65	5.77	79.8	73.40	73.28
465.00	2,307.66	5.78	80.4	73.66	73.54
470.00	2,307.66	5.80	81.0	73.92	73.80
475.00	2,307.67	5.82	81.7	74.18	74.06
480.00	2,307.68	5.83	82.3	74.44	74.32
485.00	2,307.69	5.85	82.9	74.69	74.57
490.00	2,307.70	5.86	83.5	74.94	74.82
495.00	2,307.71	5.88	84.2	75.19	75.07
500.00	2,307.71	5.90	84.8	75.44	75.32
505.00	2,307.72	5.91	85.4	75.69	75.57
510.00	2,307.73	5.93	86.0	75.94	75.82
515.00	2,307.74	5.94	86.6	76.19	76.06
520.00	2,307.75	5.96	87.3	76.43	76.31
525.00	2,307.75	5.97	87.9	76.67	76.55
530.00	2,307.76	5.99	88.5	76.91	76.79
535.00	2,307.77	6.00	89.1	77.15	77.03
540.00	2,307.78	6.02	89.7	77.39	77.27
545.00	2,307.79	6.03	90.3	77.63	77.50
550.00	2,307.79	6.05	90.9	77.87	77.74
555.00	2,307.80	6.06	91.5	78.10	77.97
560.00	2,307.81	6.08	92.1	78.34	78.21
565.00	2,307.82	6.09	92.7	78.57	78.44
570.00	2,307.83	6.11	93.3	78.80	78.67
575.00	2,307.83	6.12	93.9	79.03	78.90
580.00	2,307.84	6.14	94.5	79.26	79.13
585.00	2,307.85	6.15	95.1	79.49	79.36
590.00	2,307.86	6.16	95.7	79.71	79.58
595.00	2,307.86	6.18	96.3	79.94	79.81
600.00	2,307.87	6.19	96.9	80.17	80.03
605.00	2,307.88	6.20	97.5	80.39	80.26
610.00	2,307.89	6.22	98.1	80.61	80.48
615.00	2,307.89	6.23	98.7	80.83	80.70
620.00	2,307.90	6.24	99.3	81.05	80.92
625.00	2,307.91	6.26	99.9	81.27	81.14
630.00	2,307.91	6.27	100.5	81.49	81.35
635.00	2,307.92	6.28	101.0	81.71	81.57
640.00	2,307.93	6.30	101.6	81.92	81.79
645.00	2,307.94	6.31	102.2	82.14	82.00
650.00	2,307.94	6.32	102.8	82.35	82.22
655.00	2,307.95	6.34	103.4	82.57	82.43
660.00	2,307.96	6.35	103.9	82.78	82.64
665.00	2,307.96	6.36	104.5	82.99	82.85
670.00	2,307.97	6.37	105.1	83.20	83.06
675.00	2,307.98	6.39	105.7	83.41	83.27
680.00	2,307.98	6.40	106.3	83.62	83.48
685.00	2,307.99	6.41	106.8	83.83	83.68
690.00	2,308.00	6.42	107.4	84.03	83.89
695.00	2,308.01	6.44	108.0	84.24	84.10
700.00	2,308.01	6.45	108.5	84.44	84.30
705.00	2,308.02	6.46	109.1	84.65	84.51

Table
Rating Table for Irregular Channel

BIVOUAC TRAIL NEAR CAREFREE DRIVE

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
710.00	2,308.03	6.47	109.7	84.85	84.71
715.00	2,308.03	6.49	110.3	85.05	84.91
720.00	2,308.04	6.50	110.8	85.26	85.11
725.00	2,308.05	6.51	111.4	85.46	85.31
730.00	2,308.05	6.52	112.0	85.66	85.51
735.00	2,308.06	6.53	112.5	85.86	85.71
740.00	2,308.07	6.54	113.1	86.05	85.91
745.00	2,308.07	6.56	113.6	86.25	86.10
750.00	2,308.08	6.57	114.2	86.45	86.30
755.00	2,308.08	6.58	114.8	86.64	86.50
760.00	2,308.09	6.59	115.3	86.84	86.69
765.00	2,308.10	6.60	115.9	87.03	86.89
770.00	2,308.10	6.61	116.4	87.23	87.08
775.00	2,308.11	6.62	117.0	87.42	87.27
780.00	2,308.12	6.64	117.5	87.61	87.46
785.00	2,308.12	6.65	118.1	87.81	87.65
790.00	2,308.13	6.66	118.7	88.00	87.85
795.00	2,308.14	6.67	119.2	88.19	88.03
800.00	2,308.14	6.68	119.8	88.38	88.22
805.00	2,308.15	6.69	120.3	88.56	88.41
810.00	2,308.15	6.70	120.9	88.75	88.60
815.00	2,308.16	6.71	121.4	88.94	88.79
820.00	2,308.17	6.72	122.0	89.13	88.97
825.00	2,308.17	6.73	122.5	89.31	89.16
830.00	2,308.18	6.74	123.1	89.50	89.34
835.00	2,308.19	6.76	123.6	89.68	89.53
840.00	2,308.19	6.77	124.1	89.87	89.71
845.00	2,308.20	6.78	124.7	90.05	89.89
850.00	2,308.20	6.79	125.2	90.23	90.08
855.00	2,308.21	6.80	125.8	90.41	90.26
860.00	2,308.22	6.81	126.3	90.60	90.44
865.00	2,308.22	6.82	126.9	90.78	90.62
870.00	2,308.23	6.83	127.4	90.96	90.80
875.00	2,308.23	6.84	127.9	91.14	90.98
880.00	2,308.24	6.85	128.5	91.32	91.16
885.00	2,308.25	6.86	129.0	91.49	91.33
890.00	2,308.25	6.87	129.6	91.67	91.51
895.00	2,308.26	6.88	130.1	91.85	91.69
900.00	2,308.26	6.89	130.6	92.03	91.86
905.00	2,308.27	6.90	131.2	92.20	92.04
910.00	2,308.27	6.91	131.7	92.38	92.22
915.00	2,308.28	6.92	132.2	92.55	92.39
920.00	2,308.29	6.93	132.8	92.73	92.56
925.00	2,308.29	6.94	133.3	92.90	92.74
930.00	2,308.30	6.95	133.8	93.07	92.91
935.00	2,308.30	6.96	134.4	93.25	93.08
940.00	2,308.31	6.97	134.9	93.42	93.25
945.00	2,308.31	6.98	135.4	93.59	93.42
950.00	2,308.32	6.99	135.9	93.76	93.60
955.00	2,308.33	7.00	136.5	93.93	93.77
960.00	2,308.33	7.01	137.0	94.10	93.93
965.00	2,308.34	7.02	137.5	94.27	94.10
970.00	2,308.34	7.03	138.1	94.44	94.27
975.00	2,308.35	7.04	138.6	94.61	94.44

Table
Rating Table for Irregular Channel

BIVOUAC TRAIL NEAR CAREFREE DRIVE

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
980.00	2,308.35	7.05	139.1	94.77	94.61
985.00	2,308.36	7.05	139.6	94.94	94.77
990.00	2,308.36	7.06	140.2	95.11	94.94
995.00	2,308.37	7.07	140.7	95.28	95.11
1,000.00	2,308.38	7.08	141.2	95.44	95.27
1,005.00	2,308.38	7.09	141.7	95.61	95.44
1,010.00	2,308.39	7.10	142.2	95.77	95.60
1,015.00	2,308.39	7.11	142.8	95.94	95.77
1,020.00	2,308.40	7.12	143.3	96.10	95.93
1,025.00	2,308.40	7.13	143.8	96.26	96.09
1,030.00	2,308.41	7.14	144.3	96.43	96.25
1,035.00	2,308.41	7.15	144.8	96.59	96.42
1,040.00	2,308.42	7.16	145.3	96.75	96.58
1,045.00	2,308.42	7.16	145.9	96.91	96.74
1,050.00	2,308.43	7.17	146.4	97.07	96.90
1,055.00	2,308.43	7.18	146.9	97.23	97.06
1,060.00	2,308.44	7.19	147.4	97.39	97.22
1,065.00	2,308.45	7.20	147.9	97.55	97.38
1,070.00	2,308.45	7.21	148.4	97.71	97.54
1,075.00	2,308.46	7.22	148.9	97.87	97.70
1,080.00	2,308.46	7.23	149.5	98.03	97.85
1,085.00	2,308.47	7.23	150.0	98.19	98.01
1,090.00	2,308.47	7.24	150.5	98.34	98.17
1,095.00	2,308.48	7.25	151.0	98.50	98.33
1,100.00	2,308.48	7.26	151.5	98.66	98.48
1,105.00	2,308.49	7.27	152.0	98.81	98.64
1,110.00	2,308.49	7.28	152.5	98.97	98.79
1,115.00	2,308.50	7.29	153.0	99.13	98.95
1,120.00	2,308.50	7.29	153.5	99.28	99.10
1,125.00	2,308.51	7.30	154.0	99.43	99.26
1,130.00	2,308.51	7.31	154.5	99.59	99.41
1,135.00	2,308.52	7.32	155.1	99.74	99.56
1,140.00	2,308.52	7.33	155.6	99.90	99.72
1,145.00	2,308.53	7.34	156.1	100.05	99.87
1,150.00	2,308.53	7.35	156.6	100.20	100.02
1,155.00	2,308.54	7.35	157.1	100.35	100.17
1,160.00	2,308.54	7.36	157.6	100.50	100.32
1,165.00	2,308.55	7.37	158.1	100.66	100.48
1,170.00	2,308.55	7.38	158.6	100.81	100.63
1,175.00	2,308.56	7.39	159.1	100.96	100.78
1,180.00	2,308.56	7.39	159.6	101.11	100.93
1,185.00	2,308.57	7.40	160.1	101.26	101.07
1,190.00	2,308.57	7.41	160.6	101.41	101.22
1,195.00	2,308.58	7.42	161.1	101.56	101.37
1,200.00	2,308.58	7.43	161.6	101.70	101.52
1,205.00	2,308.59	7.43	162.1	101.85	101.67
1,210.00	2,308.59	7.44	162.6	102.00	101.82
1,215.00	2,308.60	7.45	163.1	102.15	101.96
1,220.00	2,308.60	7.46	163.6	102.29	102.11
1,225.00	2,308.61	7.47	164.1	102.44	102.26
1,230.00	2,308.61	7.47	164.6	102.59	102.40
1,235.00	2,308.62	7.48	165.0	102.73	102.55
1,240.00	2,308.62	7.49	165.5	102.88	102.69
1,245.00	2,308.63	7.50	166.0	103.03	102.84

Table
Rating Table for Irregular Channel

BIVOUAC TRAIL NEAR CAREFREE DRIVE

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
1,250.00	2,308.63	7.51	166.5	103.17	102.98
1,255.00	2,308.64	7.51	167.0	103.31	103.13
1,260.00	2,308.64	7.52	167.5	103.46	103.27
1,265.00	2,308.65	7.53	168.0	103.60	103.42
1,270.00	2,308.65	7.54	168.5	103.75	103.56
1,275.00	2,308.65	7.54	169.0	103.89	103.70
1,280.00	2,308.66	7.55	169.5	104.03	103.84
1,285.00	2,308.66	7.56	170.0	104.18	103.99
1,290.00	2,308.67	7.57	170.5	104.32	104.13
1,295.00	2,308.67	7.58	171.0	104.46	104.27
1,300.00	2,308.68	7.58	171.4	104.60	104.41
1,305.00	2,308.68	7.59	171.9	104.74	104.55
1,310.00	2,308.69	7.60	172.4	104.88	104.69
1,315.00	2,308.69	7.61	172.9	105.02	104.83
1,320.00	2,308.70	7.61	173.4	105.16	104.97
1,325.00	2,308.70	7.62	173.9	105.30	105.11
1,330.00	2,308.71	7.63	174.4	105.44	105.25
1,335.00	2,308.71	7.64	174.8	105.58	105.39
1,340.00	2,308.72	7.64	175.3	105.72	105.53
1,345.00	2,308.72	7.65	175.8	105.86	105.67
1,350.00	2,308.72	7.66	176.3	106.00	105.81
1,355.00	2,308.73	7.66	176.8	106.14	105.94
1,360.00	2,308.73	7.67	177.3	106.28	106.08
1,365.00	2,308.74	7.68	177.7	106.41	106.22
1,370.00	2,308.74	7.69	178.2	106.55	106.36
1,375.00	2,308.75	7.69	178.7	106.69	106.49
1,380.00	2,308.75	7.70	179.2	106.82	106.63
1,385.00	2,308.76	7.71	179.7	106.96	106.76
1,390.00	2,308.76	7.72	180.2	107.10	106.90
1,395.00	2,308.77	7.72	180.6	107.23	107.04
1,400.00	2,308.77	7.73	181.1	107.37	107.17
1,405.00	2,308.77	7.74	181.6	107.50	107.31
1,410.00	2,308.78	7.74	182.1	107.64	107.44
1,415.00	2,308.78	7.75	182.6	107.77	107.57
1,420.00	2,308.79	7.76	183.0	107.91	107.71
1,425.00	2,308.79	7.77	183.5	108.04	107.84
1,430.00	2,308.80	7.77	184.0	108.17	107.98
1,435.00	2,308.80	7.78	184.5	108.31	108.11
1,440.00	2,308.81	7.79	184.9	108.44	108.24
1,445.00	2,308.81	7.79	185.4	108.57	108.37
1,450.00	2,308.81	7.80	185.9	108.71	108.51
1,455.00	2,308.82	7.81	186.4	108.84	108.64
1,460.00	2,308.82	7.81	186.8	108.97	108.77
1,465.00	2,308.83	7.82	187.3	109.10	108.90
1,470.00	2,308.83	7.83	187.8	109.23	109.03
1,475.00	2,308.84	7.83	188.3	109.36	109.16
1,480.00	2,308.84	7.84	188.7	109.50	109.29
1,485.00	2,308.84	7.85	189.2	109.63	109.42
1,490.00	2,308.85	7.86	189.7	109.76	109.55
1,495.00	2,308.85	7.86	190.1	109.89	109.68
1,500.00	2,308.86	7.87	190.6	110.02	109.81
1,505.00	2,308.86	7.88	191.1	110.15	109.94
1,510.00	2,308.87	7.88	191.6	110.28	110.07
1,515.00	2,308.87	7.89	192.0	110.40	110.20

Table
Rating Table for Irregular Channel

BIVOUAC TRAIL NEAR CAREFREE DRIVE

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
1,520.00	2,308.87	7.90	192.5	110.53	110.33
1,525.00	2,308.88	7.90	193.0	110.66	110.46
1,530.00	2,308.88	7.91	193.4	110.79	110.59
1,535.00	2,308.89	7.92	193.9	110.92	110.71
1,540.00	2,308.89	7.92	194.4	111.05	110.84
1,545.00	2,308.90	7.93	194.8	111.17	110.97
1,550.00	2,308.90	7.94	195.3	111.30	111.10
1,555.00	2,308.90	7.94	195.8	111.43	111.22
1,560.00	2,308.91	7.95	196.2	111.56	111.35
1,565.00	2,308.91	7.96	196.7	111.68	111.47
1,570.00	2,308.92	7.96	197.2	111.81	111.60
1,575.00	2,308.92	7.97	197.6	111.93	111.73
1,580.00	2,308.93	7.98	198.1	112.06	111.85
1,585.00	2,308.93	7.98	198.6	112.19	111.98
1,590.00	2,308.93	7.99	199.0	112.31	112.10
1,595.00	2,308.94	7.99	199.5	112.44	112.23
1,600.00	2,308.94	8.00	200.0	112.56	112.35
1,605.00	2,308.95	8.01	200.4	112.69	112.48
1,610.00	2,308.95	8.01	200.9	112.81	112.60
1,615.00	2,308.95	8.02	201.4	112.93	112.72
1,620.00	2,308.96	8.03	201.8	113.06	112.85
1,625.00	2,308.96	8.03	202.2	113.14	112.93
1,630.00	2,308.97	8.04	202.7	113.18	112.97
1,635.00	2,308.97	8.05	203.1	113.23	113.01
1,640.00	2,308.97	8.06	203.5	113.27	113.05
1,645.00	2,308.98	8.07	203.9	113.31	113.09
1,650.00	2,308.98	8.08	204.3	113.36	113.13
1,655.00	2,308.98	8.09	204.7	113.40	113.16
1,660.00	2,308.99	8.09	205.1	113.44	113.20
1,665.00	2,308.99	8.10	205.5	113.49	113.24
1,670.00	2,308.99	8.11	205.9	113.53	113.28
1,675.00	2,309.00	8.12	206.3	113.57	113.32
1,680.00	2,309.00	8.13	206.7	113.62	113.36
1,685.00	2,309.00	8.14	207.1	113.66	113.40
1,690.00	2,309.01	8.15	207.5	113.70	113.44
1,695.00	2,309.01	8.15	207.9	113.74	113.48
1,700.00	2,309.02	8.16	208.3	113.79	113.52

AW 100 YR, 6 HR
FUTURE

6 (JEF)

BIVOUAC TRAIL NEAR CAREFREE DRIVE

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1*************************************                    *************************************
*                                   *                    *                                   *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                    *   U.S. ARMY CORPS OF ENGINEERS    *
*              JUN  1998            *                    *   HYDROLOGIC ENGINEERING CENTER   *
*           VERSION 4.1             *                    *         609 SECOND STREET         *
*                                   *                    *      DAVIS, CALIFORNIA 95616      *
*  RUN DATE   27NOV02  TIME  08:23:52 *                    *          (916) 756-1104           *
*                                   *                    *                                   *
*************************************                    *************************************

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

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

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

1                                          HEC-1 INPUT                                          PAGE  1

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

        1           ID   ANDORA HILLS WASH FUTURE CONDITIONS
        2           ID
        3           ID    100-YEAR 6-HOUR MODEL  FILENAME: AW1006F.DAT
        4           ID      MODIFIED BY JEF, INC. FOR CAREFREE AREA DRAINAGE MASTER PLAN
        5           ID      MODIFICATIONS INCLUDE:
        6           ID      1)  CHANGES TO WATERSHED DELINATION BETWEEN S320 AND S340L
        7           ID          EXAMINATION OF AERIAL PHOTOGRAPHS REVEALED AREA WITHIN
        8           ID          S320 THAT ACTUALLY FLOWS THROUGH S340L NEAR THE SW CORNER
        9           ID          OF S340L OFF THE BLACK MOUNTAIN HILLS.
       10           ID      2)  ADDITION OF NEW COMBINATION BLOCKS TO SEPARATE COMBINATIONS WITH
       11           ID          MORE THAN TWO HYDROGRAPHS IN THE ORIGINAL MODEL.
       12           ID      3)  FUTURE CONDITIONS LAND USE INTERPRETED FROM FUTURE LAND USE IN
       13           ID          CAVE CREEK WATERCOURSE MASTER PLAN BY TETRA TECH, 2001
       14           ID
       15           ID    BASED ON:
       16           ID
       17           ID        Cave Creek Above Carefree Highway FPD Study       File: AW100-6.IH1
       18           ID           by  GVSCE for Maricopa County FCD 95-28    Original: 06-17-96     mcg
       19           ID           Project:          84                         Revised:
       20           ID
       21           ID         Andora Hills Wash sub-watershed model
       22           ID           100-year, 6-hr rainfall with FCDMC Design Manual distribution
       23           ID           Green & Ampt Loss Rate Method
       24           ID           NMIN = 2
       25           ID           Clark Unit Hydrograph
       26           ID           Modified Puls, normal depth channel routing
                    *
                    *
                    *
       27           IT       2                    900
       28           IO       5       2
       29           IN      15
                    *
                    *DIAGRAM
                    *
                    *  Depth-Area reduction factors taken from Table 2.2 of FCDMC Design Manual
                    *
                    *  6-hr rainfall distributions per Table 2.4 and Figure 2.17 of Design Manual
                    *
       30           JD    3.40    0.01
       31           PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
       32           PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
       33           PC   0.962   0.972   0.983   0.991   1.000
       34           JD    3.38    0.50
       35           JD    3.30    2.80
       36           PC   0.000   0.009   0.016   0.025   0.034   0.042   0.051   0.059   0.067   0.076
       37           PC   0.087   0.100   0.120   0.163   0.252   0.451   0.694   0.837   0.900   0.938
       38           PC   0.950   0.963   0.975   0.988   1.000
                    *
                    *
1                                          HEC-1 INPUT                                          PAGE  2

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

       39           KK    S320
       40           KM   SUB-BASIN AHW1
```

Bivouac Trail Near Carefree Drive

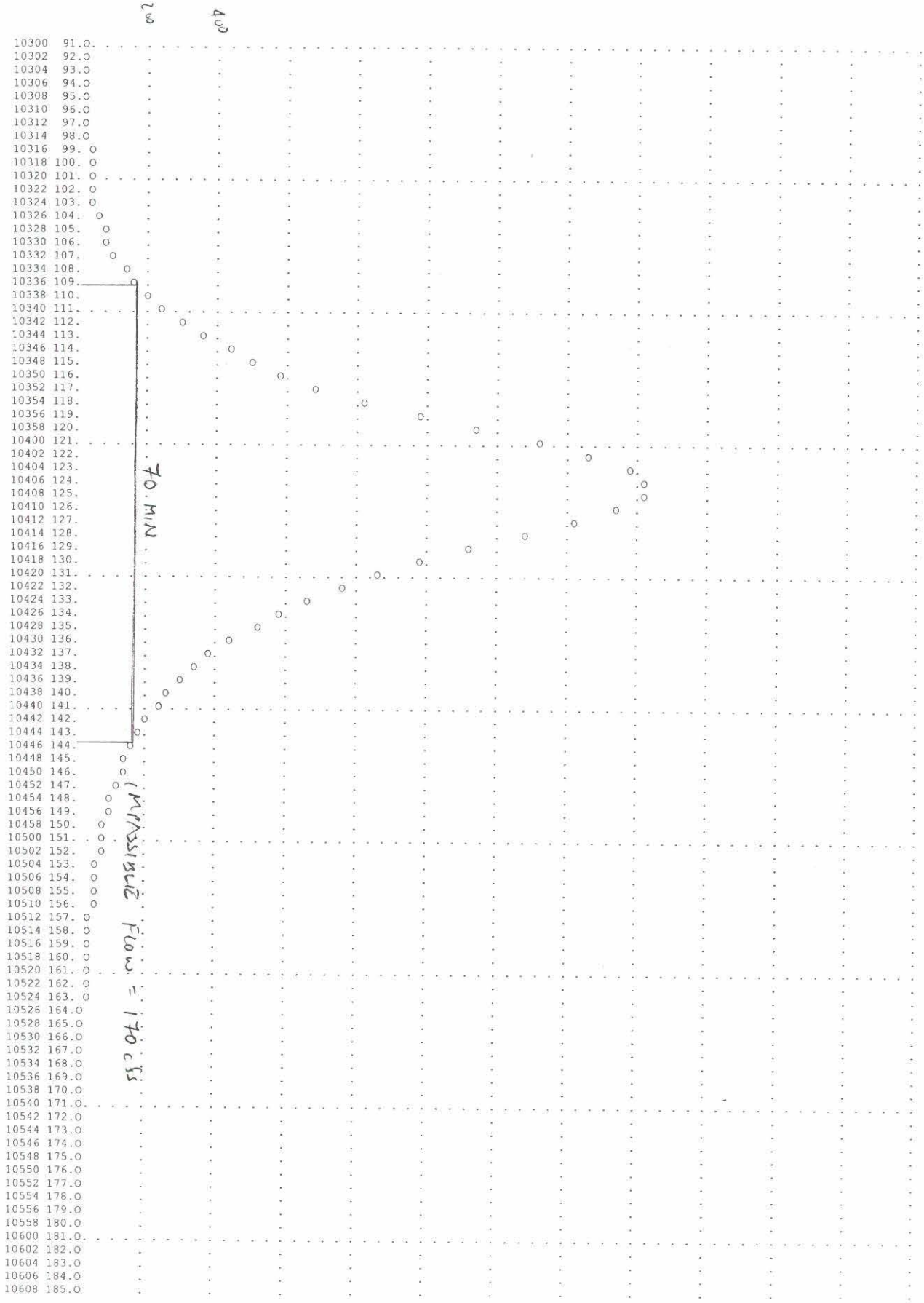
1

STATION C340R

(O) OUTFLOW

DAHRMN	PER	0.	200.	400.	600.	800.	1000.	1200.	1400.	1600.	1800.	0.	0.	0.
10000	10													
10002	20													
10004	30													
10006	40													
10008	50													
10010	60													
10012	70													
10014	80													
10016	90													
10018	100													
10020	110													
10022	120													
10024	130													
10026	140													
10028	150													
10030	160													
10032	170													
10034	180													
10036	190													
10038	200													
10040	21.0													
10042	22.0													
10044	23.0													
10046	24.0													
10048	25.0													
10050	26.0													
10052	27.0													
10054	28.0													
10056	29.0													
10058	30.0													
10100	31.0													
10102	32.0													
10104	33.0													
10106	34.0													
10108	35.0													
10110	36.0													
10112	37.0													
10114	38.0													
10116	39.0													
10118	40.0													
10120	41.0													
10122	42.0													
10124	43.0													
10126	44.0													
10128	45.0													
10130	46.0													
10132	47.0													
10134	48.0													
10136	49.0													
10138	50.0													
10140	51.0													
10142	52.0													
10144	53.0													
10146	54.0													
10148	55.0													
10150	56.0													
10152	57.0													
10154	58.0													
10156	59.0													
10158	60.0													
10200	61.0													
10202	62.0													
10204	63.0													
10206	64.0													
10208	65.0													
10210	66.0													
10212	67.0													
10214	68.0													
10216	69.0													
10218	70.0													
10220	71.0													
10222	72.0													
10224	73.0													
10226	74.0													
10228	75.0													
10230	76.0													
10232	77.0													
10234	78.0													
10236	79.0													
10238	80.0													
10240	81.0													
10242	82.0													
10244	83.0													
10246	84.0													
10248	85.0													
10250	86.0													
10252	87.0													
10254	88.0													
10256	89.0													
10258	90.0													

BIVOUAC TRAIL NEAR CAMEFREE DRIVE



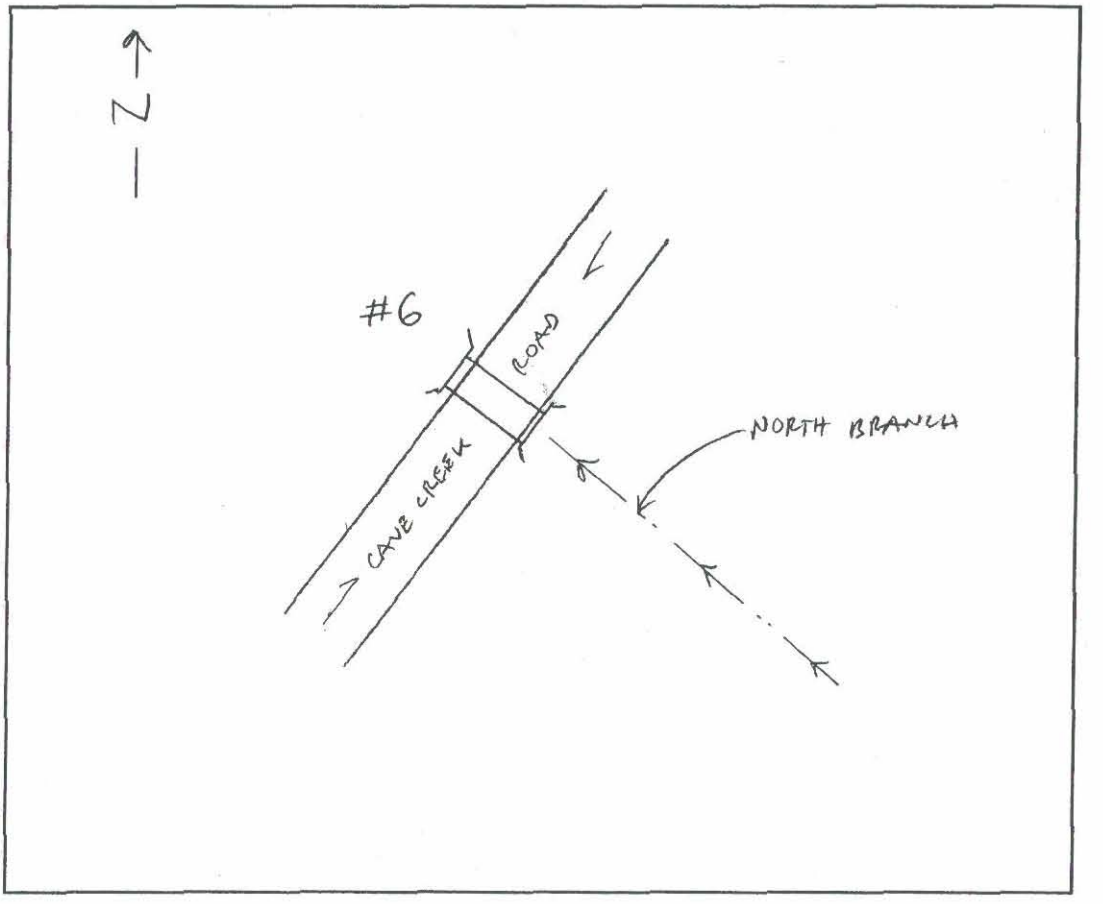
Culvert No. 6, Unnamed Central Wash

Carefree Drainage Master Plan
Field Survey Notes

Culvert Number: #6

Date of Survey: AS-BUILTS OBTAINED

Location: CAVE CREEK ROAD AT UNNAMED CENTRAL TRIBUTARY TO CAVE CREEK - NORTH BRANCH



Material: 3 - 66" DIA CMP

Headwall: YES

Notes: REFER TO BOUNDARY CONDITION MEMO ATTACHED

Boundary Conditions, Culvert No. 6, Unnamed Central Tributary To Cave Creek-North Branch

TO: Tony Bokich

COPIES: File

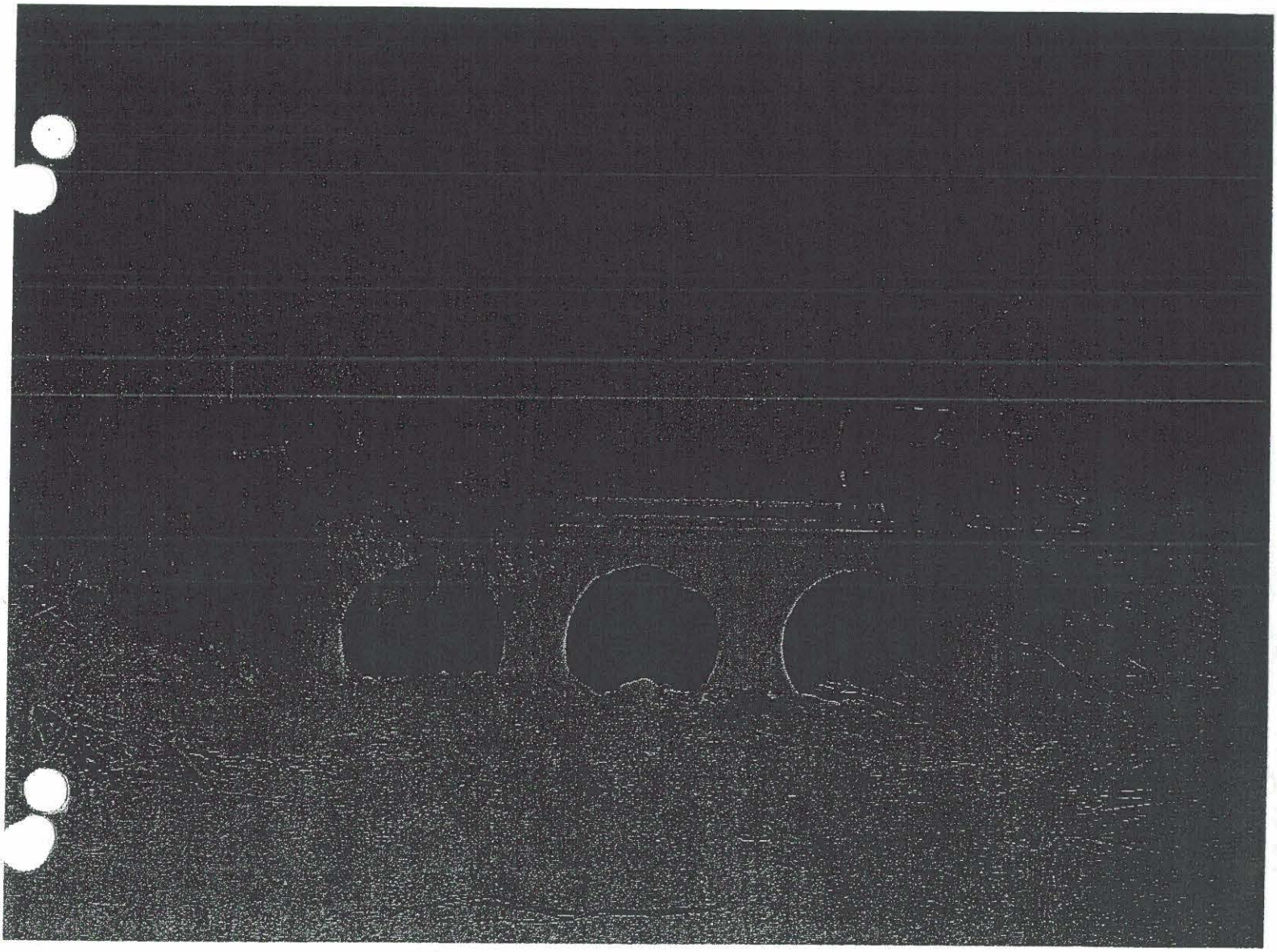
FROM: Patrick Wolf

DATE: October 24, 2002 (Revised March 24, 2004)

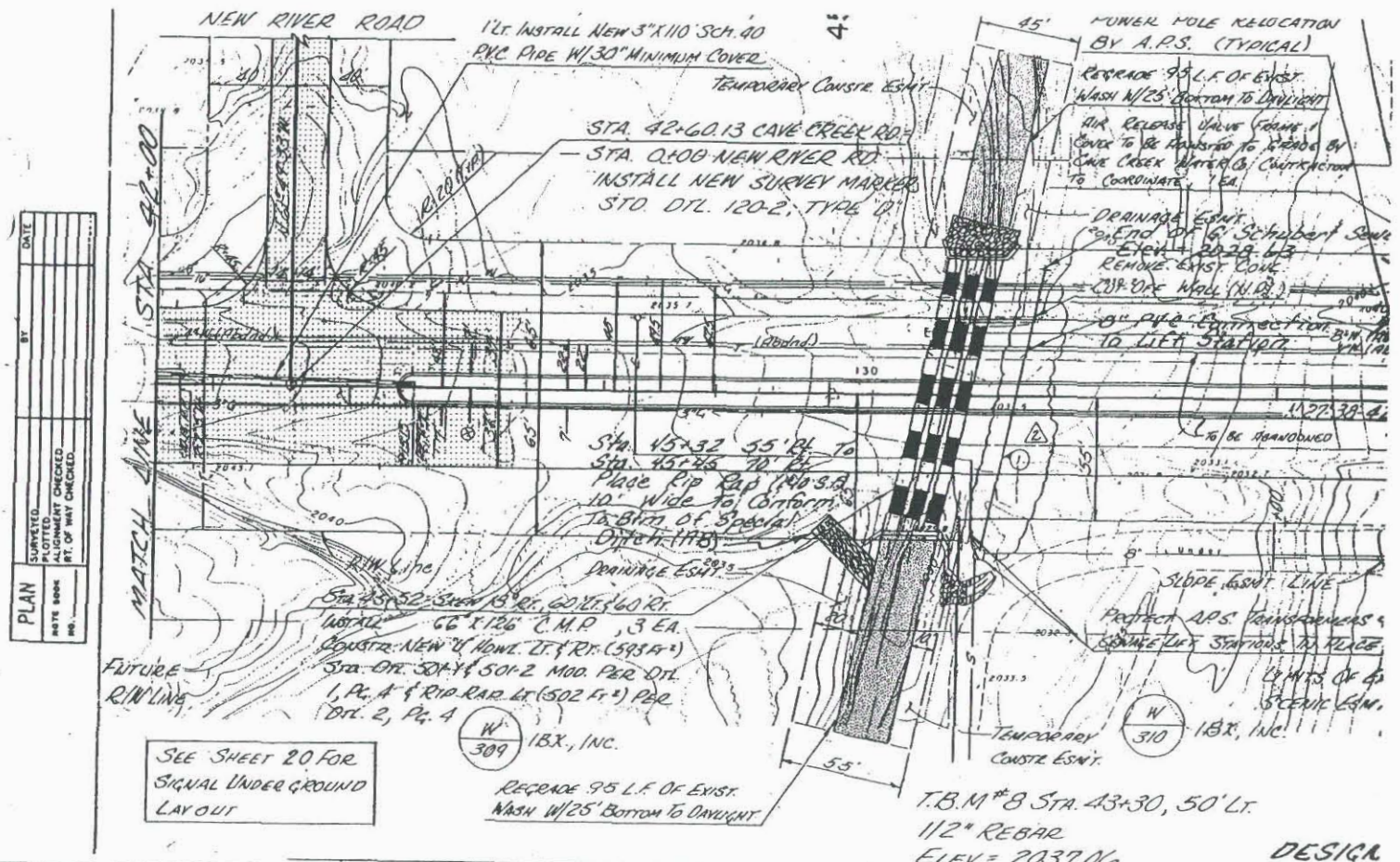
Culvert No. 6 at Cave Creek Road exists as the downstream boundary condition for one of the reaches of the Unnamed Central Wash floodplain delineation. According to the hydrology of the project (*see Data Collection Report*), 2,462 cfs will arrive at the culvert during the 100-year event. Triple 66" corrugated metal pipes exist under Cave Creek Road at this location.

Hydraulic analysis using Haestad Methods' CulvertMaster software indicates that the culverts can handle approximately 908 cfs (*see attached*) using site specific geometry conditions. A plan view of the site (*see attached*) shows the overtopping line that the remainder of the flow, 1554 cfs, will follow. The road includes a confining dip section, so the flow that is not conveyed through the culverts will overtop road and continue west towards Cave Creek.

The results indicate that the headwater elevation will be 2038.23, resulting in a maximum depth of almost two feet over the roadway. Therefore, this elevation will be used as the downstream boundary condition in the HEC-RAS floodplain model, with a boundary water surface elevation of 2038.23.



Culvert No 6, Unnamed Central Wash



DESIGN

74

~~Lt. Sta. 42+60 16' X 28' A.C. Turnout~~
~~Std. Dtl. 205, Type 2, 8" V.C.~~
~~0.02' Ft. 2-Way Crown~~
Omitted (AB)
7.00' V.C.

Finish Pavement Profile
7' Lt. & 7' Rt. Of Construction ℄

Sta. 45+15 P.V.I.
Elev. = 2033.10
Curve No. 99

-1.81%
-1.10%

Sta. 44+60, 50' Rt.
E = 2034.27

Grade To Drain

Sta. 43+52 Skew 15° Rt. 60' Lt. & 60' Rt.
66" X 126" C.M.P., 3 EA.
Inv. Elev. 60' Lt. = ~~2025.20~~ 2025.47
Inv. Elev. 60' Rt. = 2028.35 AB
Top Of Homl. Lt. = ~~2032.00~~ 2032.62
Top Of Homl. Rt. = ~~2035.35~~ AB

2040

Deleted
~~(1) Existing Lift Station At Sta. 45+65, 70' Rt. To Sta. 45+92, 56' Lt. Install 128 L.F. Of 8" PVC SDR 35 Connect To Exist. Lift Station Or And Plug Ends. Left & Right Per Dtl. 1, Pg. 1 Of 2 Profile Right.~~

2030

2020

"As Built"

44

46

PLATE 1-

Title
CAVE CREEK ROAD IMPROVEMENTS
CAREFREE HIGHWAY TO SPUR CROSS ROAD
PROJECT NO. 68301

Description | Sheet | Of

Copy of As Built Plans, 1990
Culvert No. 6 - Unnamed Central Wash

Culvert Designer/Analyzer Report
Problem #6

Unnamed Central Tributary To Cave Creek - North Branch

Analysis Component			
Storm Event	Design	Discharge	2,462.00 cfs

Peak Discharge Method: User-Specified			
Design Discharge	2,462.00 cfs	Check Discharge	2,462.00 cfs

Tailwater properties: Irregular Channel

Roughness Segments

Start Station	End Station	Mannings Coefficient
1+72	2+44	0.040
2+44	2+56	0.028
2+56	3+00	0.040
3+00	3+38	0.028
3+38	3+91	0.040

Natural Channel Points

Station (ft)	Elevation (ft)
1+72	2,031.02
1+90	2,030.13
2+21	2,029.97
2+32	2,028.36
2+44	2,024.08
2+54	2,024.16
2+56	2,024.08
2+67	2,026.13
2+79	2,025.56
2+93	2,027.15
3+00	2,026.93
3+01	2,026.97
3+30	2,026.89
3+38	2,026.36
3+49	2,027.66
3+59	2,027.85
3+64	2,027.78
3+69	2,028.77
3+91	2,031.92

Tailwater conditions for Design Storm.

Discharge	2,462.00 cfs	Actual Depth	4.22 ft
Velocity	9.73 ft/s		

Name	Description	Discharge	HW Elev.	Velocity
Culvert-1	3-66 inch Circular	907.84 cfs	2,038.23 ft	13.80 ft/s
Weir	Roadway	1,555.32 cfs	2,038.23 ft	N/A
Total	----------	2,463.16 cfs	2,038.23 ft	N/A

Culvert Designer/Analyzer Report
Problem #6

Component:Culvert-1

Culvert Summary			
Computed Headwater Elevation	2,038.23 ft	Discharge	907.84 cfs
Inlet Control HW Elev.	2,038.23 ft	Tailwater Elevation	2,028.30 ft
Outlet Control HW Elev.	2,037.54 ft	Control Type	Inlet Control
Headwater Depth/Height	1.80		

Grades			
Upstream Invert	2,028.35 ft	Downstream Invert	2,025.47 ft
Length	126.00 ft	Constructed Slope	0.022857 ft/ft

Hydraulic Profile			
Profile	M2	Depth, Downstream	4.78 ft
Slope Type	Mild	Normal Depth	N/A ft
Flow Regime	Subcritical	Critical Depth	4.78 ft
Velocity Downstream	13.80 ft/s	Critical Slope	0.025269 ft/ft

Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	5.50 ft
Section Size	66 inch	Rise	5.50 ft
Number Sections	3		

Outlet Control Properties			
Outlet Control HW Elev.	2,037.54 ft	Upstream Velocity Head	2.56 ft
Ke	0.50	Entrance Loss	1.28 ft

Inlet Control Properties			
Inlet Control HW Elev.	2,038.23 ft	Flow Control	Submerged
Inlet Type	Headwall	Area Full	71.3 ft^2
K	0.00780	HDS 5 Chart	2
M	2.00000	HDS 5 Scale	1
C	0.03790	Equation Form	1
Y	0.69000		

Culvert Designer/Analyzer Report
Problem #6

Component:Weir

Hydraulic Component(s): Roadway					
Discharge	1,555.32	cfs	Allowable HW Elevation	2,038.23	ft
Roadway Width	0.00	ft	Overtopping Coefficient	3.09	US
Low Point	2,036.57	ft	Headwater Elevation	2,038.23	ft
Discharge Coefficient (Cr)	3.09		Submergence Factor (Kt)	1.00	
Tailwater Elevation	2,028.30	ft			

Sta (ft)	Elev. (ft)
0.00	2,039.00
90.00	2,038.00
320.00	2,036.65
360.00	2,036.57
400.00	2,036.65
560.00	2,038.00
690.00	2,039.00

Rating Table Report
Problem #6

Unnamed Central Tributary To Cave Creek - North Branch

Range Data:

	Minimum	Maximum	Increment
Discharge	0.00	3,500.00	100.00 cfs

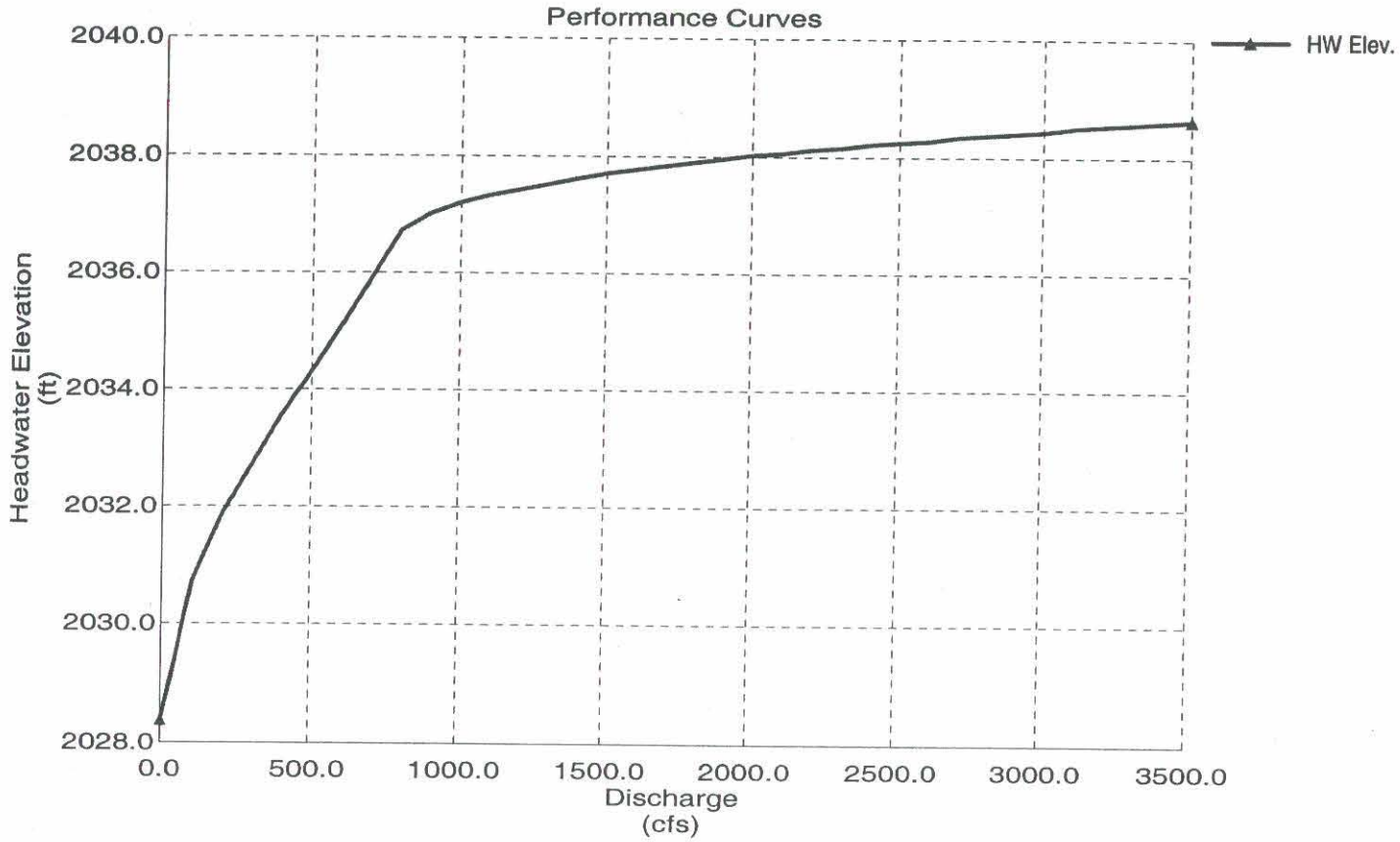
Discharge (cfs)	HW Elev. (ft)
0.00	2,028.35
100.00	2,030.75
200.00	2,031.85
300.00	2,032.74
400.00	2,033.56
500.00	2,034.33
600.00	2,035.09
700.00	2,035.86
800.00	2,036.73
900.00	2,037.01
1,000.00	2,037.18
1,100.00	2,037.32
1,200.00	2,037.43
1,300.00	2,037.53 ← Impassable
1,400.00	2,037.62
1,500.00	2,037.70
1,600.00	2,037.77
1,700.00	2,037.84
1,800.00	2,037.90
1,900.00	2,037.96
2,000.00	2,038.02
2,100.00	2,038.07
2,200.00	2,038.11
2,300.00	2,038.16
2,400.00	2,038.20
2,500.00	2,038.25
2,600.00	2,038.29
2,700.00	2,038.33
2,800.00	2,038.37
2,900.00	2,038.41
3,000.00	2,038.45
3,100.00	2,038.48
3,200.00	2,038.52
3,300.00	2,038.55
3,400.00	2,038.59
3,500.00	2,038.62

Performance Curves Report
Problem #6

Unnamed Tributary To Cave Creek - North Branch

Range Data:

	Minimum	Maximum	Increment
Discharge	0.00	3,500.00	100.00 cfs



UNNAMED CENTRAL TRIBUTARY
TO CAVE CREEK - NORTH WASH
N
1" = 60'
LEGEND
OVERTOPPING CROSS SECTION
Overtopping Cross Section Location
7+00
0+00
3-66" cmp
Wash centerline
2026.79
2035.65
2033.05
2030.98
2030
2040
2049.03
2036.57
2029.26
2040.87
2056.50
2038.00
2035.26
2056.97
2019.08
2037.06
2039.15
2044.11
2043.18

Worksheet
Worksheet for Irregular Channel

Unnamed Central Tributary to Cave Creek - North Branch

Project Description	
Worksheet	Number 6
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Slope	0.010000 ft/ft
Discharge	1,554.00 cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Method	Improved Lotter's Method
Closed Channel Weighting Method	Horton's Method

Results	
Mannings Coefficient	0.024
Water Surface Elevation	2,037.86 ft
Elevation Range	2,036.57 to 2,039.00
Flow Area	311.1 ft²
Wetted Perimeter	429.31 ft
Top Width	429.30 ft
Actual Depth	1.29 ft
Critical Elevation	2,037.88 ft
Critical Slope	0.009302 ft/ft
Velocity	5.00 ft/s
Velocity Head	0.39 ft
Specific Energy	2,038.25 ft
Froude Number	1.03
Flow Type	Supercritical

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00	6+90	0.024

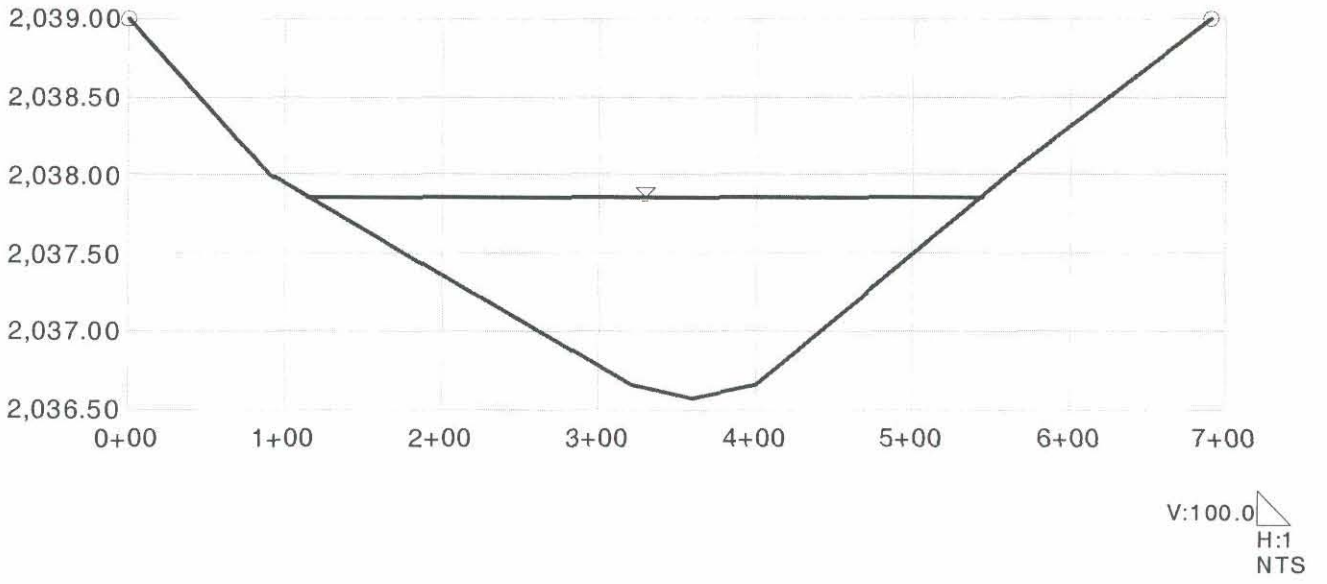
Natural Channel Points

Station (ft)	Elevation (ft)
0+00	2,039.00
0+90	2,038.00
3+20	2,036.65
3+60	2,036.57
4+00	2,036.65
5+60	2,038.00
6+90	2,039.00

Cross Section
Cross Section for Irregular Channel

Project Description	
Worksheet	Number 6
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.024	
Slope	0.010000	ft/ft
Water Surface Elevation	2,037.86	ft
Elevation Range	2,036.57 to 2,039.00	
Discharge	1,554.00	cfs



UC 100 YR, 24 HR
FUTURE

Culvert No. 6, Unnamed Central Wash

```
*                                        *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)    *
*              JUN  1998                 *
*            VERSION 4.1                 *
*                                        *
* RUN DATE   27NOV02  TIME  08:53:50     *
*                                        *
******************************************
```

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

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

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

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

1 HEC-1 INPUT PAGE 1

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

  1           ID         UC MODEL - UNNAMED WASH, CENTRAL
  2           ID         100-YEAR 24-HOUR MODEL  FILENAME: UC10024F.DAT
  3           ID         FUTURE CONDITIONS
  4           ID         CAREFREE DRAINAGE MASTER PLAN
  5           ID         FCD 2000C037
  6           ID         BY CH2M HILL
  7           ID         FOR THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
  8           ID         JANUARY 2002
  9           ID    ******************************************************************
 10           ID         100 YEAR ANALYSIS 24-HOUR STORM
 11           ID         SCS TYPE II DISTRIBUTION
 12           ID         GREEN AND AMPT LOSS RATE METHOD, NMIN=2
 13           ID         CLARK UNIT HYDROGRAPH, NORMAL DEPTH CHANNEL ROUTING
 14           ID    ******************************************************************
 15           ID      DEPTH-AREA REDUCT FACTORS BASED ON TABLE 2.1a OF FCDMC MANUAL
 16           ID      PC RECORDS ARE 24-HOUR SCS TYPE II RAINFALL DISTRIBUTION
 17           ID      PRELIMINARY
              *DIAGRAM
 18           IT       2                    500
 19           IO       5       2
 20           IN      15
 21           JD    4.60    0.01
 22           PC   0.000   0.002   0.005   0.008   0.011   0.013   0.016   0.019   0.022   0.025
 23           PC   0.028   0.032   0.035   0.038   0.041   0.044   0.048   0.053   0.056   0.060
 24           PC   0.063   0.067   0.071   0.075   0.080   0.084   0.089   0.093   0.098   0.103
 25           PC   0.109   0.114   0.120   0.127   0.133   0.140   0.147   0.155   0.163   0.172
 26           PC   0.181   0.192   0.204   0.220   0.235   0.259   0.283   0.473   0.663   0.699
 27           PC   0.735   0.754   0.772   0.785   0.799   0.810   0.820   0.829   0.838   0.846
 28           PC   0.854   0.861   0.868   0.874   0.880   0.885   0.891   0.900   0.902   0.910
 29           PC   0.912   0.920   0.921   0.926   0.929   0.930   0.937   0.941   0.945   0.950
 30           PC   0.952   0.957   0.959   0.962   0.965   0.970   0.972   0.973   0.978   0.981
 31           PC   0.984   0.987   0.989   0.992   0.995   0.998   1.000
 32           JD    4.57    1.00
 33           JD    4.46    5.00
              *

 34           KK     UC8
 35           KM   SUB-BASIN 8, UNNAMED WASH CENTRAL
 36           KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 37           KM    L= 1.04   Kb= 0.031   S=138.0
 38           BA    .054
 39           LG     .30     .36     4.9     .26    36.0
 40           UC    .225    .384
 41           UA       0       5      16      30      65      77      84      90      94      97
 42           UA     100
              *

 43           KK     UC9
 44           KM    SUBBASIN 9, UNNAMED WASH CENTRAL
 45           KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 46           KM    L= 0.91   Kb= 0.031   S=145.0
 47           BA    .047
 48           LG     .30     .36     5.0     .23    36.0
 49           UC    .208    .316
 50           UA       0       5      16      30      65      77      84      90      94      97
```

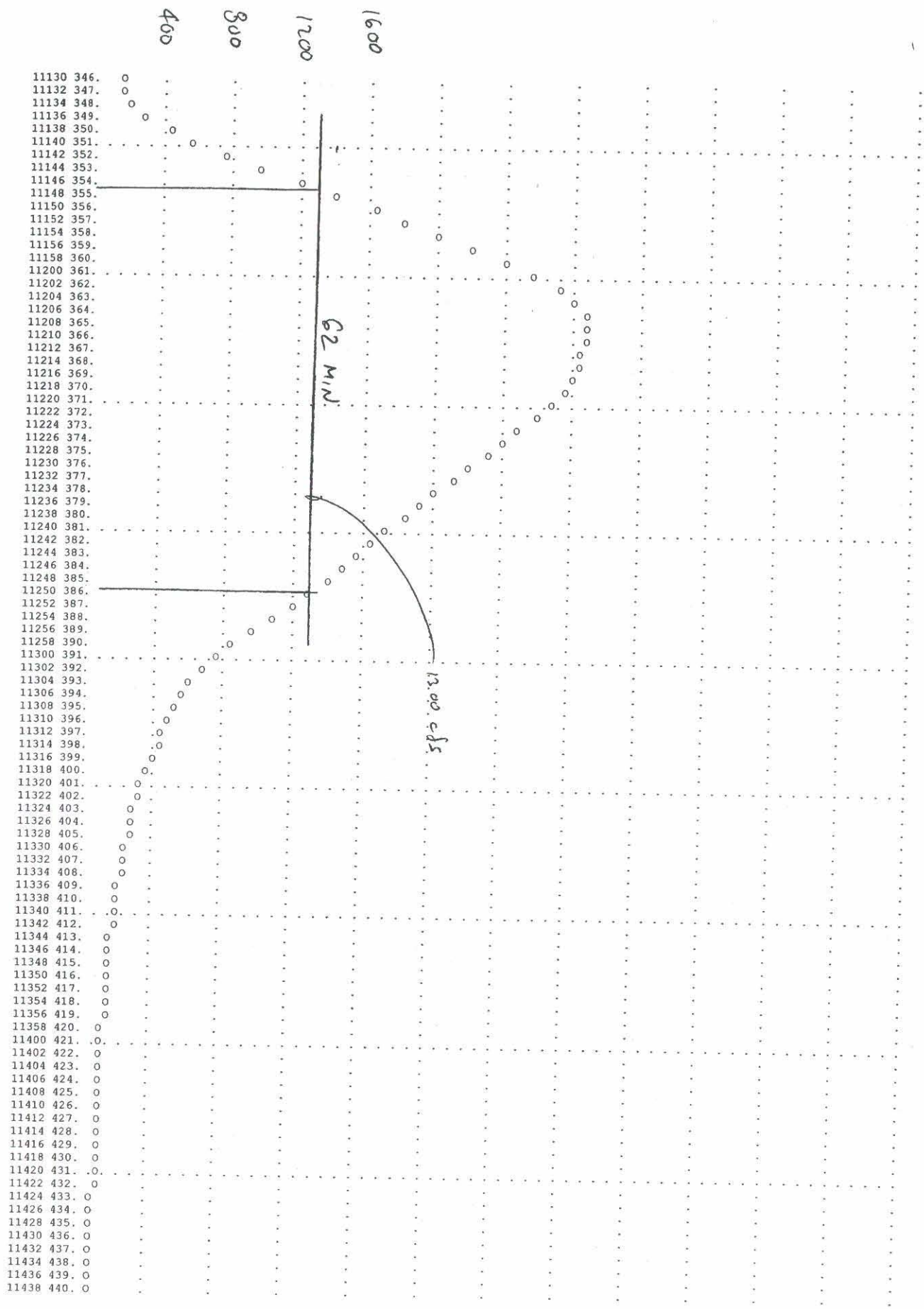
1 HEC-1 INPUT PAGE 2

Culvert No. 6, Unnamed Central Wash

```
 11542 472.0
 11544 473.0
 11546 474.0
 11548 475.0
 11550 476.0
 11552 477.0
 11554 478.0
 11556 479.0
 11558 480.0
 11600 481.0
 11602 482.0
 11604 483.0
 11606 484.0
 11608 485.0
 11610 486.0
 11612 487.0
 11614 488.0
 11616 489.0
 11618 490.0
 11620 491.0
 11622 492.0
 11624 493.0
 11626 494.0
 11628 495.0
 11630 496.0
 11632 497.0
 11634 498.0
 11636 499.0
 11638 500.0
1
1                                                STATION     CP89

                        (O) OUTFLOW
          0.     400.     800.    1200.    1600.    2000.    2400.    2800.    3200.      0.      0.      0.      0.
DAHRMN PER
 10000   10
 10002   20
 10004   30
 10006   40
 10008   50
 10010   60
 10012   70
 10014   80
 10016   90
 10018  100
 10020  110
 10022  120
 10024  130
 10026  140
 10028  150
 10030  160
 10032  170
 10034  180
 10036  190
 10038  200
 10040  210
 10042  220
 10044  230
 10046  240
 10048  250
 10050  260
 10052  270
 10054  280
 10056  290
 10058  300
 10100  310
 10102  320
 10104  330
 10106  340
 10108  350
 10110  360
 10112  370
 10114  380
 10116  390
 10118  400
 10120  410
 10122  420
 10124  430
 10126  440
 10128  450
 10130  460
 10132  470
 10134  480
 10136  490
 10138  500
 10140  510
 10142  520
 10144  530
 10146  540
 10148  550
 10150  560
 10152  570
 10154  580
 10156  590
 10158  600
```

Culvert No. 4) Unnamed Creek D-4SN



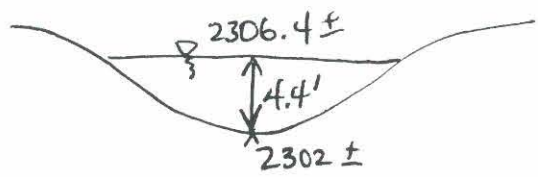
Carefree Drive at Lazy Burro Road (JEF #7)

Carefree Drainage Master Plan
Dip Crossing Notes

ID Number: JEF 7

Source of Data: Floodplain Delineation Study of Andora Hills & Galloway Washes, June 2001, preliminary (attached)

Location: Carefree Drive @ Lazy Burro Road

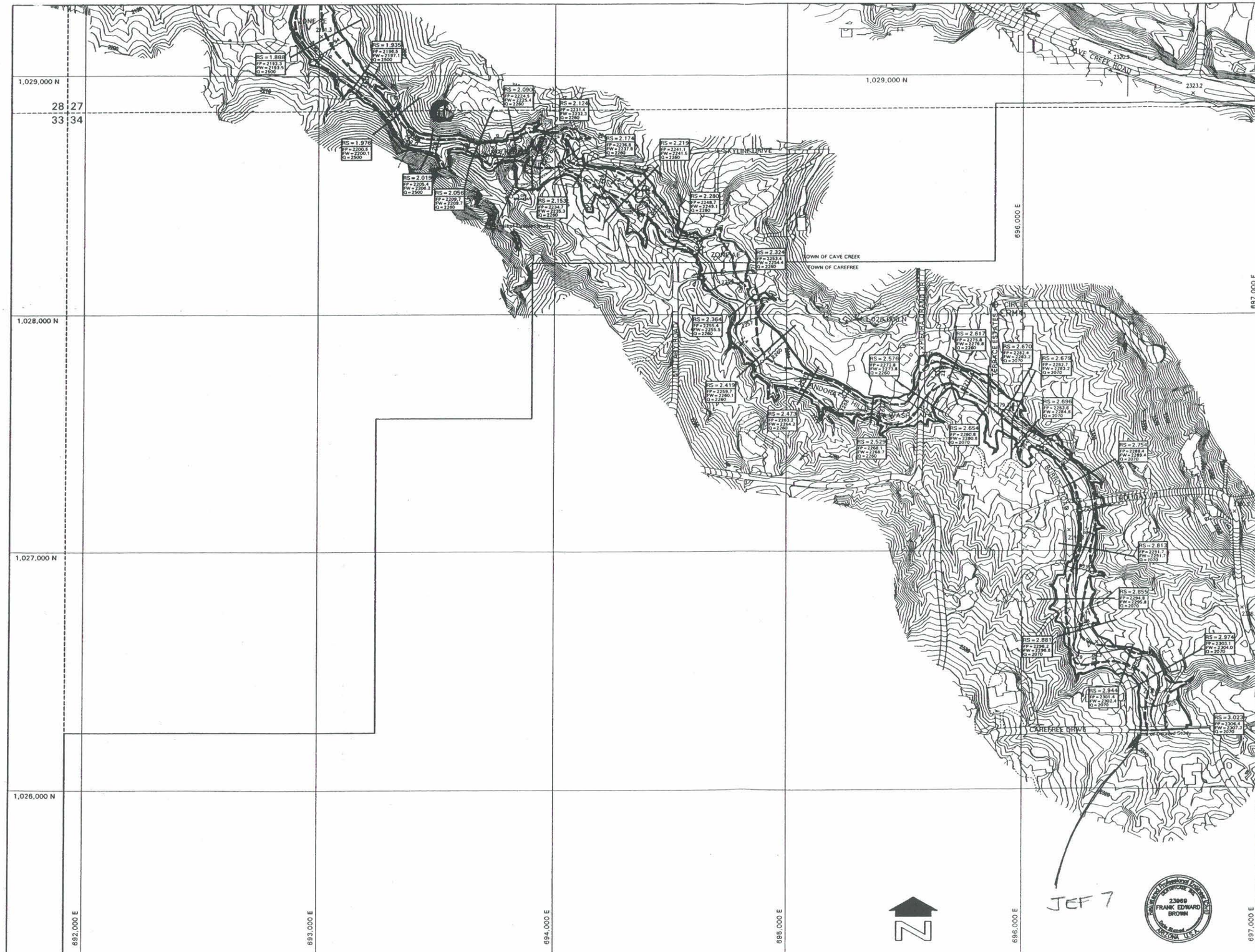


Material: Paved Dip Crossing

Protection:

Notes: Approximately 200' of roadway inundated during 100-yr. event

MATCH TO SHEET 2



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOODPLAIN DELINEATION STUDY OF ANDORA HILLS & GALLOWAY WASHES FCD 99-14

JUNE, 2001

LEGEND

100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	1.2 1.3
CROSS SECTION	RS = 0.300 FP = 2061.0 FW = 2061.5 Q = 13,700
ELEVATION REFERENCE MARK	ERM 4
BASE FLOOD ELEVATIONS	2080
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	TOWN OF CAVECREEK
SECTION LINE	

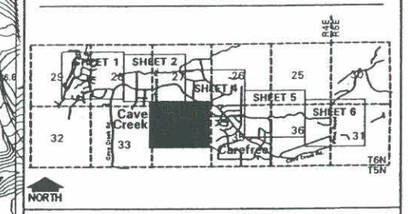
ELEVATION REFERENCE MARKS

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
ERM 4	2290.43	BC IN C/L OF TERRACE ESTATES CIRCLE, APPROXIMATELY 1000 FEET NORTH OF INTERSECTION OF BURRO ROAD AND HOLIDAY LANE, S34, T6N, R4E (N1028038.50, E695882.82)

NOTES

1. THE HYDRAULIC BASE LINE IS CROSS SECTION STATION 10,000 UNLESS NOTED OTHERWISE.
2. HORIZONTAL PROJECTION IS ARIZONA STATEPLANE, CENTRAL ZONE, NORTH AMERICAN DATUM OF 1983.
3. ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929. CONVERSION FACTOR: 1988 NGVD = 2.05 + 1929 NGVD

INDEX MAP



200 0' 200 400

SCALE: 1" = 200 FEET

CONTOUR INTERVAL = 2 FEET

REGISTERED LAND SURVEYOR CERTIFICATE NO. 24530 DAVID A. RHINE ARIZONA, U.S.A.

REGISTERED PROFESSIONAL ENGINEER (CIVIL) CERTIFICATE NO. 23969 FRANK EDWARD BROWN ARIZONA, U.S.A.

JE FULLER HYDROLOGY & GEOMORPHOLOGY, INC.

in association with

DIBBLE & ASSOCIATES CONSULTING ENGINEERS

SHEET 3 OF 6

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS FOR 1" = 200' HORIZONTAL SCALE AND 2' CONTOUR INTERVALS. FLIGHT DATE: 9/30/99

M&B AERIAL MAPPING COMPANY, LLC

GROUND CONTROL SURVEY DATA PROVIDED BY A TEAM PROFESSIONAL ASSOCIATES, INC.

Worksheet
Worksheet for Irregular Channel

CAREFREE DRIVE AT LAZY BURRO ROAD

Project Description	
Worksheet	JEF-7
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data		
Slope	017300	ft/ft
Discharg	,135.00	cfs

Options	
Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Results		
Mannings Coefficie	0.032	
Water Surface Elev	2,305.48	ft
Elevation Range	2.50 to 2,308.00	
Flow Area	248.2	ft²
Wetted Perimeter	148.45	ft
Top Width	148.29	ft
Actual Depth	2.98	ft
Critical Elevation	2,305.70	ft
Critical Slope	0.012301	ft/ft
Velocity	8.60	ft/s
Velocity Head	1.15	ft
Specific Energy	2,306.63	ft
Froude Number	1.17	
Flow Type	Supercritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+49	3+12	0.032

Natural Channel Points

Station (ft)	Elevation (ft)
0+49	2,307.81
0+96	2,304.00
0+98	2,304.00
1+17	2,302.88
1+29	2,302.83
1+37	2,302.50
1+46	2,302.78
1+55	2,302.86
1+79	2,304.00
1+86	2,304.00
2+40	2,306.00
2+73	2,306.00
3+12	2,308.00

Table
Rating Table for Irregular Channel

CAREFREE DRIVE AT LAZY BURRO ROAD

Project Description

Worksheet	JEF-7
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data

Slope	017300	ft/ft

Options

Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	2,200.00	10.00

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00	2,302.50	0.00	0.0	0.00	0.00
10.00	2,302.91	1.71	5.9	39.53	39.52
20.00	2,302.99	2.19	9.1	42.58	42.56
30.00	2,303.05	2.52	11.9	45.00	44.98
40.00	2,303.11	2.77	14.4	47.07	47.04
50.00	2,303.16	2.99	16.7	48.91	48.88
60.00	2,303.20	3.17	18.9	50.58	50.55
70.00	2,303.24	3.33	21.0	52.13	52.10
80.00	2,303.28	3.48	23.0	53.57	53.54
90.00	2,303.31	3.61	24.9	54.93	54.90
100.00	2,303.35	3.73	26.8	56.22	56.18
110.00	2,303.38	3.84	28.6	57.44	57.40
120.00	2,303.41	3.94	30.4	58.61	58.57
130.00	2,303.44	4.04	32.2	59.73	59.68
140.00	2,303.47	4.13	33.9	60.80	60.76
150.00	2,303.49	4.22	35.5	61.84	61.80
160.00	2,303.52	4.30	37.2	62.84	62.80
170.00	2,303.55	4.38	38.8	63.82	63.77
180.00	2,303.57	4.46	40.4	64.76	64.71
190.00	2,303.60	4.53	41.9	65.67	65.62
200.00	2,303.62	4.60	43.5	66.56	66.51
210.00	2,303.64	4.67	45.0	67.43	67.38
220.00	2,303.66	4.73	46.5	68.27	68.22
230.00	2,303.69	4.79	48.0	69.10	69.04
240.00	2,303.71	4.85	49.5	69.91	69.85
250.00	2,303.73	4.91	50.9	70.69	70.64
260.00	2,303.75	4.96	52.4	71.47	71.41
270.00	2,303.77	5.02	53.8	72.22	72.16
280.00	2,303.79	5.07	55.2	72.96	72.90
290.00	2,303.81	5.12	56.6	73.69	73.63
300.00	2,303.82	5.17	58.0	74.40	74.34
310.00	2,303.84	5.22	59.4	75.10	75.04
320.00	2,303.86	5.27	60.7	75.79	75.73
330.00	2,303.88	5.32	62.1	76.47	76.40

IMPASSABLE

Table
Rating Table for Irregular Channel

CAREFREE DRIVE AT LAZY BUCKLE ROAD

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
340.00	2,303.90	5.36	63.4	77.13	77.07
350.00	2,303.91	5.40	64.8	77.79	77.72
360.00	2,303.93	5.45	66.1	78.43	78.37
370.00	2,303.95	5.49	67.4	79.07	79.00
380.00	2,303.96	5.53	68.7	79.69	79.62
390.00	2,304.02	5.30	73.6	90.92	90.85
400.00	2,304.04	5.34	74.9	91.49	91.41
410.00	2,304.05	5.38	76.2	92.05	91.97
420.00	2,304.06	5.42	77.5	92.60	92.53
430.00	2,304.08	5.46	78.7	93.15	93.07
440.00	2,304.09	5.50	80.0	93.69	93.61
450.00	2,304.11	5.54	81.3	94.22	94.14
460.00	2,304.12	5.57	82.6	94.75	94.67
470.00	2,304.13	5.61	83.8	95.27	95.19
480.00	2,304.14	5.64	85.1	95.78	95.70
490.00	2,304.16	5.68	86.3	96.29	96.21
500.00	2,304.17	5.71	87.5	96.80	96.72
510.00	2,304.18	5.75	88.8	97.30	97.21
520.00	2,304.20	5.78	90.0	97.79	97.71
530.00	2,304.21	5.81	91.2	98.28	98.20
540.00	2,304.22	5.84	92.4	98.76	98.68
550.00	2,304.23	5.87	93.6	99.24	99.16
560.00	2,304.24	5.91	94.8	99.72	99.63
570.00	2,304.26	5.94	96.0	100.19	100.10
580.00	2,304.27	5.97	97.2	100.66	100.57
590.00	2,304.28	6.00	98.4	101.12	101.03
600.00	2,304.29	6.03	99.6	101.58	101.49
610.00	2,304.30	6.06	100.7	102.03	101.94
620.00	2,304.31	6.08	101.9	102.48	102.39
630.00	2,304.33	6.11	103.1	102.93	102.84
640.00	2,304.34	6.14	104.2	103.37	103.28
650.00	2,304.35	6.17	105.4	103.81	103.71
660.00	2,304.36	6.20	106.5	104.24	104.15
670.00	2,304.37	6.22	107.7	104.67	104.58
680.00	2,304.38	6.25	108.8	105.10	105.01
690.00	2,304.39	6.28	109.9	105.53	105.43
700.00	2,304.40	6.30	111.1	105.95	105.85
710.00	2,304.41	6.33	112.2	106.37	106.27
720.00	2,304.42	6.35	113.3	106.78	106.68
730.00	2,304.43	6.38	114.4	107.19	107.10
740.00	2,304.44	6.40	115.5	107.60	107.50
750.00	2,304.46	6.43	116.7	108.01	107.91
760.00	2,304.47	6.45	117.8	108.41	108.31
770.00	2,304.48	6.48	118.9	108.81	108.71
780.00	2,304.49	6.50	120.0	109.21	109.11
790.00	2,304.50	6.53	121.1	109.60	109.50
800.00	2,304.51	6.55	122.1	110.00	109.89
810.00	2,304.52	6.57	123.2	110.38	110.28
820.00	2,304.53	6.60	124.3	110.77	110.67
830.00	2,304.54	6.62	125.4	111.16	111.05
840.00	2,304.54	6.64	126.5	111.54	111.43
850.00	2,304.55	6.66	127.6	111.92	111.81
860.00	2,304.56	6.69	128.6	112.29	112.19
870.00	2,304.57	6.71	129.7	112.67	112.56

Table
Rating Table for Irregular Channel

CAREFREE DRIVE AT LAZY BURRO ROAD

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
880.00	2,304.58	6.73	130.8	113.04	112.93
890.00	2,304.59	6.75	131.8	113.41	113.30
900.00	2,304.60	6.77	132.9	113.78	113.67
910.00	2,304.61	6.79	133.9	114.14	114.03
920.00	2,304.62	6.82	135.0	114.50	114.40
930.00	2,304.63	6.84	136.0	114.87	114.76
940.00	2,304.64	6.86	137.1	115.22	115.11
950.00	2,304.65	6.88	138.1	115.58	115.47
960.00	2,304.66	6.90	139.2	115.94	115.82
970.00	2,304.67	6.92	140.2	116.29	116.18
980.00	2,304.67	6.94	141.2	116.64	116.53
990.00	2,304.68	6.96	142.3	116.99	116.88
1,000.00	2,304.69	6.98	143.3	117.33	117.22
1,010.00	2,304.70	7.00	144.3	117.68	117.57
1,020.00	2,304.71	7.02	145.4	118.02	117.91
1,030.00	2,304.72	7.04	146.4	118.36	118.25
1,040.00	2,304.73	7.06	147.4	118.70	118.59
1,050.00	2,304.74	7.07	148.4	119.04	118.92
1,060.00	2,304.74	7.09	149.4	119.37	119.26
1,070.00	2,304.75	7.11	150.4	119.71	119.59
1,080.00	2,304.76	7.13	151.4	120.04	119.92
1,090.00	2,304.77	7.15	152.5	120.37	120.25
1,100.00	2,304.78	7.17	153.5	120.70	120.58
1,110.00	2,304.79	7.19	154.5	121.03	120.91
1,120.00	2,304.79	7.20	155.5	121.35	121.23
1,130.00	2,304.80	7.22	156.5	121.68	121.56
1,140.00	2,304.81	7.24	157.5	122.00	121.88
1,150.00	2,304.82	7.26	158.5	122.32	122.20
1,160.00	2,304.83	7.28	159.4	122.64	122.52
1,170.00	2,304.83	7.29	160.4	122.96	122.84
1,180.00	2,304.84	7.31	161.4	123.27	123.15
1,190.00	2,304.85	7.33	162.4	123.59	123.47
1,200.00	2,304.86	7.34	163.4	123.90	123.78
1,210.00	2,304.87	7.36	164.4	124.21	124.09
1,220.00	2,304.87	7.38	165.3	124.52	124.40
1,230.00	2,304.88	7.40	166.3	124.83	124.71
1,240.00	2,304.89	7.41	167.3	125.14	125.01
1,250.00	2,304.90	7.43	168.3	125.45	125.32
1,260.00	2,304.91	7.45	169.2	125.75	125.62
1,270.00	2,304.91	7.46	170.2	126.05	125.93
1,280.00	2,304.92	7.48	171.2	126.36	126.23
1,290.00	2,304.93	7.49	172.1	126.66	126.53
1,300.00	2,304.94	7.51	173.1	126.96	126.83
1,310.00	2,304.94	7.53	174.1	127.25	127.13
1,320.00	2,304.95	7.54	175.0	127.55	127.42
1,330.00	2,304.96	7.56	176.0	127.85	127.72
1,340.00	2,304.97	7.57	176.9	128.14	128.01
1,350.00	2,304.97	7.59	177.9	128.43	128.30
1,360.00	2,304.98	7.60	178.8	128.73	128.60
1,370.00	2,304.99	7.62	179.8	129.02	128.89
1,380.00	2,305.00	7.64	180.7	129.31	129.18
1,390.00	2,305.00	7.65	181.7	129.59	129.46
1,400.00	2,305.01	7.67	182.6	129.88	129.75
1,410.00	2,305.02	7.68	183.6	130.17	130.04

Table
Rating Table for Irregular Channel

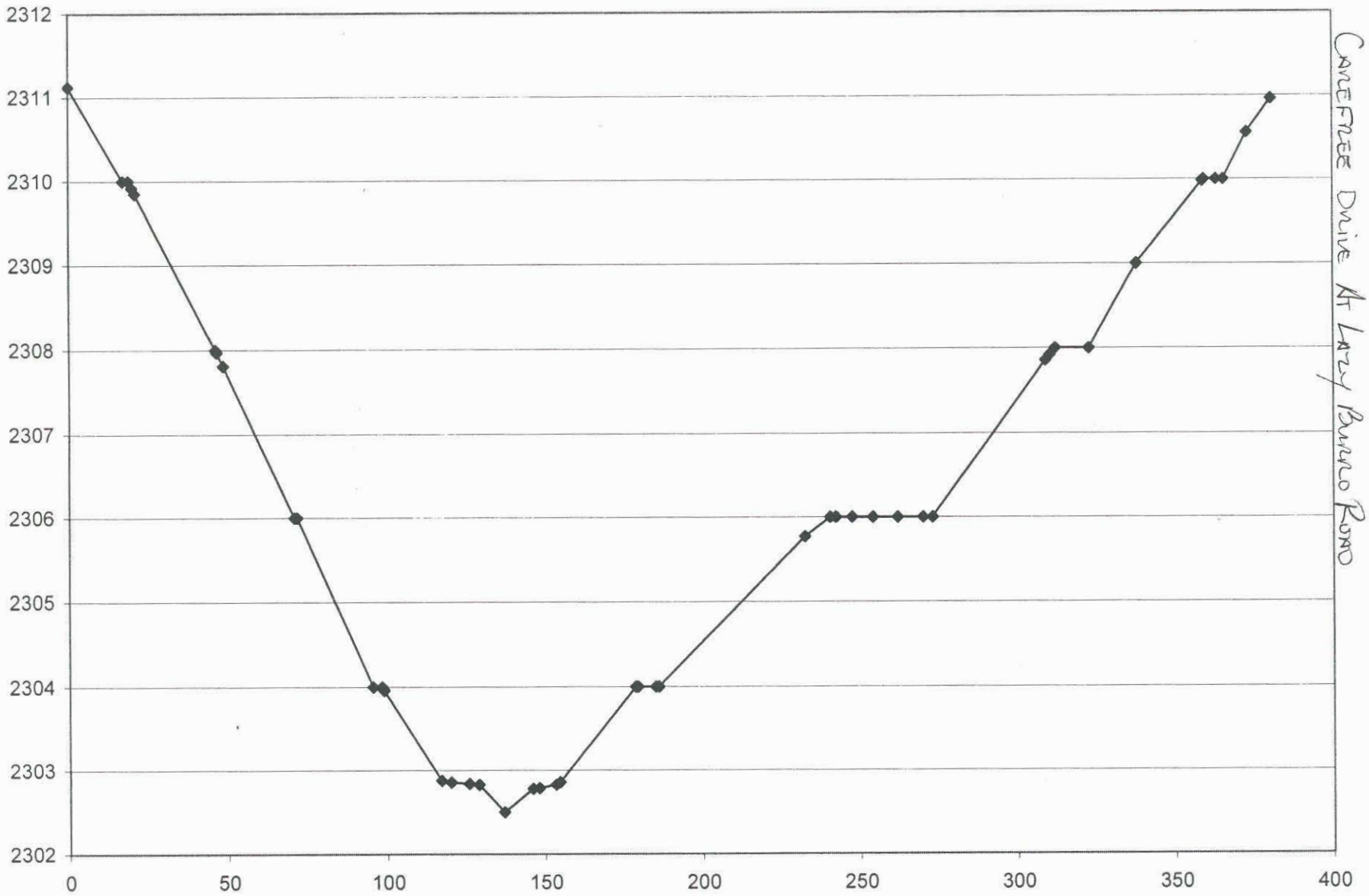
CAREFREE DRIVE AT LAZY BURRO ROAD

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
1,420.00	2,305.03	7.70	184.5	130.45	130.32
1,430.00	2,305.03	7.71	185.5	130.74	130.60
1,440.00	2,305.04	7.73	186.4	131.02	130.89
1,450.00	2,305.05	7.74	187.3	131.30	131.17
1,460.00	2,305.05	7.76	188.3	131.58	131.45
1,470.00	2,305.06	7.77	189.2	131.86	131.73
1,480.00	2,305.07	7.78	190.1	132.14	132.00
1,490.00	2,305.07	7.80	191.1	132.42	132.28
1,500.00	2,305.08	7.81	192.0	132.69	132.56
1,510.00	2,305.09	7.83	192.9	132.97	132.83
1,520.00	2,305.10	7.84	193.8	133.24	133.10
1,530.00	2,305.10	7.86	194.8	133.51	133.38
1,540.00	2,305.11	7.87	195.7	133.79	133.65
1,550.00	2,305.12	7.88	196.6	134.06	133.92
1,560.00	2,305.12	7.90	197.5	134.33	134.19
1,570.00	2,305.13	7.91	198.4	134.60	134.46
1,580.00	2,305.14	7.93	199.4	134.86	134.73
1,590.00	2,305.14	7.94	200.3	135.13	134.99
1,600.00	2,305.15	7.95	201.2	135.40	135.26
1,610.00	2,305.16	7.97	202.1	135.66	135.52
1,620.00	2,305.16	7.98	203.0	135.93	135.79
1,630.00	2,305.17	7.99	203.9	136.19	136.05
1,640.00	2,305.18	8.01	204.8	136.45	136.31
1,650.00	2,305.18	8.02	205.7	136.71	136.57
1,660.00	2,305.19	8.03	206.6	136.98	136.83
1,670.00	2,305.20	8.05	207.5	137.23	137.09
1,680.00	2,305.20	8.06	208.4	137.49	137.35
1,690.00	2,305.21	8.07	209.3	137.75	137.61
1,700.00	2,305.22	8.09	210.2	138.01	137.87
1,710.00	2,305.22	8.10	211.1	138.27	138.12
1,720.00	2,305.23	8.11	212.0	138.52	138.38
1,730.00	2,305.24	8.12	212.9	138.78	138.63
1,740.00	2,305.24	8.14	213.8	139.03	138.88
1,750.00	2,305.25	8.15	214.7	139.28	139.14
1,760.00	2,305.26	8.16	215.6	139.53	139.39
1,770.00	2,305.26	8.18	216.5	139.79	139.64
1,780.00	2,305.27	8.19	217.4	140.04	139.89
1,790.00	2,305.27	8.20	218.3	140.29	140.14
1,800.00	2,305.28	8.21	219.2	140.53	140.39
1,810.00	2,305.29	8.23	220.0	140.78	140.64
1,820.00	2,305.29	8.24	220.9	141.03	140.88
1,830.00	2,305.30	8.25	221.8	141.28	141.13
1,840.00	2,305.31	8.26	222.7	141.52	141.37
1,850.00	2,305.31	8.27	223.6	141.77	141.62
1,860.00	2,305.32	8.29	224.4	142.01	141.86
1,870.00	2,305.32	8.30	225.3	142.26	142.11
1,880.00	2,305.33	8.31	226.2	142.50	142.35
1,890.00	2,305.34	8.32	227.1	142.74	142.59
1,900.00	2,305.34	8.34	228.0	142.98	142.83
1,910.00	2,305.35	8.35	228.8	143.22	143.07
1,920.00	2,305.36	8.36	229.7	143.46	143.31
1,930.00	2,305.36	8.37	230.6	143.70	143.55
1,940.00	2,305.37	8.38	231.4	143.94	143.79
1,950.00	2,305.37	8.39	232.3	144.18	144.02

Table
Rating Table for Irregular Channel

CAREFREE DRIVE AT LAZY BURRO ROAD

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
1,960.00	2,305.38	8.41	233.2	144.41	144.26
1,970.00	2,305.39	8.42	234.0	144.65	144.50
1,980.00	2,305.39	8.43	234.9	144.89	144.73
1,990.00	2,305.40	8.44	235.8	145.12	144.97
2,000.00	2,305.40	8.45	236.6	145.35	145.20
2,010.00	2,305.41	8.46	237.5	145.59	145.43
2,020.00	2,305.42	8.47	238.4	145.82	145.67
2,030.00	2,305.42	8.49	239.2	146.05	145.90
2,040.00	2,305.43	8.50	240.1	146.29	146.13
2,050.00	2,305.43	8.51	240.9	146.52	146.36
2,060.00	2,305.44	8.52	241.8	146.75	146.59
2,070.00	2,305.44	8.53	242.6	146.98	146.82
2,080.00	2,305.45	8.54	243.5	147.21	147.05
2,090.00	2,305.46	8.55	244.3	147.43	147.28
2,100.00	2,305.46	8.56	245.2	147.66	147.50
2,110.00	2,305.47	8.58	246.0	147.89	147.73
2,120.00	2,305.47	8.59	246.9	148.12	147.96
2,130.00	2,305.48	8.60	247.7	148.34	148.18
2,140.00	2,305.48	8.61	248.6	148.57	148.41
2,150.00	2,305.49	8.62	249.4	148.79	148.63
2,160.00	2,305.50	8.63	250.3	149.02	148.86
2,170.00	2,305.50	8.64	251.1	149.24	149.08
2,180.00	2,305.51	8.65	252.0	149.46	149.30
2,190.00	2,305.51	8.66	252.8	149.68	149.52
2,200.00	2,305.52	8.67	253.7	149.91	149.74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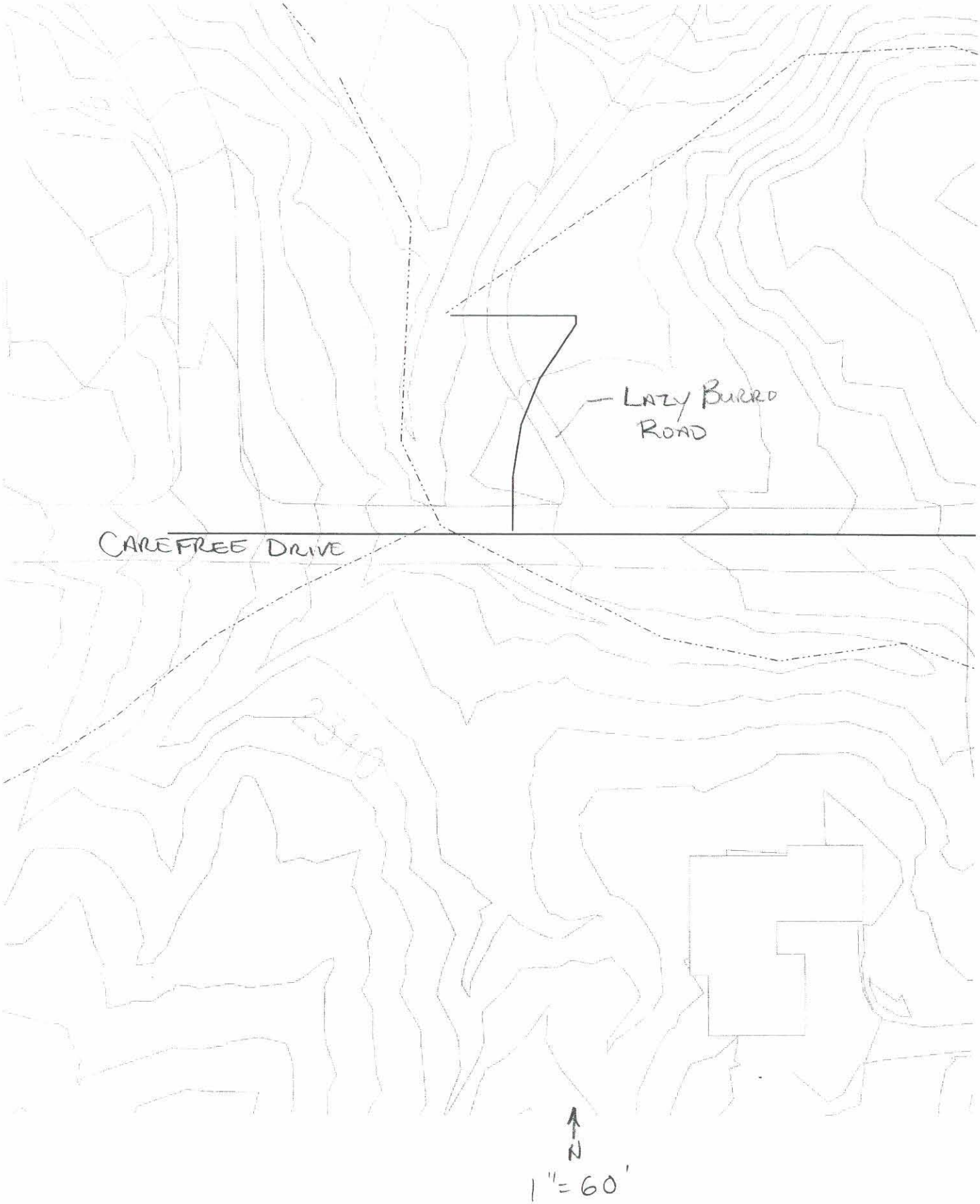
2303
2302
0
50
100
150
200
250
300
350
400
CANEFREE DRIVE AT LAZY BUNCO ROAD



CAREFREE DRIVE AT
LAZY BURRO ROAD
CHANNEL SLOPE MAP

AW 100 YR, 6 HR
FUTURE

7 (JEF)

CAREFREE DRIVE AT LAZY BURRO ROAD

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1*************************************
*                                   *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN  1998            *
*            VERSION 4.1            *
*                                   *
*  RUN DATE   27NOV02  TIME  08:23:52  *
*                                   *
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*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*           (916) 756-1104          *
*                                   *
*************************************
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X     X  XXXXXXX   XXXXX          X
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X     X  X       X                X
XXXXXXX  XXXX    X        XXXXX   X
X     X  X       X                X
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X     X  XXXXXXX   XXXXX         XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

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

1 HEC-1 INPUT PAGE 1

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

  1           ID   ANDORA HILLS WASH FUTURE CONDITIONS
  2           ID
  3           ID    100-YEAR 6-HOUR MODEL  FILENAME: AW1006F.DAT
  4           ID      MODIFIED BY JEF, INC. FOR CAREFREE AREA DRAINAGE MASTER PLAN
  5           ID      MODIFICATIONS INCLUDE:
  6           ID      1)  CHANGES TO WATERSHED DELINATION BETWEEN S320 AND S340L
  7           ID          EXAMINATION OF AERIAL PHOTOGRAPHS REVEALED AREA WITHIN
  8           ID          S320 THAT ACTUALLY FLOWS THROUGH S340L NEAR THE SW CORNER
  9           ID          OF S340L OFF THE BLACK MOUNTAIN HILLS.
 10           ID      2)  ADDITION OF NEW COMBINATION BLOCKS TO SEPARATE COMBINATIONS WITH
 11           ID          MORE THAN TWO HYDROGRAPHS IN THE ORIGINAL MODEL.
 12           ID      3)  FUTURE CONDITIONS LAND USE INTERPRETED FROM FUTURE LAND USE IN
 13           ID          CAVE CREEK WATERCOURSE MASTER PLAN BY TETRA TECH, 2001
 14           ID
 15           ID    BASED ON:
 16           ID
 17           ID        Cave Creek Above Carefree Highway FPD Study       File: AW100-6.IH1
 18           ID          by  GVSCE for Maricopa County FCD 95-28    Original: 06-17-96     mcg
 19           ID          Project:           84                       Revised:
 20           ID
 21           ID         Andora Hills Wash sub-watershed model
 22           ID          100-year, 6-hr rainfall with FCDMC Design Manual distribution
 23           ID          Green & Ampt Loss Rate Method
 24           ID          NMIN = 2
 25           ID          Clark Unit Hydrograph
 26           ID          Modified Puls, normal depth channel routing
              *
              *
              *
 27           IT       2                      900
 28           IO       5       2
 29           IN      15
              *
              *DIAGRAM
              *
              *  Depth-Area reduction factors taken from Table 2.2 of FCDMC Design Manual
              *
              *  6-hr rainfall distributions per Table 2.4 and Figure 2.17 of Design Manual
              *
 30           JD    3.40    0.01
 31           PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
 32           PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
 33           PC   0.962   0.972   0.983   0.991   1.000
 34           JD    3.38    0.50
 35           JD    3.30    2.80
 36           PC   0.000   0.009   0.016   0.025   0.034   0.042   0.051   0.059   0.067   0.076
 37           PC   0.087   0.100   0.120   0.163   0.252   0.451   0.694   0.837   0.900   0.938
 38           PC   0.950   0.963   0.975   0.988   1.000
              *
              *
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1 HEC-1 INPUT PAGE 2

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

 39           KK    S320
 40           KM   SUB-BASIN AHW1
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CAREFREE DRIVE AT LAZY BURRO ROAD

1

STATION C340R

(O) OUTFLOW

DAHRMN	PER	0.	200.	400.	600.	800.	1000.	1200.	1400.	1600.	1800.	0.	0.	0.
10000	10													
10002	20													
10004	30													
10006	40													
10008	50													
10010	60													
10012	70													
10014	80													
10016	90													
10018	100													
10020	110													
10022	120													
10024	130													
10026	140													
10028	150													
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10250	86.0													
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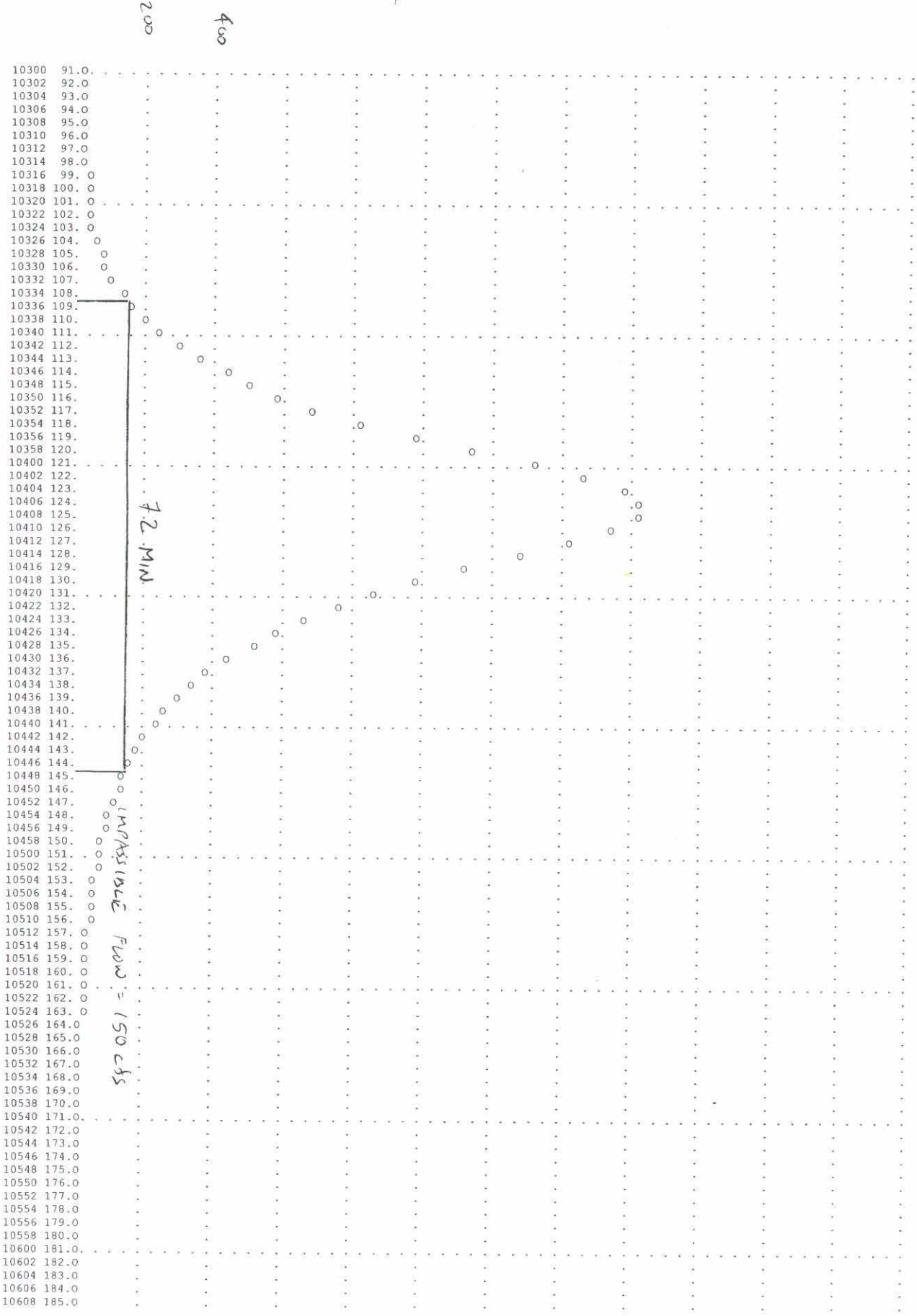
10258	90.0													

CAREFREE DRIVE AT LAZY BURRO DRIVE



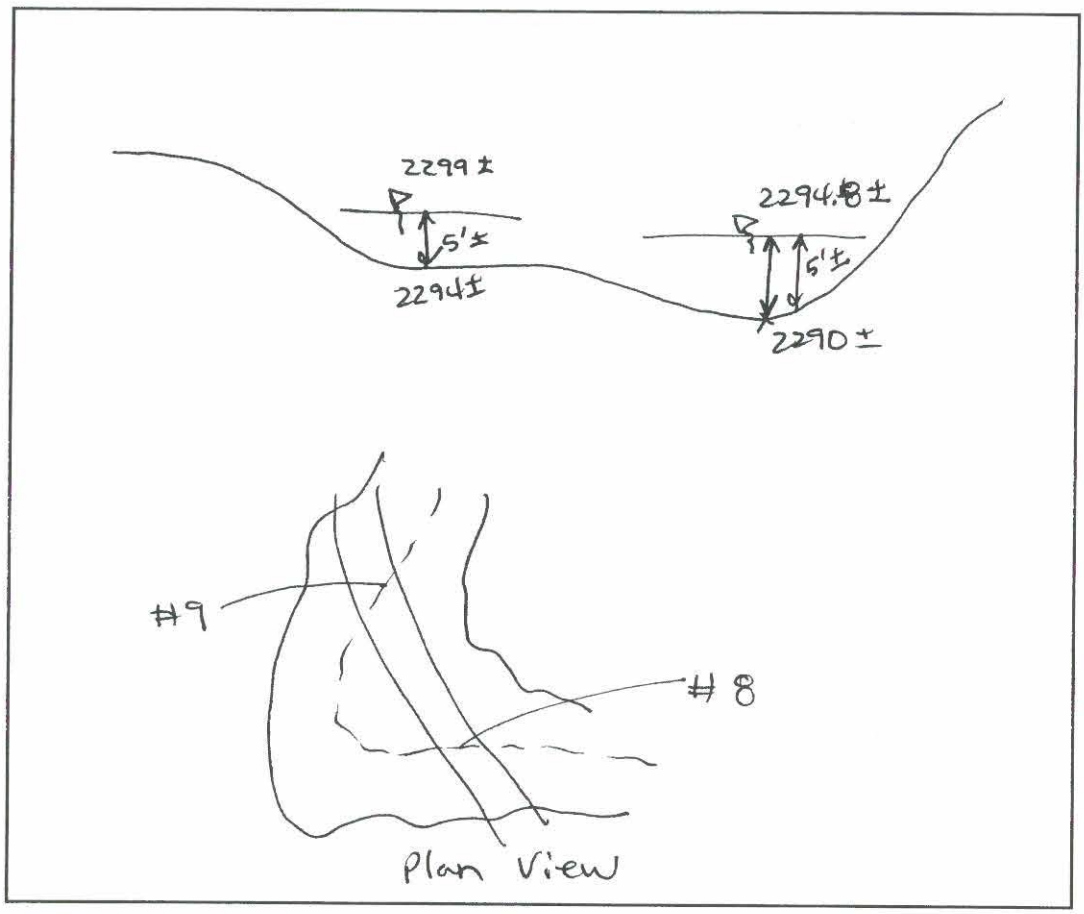
Lazy Burro Road Between Holiday Lane and Carefree Drive (JEF #8 and #9)

Carefree Drainage Master Plan
Dip Crossing Notes

ID Number: JEF 9 & JEF 8

Source of Data: Floodplain Delineation Study of Andora Hills & Galloway Washes, June 2001, preliminary (attached)

Location: Lazy Burro Road between Holiday Lane and Carefree Drive

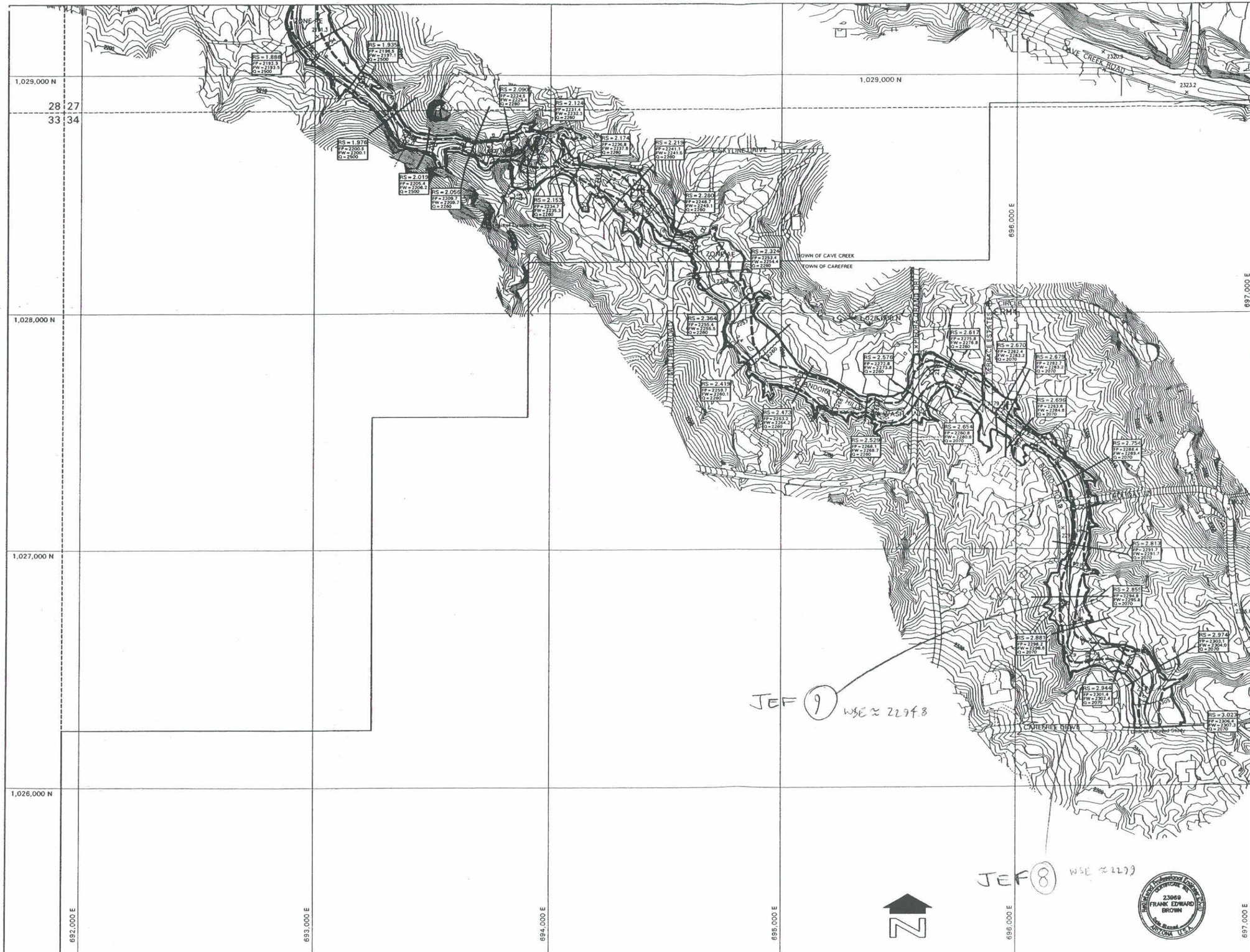


Material: Paved dip sections

Protection:

Notes: approximately 500' of roadway inundated w/ flow during 100-yr. event

MATCH TO SHEET 2



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOODPLAIN DELINEATION STUDY OF ANDORA HILLS & GALLOWAY WASHES FCD 99-14

JUNE, 2001

LEGEND

100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	1.2 — 1.3
CROSS SECTION	RS = 0.300, FP = 2061.0, FW = 2061.5, Q = 13,700
ELEVATION REFERENCE MARK	ERM 4
BASE FLOOD ELEVATIONS	2080
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	TOWN OF CAVECREEK
SECTION LINE	

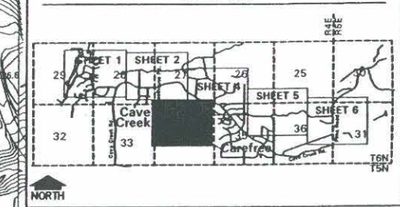
ELEVATION REFERENCE MARKS

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
ERM 4	2290.43	BC IN C/L OF TERRACE ESTATES CIRCLE, APPROXIMATELY 1000 FEET NORTH OF INTERSECTION OF BURRO ROAD AND HOLIDAY LANE, S34, T6N, R4E (N1028038.50, E695882.82)

NOTES

1. THE HYDRAULIC BASE LINE IS CROSS SECTION STATION 10,000 UNLESS NOTED OTHERWISE.
2. HORIZONTAL PROJECTION IS ARIZONA STATEPLANE, CENTRAL ZONE, NORTH AMERICAN DATUM OF 1983.
3. ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929. CONVERSION FACTOR: 1988 NGVD = 2.05 + 1929 NGVD

INDEX MAP



NORTH

200 0' 200 400

SCALE: 1" = 200 FEET

CONTOUR INTERVAL = 2 FEET

REGISTERED LAND SURVEYOR
24530
DAVID A. RHINE
ARIZONA, U.S.A.

JE FULLER
HYDROLOGY & GEOMORPHOLOGY, INC.
in association with
DIBBLE & ASSOCIATES
CONSULTING ENGINEERS

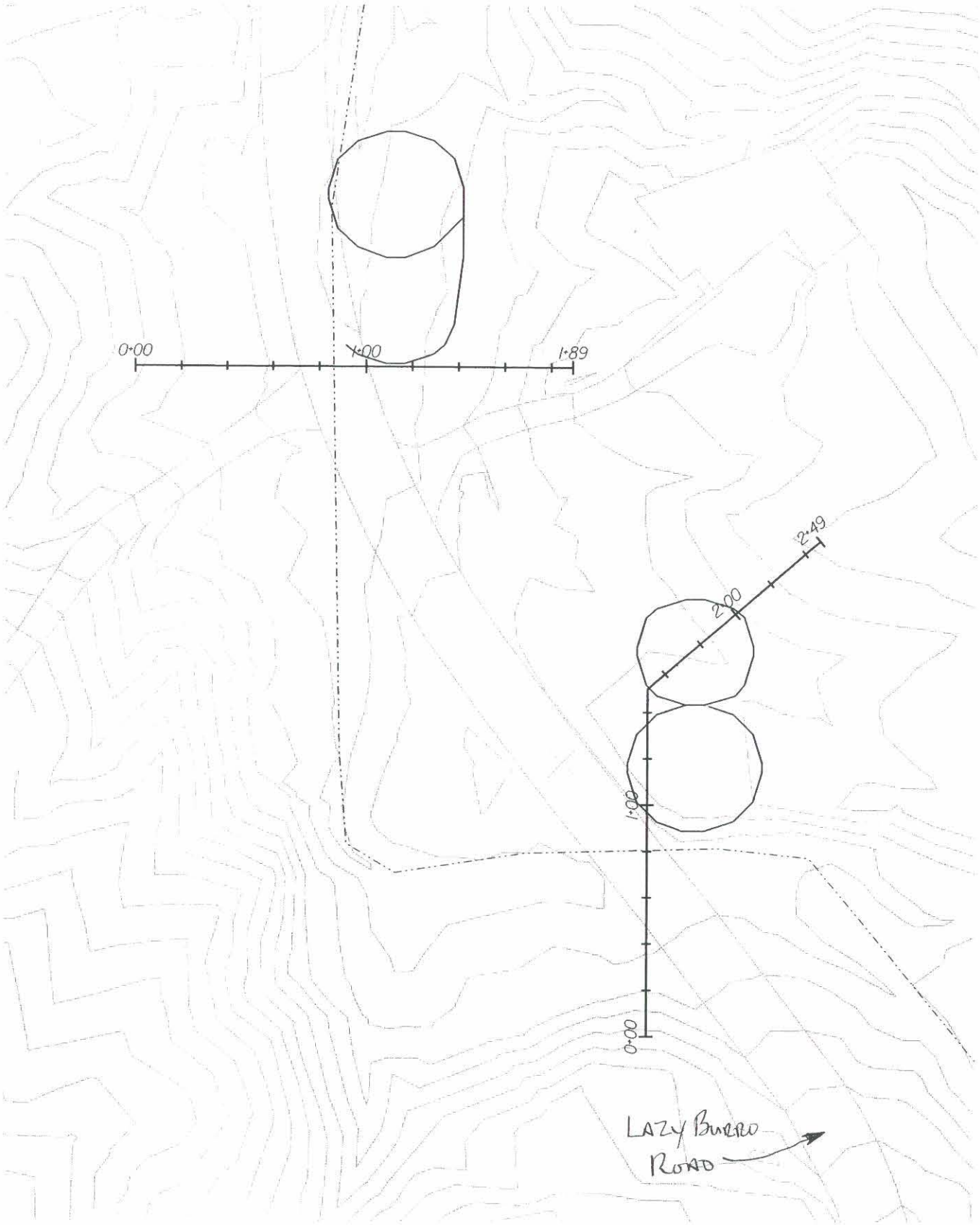
Registered Professional Engineer (Civil)
23969
FRANK EDWARD BROWN
ARIZONA, U.S.A.

SHEET 3 OF 8

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS FOR 1" = 200' HORIZONTAL SCALE AND 2' CONTOUR INTERVALS. FLIGHT DATE: 9/30/99

M&B AERIAL MAPPING COMPANY, LLC

GROUND CONTROL SURVEY DATA PROVIDED BY A TEAM PROFESSIONAL ASSOCIATES, INC.



LAZY BURRO ROAD BETWEEN
HOLIDAY LANE AND CAREFREE DRIVE

1" = 60'

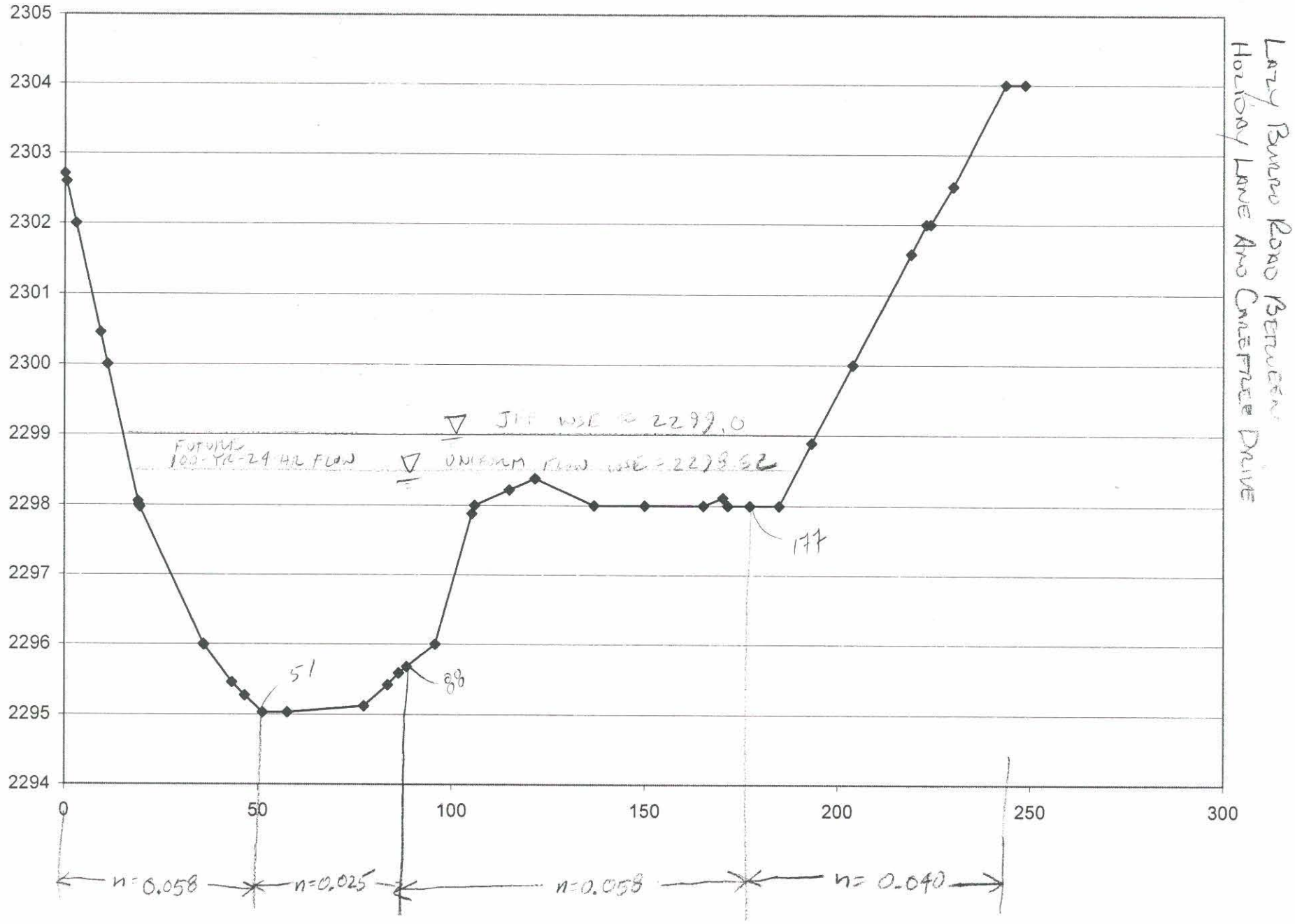

LAZY BARRO ROAD BETWEEN
HOLLOW LANE AND CREEPER DRIVE
2305
2304
2303
2302
2301
2300
2299
2298
2297
2296
2295
2294
0
50
100
150
200
250
300
JHF WSE @ 2299.0
FUTURE 100-YR-24 HR FLOW
UNIFORM FLOW WSE = 2298.62
51
88
177
n=0.058
n=0.025
n=0.058
n=0.040

Table
Rating Table for Irregular Channel

LAZY BURRO ROAD BETWEEN HOLIDAY LANE AND CAREFREE DRIVE

Project Description	
Worksheet	JEF-8
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data	
Slope	020000 ft/ft

Options	
Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weighting	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	2,300.00	10.00

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00	2,295.03	0.00	0.0	0.00	0.00
10.00	2,295.23	2.24	4.5	31.27	31.26
20.00	2,295.31	2.85	7.0	34.02	34.01
30.00	2,295.37	3.26	9.2	36.20	36.18
40.00	2,295.42	3.58	11.2	38.07	38.05
50.00	2,295.47	3.84	13.0	39.74	39.72
60.00	2,295.51	4.06	14.8	41.26	41.23
70.00	2,295.55	4.26	16.4	42.66	42.63
80.00	2,295.59	4.43	18.1	43.98	43.94
90.00	2,295.63	4.59	19.6	45.21	45.18
100.00	2,295.66	4.73	21.1	46.38	46.35
110.00	2,295.69	4.87	22.6	47.51	47.48
120.00	2,295.72	5.02	23.9	48.62	48.58
130.00	2,295.74	5.16	25.2	49.69	49.65
140.00	2,295.77	5.29	26.5	50.73	50.69
150.00	2,295.79	5.41	27.7	51.73	51.69
160.00	2,295.82	5.52	29.0	52.70	52.66
170.00	2,295.84	5.62	30.2	53.65	53.61
180.00	2,295.86	5.72	31.5	54.57	54.53
190.00	2,295.89	5.81	32.7	55.47	55.43
200.00	2,295.91	5.90	33.9	56.35	56.30
210.00	2,295.93	5.98	35.1	57.21	57.16
220.00	2,295.95	6.06	36.3	58.05	58.00
230.00	2,295.97	6.14	37.5	58.87	58.82
240.00	2,295.99	6.21	38.6	59.67	59.62
250.00	2,296.01	6.28	39.8	60.16	60.11
260.00	2,296.03	6.35	40.9	60.38	60.32
270.00	2,296.05	6.42	42.1	60.58	60.52
280.00	2,296.07	6.49	43.2	60.79	60.72
290.00	2,296.08	6.55	44.2	60.99	60.92
300.00	2,296.10	6.62	45.3	61.19	61.12
310.00	2,296.12	6.68	46.4	61.38	61.31
320.00	2,296.14	6.75	47.4	61.58	61.50
330.00	2,296.15	6.81	48.5	61.77	61.69

IMPASSIBLE

LAZY BURRO ROAD BETWEEN HOLIDAY LANE AND CAREFREE DRIVE

Table
Rating Table for Irregular Channel

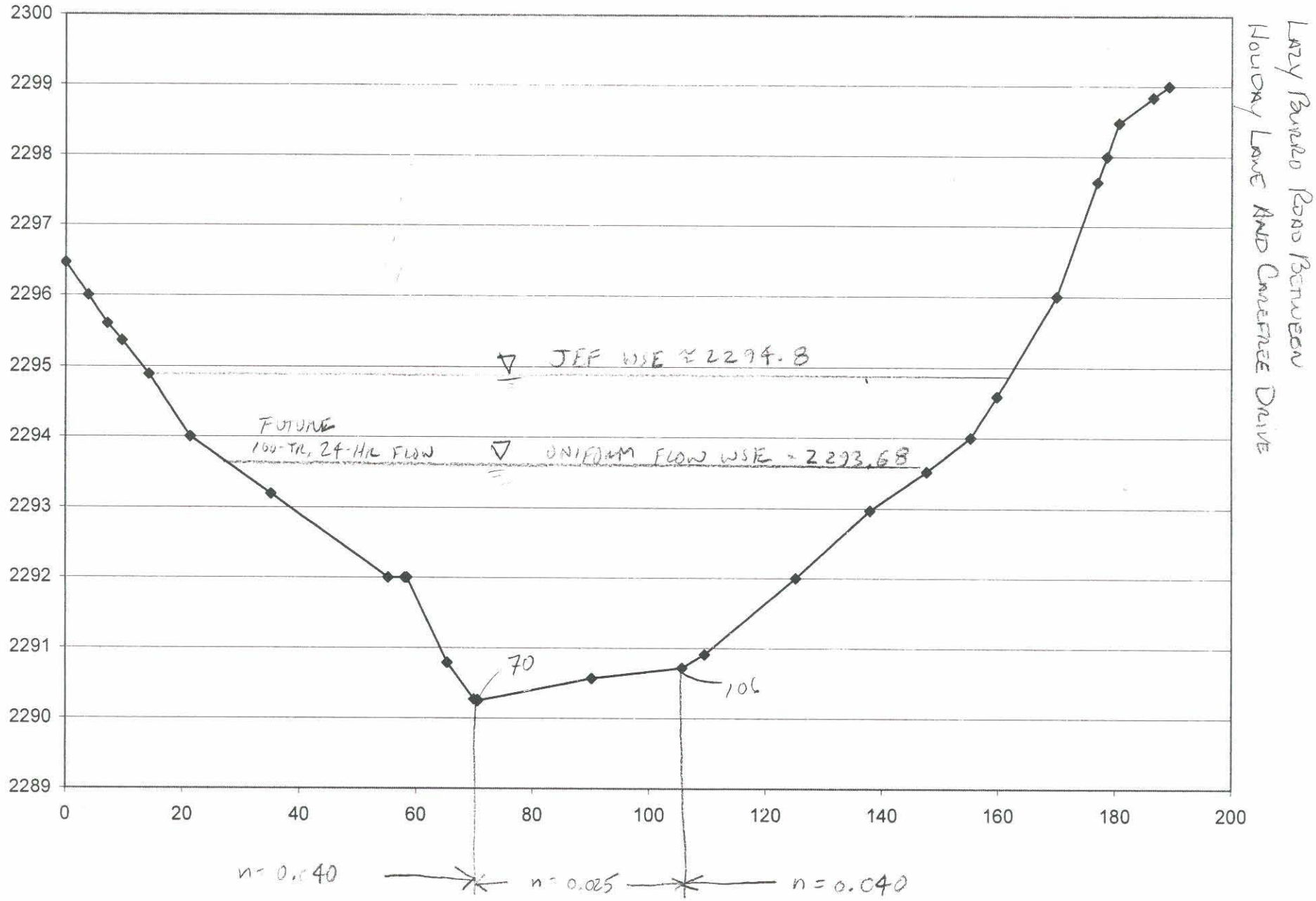
Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
880.00	2,296.88	9.14	96.2	69.94	69.73
890.00	2,296.89	9.18	97.0	70.07	69.85
900.00	2,296.90	9.21	97.8	70.19	69.97
910.00	2,296.91	9.24	98.5	70.31	70.09
920.00	2,296.92	9.27	99.3	70.43	70.21
930.00	2,296.93	9.30	100.0	70.55	70.33
940.00	2,296.94	9.33	100.8	70.67	70.45
950.00	2,296.95	9.36	101.5	70.79	70.57
960.00	2,296.97	9.39	102.3	70.91	70.68
970.00	2,296.98	9.41	103.0	71.03	70.80
980.00	2,296.99	9.44	103.8	71.15	70.92
990.00	2,297.00	9.47	104.5	71.26	71.03
1,000.00	2,297.01	9.50	105.3	71.38	71.15
1,010.00	2,297.02	9.53	106.0	71.50	71.26
1,020.00	2,297.03	9.56	106.7	71.61	71.38
1,030.00	2,297.04	9.59	107.5	71.73	71.49
1,040.00	2,297.05	9.61	108.2	71.84	71.60
1,050.00	2,297.06	9.64	108.9	71.96	71.72
1,060.00	2,297.07	9.67	109.6	72.07	71.83
1,070.00	2,297.08	9.69	110.4	72.19	71.94
1,080.00	2,297.09	9.72	111.1	72.30	72.05
1,090.00	2,297.10	9.75	111.8	72.41	72.16
1,100.00	2,297.11	9.77	112.5	72.52	72.27
1,110.00	2,297.12	9.80	113.3	72.64	72.38
1,120.00	2,297.13	9.83	114.0	72.75	72.49
1,130.00	2,297.14	9.85	114.7	72.86	72.60
1,140.00	2,297.15	9.88	115.4	72.97	72.71
1,150.00	2,297.16	9.90	116.1	73.08	72.82
1,160.00	2,297.17	9.93	116.8	73.19	72.92
1,170.00	2,297.18	9.96	117.5	73.30	73.03
1,180.00	2,297.19	9.98	118.2	73.41	73.14
1,190.00	2,297.20	10.01	118.9	73.51	73.25
1,200.00	2,297.21	10.03	119.6	73.62	73.35
1,210.00	2,297.22	10.05	120.3	73.73	73.46
1,220.00	2,297.23	10.08	121.0	73.84	73.56
1,230.00	2,297.23	10.10	121.7	73.94	73.67
1,240.00	2,297.24	10.13	122.4	74.05	73.77
1,250.00	2,297.25	10.15	123.1	74.16	73.88
1,260.00	2,297.26	10.18	123.8	74.26	73.98
1,270.00	2,297.27	10.20	124.5	74.37	74.08
1,280.00	2,297.28	10.22	125.2	74.47	74.19
1,290.00	2,297.29	10.25	125.9	74.58	74.29
1,300.00	2,297.30	10.27	126.6	74.68	74.39
1,310.00	2,297.31	10.29	127.3	74.78	74.49
1,320.00	2,297.32	10.32	128.0	74.89	74.60
1,330.00	2,297.33	10.34	128.6	74.99	74.70
1,340.00	2,297.34	10.36	129.3	75.09	74.80
1,350.00	2,297.35	10.38	130.0	75.19	74.90
1,360.00	2,297.36	10.41	130.7	75.30	75.00
1,370.00	2,297.36	10.43	131.4	75.40	75.10
1,380.00	2,297.37	10.45	132.0	75.50	75.20
1,390.00	2,297.38	10.47	132.7	75.60	75.30
1,400.00	2,297.39	10.50	133.4	75.70	75.40
1,410.00	2,297.40	10.52	134.1	75.80	75.50

Table

LAZY BURRO ROAD BETWEEN HOLIDAY LANE AND CAREFREE DRIVE

Rating Table for Irregular Channel

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
1,960.00	2,298.42	8.03	244.1	168.11	167.63
1,970.00	2,298.42	8.03	245.3	168.23	167.75
1,980.00	2,298.43	8.03	246.5	168.34	167.86
1,990.00	2,298.44	8.03	247.7	168.46	167.97
2,000.00	2,298.45	8.03	249.0	168.57	168.09
2,010.00	2,298.45	8.03	250.2	168.68	168.20
2,020.00	2,298.46	8.04	251.4	168.79	168.31
2,030.00	2,298.47	8.04	252.6	168.91	168.42
2,040.00	2,298.48	8.04	253.8	169.02	168.53
2,050.00	2,298.48	8.04	255.0	169.13	168.64
2,060.00	2,298.49	8.04	256.2	169.24	168.75
2,070.00	2,298.50	8.04	257.4	169.35	168.86
2,080.00	2,298.50	8.05	258.5	169.46	168.97
2,090.00	2,298.51	8.05	259.7	169.57	169.08
2,100.00	2,298.52	8.05	260.9	169.68	169.19
2,110.00	2,298.52	8.05	262.0	169.78	169.29
2,120.00	2,298.52	8.09	262.0	169.78	169.29
2,130.00	2,298.52	8.13	262.0	169.78	169.29
2,140.00	2,298.52	8.17	262.0	169.78	169.29
2,150.00	2,298.52	8.21	262.0	169.78	169.29
2,160.00	2,298.52	8.25	262.0	169.78	169.29
2,170.00	2,298.52	8.28	262.0	169.78	169.29
2,180.00	2,298.52	8.32	262.0	169.78	169.29
2,190.00	2,298.52	8.36	262.0	169.78	169.29
2,200.00	2,298.52	8.40	262.0	169.78	169.29
2,210.00	2,298.52	8.44	262.0	169.78	169.29
2,220.00	2,298.52	8.47	262.0	169.78	169.29
2,230.00	2,298.52	8.51	262.0	169.78	169.29
2,240.00	2,298.52	8.55	262.0	169.78	169.29
2,250.00	2,298.52	8.59	262.0	169.78	169.29
2,260.00	2,298.52	8.63	262.0	169.78	169.29
2,270.00	2,298.52	8.66	262.0	169.78	169.29
2,280.00	2,298.52	8.70	262.0	169.78	169.29
2,290.00	2,298.52	8.74	262.0	169.78	169.29
2,300.00	2,298.52	8.78	262.0	169.78	169.29


LAZY BURRO ROAD BETWEEN
HOLIDAY LANE AND CREEFREE DRIVE
2300
2299
2298
2297
2296
2295
2294
2293
2292
2291
2290
2289
0
20
40
60
80
100
120
140
160
180
200
JEF WSE ≈ 2294.8
FUTURE
100-YR, 24-HR FLOW
UNIFORM FLOW WSE = 2293.68
70
106
n = 0.040
n = 0.025
n = 0.040

Table

LAZY BURRO ROAD BETWEEN HOLIDAY LANE AND CAREFREE DRIVE

Rating Table for Irregular Channel

Project Description	
Worksheet	JEF-9
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data	
Slope	012500 ft/ft

Options	
Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	2,400.00	10.00

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00	2,290.25	0.00	0.0	0.00	0.00
10.00	2,290.60	2.00	5.0	28.92	28.89
20.00	2,290.70	2.38	8.4	37.50	37.47
30.00	2,290.76	2.74	11.0	40.19	40.15
40.00	2,290.82	3.05	13.1	41.31	41.26
50.00	2,290.86	3.32	15.1	42.31	42.26
60.00	2,290.91	3.54	16.9	43.23	43.17
70.00	2,290.95	3.74	18.7	44.09	44.02
80.00	2,291.00	3.78	21.1	45.25	45.18
90.00	2,291.04	3.93	22.9	46.06	45.99
100.00	2,291.08	4.07	24.6	46.84	46.76
110.00	2,291.11	4.19	26.2	47.58	47.50
120.00	2,291.15	4.31	27.9	48.30	48.21
130.00	2,291.18	4.41	29.4	48.99	48.90
140.00	2,291.21	4.52	31.0	49.66	49.57
150.00	2,291.24	4.61	32.5	50.30	50.21
160.00	2,291.27	4.70	34.0	50.94	50.84
170.00	2,291.30	4.79	35.5	51.55	51.45
180.00	2,291.33	4.87	37.0	52.15	52.05
190.00	2,291.36	4.95	38.4	52.73	52.63
200.00	2,291.38	5.02	39.8	53.30	53.20
210.00	2,291.41	5.09	41.3	53.86	53.75
220.00	2,291.44	5.16	42.7	54.41	54.30
230.00	2,291.46	5.22	44.0	54.95	54.83
240.00	2,291.49	5.29	45.4	55.47	55.35
250.00	2,291.50	5.44	46.0	55.69	55.56
260.00	2,291.50	5.66	46.0	55.69	55.56
270.00	2,291.50	5.86	46.1	55.74	55.62
280.00	2,291.52	5.92	47.3	56.19	56.07
290.00	2,291.54	5.98	48.5	56.63	56.51
300.00	2,291.56	6.05	49.6	57.06	56.94
310.00	2,291.58	6.11	50.8	57.49	57.36
320.00	2,291.60	6.16	51.9	57.91	57.78
330.00	2,291.62	6.22	53.0	58.33	58.19

IMPASSABLE

Table

LAZY BURRO ROAD BETWEEN HOLIDAY LANE AND CAREFREE DRIVE

Rating Table for Irregular Channel

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
880.00	2,292.44	7.98	110.3	83.19	82.99
890.00	2,292.45	8.00	111.3	83.56	83.35
900.00	2,292.46	8.02	112.2	83.92	83.72
910.00	2,292.48	8.04	113.2	84.29	84.08
920.00	2,292.49	8.06	114.2	84.65	84.44
930.00	2,292.50	8.08	115.1	85.01	84.80
940.00	2,292.51	8.10	116.1	85.36	85.15
950.00	2,292.52	8.11	117.1	85.72	85.51
960.00	2,292.53	8.13	118.0	86.07	85.86
970.00	2,292.54	8.15	119.0	86.42	86.21
980.00	2,292.56	8.17	120.0	86.77	86.56
990.00	2,292.57	8.19	120.9	87.11	86.90
1,000.00	2,292.58	8.20	121.9	87.46	87.24
1,010.00	2,292.59	8.22	122.8	87.80	87.59
1,020.00	2,292.60	8.24	123.8	88.14	87.93
1,030.00	2,292.61	8.26	124.8	88.48	88.26
1,040.00	2,292.62	8.27	125.7	88.82	88.60
1,050.00	2,292.63	8.29	126.7	89.15	88.94
1,060.00	2,292.64	8.31	127.6	89.48	89.27
1,070.00	2,292.65	8.32	128.6	89.82	89.60
1,080.00	2,292.66	8.34	129.5	90.15	89.93
1,090.00	2,292.67	8.36	130.4	90.47	90.26
1,100.00	2,292.68	8.37	131.4	90.80	90.58
1,110.00	2,292.70	8.39	132.3	91.13	90.91
1,120.00	2,292.71	8.40	133.3	91.45	91.23
1,130.00	2,292.72	8.42	134.2	91.77	91.55
1,140.00	2,292.73	8.43	135.2	92.09	91.87
1,150.00	2,292.74	8.45	136.1	92.41	92.19
1,160.00	2,292.75	8.47	137.0	92.73	92.50
1,170.00	2,292.76	8.48	138.0	93.04	92.82
1,180.00	2,292.77	8.50	138.9	93.36	93.13
1,190.00	2,292.78	8.51	139.8	93.67	93.44
1,200.00	2,292.79	8.53	140.8	93.98	93.75
1,210.00	2,292.80	8.54	141.7	94.29	94.06
1,220.00	2,292.81	8.55	142.6	94.60	94.37
1,230.00	2,292.82	8.57	143.5	94.90	94.68
1,240.00	2,292.83	8.58	144.5	95.21	94.98
1,250.00	2,292.84	8.60	145.4	95.51	95.28
1,260.00	2,292.84	8.61	146.3	95.81	95.59
1,270.00	2,292.85	8.63	147.2	96.12	95.89
1,280.00	2,292.86	8.64	148.2	96.42	96.19
1,290.00	2,292.87	8.65	149.1	96.71	96.48
1,300.00	2,292.88	8.67	150.0	97.01	96.78
1,310.00	2,292.89	8.68	150.9	97.31	97.08
1,320.00	2,292.90	8.69	151.8	97.60	97.37
1,330.00	2,292.91	8.71	152.7	97.90	97.66
1,340.00	2,292.92	8.72	153.7	98.19	97.95
1,350.00	2,292.93	8.73	154.6	98.48	98.24
1,360.00	2,292.94	8.75	155.5	98.77	98.53
1,370.00	2,292.95	8.76	156.4	99.06	98.82
1,380.00	2,292.96	8.77	157.3	99.35	99.11
1,390.00	2,292.97	8.79	158.2	99.63	99.39
1,400.00	2,292.98	8.80	159.1	99.89	99.66
1,410.00	2,292.98	8.81	160.0	100.14	99.90

Table

LAZY BURRO ROAD BETWEEN HOLIDAY LANE AND CAREFREE DRIVE

Rating Table for Irregular Channel

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
1,960.00	2,293.43	9.44	207.6	112.55	112.27
1,970.00	2,293.44	9.45	208.5	112.75	112.48
1,980.00	2,293.45	9.46	209.3	112.96	112.68
1,990.00	2,293.46	9.47	210.1	113.16	112.89
2,000.00	2,293.46	9.48	211.0	113.37	113.09
2,010.00	2,293.47	9.49	211.8	113.57	113.30
2,020.00	2,293.48	9.50	212.6	113.78	113.50
2,030.00	2,293.49	9.51	213.5	113.98	113.70
2,040.00	2,293.49	9.52	214.3	114.18	113.91
2,050.00	2,293.50	9.53	215.1	114.38	114.11
2,060.00	2,293.51	9.54	216.0	114.59	114.31
2,070.00	2,293.51	9.55	216.8	114.79	114.51
2,080.00	2,293.52	9.56	217.6	114.99	114.71
2,090.00	2,293.53	9.57	218.5	115.19	114.91
2,100.00	2,293.54	9.58	219.3	115.39	115.11
2,110.00	2,293.54	9.59	220.1	115.59	115.30
2,120.00	2,293.55	9.59	221.0	115.78	115.50
2,130.00	2,293.56	9.60	221.8	115.98	115.70
2,140.00	2,293.57	9.61	222.6	116.18	115.90
2,150.00	2,293.57	9.62	223.4	116.38	116.09
2,160.00	2,293.58	9.63	224.3	116.57	116.29
2,170.00	2,293.59	9.64	225.1	116.77	116.48
2,180.00	2,293.59	9.65	225.9	116.96	116.68
2,190.00	2,293.60	9.66	226.7	117.16	116.87
2,200.00	2,293.61	9.67	227.6	117.35	117.07
2,210.00	2,293.61	9.68	228.4	117.55	117.26
2,220.00	2,293.62	9.69	229.2	117.74	117.45
2,230.00	2,293.63	9.69	230.0	117.93	117.64
2,240.00	2,293.64	9.70	230.8	118.12	117.84
2,250.00	2,293.64	9.71	231.7	118.32	118.03
2,260.00	2,293.65	9.72	232.5	118.51	118.22
2,270.00	2,293.66	9.73	233.3	118.70	118.41
2,280.00	2,293.66	9.74	234.1	118.89	118.60
2,290.00	2,293.67	9.75	234.9	119.08	118.79
2,300.00	2,293.68	9.76	235.7	119.27	118.98
2,310.00	2,293.68	9.77	236.6	119.46	119.16
2,320.00	2,293.69	9.77	237.4	119.65	119.35
2,330.00	2,293.70	9.78	238.2	119.83	119.54
2,340.00	2,293.70	9.79	239.0	120.02	119.73
2,350.00	2,293.71	9.80	239.8	120.21	119.91
2,360.00	2,293.72	9.81	240.6	120.40	120.10
2,370.00	2,293.72	9.82	241.4	120.58	120.29
2,380.00	2,293.73	9.83	242.2	120.77	120.47
2,390.00	2,293.74	9.83	243.0	120.95	120.66
2,400.00	2,293.74	9.84	243.9	121.14	120.84

AW 100 YR, 6 HR

8 (JEF)

LAZY BURRO ROAD BETWEEN FUTURE
HOLIDAY LANE AND CAREFREE DRIVE

```
1*************************************
*                                   *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN  1998            *
*           VERSION 4.1             *
*                                   *
*  RUN DATE   27NOV02  TIME  08:23:52  *
*                                   *
*************************************
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*************************************
*                                   *
*   U.S. ARMY CORPS OF ENGINEERS    *
*   HYDROLOGIC ENGINEERING CENTER   *
*         609 SECOND STREET         *
*      DAVIS, CALIFORNIA 95616      *
*          (916) 756-1104           *
*                                   *
*************************************
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X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

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

1 HEC-1 INPUT PAGE 1

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

  1           ID   ANDORA HILLS WASH FUTURE CONDITIONS
  2           ID
  3           ID    100-YEAR 6-HOUR MODEL  FILENAME: AW1006F.DAT
  4           ID      MODIFIED BY JEF, INC. FOR CAREFREE AREA DRAINAGE MASTER PLAN
  5           ID      MODIFICATIONS INCLUDE:
  6           ID      1)  CHANGES TO WATERSHED DELINATION BETWEEN S320 AND S340L
  7           ID          EXAMINATION OF AERIAL PHOTOGRAPHS REVEALED AREA WITHIN
  8           ID          S320 THAT ACTUALLY FLOWS THROUGH S340L NEAR THE SW CORNER
  9           ID          OF S340L OFF THE BLACK MOUNTAIN HILLS.
 10           ID      2)  ADDITION OF NEW COMBINATION BLOCKS TO SEPARATE COMBINATIONS WITH
 11           ID          MORE THAN TWO HYDROGRAPHS IN THE ORIGINAL MODEL.
 12           ID      3)  FUTURE CONDITIONS LAND USE INTERPRETED FROM FUTURE LAND USE IN
 13           ID          CAVE CREEK WATERCOURSE MASTER PLAN BY TETRA TECH, 2001
 14           ID
 15           ID    BASED ON:
 16           ID
 17           ID        Cave Creek Above Carefree Highway FPD Study       File: AW100-6.IH1
 18           ID          by  GVSCE for Maricopa County FCD 95-28    Original: 06-17-96     mcg
 19           ID          Project:            84                       Revised:
 20           ID
 21           ID         Andora Hills Wash sub-watershed model
 22           ID           100-year, 6-hr rainfall with FCDMC Design Manual distribution
 23           ID           Green & Ampt Loss Rate Method
 24           ID           NMIN = 2
 25           ID           Clark Unit Hydrograph
 26           ID           Modified Puls, normal depth channel routing
              *
              *
              *
 27           IT       2                      900
 28           IO       5       2
 29           IN      15
              *
              *DIAGRAM
              *
              *  Depth-Area reduction factors taken from Table 2.2 of FCDMC Design Manual
              *
              *  6-hr rainfall distributions per Table 2.4 and Figure 2.17 of Design Manual
              *
 30           JD   3.40    0.01
 31           PC  0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
 32           PC  0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
 33           PC  0.962   0.972   0.983   0.991   1.000
 34           JD   3.38    0.50
 35           JD   3.30    2.80
 36           PC  0.000   0.009   0.016   0.025   0.034   0.042   0.051   0.059   0.067   0.076
 37           PC  0.087   0.100   0.120   0.163   0.252   0.451   0.694   0.837   0.900   0.938
 38           PC  0.950   0.963   0.975   0.988   1.000
              *
              *
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1 HEC-1 INPUT PAGE 2

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

 39           KK    S320
 40           KM   SUB-BASIN AHW1
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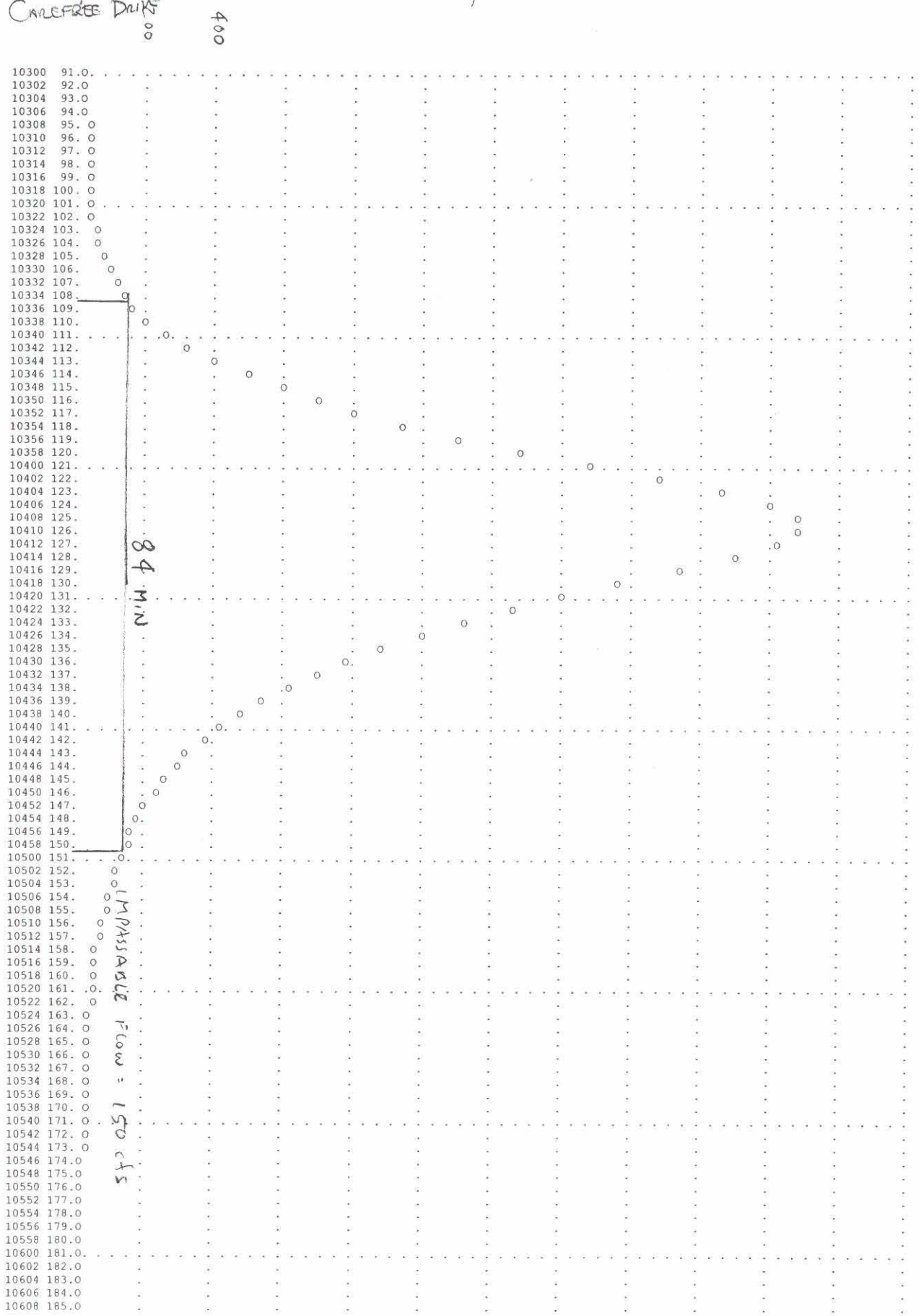
LAZY BURRO ROAD BETWEEN HOLIDAY LANE AND CARLEFREE DRIVE



LAZY BURRO ROAD BETWEEN
1 HOLIDAY LANE AND CARLEFREE DRIVE STATION 340350

(O) OUTFLOW

DAHRMN	PER	0.	200.	400.	600.	800.	1000.	1200.	1400.	1600.	1800.	2000.	2200.	0.
10000	10													
10002	20													
10004	30													
10006	40													
10008	50													
10010	60													
10012	70													
10014	80													
10016	90													
10018	100													
10020	110													
10022	120													
10024	130													
10026	140													
10028	150													
10030	160													
10032	170													
10034	180													
10036	190													
10038	200													
10040	210													
10042	22.0													
10044	23.0													
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10048	25.0													
10050	26.0													
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10056	29.0													
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10134	48.0													
10136	49.0													
10138	50.0													
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10142	52.0													
10144	53.0													
10146	54.0													
10148	55.0													
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10152	57.0													
10154	58.0													
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10202	62.0													
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10216	69.0													
10218	70.0													
10220	71.0													
10222	72.0													
10224	73.0													
10226	74.0													
10228	75.0													
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10238	80.0													
10240	81.0													
10242	82.0													
10244	83.0													
10246	84.0													
10248	85.0													
10250	86.0													
10252	87.0													
10254	88.0													
10256	89.0													
10258	90.0													

AW 100 YR, 6 HR FUTURE

LAZY BURRO DRIVE BETWEEN HOLIDAY LANE AND CAREFREE DRIVE

9 (JEF)

```
1*************************************                                    *************************************
*                                   *                                    *                                   *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                                *   U.S. ARMY CORPS OF ENGINEERS    *
*              JUN   1998           *                                    *   HYDROLOGIC ENGINEERING CENTER   *
*           VERSION 4.1             *                                    *         609 SECOND STREET         *
*                                   *                                    *      DAVIS, CALIFORNIA 95616      *
*  RUN DATE   27NOV02  TIME  08:23:52 *                                  *          (916) 756-1104           *
*                                   *                                    *                                   *
*************************************                                    *************************************

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

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DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1                                          HEC-1 INPUT                                                    PAGE  1

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   14           ID
   15           ID    BASED ON:
   16           ID
   17           ID        Cave Creek Above Carefree Highway FPD Study       File: AW100-6.IH1
   18           ID           by  GVSCE for Maricopa County FCD 95-28    Original: 06-17-96     mcg
   19           ID           Project:          84                         Revised:
   20           ID
   21           ID         Andora Hills Wash sub-watershed model
   22           ID           100-year, 6-hr rainfall with FCDMC Design Manual distribution
   23           ID           Green & Ampt Loss Rate Method
   24           ID           NMIN = 2
   25           ID           Clark Unit Hydrograph
   26           ID           Modified Puls, normal depth channel routing
                *
                *
                *
   27           IT       2                    900
   28           IO       5       2
   29           IN      15
                *
                *DIAGRAM
                *
                *  Depth-Area reduction factors taken from Table 2.2 of FCDMC Design Manual
                *
                *  6-hr rainfall distributions per Table 2.4 and Figure 2.17 of Design Manual
                *
   30           JD    3.40    0.01
   31           PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
   32           PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
   33           PC   0.962   0.972   0.983   0.991   1.000
   34           JD    3.38    0.50
   35           JD    3.30    2.80
   36           PC   0.000   0.009   0.016   0.025   0.034   0.042   0.051   0.059   0.067   0.076
   37           PC   0.087   0.100   0.120   0.163   0.252   0.451   0.694   0.837   0.900   0.938
   38           PC   0.950   0.963   0.975   0.988   1.000
                *
                *
1                                          HEC-1 INPUT                                                    PAGE  2

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

   39           KK    S320
   40           KM   SUB-BASIN AHW1
```
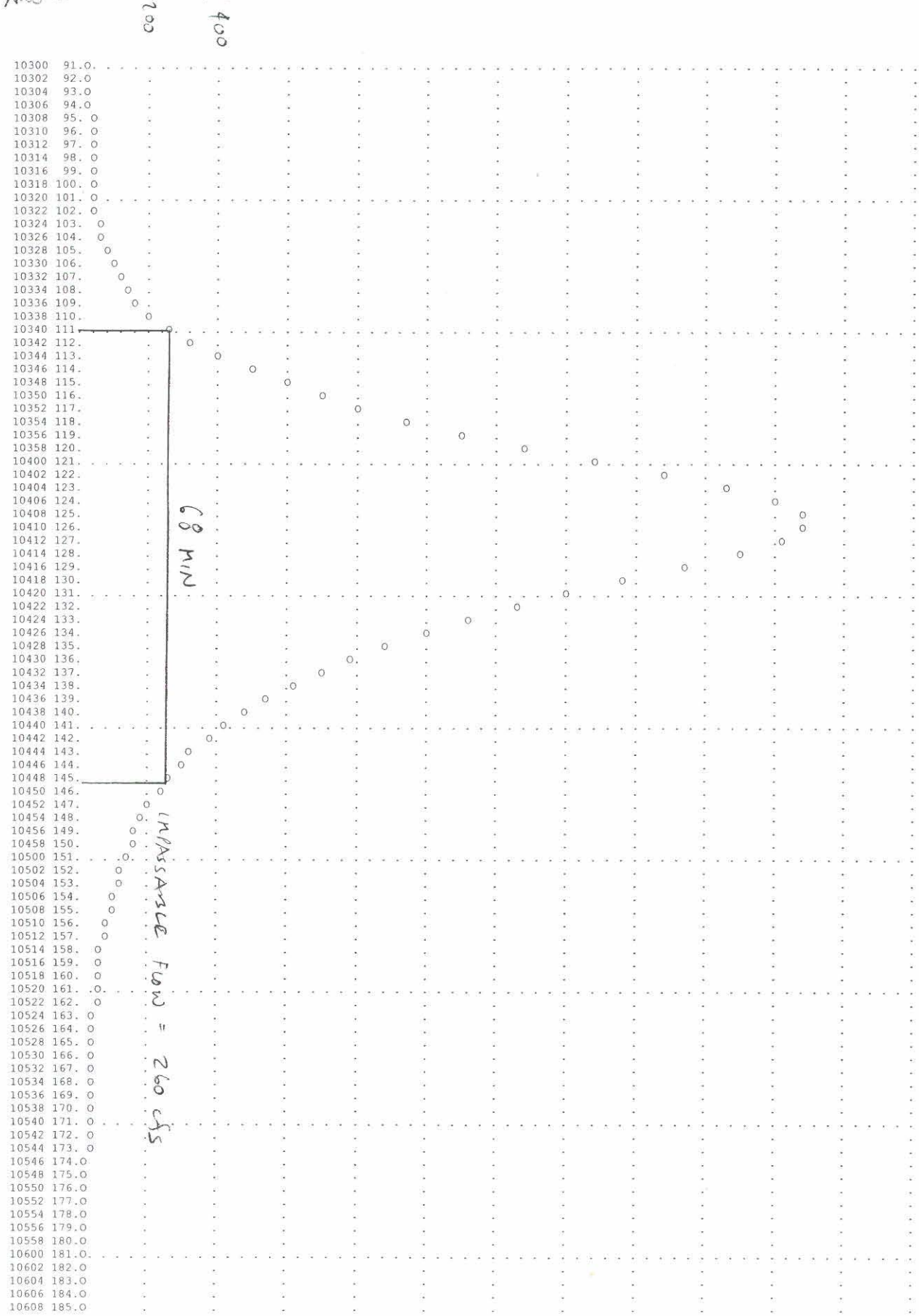

LAZY BURRO ROAD BETWEEN HOLIDAY LANE AND CAREFREE DRIVE



LAZY BURRO ROAD BETWEEN HOLIDAY LANE AND CAREFREE DRIVE

1

STATION 340350

(O) OUTFLOW

DAHRMN	PER	0.	200.	400.	600.	800.	1000.	1200.	1400.	1600.	1800.	2000.	2200.	0.
10000	10													
10002	20													
10004	30													
10006	40													
10008	50													
10010	60													
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10250	86.0													
10252	87.0													
10254	88.0													
10256	89.0													
10258	90.0													

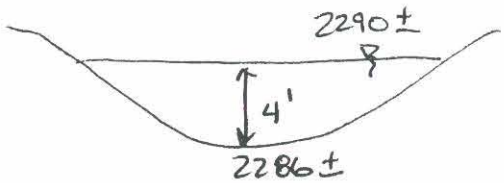
Holiday Lane at Lazy Burro Road (JEF #10)

Carefree Drainage Master Plan
Dip Crossing Notes

ID Number: JEF #10

Source of Data: Floodplain Delineation Study of Andora Hills & Galloway Washes, June 2001, preliminary (attached)

Location: Holiday Lane @ Lazy Burro Rd.

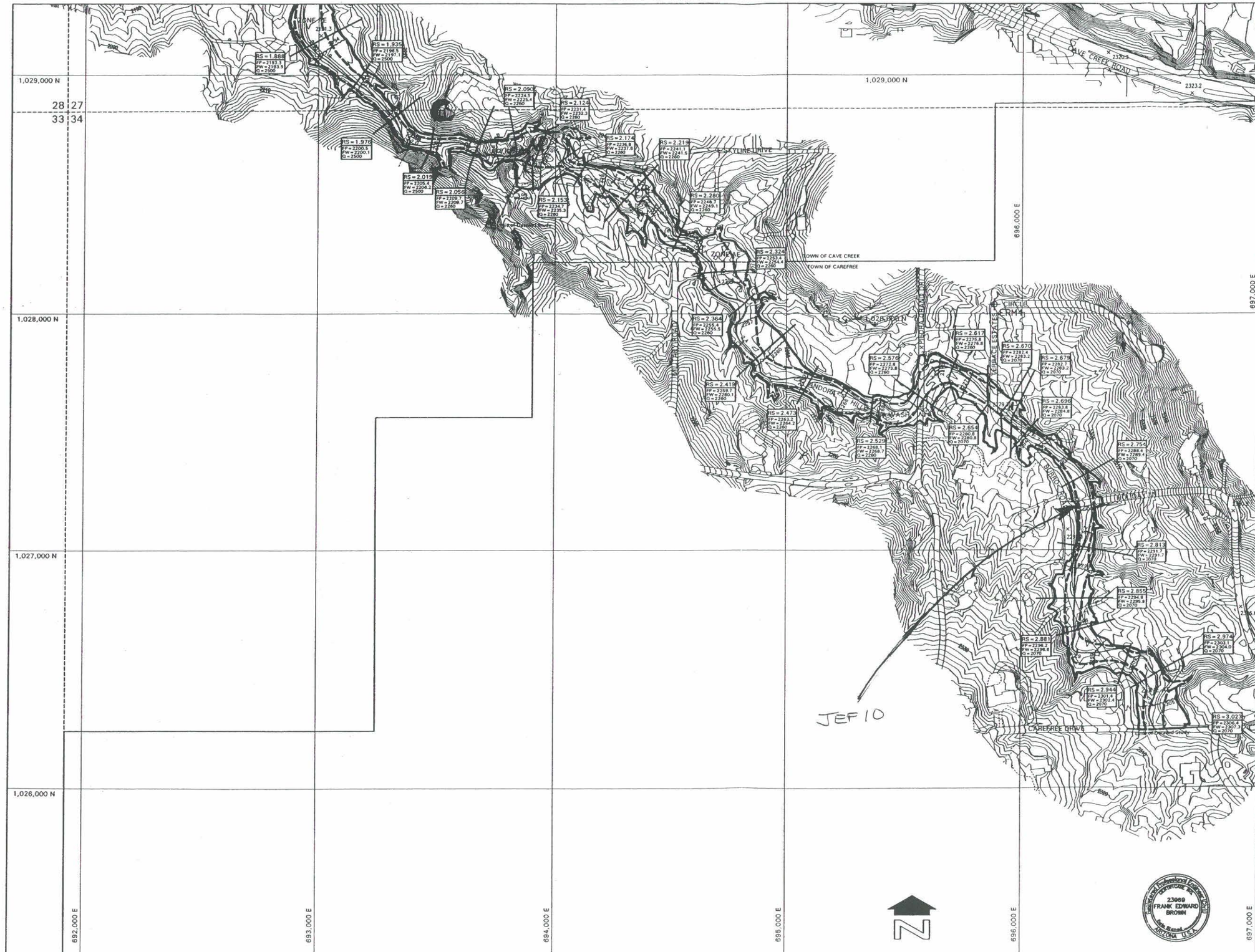


Material: Paved Dip Crossing

Protection:

Notes:

MATCH TO SHEET 2



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOODPLAIN DELINEATION STUDY OF ANDORA HILLS & GALLOWAY WASHES FCD 99-14

JUNE, 2001

LEGEND

100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	1.2 — 1.3
CROSS SECTION	RS = 0.300 FP = 2061.0 FW = 2061.5 Q = 13,700
ELEVATION REFERENCE MARK	ERM 4
BASE FLOOD ELEVATIONS	2080
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	TOWN OF CAVECREEK
SECTION LINE	

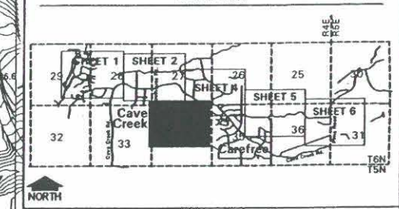
ELEVATION REFERENCE MARKS

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
ERM 4	2290.43	BC IN C/L OF TERRACE ESTATES CIRCLE, APPROXIMATELY 1000 FEET NORTH OF INTERSECTION OF BURRO ROAD AND HOLIDAY LANE, S34, T8N, R4E (N1028038.50, E695882.82)

NOTES

1. THE HYDRAULIC BASE LINE IS CROSS SECTION STATION 10,000 UNLESS NOTED OTHERWISE.
2. HORIZONTAL PROJECTION IS ARIZONA STATEPLANE, CENTRAL ZONE, NORTH AMERICAN DATUM OF 1983.
3. ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929. CONVERSION FACTOR: 1988 NGVD = 2.05 + 1929 NGVD

INDEX MAP



200 0' 200 400

SCALE: 1" = 200 FEET

CONTOUR INTERVAL = 2 FEET

REGISTERED LAND SURVEYOR
CERTIFICATE NO. 24530
DAVID A. RHINE
ARIZONA, U.S.A.

REGISTERED Professional Engineer (Civil)
CERTIFICATE NO. 23069
FRANK EDWARD BROWN
ARIZONA, U.S.A.

JE FULLER
HYDROLOGY & GEOMORPHOLOGY, INC.

in association with

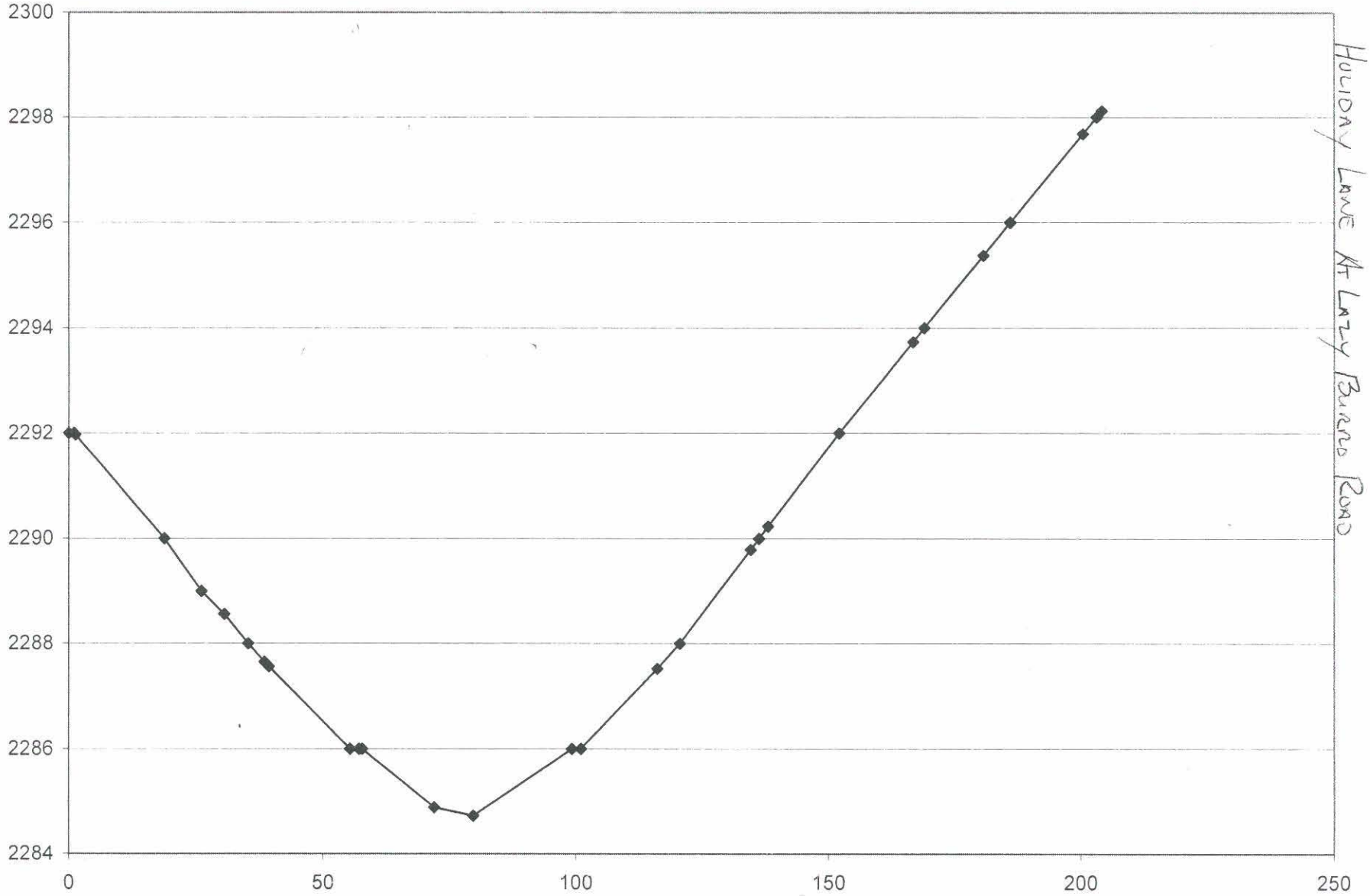
DIBBLE & ASSOCIATES
CONSULTING ENGINEERS

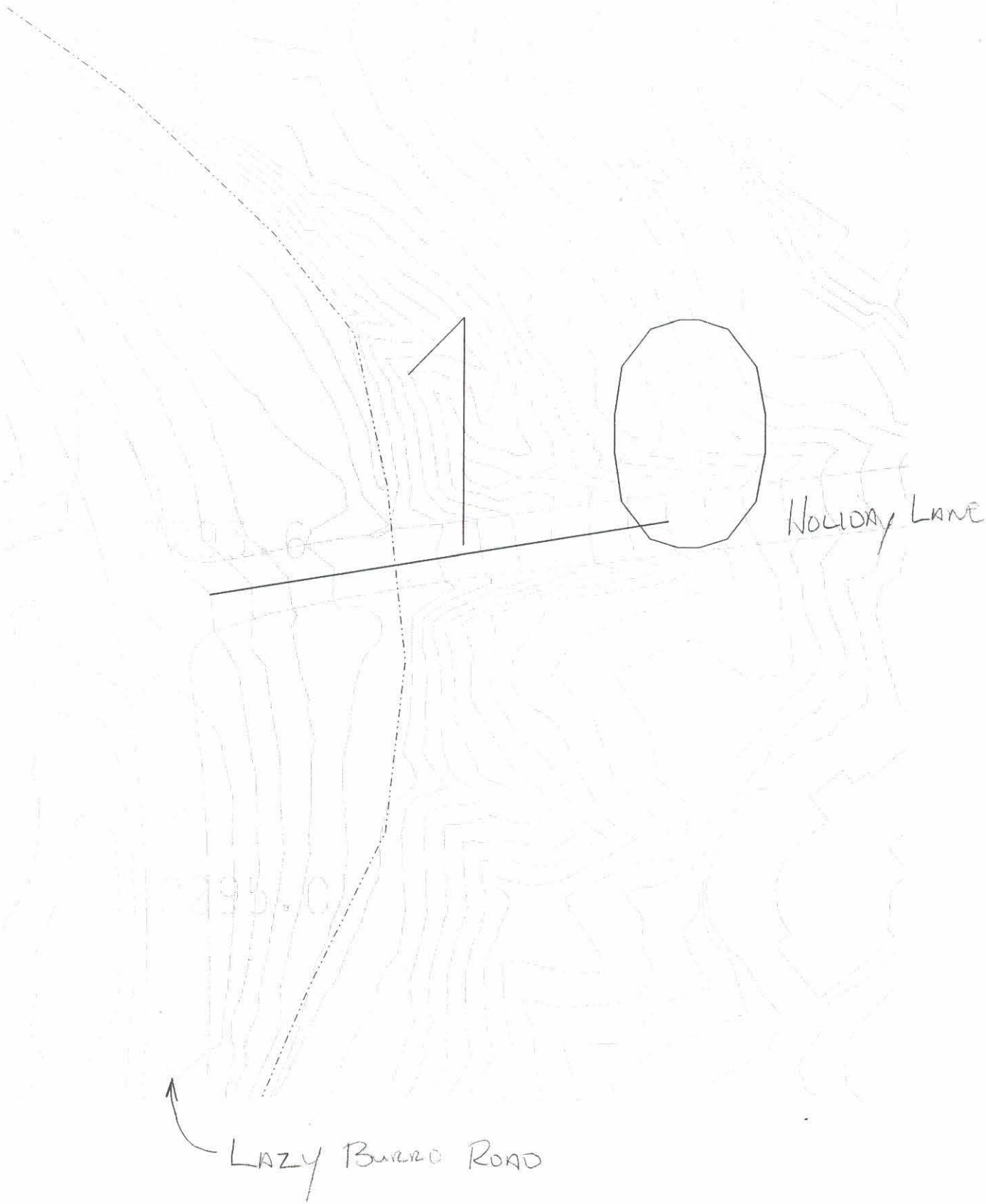
SHEET 3 OF 6

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS FOR 1" = 200' HORIZONTAL SCALE AND 2' CONTOUR INTERVALS. FLIGHT DATE: 9/30/99

M&B AERIAL MAPPING COMPANY, LLC

GROUND CONTROL SURVEY DATA PROVIDED BY A TEAM PROFESSIONAL ASSOCIATES, INC.


2300
2298
2296
2294
2292
2290
2288
2286
2284
0
50
100
150
200
250
HOLIDAY LANE AT LAZY BURRO ROAD



HOLIDAY LANE AT
LAZY BURRO ROAD

N

SCALE 1" = 60

Worksheet
Worksheet for Irregular Channel

HOLLOW LANE AT LAZY BURRO ROAD

Project Description	
Worksheet	JEF-10
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data		
Slope	012600	ft/ft
Discharg	,334.00	cfs

Options	
Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Results		
Mannings Coefficie	0.032	
Water Surface Elev	2,288.89	ft
Elevation Range	34.73 to 2,292.00	
Flow Area	245.6	ft²
Wetted Perimeter	99.78	ft
Top Width	99.39	ft
Actual Depth	4.16	ft
Critical Elevation	2,289.01	ft
Critical Slope	0.010990	ft/ft
Velocity	9.50	ft/s
Velocity Head	1.40	ft
Specific Energy	2,290.29	ft
Froude Number	1.07	
Flow Type	Supercritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+01	1+52	0.032

Natural Channel Points

Station (ft)	Elevation (ft)
0+01	2,291.97
0+39	2,287.56
0+55	2,286.00
0+72	2,284.89
0+80	2,284.73
1+01	2,286.00
1+16	2,287.52
1+52	2,292.00

Table
Rating Table for Irregular Channel

HOLIDAY LANE AT LAZY BURRO ROAD

Project Description

Worksheet	JEF-10
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data

Slope	012600 ft/ft

Options

Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	2,340.00	10.00

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00	2,284.73	0.00	0.0	0.00	0.00
10.00	2,285.16	2.08	4.8	19.15	19.13
20.00	2,285.30	2.51	8.0	23.84	23.80
30.00	2,285.41	2.80	10.7	27.28	27.25
40.00	2,285.50	3.02	13.3	30.11	30.06
50.00	2,285.58	3.20	15.6	32.53	32.48
60.00	2,285.64	3.35	17.9	34.68	34.63
70.00	2,285.70	3.49	20.1	36.62	36.56
80.00	2,285.76	3.61	22.2	38.40	38.34
90.00	2,285.81	3.72	24.2	40.05	39.99
100.00	2,285.86	3.82	26.1	41.60	41.53
110.00	2,285.91	3.92	28.1	43.05	42.98
120.00	2,285.95	4.01	29.9	44.42	44.35
130.00	2,285.99	4.09	31.8	45.72	45.65
140.00	2,286.03	4.18	33.5	46.60	46.52
150.00	2,286.06	4.27	35.1	47.30	47.22
160.00	2,286.09	4.36	36.7	47.98	47.89
170.00	2,286.13	4.44	38.3	48.63	48.54
180.00	2,286.16	4.52	39.8	49.27	49.18
190.00	2,286.19	4.60	41.3	49.89	49.80
200.00	2,286.22	4.67	42.8	50.50	50.40
210.00	2,286.25	4.74	44.3	51.09	50.99
220.00	2,286.28	4.81	45.8	51.66	51.56
230.00	2,286.30	4.87	47.2	52.22	52.12
240.00	2,286.33	4.94	48.6	52.77	52.66
250.00	2,286.36	5.00	50.0	53.31	53.20
260.00	2,286.38	5.06	51.4	53.84	53.72
270.00	2,286.41	5.11	52.8	54.36	54.24
280.00	2,286.43	5.17	54.2	54.86	54.74
290.00	2,286.46	5.22	55.5	55.36	55.24
300.00	2,286.48	5.28	56.9	55.85	55.72
310.00	2,286.51	5.33	58.2	56.33	56.20
320.00	2,286.53	5.38	59.5	56.80	56.67
330.00	2,286.55	5.43	60.8	57.27	57.13

IMPASSABLE

Table
Rating Table for Irregular Channel

HOLIDAY LANE AT LAZY BURRO ROAD

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
340.00	2,286.58	5.47	62.1	57.72	57.59
350.00	2,286.60	5.52	63.4	58.17	58.04
360.00	2,286.62	5.57	64.7	58.62	58.48
370.00	2,286.64	5.61	65.9	59.05	58.91
380.00	2,286.66	5.65	67.2	59.48	59.34
390.00	2,286.68	5.70	68.5	59.91	59.76
400.00	2,286.70	5.74	69.7	60.33	60.18
410.00	2,286.73	5.78	70.9	60.74	60.59
420.00	2,286.75	5.82	72.2	61.15	61.00
430.00	2,286.77	5.86	73.4	61.55	61.40
440.00	2,286.78	5.90	74.6	61.95	61.79
450.00	2,286.80	5.94	75.8	62.34	62.18
460.00	2,286.82	5.97	77.0	62.73	62.57
470.00	2,286.84	6.01	78.2	63.11	62.95
480.00	2,286.86	6.05	79.4	63.49	63.33
490.00	2,286.88	6.08	80.5	63.87	63.70
500.00	2,286.90	6.12	81.7	64.24	64.07
510.00	2,286.92	6.15	82.9	64.60	64.44
520.00	2,286.93	6.19	84.0	64.97	64.80
530.00	2,286.95	6.22	85.2	65.33	65.15
540.00	2,286.97	6.25	86.3	65.68	65.51
550.00	2,286.99	6.29	87.5	66.03	65.86
560.00	2,287.00	6.32	88.6	66.38	66.20
570.00	2,287.02	6.35	89.7	66.73	66.55
580.00	2,287.04	6.38	90.9	67.07	66.89
590.00	2,287.05	6.41	92.0	67.41	67.22
600.00	2,287.07	6.44	93.1	67.74	67.56
610.00	2,287.09	6.47	94.2	68.07	67.89
620.00	2,287.10	6.50	95.3	68.40	68.22
630.00	2,287.12	6.53	96.4	68.73	68.54
640.00	2,287.14	6.56	97.5	69.05	68.86
650.00	2,287.15	6.59	98.6	69.37	69.18
660.00	2,287.17	6.62	99.7	69.69	69.50
670.00	2,287.18	6.65	100.8	70.01	69.81
680.00	2,287.20	6.67	101.9	70.32	70.12
690.00	2,287.21	6.70	103.0	70.63	70.43
700.00	2,287.23	6.73	104.0	70.94	70.74
710.00	2,287.24	6.76	105.1	71.24	71.04
720.00	2,287.26	6.78	106.2	71.54	71.34
730.00	2,287.27	6.81	107.2	71.84	71.64
740.00	2,287.29	6.83	108.3	72.14	71.94
750.00	2,287.30	6.86	109.3	72.44	72.23
760.00	2,287.32	6.88	110.4	72.73	72.52
770.00	2,287.33	6.91	111.4	73.02	72.81
780.00	2,287.35	6.93	112.5	73.31	73.10
790.00	2,287.36	6.96	113.5	73.60	73.39
800.00	2,287.38	6.98	114.6	73.88	73.67
810.00	2,287.39	7.01	115.6	74.17	73.95
820.00	2,287.40	7.03	116.6	74.45	74.23
830.00	2,287.42	7.05	117.7	74.73	74.51
840.00	2,287.43	7.08	118.7	75.01	74.79
850.00	2,287.44	7.10	119.7	75.28	75.06
860.00	2,287.46	7.12	120.7	75.56	75.34
870.00	2,287.47	7.15	121.7	75.83	75.61

Table
Rating Table for Irregular Channel

HOLIDAY LANE AT LAZY BURRO ROAD

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
880.00	2,287.48	7.17	122.7	76.10	75.87
890.00	2,287.50	7.19	123.8	76.37	76.14
900.00	2,287.51	7.21	124.8	76.63	76.41
910.00	2,287.52	7.24	125.8	76.89	76.66
920.00	2,287.54	7.26	126.7	77.13	76.90
930.00	2,287.55	7.28	127.7	77.36	77.13
940.00	2,287.56	7.30	128.7	77.59	77.36
950.00	2,287.57	7.33	129.7	77.80	77.56
960.00	2,287.59	7.35	130.6	78.00	77.77
970.00	2,287.60	7.37	131.6	78.21	77.97
980.00	2,287.61	7.40	132.5	78.41	78.17
990.00	2,287.62	7.42	133.5	78.61	78.38
1,000.00	2,287.64	7.44	134.4	78.82	78.58
1,010.00	2,287.65	7.46	135.4	79.02	78.78
1,020.00	2,287.66	7.48	136.3	79.22	78.97
1,030.00	2,287.67	7.51	137.2	79.42	79.17
1,040.00	2,287.68	7.53	138.2	79.61	79.37
1,050.00	2,287.69	7.55	139.1	79.81	79.56
1,060.00	2,287.71	7.57	140.0	80.01	79.76
1,070.00	2,287.72	7.59	141.0	80.20	79.95
1,080.00	2,287.73	7.61	141.9	80.40	80.14
1,090.00	2,287.74	7.63	142.8	80.59	80.34
1,100.00	2,287.75	7.65	143.7	80.78	80.53
1,110.00	2,287.76	7.67	144.6	80.97	80.72
1,120.00	2,287.78	7.69	145.6	81.16	80.91
1,130.00	2,287.79	7.71	146.5	81.35	81.09
1,140.00	2,287.80	7.73	147.4	81.54	81.28
1,150.00	2,287.81	7.75	148.3	81.73	81.47
1,160.00	2,287.82	7.77	149.2	81.92	81.65
1,170.00	2,287.83	7.79	150.1	82.10	81.84
1,180.00	2,287.84	7.81	151.0	82.29	82.02
1,190.00	2,287.85	7.83	151.9	82.47	82.20
1,200.00	2,287.86	7.85	152.8	82.65	82.39
1,210.00	2,287.88	7.87	153.7	82.84	82.57
1,220.00	2,287.89	7.89	154.6	83.02	82.75
1,230.00	2,287.90	7.91	155.5	83.20	82.93
1,240.00	2,287.91	7.93	156.4	83.38	83.11
1,250.00	2,287.92	7.95	157.3	83.56	83.29
1,260.00	2,287.93	7.97	158.2	83.74	83.46
1,270.00	2,287.94	7.98	159.1	83.92	83.64
1,280.00	2,287.95	8.00	160.0	84.09	83.82
1,290.00	2,287.96	8.02	160.8	84.27	83.99
1,300.00	2,287.97	8.04	161.7	84.45	84.17
1,310.00	2,287.98	8.06	162.6	84.62	84.34
1,320.00	2,287.99	8.07	163.5	84.80	84.51
1,330.00	2,288.00	8.09	164.4	84.97	84.69
1,340.00	2,288.01	8.11	165.2	85.14	84.86
1,350.00	2,288.02	8.13	166.1	85.32	85.03
1,360.00	2,288.03	8.14	167.0	85.49	85.20
1,370.00	2,288.04	8.16	167.9	85.66	85.37
1,380.00	2,288.05	8.18	168.7	85.83	85.54
1,390.00	2,288.06	8.20	169.6	86.00	85.71
1,400.00	2,288.07	8.21	170.4	86.17	85.88
1,410.00	2,288.08	8.23	171.3	86.34	86.04

Table
Rating Table for Irregular Channel

HOLIDAY LANE AT LAZY BURRO ROAD

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
1,420.00	2,288.09	8.25	172.2	86.50	86.21
1,430.00	2,288.10	8.26	173.0	86.67	86.37
1,440.00	2,288.11	8.28	173.9	86.84	86.54
1,450.00	2,288.12	8.30	174.8	87.00	86.70
1,460.00	2,288.13	8.31	175.6	87.17	86.87
1,470.00	2,288.14	8.33	176.5	87.33	87.03
1,480.00	2,288.15	8.35	177.3	87.50	87.20
1,490.00	2,288.16	8.36	178.2	87.66	87.36
1,500.00	2,288.17	8.38	179.0	87.82	87.52
1,510.00	2,288.18	8.40	179.9	87.99	87.68
1,520.00	2,288.19	8.41	180.7	88.15	87.84
1,530.00	2,288.20	8.43	181.6	88.31	88.00
1,540.00	2,288.21	8.44	182.4	88.47	88.16
1,550.00	2,288.22	8.46	183.2	88.63	88.32
1,560.00	2,288.23	8.47	184.1	88.79	88.48
1,570.00	2,288.24	8.49	184.9	88.95	88.64
1,580.00	2,288.25	8.51	185.8	89.11	88.79
1,590.00	2,288.26	8.52	186.6	89.27	88.95
1,600.00	2,288.27	8.54	187.4	89.42	89.11
1,610.00	2,288.28	8.55	188.3	89.58	89.26
1,620.00	2,288.29	8.57	189.1	89.74	89.42
1,630.00	2,288.30	8.58	189.9	89.89	89.57
1,640.00	2,288.30	8.60	190.8	90.05	89.73
1,650.00	2,288.31	8.61	191.6	90.20	89.88
1,660.00	2,288.32	8.63	192.4	90.36	90.03
1,670.00	2,288.33	8.64	193.2	90.51	90.19
1,680.00	2,288.34	8.66	194.1	90.66	90.34
1,690.00	2,288.35	8.67	194.9	90.82	90.49
1,700.00	2,288.36	8.69	195.7	90.97	90.64
1,710.00	2,288.37	8.70	196.5	91.12	90.79
1,720.00	2,288.38	8.72	197.3	91.27	90.94
1,730.00	2,288.39	8.73	198.2	91.42	91.09
1,740.00	2,288.40	8.74	199.0	91.57	91.24
1,750.00	2,288.40	8.76	199.8	91.72	91.39
1,760.00	2,288.41	8.77	200.6	91.87	91.54
1,770.00	2,288.42	8.79	201.4	92.02	91.69
1,780.00	2,288.43	8.80	202.2	92.17	91.83
1,790.00	2,288.44	8.82	203.1	92.32	91.98
1,800.00	2,288.45	8.83	203.9	92.46	92.13
1,810.00	2,288.46	8.84	204.7	92.61	92.27
1,820.00	2,288.47	8.86	205.5	92.76	92.42
1,830.00	2,288.48	8.87	206.3	92.90	92.56
1,840.00	2,288.48	8.89	207.1	93.05	92.71
1,850.00	2,288.49	8.90	207.9	93.20	92.85
1,860.00	2,288.50	8.91	208.7	93.34	93.00
1,870.00	2,288.51	8.93	209.5	93.49	93.14
1,880.00	2,288.52	8.94	210.3	93.63	93.28
1,890.00	2,288.53	8.95	211.1	93.77	93.43
1,900.00	2,288.54	8.97	211.9	93.92	93.57
1,910.00	2,288.54	8.98	212.7	94.06	93.71
1,920.00	2,288.55	8.99	213.5	94.20	93.85
1,930.00	2,288.56	9.01	214.3	94.34	93.99
1,940.00	2,288.57	9.02	215.1	94.49	94.13
1,950.00	2,288.58	9.03	215.9	94.63	94.27

Table
Rating Table for Irregular Channel

HOLIDAY LANE AT LAZY BURRO ROAD

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
1,960.00	2,288.59	9.05	216.7	94.77	94.41
1,970.00	2,288.59	9.06	217.5	94.91	94.55
1,980.00	2,288.60	9.07	218.3	95.05	94.69
1,990.00	2,288.61	9.09	219.0	95.19	94.83
2,000.00	2,288.62	9.10	219.8	95.33	94.97
2,010.00	2,288.63	9.11	220.6	95.47	95.11
2,020.00	2,288.64	9.12	221.4	95.60	95.24
2,030.00	2,288.64	9.14	222.2	95.74	95.38
2,040.00	2,288.65	9.15	223.0	95.88	95.52
2,050.00	2,288.66	9.16	223.8	96.02	95.66
2,060.00	2,288.67	9.17	224.5	96.16	95.79
2,070.00	2,288.68	9.19	225.3	96.29	95.93
2,080.00	2,288.69	9.20	226.1	96.43	96.06
2,090.00	2,288.69	9.21	226.9	96.56	96.20
2,100.00	2,288.70	9.22	227.7	96.70	96.33
2,110.00	2,288.71	9.24	228.4	96.84	96.47
2,120.00	2,288.72	9.25	229.2	96.97	96.60
2,130.00	2,288.73	9.26	230.0	97.10	96.73
2,140.00	2,288.73	9.27	230.8	97.24	96.87
2,150.00	2,288.74	9.29	231.5	97.37	97.00
2,160.00	2,288.75	9.30	232.3	97.51	97.13
2,170.00	2,288.76	9.31	233.1	97.64	97.27
2,180.00	2,288.77	9.32	233.9	97.77	97.40
2,190.00	2,288.77	9.33	234.6	97.91	97.53
2,200.00	2,288.78	9.35	235.4	98.04	97.66
2,210.00	2,288.79	9.36	236.2	98.17	97.79
2,220.00	2,288.80	9.37	236.9	98.30	97.92
2,230.00	2,288.80	9.38	237.7	98.43	98.05
2,240.00	2,288.81	9.39	238.5	98.56	98.18
2,250.00	2,288.82	9.41	239.2	98.69	98.31
2,260.00	2,288.83	9.42	240.0	98.82	98.44
2,270.00	2,288.84	9.43	240.8	98.95	98.57
2,280.00	2,288.84	9.44	241.5	99.08	98.70
2,290.00	2,288.85	9.45	242.3	99.21	98.83
2,300.00	2,288.86	9.46	243.0	99.34	98.95
2,310.00	2,288.87	9.48	243.8	99.47	99.08
2,320.00	2,288.87	9.49	244.6	99.60	99.21
2,330.00	2,288.88	9.50	245.3	99.73	99.34
2,340.00	2,288.89	9.51	246.1	99.85	99.46

AW 100 YR, 6 HR

10 (JEF)

HOLLOWAY LANE AT LAZY BURRO FUTURE ROAD

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1*************************************
 *                                   *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
 *              JUN  1998            *
 *           VERSION 4.1             *
 *                                   *
 *  RUN DATE   27NOV02  TIME  08:23:52  *
 *                                   *
 *************************************
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*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*           (916) 756-1104          *
*                                   *
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X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X               X
XXXXXXX  XXXX     X       XXXXX   X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX         XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

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

1 HEC-1 INPUT PAGE 1

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

  1           ID   ANDORA HILLS WASH FUTURE CONDITIONS
  2           ID
  3           ID    100-YEAR 6-HOUR MODEL  FILENAME: AW1006F.DAT
  4           ID      MODIFIED BY JEF, INC. FOR CAREFREE AREA DRAINAGE MASTER PLAN
  5           ID      MODIFICATIONS INCLUDE:
  6           ID      1)  CHANGES TO WATERSHED DELINATION BETWEEN S320 AND S340L
  7           ID          EXAMINATION OF AERIAL PHOTOGRAPHS REVEALED AREA WITHIN
  8           ID          S320 THAT ACTUALLY FLOWS THROUGH S340L NEAR THE SW CORNER
  9           ID          OF S340L OFF THE BLACK MOUNTAIN HILLS.
 10           ID      2)  ADDITION OF NEW COMBINATION BLOCKS TO SEPARATE COMBINATIONS WITH
 11           ID          MORE THAN TWO HYDROGRAPHS IN THE ORIGINAL MODEL.
 12           ID      3)  FUTURE CONDITIONS LAND USE INTERPRETED FROM FUTURE LAND USE IN
 13           ID          CAVE CREEK WATERCOURSE MASTER PLAN BY TETRA TECH, 2001
 14           ID
 15           ID    BASED ON:
 16           ID
 17           ID        Cave Creek Above Carefree Highway FPD Study       File: AW100-6.IH1
 18           ID          by  GVSCE for Maricopa County FCD 95-28    Original: 06-17-96     mcg
 19           ID          Project:           84                       Revised:
 20           ID
 21           ID        Andora Hills Wash sub-watershed model
 22           ID          100-year, 6-hr rainfall with FCDMC Design Manual distribution
 23           ID          Green & Ampt Loss Rate Method
 24           ID          NMIN = 2
 25           ID          Clark Unit Hydrograph
 26           ID          Modified Puls, normal depth channel routing
              *
              *
              *
 27           IT       2                     900
 28           IO       5       2
 29           IN      15
              *
              *DIAGRAM
              *
              *  Depth-Area reduction factors taken from Table 2.2 of FCDMC Design Manual
              *
              *  6-hr rainfall distributions per Table 2.4 and Figure 2.17 of Design Manual
              *
 30           JD    3.40    0.01
 31           PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
 32           PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
 33           PC   0.962   0.972   0.983   0.991   1.000
 34           JD    3.38    0.50
 35           JD    3.30    2.80
 36           PC   0.000   0.009   0.016   0.025   0.034   0.042   0.051   0.059   0.067   0.076
 37           PC   0.087   0.100   0.120   0.163   0.252   0.451   0.694   0.837   0.900   0.938
 38           PC   0.950   0.963   0.975   0.988   1.000
              *
              *
```

1 HEC-1 INPUT PAGE 2

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

 39           KK    S320
 40           KM   SUB-BASIN AHW1
```

HOLIDAY LANE AT LAZY BURRO ROAD

```
  20548 8950          .         .         .         .         .         .         .         .         .         .         .         .
  20550 8960          .         .         .         .         .         .         .         .         .         .         .         .
  20552 8970          .         .         .         .         .         .         .         .         .         .         .         .
  20554 8980          .         .         .         .         .         .         .         .         .         .         .         .
  20556 8990          .         .         .         .         .         .         .         .         .         .         .         .
  20558 9000---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
1
1                                                  STATION     C350

                          (O) OUTFLOW
         0.       400.      800.      1200.     1600.     2000.     2400.       0.        0.        0.        0.        0.        0.
 DAHRMN PER
  10000   10---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
  10002   20          .         .         .         .         .         .         .         .         .         .         .         .
  10004   30          .         .         .         .         .         .         .         .         .         .         .         .
  10006   40          .         .         .         .         .         .         .         .         .         .         .         .
  10008   50          .         .         .         .         .         .         .         .         .         .         .         .
  10010   60          .         .         .         .         .         .         .         .         .         .         .         .
  10012   70          .         .         .         .         .         .         .         .         .         .         .         .
  10014   80          .         .         .         .         .         .         .         .         .         .         .         .
  10016   90          .         .         .         .         .         .         .         .         .         .         .         .
  10018  100          .         .         .         .         .         .         .         .         .         .         .         .
  10020  110 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10022  120          .         .         .         .         .         .         .         .         .         .         .         .
  10024  130          .         .         .         .         .         .         .         .         .         .         .         .
  10026  140          .         .         .         .         .         .         .         .         .         .         .         .
  10028  150          .         .         .         .         .         .         .         .         .         .         .         .
  10030  160          .         .         .         .         .         .         .         .         .         .         .         .
  10032  170          .         .         .         .         .         .         .         .         .         .         .         .
  10034  180          .         .         .         .         .         .         .         .         .         .         .         .
  10036  190          .         .         .         .         .         .         .         .         .         .         .         .
  10038  200          .         .         .         .         .         .         .         .         .         .         .         .
  10040  210 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10042  220          .         .         .         .         .         .         .         .         .         .         .         .
  10044  230          .         .         .         .         .         .         .         .         .         .         .         .
  10046  240          .         .         .         .         .         .         .         .         .         .         .         .
  10048  250          .         .         .         .         .         .         .         .         .         .         .         .
  10050  260          .         .         .         .         .         .         .         .         .         .         .         .
  10052  270          .         .         .         .         .         .         .         .         .         .         .         .
  10054  280          .         .         .         .         .         .         .         .         .         .         .         .
  10056  290          .         .         .         .         .         .         .         .         .         .         .         .
  10058  300          .         .         .         .         .         .         .         .         .         .         .         .
  10100  310 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10102  320          .         .         .         .         .         .         .         .         .         .         .         .
  10104  33.0         .         .         .         .         .         .         .         .         .         .         .         .
  10106  34.0         .         .         .         .         .         .         .         .         .         .         .         .
  10108  35.0         .         .         .         .         .         .         .         .         .         .         .         .
  10110  36.0         .         .         .         .         .         .         .         .         .         .         .         .
  10112  37.0         .         .         .         .         .         .         .         .         .         .         .         .
  10114  38.0         .         .         .         .         .         .         .         .         .         .         .         .
  10116  39.0         .         .         .         .         .         .         .         .         .         .         .         .
  10118  40.0         .         .         .         .         .         .         .         .         .         .         .         .
  10120  41.0. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10122  42.0         .         .         .         .         .         .         .         .         .         .         .         .
  10124  43.0         .         .         .         .         .         .         .         .         .         .         .         .
  10126  44.0         .         .         .         .         .         .         .         .         .         .         .         .
  10128  45.0         .         .         .         .         .         .         .         .         .         .         .         .
  10130  46.0         .         .         .         .         .         .         .         .         .         .         .         .
  10132  47.0         .         .         .         .         .         .         .         .         .         .         .         .
  10134  48.0         .         .         .         .         .         .         .         .         .         .         .         .
  10136  49.0         .         .         .         .         .         .         .         .         .         .         .         .
  10138  50.0         .         .         .         .         .         .         .         .         .         .         .         .
  10140  51.0. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10142  52.0         .         .         .         .         .         .         .         .         .         .         .         .
  10144  53.0         .         .         .         .         .         .         .         .         .         .         .         .
  10146  54.0         .         .         .         .         .         .         .         .         .         .         .         .
  10148  55.0         .         .         .         .         .         .         .         .         .         .         .         .
  10150  56.0         .         .         .         .         .         .         .         .         .         .         .         .
  10152  57.0         .         .         .         .         .         .         .         .         .         .         .         .
  10154  58.0         .         .         .         .         .         .         .         .         .         .         .         .
  10156  59.0         .         .         .         .         .         .         .         .         .         .         .         .
  10158  60.0         .         .         .         .         .         .         .         .         .         .         .         .
  10200  61.0. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10202  62.0         .         .         .         .         .         .         .         .         .         .         .         .
  10204  63.0         .         .         .         .         .         .         .         .         .         .         .         .
  10206  64.0         .         .         .         .         .         .         .         .         .         .         .         .
  10208  65.0         .         .         .         .         .         .         .         .         .         .         .         .
  10210  66.0         .         .         .         .         .         .         .         .         .         .         .         .
  10212  67.0         .         .         .         .         .         .         .         .         .         .         .         .
  10214  68.0         .         .         .         .         .         .         .         .         .         .         .         .
  10216  69.0         .         .         .         .         .         .         .         .         .         .         .         .
  10218  70.0         .         .         .         .         .         .         .         .         .         .         .         .
  10220  71.0. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10222  72.0         .         .         .         .         .         .         .         .         .         .         .         .
  10224  73.0         .         .         .         .         .         .         .         .         .         .         .         .
  10226  74.0         .         .         .         .         .         .         .         .         .         .         .         .
  10228  75.0         .         .         .         .         .         .         .         .         .         .         .         .
  10230  76.0         .         .         .         .         .         .         .         .         .         .         .         .
  10232  77.0         .         .         .         .         .         .         .         .         .         .         .         .
  10234  78.0         .         .         .         .         .         .         .         .         .         .         .         .
  10236  79.0         .         .         .         .         .         .         .         .         .         .         .         .
  10238  80.0         .         .         .         .         .         .         .         .         .         .         .         .
  10240  81.0. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10242  82.0         .         .         .         .         .         .         .         .         .         .         .         .
  10244  83.0         .         .         .         .         .         .         .         .         .         .         .         .
```

HOLIDAY LANE AT LAZY BURRO DRIVE

400 800

10246	84.0
10248	85.0
10250	86.0
10252	87.0
10254	88.0
10256	89.0
10258	90.0
10300	91.0
10302	92.0
10304	93.0
10306	94.0
10308	95.0
10310	96.0
10312	97.0
10314	98.0
10316	99.0
10318	100.0
10320	101.
10322	102.
10324	103.
10326	104.
10328	105.
10330	106.
10332	107.
10334	108.
10336	109.
10338	110.
10340	111.
10342	112.
10344	113.
10346	114.
10348	115.
10350	116.
10352	117.
10354	118.
10356	119.
10358	120.
10400	121.
10402	122.
10404	123.
10406	124.
10408	125.
10410	126.
10412	127.
10414	128.
10416	129.
10418	130.
10420	131.
10422	132.
10424	133.
10426	134.
10428	135.
10430	136.
10432	137.
10434	138.
10436	139.
10438	140.
10440	141.
10442	142.
10444	143.
10446	144.
10448	145.
10450	146.
10452	147.
10454	148.
10456	149.
10458	150.
10500	151.
10502	152.
10504	153.
10506	154.
10508	155.
10510	156.
10512	157.
10514	158.
10516	159.
10518	160.
10520	161.
10522	162.0
10524	163.0
10526	164.0
10528	165.0
10530	166.0
10532	167.0
10534	168.0
10536	169.0
10538	170.0
10540	171.0
10542	172.0
10544	173.0
10546	174.0
10548	175.0
10550	176.0
10552	177.0
10554	178.0

112 MIN

IMPASSABLE FLOW = 75 CFS

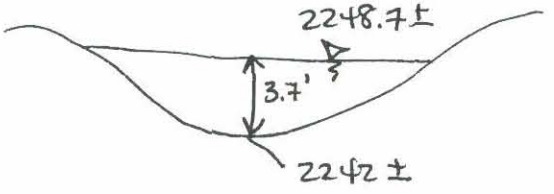
Military Road at Town Boundary with Cave Creek (JEF #13)

Carefree Drainage Master Plan
Dip Crossing Notes

ID Number: JEF #13

Source of Data: Floodplain Delineation Study of Andora Hills & Galloway Washes, June 2001, preliminary (attached)

Location: Military Road at Town Boundary w/ Cave Creek



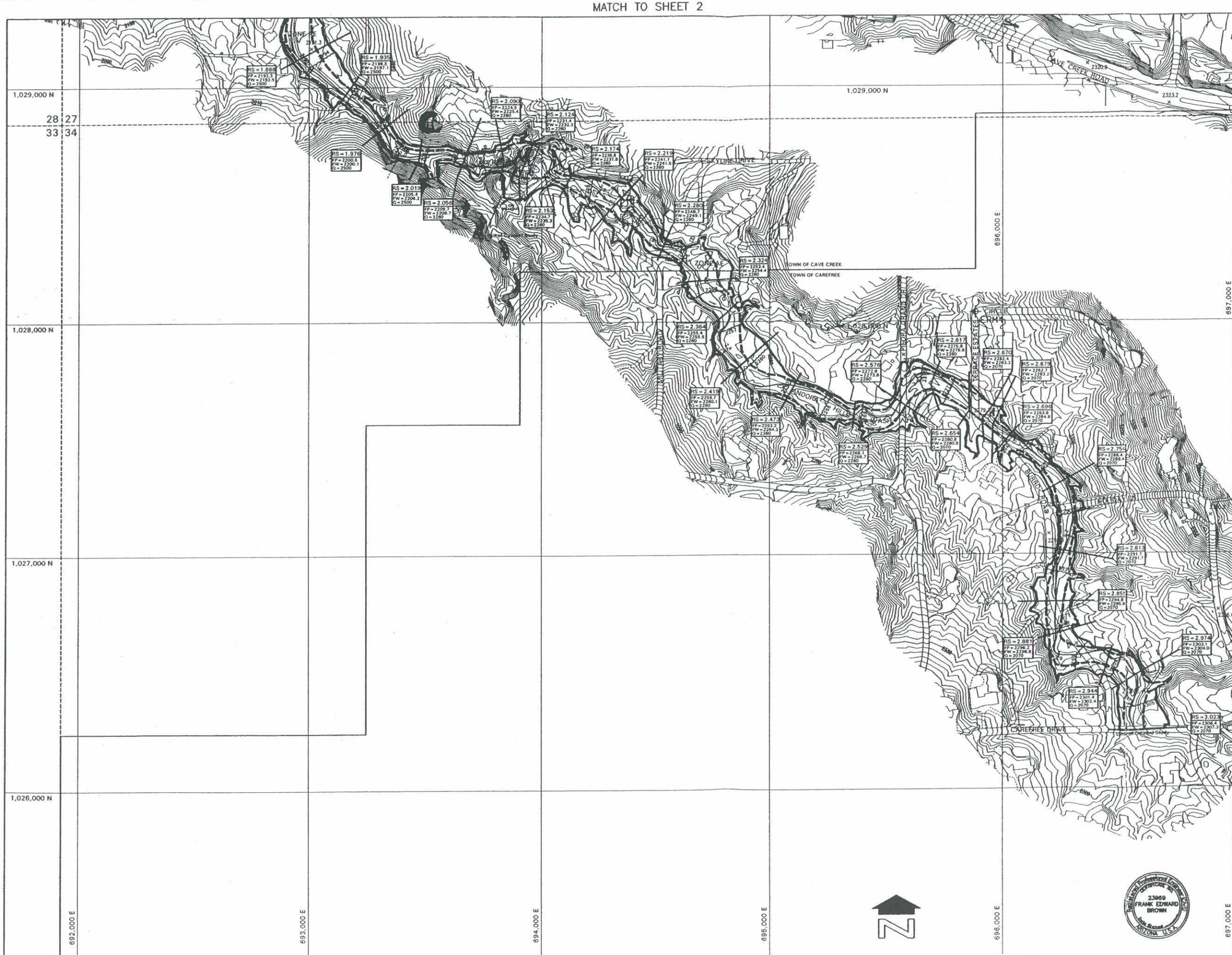
Profile View

Material: road is dirt @ wash crossing

Protection: none

Notes: Impassable during 100-yr.

MATCH TO SHEET 2



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOODPLAIN DELINEATION STUDY OF ANDORA HILLS & GALLOWAY WASHES FCD 99-14

JUNE, 2001

LEGEND

100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	1.2 1.3
CROSS SECTION	RS = 0.300 FP = 2061.6 FW = 2061.5 Q = 13,700
ELEVATION REFERENCE MARK	ERM 4
BASE FLOOD ELEVATIONS	2080
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	TOWN OF CAVECREEK
SECTION LINE	

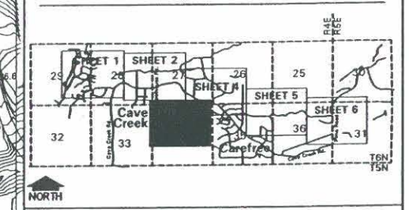
ELEVATION REFERENCE MARKS

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
ERM 4	2290.43	BC IN C/L OF TERRACE ESTATES CIRCLE, APPROXIMATELY 1000 FEET NORTH OF INTERSECTION OF BURRO ROAD AND HOLIDAY LANE, S34, T8N, R4E (N1028038.58, E695882.82)

NOTES

1. THE HYDRAULIC BASE LINE IS CROSS SECTION STATION 10,000 UNLESS NOTED OTHERWISE.
2. HORIZONTAL PROJECTION IS ARIZONA STATEPLANE, CENTRAL ZONE, NORTH AMERICAN DATUM OF 1983.
3. ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929. CONVERSION FACTOR: 1988 NGVD = 2.05 + 1929 NGVD

INDEX MAP



200 0' 200 400

SCALE: 1" = 200 FEET

CONTOUR INTERVAL = 2 FEET

REGISTERED LAND SURVEYOR
CERTIFICATE NO. 24530
DAVID A. RHINE
ARIZONA, U.S.A.

Registered Professional Engineer (Civil)
CERTIFICATE NO. 23969
FRANK EDWARD BROWN
ARIZONA, U.S.A.

JE FULLER
HYDROLOGY & GEOMORPHOLOGY, INC.
in association with
DIBBLE & ASSOCIATES
CONSULTING ENGINEERS

SHEET 3 OF 8

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS FOR 1" = 200' HORIZONTAL SCALE AND 2' CONTOUR INTERVALS. FLIGHT DATE: 9/30/99

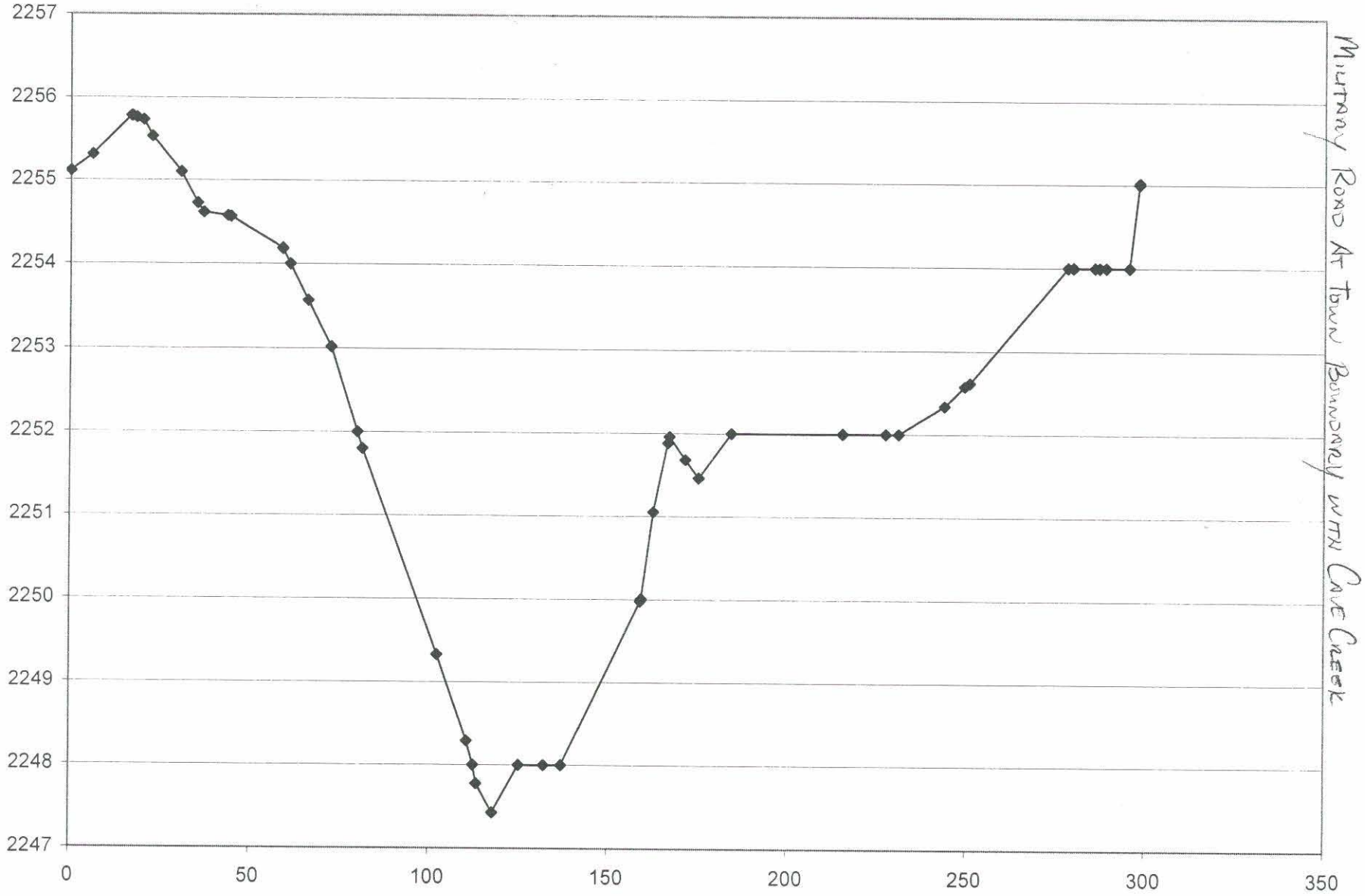
M&B AERIAL MAPPING COMPANY, LLC

GROUND CONTROL SURVEY DATA PROVIDED BY A TEAM PROFESSIONAL ASSOCIATES, INC.

MILITARY ROAD AT TOWN BOUNDARY
WITH CAVE CREEK

N

SCALE 1" = 60'


2257
2256
2255
2254
2253
2252
2251
2250
2249
2248
2247
0
50
100
150
200
250
300
350
MILITARY ROAD AT TOWN BOUNDARY WITH CAVE CREEK

Worksheet
Worksheet for Irregular Channel

MILITARY ROAD AT TOWN BOUNDARY WITH CAVE CREEK

Project Description	
Worksheet	JEF-13
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data		
Slope	018600	ft/ft
Discharg	,456.00	cfs

Options	
Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Results		
Mannings Coefficie	0.032	
Water Surface Elev	2,251.60	ft
Elevation Range	17.40 to 2,252.00	
Flow Area	209.1	ft²
Wetted Perimeter	82.78	ft
Top Width	82.21	ft
Actual Depth	4.20	ft
Critical Elevation	2,252.12	ft
Critical Slope	0.010587	ft/ft
Velocity	11.75	ft/s
Velocity Head	2.14	ft
Specific Energy	2,253.74	ft
Froude Number	1.30	
Flow Type	Supercritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+80	1+67	0.032

Natural Channel Points

Station (ft)	Elevation (ft)
0+80	2,252.00
1+13	2,247.80
1+17	2,247.40
1+25	2,248.00
1+37	2,248.00
1+59	2,250.00
1+67	2,252.00

Table
Rating Table for Irregular Channel

MILITARY ROAD AT TOWN BOUNDARY WITH CAVE CREEK

Project Description

Worksheet	JEF-13
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data

Slope 018600 ft/ft

Options

Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	2,500.00	10.00

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00	2,247.40	0.00	0.0	0.00	0.00
10.00	2,247.96	2.74	3.6	12.80	12.75
20.00	2,248.13	2.64	7.6	28.04	27.97
30.00	2,248.21	3.04	9.9	29.55	29.47
40.00	2,248.28	3.36	11.9	30.85	30.76
50.00	2,248.34	3.62	13.8	32.00	31.91
60.00	2,248.39	3.84	15.6	33.05	32.96
70.00	2,248.44	4.04	17.3	34.03	33.92
80.00	2,248.49	4.22	19.0	34.93	34.82
90.00	2,248.54	4.38	20.6	35.79	35.67
100.00	2,248.58	4.52	22.1	36.60	36.48
110.00	2,248.62	4.66	23.6	37.37	37.24
120.00	2,248.66	4.79	25.1	38.10	37.98
130.00	2,248.69	4.91	26.5	38.81	38.68
140.00	2,248.73	5.02	27.9	39.49	39.35
150.00	2,248.77	5.13	29.3	40.14	40.00
160.00	2,248.80	5.23	30.6	40.77	40.63
170.00	2,248.83	5.33	31.9	41.39	41.24
180.00	2,248.86	5.42	33.2	41.98	41.83
190.00	2,248.89	5.51	34.5	42.56	42.41
200.00	2,248.92	5.59	35.8	43.12	42.97
210.00	2,248.95	5.67	37.0	43.67	43.51
220.00	2,248.98	5.75	38.3	44.21	44.04
230.00	2,249.01	5.83	39.5	44.73	44.56
240.00	2,249.03	5.90	40.7	45.24	45.07
250.00	2,249.06	5.97	41.9	45.74	45.57
260.00	2,249.09	6.04	43.0	46.22	46.05
270.00	2,249.11	6.11	44.2	46.70	46.53
280.00	2,249.14	6.17	45.4	47.17	46.99
290.00	2,249.16	6.23	46.5	47.63	47.45
300.00	2,249.18	6.30	47.7	48.08	47.90
310.00	2,249.21	6.35	48.8	48.53	48.34
320.00	2,249.23	6.41	49.9	48.96	48.77
330.00	2,249.25	6.47	51.0	49.39	49.20

IMPASSABLE

Table
Rating Table for Irregular Channel

MILITARY ROAD AT TOWN BOUNDARY WITH CAVE CREEK

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
880.00	2,250.15	8.56	102.8	65.39	65.09
890.00	2,250.16	8.59	103.6	65.54	65.24
900.00	2,250.18	8.62	104.4	65.68	65.38
910.00	2,250.19	8.65	105.2	65.83	65.52
920.00	2,250.20	8.68	105.9	65.97	65.66
930.00	2,250.21	8.71	106.7	66.12	65.80
940.00	2,250.22	8.74	107.5	66.26	65.94
950.00	2,250.24	8.77	108.3	66.40	66.08
960.00	2,250.25	8.80	109.1	66.54	66.22
970.00	2,250.26	8.83	109.8	66.68	66.36
980.00	2,250.27	8.86	110.6	66.82	66.50
990.00	2,250.28	8.89	111.4	66.96	66.64
1,000.00	2,250.29	8.92	112.1	67.10	66.77
1,010.00	2,250.31	8.95	112.9	67.24	66.91
1,020.00	2,250.32	8.97	113.7	67.37	67.04
1,030.00	2,250.33	9.00	114.4	67.51	67.18
1,040.00	2,250.34	9.03	115.2	67.65	67.31
1,050.00	2,250.35	9.06	115.9	67.78	67.44
1,060.00	2,250.36	9.08	116.7	67.92	67.57
1,070.00	2,250.37	9.11	117.4	68.05	67.71
1,080.00	2,250.38	9.14	118.2	68.18	67.84
1,090.00	2,250.39	9.16	118.9	68.31	67.97
1,100.00	2,250.41	9.19	119.7	68.45	68.10
1,110.00	2,250.42	9.22	120.4	68.58	68.23
1,120.00	2,250.43	9.24	121.2	68.71	68.36
1,130.00	2,250.44	9.27	121.9	68.84	68.49
1,140.00	2,250.45	9.30	122.6	68.97	68.61
1,150.00	2,250.46	9.32	123.4	69.10	68.74
1,160.00	2,250.47	9.35	124.1	69.23	68.87
1,170.00	2,250.48	9.37	124.8	69.36	68.99
1,180.00	2,250.49	9.40	125.6	69.48	69.12
1,190.00	2,250.50	9.42	126.3	69.61	69.24
1,200.00	2,250.51	9.45	127.0	69.74	69.37
1,210.00	2,250.52	9.47	127.8	69.86	69.49
1,220.00	2,250.53	9.50	128.5	69.99	69.62
1,230.00	2,250.54	9.52	129.2	70.11	69.74
1,240.00	2,250.55	9.54	129.9	70.24	69.86
1,250.00	2,250.56	9.57	130.7	70.36	69.98
1,260.00	2,250.58	9.59	131.4	70.48	70.10
1,270.00	2,250.59	9.61	132.1	70.61	70.23
1,280.00	2,250.60	9.64	132.8	70.73	70.35
1,290.00	2,250.61	9.66	133.5	70.85	70.47
1,300.00	2,250.62	9.68	134.2	70.97	70.59
1,310.00	2,250.63	9.71	134.9	71.09	70.71
1,320.00	2,250.64	9.73	135.6	71.22	70.82
1,330.00	2,250.65	9.75	136.4	71.34	70.94
1,340.00	2,250.66	9.78	137.1	71.46	71.06
1,350.00	2,250.67	9.80	137.8	71.58	71.18
1,360.00	2,250.68	9.82	138.5	71.69	71.30
1,370.00	2,250.69	9.84	139.2	71.81	71.41
1,380.00	2,250.70	9.87	139.9	71.93	71.53
1,390.00	2,250.70	9.89	140.6	72.05	71.64
1,400.00	2,250.71	9.91	141.3	72.17	71.76
1,410.00	2,250.72	9.93	142.0	72.28	71.87

Table
Rating Table for Irregular Channel

MILITARY ROAD AT TOWN BOUNDARY WITH COVE CREEK

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
1,960.00	2,251.21	10.98	178.5	78.16	77.67
1,970.00	2,251.22	11.00	179.1	78.26	77.76
1,980.00	2,251.23	11.02	179.8	78.36	77.86
1,990.00	2,251.24	11.03	180.4	78.46	77.96
2,000.00	2,251.25	11.05	181.0	78.56	78.05
2,010.00	2,251.25	11.06	181.7	78.65	78.15
2,020.00	2,251.26	11.08	182.3	78.75	78.24
2,030.00	2,251.27	11.10	182.9	78.85	78.34
2,040.00	2,251.28	11.11	183.5	78.95	78.43
2,050.00	2,251.29	11.13	184.2	79.04	78.53
2,060.00	2,251.29	11.15	184.8	79.14	78.62
2,070.00	2,251.30	11.16	185.4	79.23	78.72
2,080.00	2,251.31	11.18	186.1	79.33	78.81
2,090.00	2,251.32	11.20	186.7	79.43	78.91
2,100.00	2,251.33	11.21	187.3	79.52	79.00
2,110.00	2,251.33	11.23	187.9	79.62	79.10
2,120.00	2,251.34	11.24	188.6	79.71	79.19
2,130.00	2,251.35	11.26	189.2	79.81	79.28
2,140.00	2,251.36	11.27	189.8	79.90	79.38
2,150.00	2,251.36	11.29	190.4	79.99	79.47
2,160.00	2,251.37	11.31	191.0	80.09	79.56
2,170.00	2,251.38	11.32	191.7	80.18	79.65
2,180.00	2,251.39	11.34	192.3	80.28	79.74
2,190.00	2,251.40	11.35	192.9	80.37	79.84
2,200.00	2,251.40	11.37	193.5	80.46	79.93
2,210.00	2,251.41	11.38	194.1	80.56	80.02
2,220.00	2,251.42	11.40	194.8	80.65	80.11
2,230.00	2,251.43	11.41	195.4	80.74	80.20
2,240.00	2,251.43	11.43	196.0	80.83	80.29
2,250.00	2,251.44	11.44	196.6	80.93	80.38
2,260.00	2,251.45	11.46	197.2	81.02	80.47
2,270.00	2,251.46	11.47	197.8	81.11	80.56
2,280.00	2,251.46	11.49	198.4	81.20	80.65
2,290.00	2,251.47	11.50	199.0	81.29	80.74
2,300.00	2,251.48	11.52	199.7	81.38	80.83
2,310.00	2,251.49	11.53	200.3	81.47	80.92
2,320.00	2,251.50	11.55	200.9	81.56	81.01
2,330.00	2,251.50	11.56	201.5	81.65	81.10
2,340.00	2,251.51	11.58	202.1	81.74	81.19
2,350.00	2,251.52	11.59	202.7	81.83	81.28
2,360.00	2,251.52	11.61	203.3	81.92	81.37
2,370.00	2,251.53	11.62	203.9	82.01	81.46
2,380.00	2,251.54	11.64	204.5	82.10	81.54
2,390.00	2,251.55	11.65	205.1	82.19	81.63
2,400.00	2,251.55	11.67	205.7	82.28	81.72
2,410.00	2,251.56	11.68	206.3	82.37	81.81
2,420.00	2,251.57	11.69	206.9	82.46	81.89
2,430.00	2,251.58	11.71	207.5	82.55	81.98
2,440.00	2,251.58	11.72	208.1	82.64	82.07
2,450.00	2,251.59	11.74	208.7	82.72	82.15
2,460.00	2,251.60	11.75	209.3	82.81	82.24
2,470.00	2,251.61	11.77	209.9	82.90	82.33
2,480.00	2,251.61	11.78	210.5	82.99	82.41
2,490.00	2,251.62	11.79	211.1	83.07	82.50

AW 100 YR, 6 HR
FUTURE
MILITARY ROAD AT TOWN BOUNDARY WITH CAVE CREEK

15 (JEF)

```
1*************************************
*                                   *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN  1998            *
*            VERSION 4.1            *
*                                   *
*  RUN DATE   27NOV02  TIME  08:23:52  *
*                                   *
*************************************
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*************************************
*                                   *
*   U.S. ARMY CORPS OF ENGINEERS    *
*   HYDROLOGIC ENGINEERING CENTER   *
*         609 SECOND STREET         *
*      DAVIS, CALIFORNIA 95616      *
*          (916) 756-1104           *
*                                   *
*************************************
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X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
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X     X  XXXXXXX   XXXXX         XXX
```

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

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

```
1                                   HEC-1 INPUT                                          PAGE  1

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

    1           ID   ANDORA HILLS WASH FUTURE CONDITIONS
    2           ID
    3           ID    100-YEAR 6-HOUR MODEL  FILENAME: AW1006F.DAT
    4           ID      MODIFIED BY JEF, INC. FOR CAREFREE AREA DRAINAGE MASTER PLAN
    5           ID      MODIFICATIONS INCLUDE:
    6           ID      1)  CHANGES TO WATERSHED DELINATION BETWEEN S320 AND S340L
    7           ID          EXAMINATION OF AERIAL PHOTOGRAPHS REVEALED AREA WITHIN
    8           ID          S320 THAT ACTUALLY FLOWS THROUGH S340L NEAR THE SW CORNER
    9           ID          OF S340L OFF THE BLACK MOUNTAIN HILLS.
   10           ID      2)  ADDITION OF NEW COMBINATION BLOCKS TO SEPARATE COMBINATIONS WITH
   11           ID          MORE THAN TWO HYDROGRAPHS IN THE ORIGINAL MODEL.
   12           ID      3)  FUTURE CONDITIONS LAND USE INTERPRETED FROM FUTURE LAND USE IN
   13           ID          CAVE CREEK WATERCOURSE MASTER PLAN BY TETRA TECH, 2001
   14           ID
   15           ID    BASED ON:
   16           ID
   17           ID        Cave Creek Above Carefree Highway FPD Study       File: AW100-6.IH1
   18           ID          by  GVSCE for Maricopa County FCD 95-28    Original: 06-17-96     mcg
   19           ID          Project:          84                        Revised:
   20           ID
   21           ID         Andora Hills Wash sub-watershed model
   22           ID           100-year, 6-hr rainfall with FCDMC Design Manual distribution
   23           ID           Green & Ampt Loss Rate Method
   24           ID           NMIN = 2
   25           ID           Clark Unit Hydrograph
   26           ID           Modified Puls, normal depth channel routing
                *
                *
                *
   27           IT       2                    900
   28           IO       5       2
   29           IN      15
                *
                *DIAGRAM
                *
                *  Depth-Area reduction factors taken from Table 2.2 of FCDMC Design Manual
                *
                *  6-hr rainfall distributions per Table 2.4 and Figure 2.17 of Design Manual
                *
   30           JD    3.40    0.01
   31           PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
   32           PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
   33           PC   0.962   0.972   0.983   0.991   1.000
   34           JD    3.38    0.50
   35           JD    3.30    2.80
   36           PC   0.000   0.009   0.016   0.025   0.034   0.042   0.051   0.059   0.067   0.076
   37           PC   0.087   0.100   0.120   0.163   0.252   0.451   0.694   0.837   0.900   0.938
   38           PC   0.950   0.963   0.975   0.988   1.000
                *
                *
1                                   HEC-1 INPUT                                          PAGE  2

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

   39           KK    S320
   40           KM   SUB-BASIN AHW1
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MILITARY ROAD AT TOWN BOUNDARY WITH CAVE CREEK

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 20548 8950
 20550 8960
 20552 8970
 20554 8980
 20556 8990
 20558 9000---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
1
1                                                   STATION     C350

                          (O) OUTFLOW
          0.      400.      800.     1200.     1600.     2000.     2400.       0.       0.       0.       0.       0.       0.
DAHRMN PER
 10000   10---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
 10002   20
 10004   30
 10006   40
 10008   50
 10010   60
 10012   70
 10014   80
 10016   90
 10018  100
 10020  110
 10022  120
 10024  130
 10026  140
 10028  150
 10030  160
 10032  170
 10034  180
 10036  190
 10038  200
 10040  210
 10042  220
 10044  230
 10046  240
 10048  250
 10050  260
 10052  270
 10054  280
 10056  290
 10058  300
 10100  310
 10102  320
 10104  33.0
 10106  34.0
 10108  35.0
 10110  36.0
 10112  37.0
 10114  38.0
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 10120  41.0
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 10230  76.0
 10232  77.0
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 10236  79.0
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 10244  83.0
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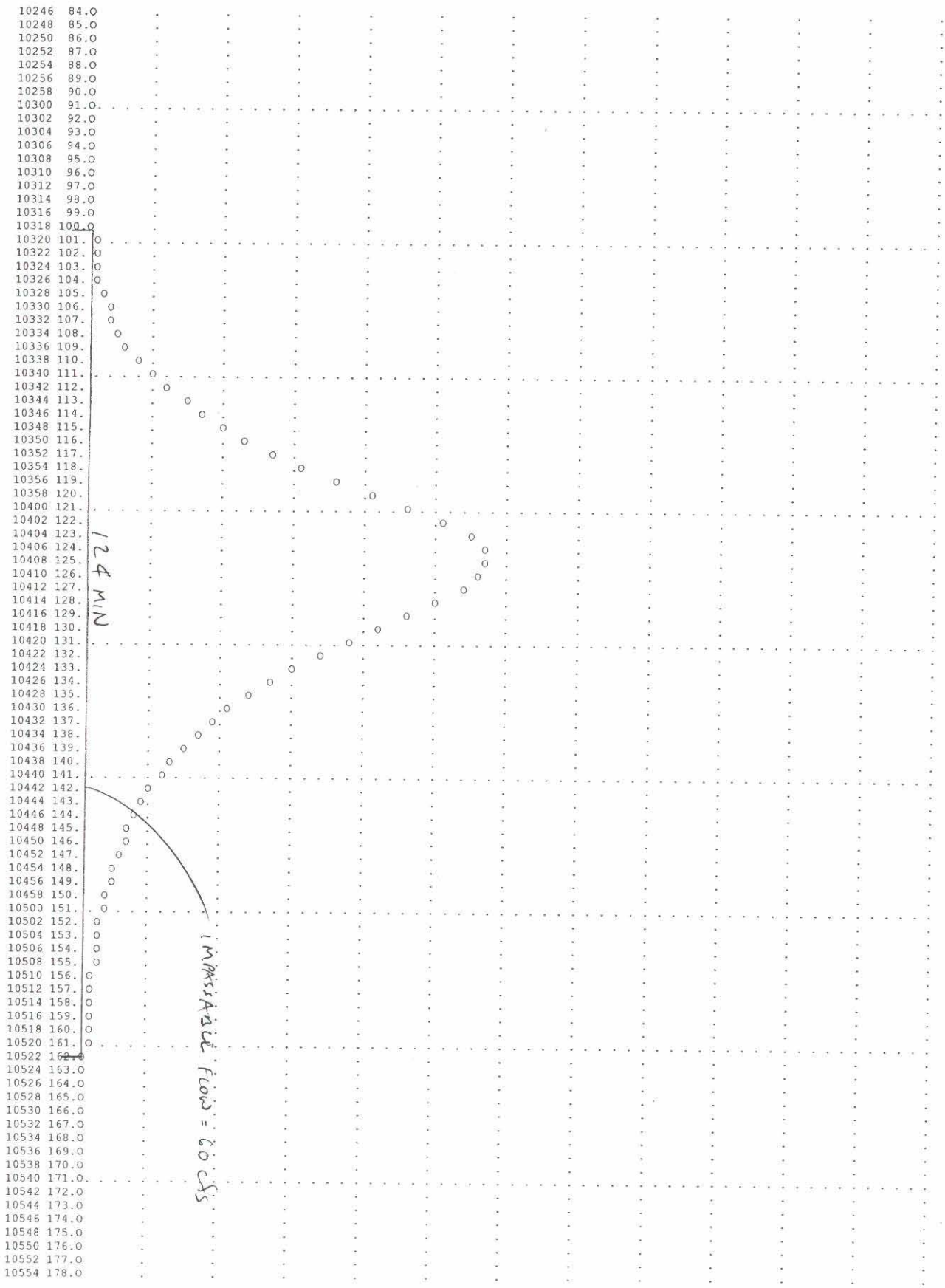
MILITARY ROAD AT TOWN BOUNDARY WITH CAVE CREEK

400



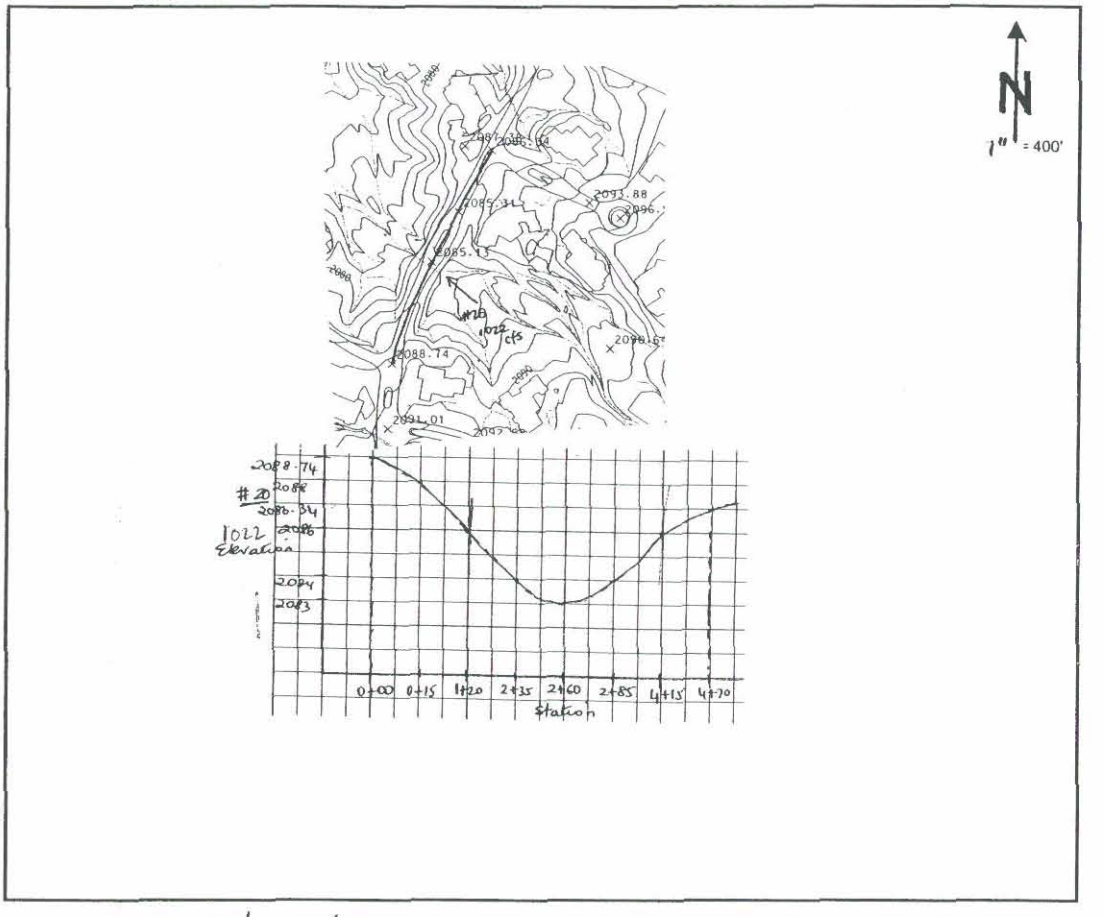
Carefree Mountain Drive (#20)

Carefree Drainage Master Plan
Crossing Notes

ID Number: #20

Source of Data:

Location: CAREFREE MOUNTAIN DR



Material: 2- 8' x 3' RCB

Protection: YES - STANDARD W/ WINGWALLS

Notes: SEE ATTACHED GRADING PLAN

Culvert No. 20

SCALE: 1" = 100'

0 100 200 300

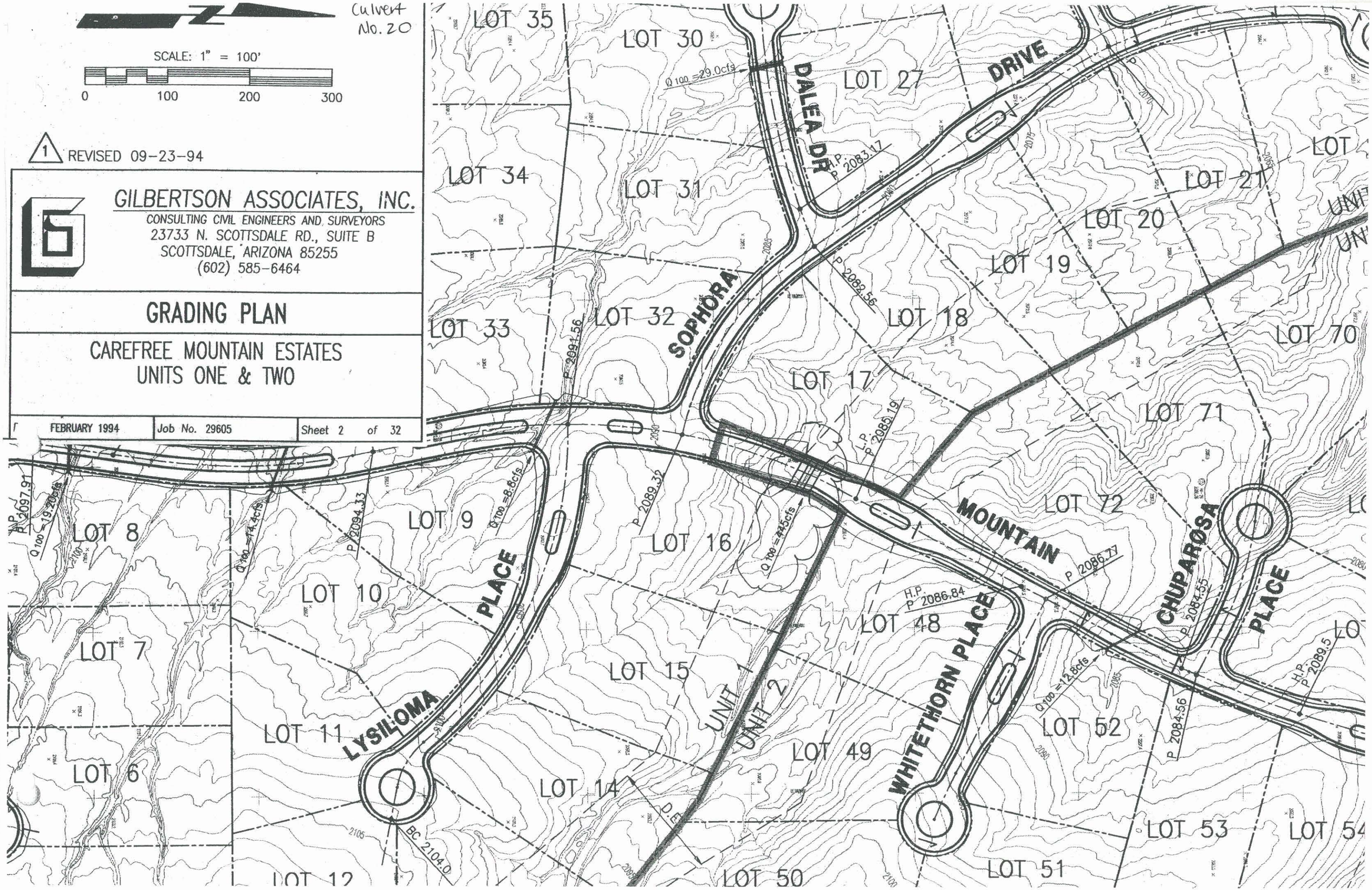
1 REVISED 09-23-94

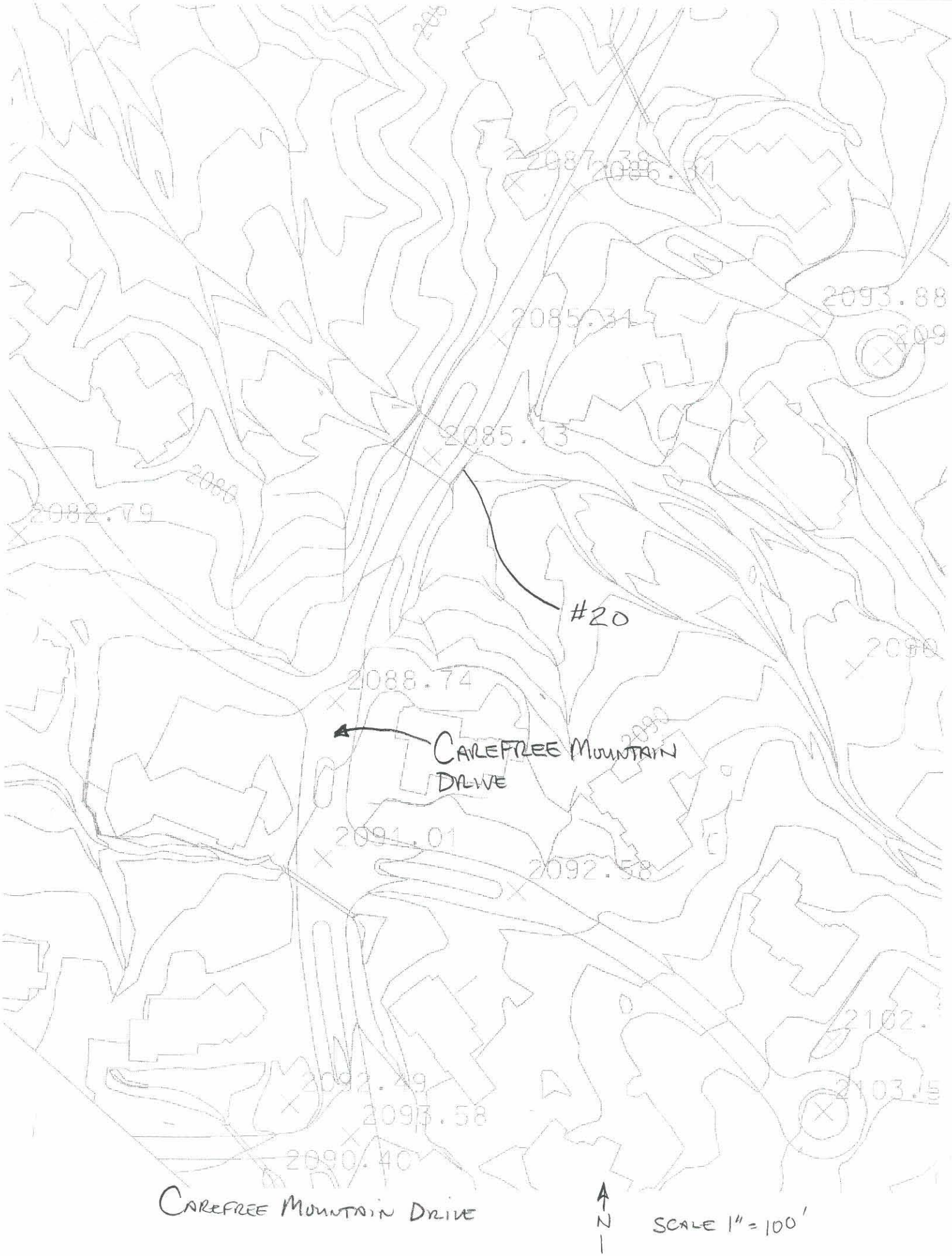
GILBERTSON ASSOCIATES, INC.
CONSULTING CIVIL ENGINEERS AND SURVEYORS
23733 N. SCOTTSDALE RD., SUITE B
SCOTTSDALE, ARIZONA 85255
(602) 585-6464

GRADING PLAN

CAREFREE MOUNTAIN ESTATES UNITS ONE & TWO

FEBRUARY 1994	Job No. 29605	Sheet 2 of 32




2087.38
2085.31
2093.88
2085.31
2085.13
2082.79
#20
2088.74
CAREFREE MOUNTAIN DRIVE
2091.01
2092.58
2102.
2103.15
2092.49
2093.58
2090.40
CAREFREE MOUNTAIN DRIVE
N
SCALE 1" = 100'

Curve
Plotted Curves for Irregular Channel

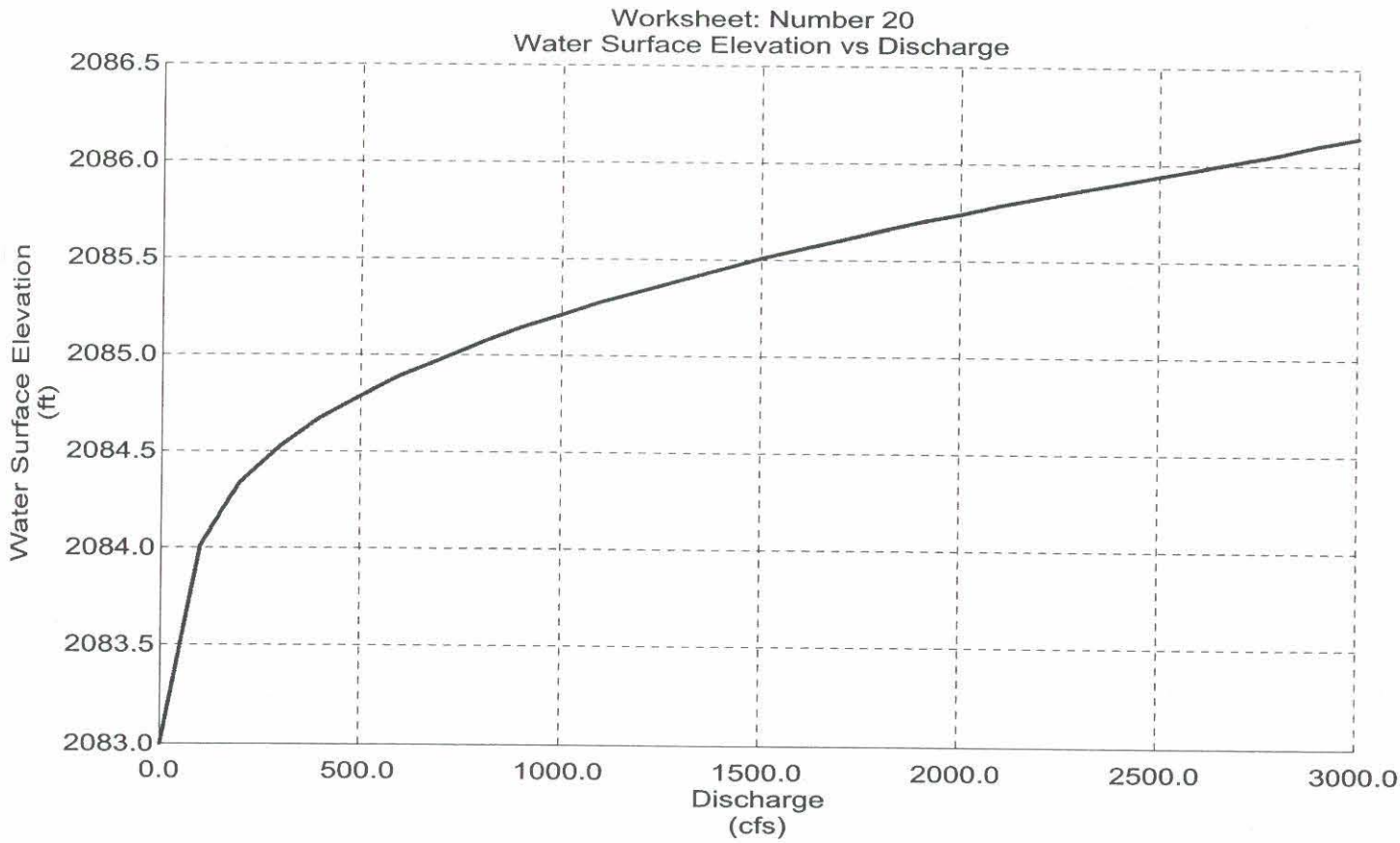
CAREFREE MOUNTAIN DRIVE

Project Description	
Worksheet	Number 20
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data	
Slope	010000 ft/ft

Options	
Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	3,000.00	100.00



Curve
Plotted Curves for Irregular Channel

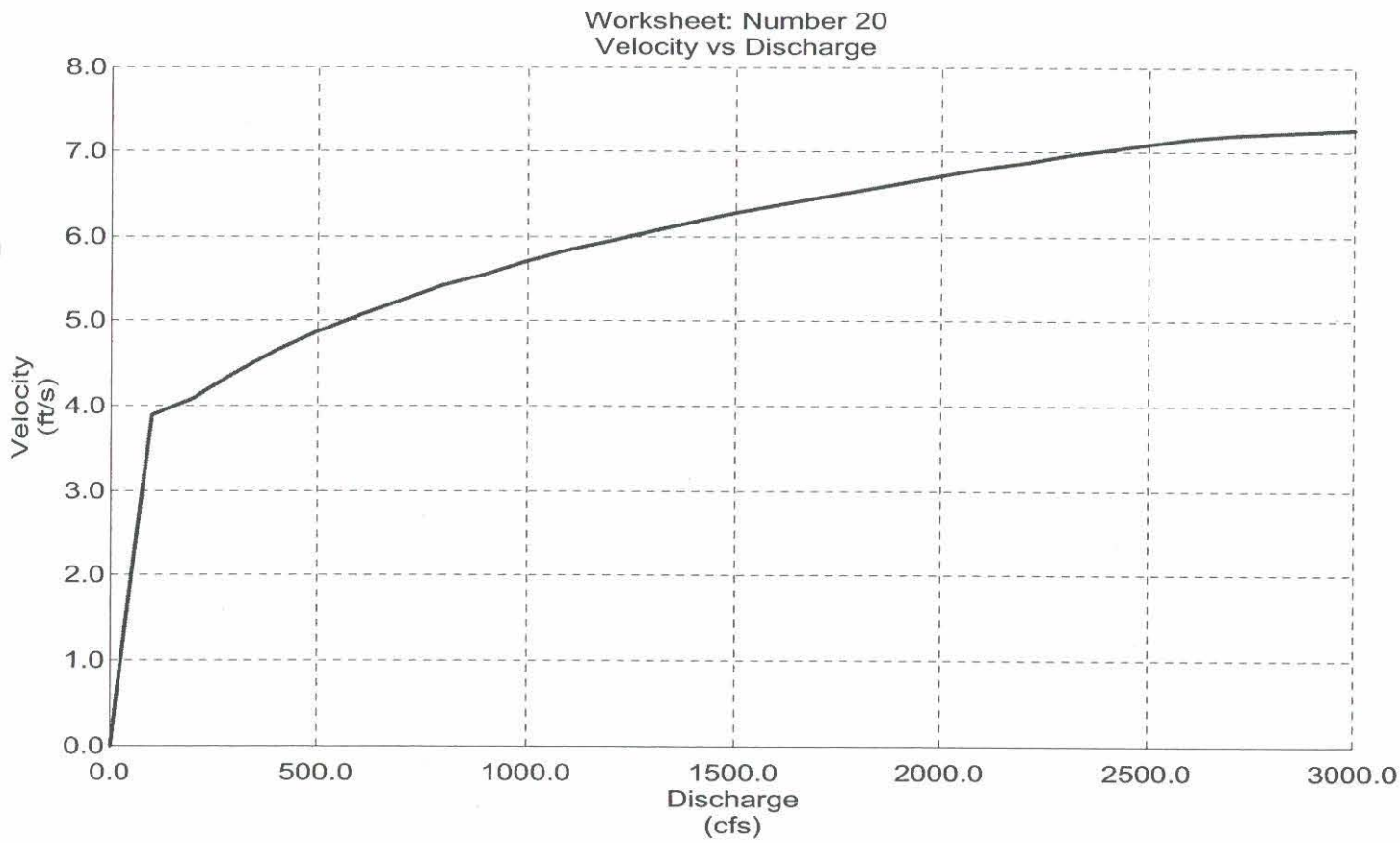
CAREFREE MOUNTAIN DRIVE

Project Description	
Worksheet	Number 20
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data	
Slope	010000 ft/ft

Options	
Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	3,000.00	100.00



Plan: Plan 02 Unnamed Central North RS: 0.7415 Culv Group: Culvert #1 Profile: PF 1

Q Culv Group (cfs)	1468.12	Culv Full Len (ft)	41.70
# Barrels	4	Culv Vel US (ft/s)	9.18
Q Barrel (cfs)	367.03	Culv Vel DS (ft/s)	9.18
E.G. US. (ft)	2122.93	Culv Inv El Up (ft)	2117.57
W.S. US. (ft)	2122.76	Culv Inv El Dn (ft)	2116.81
E.G. DS (ft)	2121.18	Culv Frctn Ls (ft)	0.64
W.S. DS (ft)	2120.93	Culv Exit Loss (ft)	1.06
Delta EG (ft)	1.75	Culv Entr Loss (ft)	0.52
Delta WS (ft)	1.84	Q Weir (cfs)	781.88
E.G. IC (ft)	2123.13	Weir Sta Lft (ft)	70.24
E.G. OC (ft)	2122.93	Weir Sta Rgt (ft)	308.84
Culvert Control	Outlet	Weir Submerg	0.00
Culv WS Inlet (ft)	2121.57	Weir Max Depth (ft)	1.90
Culv WS Outlet (ft)	2120.81	Weir Avg Depth (ft)	1.11
Culv Nml Depth (ft)	1.91	Weir Flow Area (sq ft)	262.57
Culv Crt Depth (ft)	3.47	Min El Weir Flow (ft)	2121.03

Depth

$V = Q/A$

$V = 781.88/262.57 = 2.98 fps$

CARLEFREE MOUNTAIN DRIVE

Plan: Plan 09 Unnamed Central North RS: 0.4415 Profile: PF 3 Culvert ID: Culvert #1

Culv Q (cfs)	1199.70	Culv Ful Lngh (ft)	60.00
# Barrels	4	Culv Vel US (ft/s)	12.50
Q Barrel (cfs)	299.93	Culv Vel DS (ft/s)	12.50
E.G. US. (ft)	2085.93	Culv Inv El Up (ft)	2080.82
W.S. US. (ft)	2085.88	Culv Inv El Dn (ft)	2078.90
E.G. DS (ft)	2081.67	Culv Frctn Ls (ft)	1.92
W.S. DS (ft)	2081.14	Culv Ext Lss (ft)	2.65
Delta EG (ft)	4.26	Culv Ent Lss (ft)	0.97
Delta WS (ft)	4.74	Q Weir (cfs)	300.30
E.G. IC (ft)	2086.32	Weir Sta Lft (ft)	78.54
E.G. OC (ft)	2085.93	Weir Sta Rgt (ft)	326.00
Culvert Control	Outlet	Weir Submerg	0.00
Culv WS Inlet (ft)	2083.82	Weir Max Depth (ft)	0.97
Culv WS Outlet (ft)	2081.90	Weir Avg Depth (ft)	0.58
Culv Nml Depth (ft)	1.65	Wr Flw Area (sq ft)	141.14
Culv Crt Depth (ft)	3.00	Min El Weir Flow (ft)	2084.98

← DEPTH ≈ 1'

Q_{TOTAL} = 1500 cfs (PASSABLE FLOW)

UC 100 YR, 24 HR
FUTURE

CAREFREE MOUNTAIN DRIVE

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1*************************************
*                                   *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN  1998            *
*           VERSION 4.1             *
*                                   *
*  RUN DATE   27NOV02  TIME  08:53:50  *
*                                   *
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*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*           (916) 756-1104          *
*                                   *
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X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX         XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

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

1 HEC-1 INPUT PAGE 1

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

  1           ID         UC MODEL - UNNAMED WASH, CENTRAL
  2           ID         100-YEAR 24-HOUR MODEL  FILENAME: UC10024F.DAT
  3           ID         FUTURE CONDITIONS
  4           ID         CAREFREE DRAINAGE MASTER PLAN
  5           ID         FCD 2000C037
  6           ID         BY CH2M HILL
  7           ID         FOR THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
  8           ID         JANUARY 2002
  9           ID    ****************************************************************
 10           ID         100 YEAR ANALYSIS 24-HOUR STORM
 11           ID         SCS TYPE II DISTRIBUTION
 12           ID         GREEN AND AMPT LOSS RATE METHOD, NMIN=2
 13           ID         CLARK UNIT HYDROGRAPH, NORMAL DEPTH CHANNEL ROUTING
 14           ID   ****************************************************************
 15           ID     DEPTH-AREA REDUCT FACTORS BASED ON TABLE 2.1a OF FCDMC MANUAL
 16           ID     PC RECORDS ARE 24-HOUR SCS TYPE II RAINFALL DISTRIBUTION
 17           ID     PRELIMINARY
              *DIAGRAM
 18           IT       2                    500
 19           IO       5       2
 20           IN      15
 21           JD    4.60    0.01
 22           PC   0.000   0.002   0.005   0.008   0.011   0.013   0.016   0.019   0.022   0.025
 23           PC   0.028   0.032   0.035   0.038   0.041   0.044   0.048   0.053   0.056   0.060
 24           PC   0.063   0.067   0.071   0.075   0.080   0.084   0.089   0.093   0.098   0.103
 25           PC   0.109   0.114   0.120   0.127   0.133   0.140   0.147   0.155   0.163   0.172
 26           PC   0.181   0.192   0.204   0.220   0.235   0.259   0.283   0.473   0.663   0.699
 27           PC   0.735   0.754   0.772   0.785   0.799   0.810   0.820   0.829   0.838   0.846
 28           PC   0.854   0.861   0.868   0.874   0.880   0.885   0.891   0.900   0.902   0.910
 29           PC   0.912   0.920   0.921   0.926   0.929   0.930   0.937   0.941   0.945   0.950
 30           PC   0.952   0.957   0.959   0.962   0.965   0.970   0.972   0.973   0.978   0.981
 31           PC   0.984   0.987   0.989   0.992   0.995   0.998   1.000
 32           JD    4.57    1.00
 33           JD    4.46    5.00
              *

 34           KK     UC8
 35           KM   SUB-BASIN 8, UNNAMED WASH CENTRAL
 36           KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 37           KM    L= 1.04   Kb= 0.031   S=138.0
 38           BA    .054
 39           LG     .30     .36     4.9     .26    36.0
 40           UC    .225    .384
 41           UA       0       5      16      30      65      77      84      90      94      97
 42           UA     100
              *

 43           KK     UC9
 44           KM    SUBBASIN 9, UNNAMED WASH CENTRAL
 45           KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 46           KM    L= 0.91   Kb= 0.031   S=145.0
 47           BA    .047
 48           LG     .30     .36     5.0     .23    36.0
 49           UC    .208    .316
 50           UA       0       5      16      30      65      77      84      90      94      97
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CAREFREE MOUNTAIN DRIVE

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 11634 4980
 11636 4990
 11638 5000---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
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1                                                    STATION     CP84

                          (O) OUTFLOW
          0.      400.      800.     1200.     1600.     2000.     2400.     2800.       0.       0.       0.       0.       0.
DAHRMN PER
 10000   10---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
 10002   20         .         .         .         .         .         .         .         .         .         .         .         .
 10004   30         .         .         .         .         .         .         .         .         .         .         .         .
 10006   40         .         .         .         .         .         .         .         .         .         .         .         .
 10008   50         .         .         .         .         .         .         .         .         .         .         .         .
 10010   60         .         .         .         .         .         .         .         .         .         .         .         .
 10012   70         .         .         .         .         .         .         .         .         .         .         .         .
 10014   80         .         .         .         .         .         .         .         .         .         .         .         .
 10016   90         .         .         .         .         .         .         .         .         .         .         .         .
 10018  100         .         .         .         .         .         .         .         .         .         .         .         .
 10020  110 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10022  120         .         .         .         .         .         .         .         .         .         .         .         .
 10024  130         .         .         .         .         .         .         .         .         .         .         .         .
 10026  140         .         .         .         .         .         .         .         .         .         .         .         .
 10028  150         .         .         .         .         .         .         .         .         .         .         .         .
 10030  160         .         .         .         .         .         .         .         .         .         .         .         .
 10032  170         .         .         .         .         .         .         .         .         .         .         .         .
 10034  180         .         .         .         .         .         .         .         .         .         .         .         .
 10036  190         .         .         .         .         .         .         .         .         .         .         .         .
 10038  200         .         .         .         .         .         .         .         .         .         .         .         .
 10040  210 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10042  220         .         .         .         .         .         .         .         .         .         .         .         .
 10044  230         .         .         .         .         .         .         .         .         .         .         .         .
 10046  240         .         .         .         .         .         .         .         .         .         .         .         .
 10048  250         .         .         .         .         .         .         .         .         .         .         .         .
 10050  260         .         .         .         .         .         .         .         .         .         .         .         .
 10052  270         .         .         .         .         .         .         .         .         .         .         .         .
 10054  280         .         .         .         .         .         .         .         .         .         .         .         .
 10056  290         .         .         .         .         .         .         .         .         .         .         .         .
 10058  300         .         .         .         .         .         .         .         .         .         .         .         .
 10100  310 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10102  320         .         .         .         .         .         .         .         .         .         .         .         .
 10104  330         .         .         .         .         .         .         .         .         .         .         .         .
 10106  340         .         .         .         .         .         .         .         .         .         .         .         .
 10108  350         .         .         .         .         .         .         .         .         .         .         .         .
 10110  360         .         .         .         .         .         .         .         .         .         .         .         .
 10112  370         .         .         .         .         .         .         .         .         .         .         .         .
 10114  380         .         .         .         .         .         .         .         .         .         .         .         .
 10116  390         .         .         .         .         .         .         .         .         .         .         .         .
 10118  400         .         .         .         .         .         .         .         .         .         .         .         .
 10120  410 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10122  420         .         .         .         .         .         .         .         .         .         .         .         .
 10124  430         .         .         .         .         .         .         .         .         .         .         .         .
 10126  440         .         .         .         .         .         .         .         .         .         .         .         .
 10128  450         .         .         .         .         .         .         .         .         .         .         .         .
 10130  460         .         .         .         .         .         .         .         .         .         .         .         .
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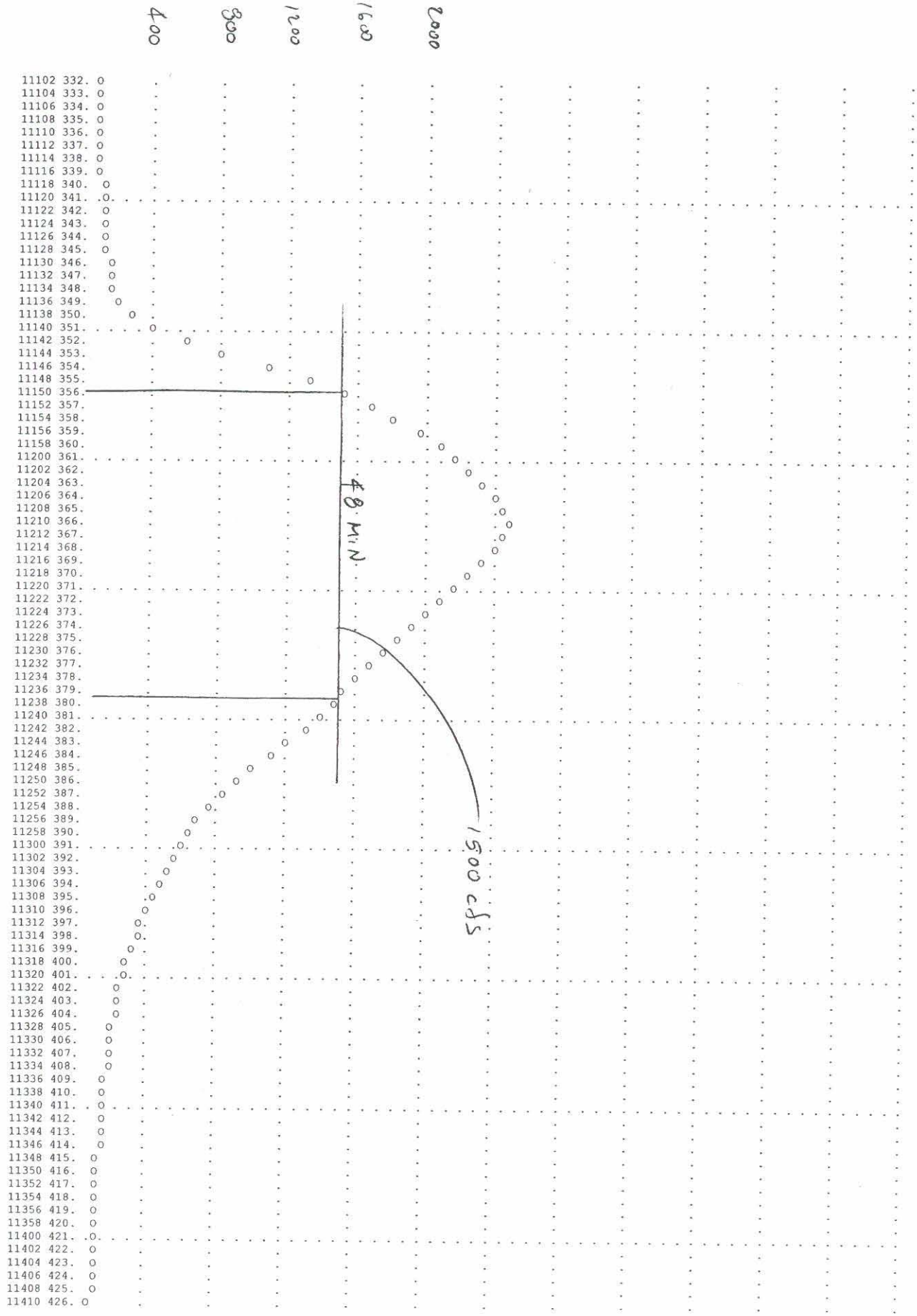
CAREFREE MOUNTAIN DRIVE



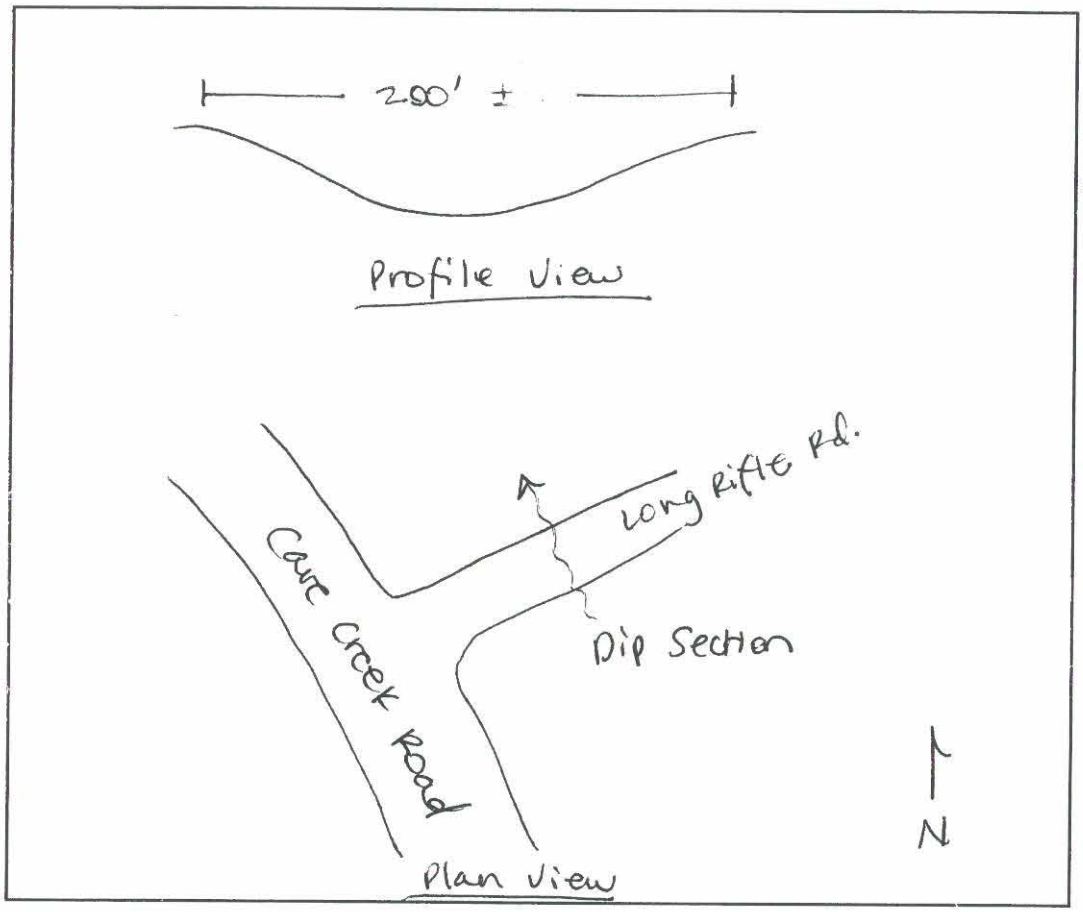
Long Rifle Road Near Cave Creek Road (JEF #24)

Carefree Drainage Master Plan
Field Survey Notes

Culvert Number: JEF 24

Date of Survey: 10/9/02

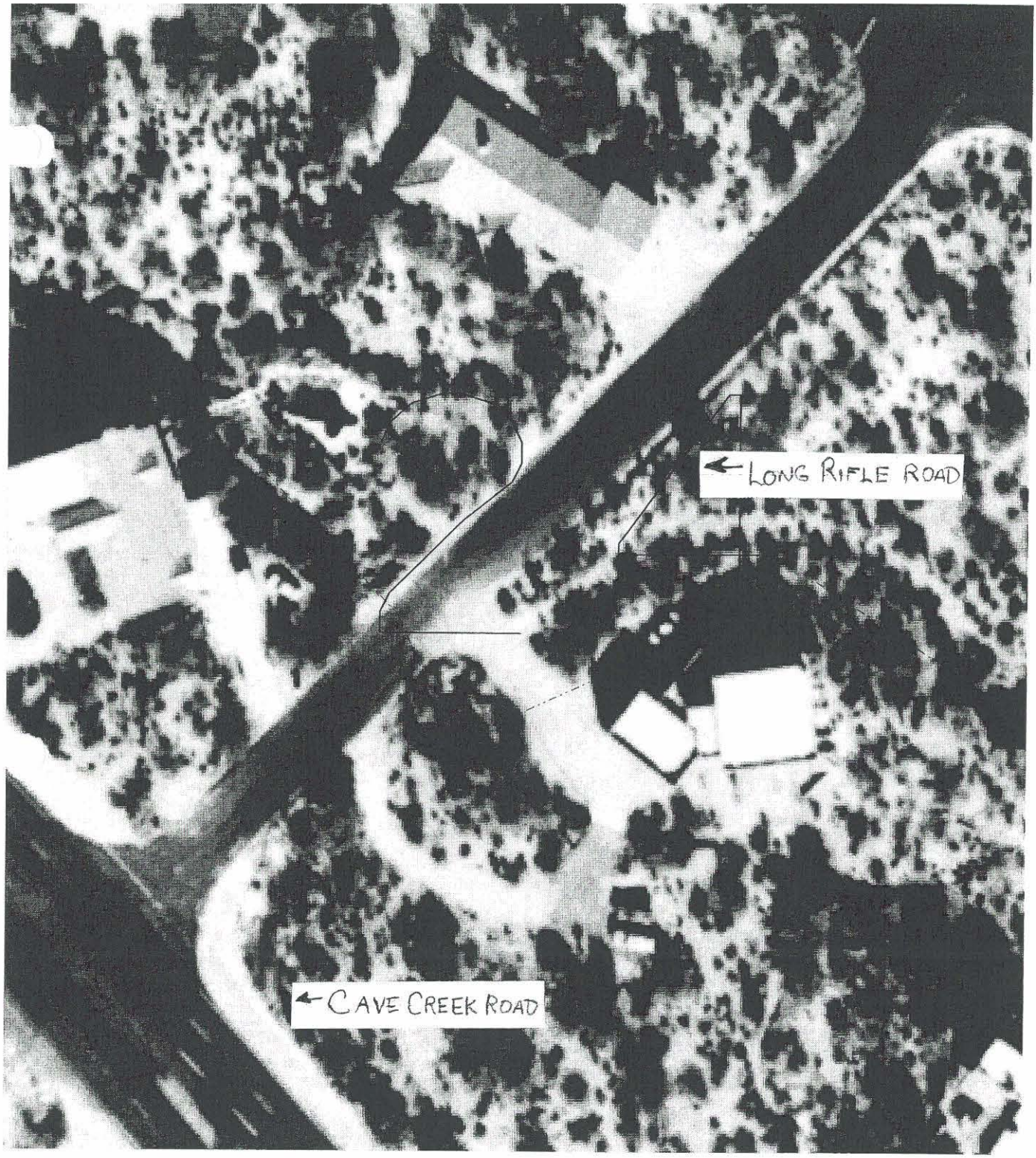
Location: Long Rifle Road near Cave Creek Road



Material: Paved Dip crossing

Headwall: none

Notes:



LONG RIFLE ROAD NEAR
CAVE CREEK ROAD

N

SCALE 1" = 60'

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA AND INCORPORATED AREAS

PANEL 808 OF 4350

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CAREFREE, TOWN OF	040129	0808	G
CAVE CREEK, TOWN OF	040129	0808	G
SCOTTSDALE, CITY OF	045012	0808	G

MAP NUMBER
04013C0808G

MAP REVISED:
DECEMBER 3, 1993

Federal Emergency Management Agency

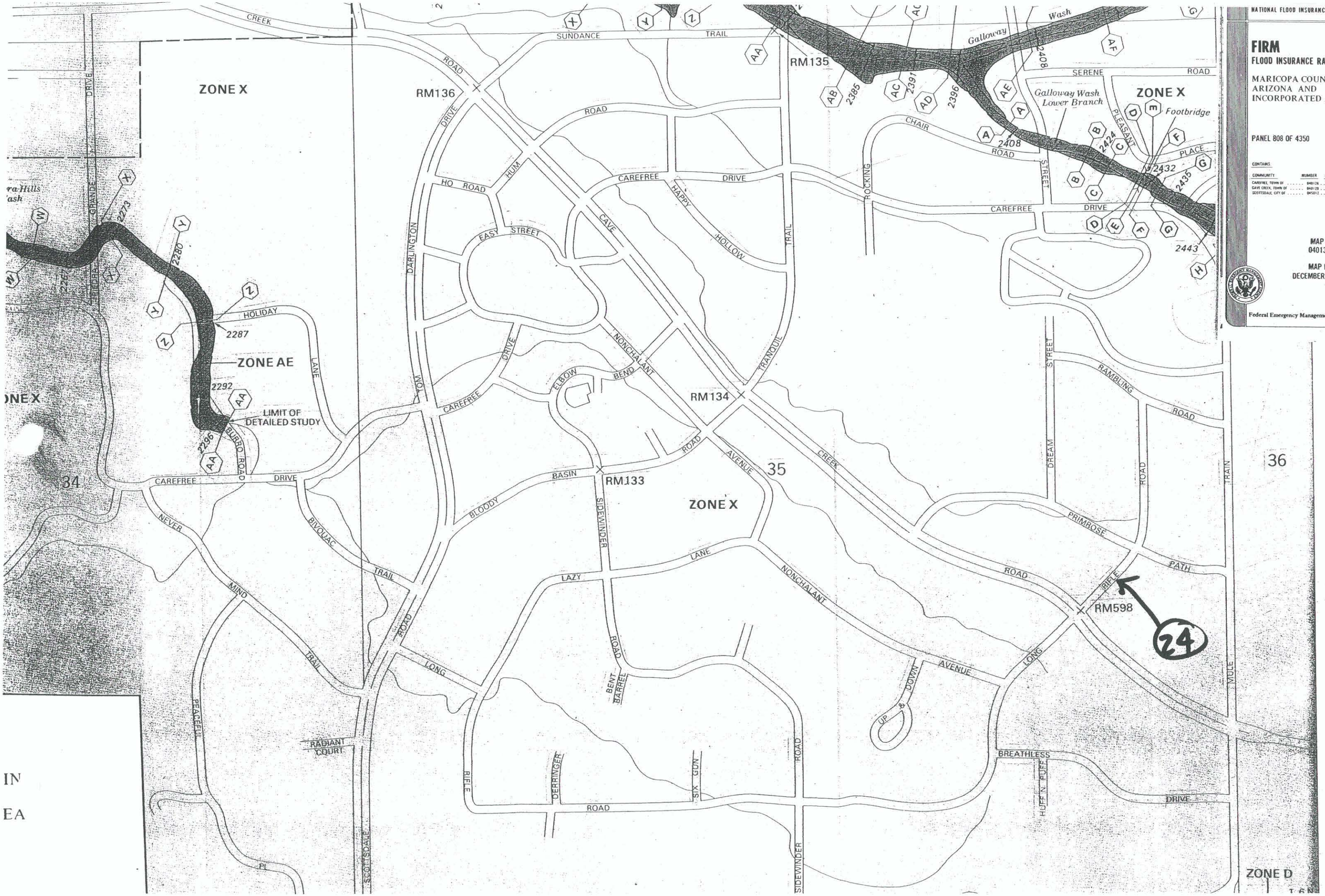


Table
Rating Table for Irregular Channel

LONG RIFLE ROAD NEAR CAVE CREEK ROAD

Project Description	
Worksheet	Generic 200 foot v
Flow Element	Irregular Channel
Method	Manning's Formul
Solve For	Channel Depth

Input Data	
Slope	010000 ft/ft

Options	
Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	1,600.00	5.00

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00	0.00	0.00	0.0	0.00	0.00
5.00	0.26	1.20	4.2	31.60	31.60
10.00	0.34	1.43	7.0	40.99	40.98
15.00	0.40	1.58	9.5	47.72	47.71
20.00	0.44	1.70	11.8	53.15	53.15
25.00	0.48	1.80	13.9	57.79	57.78
30.00	0.52	1.88	16.0	61.88	61.87
35.00	0.55	1.95	17.9	65.56	65.55
40.00	0.57	2.02	19.8	68.93	68.92
45.00	0.60	2.08	21.6	72.04	72.03
50.00	0.62	2.14	23.4	74.95	74.94
55.00	0.65	2.19	25.1	77.67	77.66
60.00	0.67	2.24	26.8	80.25	80.24
65.00	0.69	2.28	28.5	82.70	82.68
70.00	0.71	2.32	30.1	85.03	85.01
75.00	0.73	2.36	31.7	87.25	87.24
80.00	0.74	2.40	33.3	89.39	89.38
85.00	0.76	2.44	34.8	91.45	91.43
90.00	0.78	2.48	36.4	93.43	93.42
95.00	0.79	2.51	37.9	95.34	95.33
100.00	0.81	2.54	39.4	97.19	97.18
105.00	0.82	2.57	40.8	98.99	98.97
110.00	0.84	2.60	42.3	100.73	100.72
115.00	0.85	2.63	43.7	102.42	102.41
120.00	0.87	2.66	45.1	104.07	104.06
125.00	0.88	2.69	46.5	105.68	105.66
130.00	0.89	2.71	47.9	107.24	107.23
135.00	0.91	2.74	49.3	108.77	108.76
140.00	0.92	2.76	50.6	110.27	110.25
145.00	0.93	2.79	52.0	111.73	111.71
150.00	0.94	2.81	53.3	113.16	113.14
155.00	0.95	2.84	54.7	114.56	114.54
160.00	0.97	2.86	56.0	115.93	115.91
165.00	0.98	2.88	57.3	117.27	117.26

Table
Rating Table for Irregular Channel

LONG RIFLE ROAD NEAR CAVE CREEK ROAD

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
170.00	0.99	2.90	58.6	118.59	118.58
175.00	1.00	2.92	59.9	119.89	119.87
180.00	1.01	2.95	61.0	120.35	120.33
185.00	1.02	2.98	62.1	120.71	120.69
190.00	1.03	3.01	63.1	121.06	121.04
195.00	1.03	3.04	64.2	121.41	121.40
200.00	1.04	3.06	65.3	121.76	121.74
205.00	1.05	3.09	66.3	122.11	122.09
210.00	1.06	3.12	67.4	122.45	122.43
215.00	1.07	3.14	68.4	122.79	122.77
220.00	1.08	3.17	69.4	123.12	123.10
225.00	1.09	3.19	70.4	123.45	123.43
230.00	1.09	3.22	71.4	123.78	123.76
235.00	1.10	3.24	72.5	124.10	124.08
240.00	1.11	3.27	73.4	124.42	124.40
245.00	1.12	3.29	74.4	124.74	124.72
250.00	1.13	3.31	75.4	125.06	125.04
255.00	1.13	3.34	76.4	125.37	125.35
260.00	1.14	3.36	77.4	125.68	125.66
265.00	1.15	3.38	78.3	125.99	125.96
270.00	1.16	3.40	79.3	126.29	126.27
275.00	1.16	3.43	80.3	126.60	126.57
280.00	1.17	3.45	81.2	126.90	126.87
285.00	1.18	3.47	82.1	127.19	127.17
290.00	1.19	3.49	83.1	127.49	127.46
295.00	1.19	3.51	84.0	127.78	127.76
300.00	1.20	3.53	84.9	128.07	128.05
305.00	1.21	3.55	85.9	128.36	128.33
310.00	1.22	3.57	86.8	128.65	128.62
315.00	1.22	3.59	87.7	128.93	128.90
320.00	1.23	3.61	88.6	129.21	129.19
325.00	1.24	3.63	89.5	129.50	129.47
330.00	1.24	3.65	90.4	129.77	129.75
335.00	1.25	3.67	91.3	130.05	130.02
340.00	1.26	3.69	92.2	130.33	130.30
345.00	1.26	3.71	93.1	130.60	130.57
350.00	1.27	3.72	94.0	130.87	130.84
355.00	1.28	3.74	94.9	131.14	131.11
360.00	1.28	3.76	95.7	131.41	131.38
365.00	1.29	3.78	96.6	131.67	131.64
370.00	1.30	3.80	97.5	131.94	131.91
375.00	1.30	3.81	98.4	132.20	132.17
380.00	1.31	3.83	99.2	132.46	132.43
385.00	1.32	3.85	100.1	132.72	132.69
390.00	1.32	3.86	100.9	132.98	132.95
395.00	1.33	3.88	101.8	133.24	133.20
400.00	1.34	3.90	102.6	133.49	133.46
405.00	1.34	3.91	103.5	133.75	133.71
410.00	1.35	3.93	104.3	134.00	133.96
415.00	1.36	3.95	105.2	134.25	134.21
420.00	1.36	3.96	106.0	134.50	134.46
425.00	1.37	3.98	106.8	134.75	134.71
430.00	1.37	3.99	107.7	134.99	134.96
435.00	1.38	4.01	108.5	135.24	135.20

IMPASSABLE

Table
Rating Table for Irregular Channel

LONG RIFLE ROAD NEAR CAVE CREEK ROAD

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
440.00	1.39	4.02	109.3	135.48	135.45
445.00	1.39	4.04	110.1	135.73	135.69
450.00	1.40	4.06	111.0	135.97	135.93
455.00	1.40	4.07	111.8	136.21	136.17
460.00	1.41	4.09	112.6	136.45	136.41
465.00	1.42	4.10	113.4	136.69	136.65
470.00	1.42	4.11	114.2	136.92	136.89
475.00	1.43	4.13	115.0	137.16	137.12
480.00	1.43	4.14	115.8	137.39	137.36
485.00	1.44	4.16	116.6	137.63	137.59
490.00	1.45	4.17	117.4	137.86	137.82
495.00	1.45	4.19	118.2	138.09	138.05
500.00	1.46	4.20	119.0	138.32	138.28
505.00	1.46	4.21	119.8	138.55	138.51
510.00	1.47	4.23	120.6	138.78	138.74
515.00	1.47	4.24	121.4	139.01	138.97
520.00	1.48	4.26	122.2	139.23	139.19
525.00	1.49	4.27	123.0	139.46	139.42
530.00	1.49	4.28	123.7	139.68	139.64
535.00	1.50	4.30	124.5	139.90	139.86
540.00	1.50	4.31	125.3	140.13	140.08
545.00	1.51	4.32	126.1	140.35	140.31
550.00	1.51	4.34	126.8	140.57	140.53
555.00	1.52	4.35	127.6	140.79	140.74
560.00	1.52	4.36	128.4	141.01	140.96
565.00	1.53	4.37	129.1	141.22	141.18
570.00	1.53	4.39	129.9	141.44	141.40
575.00	1.54	4.40	130.7	141.66	141.61
580.00	1.55	4.41	131.4	141.87	141.83
585.00	1.55	4.43	132.2	142.08	142.04
590.00	1.56	4.44	132.9	142.30	142.25
595.00	1.56	4.45	133.7	142.51	142.46
600.00	1.57	4.46	134.5	142.72	142.68
605.00	1.57	4.47	135.2	142.93	142.89
610.00	1.58	4.49	136.0	143.14	143.10
615.00	1.58	4.50	136.7	143.35	143.30
620.00	1.59	4.51	137.4	143.56	143.51
625.00	1.59	4.52	138.2	143.77	143.72
630.00	1.60	4.53	138.9	143.97	143.93
635.00	1.60	4.55	139.7	144.18	144.13
640.00	1.61	4.56	140.4	144.38	144.34
645.00	1.61	4.57	141.2	144.59	144.54
650.00	1.62	4.58	141.9	144.79	144.74
655.00	1.62	4.59	142.6	144.99	144.95
660.00	1.63	4.60	143.4	145.20	145.15
665.00	1.63	4.62	144.1	145.40	145.35
670.00	1.64	4.63	144.8	145.60	145.55
675.00	1.64	4.64	145.5	145.80	145.75
680.00	1.65	4.65	146.3	146.00	145.95
685.00	1.65	4.66	147.0	146.20	146.15
690.00	1.66	4.67	147.7	146.39	146.35
695.00	1.66	4.68	148.4	146.59	146.54
700.00	1.67	4.69	149.2	146.79	146.74
705.00	1.67	4.70	149.9	146.98	146.93

Table
Rating Table for Irregular Channel

LONG RIFLE ROAD NEAR CAVE CREEK ROAD

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
710.00	1.68	4.71	150.6	147.18	147.13
715.00	1.68	4.73	151.3	147.37	147.32
720.00	1.69	4.74	152.0	147.57	147.52
725.00	1.69	4.75	152.7	147.76	147.71
730.00	1.70	4.76	153.4	147.95	147.90
735.00	1.70	4.77	154.1	148.15	148.09
740.00	1.71	4.78	154.9	148.34	148.29
745.00	1.71	4.79	155.6	148.53	148.48
750.00	1.72	4.80	156.3	148.72	148.67
755.00	1.72	4.81	157.0	148.91	148.86
760.00	1.73	4.82	157.7	149.10	149.04
765.00	1.73	4.83	158.4	149.29	149.23
770.00	1.74	4.84	159.1	149.47	149.42
775.00	1.74	4.85	159.8	149.66	149.61
780.00	1.74	4.86	160.5	149.85	149.79
785.00	1.75	4.87	161.2	150.03	149.98
790.00	1.75	4.88	161.9	150.22	150.16
795.00	1.76	4.89	162.6	150.40	150.35
800.00	1.76	4.90	163.3	150.59	150.53
805.00	1.77	4.91	163.9	150.77	150.72
810.00	1.77	4.92	164.6	150.96	150.90
815.00	1.78	4.93	165.3	151.14	151.08
820.00	1.78	4.94	166.0	151.32	151.26
825.00	1.79	4.95	166.7	151.50	151.45
830.00	1.79	4.96	167.4	151.68	151.63
835.00	1.80	4.97	168.1	151.86	151.81
840.00	1.80	4.98	168.8	152.04	151.99
845.00	1.80	4.99	169.4	152.22	152.17
850.00	1.81	5.00	170.1	152.40	152.35
855.00	1.81	5.01	170.8	152.58	152.52
860.00	1.82	5.02	171.5	152.76	152.70
865.00	1.82	5.02	172.1	152.94	152.88
870.00	1.83	5.03	172.8	153.11	153.06
875.00	1.83	5.04	173.5	153.29	153.23
880.00	1.84	5.05	174.2	153.47	153.41
885.00	1.84	5.06	174.8	153.64	153.58
890.00	1.84	5.07	175.5	153.82	153.76
895.00	1.85	5.08	176.2	153.99	153.93
900.00	1.85	5.09	176.9	154.17	154.11
905.00	1.86	5.10	177.5	154.34	154.28
910.00	1.86	5.11	178.2	154.51	154.45
915.00	1.87	5.12	178.9	154.69	154.63
920.00	1.87	5.12	179.5	154.86	154.80
925.00	1.87	5.13	180.2	155.03	154.97
930.00	1.88	5.14	180.9	155.20	155.14
935.00	1.88	5.15	181.5	155.37	155.31
940.00	1.89	5.16	182.2	155.54	155.48
945.00	1.89	5.17	182.8	155.71	155.65
950.00	1.90	5.18	183.5	155.88	155.82
955.00	1.90	5.19	184.2	156.05	155.99
960.00	1.90	5.19	184.8	156.22	156.16
965.00	1.91	5.20	185.5	156.39	156.33
970.00	1.91	5.21	186.1	156.56	156.50
975.00	1.92	5.22	186.8	156.72	156.66

Table
Rating Table for Irregular Channel

LONG RIFLE ROAD NEAR CAVE CREEK ROAD

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
980.00	1.92	5.23	187.4	156.89	156.83
985.00	1.92	5.24	188.1	157.06	157.00
990.00	1.93	5.25	188.7	157.23	157.16
995.00	1.93	5.25	189.4	157.39	157.33
1,000.00	1.94	5.26	190.1	157.56	157.49
1,005.00	1.94	5.27	190.7	157.72	157.66
1,010.00	1.95	5.28	191.3	157.89	157.82
1,015.00	1.95	5.29	192.0	158.05	157.99
1,020.00	1.95	5.29	192.6	158.21	158.15
1,025.00	1.96	5.30	193.3	158.38	158.31
1,030.00	1.96	5.31	193.9	158.54	158.48
1,035.00	1.97	5.32	194.6	158.70	158.64
1,040.00	1.97	5.33	195.2	158.87	158.80
1,045.00	1.97	5.34	195.9	159.03	158.96
1,050.00	1.98	5.34	196.5	159.19	159.12
1,055.00	1.98	5.35	197.1	159.35	159.28
1,060.00	1.99	5.36	197.8	159.51	159.45
1,065.00	1.99	5.37	198.4	159.67	159.61
1,070.00	1.99	5.38	199.1	159.83	159.77
1,075.00	2.00	5.38	199.7	159.99	159.92
1,080.00	2.00	5.39	200.3	160.15	160.08
1,085.00	2.01	5.40	201.0	160.31	160.24
1,090.00	2.01	5.41	201.6	160.47	160.40
1,095.00	2.01	5.41	202.2	160.63	160.56
1,100.00	2.02	5.42	202.9	160.78	160.72
1,105.00	2.02	5.43	203.5	160.94	160.87
1,110.00	2.03	5.44	204.1	161.10	161.03
1,115.00	2.03	5.45	204.8	161.26	161.19
1,120.00	2.03	5.45	205.4	161.41	161.34
1,125.00	2.04	5.46	206.0	161.57	161.50
1,130.00	2.04	5.47	206.7	161.72	161.66
1,135.00	2.05	5.48	207.3	161.88	161.81
1,140.00	2.05	5.48	207.9	162.03	161.97
1,145.00	2.05	5.49	208.5	162.19	162.12
1,150.00	2.06	5.50	209.2	162.34	162.27
1,155.00	2.06	5.51	209.8	162.50	162.43
1,160.00	2.06	5.51	210.4	162.65	162.58
1,165.00	2.07	5.52	211.0	162.81	162.74
1,170.00	2.07	5.53	211.7	162.96	162.89
1,175.00	2.08	5.54	212.3	163.11	163.04
1,180.00	2.08	5.54	212.9	163.26	163.19
1,185.00	2.08	5.55	213.5	163.42	163.35
1,190.00	2.09	5.56	214.1	163.57	163.50
1,195.00	2.09	5.56	214.8	163.72	163.65
1,200.00	2.09	5.57	215.4	163.87	163.80
1,205.00	2.10	5.58	216.0	164.02	163.95
1,210.00	2.10	5.59	216.6	164.17	164.10
1,215.00	2.11	5.59	217.2	164.32	164.25
1,220.00	2.11	5.60	217.8	164.47	164.40
1,225.00	2.11	5.61	218.5	164.62	164.55
1,230.00	2.12	5.61	219.1	164.77	164.70
1,235.00	2.12	5.62	219.7	164.92	164.85
1,240.00	2.12	5.63	220.3	165.07	165.00
1,245.00	2.13	5.64	220.9	165.22	165.15

Table
Rating Table for Irregular Channel

LONG RIFLE ROAD NEAR CAVE CREEK ROAD

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
1,250.00	2.13	5.64	221.5	165.37	165.29
1,255.00	2.14	5.65	222.1	165.51	165.44
1,260.00	2.14	5.66	222.7	165.66	165.59
1,265.00	2.14	5.66	223.4	165.81	165.74
1,270.00	2.15	5.67	224.0	165.96	165.88
1,275.00	2.15	5.68	224.6	166.10	166.03
1,280.00	2.15	5.68	225.2	166.25	166.17
1,285.00	2.16	5.69	225.8	166.40	166.32
1,290.00	2.16	5.70	226.4	166.54	166.47
1,295.00	2.17	5.70	227.0	166.69	166.61
1,300.00	2.17	5.71	227.6	166.83	166.76
1,305.00	2.17	5.72	228.2	166.98	166.90
1,310.00	2.18	5.73	228.8	167.12	167.05
1,315.00	2.18	5.73	229.4	167.27	167.19
1,320.00	2.18	5.74	230.0	167.41	167.33
1,325.00	2.19	5.75	230.6	167.55	167.48
1,330.00	2.19	5.75	231.2	167.70	167.62
1,335.00	2.19	5.76	231.8	167.84	167.77
1,340.00	2.20	5.77	232.4	167.98	167.91
1,345.00	2.20	5.77	233.0	168.13	168.05
1,350.00	2.20	5.78	233.6	168.27	168.19
1,355.00	2.21	5.79	234.2	168.41	168.34
1,360.00	2.21	5.79	234.8	168.55	168.48
1,365.00	2.22	5.80	235.4	168.70	168.62
1,370.00	2.22	5.81	236.0	168.84	168.76
1,375.00	2.22	5.81	236.6	168.98	168.90
1,380.00	2.23	5.82	237.2	169.12	169.04
1,385.00	2.23	5.82	237.8	169.26	169.18
1,390.00	2.23	5.83	238.4	169.40	169.32
1,395.00	2.24	5.84	239.0	169.54	169.46
1,400.00	2.24	5.84	239.6	169.68	169.60
1,405.00	2.24	5.85	240.2	169.82	169.74
1,410.00	2.25	5.86	240.7	169.96	169.88
1,415.00	2.25	5.86	241.3	170.10	170.02
1,420.00	2.25	5.87	241.9	170.24	170.16
1,425.00	2.26	5.88	242.5	170.38	170.30
1,430.00	2.26	5.88	243.1	170.52	170.44
1,435.00	2.26	5.89	243.7	170.65	170.57
1,440.00	2.27	5.89	244.3	170.79	170.71
1,445.00	2.27	5.90	244.9	170.93	170.85
1,450.00	2.27	5.91	245.5	171.07	170.99
1,455.00	2.28	5.91	246.0	171.21	171.12
1,460.00	2.28	5.92	246.6	171.34	171.26
1,465.00	2.28	5.93	247.2	171.48	171.40
1,470.00	2.29	5.93	247.8	171.62	171.53
1,475.00	2.29	5.94	248.4	171.75	171.67
1,480.00	2.30	5.94	249.0	171.89	171.81
1,485.00	2.30	5.95	249.6	172.02	171.94
1,490.00	2.30	5.96	250.1	172.16	172.08
1,495.00	2.31	5.96	250.7	172.30	172.21
1,500.00	2.31	5.97	251.3	172.43	172.35
1,505.00	2.31	5.98	251.9	172.57	172.48
1,510.00	2.32	5.98	252.5	172.70	172.62
1,515.00	2.32	5.99	253.0	172.83	172.75

Table
Rating Table for Irregular Channel

LONG RIFLE ROAD NEAR CAVE CREEK ROAD

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
1,520.00	2.32	5.99	253.6	172.97	172.89
1,525.00	2.33	6.00	254.2	173.10	173.02
1,530.00	2.33	6.01	254.8	173.24	173.15
1,535.00	2.33	6.01	255.4	173.37	173.29
1,540.00	2.34	6.02	255.9	173.50	173.42
1,545.00	2.34	6.02	256.5	173.64	173.55
1,550.00	2.34	6.03	257.1	173.77	173.69
1,555.00	2.35	6.03	257.7	173.90	173.82
1,560.00	2.35	6.04	258.2	174.04	173.95
1,565.00	2.35	6.05	258.8	174.17	174.08
1,570.00	2.36	6.05	259.4	174.30	174.22
1,575.00	2.36	6.06	260.0	174.43	174.35
1,580.00	2.36	6.06	260.5	174.56	174.48
1,585.00	2.37	6.07	261.1	174.70	174.61
1,590.00	2.37	6.08	261.7	174.83	174.74
1,595.00	2.37	6.08	262.3	174.96	174.87
1,600.00	2.38	6.09	262.8	175.09	175.00

GW 100 YR 6 HR

FUTURE

Long Rifle Road Near Cave Creek Road

24 (JEF)

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1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN  1998                *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   27NOV02  TIME  08:49:21   *
*                                       *
*****************************************
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*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
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X     X  XXXXXXX   XXXXX           X
X     X  X       X     X         XX
X     X  X       X                X
XXXXXXX  XXXX    X        XXXXX   X
X     X  X       X                X
X     X  X       X     X          X
X     X  XXXXXXX   XXXXX          XXX
```

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

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

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1                                   HEC-1 INPUT                                          PAGE  1

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

    1           ID     FUTURE CONDITIONS HYDROLOGY FOR CAREFREE AREA DRAINAGE MASTER PLAN
    2           ID       BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC., DEC. 2001
    3           ID
    4           ID     FUTURE CONDITIONS LAND USE BASED ON CAVE CREEK WATERCOURSE MASTER PLAN
    5           ID     HYDROLOGY BY TETRA TECH, 2000.
    6           ID
    7           ID     BASE MODEL BASED ON:
    8           ID
    9           ID           FLOODPLAIN DELINEATION STUDY OF ANDORA HILLS & GALLOWAY WASHES
   10           ID           FCD 99-14
   11           ID           BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC.
   12           ID           FOR THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
   13           ID           REVISED MARCH 2002     FILENAME: GWM224R.DAT
   14           ID      ***************************************************************
   15           ID           100 YEAR ANALYSIS 24-HOUR STORM USING JD RECORDS
   16           ID           MCUHP2 USED FOR UNIT HYDROGRAPHS
   17           ID     ***************************************************************
   18           ID
   19           ID     DDM MCUHP2 GALLOWAY WASH FLOODPLAIN DELINEATION STUDY, FCD NO. 99-14
   20           ID
   21           ID    March 2002 revisions to original Dec. 1999 model include:
   22           ID
   23           ID    HC BLOCK ADDED FOR GRAPEVINE WASH (CP 295A)
   24           ID
   25           ID    SUBBASIN GWW1_3 FURTHER SUBDIVIDED ALONG GALLOWAY WASH PER FEMA COMMENTS
   26           ID    IN LETTER DATED FEB. 8, 2002
   27           ID
   28           ID    *** ADDITIONAL COMBINATION ADDED 10-17-02 TO PROVIDE TOTAL FLOW IN
   29           ID        NORTH GALLOWAY WASH BY TWL FOR CH2M HILL FOR CAREFREE DMP ***
   30           ID
   31           ID   DDM MCUHP2 Carefree Area Drainage Master Plan, Galloway Wash Future Condition
                *DIAGRAM
   32           IT       5 01DEC99    0005     400
   33           IO       5       2
   34           IN      15
   35           JD    3.50    0.01
   36           PC    .000    .008    .016    .025    .033    .041    .050    .058    .066    .074
   37           PC    .087    .099    .118    .138    .216    .377    .834    .911    .931    .950
   38           PC    .962    .972    .983    .991   1.000
   39           JD    3.48    0.50
   40           JD    3.43    2.80
   41           PC    .000    .009    .016    .025    .034    .042    .051    .059    .067    .076
   42           PC    .087    .100    .120    .163    .252    .451    .694    .837    .900    .938
   43           PC    .950    .963    .975    .988   1.000
   44           JD    3.23    16.0
   45           PC    .000    .015    .020    .030    .048    .063    .076    .090    .105    .119
   46           PC    .135    .152    .175    .222    .304    .472    .670    .796    .868    .912
   47           PC    .946    .960    .973    .987   1.000
   48           JD    2.84    90.0
   49           PC    .000    .021    .035    .051    .071    .087    .105    .125    .143    .160
   50           PC    .179    .201    .232    .281    .364    .500    .658    .773    .841    .888
   51           PC    .927    .945    .964    .982   1.000
                *
                * DDM   ***** Updated *****
1                                   HEC-1 INPUT                                          PAGE  2

  LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
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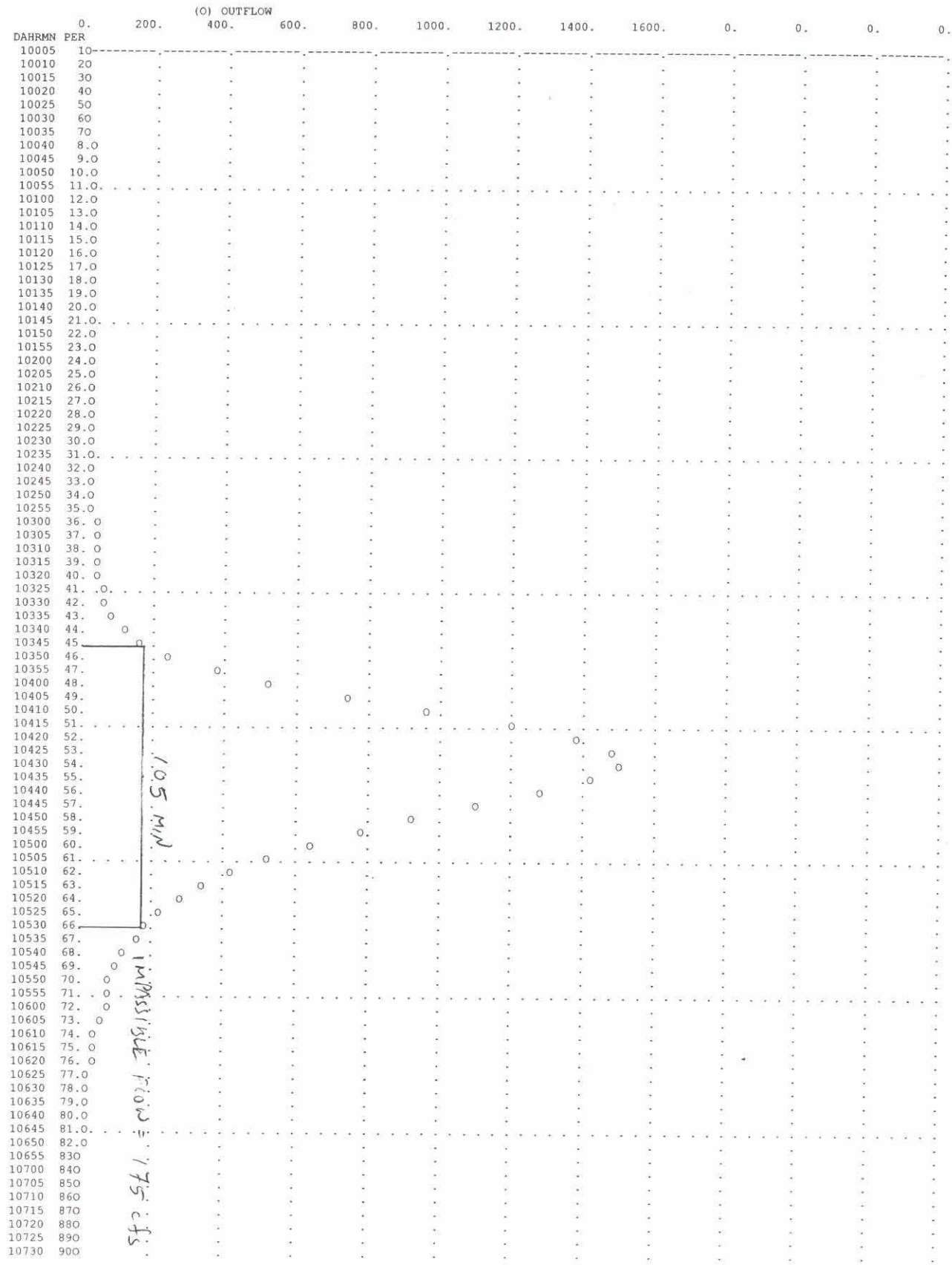
24 (JEF)

Long Rifle Road Near Cave Creek Road

1

STATION GWW1_5

(O) OUTFLOW



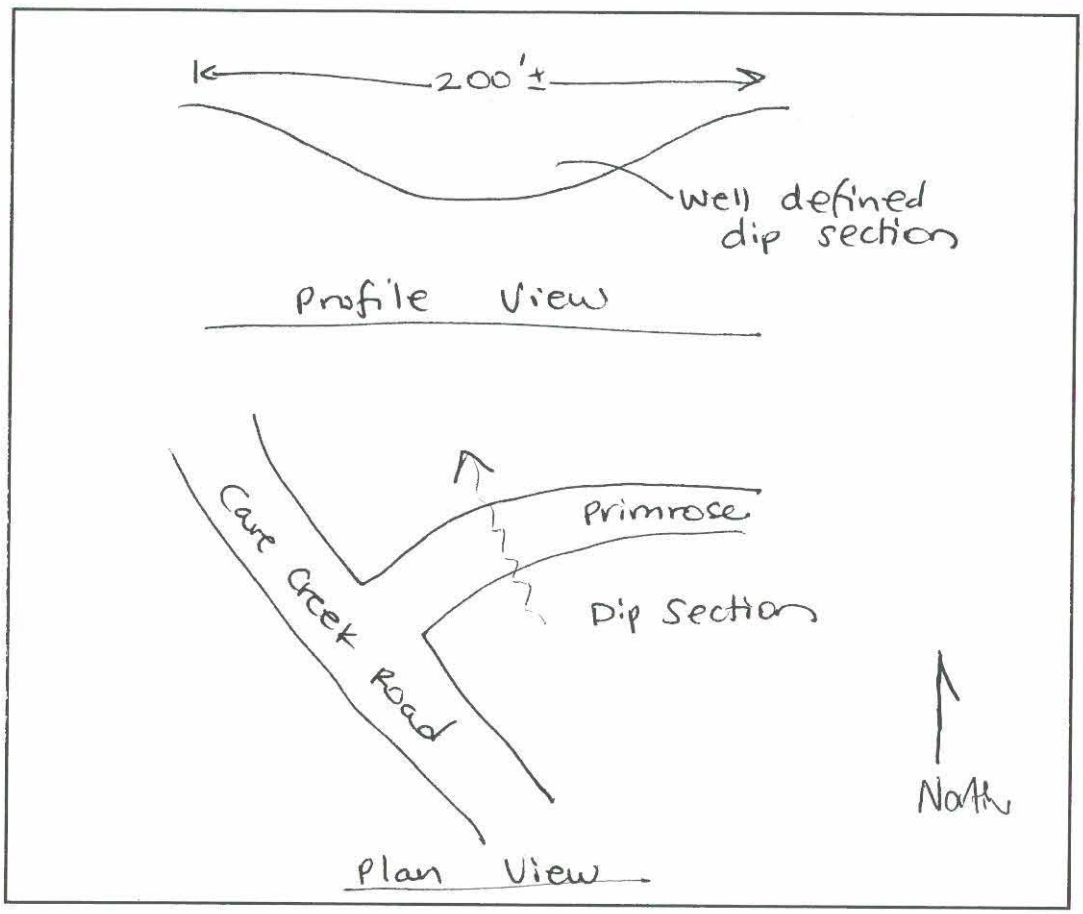
Primrose Path Near Cave Creek Road (JEF #25)

Carefree Drainage Master Plan
Field Survey Notes

Culvert Number: # JEF 25

Date of Survey: 10/9/02

Location: Primrose Path near Cave Creek Road



Material: Paved Dip Crossing

Headwall: none

Notes:

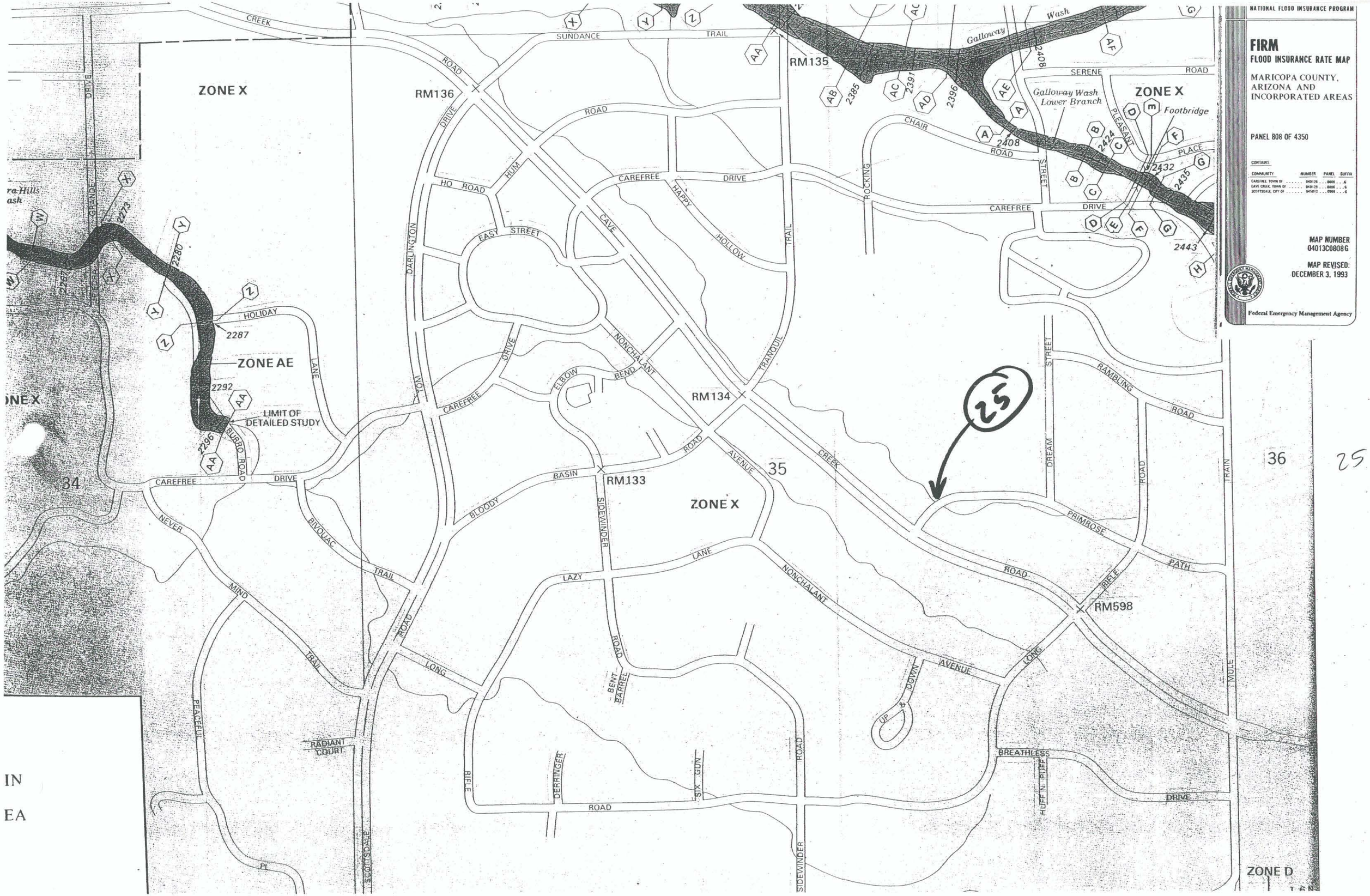

NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
MARICOPA COUNTY, ARIZONA AND INCORPORATED AREAS
PANEL 808 OF 4350
CONTAINS:
COMMUNITY NUMBER PANEL SUFFIX
CAREFREE, TOWN OF . . . . . 040126 . . . 0808 . . . G
CAVE CREEK, TOWN OF . . . . . 040129 . . . 0808 . . . G
SCOTTSDALE, CITY OF . . . . . 045012 . . . 0808 . . . G
MAP NUMBER
04013C0808G
MAP REVISED:
DECEMBER 3, 1993
Federal Emergency Management Agency
ZONE X
ZONE AE
ZONE D
LIMIT OF DETAILED STUDY
RM136
RM135
RM134
RM133
RM598
Galloway Wash
Galloway Wash Lower Branch
Footbridge
SUNDANCE TRAIL
CREEK
SERENE ROAD
CHAIR ROAD
CAREFREE DRIVE
HOLIDAY
EASY STREET
HO HUM ROAD
DARLINGTON DRIVE
TOM
CAVE
HAPPY HOLLOW
TRAIL
ROCKING
PLEASANT PLACE
STREET
NONCHALANT
ELBOW BEND
TRANQUIL
AVENUE
BLOODY BASIN ROAD
SIDEWINDER
LAZY LANE
LONG
BENT BARREL
DOWN
UP
RAMBLING ROAD
DREAM
PRIMROSE PATH
RIFLE
MULE
TRAIN
BREATHLESS
HUFF N PUFF
DRIVE
DERRINGER
SIX GUN
BIVOUAC TRAIL
NEVER
MIND
PEACEFUL
RADIANT COURT
SCOTTSDALE
PL
BURRO ROAD
LANE
GRANDE
DRIVE
34
35
36
25

Table
Rating Table for Irregular Channel

PRIMROSE PATH NEAR CAVE CREEK ROAD

Project Description

Worksheet	Generic 200 foot v
Flow Element	Irregular Channel
Method	Manning's Formul
Solve For	Channel Depth

Input Data

Slope 010000 ft/ft

Options

Current Roughness Metho	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	1,600.00	5.00

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00	0.00	0.00	0.0	0.00	0.00
5.00	0.26	1.20	4.2	31.60	31.60
10.00	0.34	1.43	7.0	40.99	40.98
15.00	0.40	1.58	9.5	47.72	47.71
20.00	0.44	1.70	11.8	53.15	53.15
25.00	0.48	1.80	13.9	57.79	57.78
30.00	0.52	1.88	16.0	61.88	61.87
35.00	0.55	1.95	17.9	65.56	65.55
40.00	0.57	2.02	19.8	68.93	68.92
45.00	0.60	2.08	21.6	72.04	72.03
50.00	0.62	2.14	23.4	74.95	74.94
55.00	0.65	2.19	25.1	77.67	77.66
60.00	0.67	2.24	26.8	80.25	80.24
65.00	0.69	2.28	28.5	82.70	82.68
70.00	0.71	2.32	30.1	85.03	85.01
75.00	0.73	2.36	31.7	87.25	87.24
80.00	0.74	2.40	33.3	89.39	89.38
85.00	0.76	2.44	34.8	91.45	91.43
90.00	0.78	2.48	36.4	93.43	93.42
95.00	0.79	2.51	37.9	95.34	95.33
100.00	0.81	2.54	39.4	97.19	97.18
105.00	0.82	2.57	40.8	98.99	98.97
110.00	0.84	2.60	42.3	100.73	100.72
115.00	0.85	2.63	43.7	102.42	102.41
120.00	0.87	2.66	45.1	104.07	104.06
125.00	0.88	2.69	46.5	105.68	105.66
130.00	0.89	2.71	47.9	107.24	107.23
135.00	0.91	2.74	49.3	108.77	108.76
140.00	0.92	2.76	50.6	110.27	110.25
145.00	0.93	2.79	52.0	111.73	111.71
150.00	0.94	2.81	53.3	113.16	113.14
155.00	0.95	2.84	54.7	114.56	114.54
160.00	0.97	2.86	56.0	115.93	115.91
165.00	0.98	2.88	57.3	117.27	117.26

Table
Rating Table for Irregular Channel

PRIMROSE PATH NEAR CAVE CREEK ROAD

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
170.00	0.99	2.90	58.6	118.59	118.58
175.00	1.00	2.92	59.9	119.89	119.87
180.00	1.01	2.95	61.0	120.35	120.33
185.00	1.02	2.98	62.1	120.71	120.69
190.00	1.03	3.01	63.1	121.06	121.04
195.00	1.03	3.04	64.2	121.41	121.40
200.00	1.04	3.06	65.3	121.76	121.74
205.00	1.05	3.09	66.3	122.11	122.09
210.00	1.06	3.12	67.4	122.45	122.43
215.00	1.07	3.14	68.4	122.79	122.77
220.00	1.08	3.17	69.4	123.12	123.10
225.00	1.09	3.19	70.4	123.45	123.43
230.00	1.09	3.22	71.4	123.78	123.76
235.00	1.10	3.24	72.5	124.10	124.08
240.00	1.11	3.27	73.4	124.42	124.40
245.00	1.12	3.29	74.4	124.74	124.72
250.00	1.13	3.31	75.4	125.06	125.04
255.00	1.13	3.34	76.4	125.37	125.35
260.00	1.14	3.36	77.4	125.68	125.66
265.00	1.15	3.38	78.3	125.99	125.96
270.00	1.16	3.40	79.3	126.29	126.27
275.00	1.16	3.43	80.3	126.60	126.57
280.00	1.17	3.45	81.2	126.90	126.87
285.00	1.18	3.47	82.1	127.19	127.17
290.00	1.19	3.49	83.1	127.49	127.46
295.00	1.19	3.51	84.0	127.78	127.76
300.00	1.20	3.53	84.9	128.07	128.05
305.00	1.21	3.55	85.9	128.36	128.33
310.00	1.22	3.57	86.8	128.65	128.62
315.00	1.22	3.59	87.7	128.93	128.90
320.00	1.23	3.61	88.6	129.21	129.19
325.00	1.24	3.63	89.5	129.50	129.47
330.00	1.24	3.65	90.4	129.77	129.75
335.00	1.25	3.67	91.3	130.05	130.02
340.00	1.26	3.69	92.2	130.33	130.30
345.00	1.26	3.71	93.1	130.60	130.57
350.00	1.27	3.72	94.0	130.87	130.84
355.00	1.28	3.74	94.9	131.14	131.11
360.00	1.28	3.76	95.7	131.41	131.38
365.00	1.29	3.78	96.6	131.67	131.64
370.00	1.30	3.80	97.5	131.94	131.91
375.00	1.30	3.81	98.4	132.20	132.17
380.00	1.31	3.83	99.2	132.46	132.43
385.00	1.32	3.85	100.1	132.72	132.69
390.00	1.32	3.86	100.9	132.98	132.95
395.00	1.33	3.88	101.8	133.24	133.20
400.00	1.34	3.90	102.6	133.49	133.46
405.00	1.34	3.91	103.5	133.75	133.71
410.00	1.35	3.93	104.3	134.00	133.96
415.00	1.36	3.95	105.2	134.25	134.21
420.00	1.36	3.96	106.0	134.50	134.46
425.00	1.37	3.98	106.8	134.75	134.71
430.00	1.37	3.99	107.7	134.99	134.96
435.00	1.38	4.01	108.5	135.24	135.20

IMPASSABLE

Table
Rating Table for Irregular Channel

PRIMROSE PATH NEAR CAVE CREEK ROAD

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
440.00	1.39	4.02	109.3	135.48	135.45
445.00	1.39	4.04	110.1	135.73	135.69
450.00	1.40	4.06	111.0	135.97	135.93
455.00	1.40	4.07	111.8	136.21	136.17
460.00	1.41	4.09	112.6	136.45	136.41
465.00	1.42	4.10	113.4	136.69	136.65
470.00	1.42	4.11	114.2	136.92	136.89
475.00	1.43	4.13	115.0	137.16	137.12
480.00	1.43	4.14	115.8	137.39	137.36
485.00	1.44	4.16	116.6	137.63	137.59
490.00	1.45	4.17	117.4	137.86	137.82
495.00	1.45	4.19	118.2	138.09	138.05
500.00	1.46	4.20	119.0	138.32	138.28
505.00	1.46	4.21	119.8	138.55	138.51
510.00	1.47	4.23	120.6	138.78	138.74
515.00	1.47	4.24	121.4	139.01	138.97
520.00	1.48	4.26	122.2	139.23	139.19
525.00	1.49	4.27	123.0	139.46	139.42
530.00	1.49	4.28	123.7	139.68	139.64
535.00	1.50	4.30	124.5	139.90	139.86
540.00	1.50	4.31	125.3	140.13	140.08
545.00	1.51	4.32	126.1	140.35	140.31
550.00	1.51	4.34	126.8	140.57	140.53
555.00	1.52	4.35	127.6	140.79	140.74
560.00	1.52	4.36	128.4	141.01	140.96
565.00	1.53	4.37	129.1	141.22	141.18
570.00	1.53	4.39	129.9	141.44	141.40
575.00	1.54	4.40	130.7	141.66	141.61
580.00	1.55	4.41	131.4	141.87	141.83
585.00	1.55	4.43	132.2	142.08	142.04
590.00	1.56	4.44	132.9	142.30	142.25
595.00	1.56	4.45	133.7	142.51	142.46
600.00	1.57	4.46	134.5	142.72	142.68
605.00	1.57	4.47	135.2	142.93	142.89
610.00	1.58	4.49	136.0	143.14	143.10
615.00	1.58	4.50	136.7	143.35	143.30
620.00	1.59	4.51	137.4	143.56	143.51
625.00	1.59	4.52	138.2	143.77	143.72
630.00	1.60	4.53	138.9	143.97	143.93
635.00	1.60	4.55	139.7	144.18	144.13
640.00	1.61	4.56	140.4	144.38	144.34
645.00	1.61	4.57	141.2	144.59	144.54
650.00	1.62	4.58	141.9	144.79	144.74
655.00	1.62	4.59	142.6	144.99	144.95
660.00	1.63	4.60	143.4	145.20	145.15
665.00	1.63	4.62	144.1	145.40	145.35
670.00	1.64	4.63	144.8	145.60	145.55
675.00	1.64	4.64	145.5	145.80	145.75
680.00	1.65	4.65	146.3	146.00	145.95
685.00	1.65	4.66	147.0	146.20	146.15
690.00	1.66	4.67	147.7	146.39	146.35
695.00	1.66	4.68	148.4	146.59	146.54
700.00	1.67	4.69	149.2	146.79	146.74
705.00	1.67	4.70	149.9	146.98	146.93

Table
Rating Table for Irregular Channel

PRIMROSE PATH NEAR CAVE CREEK ROAD

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
710.00	1.68	4.71	150.6	147.18	147.13
715.00	1.68	4.73	151.3	147.37	147.32
720.00	1.69	4.74	152.0	147.57	147.52
725.00	1.69	4.75	152.7	147.76	147.71
730.00	1.70	4.76	153.4	147.95	147.90
735.00	1.70	4.77	154.1	148.15	148.09
740.00	1.71	4.78	154.9	148.34	148.29
745.00	1.71	4.79	155.6	148.53	148.48
750.00	1.72	4.80	156.3	148.72	148.67
755.00	1.72	4.81	157.0	148.91	148.86
760.00	1.73	4.82	157.7	149.10	149.04
765.00	1.73	4.83	158.4	149.29	149.23
770.00	1.74	4.84	159.1	149.47	149.42
775.00	1.74	4.85	159.8	149.66	149.61
780.00	1.74	4.86	160.5	149.85	149.79
785.00	1.75	4.87	161.2	150.03	149.98
790.00	1.75	4.88	161.9	150.22	150.16
795.00	1.76	4.89	162.6	150.40	150.35
800.00	1.76	4.90	163.3	150.59	150.53
805.00	1.77	4.91	163.9	150.77	150.72
810.00	1.77	4.92	164.6	150.96	150.90
815.00	1.78	4.93	165.3	151.14	151.08
820.00	1.78	4.94	166.0	151.32	151.26
825.00	1.79	4.95	166.7	151.50	151.45
830.00	1.79	4.96	167.4	151.68	151.63
835.00	1.80	4.97	168.1	151.86	151.81
840.00	1.80	4.98	168.8	152.04	151.99
845.00	1.80	4.99	169.4	152.22	152.17
850.00	1.81	5.00	170.1	152.40	152.35
855.00	1.81	5.01	170.8	152.58	152.52
860.00	1.82	5.02	171.5	152.76	152.70
865.00	1.82	5.02	172.1	152.94	152.88
870.00	1.83	5.03	172.8	153.11	153.06
875.00	1.83	5.04	173.5	153.29	153.23
880.00	1.84	5.05	174.2	153.47	153.41
885.00	1.84	5.06	174.8	153.64	153.58
890.00	1.84	5.07	175.5	153.82	153.76
895.00	1.85	5.08	176.2	153.99	153.93
900.00	1.85	5.09	176.9	154.17	154.11
905.00	1.86	5.10	177.5	154.34	154.28
910.00	1.86	5.11	178.2	154.51	154.45
915.00	1.87	5.12	178.9	154.69	154.63
920.00	1.87	5.12	179.5	154.86	154.80
925.00	1.87	5.13	180.2	155.03	154.97
930.00	1.88	5.14	180.9	155.20	155.14
935.00	1.88	5.15	181.5	155.37	155.31
940.00	1.89	5.16	182.2	155.54	155.48
945.00	1.89	5.17	182.8	155.71	155.65
950.00	1.90	5.18	183.5	155.88	155.82
955.00	1.90	5.19	184.2	156.05	155.99
960.00	1.90	5.19	184.8	156.22	156.16
965.00	1.91	5.20	185.5	156.39	156.33
970.00	1.91	5.21	186.1	156.56	156.50
975.00	1.92	5.22	186.8	156.72	156.66

Table
Rating Table for Irregular Channel

PRIMROSE PATH NEAR CAVE CREEK ROAD

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
980.00	1.92	5.23	187.4	156.89	156.83
985.00	1.92	5.24	188.1	157.06	157.00
990.00	1.93	5.25	188.7	157.23	157.16
995.00	1.93	5.25	189.4	157.39	157.33
1,000.00	1.94	5.26	190.1	157.56	157.49
1,005.00	1.94	5.27	190.7	157.72	157.66
1,010.00	1.95	5.28	191.3	157.89	157.82
1,015.00	1.95	5.29	192.0	158.05	157.99
1,020.00	1.95	5.29	192.6	158.21	158.15
1,025.00	1.96	5.30	193.3	158.38	158.31
1,030.00	1.96	5.31	193.9	158.54	158.48
1,035.00	1.97	5.32	194.6	158.70	158.64
1,040.00	1.97	5.33	195.2	158.87	158.80
1,045.00	1.97	5.34	195.9	159.03	158.96
1,050.00	1.98	5.34	196.5	159.19	159.12
1,055.00	1.98	5.35	197.1	159.35	159.28
1,060.00	1.99	5.36	197.8	159.51	159.45
1,065.00	1.99	5.37	198.4	159.67	159.61
1,070.00	1.99	5.38	199.1	159.83	159.77
1,075.00	2.00	5.38	199.7	159.99	159.92
1,080.00	2.00	5.39	200.3	160.15	160.08
1,085.00	2.01	5.40	201.0	160.31	160.24
1,090.00	2.01	5.41	201.6	160.47	160.40
1,095.00	2.01	5.41	202.2	160.63	160.56
1,100.00	2.02	5.42	202.9	160.78	160.72
1,105.00	2.02	5.43	203.5	160.94	160.87
1,110.00	2.03	5.44	204.1	161.10	161.03
1,115.00	2.03	5.45	204.8	161.26	161.19
1,120.00	2.03	5.45	205.4	161.41	161.34
1,125.00	2.04	5.46	206.0	161.57	161.50
1,130.00	2.04	5.47	206.7	161.72	161.66
1,135.00	2.05	5.48	207.3	161.88	161.81
1,140.00	2.05	5.48	207.9	162.03	161.97
1,145.00	2.05	5.49	208.5	162.19	162.12
1,150.00	2.06	5.50	209.2	162.34	162.27
1,155.00	2.06	5.51	209.8	162.50	162.43
1,160.00	2.06	5.51	210.4	162.65	162.58
1,165.00	2.07	5.52	211.0	162.81	162.74
1,170.00	2.07	5.53	211.7	162.96	162.89
1,175.00	2.08	5.54	212.3	163.11	163.04
1,180.00	2.08	5.54	212.9	163.26	163.19
1,185.00	2.08	5.55	213.5	163.42	163.35
1,190.00	2.09	5.56	214.1	163.57	163.50
1,195.00	2.09	5.56	214.8	163.72	163.65
1,200.00	2.09	5.57	215.4	163.87	163.80
1,205.00	2.10	5.58	216.0	164.02	163.95
1,210.00	2.10	5.59	216.6	164.17	164.10
1,215.00	2.11	5.59	217.2	164.32	164.25
1,220.00	2.11	5.60	217.8	164.47	164.40
1,225.00	2.11	5.61	218.5	164.62	164.55
1,230.00	2.12	5.61	219.1	164.77	164.70
1,235.00	2.12	5.62	219.7	164.92	164.85
1,240.00	2.12	5.63	220.3	165.07	165.00
1,245.00	2.13	5.64	220.9	165.22	165.15

Table
Rating Table for Irregular Channel

PRIMROSE PATH NEAR CAVE CREEK ROAD

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
1,250.00	2.13	5.64	221.5	165.37	165.29
1,255.00	2.14	5.65	222.1	165.51	165.44
1,260.00	2.14	5.66	222.7	165.66	165.59
1,265.00	2.14	5.66	223.4	165.81	165.74
1,270.00	2.15	5.67	224.0	165.96	165.88
1,275.00	2.15	5.68	224.6	166.10	166.03
1,280.00	2.15	5.68	225.2	166.25	166.17
1,285.00	2.16	5.69	225.8	166.40	166.32
1,290.00	2.16	5.70	226.4	166.54	166.47
1,295.00	2.17	5.70	227.0	166.69	166.61
1,300.00	2.17	5.71	227.6	166.83	166.76
1,305.00	2.17	5.72	228.2	166.98	166.90
1,310.00	2.18	5.73	228.8	167.12	167.05
1,315.00	2.18	5.73	229.4	167.27	167.19
1,320.00	2.18	5.74	230.0	167.41	167.33
1,325.00	2.19	5.75	230.6	167.55	167.48
1,330.00	2.19	5.75	231.2	167.70	167.62
1,335.00	2.19	5.76	231.8	167.84	167.77
1,340.00	2.20	5.77	232.4	167.98	167.91
1,345.00	2.20	5.77	233.0	168.13	168.05
1,350.00	2.20	5.78	233.6	168.27	168.19
1,355.00	2.21	5.79	234.2	168.41	168.34
1,360.00	2.21	5.79	234.8	168.55	168.48
1,365.00	2.22	5.80	235.4	168.70	168.62
1,370.00	2.22	5.81	236.0	168.84	168.76
1,375.00	2.22	5.81	236.6	168.98	168.90
1,380.00	2.23	5.82	237.2	169.12	169.04
1,385.00	2.23	5.82	237.8	169.26	169.18
1,390.00	2.23	5.83	238.4	169.40	169.32
1,395.00	2.24	5.84	239.0	169.54	169.46
1,400.00	2.24	5.84	239.6	169.68	169.60
1,405.00	2.24	5.85	240.2	169.82	169.74
1,410.00	2.25	5.86	240.7	169.96	169.88
1,415.00	2.25	5.86	241.3	170.10	170.02
1,420.00	2.25	5.87	241.9	170.24	170.16
1,425.00	2.26	5.88	242.5	170.38	170.30
1,430.00	2.26	5.88	243.1	170.52	170.44
1,435.00	2.26	5.89	243.7	170.65	170.57
1,440.00	2.27	5.89	244.3	170.79	170.71
1,445.00	2.27	5.90	244.9	170.93	170.85
1,450.00	2.27	5.91	245.5	171.07	170.99
1,455.00	2.28	5.91	246.0	171.21	171.12
1,460.00	2.28	5.92	246.6	171.34	171.26
1,465.00	2.28	5.93	247.2	171.48	171.40
1,470.00	2.29	5.93	247.8	171.62	171.53
1,475.00	2.29	5.94	248.4	171.75	171.67
1,480.00	2.30	5.94	249.0	171.89	171.81
1,485.00	2.30	5.95	249.6	172.02	171.94
1,490.00	2.30	5.96	250.1	172.16	172.08
1,495.00	2.31	5.96	250.7	172.30	172.21
1,500.00	2.31	5.97	251.3	172.43	172.35
1,505.00	2.31	5.98	251.9	172.57	172.48
1,510.00	2.32	5.98	252.5	172.70	172.62
1,515.00	2.32	5.99	253.0	172.83	172.75

Table
Rating Table for Irregular Channel

PRIMROSE PATH NEAR CAVE CREEK ROAD

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
1,520.00	2.32	5.99	253.6	172.97	172.89
1,525.00	2.33	6.00	254.2	173.10	173.02
1,530.00	2.33	6.01	254.8	173.24	173.15
1,535.00	2.33	6.01	255.4	173.37	173.29
1,540.00	2.34	6.02	255.9	173.50	173.42
1,545.00	2.34	6.02	256.5	173.64	173.55
1,550.00	2.34	6.03	257.1	173.77	173.69
1,555.00	2.35	6.03	257.7	173.90	173.82
1,560.00	2.35	6.04	258.2	174.04	173.95
1,565.00	2.35	6.05	258.8	174.17	174.08
1,570.00	2.36	6.05	259.4	174.30	174.22
1,575.00	2.36	6.06	260.0	174.43	174.35
1,580.00	2.36	6.06	260.5	174.56	174.48
1,585.00	2.37	6.07	261.1	174.70	174.61
1,590.00	2.37	6.08	261.7	174.83	174.74
1,595.00	2.37	6.08	262.3	174.96	174.87
1,600.00	2.38	6.09	262.8	175.09	175.00

GW 100 YR 6 HR

FUTURE

25 (JEF

PRIMROSE PATH NEAR CAVE CREEK ROAD

```
1*************************************
*                                   *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN  1998            *
*            VERSION 4.1            *
*                                   *
* RUN DATE   27NOV02  TIME  08:49:21 *
*                                   *
*************************************
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```
*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*           (916) 756-1104          *
*                                   *
*************************************
```

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

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

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

1 HEC-1 INPUT PAGE 1

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

  1           ID     FUTURE CONDITIONS HYDROLOGY FOR CAREFREE AREA DRAINAGE MASTER PLAN
  2           ID       BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC., DEC. 2001
  3           ID
  4           ID     FUTURE CONDITIONS LAND USE BASED ON CAVE CREEK WATERCOURSE MASTER PLAN
  5           ID     HYDROLOGY BY TETRA TECH, 2000.
  6           ID
  7           ID     BASE MODEL BASED ON:
  8           ID
  9           ID          FLOODPLAIN DELINEATION STUDY OF ANDORA HILLS & GALLOWAY WASHES
 10           ID          FCD 99-14
 11           ID          BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC.
 12           ID          FOR THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
 13           ID          REVISED MARCH 2002     FILENAME: GWM224R.DAT
 14           ID      ****************************************************************
 15           ID          100 YEAR ANALYSIS 24-HOUR STORM USING JD RECORDS
 16           ID          MCUHP2 USED FOR UNIT HYDROGRAPHS
 17           ID     ****************************************************************
 18           ID
 19           ID     DDM MCUHP2 GALLOWAY WASH FLOODPLAIN DELINEATION STUDY, FCD NO. 99-14
 20           ID
 21           ID    March 2002 revisions to original Dec. 1999 model include:
 22           ID
 23           ID    HC BLOCK ADDED FOR GRAPEVINE WASH (CP 295A)
 24           ID
 25           ID    SUBBASIN GWW1_3 FURTHER SUBDIVIDED ALONG GALLOWAY WASH PER FEMA COMMENTS
 26           ID    IN LETTER DATED FEB. 8, 2002
 27           ID
 28           ID    *** ADDITIONAL COMBINATION ADDED 10-17-02 TO PROVIDE TOTAL FLOW IN
 29           ID        NORTH GALLOWAY WASH BY TWL FOR CH2M HILL FOR CAREFREE DMP ***
 30           ID
 31           ID   DDM MCUHP2 Carefree Area Drainage Master Plan, Galloway Wash Future Condition
              *DIAGRAM
 32           IT       5 01DEC99    0005     400
 33           IO       5       2
 34           IN      15
 35           JD    3.50    0.01
 36           PC    .000    .008    .016    .025    .033    .041    .050    .058    .066    .074
 37           PC    .087    .099    .118    .138    .216    .377    .834    .911    .931    .950
 38           PC    .962    .972    .983    .991   1.000
 39           JD    3.48    0.50
 40           JD    3.43    2.80
 41           PC    .000    .009    .016    .025    .034    .042    .051    .059    .067    .076
 42           PC    .087    .100    .120    .163    .252    .451    .694    .837    .900    .938
 43           PC    .950    .963    .975    .988   1.000
 44           JD    3.23    16.0
 45           PC    .000    .015    .020    .030    .048    .063    .076    .090    .105    .119
 46           PC    .135    .152    .175    .222    .304    .472    .670    .796    .868    .912
 47           PC    .946    .960    .973    .987   1.000
 48           JD    2.84    90.0
 49           PC    .000    .021    .035    .051    .071    .087    .105    .125    .143    .160
 50           PC    .179    .201    .232    .281    .364    .500    .658    .773    .841    .888
 51           PC    .927    .945    .964    .982   1.000
              *
              * DDM   ***** Updated *****
```

1 HEC-1 INPUT PAGE 2

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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
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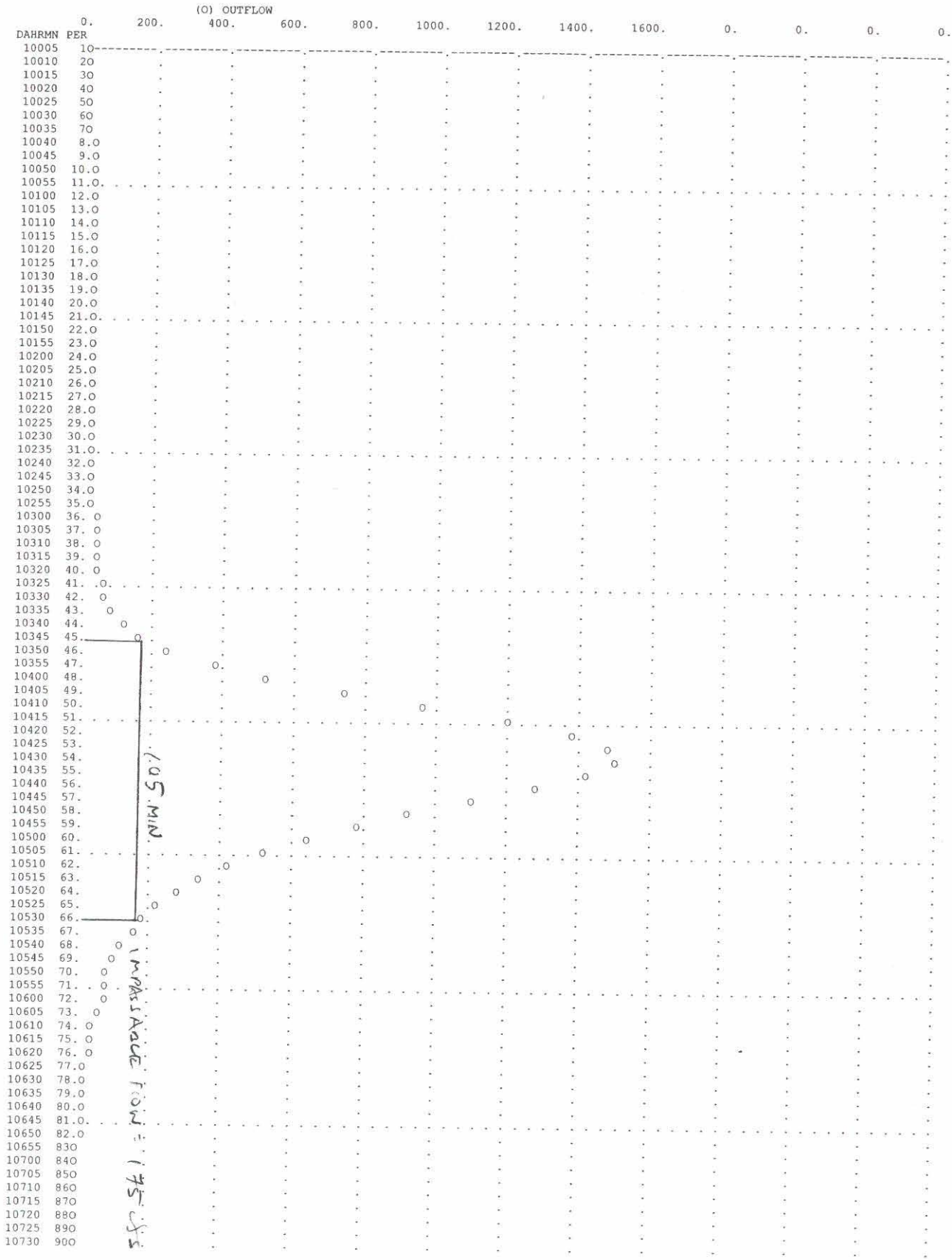
PRIMROSE PATH NEAR CAVE CREEK ROAD

1

STATION GWW1_5

(O) OUTFLOW



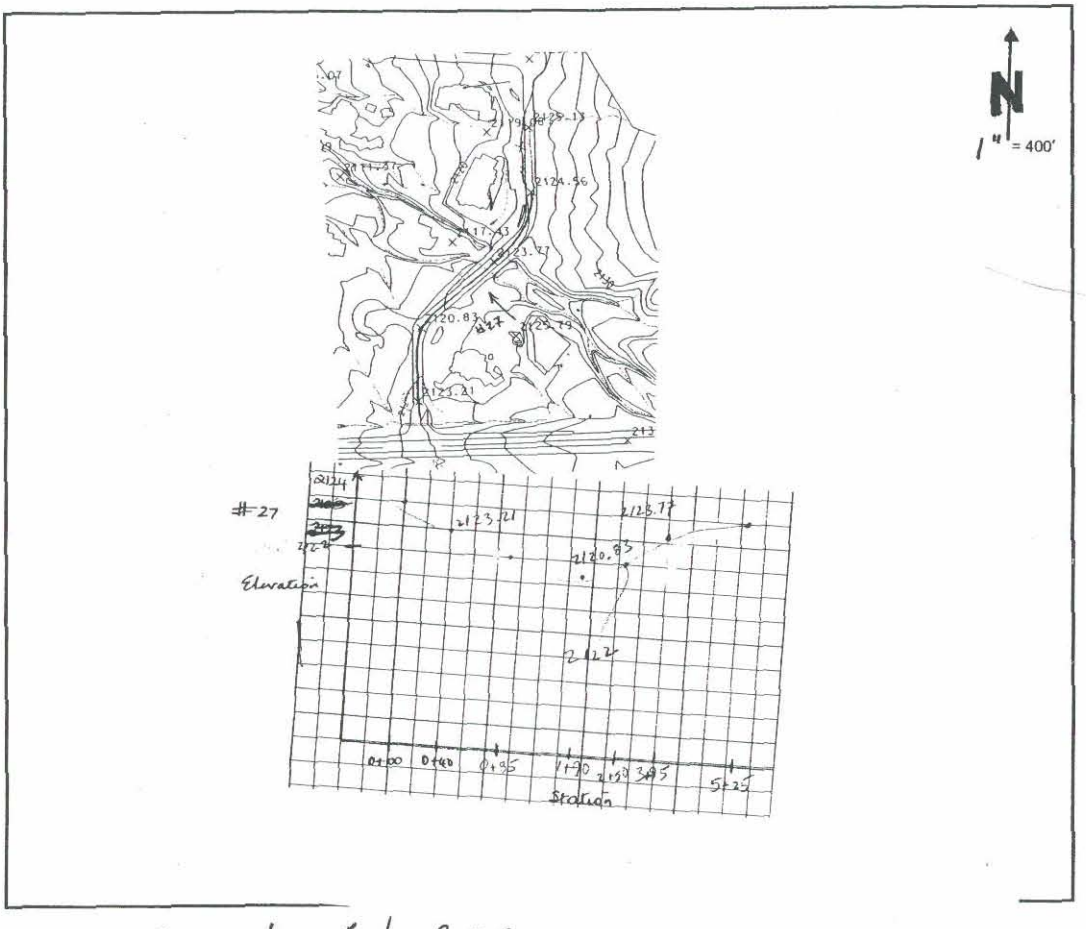
Los Reales Drive at Gated Community (#27)

Carefree Drainage Master Plan
Crossing Notes

ID Number: #27

Source of Data:

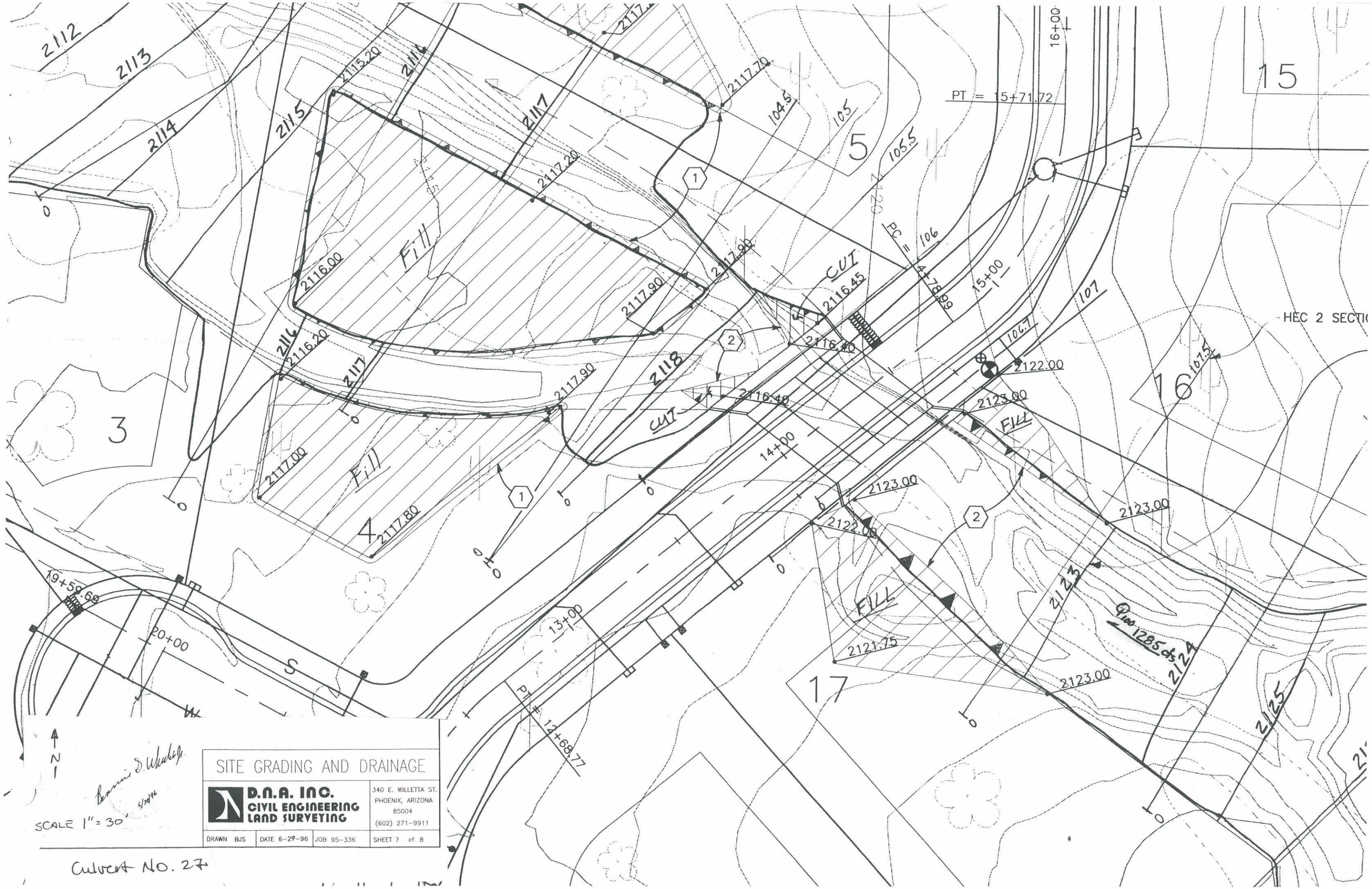
Location: LOS REALES DR - GATED COMMUNITY



Material: 4 - 10' x 4' RCB

Protection: YES - STD W/ WING WALLS

Notes: FIELD SURVEY BY AZTEC ENGINEERING
SEE ATTACHED SITE GRADING AND DRAINAGE PLAN


2112
2113
2114
2115
2116
2117
2115.20
2117.70
2117.20
2116.00
2116.20
2117.90
2117.80
2117.00
2116.45
2116.40
2122.00
2123.00
2122.00
2121.75
104.5
105
105.5
106
106.7
107
107.5
PT = 15+71.72
PC = 106
4+78.99
16+00
15+00
14+00
13+00
19+59.69
20+00
PT = 12+68.77
CUT
FILL
Fill
Q100 1285 cfs
HEC 2 SECTI
15
16
17
5
4
3
S
1
2
N
SITE GRADING AND DRAINAGE
D.N.A. INC.
CIVIL ENGINEERING
LAND SURVEYING
340 E. WILLETTA ST.
PHOENIX, ARIZONA
85004
(602) 271-9911
DRAWN BJS
DATE 6-29-96
JOB 95-336
SHEET 7 of 8
SCALE 1" = 30'
Culvert No. 27

Curve
Plotted Curves for Irregular Channel

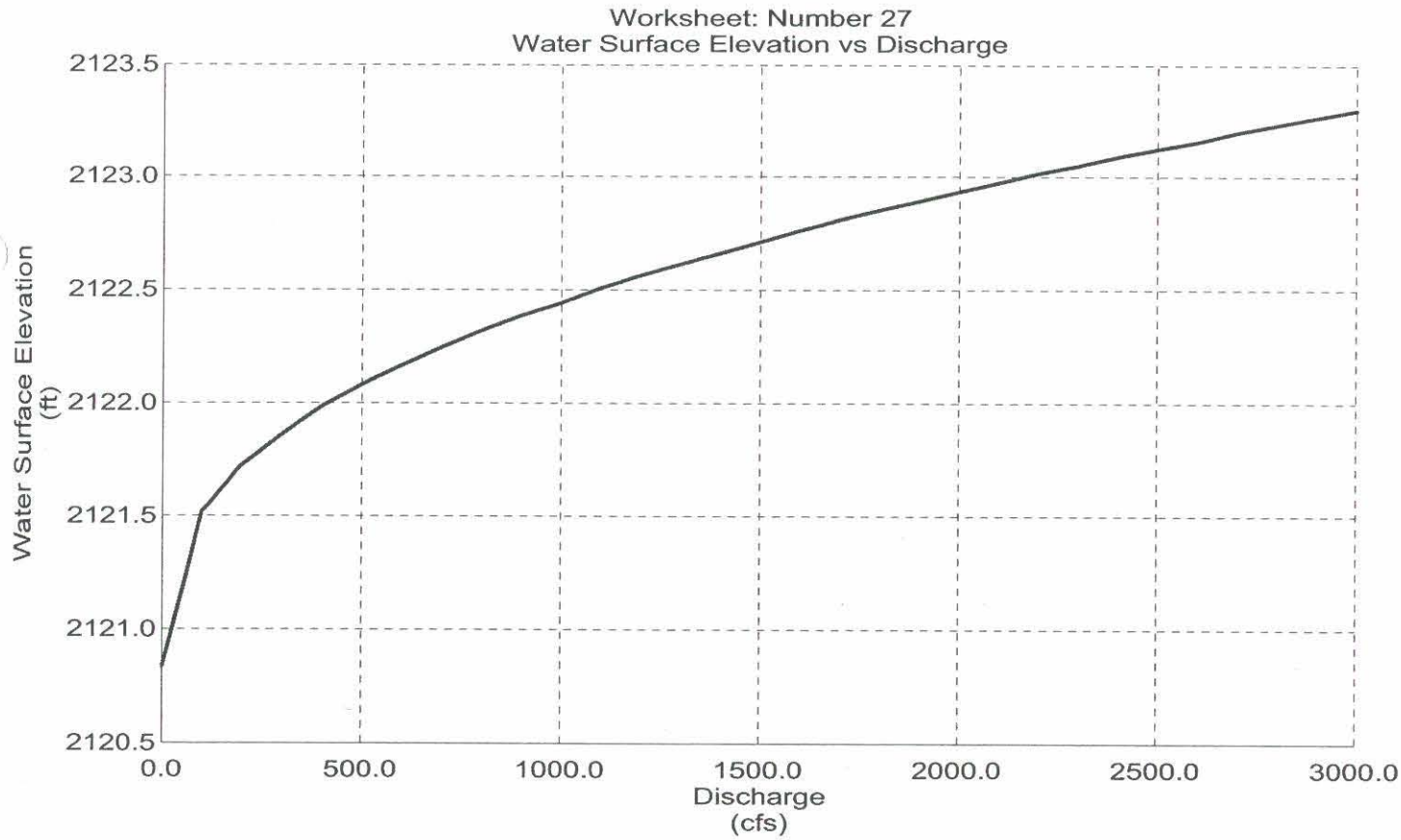
Los Reales Dr At Gated Community

Project Description	
Worksheet	Number 27
Flow Element	Irregular Chan
Method	Manning's Forr
Solve For	Channel Depth

Input Data	
Slope	010000 ft/ft

Options	
Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	3,000.00	100.00



Curve
Plotted Curves for Irregular Channel

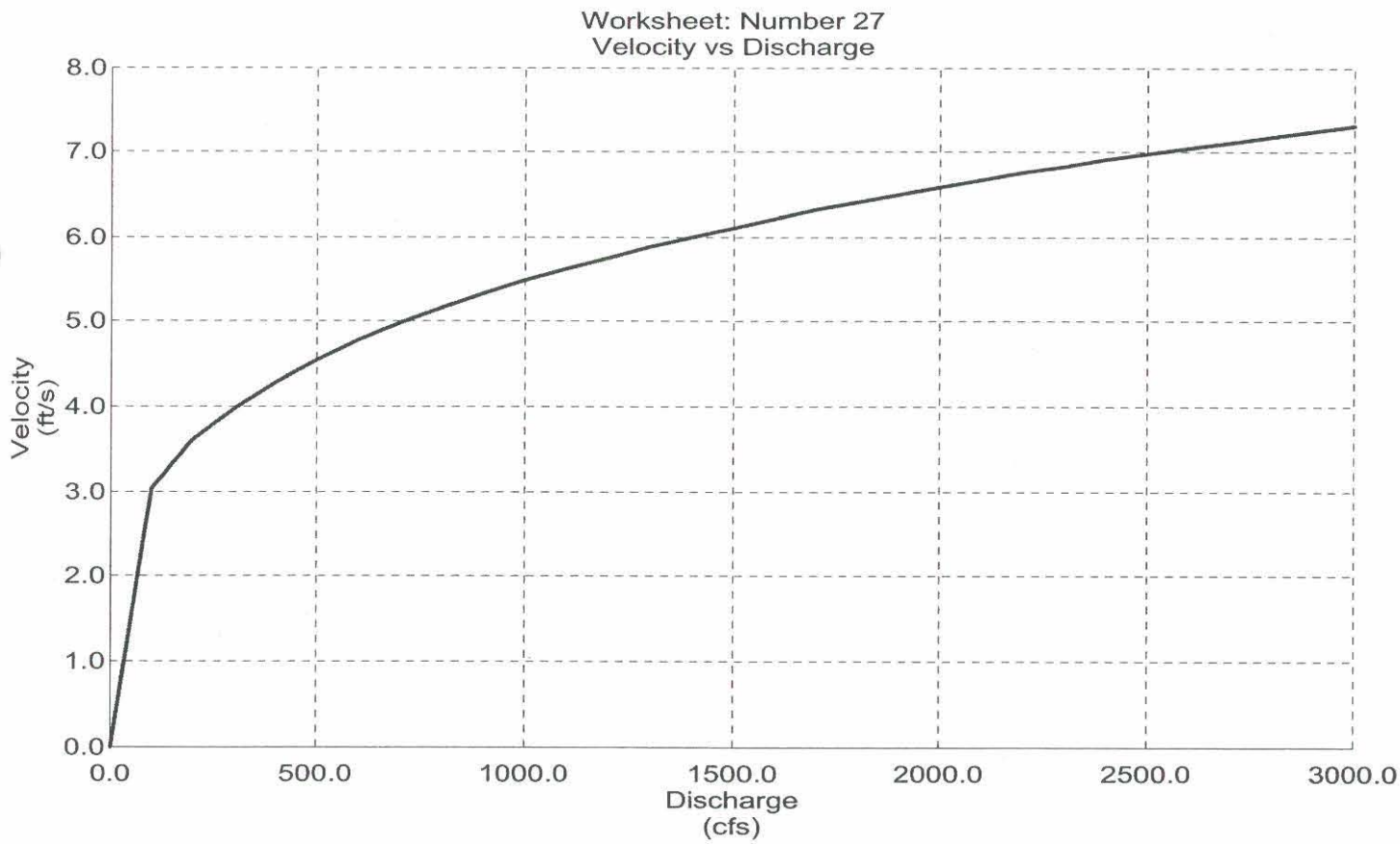
LOS REALES DRIVE AT GATED COMMUNITY

Project Description	
Worksheet	Number 27
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data	
Slope	010000 ft/ft

Options	
Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	3,000.00	100.00



Plan: Plan 02 Unnamed Central North RS: 0.7415 Culv Group: Culvert #1 Profile: PF 1

Q Culv Group (cfs)	1468.12	Culv Full Len (ft)	41.70
# Barrels	4	Culv Vel US (ft/s)	9.18
Q Barrel (cfs)	367.03	Culv Vel DS (ft/s)	9.18
E.G. US. (ft)	2122.93	Culv Inv El Up (ft)	2117.57
W.S. US. (ft)	2122.76	Culv Inv El Dn (ft)	2116.81
E.G. DS (ft)	2121.18	Culv Frctn Ls (ft)	0.64
W.S. DS (ft)	2120.93	Culv Exit Loss (ft)	1.06
Delta EG (ft)	1.75	Culv Entr Loss (ft)	0.52
Delta WS (ft)	1.84	Q Weir (cfs)	781.88
E.G. IC (ft)	2123.13	Weir Sta Lft (ft)	70.24
E.G. OC (ft)	2122.93	Weir Sta Rgt (ft)	308.84
Culvert Control	Outlet	Weir Submerg	0.00
Culv WS Inlet (ft)	2121.57	Weir Max Depth (ft)	1.90
Culv WS Outlet (ft)	2120.81	Weir Avg Depth (ft)	1.11
Culv Nml Depth (ft)	1.91	Weir Flow Area (sq ft)	262.57
Culv Crt Depth (ft)	3.47	Min El Weir Flow (ft)	2121.03

$V = Q/A$

$V = 782\,cfs / 262.6\,ft^2 = 2.98\,fps$

$Q_{TOT} = 2289\,cfs$

LOS REALES DRIVE AT GATED COMMUNITY

Plan: Plan 09 Unnamed Central North RS: 0.7415 Profile: PF 5 Culvert ID: Culvert #1

Culv Q (cfs)	957.08	Culv Ful Lngh (ft)	
# Barrels	4	Culv Vel US (ft/s)	9.17
Q Barrel (cfs)	239.27	Culv Vel DS (ft/s)	12.79
E.G. US. (ft)	2122.01	Culv Inv El Up (ft)	2117.57
W.S. US. (ft)	2121.86	Culv Inv El Dn (ft)	2116.81
E.G. DS (ft)	2120.34	Culv Frctn Ls (ft)	0.26
W.S. DS (ft)	2119.93	Culv Ext Lss (ft)	0.88
Delta EG (ft)	1.67	Culv Ent Lss (ft)	0.52
Delta WS (ft)	1.92	Q Weir (cfs)	192.92
E.G. IC (ft)	2121.76	Weir Sta Lft (ft)	110.31
E.G. OC (ft)	2122.01	Weir Sta Rgt (ft)	259.25
Culvert Control	Outlet	Weir Submerg	0.00
Culv WS Inlet (ft)	2120.18	Weir Max Depth (ft)	0.98 ←
Culv WS Outlet (ft)	2118.68	Weir Avg Depth (ft)	0.60
Culv Nml Depth (ft)	1.44	Wr Flw Area (sq ft)	88.90
Culv Crt Depth (ft)	2.61	Min El Weir Flow (ft)	2121.03

Q_{TOT} = 1150 cfs (PASSABLE)

UC 100 YR, 24 HR
FUTURE
Los Reales Drive At Gatto Community

```
1*************************************
 *                                   *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
 *              JUN  1998            *
 *           VERSION 4.1             *
 *                                   *
 *  RUN DATE   27NOV02  TIME  08:53:50  *
 *                                   *
 *************************************
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*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*           (916) 756-1104          *
*                                   *
*************************************
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X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
```

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

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


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

  1           ID         UC MODEL - UNNAMED WASH, CENTRAL
  2           ID         100-YEAR 24-HOUR MODEL  FILENAME: UC10024F.DAT
  3           ID         FUTURE CONDITIONS
  4           ID         CAREFREE DRAINAGE MASTER PLAN
  5           ID         FCD 2000C037
  6           ID         BY CH2M HILL
  7           ID         FOR THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
  8           ID         JANUARY 2002
  9           ID    ****************************************************************
 10           ID         100 YEAR ANALYSIS 24-HOUR STORM
 11           ID         SCS TYPE II DISTRIBUTION
 12           ID         GREEN AND AMPT LOSS RATE METHOD, NMIN=2
 13           ID         CLARK UNIT HYDROGRAPH, NORMAL DEPTH CHANNEL ROUTING
 14           ID    ****************************************************************
 15           ID      DEPTH-AREA REDUCT FACTORS BASED ON TABLE 2.1a OF FCDMC MANUAL
 16           ID      PC RECORDS ARE 24-HOUR SCS TYPE II RAINFALL DISTRIBUTION
 17           ID      PRELIMINARY
              *DIAGRAM
 18           IT       2                    500
 19           IO       5       2
 20           IN      15
 21           JD    4.60    0.01
 22           PC   0.000   0.002   0.005   0.008   0.011   0.013   0.016   0.019   0.022   0.025
 23           PC   0.028   0.032   0.035   0.038   0.041   0.044   0.048   0.053   0.056   0.060
 24           PC   0.063   0.067   0.071   0.075   0.080   0.084   0.089   0.093   0.098   0.103
 25           PC   0.109   0.114   0.120   0.127   0.133   0.140   0.147   0.155   0.163   0.172
 26           PC   0.181   0.192   0.204   0.220   0.235   0.259   0.283   0.473   0.663   0.699
 27           PC   0.735   0.754   0.772   0.785   0.799   0.810   0.820   0.829   0.838   0.846
 28           PC   0.854   0.861   0.868   0.874   0.880   0.885   0.891   0.900   0.902   0.910
 29           PC   0.912   0.920   0.921   0.926   0.929   0.930   0.937   0.941   0.945   0.950
 30           PC   0.952   0.957   0.959   0.962   0.965   0.970   0.972   0.973   0.978   0.981
 31           PC   0.984   0.987   0.989   0.992   0.995   0.998   1.000
 32           JD    4.57    1.00
 33           JD    4.46    5.00
              *

 34           KK     UC8
 35           KM   SUB-BASIN 8, UNNAMED WASH CENTRAL
 36           KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 37           KM    L= 1.04   Kb= 0.031   S=138.0
 38           BA    .054
 39           LG     .30     .36     4.9     .26    36.0
 40           UC    .225    .384
 41           UA       0       5      16      30      65      77      84      90      94      97
 42           UA     100
              *

 43           KK     UC9
 44           KM    SUBBASIN 9, UNNAMED WASH CENTRAL
 45           KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 46           KM    L= 0.91   Kb= 0.031   S=145.0
 47           BA    .047
 48           LG     .30     .36     5.0     .23    36.0
 49           UC    .208    .316
 50           UA       0       5      16      30      65      77      84      90      94      97
```

Los Reales Drive At Gated Community

```
 11634 4980
 11636 4990
 11638 5000---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
1
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```
1                                                    STATION     CP84

                          (O) OUTFLOW
          0.      400.      800.     1200.     1600.     2000.     2400.     2800.       0.        0.        0.        0.        0.
DAHRMN PER
 10000   1O---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
 10002   2O         .         .         .         .         .         .         .         .         .         .         .         .
 10004   3O         .         .         .         .         .         .         .         .         .         .         .         .
 10006   4O         .         .         .         .         .         .         .         .         .         .         .         .
 10008   5O         .         .         .         .         .         .         .         .         .         .         .         .
 10010   6O         .         .         .         .         .         .         .         .         .         .         .         .
 10012   7O         .         .         .         .         .         .         .         .         .         .         .         .
 10014   8O         .         .         .         .         .         .         .         .         .         .         .         .
 10016   9O         .         .         .         .         .         .         .         .         .         .         .         .
 10018  10O         .         .         .         .         .         .         .         .         .         .         .         .
 10020  11O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10022  12O         .         .         .         .         .         .         .         .         .         .         .         .
 10024  13O         .         .         .         .         .         .         .         .         .         .         .         .
 10026  14O         .         .         .         .         .         .         .         .         .         .         .         .
 10028  15O         .         .         .         .         .         .         .         .         .         .         .         .
 10030  16O         .         .         .         .         .         .         .         .         .         .         .         .
 10032  17O         .         .         .         .         .         .         .         .         .         .         .         .
 10034  18O         .         .         .         .         .         .         .         .         .         .         .         .
 10036  19O         .         .         .         .         .         .         .         .         .         .         .         .
 10038  20O         .         .         .         .         .         .         .         .         .         .         .         .
 10040  21O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10042  22O         .         .         .         .         .         .         .         .         .         .         .         .
 10044  23O         .         .         .         .         .         .         .         .         .         .         .         .
 10046  24O         .         .         .         .         .         .         .         .         .         .         .         .
 10048  25O         .         .         .         .         .         .         .         .         .         .         .         .
 10050  26O         .         .         .         .         .         .         .         .         .         .         .         .
 10052  27O         .         .         .         .         .         .         .         .         .         .         .         .
 10054  28O         .         .         .         .         .         .         .         .         .         .         .         .
 10056  29O         .         .         .         .         .         .         .         .         .         .         .         .
 10058  30O         .         .         .         .         .         .         .         .         .         .         .         .
 10100  31O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10102  32O         .         .         .         .         .         .         .         .         .         .         .         .
 10104  33O         .         .         .         .         .         .         .         .         .         .         .         .
 10106  34O         .         .         .         .         .         .         .         .         .         .         .         .
 10108  35O         .         .         .         .         .         .         .         .         .         .         .         .
 10110  36O         .         .         .         .         .         .         .         .         .         .         .         .
 10112  37O         .         .         .         .         .         .         .         .         .         .         .         .
 10114  38O         .         .         .         .         .         .         .         .         .         .         .         .
 10116  39O         .         .         .         .         .         .         .         .         .         .         .         .
 10118  40O         .         .         .         .         .         .         .         .         .         .         .         .
 10120  41O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10122  42O         .         .         .         .         .         .         .         .         .         .         .         .
 10124  43O         .         .         .         .         .         .         .         .         .         .         .         .
 10126  44O         .         .         .         .         .         .         .         .         .         .         .         .
 10128  45O         .         .         .         .         .         .         .         .         .         .         .         .
 10130  46O         .         .         .         .         .         .         .         .         .         .         .         .
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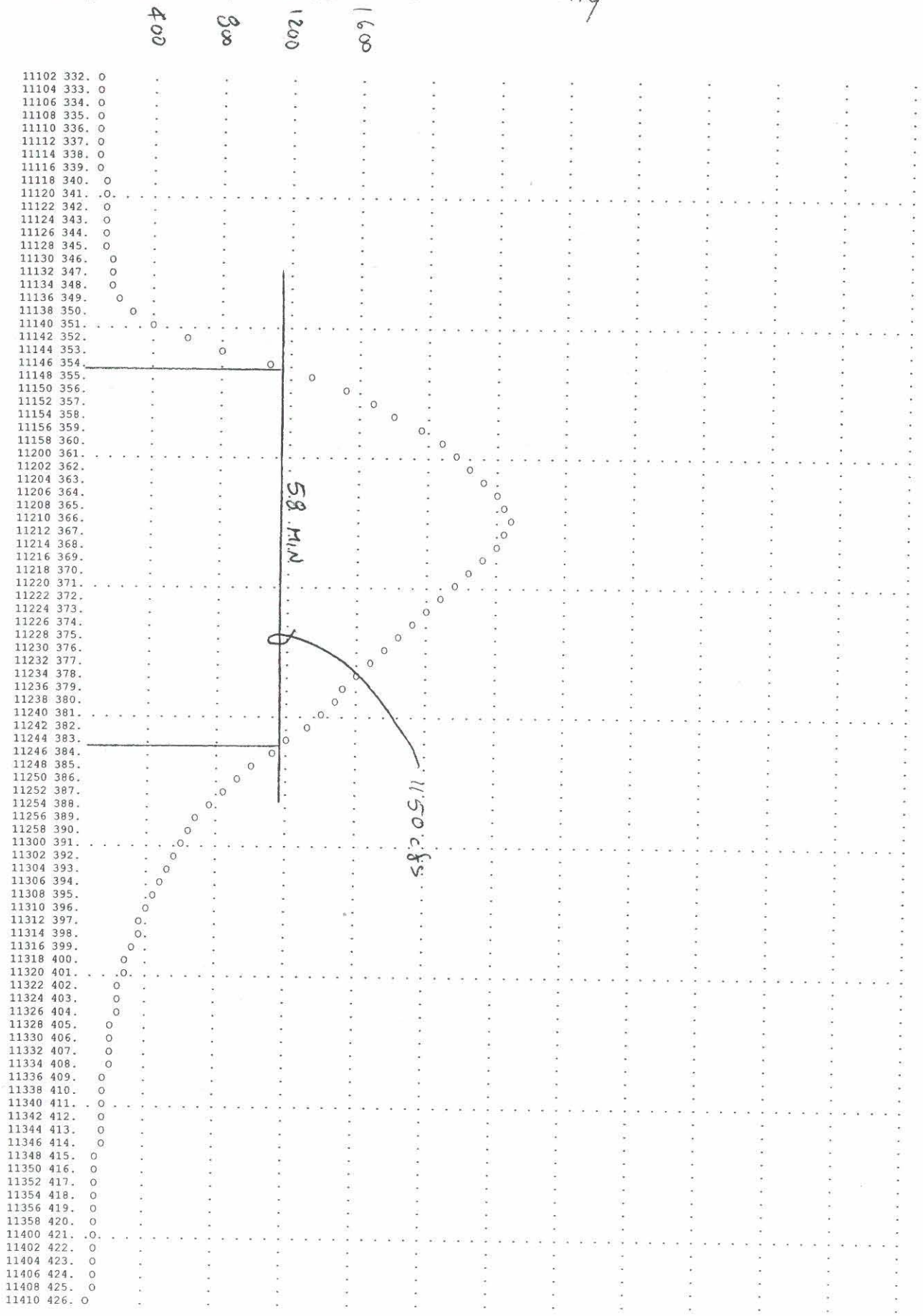
Los Reales Drive At Gated Community



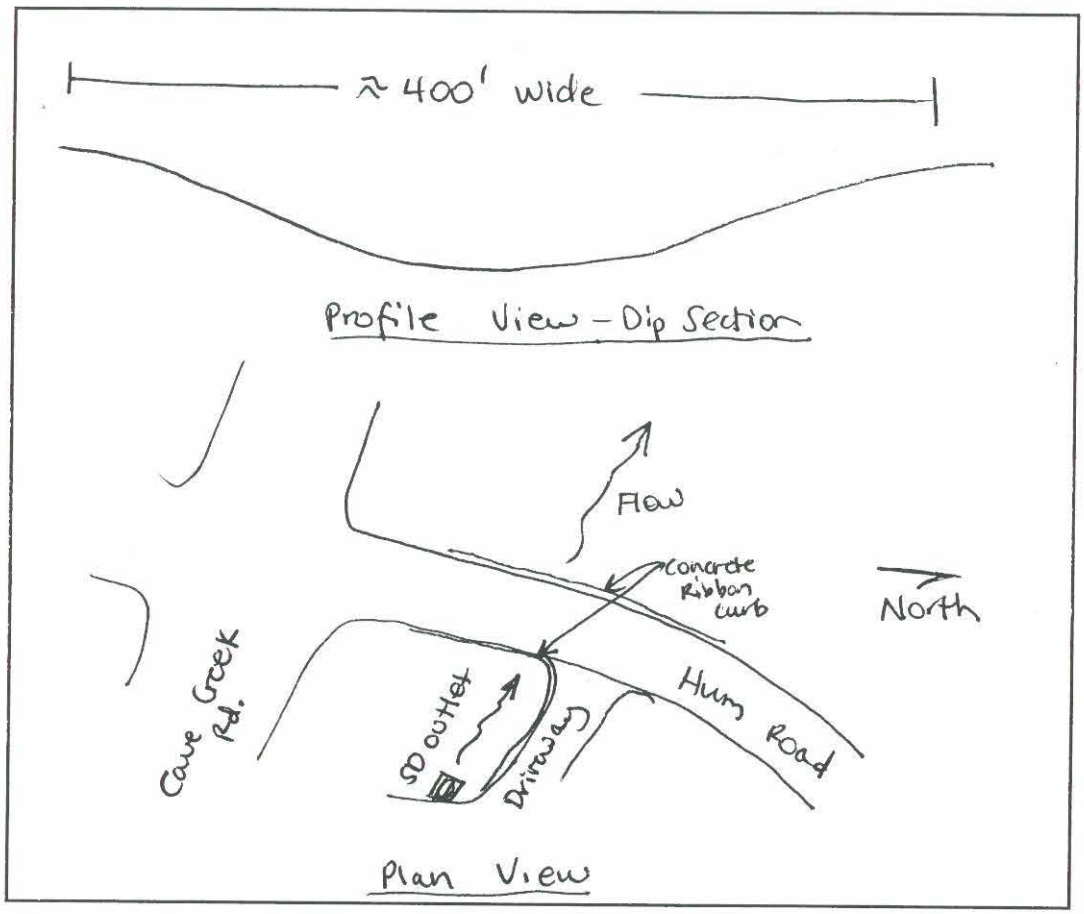
Hum Road Near Cave Creek Road (JEF #29)

Carefree Drainage Master Plan
Field Survey Notes

Culvert Number: # JEF 29

Date of Survey: 10/10/02

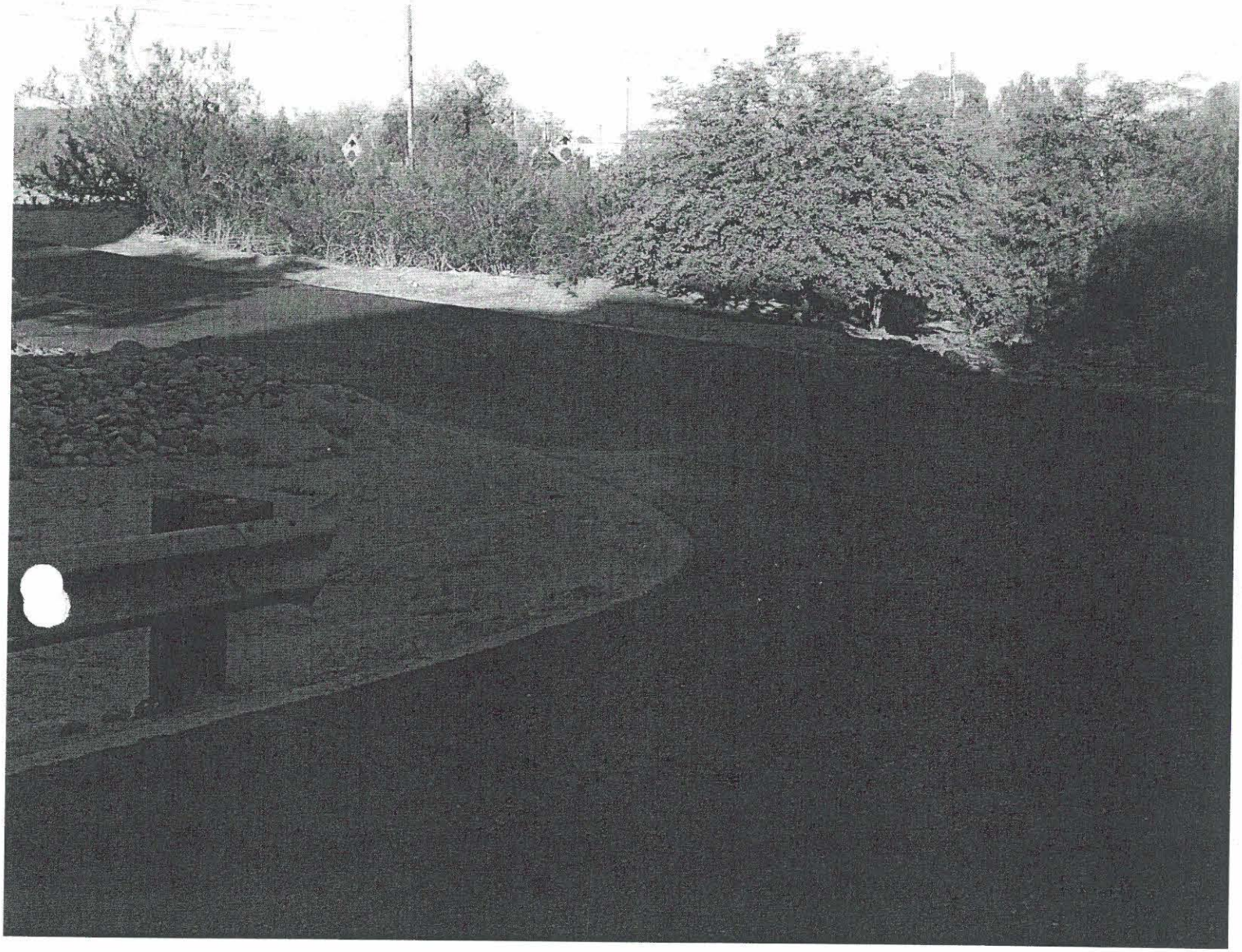
Location: Hum Road near Cave Creek Road



Material: Asphalt Road, riprap at downstream

Headwall: None - Dip Crossing

Notes: Well confined dip



HUM ROAD NEAR CAVE CREEK ROAD

NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
MARICOPA COUNTY, ARIZONA AND INCORPORATED AREAS
PANEL 808 OF 4350
CONTAINS:
COMMUNITY NUMBER PANEL SUFFIX
CAREFREE, TOWN OF . . . . . 040126 . . . 0808 . . . G
CAVE CREEK, TOWN OF . . . . . 040129 . . . 0808 . . . G
SCOTTSDALE, CITY OF . . . . . 045012 . . . 0808 . . . G
MAP NUMBER
04013C0808G
MAP REVISED:
DECEMBER 3, 1993
Federal Emergency Management Agency
ZONE X
ZONE AE
ZONE D
LIMIT OF DETAILED STUDY
RM136
RM135
RM134
RM133
RM598
Galloway Wash
Galloway Wash Lower Branch
Footbridge
SUNDANCE TRAIL
CREEK
ROAD
DRIVE
HO ROAD
HUM
CAREFREE DRIVE
HAPPY HOLLOW
CAVE CREEK
EASY STREET
DARLINGTON
TOM
TRAIL
ROCKING
STREET
CHAIR ROAD
SERENE ROAD
PLEASANT PLACE
HOLIDAY
LANE
NONCHALANT
TRANQUIL
ELBOW BEND
BURRO ROAD
BASIN
BLOODY
SIDEWINDER
AVENUE
LAZY LANE
BIVOUAC TRAIL
NEVER
MIND
PEACEFUL
PL
RADIANT COURT
SCOTTSDALE
LONG
BENT BARREL
DERRINGER
SIX GUN
RIFLE
UP & DOWN
BREATHLESS
HUFF N PUFF
DREAM
RAMBLING
PRIMROSE
PATH
MULE
TRAIN
34
35
36
29
2273
2280
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2443

Table
Rating Table for Irregular Channel

Hum Road Near Cave Creek Road

Project Description

Worksheet	Generic 400 foot v
Flow Element	Irregular Channel
Method	Manning's Formul
Solve For	Channel Depth

Input Data

Slope	010000 ft/ft

Options

Current Roughness Metho	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weighting	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	1,200.00	5.00

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00	0.00	0.00	0.0	0.00	0.00
5.00	0.24	1.12	4.5	37.83	37.82
10.00	0.31	1.33	7.5	49.06	49.05
15.00	0.36	1.47	10.2	57.11	57.11
20.00	0.40	1.58	12.6	63.62	63.61
25.00	0.43	1.67	14.9	69.17	69.17
30.00	0.46	1.75	17.1	74.07	74.06
35.00	0.49	1.82	19.2	78.47	78.47
40.00	0.52	1.88	21.3	82.50	82.50
45.00	0.54	1.94	23.2	86.23	86.22
50.00	0.56	1.99	25.1	89.70	89.70
55.00	0.58	2.04	27.0	92.97	92.96
60.00	0.60	2.08	28.8	96.05	96.04
65.00	0.62	2.12	30.6	98.98	98.97
70.00	0.64	2.16	32.4	101.77	101.76
75.00	0.65	2.20	34.1	104.43	104.43
80.00	0.67	2.24	35.8	106.99	106.98
85.00	0.68	2.27	37.4	109.45	109.44
90.00	0.70	2.30	39.1	111.82	111.82
95.00	0.71	2.33	40.7	114.11	114.11
100.00	0.73	2.36	42.3	116.33	116.32
105.00	0.74	2.39	43.9	118.48	118.47
110.00	0.75	2.42	45.4	120.56	120.55
115.00	0.77	2.45	47.0	122.59	122.58
120.00	0.78	2.48	48.5	124.56	124.55
125.00	0.79	2.50	50.0	126.48	126.47
130.00	0.80	2.53	51.5	128.36	128.35
135.00	0.81	2.55	53.0	130.19	130.18
140.00	0.82	2.57	54.4	131.97	131.96
145.00	0.84	2.60	55.9	133.72	133.71
150.00	0.85	2.62	57.3	135.43	135.42
155.00	0.86	2.64	58.7	137.11	137.10
160.00	0.87	2.66	60.2	138.75	138.74
165.00	0.88	2.68	61.6	140.36	140.35

Table
Rating Table for Irregular Channel

HUM ROAD NEAR CAVE CREEK ROAD

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
170.00	0.89	2.70	63.0	141.94	141.93
175.00	0.90	2.72	64.3	143.49	143.48
180.00	0.91	2.74	65.7	145.02	145.01
185.00	0.92	2.76	67.1	146.52	146.50
190.00	0.92	2.78	68.4	147.99	147.98
195.00	0.93	2.79	69.8	149.44	149.42
200.00	0.94	2.81	71.1	150.86	150.85
205.00	0.95	2.83	72.4	152.27	152.25
210.00	0.96	2.85	73.8	153.65	153.64
215.00	0.97	2.86	75.1	155.01	155.00
220.00	0.98	2.88	76.4	156.35	156.34
225.00	0.99	2.90	77.7	157.67	157.66
230.00	0.99	2.91	79.0	158.98	158.97
235.00	1.00	2.93	80.2	160.07	160.05
240.00	1.01	2.95	81.3	160.33	160.32
245.00	1.01	2.97	82.4	160.60	160.59
250.00	1.02	3.00	83.4	160.86	160.85
255.00	1.03	3.02	84.5	161.13	161.11
260.00	1.03	3.04	85.5	161.39	161.37
265.00	1.04	3.06	86.5	161.64	161.63
270.00	1.05	3.08	87.6	161.90	161.88
275.00	1.05	3.10	88.6	162.15	162.14
280.00	1.06	3.12	89.6	162.40	162.39
285.00	1.07	3.14	90.6	162.65	162.64
290.00	1.07	3.16	91.6	162.90	162.88
295.00	1.08	3.18	92.6	163.15	163.13
300.00	1.08	3.20	93.6	163.39	163.37
305.00	1.09	3.22	94.6	163.63	163.62
310.00	1.10	3.24	95.6	163.87	163.86
315.00	1.10	3.26	96.6	164.11	164.10
320.00	1.11	3.28	97.6	164.35	164.33
325.00	1.11	3.30	98.5	164.59	164.57
330.00	1.12	3.32	99.5	164.82	164.80
335.00	1.13	3.33	100.5	165.05	165.03
340.00	1.13	3.35	101.4	165.28	165.27
345.00	1.14	3.37	102.4	165.51	165.49
350.00	1.14	3.39	103.3	165.74	165.72
355.00	1.15	3.41	104.2	165.97	165.95
360.00	1.15	3.42	105.2	166.20	166.18
365.00	1.16	3.44	106.1	166.42	166.40
370.00	1.17	3.46	107.0	166.64	166.62
375.00	1.17	3.47	108.0	166.86	166.84
380.00	1.18	3.49	108.9	167.08	167.06
385.00	1.18	3.51	109.8	167.30	167.28
390.00	1.19	3.52	110.7	167.52	167.50
395.00	1.19	3.54	111.6	167.74	167.72
400.00	1.20	3.56	112.5	167.95	167.93
405.00	1.20	3.57	113.4	168.17	168.15
410.00	1.21	3.59	114.3	168.38	168.36
415.00	1.21	3.60	115.2	168.59	168.57
420.00	1.22	3.62	116.1	168.81	168.78
425.00	1.22	3.63	117.0	169.02	168.99
430.00	1.23	3.65	117.9	169.22	169.20
435.00	1.24	3.66	118.7	169.43	169.41

IMPASSABLE

Table
Rating Table for Irregular Channel

Hum Road Near Cave Creek Road

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
440.00	1.24	3.68	119.6	169.64	169.61
445.00	1.25	3.69	120.5	169.84	169.82
450.00	1.25	3.71	121.4	170.05	170.02
455.00	1.26	3.72	122.2	170.25	170.23
460.00	1.26	3.74	123.1	170.46	170.43
465.00	1.27	3.75	123.9	170.66	170.63
470.00	1.27	3.77	124.8	170.86	170.83
475.00	1.28	3.78	125.7	171.06	171.03
480.00	1.28	3.79	126.5	171.26	171.23
485.00	1.29	3.81	127.4	171.46	171.43
490.00	1.29	3.82	128.2	171.65	171.63
495.00	1.30	3.84	129.0	171.85	171.82
500.00	1.30	3.85	129.9	172.05	172.02
505.00	1.31	3.86	130.7	172.24	172.21
510.00	1.31	3.88	131.5	172.43	172.41
515.00	1.31	3.89	132.4	172.63	172.60
520.00	1.32	3.90	133.2	172.82	172.79
525.00	1.32	3.92	134.0	173.01	172.98
530.00	1.33	3.93	134.9	173.20	173.17
535.00	1.33	3.94	135.7	173.39	173.36
540.00	1.34	3.96	136.5	173.58	173.55
545.00	1.34	3.97	137.3	173.77	173.74
550.00	1.35	3.98	138.1	173.96	173.93
555.00	1.35	3.99	138.9	174.14	174.11
560.00	1.36	4.01	139.8	174.33	174.30
565.00	1.36	4.02	140.6	174.51	174.48
570.00	1.37	4.03	141.4	174.70	174.67
575.00	1.37	4.04	142.2	174.88	174.85
580.00	1.38	4.06	143.0	175.07	175.03
585.00	1.38	4.07	143.8	175.25	175.22
590.00	1.38	4.08	144.6	175.43	175.40
595.00	1.39	4.09	145.4	175.61	175.58
600.00	1.39	4.11	146.1	175.79	175.76
605.00	1.40	4.12	146.9	175.97	175.94
610.00	1.40	4.13	147.7	176.15	176.12
615.00	1.41	4.14	148.5	176.33	176.30
620.00	1.41	4.15	149.3	176.51	176.47
625.00	1.42	4.16	150.1	176.68	176.65
630.00	1.42	4.18	150.9	176.86	176.83
635.00	1.43	4.19	151.6	177.04	177.00
640.00	1.43	4.20	152.4	177.21	177.18
645.00	1.43	4.21	153.2	177.39	177.35
650.00	1.44	4.22	154.0	177.56	177.53
655.00	1.44	4.23	154.7	177.74	177.70
660.00	1.45	4.24	155.5	177.91	177.87
665.00	1.45	4.26	156.3	178.08	178.05
670.00	1.46	4.27	157.0	178.25	178.22
675.00	1.46	4.28	157.8	178.42	178.39
680.00	1.46	4.29	158.5	178.59	178.56
685.00	1.47	4.30	159.3	178.77	178.73
690.00	1.47	4.31	160.1	178.93	178.90
695.00	1.48	4.32	160.8	179.10	179.07
700.00	1.48	4.33	161.6	179.27	179.24
705.00	1.49	4.34	162.3	179.44	179.40

Table
Rating Table for Irregular Channel

Hum Road Near Cave Creek Road

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
710.00	1.49	4.35	163.1	179.61	179.57
715.00	1.49	4.36	163.8	179.77	179.74
720.00	1.50	4.38	164.6	179.94	179.90
725.00	1.50	4.39	165.3	180.11	180.07
730.00	1.51	4.40	166.1	180.27	180.23
735.00	1.51	4.41	166.8	180.44	180.40
740.00	1.51	4.42	167.5	180.60	180.56
745.00	1.52	4.43	168.3	180.77	180.73
750.00	1.52	4.44	169.0	180.93	180.89
755.00	1.53	4.45	169.8	181.09	181.05
760.00	1.53	4.46	170.5	181.25	181.22
765.00	1.53	4.47	171.2	181.42	181.38
770.00	1.54	4.48	172.0	181.58	181.54
775.00	1.54	4.49	172.7	181.74	181.70
780.00	1.55	4.50	173.4	181.90	181.86
785.00	1.55	4.51	174.1	182.06	182.02
790.00	1.55	4.52	174.9	182.22	182.18
795.00	1.56	4.53	175.6	182.38	182.34
800.00	1.56	4.54	176.3	182.54	182.50
805.00	1.57	4.55	177.0	182.70	182.66
810.00	1.57	4.56	177.8	182.85	182.81
815.00	1.57	4.57	178.5	183.01	182.97
820.00	1.58	4.58	179.2	183.17	183.13
825.00	1.58	4.59	179.9	183.32	183.28
830.00	1.59	4.60	180.6	183.48	183.44
835.00	1.59	4.60	181.3	183.64	183.59
840.00	1.59	4.61	182.1	183.79	183.75
845.00	1.60	4.62	182.8	183.95	183.90
850.00	1.60	4.63	183.5	184.10	184.06
855.00	1.61	4.64	184.2	184.26	184.21
860.00	1.61	4.65	184.9	184.41	184.37
865.00	1.61	4.66	185.6	184.56	184.52
870.00	1.62	4.67	186.3	184.72	184.67
875.00	1.62	4.68	187.0	184.87	184.82
880.00	1.62	4.69	187.7	185.02	184.98
885.00	1.63	4.70	188.4	185.17	185.13
890.00	1.63	4.71	189.1	185.32	185.28
895.00	1.64	4.72	189.8	185.47	185.43
900.00	1.64	4.72	190.5	185.62	185.58
905.00	1.64	4.73	191.2	185.77	185.73
910.00	1.65	4.74	191.9	185.92	185.88
915.00	1.65	4.75	192.6	186.07	186.03
920.00	1.65	4.76	193.3	186.22	186.18
925.00	1.66	4.77	194.0	186.37	186.33
930.00	1.66	4.78	194.7	186.52	186.47
935.00	1.67	4.79	195.3	186.67	186.62
940.00	1.67	4.80	196.0	186.82	186.77
945.00	1.67	4.80	196.7	186.96	186.92
950.00	1.68	4.81	197.4	187.11	187.06
955.00	1.68	4.82	198.1	187.26	187.21
960.00	1.68	4.83	198.8	187.40	187.36
965.00	1.69	4.84	199.5	187.55	187.50
970.00	1.69	4.85	200.1	187.69	187.65
975.00	1.69	4.86	200.8	187.84	187.79

Table
Rating Table for Irregular Channel

HUM ROAD NEAR CAVE CREEK ROAD

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
980.00	1.70	4.86	201.5	187.98	187.94
985.00	1.70	4.87	202.2	188.13	188.08
990.00	1.71	4.88	202.9	188.27	188.22
995.00	1.71	4.89	203.5	188.42	188.37
1,000.00	1.71	4.90	204.2	188.56	188.51
1,005.00	1.72	4.91	204.9	188.70	188.65
1,010.00	1.72	4.91	205.6	188.85	188.80
1,015.00	1.72	4.92	206.2	188.99	188.94
1,020.00	1.73	4.93	206.9	189.13	189.08
1,025.00	1.73	4.94	207.6	189.27	189.22
1,030.00	1.73	4.95	208.2	189.41	189.36
1,035.00	1.74	4.95	208.9	189.56	189.51
1,040.00	1.74	4.96	209.6	189.70	189.65
1,045.00	1.74	4.97	210.2	189.84	189.79
1,050.00	1.75	4.98	210.9	189.98	189.93
1,055.00	1.75	4.99	211.6	190.12	190.07
1,060.00	1.76	4.99	212.2	190.26	190.21
1,065.00	1.76	5.00	212.9	190.40	190.35
1,070.00	1.76	5.01	213.6	190.54	190.49
1,075.00	1.77	5.02	214.2	190.67	190.62
1,080.00	1.77	5.03	214.9	190.81	190.76
1,085.00	1.77	5.03	215.5	190.95	190.90
1,090.00	1.78	5.04	216.2	191.09	191.04
1,095.00	1.78	5.05	216.9	191.23	191.18
1,100.00	1.78	5.06	217.5	191.36	191.31
1,105.00	1.79	5.07	218.2	191.50	191.45
1,110.00	1.79	5.07	218.8	191.64	191.59
1,115.00	1.79	5.08	219.5	191.77	191.72
1,120.00	1.80	5.09	220.1	191.91	191.86
1,125.00	1.80	5.10	220.8	192.05	191.99
1,130.00	1.80	5.10	221.4	192.18	192.13
1,135.00	1.81	5.11	222.1	192.32	192.27
1,140.00	1.81	5.12	222.7	192.45	192.40
1,145.00	1.81	5.13	223.4	192.59	192.53
1,150.00	1.82	5.13	224.0	192.72	192.67
1,155.00	1.82	5.14	224.7	192.86	192.80
1,160.00	1.82	5.15	225.3	192.99	192.94
1,165.00	1.83	5.16	226.0	193.12	193.07
1,170.00	1.83	5.16	226.6	193.26	193.20
1,175.00	1.83	5.17	227.2	193.39	193.34
1,180.00	1.84	5.18	227.9	193.52	193.47
1,185.00	1.84	5.19	228.5	193.66	193.60
1,190.00	1.84	5.19	229.2	193.79	193.74
1,195.00	1.85	5.20	229.8	193.92	193.87
1,200.00	1.85	5.21	230.4	194.05	194.00

GW 100 YR 6 HR

FUTURE

29 (JEF

HUM ROAD NEAR CAVE CREEK ROAD

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1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*             JUN  1998                *
*           VERSION 4.1                *
*                                      *
* RUN DATE   27NOV02  TIME  08:49:21   *
*                                      *
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****************************************
*                                      *
*   U.S. ARMY CORPS OF ENGINEERS       *
*   HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET            *
*      DAVIS, CALIFORNIA 95616         *
*          (916) 756-1104              *
*                                      *
****************************************
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X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX         XXX
```

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

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

1 HEC-1 INPUT PAGE 1

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

  1           ID     FUTURE CONDITIONS HYDROLOGY FOR CAREFREE AREA DRAINAGE MASTER PLAN
  2           ID       BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC., DEC. 2001
  3           ID
  4           ID     FUTURE CONDITIONS LAND USE BASED ON CAVE CREEK WATERCOURSE MASTER PLAN
  5           ID     HYDROLOGY BY TETRA TECH, 2000.
  6           ID
  7           ID     BASE MODEL BASED ON:
  8           ID
  9           ID          FLOODPLAIN DELINEATION STUDY OF ANDORA HILLS & GALLOWAY WASHES
 10           ID          FCD 99-14
 11           ID          BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC.
 12           ID          FOR THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
 13           ID          REVISED MARCH 2002     FILENAME: GWM224R.DAT
 14           ID      ****************************************************************
 15           ID          100 YEAR ANALYSIS 24-HOUR STORM USING JD RECORDS
 16           ID          MCUHP2 USED FOR UNIT HYDROGRAPHS
 17           ID     ****************************************************************
 18           ID
 19           ID     DDM MCUHP2 GALLOWAY WASH FLOODPLAIN DELINEATION STUDY, FCD NO. 99-14
 20           ID
 21           ID    March 2002 revisions to original Dec. 1999 model include:
 22           ID
 23           ID    HC BLOCK ADDED FOR GRAPEVINE WASH (CP 295A)
 24           ID
 25           ID    SUBBASIN GWW1_3 FURTHER SUBDIVIDED ALONG GALLOWAY WASH PER FEMA COMMENTS
 26           ID    IN LETTER DATED FEB. 8, 2002
 27           ID
 28           ID    *** ADDITIONAL COMBINATION ADDED 10-17-02 TO PROVIDE TOTAL FLOW IN
 29           ID        NORTH GALLOWAY WASH BY TWL FOR CH2M HILL FOR CAREFREE DMP ***
 30           ID
 31           ID   DDM MCUHP2 Carefree Area Drainage Master Plan, Galloway Wash Future Condition
              *DIAGRAM
 32           IT       5 01DEC99    0005     400
 33           IO       5       2
 34           IN      15
 35           JD    3.50    0.01
 36           PC    .000    .008    .016    .025    .033    .041    .050    .058    .066    .074
 37           PC    .087    .099    .118    .138    .216    .377    .834    .911    .931    .950
 38           PC    .962    .972    .983    .991   1.000
 39           JD    3.48    0.50
 40           JD    3.43    2.80
 41           PC    .000    .009    .016    .025    .034    .042    .051    .059    .067    .076
 42           PC    .087    .100    .120    .163    .252    .451    .694    .837    .900    .938
 43           PC    .950    .963    .975    .988   1.000
 44           JD    3.23    16.0
 45           PC    .000    .015    .020    .030    .048    .063    .076    .090    .105    .119
 46           PC    .135    .152    .175    .222    .304    .472    .670    .796    .868    .912
 47           PC    .946    .960    .973    .987   1.000
 48           JD    2.84    90.0
 49           PC    .000    .021    .035    .051    .071    .087    .105    .125    .143    .160
 50           PC    .179    .201    .232    .281    .364    .500    .658    .773    .841    .888
 51           PC    .927    .945    .964    .982   1.000
              *
              * DDM   ***** Updated *****
```

1 HEC-1 INPUT PAGE 2

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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
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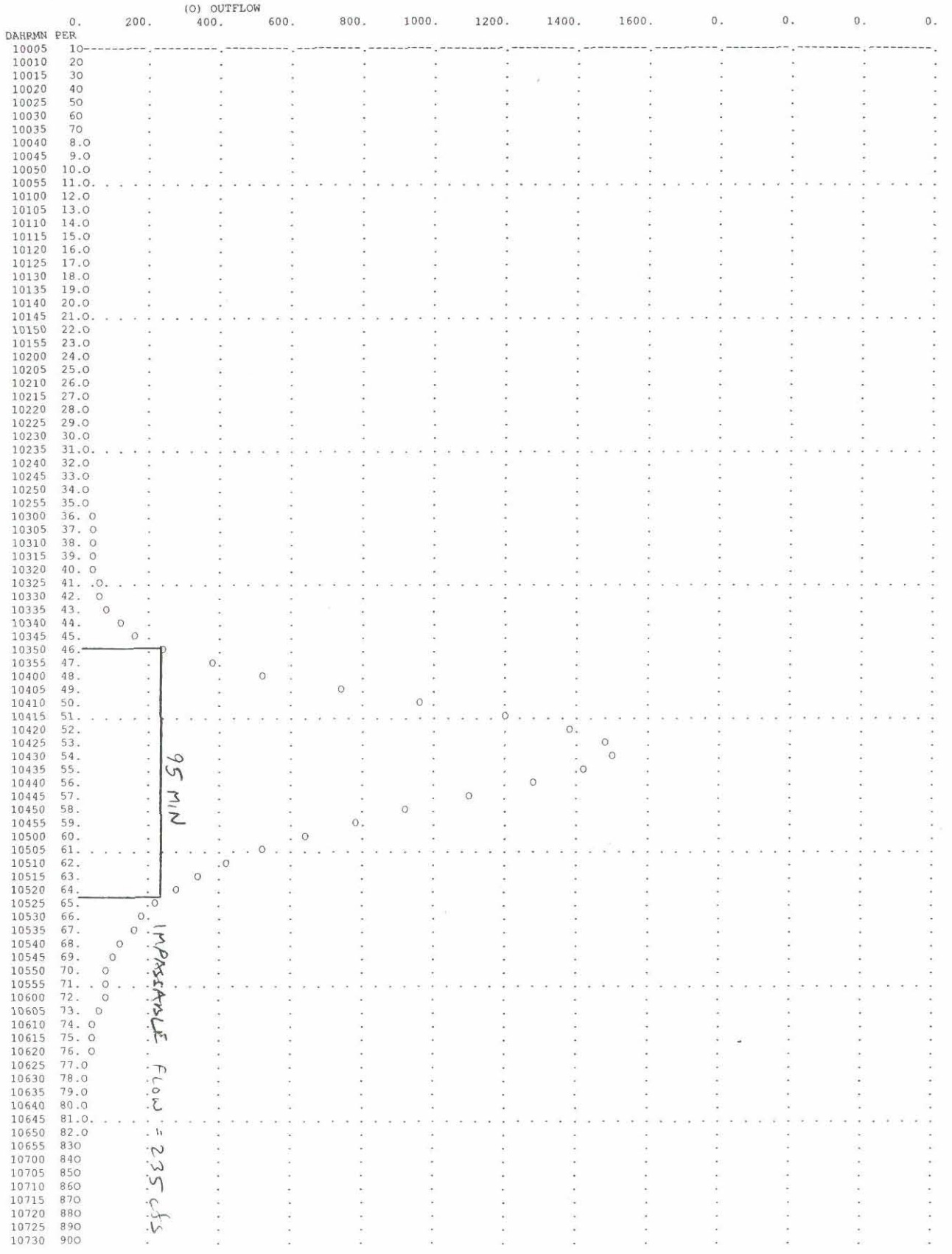
1 Hum Road Near Cave Creek Road STATION GWW1_5



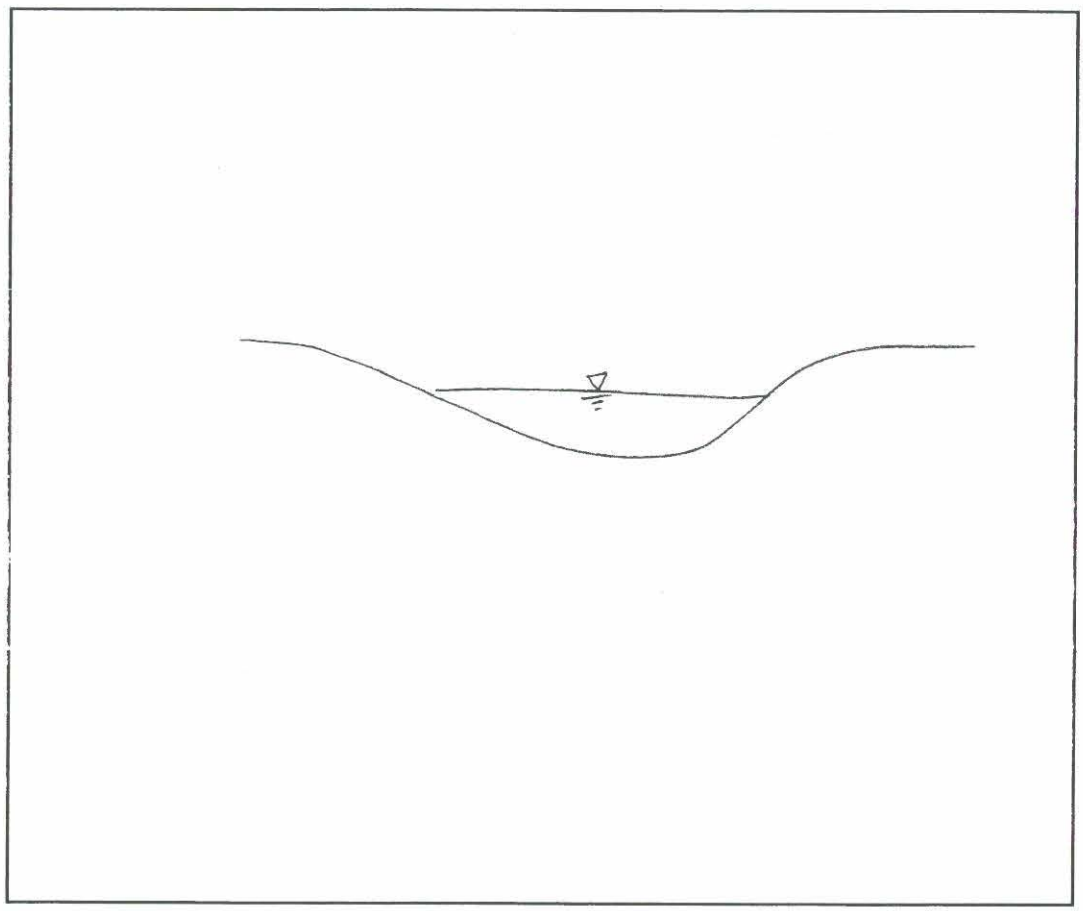
Scopa Trail North of Cave Creek Road (JEF #31)

Carefree Drainage Master Plan
Dip Crossing Notes

ID Number: JEF 31

Source of Data: FLOODPLAIN DELINEATION STUDY OF ANDORA HILLS & GALLOWAY WASHES, JUNE 2001, PRELIMINARY

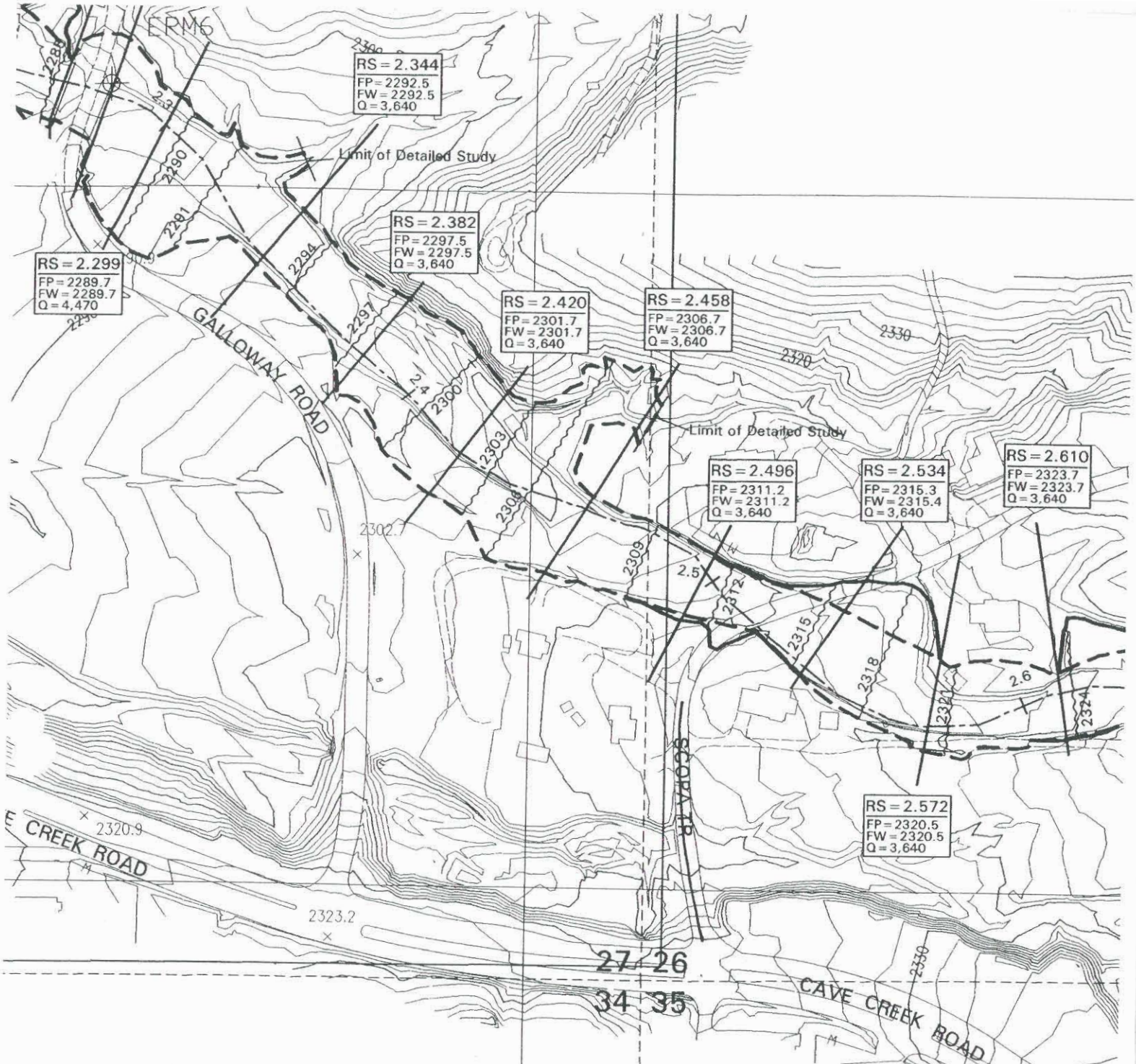
Location: SCOPA TRAIL NORTH OF CAVE CREEK ROAD



Material: PAVED DIP CROSSING

Protection:

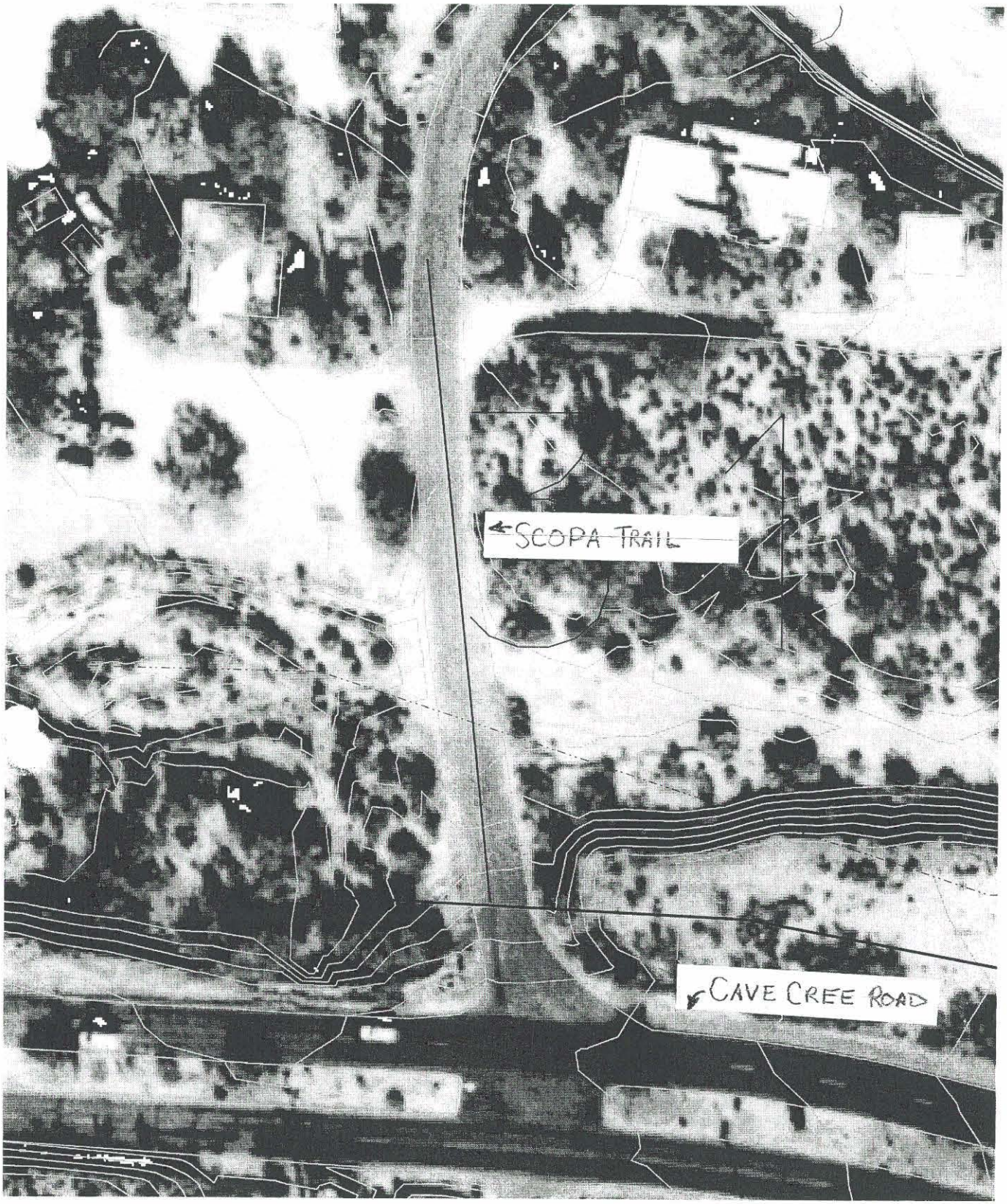
Notes:



Scopa Trail North of
Cave Creek Road

N

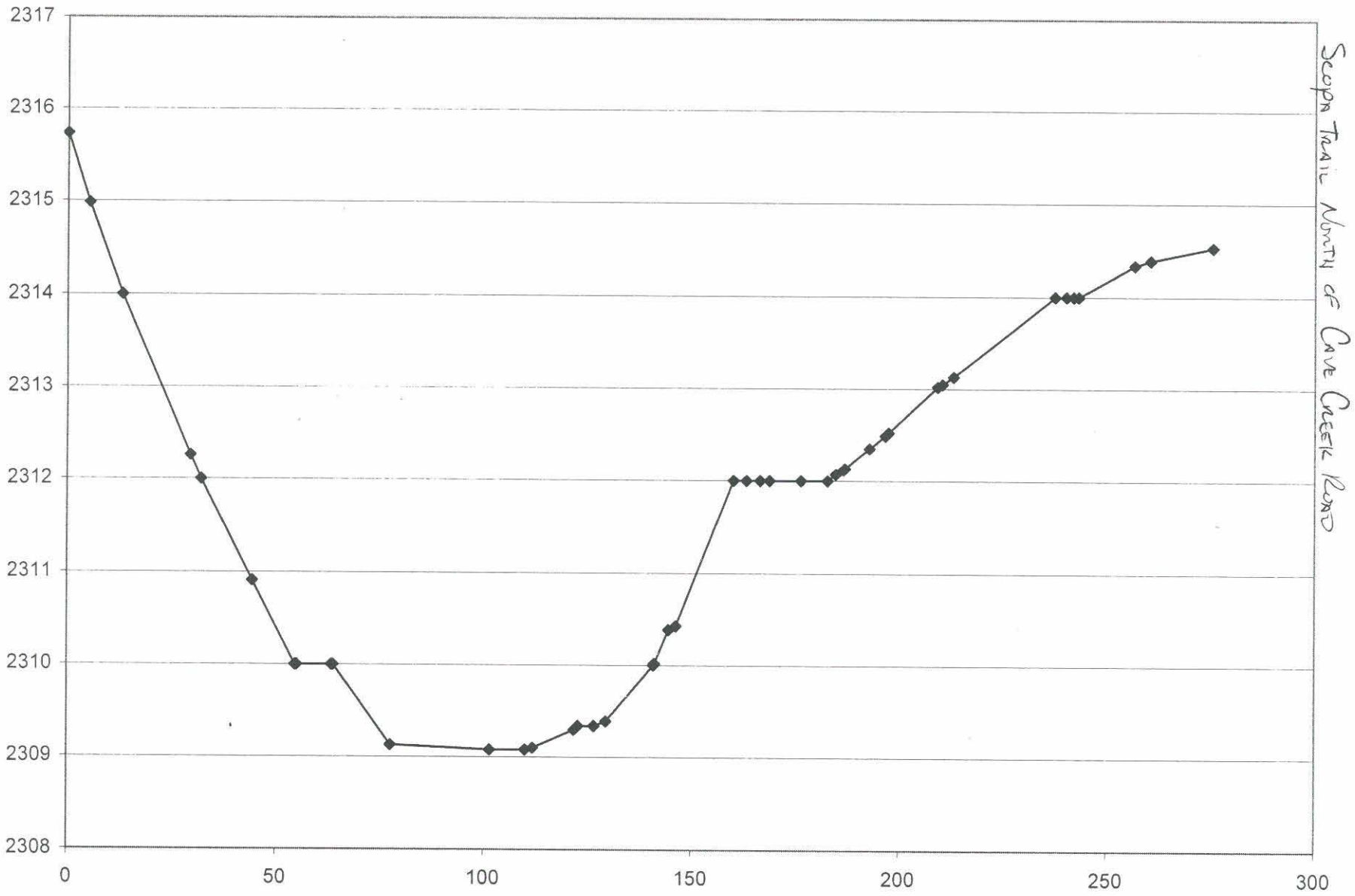
Scale 1" = 200'



SCOPA TRAIL NORTH OF
CAVE CREEK ROAD

N

SCALE 1" = 60'


2317
2316
2315
2314
2313
2312
2311
2310
2309
2308
0
50
100
150
200
250
300
Scoop Trail North of Cave Creek Road

Worksheet
Worksheet for Irregular Channel

Scopa Trail North of Cave Creek Road

Project Description	
Worksheet	JEF-31
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data	
Slope	018000 ft/ft
Discharg	,432.00 cfs

Options	
Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Results		
Mannings Coefficie	0.032	
Water Surface Elev	2,311.25	ft
Elevation Range	9.10 to 2,315.70	
Flow Area	170.1	ft²
Wetted Perimeter	108.31	ft
Top Width	108.13	ft
Actual Depth	2.15	ft
Critical Elevation	2,311.46	ft
Critical Slope	0.012499	ft/ft
Velocity	8.42	ft/s
Velocity Head	1.10	ft
Specific Energy	2,312.35	ft
Froude Number	1.18	
Flow Type	Supercritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00	2+37	0.032

Natural Channel Points

Station (ft)	Elevation (ft)
0+00	2,315.70
0+55	2,310.00
0+64	2,310.00
0+78	2,309.10
1+12	2,309.10
1+23	2,309.30
1+29	2,309.40
1+60	2,312.00
1+83	2,312.00
2+37	2,314.00

Table
Rating Table for Irregular Channel

Scopa Trail North of Cave Creek Road

Project Description

Worksheet	JEF-31
Flow Element	Irregular Chani
Method	Manning's Forr
Solve For	Channel Depth

Input Data

Slope	018000	ft/ft

Options

Current Roughness Metho	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	1,500.00	5.00

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00	2,309.10	0.00	0.0	0.00	0.00
5.00	2,309.20	1.29	3.9	41.28	41.28
10.00	2,309.25	1.64	6.1	44.89	44.88
15.00	2,309.29	1.89	8.0	47.74	47.73
20.00	2,309.33	2.07	9.7	50.33	50.33
25.00	2,309.36	2.22	11.2	52.66	52.65
30.00	2,309.39	2.36	12.7	54.77	54.76
35.00	2,309.41	2.48	14.1	56.02	56.01
40.00	2,309.43	2.61	15.3	56.63	56.62
45.00	2,309.46	2.72	16.5	57.21	57.19
50.00	2,309.48	2.83	17.7	57.76	57.74
55.00	2,309.49	2.93	18.8	58.28	58.26
60.00	2,309.51	3.02	19.9	58.79	58.77
65.00	2,309.53	3.11	20.9	59.28	59.25
70.00	2,309.55	3.19	21.9	59.75	59.73
75.00	2,309.56	3.27	22.9	60.21	60.18
80.00	2,309.58	3.35	23.9	60.65	60.63
85.00	2,309.60	3.42	24.9	61.08	61.06
90.00	2,309.61	3.49	25.8	61.51	61.48
95.00	2,309.63	3.56	26.7	61.92	61.89
100.00	2,309.64	3.62	27.6	62.32	62.29
105.00	2,309.66	3.68	28.5	62.71	62.68
110.00	2,309.67	3.74	29.4	63.10	63.07
115.00	2,309.68	3.80	30.3	63.48	63.44
120.00	2,309.70	3.86	31.1	63.85	63.81
125.00	2,309.71	3.91	32.0	64.21	64.17
130.00	2,309.72	3.97	32.8	64.57	64.53
135.00	2,309.74	4.02	33.6	64.92	64.88
140.00	2,309.75	4.07	34.4	65.26	65.22
145.00	2,309.76	4.12	35.2	65.60	65.56
150.00	2,309.77	4.16	36.0	65.94	65.90
155.00	2,309.78	4.21	36.8	66.26	66.22
160.00	2,309.80	4.26	37.6	66.59	66.55
165.00	2,309.81	4.30	38.4	66.91	66.87

Table
Rating Table for Irregular Channel

SCOPA TRAIL NORTH OF CAVE CREEK ROAD

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)	
170.00	2,309.82	4.34	39.1	67.22	67.18	
175.00	2,309.83	4.39	39.9	67.53	67.49	
180.00	2,309.84	4.43	40.7	67.84	67.80	
185.00	2,309.85	4.47	41.4	68.15	68.10	
190.00	2,309.86	4.51	42.1	68.44	68.40	
195.00	2,309.87	4.55	42.9	68.74	68.69	
200.00	2,309.88	4.59	43.6	69.03	68.98	
205.00	2,309.90	4.62	44.3	69.32	69.27	
210.00	2,309.91	4.66	45.1	69.61	69.56	
215.00	2,309.92	4.70	45.8	69.89	69.84	
220.00	2,309.93	4.73	46.5	70.17	70.12	
225.00	2,309.94	4.77	47.2	70.45	70.39	
230.00	2,309.95	4.80	47.9	70.72	70.67	
235.00	2,309.96	4.84	48.6	70.99	70.94	
240.00	2,309.97	4.87	49.3	71.26	71.20	
245.00	2,309.98	4.90	50.0	71.52	71.47	
250.00	2,309.98	4.94	50.6	71.79	71.73	
255.00	2,310.03	4.72	54.0	81.81	81.75	
260.00	2,310.04	4.76	54.7	81.99	81.93	
265.00	2,310.04	4.79	55.4	82.17	82.11	
270.00	2,310.05	4.82	56.0	82.35	82.28	
275.00	2,310.06	4.85	56.7	82.52	82.46	
280.00	2,310.07	4.88	57.4	82.70	82.63	
285.00	2,310.08	4.91	58.0	82.87	82.80	
290.00	2,310.08	4.94	58.7	83.04	82.98	
295.00	2,310.09	4.97	59.3	83.21	83.15	
300.00	2,310.10	5.00	60.0	83.38	83.31	IMPASSABLE
305.00	2,310.11	5.03	60.6	83.55	83.48	
310.00	2,310.12	5.06	61.3	83.71	83.65	
315.00	2,310.12	5.09	61.9	83.88	83.81	
320.00	2,310.13	5.12	62.5	84.04	83.98	
325.00	2,310.14	5.14	63.2	84.21	84.14	
330.00	2,310.15	5.17	63.8	84.37	84.30	
335.00	2,310.15	5.20	64.4	84.53	84.46	
340.00	2,310.16	5.23	65.1	84.69	84.62	
345.00	2,310.17	5.25	65.7	84.85	84.78	
350.00	2,310.18	5.28	66.3	85.01	84.94	
355.00	2,310.18	5.30	66.9	85.17	85.09	
360.00	2,310.19	5.33	67.5	85.32	85.25	
365.00	2,310.20	5.36	68.1	85.48	85.40	
370.00	2,310.20	5.38	68.8	85.63	85.55	
375.00	2,310.21	5.41	69.4	85.78	85.71	
380.00	2,310.22	5.43	70.0	85.94	85.86	
385.00	2,310.23	5.46	70.6	86.09	86.01	
390.00	2,310.23	5.48	71.2	86.24	86.16	
395.00	2,310.24	5.50	71.8	86.39	86.31	
400.00	2,310.25	5.53	72.3	86.54	86.46	
405.00	2,310.25	5.55	72.9	86.68	86.60	
410.00	2,310.26	5.58	73.5	86.83	86.75	
415.00	2,310.27	5.60	74.1	86.98	86.90	
420.00	2,310.27	5.62	74.7	87.12	87.04	
425.00	2,310.28	5.65	75.3	87.27	87.19	
430.00	2,310.29	5.67	75.9	87.41	87.33	
435.00	2,310.29	5.69	76.4	87.56	87.47	

Table
Rating Table for Irregular Channel

Scopa Trail North of Cave Creek Road

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
440.00	2,310.30	5.71	77.0	87.70	87.61
445.00	2,310.31	5.74	77.6	87.84	87.76
450.00	2,310.31	5.76	78.2	87.98	87.90
455.00	2,310.32	5.78	78.7	88.12	88.04
460.00	2,310.33	5.80	79.3	88.26	88.17
465.00	2,310.33	5.82	79.9	88.40	88.31
470.00	2,310.34	5.84	80.4	88.54	88.45
475.00	2,310.34	5.86	81.0	88.68	88.59
480.00	2,310.35	5.89	81.6	88.81	88.72
485.00	2,310.36	5.91	82.1	88.95	88.86
490.00	2,310.36	5.93	82.7	89.09	89.00
495.00	2,310.37	5.95	83.2	89.22	89.13
500.00	2,310.38	5.97	83.8	89.36	89.26
505.00	2,310.38	5.99	84.3	89.49	89.40
510.00	2,310.39	6.01	84.9	89.62	89.53
515.00	2,310.39	6.03	85.4	89.76	89.66
520.00	2,310.40	6.05	86.0	89.89	89.79
525.00	2,310.41	6.07	86.5	90.02	89.92
530.00	2,310.41	6.09	87.1	90.15	90.06
535.00	2,310.42	6.11	87.6	90.28	90.19
540.00	2,310.42	6.13	88.2	90.41	90.31
545.00	2,310.43	6.14	88.7	90.54	90.44
550.00	2,310.44	6.16	89.2	90.67	90.57
555.00	2,310.44	6.18	89.8	90.80	90.70
560.00	2,310.45	6.20	90.3	90.92	90.83
565.00	2,310.45	6.22	90.8	91.05	90.95
570.00	2,310.46	6.24	91.4	91.18	91.08
575.00	2,310.47	6.26	91.9	91.31	91.20
580.00	2,310.47	6.28	92.4	91.43	91.33
585.00	2,310.48	6.29	93.0	91.56	91.45
590.00	2,310.48	6.31	93.5	91.68	91.58
595.00	2,310.49	6.33	94.0	91.80	91.70
600.00	2,310.49	6.35	94.5	91.93	91.83
605.00	2,310.50	6.36	95.1	92.05	91.95
610.00	2,310.51	6.38	95.6	92.17	92.07
615.00	2,310.51	6.40	96.1	92.30	92.19
620.00	2,310.52	6.42	96.6	92.42	92.31
625.00	2,310.52	6.43	97.1	92.54	92.43
630.00	2,310.53	6.45	97.7	92.66	92.56
635.00	2,310.53	6.47	98.2	92.78	92.68
640.00	2,310.54	6.49	98.7	92.90	92.79
645.00	2,310.55	6.50	99.2	93.02	92.91
650.00	2,310.55	6.52	99.7	93.14	93.03
655.00	2,310.56	6.54	100.2	93.26	93.15
660.00	2,310.56	6.55	100.7	93.38	93.27
665.00	2,310.57	6.57	101.2	93.50	93.39
670.00	2,310.57	6.59	101.7	93.61	93.50
675.00	2,310.58	6.60	102.2	93.73	93.62
680.00	2,310.58	6.62	102.8	93.85	93.74
685.00	2,310.59	6.63	103.3	93.96	93.85
690.00	2,310.59	6.65	103.8	94.08	93.97
695.00	2,310.60	6.67	104.3	94.20	94.08
700.00	2,310.60	6.68	104.8	94.31	94.20
705.00	2,310.61	6.70	105.3	94.43	94.31

Table
Rating Table for Irregular Channel

SCOPA TRAIL NORTH OF CAVE CREEK ROAD

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
710.00	2,310.62	6.71	105.8	94.54	94.43
715.00	2,310.62	6.73	106.3	94.65	94.54
720.00	2,310.63	6.74	106.8	94.77	94.65
725.00	2,310.63	6.76	107.2	94.88	94.77
730.00	2,310.64	6.78	107.7	94.99	94.88
735.00	2,310.64	6.79	108.2	95.11	94.99
740.00	2,310.65	6.81	108.7	95.22	95.10
745.00	2,310.65	6.82	109.2	95.33	95.21
750.00	2,310.66	6.84	109.7	95.44	95.32
755.00	2,310.66	6.85	110.2	95.55	95.44
760.00	2,310.67	6.87	110.7	95.66	95.55
765.00	2,310.67	6.88	111.2	95.78	95.66
770.00	2,310.68	6.90	111.7	95.89	95.77
775.00	2,310.68	6.91	112.1	96.00	95.87
780.00	2,310.69	6.93	112.6	96.10	95.98
785.00	2,310.69	6.94	113.1	96.21	96.09
790.00	2,310.70	6.95	113.6	96.32	96.20
795.00	2,310.70	6.97	114.1	96.43	96.31
800.00	2,310.71	6.98	114.6	96.54	96.42
805.00	2,310.71	7.00	115.0	96.65	96.52
810.00	2,310.72	7.01	115.5	96.76	96.63
815.00	2,310.72	7.03	116.0	96.86	96.74
820.00	2,310.73	7.04	116.5	96.97	96.84
825.00	2,310.73	7.05	117.0	97.08	96.95
830.00	2,310.74	7.07	117.4	97.18	97.06
835.00	2,310.74	7.08	117.9	97.29	97.16
840.00	2,310.75	7.10	118.4	97.39	97.27
845.00	2,310.75	7.11	118.9	97.50	97.37
850.00	2,310.76	7.12	119.3	97.60	97.48
855.00	2,310.76	7.14	119.8	97.71	97.58
860.00	2,310.77	7.15	120.3	97.81	97.69
865.00	2,310.77	7.16	120.7	97.92	97.79
870.00	2,310.78	7.18	121.2	98.02	97.89
875.00	2,310.78	7.19	121.7	98.13	98.00
880.00	2,310.79	7.20	122.2	98.23	98.10
885.00	2,310.79	7.22	122.6	98.33	98.20
890.00	2,310.80	7.23	123.1	98.44	98.30
895.00	2,310.80	7.24	123.6	98.54	98.41
900.00	2,310.80	7.26	124.0	98.64	98.51
905.00	2,310.81	7.27	124.5	98.74	98.61
910.00	2,310.81	7.28	124.9	98.84	98.71
915.00	2,310.82	7.30	125.4	98.95	98.81
920.00	2,310.82	7.31	125.9	99.05	98.91
925.00	2,310.83	7.32	126.3	99.15	99.01
930.00	2,310.83	7.33	126.8	99.25	99.11
935.00	2,310.84	7.35	127.3	99.35	99.21
940.00	2,310.84	7.36	127.7	99.45	99.31
945.00	2,310.85	7.37	128.2	99.55	99.41
950.00	2,310.85	7.39	128.6	99.65	99.51
955.00	2,310.86	7.40	129.1	99.75	99.61
960.00	2,310.86	7.41	129.5	99.85	99.71
965.00	2,310.86	7.42	130.0	99.95	99.81
970.00	2,310.87	7.44	130.5	100.05	99.91
975.00	2,310.87	7.45	130.9	100.15	100.01

Table
Rating Table for Irregular Channel

Scopa Trail North of Cave Creek Road

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
980.00	2,310.88	7.46	131.4	100.24	100.10
985.00	2,310.88	7.47	131.8	100.34	100.20
990.00	2,310.89	7.48	132.3	100.44	100.30
995.00	2,310.89	7.50	132.7	100.54	100.40
1,000.00	2,310.90	7.51	133.2	100.63	100.49
1,005.00	2,310.90	7.52	133.6	100.73	100.59
1,010.00	2,310.91	7.53	134.1	100.83	100.69
1,015.00	2,310.91	7.55	134.5	100.92	100.78
1,020.00	2,310.91	7.56	135.0	101.02	100.88
1,025.00	2,310.92	7.57	135.4	101.12	100.97
1,030.00	2,310.92	7.58	135.9	101.21	101.07
1,035.00	2,310.93	7.59	136.3	101.31	101.17
1,040.00	2,310.93	7.60	136.8	101.40	101.26
1,045.00	2,310.94	7.62	137.2	101.50	101.36
1,050.00	2,310.94	7.63	137.6	101.60	101.45
1,055.00	2,310.95	7.64	138.1	101.69	101.54
1,060.00	2,310.95	7.65	138.5	101.78	101.64
1,065.00	2,310.95	7.66	139.0	101.88	101.73
1,070.00	2,310.96	7.67	139.4	101.97	101.83
1,075.00	2,310.96	7.69	139.9	102.07	101.92
1,080.00	2,310.97	7.70	140.3	102.16	102.01
1,085.00	2,310.97	7.71	140.7	102.25	102.11
1,090.00	2,310.98	7.72	141.2	102.35	102.20
1,095.00	2,310.98	7.73	141.6	102.44	102.29
1,100.00	2,310.98	7.74	142.1	102.53	102.39
1,105.00	2,310.99	7.75	142.5	102.63	102.48
1,110.00	2,310.99	7.77	142.9	102.72	102.57
1,115.00	2,311.00	7.78	143.4	102.81	102.66
1,120.00	2,311.00	7.79	143.8	102.90	102.75
1,125.00	2,311.01	7.80	144.3	103.00	102.85
1,130.00	2,311.01	7.81	144.7	103.09	102.94
1,135.00	2,311.01	7.82	145.1	103.18	103.03
1,140.00	2,311.02	7.83	145.6	103.27	103.12
1,145.00	2,311.02	7.84	146.0	103.36	103.21
1,150.00	2,311.03	7.85	146.4	103.45	103.30
1,155.00	2,311.03	7.86	146.9	103.54	103.39
1,160.00	2,311.04	7.88	147.3	103.63	103.48
1,165.00	2,311.04	7.89	147.7	103.73	103.57
1,170.00	2,311.04	7.90	148.2	103.82	103.66
1,175.00	2,311.05	7.91	148.6	103.91	103.75
1,180.00	2,311.05	7.92	149.0	104.00	103.84
1,185.00	2,311.06	7.93	149.5	104.08	103.93
1,190.00	2,311.06	7.94	149.9	104.17	104.02
1,195.00	2,311.06	7.95	150.3	104.26	104.11
1,200.00	2,311.07	7.96	150.7	104.35	104.20
1,205.00	2,311.07	7.97	151.2	104.44	104.28
1,210.00	2,311.08	7.98	151.6	104.53	104.37
1,215.00	2,311.08	7.99	152.0	104.62	104.46
1,220.00	2,311.08	8.00	152.4	104.71	104.55
1,225.00	2,311.09	8.01	152.9	104.80	104.64
1,230.00	2,311.09	8.02	153.3	104.88	104.73
1,235.00	2,311.10	8.03	153.7	104.97	104.81
1,240.00	2,311.10	8.04	154.1	105.06	104.90
1,245.00	2,311.10	8.05	154.6	105.15	104.99

Table
Rating Table for Irregular Channel

Scopa Trail North of Cave Creek Road

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
1,250.00	2,311.11	8.06	155.0	105.23	105.07
1,255.00	2,311.11	8.07	155.4	105.32	105.16
1,260.00	2,311.12	8.09	155.8	105.41	105.25
1,265.00	2,311.12	8.10	156.3	105.50	105.33
1,270.00	2,311.12	8.11	156.7	105.58	105.42
1,275.00	2,311.13	8.12	157.1	105.67	105.51
1,280.00	2,311.13	8.13	157.5	105.76	105.59
1,285.00	2,311.14	8.14	157.9	105.84	105.68
1,290.00	2,311.14	8.15	158.4	105.93	105.76
1,295.00	2,311.14	8.16	158.8	106.01	105.85
1,300.00	2,311.15	8.17	159.2	106.10	105.94
1,305.00	2,311.15	8.18	159.6	106.18	106.02
1,310.00	2,311.16	8.19	160.0	106.27	106.11
1,315.00	2,311.16	8.20	160.5	106.36	106.19
1,320.00	2,311.16	8.20	160.9	106.44	106.28
1,325.00	2,311.17	8.21	161.3	106.53	106.36
1,330.00	2,311.17	8.22	161.7	106.61	106.44
1,335.00	2,311.18	8.23	162.1	106.70	106.53
1,340.00	2,311.18	8.24	162.5	106.78	106.61
1,345.00	2,311.18	8.25	163.0	106.86	106.70
1,350.00	2,311.19	8.26	163.4	106.95	106.78
1,355.00	2,311.19	8.27	163.8	107.03	106.86
1,360.00	2,311.20	8.28	164.2	107.12	106.95
1,365.00	2,311.20	8.29	164.6	107.20	107.03
1,370.00	2,311.20	8.30	165.0	107.28	107.11
1,375.00	2,311.21	8.31	165.4	107.37	107.20
1,380.00	2,311.21	8.32	165.9	107.45	107.28
1,385.00	2,311.21	8.33	166.3	107.53	107.36
1,390.00	2,311.22	8.34	166.7	107.62	107.45
1,395.00	2,311.22	8.35	167.1	107.70	107.53
1,400.00	2,311.23	8.36	167.5	107.78	107.61
1,405.00	2,311.23	8.37	167.9	107.86	107.69
1,410.00	2,311.23	8.38	168.3	107.95	107.77
1,415.00	2,311.24	8.39	168.7	108.03	107.86
1,420.00	2,311.24	8.40	169.1	108.11	107.94
1,425.00	2,311.25	8.40	169.5	108.19	108.02
1,430.00	2,311.25	8.41	170.0	108.27	108.10
1,435.00	2,311.25	8.42	170.4	108.36	108.18
1,440.00	2,311.26	8.43	170.8	108.44	108.26
1,445.00	2,311.26	8.44	171.2	108.52	108.34
1,450.00	2,311.26	8.45	171.6	108.60	108.43
1,455.00	2,311.27	8.46	172.0	108.68	108.51
1,460.00	2,311.27	8.47	172.4	108.76	108.59
1,465.00	2,311.28	8.48	172.8	108.84	108.67
1,470.00	2,311.28	8.49	173.2	108.92	108.75
1,475.00	2,311.28	8.50	173.6	109.00	108.83
1,480.00	2,311.29	8.51	174.0	109.09	108.91
1,485.00	2,311.29	8.51	174.4	109.17	108.99
1,490.00	2,311.29	8.52	174.8	109.25	109.07
1,495.00	2,311.30	8.53	175.2	109.33	109.15
1,500.00	2,311.30	8.54	175.6	109.41	109.23

GW 100 YR 6 HR FUTURE

31 (JEF)

Scopa Trail Near Cave Creek Road

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1*************************************
 *                                   *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
 *              JUN   1998           *
 *           VERSION 4.1             *
 *                                   *
 *  RUN DATE   27NOV02  TIME  08:49:21  *
 *                                   *
 *************************************
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*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*           (916) 756-1104          *
*                                   *
*************************************
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X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX         XXX
```

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

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


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

  1           ID     FUTURE CONDITIONS HYDROLOGY FOR CAREFREE AREA DRAINAGE MASTER PLAN
  2           ID       BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC., DEC. 2001
  3           ID
  4           ID     FUTURE CONDITIONS LAND USE BASED ON CAVE CREEK WATERCOURSE MASTER PLAN
  5           ID     HYDROLOGY BY TETRA TECH, 2000.
  6           ID
  7           ID     BASE MODEL BASED ON:
  8           ID
  9           ID           FLOODPLAIN DELINEATION STUDY OF ANDORA HILLS & GALLOWAY WASHES
 10           ID           FCD 99-14
 11           ID           BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC.
 12           ID           FOR THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
 13           ID           REVISED MARCH 2002     FILENAME: GWM224R.DAT
 14           ID      ***************************************************************
 15           ID           100 YEAR ANALYSIS 24-HOUR STORM USING JD RECORDS
 16           ID           MCUHP2 USED FOR UNIT HYDROGRAPHS
 17           ID     ***************************************************************
 18           ID
 19           ID     DDM MCUHP2 GALLOWAY WASH FLOODPLAIN DELINEATION STUDY, FCD NO. 99-14
 20           ID
 21           ID    March 2002 revisions to original Dec. 1999 model include:
 22           ID
 23           ID    HC BLOCK ADDED FOR GRAPEVINE WASH (CP 295A)
 24           ID
 25           ID    SUBBASIN GWW1_3 FURTHER SUBDIVIDED ALONG GALLOWAY WASH PER FEMA COMMENTS
 26           ID    IN LETTER DATED FEB. 8, 2002
 27           ID
 28           ID    *** ADDITIONAL COMBINATION ADDED 10-17-02 TO PROVIDE TOTAL FLOW IN
 29           ID        NORTH GALLOWAY WASH BY TWL FOR CH2M HILL FOR CAREFREE DMP ***
 30           ID
 31           ID   DDM MCUHP2 Carefree Area Drainage Master Plan, Galloway Wash Future Condition
              *DIAGRAM
 32           IT       5 01DEC99    0005     400
 33           IO       5       2
 34           IN      15
 35           JD    3.50    0.01
 36           PC    .000    .008    .016    .025    .033    .041    .050    .058    .066    .074
 37           PC    .087    .099    .118    .138    .216    .377    .834    .911    .931    .950
 38           PC    .962    .972    .983    .991   1.000
 39           JD    3.48    0.50
 40           JD    3.43    2.80
 41           PC    .000    .009    .016    .025    .034    .042    .051    .059    .067    .076
 42           PC    .087    .100    .120    .163    .252    .451    .694    .837    .900    .938
 43           PC    .950    .963    .975    .988   1.000
 44           JD    3.23    16.0
 45           PC    .000    .015    .020    .030    .048    .063    .076    .090    .105    .119
 46           PC    .135    .152    .175    .222    .304    .472    .670    .796    .868    .912
 47           PC    .946    .960    .973    .987   1.000
 48           JD    2.84    90.0
 49           PC    .000    .021    .035    .051    .071    .087    .105    .125    .143    .160
 50           PC    .179    .201    .232    .281    .364    .500    .658    .773    .841    .888
 51           PC    .927    .945    .964    .982   1.000
              *
              * DDM   ***** Updated *****
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
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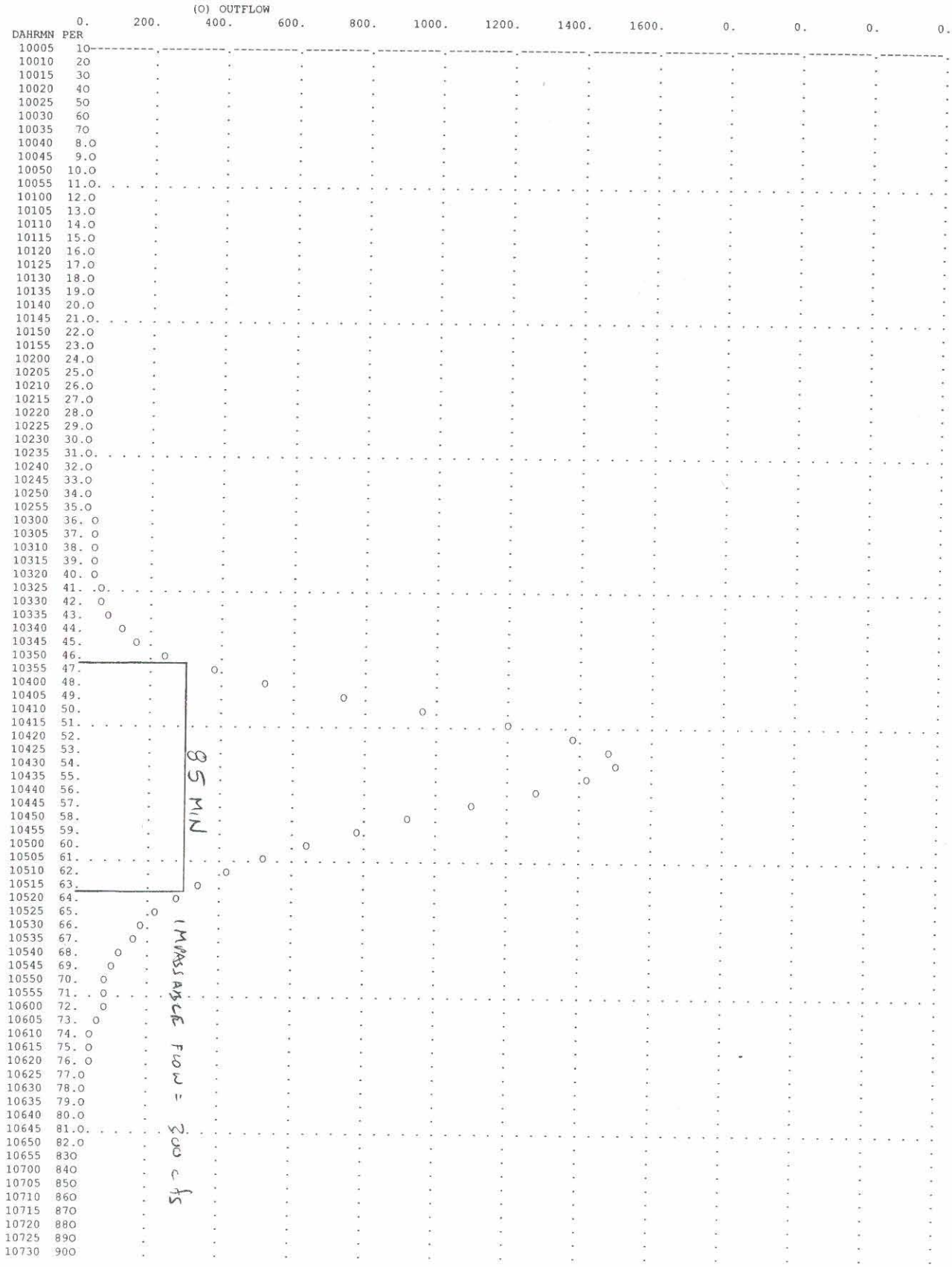
Scopa Trail North of Cave Creek Road

1

STATION GWW1_5

(O) OUTFLOW



Pima Road North of Short Putt Place (JEF #32)

Carefree Drainage Master Plan
Dip Crossing Notes

ID Number: JEF-32

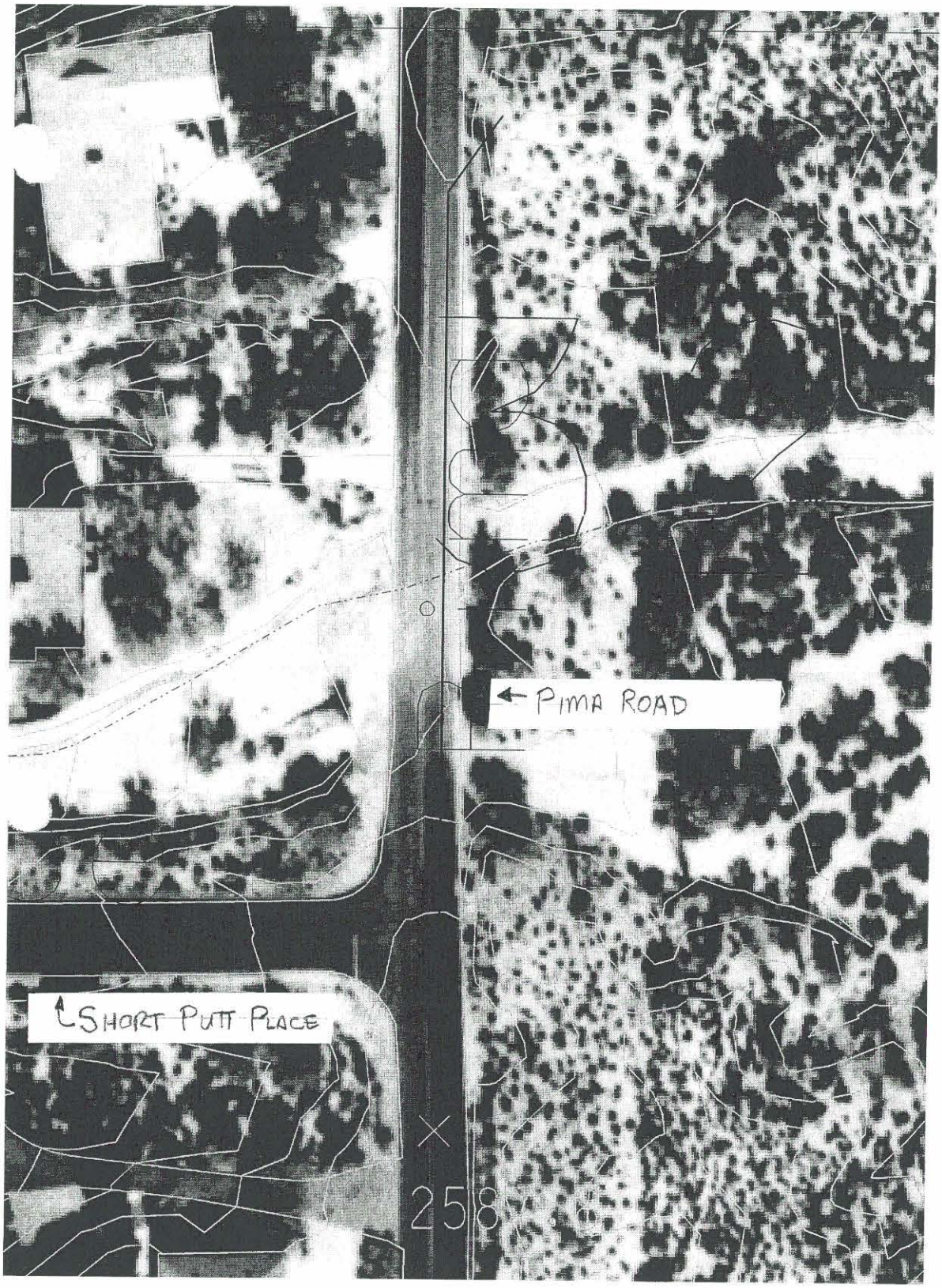
Source of Data: FLOOD PLAIN DELINEATION STUDY OF ANDORA HILLS & GALLOWAY WASHES, JUNE 2001, PRELIMINARY

Location: PIMA ROAD NORTH OF SHORT PUTT PLACE

Material: PAVED DIP CROSSING

Protection:

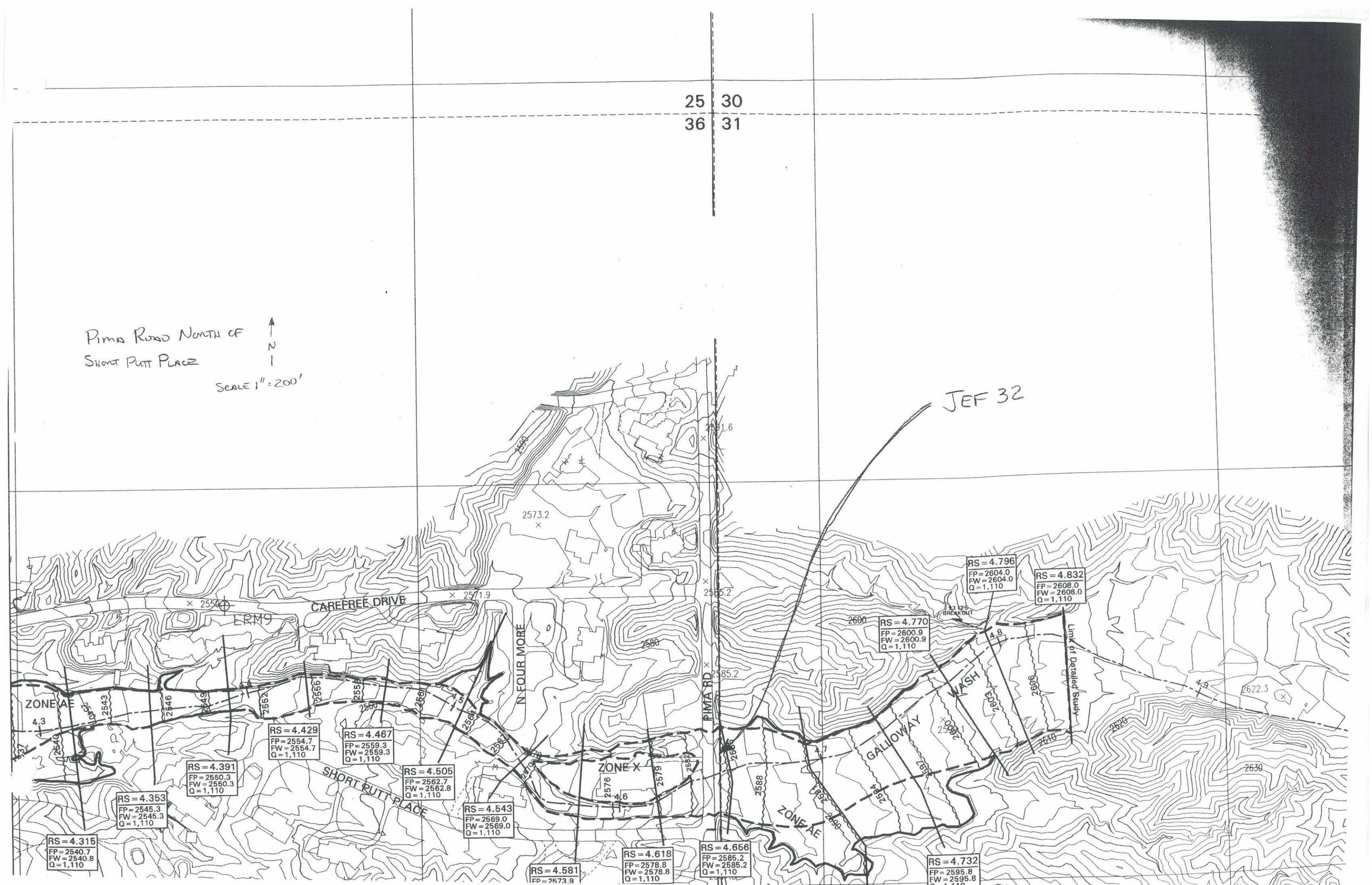
Notes:



PIMA ROAD NORTH OF
SHORT PUTT PLACE

N

SCALE 1" = 60'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36 31
PIMA ROAD NORTH OF
SHORT PUTT PLACE
N
SCALE 1" = 200'
JEF 32
CAREFREE DRIVE
ERM9
N FOUR MORE
PIMA RD
SHORT PUTT PLACE
ZONE AE
ZONE X
GALLOWAY WASH
Limit of Detailed Study
RS = 4.315
FP = 2540.7
FW = 2540.8
Q = 1,110
RS = 4.353
FP = 2545.3
FW = 2545.3
Q = 1,110
RS = 4.391
FP = 2550.3
FW = 2550.3
Q = 1,110
RS = 4.429
FP = 2554.7
FW = 2554.7
Q = 1,110
RS = 4.467
FP = 2559.3
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Q = 1,110
RS = 4.505
FP = 2562.7
FW = 2562.8
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RS = 4.543
FP = 2569.0
FW = 2569.0
Q = 1,110
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FP = 2573.9
RS = 4.618
FP = 2578.8
FW = 2578.8
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RS = 4.656
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Q = 1,110
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FW = 2600.9
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RS = 4.796
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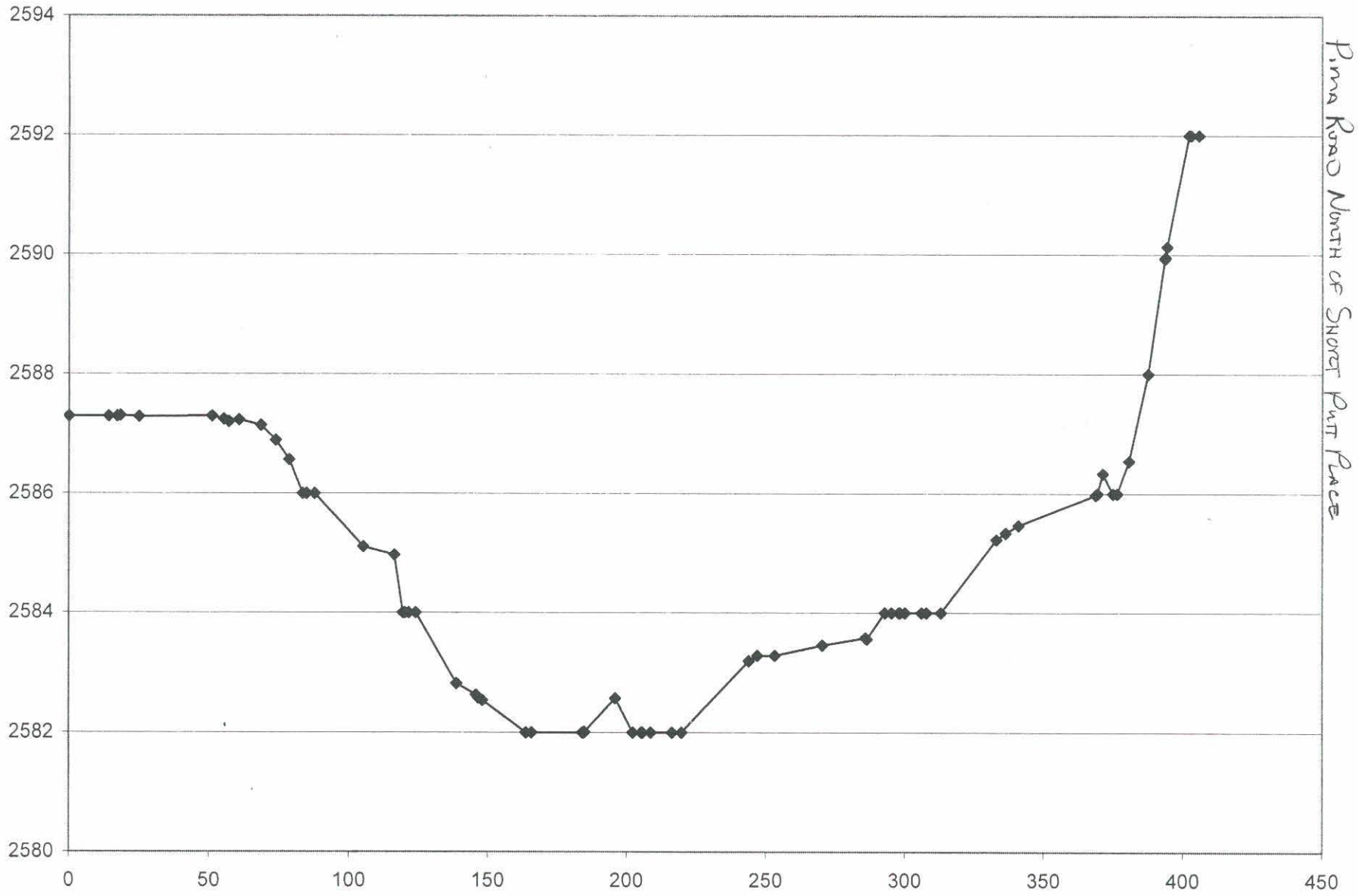
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50
100
150
200
250
300
350
400
450
Pima Road North of Short Putt Place

Worksheet
Worksheet for Irregular Channel

PIMA ROAD NORTH OF SHORT PUTT PLACE

Project Description	
Worksheet	JEF-32
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data		
Slope	031600	ft/ft
Discharg	,259.00	cfs

Options	
Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Results		
Mannings Coefficie	0.035	
Water Surface Elev	2,583.61	ft
Elevation Range	31.80 to 2,592.00	
Flow Area	164.3	ft²
Wetted Perimeter	160.60	ft
Top Width	160.53	ft
Actual Depth	1.81	ft
Critical Elevation	2,583.85	ft
Critical Slope	0.016799	ft/ft
Velocity	7.66	ft/s
Velocity Head	0.91	ft
Specific Energy	2,584.53	ft
Froude Number	1.34	
Flow Type	Supercritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+69	4+02	0.035

Natural Channel Points

Station (ft)	Elevation (ft)
0+69	2,587.10
1+39	2,582.80
1+64	2,582.00
1+96	2,581.80
2+20	2,582.00
2+47	2,583.30
2+86	2,583.60
2+93	2,584.00
3+13	2,584.00
3+36	2,585.30
3+69	2,586.00
4+02	2,592.00

Table
Rating Table for Irregular Channel

Pima Road North of Short Putt Place

Project Description

Worksheet	JEF-32
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data

Slope 031600 ft/ft

Options

Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	1,300.00	5.00

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00	2,581.80	0.00	0.0	0.00	0.00
5.00	2,581.96	1.40	3.6	44.73	44.73
10.00	2,582.01	1.68	5.9	56.31	56.31
15.00	2,582.04	1.96	7.7	57.88	57.88
20.00	2,582.06	2.18	9.2	59.24	59.24
25.00	2,582.09	2.36	10.6	60.46	60.45
30.00	2,582.11	2.52	11.9	61.58	61.57
35.00	2,582.13	2.66	13.1	62.62	62.61
40.00	2,582.15	2.79	14.3	63.59	63.59
45.00	2,582.16	2.91	15.5	64.52	64.51
50.00	2,582.18	3.02	16.6	65.40	65.39
55.00	2,582.20	3.12	17.6	66.24	66.23
60.00	2,582.21	3.22	18.7	67.05	67.04
65.00	2,582.23	3.31	19.7	67.83	67.82
70.00	2,582.24	3.39	20.6	68.58	68.57
75.00	2,582.26	3.47	21.6	69.31	69.30
80.00	2,582.27	3.55	22.6	70.01	70.00
85.00	2,582.28	3.62	23.5	70.70	70.69
90.00	2,582.30	3.69	24.4	71.37	71.35
95.00	2,582.31	3.76	25.3	72.02	72.00
100.00	2,582.32	3.82	26.2	72.65	72.64
105.00	2,582.33	3.88	27.0	73.27	73.26
110.00	2,582.34	3.94	27.9	73.88	73.86
115.00	2,582.35	4.00	28.7	74.47	74.46
120.00	2,582.37	4.06	29.6	75.06	75.04
125.00	2,582.38	4.11	30.4	75.63	75.61
130.00	2,582.39	4.16	31.2	76.19	76.17
135.00	2,582.40	4.22	32.0	76.73	76.72
140.00	2,582.41	4.26	32.8	77.27	77.26
145.00	2,582.42	4.31	33.6	77.81	77.79
150.00	2,582.43	4.36	34.4	78.33	78.31
155.00	2,582.44	4.41	35.2	78.84	78.82
160.00	2,582.45	4.45	35.9	79.35	79.33
165.00	2,582.46	4.50	36.7	79.85	79.83

Table
Rating Table for Irregular Channel

PIMA ROAD NORTH OF SNOWY PUTT PLACE

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
170.00	2,582.47	4.54	37.5	80.34	80.32
175.00	2,582.48	4.58	38.2	80.82	80.80
180.00	2,582.49	4.62	39.0	81.30	81.28
185.00	2,582.49	4.66	39.7	81.77	81.75
190.00	2,582.50	4.70	40.4	82.23	82.21
195.00	2,582.51	4.74	41.1	82.69	82.67
200.00	2,582.52	4.78	41.9	83.14	83.12
205.00	2,582.53	4.81	42.6	83.59	83.57
210.00	2,582.54	4.85	43.3	84.03	84.01
215.00	2,582.55	4.89	44.0	84.47	84.45
220.00	2,582.56	4.92	44.7	84.90	84.88
225.00	2,582.56	4.96	45.4	85.33	85.31
230.00	2,582.57	4.99	46.1	85.75	85.73
235.00	2,582.58	5.02	46.8	86.17	86.15
240.00	2,582.59	5.06	47.5	86.58	86.56
245.00	2,582.60	5.09	48.2	86.99	86.97
250.00	2,582.60	5.12	48.8	87.40	87.37
255.00	2,582.61	5.15	49.5	87.80	87.77
260.00	2,582.62	5.18	50.2	88.19	88.17
265.00	2,582.63	5.21	50.8	88.59	88.56
270.00	2,582.63	5.24	51.5	88.98	88.95
275.00	2,582.64	5.27	52.2	89.36	89.34
280.00	2,582.65	5.30	52.8	89.74	89.72
285.00	2,582.66	5.33	53.5	90.12	90.10
290.00	2,582.66	5.36	54.1	90.50	90.47
295.00	2,582.67	5.39	54.8	90.87	90.84
300.00	2,582.68	5.41	55.4	91.24	91.21
305.00	2,582.68	5.44	56.1	91.61	91.58
310.00	2,582.69	5.47	56.7	91.97	91.94
315.00	2,582.70	5.49	57.3	92.33	92.30
320.00	2,582.70	5.52	58.0	92.68	92.65
325.00	2,582.71	5.55	58.6	93.04	93.01
330.00	2,582.72	5.57	59.2	93.39	93.36
335.00	2,582.72	5.60	59.9	93.74	93.71
340.00	2,582.73	5.62	60.5	94.08	94.05
345.00	2,582.74	5.65	61.1	94.43	94.40
350.00	2,582.74	5.67	61.7	94.77	94.74
355.00	2,582.75	5.69	62.3	95.11	95.07
360.00	2,582.76	5.72	63.0	95.44	95.41
365.00	2,582.76	5.74	63.6	95.77	95.74
370.00	2,582.77	5.77	64.2	96.10	96.07
375.00	2,582.78	5.79	64.8	96.43	96.40
380.00	2,582.78	5.81	65.4	96.76	96.73
385.00	2,582.79	5.83	66.0	97.08	97.05
390.00	2,582.80	5.86	66.6	97.41	97.37
395.00	2,582.80	5.88	67.2	97.70	97.67
400.00	2,582.81	5.90	67.8	97.92	97.88
405.00	2,582.81	5.93	68.3	98.13	98.10
410.00	2,582.82	5.95	68.9	98.34	98.31
415.00	2,582.82	5.98	69.4	98.56	98.52
420.00	2,582.83	6.00	70.0	98.77	98.73
425.00	2,582.84	6.02	70.6	98.98	98.94
430.00	2,582.84	6.05	71.1	99.19	99.15
435.00	2,582.85	6.07	71.7	99.39	99.36

IMPASSABLE

Table
Rating Table for Irregular Channel

PIMA ROAD NORTH OF SHORT PUTT PLACE

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
440.00	2,582.85	6.09	72.2	99.60	99.56
445.00	2,582.86	6.11	72.8	99.80	99.77
450.00	2,582.86	6.14	73.3	100.01	99.97
455.00	2,582.87	6.16	73.9	100.21	100.17
460.00	2,582.87	6.18	74.4	100.41	100.38
465.00	2,582.88	6.20	75.0	100.61	100.58
470.00	2,582.89	6.22	75.5	100.81	100.78
475.00	2,582.89	6.25	76.1	101.01	100.98
480.00	2,582.90	6.27	76.6	101.21	101.17
485.00	2,582.90	6.29	77.1	101.41	101.37
490.00	2,582.91	6.31	77.7	101.60	101.57
495.00	2,582.91	6.33	78.2	101.80	101.76
500.00	2,582.92	6.35	78.7	101.99	101.95
505.00	2,582.92	6.37	79.3	102.19	102.15
510.00	2,582.93	6.39	79.8	102.38	102.34
515.00	2,582.93	6.41	80.3	102.57	102.53
520.00	2,582.94	6.43	80.8	102.76	102.72
525.00	2,582.94	6.45	81.4	102.95	102.91
530.00	2,582.95	6.47	81.9	103.14	103.10
535.00	2,582.95	6.49	82.4	103.33	103.29
540.00	2,582.96	6.51	82.9	103.51	103.47
545.00	2,582.96	6.53	83.5	103.70	103.66
550.00	2,582.97	6.55	84.0	103.89	103.84
555.00	2,582.97	6.57	84.5	104.07	104.03
560.00	2,582.98	6.59	85.0	104.26	104.21
565.00	2,582.98	6.61	85.5	104.44	104.39
570.00	2,582.99	6.62	86.0	104.62	104.58
575.00	2,582.99	6.64	86.6	104.80	104.76
580.00	2,583.00	6.66	87.1	104.98	104.94
585.00	2,583.00	6.68	87.6	105.16	105.12
590.00	2,583.01	6.70	88.1	105.34	105.30
595.00	2,583.01	6.72	88.6	105.52	105.48
600.00	2,583.02	6.73	89.1	105.70	105.65
605.00	2,583.02	6.75	89.6	105.88	105.83
610.00	2,583.03	6.77	90.1	106.05	106.01
615.00	2,583.03	6.79	90.6	106.23	106.18
620.00	2,583.04	6.81	91.1	106.40	106.36
625.00	2,583.04	6.82	91.6	106.58	106.53
630.00	2,583.05	6.84	92.1	106.75	106.70
635.00	2,583.05	6.86	92.6	106.92	106.88
640.00	2,583.05	6.87	93.1	107.10	107.05
645.00	2,583.06	6.89	93.6	107.27	107.22
650.00	2,583.06	6.91	94.1	107.44	107.39
655.00	2,583.07	6.93	94.6	107.61	107.56
660.00	2,583.07	6.94	95.1	107.78	107.73
665.00	2,583.08	6.96	95.6	107.95	107.90
670.00	2,583.08	6.97	96.1	108.12	108.07
675.00	2,583.09	6.99	96.5	108.28	108.23
680.00	2,583.09	7.01	97.0	108.45	108.40
685.00	2,583.10	7.02	97.5	108.62	108.57
690.00	2,583.10	7.04	98.0	108.78	108.73
695.00	2,583.10	7.06	98.5	108.95	108.90
700.00	2,583.11	7.07	99.0	109.11	109.06
705.00	2,583.11	7.09	99.5	109.28	109.23

Table
Rating Table for Irregular Channel

PIMA ROAD NORTH OF SHORT PUTT PLACE

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
710.00	2,583.12	7.10	99.9	109.44	109.39
715.00	2,583.12	7.12	100.4	109.61	109.55
720.00	2,583.13	7.14	100.9	109.77	109.72
725.00	2,583.13	7.15	101.4	109.93	109.88
730.00	2,583.14	7.17	101.9	110.09	110.04
735.00	2,583.14	7.18	102.3	110.25	110.20
740.00	2,583.14	7.20	102.8	110.41	110.36
745.00	2,583.15	7.21	103.3	110.57	110.52
750.00	2,583.15	7.23	103.8	110.73	110.68
755.00	2,583.16	7.24	104.2	110.89	110.84
760.00	2,583.16	7.26	104.7	111.05	111.00
765.00	2,583.17	7.27	105.2	111.21	111.15
770.00	2,583.17	7.29	105.7	111.37	111.31
775.00	2,583.17	7.30	106.1	111.52	111.47
780.00	2,583.18	7.32	106.6	111.68	111.62
785.00	2,583.18	7.33	107.1	111.83	111.78
790.00	2,583.19	7.35	107.5	111.99	111.94
795.00	2,583.19	7.36	108.0	112.14	112.09
800.00	2,583.19	7.37	108.5	112.30	112.24
805.00	2,583.20	7.39	108.9	112.45	112.40
810.00	2,583.20	7.40	109.4	112.61	112.55
815.00	2,583.21	7.42	109.9	112.76	112.70
820.00	2,583.21	7.43	110.3	112.91	112.86
825.00	2,583.22	7.45	110.8	113.06	113.01
830.00	2,583.22	7.46	111.3	113.22	113.16
835.00	2,583.22	7.47	111.7	113.37	113.31
840.00	2,583.23	7.49	112.2	113.52	113.46
845.00	2,583.23	7.50	112.6	113.67	113.61
850.00	2,583.24	7.52	113.1	113.82	113.76
855.00	2,583.24	7.53	113.6	113.97	113.91
860.00	2,583.24	7.54	114.0	114.12	114.06
865.00	2,583.25	7.56	114.5	114.26	114.21
870.00	2,583.25	7.57	114.9	114.41	114.35
875.00	2,583.26	7.58	115.4	114.56	114.50
880.00	2,583.26	7.60	115.8	114.71	114.65
885.00	2,583.26	7.61	116.3	114.85	114.80
890.00	2,583.27	7.62	116.7	115.00	114.94
895.00	2,583.27	7.64	117.2	115.15	115.09
900.00	2,583.28	7.65	117.7	115.29	115.23
905.00	2,583.28	7.66	118.1	115.44	115.38
910.00	2,583.28	7.68	118.6	115.58	115.52
915.00	2,583.29	7.69	119.0	115.73	115.67
920.00	2,583.29	7.70	119.5	115.87	115.81
925.00	2,583.29	7.71	119.9	116.01	115.95
930.00	2,583.30	7.73	120.3	116.16	116.10
935.00	2,583.30	7.72	121.1	116.91	116.85
940.00	2,583.31	7.71	121.9	117.91	117.85
945.00	2,583.32	7.70	122.6	118.90	118.83
950.00	2,583.33	7.70	123.4	119.86	119.80
955.00	2,583.33	7.69	124.2	120.81	120.75
960.00	2,583.34	7.68	125.0	121.75	121.68
965.00	2,583.34	7.67	125.8	122.67	122.60
970.00	2,583.35	7.67	126.5	123.57	123.51
975.00	2,583.36	7.66	127.3	124.47	124.41

Table
Rating Table for Irregular Channel

PIMA ROAD NORTH OF SHORT PUTT PLACE

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
980.00	2,583.36	7.65	128.0	125.35	125.29
985.00	2,583.37	7.65	128.8	126.22	126.16
990.00	2,583.37	7.64	129.5	127.08	127.01
995.00	2,583.38	7.64	130.3	127.92	127.86
1,000.00	2,583.39	7.63	131.0	128.76	128.70
1,005.00	2,583.39	7.63	131.7	129.59	129.52
1,010.00	2,583.40	7.63	132.4	130.40	130.34
1,015.00	2,583.40	7.62	133.2	131.21	131.15
1,020.00	2,583.41	7.62	133.9	132.01	131.94
1,025.00	2,583.41	7.62	134.6	132.80	132.73
1,030.00	2,583.42	7.61	135.3	133.58	133.51
1,035.00	2,583.42	7.61	136.0	134.35	134.29
1,040.00	2,583.43	7.61	136.7	135.12	135.05
1,045.00	2,583.43	7.60	137.4	135.87	135.81
1,050.00	2,583.44	7.60	138.1	136.62	136.56
1,055.00	2,583.44	7.60	138.8	137.37	137.30
1,060.00	2,583.45	7.60	139.5	138.10	138.04
1,065.00	2,583.45	7.60	140.2	138.83	138.76
1,070.00	2,583.46	7.59	140.9	139.55	139.49
1,075.00	2,583.46	7.59	141.6	140.27	140.20
1,080.00	2,583.47	7.59	142.2	140.98	140.91
1,085.00	2,583.47	7.59	142.9	141.68	141.61
1,090.00	2,583.48	7.59	143.6	142.38	142.31
1,095.00	2,583.48	7.59	144.3	143.07	143.00
1,100.00	2,583.49	7.59	145.0	143.76	143.69
1,105.00	2,583.49	7.59	145.6	144.44	144.37
1,110.00	2,583.50	7.59	146.3	145.11	145.04
1,115.00	2,583.50	7.59	147.0	145.78	145.71
1,120.00	2,583.51	7.59	147.6	146.45	146.38
1,125.00	2,583.51	7.59	148.3	147.10	147.04
1,130.00	2,583.52	7.59	148.9	147.76	147.69
1,135.00	2,583.52	7.59	149.6	148.41	148.34
1,140.00	2,583.52	7.59	150.3	149.05	148.99
1,145.00	2,583.53	7.59	150.9	149.70	149.63
1,150.00	2,583.53	7.59	151.6	150.33	150.26
1,155.00	2,583.54	7.59	152.2	150.96	150.89
1,160.00	2,583.54	7.59	152.9	151.59	151.52
1,165.00	2,583.55	7.59	153.5	152.21	152.14
1,170.00	2,583.55	7.59	154.1	152.83	152.76
1,175.00	2,583.55	7.59	154.8	153.45	153.38
1,180.00	2,583.56	7.59	155.4	154.06	153.99
1,185.00	2,583.56	7.59	156.1	154.67	154.60
1,190.00	2,583.57	7.59	156.7	155.27	155.20
1,195.00	2,583.57	7.59	157.3	155.87	155.80
1,200.00	2,583.58	7.60	158.0	156.46	156.39
1,205.00	2,583.58	7.60	158.6	157.06	156.99
1,210.00	2,583.58	7.60	159.3	157.64	157.57
1,215.00	2,583.59	7.60	159.9	158.23	158.16
1,220.00	2,583.59	7.60	160.5	158.81	158.74
1,225.00	2,583.60	7.60	161.1	159.39	159.32
1,230.00	2,583.60	7.60	161.8	159.96	159.89
1,235.00	2,583.60	7.61	162.2	160.16	160.09
1,240.00	2,583.60	7.62	162.7	160.26	160.18
1,245.00	2,583.61	7.63	163.1	160.35	160.28

Table
Rating Table for Irregular Channel

PIMA ROAD NORTH OF SNOWY PUTT PLACE

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
1,250.00	2,583.61	7.64	163.5	160.44	160.37
1,255.00	2,583.61	7.65	164.0	160.53	160.46
1,260.00	2,583.62	7.66	164.4	160.62	160.55
1,265.00	2,583.62	7.68	164.8	160.71	160.64
1,270.00	2,583.62	7.69	165.2	160.80	160.73
1,275.00	2,583.62	7.70	165.7	160.89	160.82
1,280.00	2,583.63	7.71	166.1	160.98	160.91
1,285.00	2,583.63	7.72	166.5	161.07	160.99
1,290.00	2,583.63	7.73	167.0	161.16	161.08
1,295.00	2,583.63	7.74	167.4	161.25	161.17
1,300.00	2,583.64	7.75	167.8	161.34	161.26

GW 100 YR 6 HR

FUTURE

PIMA ROAD NORTH OF SHONT PUTT PLACE

32 (JEF)

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*                                   *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN  1998            *
*           VERSION 4.1             *
*                                   *
*  RUN DATE   27NOV02  TIME  08:49:21  *
*                                   *
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*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*           (916) 756-1104          *
*                                   *
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X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX         XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

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


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

  1           ID     FUTURE CONDITIONS HYDROLOGY FOR CAREFREE AREA DRAINAGE MASTER PLAN
  2           ID       BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC., DEC. 2001
  3           ID
  4           ID     FUTURE CONDITIONS LAND USE BASED ON CAVE CREEK WATERCOURSE MASTER PLAN
  5           ID     HYDROLOGY BY TETRA TECH, 2000.
  6           ID
  7           ID     BASE MODEL BASED ON:
  8           ID
  9           ID           FLOODPLAIN DELINEATION STUDY OF ANDORA HILLS & GALLOWAY WASHES
 10           ID           FCD 99-14
 11           ID           BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC.
 12           ID           FOR THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
 13           ID           REVISED MARCH 2002     FILENAME: GWM224R.DAT
 14           ID      ***************************************************************
 15           ID           100 YEAR ANALYSIS 24-HOUR STORM USING JD RECORDS
 16           ID           MCUHP2 USED FOR UNIT HYDROGRAPHS
 17           ID     ***************************************************************
 18           ID
 19           ID     DDM MCUHP2 GALLOWAY WASH FLOODPLAIN DELINEATION STUDY, FCD NO. 99-14
 20           ID
 21           ID    March 2002 revisions to original Dec. 1999 model include:
 22           ID
 23           ID    HC BLOCK ADDED FOR GRAPEVINE WASH (CP 295A)
 24           ID
 25           ID    SUBBASIN GWW1_3 FURTHER SUBDIVIDED ALONG GALLOWAY WASH PER FEMA COMMENTS
 26           ID    IN LETTER DATED FEB. 8, 2002
 27           ID
 28           ID    *** ADDITIONAL COMBINATION ADDED 10-17-02 TO PROVIDE TOTAL FLOW IN
 29           ID        NORTH GALLOWAY WASH BY TWL FOR CH2M HILL FOR CAREFREE DMP ***
 30           ID
 31           ID   DDM MCUHP2 Carefree Area Drainage Master Plan, Galloway Wash Future Condition
              *DIAGRAM
 32           IT       5 01DEC99    0005     400
 33           IO       5       2
 34           IN      15
 35           JD    3.50    0.01
 36           PC    .000    .008    .016    .025    .033    .041    .050    .058    .066    .074
 37           PC    .087    .099    .118    .138    .216    .377    .834    .911    .931    .950
 38           PC    .962    .972    .983    .991   1.000
 39           JD    3.48    0.50
 40           JD    3.43    2.80
 41           PC    .000    .009    .016    .025    .034    .042    .051    .059    .067    .076
 42           PC    .087    .100    .120    .163    .252    .451    .694    .837    .900    .938
 43           PC    .950    .963    .975    .988   1.000
 44           JD    3.23    16.0
 45           PC    .000    .015    .020    .030    .048    .063    .076    .090    .105    .119
 46           PC    .135    .152    .175    .222    .304    .472    .670    .796    .868    .912
 47           PC    .946    .960    .973    .987   1.000
 48           JD    2.84    90.0
 49           PC    .000    .021    .035    .051    .071    .087    .105    .125    .143    .160
 50           PC    .179    .201    .232    .281    .364    .500    .658    .773    .841    .888
 51           PC    .927    .945    .964    .982   1.000
              *
              * DDM   ***** Updated *****
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
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Pima Road North of Short Putt Place

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 20410 3380         .         .         .         .         .         .         .         .         .         .         .         .
 20415 3390         .         .         .         .         .         .         .         .         .         .         .         .
 20420 3400         .         .         .         .         .         .         .         .         .         .         .         .
 20425 3410 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 20430 3420         .         .         .         .         .         .         .         .         .         .         .         .
 20435 3430         .         .         .         .         .         .         .         .         .         .         .         .
 20440 3440         .         .         .         .         .         .         .         .         .         .         .         .
 20445 3450         .         .         .         .         .         .         .         .         .         .         .         .
 20450 3460         .         .         .         .         .         .         .         .         .         .         .         .
 20455 3470         .         .         .         .         .         .         .         .         .         .         .         .
 20500 3480         .         .         .         .         .         .         .         .         .         .         .         .
 20505 3490         .         .         .         .         .         .         .         .         .         .         .         .
 20510 3500         .         .         .         .         .         .         .         .         .         .         .         .
 20515 3510 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 20520 3520         .         .         .         .         .         .         .         .         .         .         .         .
 20525 3530         .         .         .         .         .         .         .         .         .         .         .         .
 20530 3540         .         .         .         .         .         .         .         .         .         .         .         .
 20535 3550         .         .         .         .         .         .         .         .         .         .         .         .
 20540 3560         .         .         .         .         .         .         .         .         .         .         .         .
 20545 3570         .         .         .         .         .         .         .         .         .         .         .         .
 20550 3580         .         .         .         .         .         .         .         .         .         .         .         .
 20555 3590         .         .         .         .         .         .         .         .         .         .         .         .
 20600 3600         .         .         .         .         .         .         .         .         .         .         .         .
 20605 3610 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 20610 3620         .         .         .         .         .         .         .         .         .         .         .         .
 20615 3630         .         .         .         .         .         .         .         .         .         .         .         .
 20620 3640         .         .         .         .         .         .         .         .         .         .         .         .
 20625 3650         .         .         .         .         .         .         .         .         .         .         .         .
 20630 3660         .         .         .         .         .         .         .         .         .         .         .         .
 20635 3670         .         .         .         .         .         .         .         .         .         .         .         .
 20640 3680         .         .         .         .         .         .         .         .         .         .         .         .
 20645 3690         .         .         .         .         .         .         .         .         .         .         .         .
 20650 3700         .         .         .         .         .         .         .         .         .         .         .         .
 20655 3710 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 20700 3720         .         .         .         .         .         .         .         .         .         .         .         .
 20705 3730         .         .         .         .         .         .         .         .         .         .         .         .
 20710 3740         .         .         .         .         .         .         .         .         .         .         .         .
 20715 3750         .         .         .         .         .         .         .         .         .         .         .         .
 20720 3760         .         .         .         .         .         .         .         .         .         .         .         .
 20725 3770         .         .         .         .         .         .         .         .         .         .         .         .
 20730 3780         .         .         .         .         .         .         .         .         .         .         .         .
 20735 3790         .         .         .         .         .         .         .         .         .         .         .         .
 20740 3800         .         .         .         .         .         .         .         .         .         .         .         .
 20745 3810 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 20750 3820         .         .         .         .         .         .         .         .         .         .         .         .
 20755 3830         .         .         .         .         .         .         .         .         .         .         .         .
 20800 3840         .         .         .         .         .         .         .         .         .         .         .         .
 20805 3850         .         .         .         .         .         .         .         .         .         .         .         .
 20810 3860         .         .         .         .         .         .         .         .         .         .         .         .
 20815 3870         .         .         .         .         .         .         .         .         .         .         .         .
 20820 3880         .         .         .         .         .         .         .         .         .         .         .         .
 20825 3890         .         .         .         .         .         .         .         .         .         .         .         .
 20830 3900         .         .         .         .         .         .         .         .         .         .         .         .
 20835 3910 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 20840 3920         .         .         .         .         .         .         .         .         .         .         .         .
 20845 3930         .         .         .         .         .         .         .         .         .         .         .         .
 20850 3940         .         .         .         .         .         .         .         .         .         .         .         .
 20855 3950         .         .         .         .         .         .         .         .         .         .         .         .
 20900 3960         .         .         .         .         .         .         .         .         .         .         .         .
 20905 3970         .         .         .         .         .         .         .         .         .         .         .         .
 20910 3980         .         .         .         .         .         .         .         .         .         .         .         .
 20915 3990         .         .         .         .         .         .         .         .         .         .         .         .
 20920 4000---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
1
1                                                             STATION   GWW1_2

                        (O) OUTFLOW
            0.      200.      400.      600.      800.     1000.     1200.     1400.         0.         0.         0.         0.         0.
 DAHRMN PER
 10005     10---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
 10010     20         .         .         .         .         .         .         .         .         .         .         .         .
 10015     30         .         .         .         .         .         .         .         .         .         .         .         .
 10020     40         .         .         .         .         .         .         .         .         .         .         .         .
 10025     50         .         .         .         .         .         .         .         .         .         .         .         .
 10030     60         .         .         .         .         .         .         .         .         .         .         .         .
 10035     70         .         .         .         .         .         .         .         .         .         .         .         .
 10040     80         .         .         .         .         .         .         .         .         .         .         .         .
 10045     90         .         .         .         .         .         .         .         .         .         .         .         .
 10050    100         .         .         .         .         .         .         .         .         .         .         .         .
 10055    110 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10100    120         .         .         .         .         .         .         .         .         .         .         .         .
 10105    130         .         .         .         .         .         .         .         .         .         .         .         .
 10110    140         .         .         .         .         .         .         .         .         .         .         .         .
 10115    150         .         .         .         .         .         .         .         .         .         .         .         .
 10120    160         .         .         .         .         .         .         .         .         .         .         .         .
 10125    170         .         .         .         .         .         .         .         .         .         .         .         .
 10130    180         .         .         .         .         .         .         .         .         .         .         .         .
 10135    190         .         .         .         .         .         .         .         .         .         .         .         .
 10140    200         .         .         .         .         .         .         .         .         .         .         .         .
 10145    210 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10150    220         .         .         .         .         .         .         .         .         .         .         .         .
 10155    230         .         .         .         .         .         .         .         .         .         .         .         .
 10200    240         .         .         .         .         .         .         .         .         .         .         .         .
 10205    250         .         .         .         .         .         .         .         .         .         .         .         .
 10210    260         .         .         .         .         .         .         .         .         .         .         .         .
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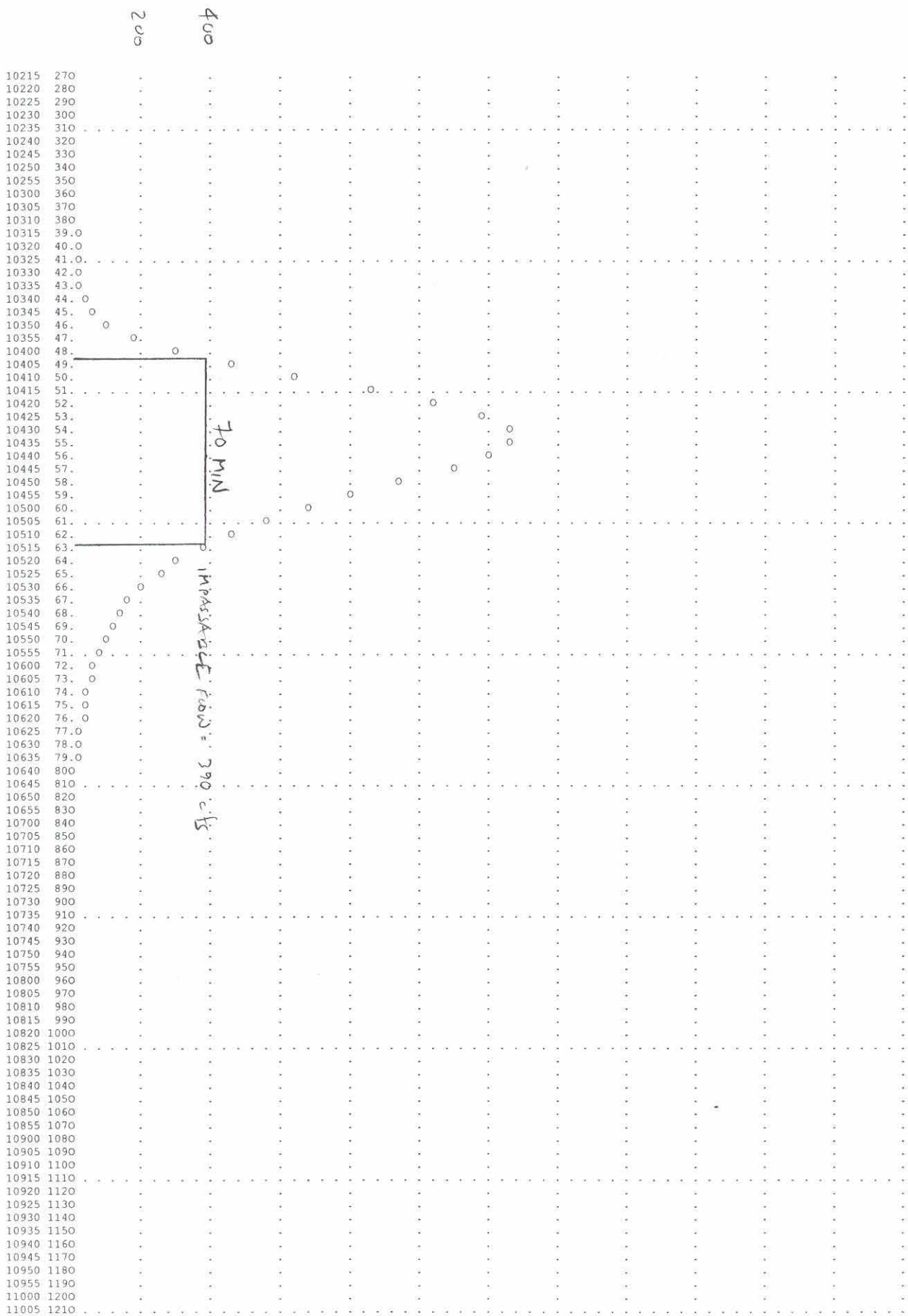
Pima Road North of Short Putt Place



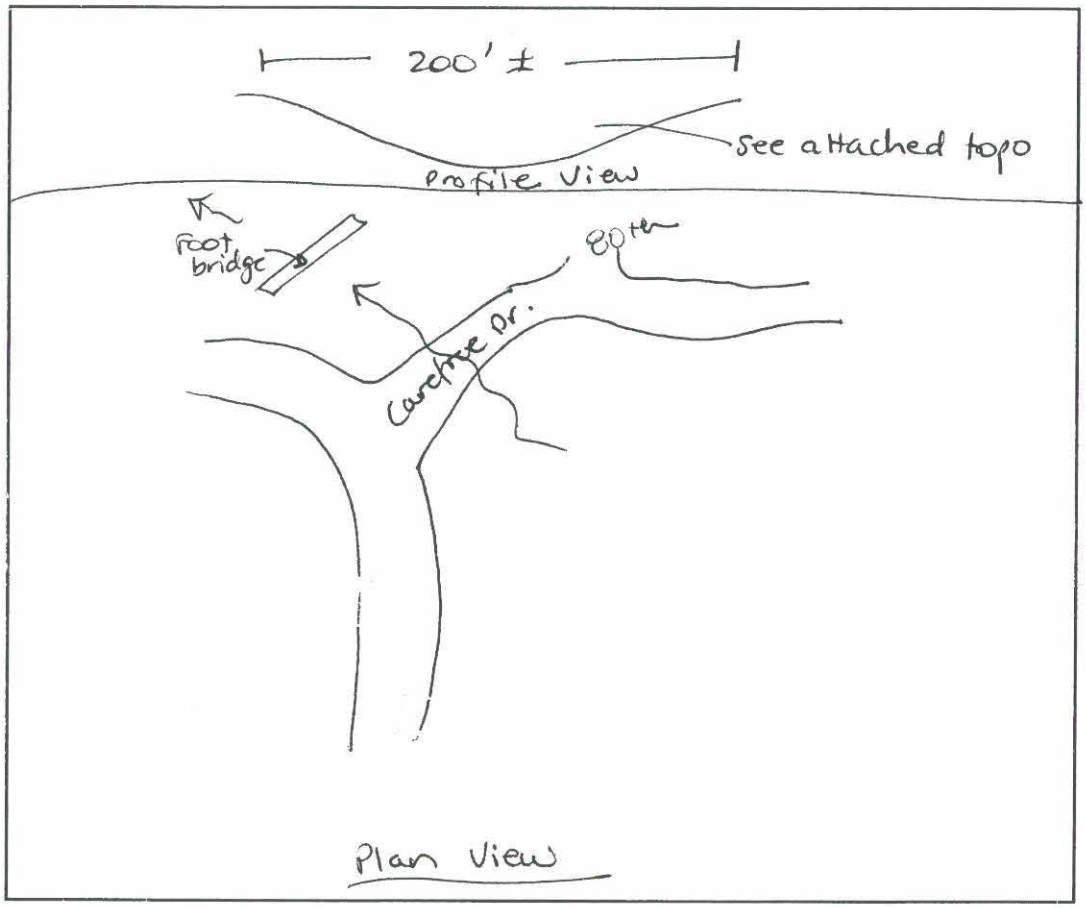
Carefree Drive Between Mule Train and Pleasant Place (JEF #33)

Carefree Drainage Master Plan
Field Survey Notes

Culvert Number: JEF 33

Date of Survey: 10/9/02

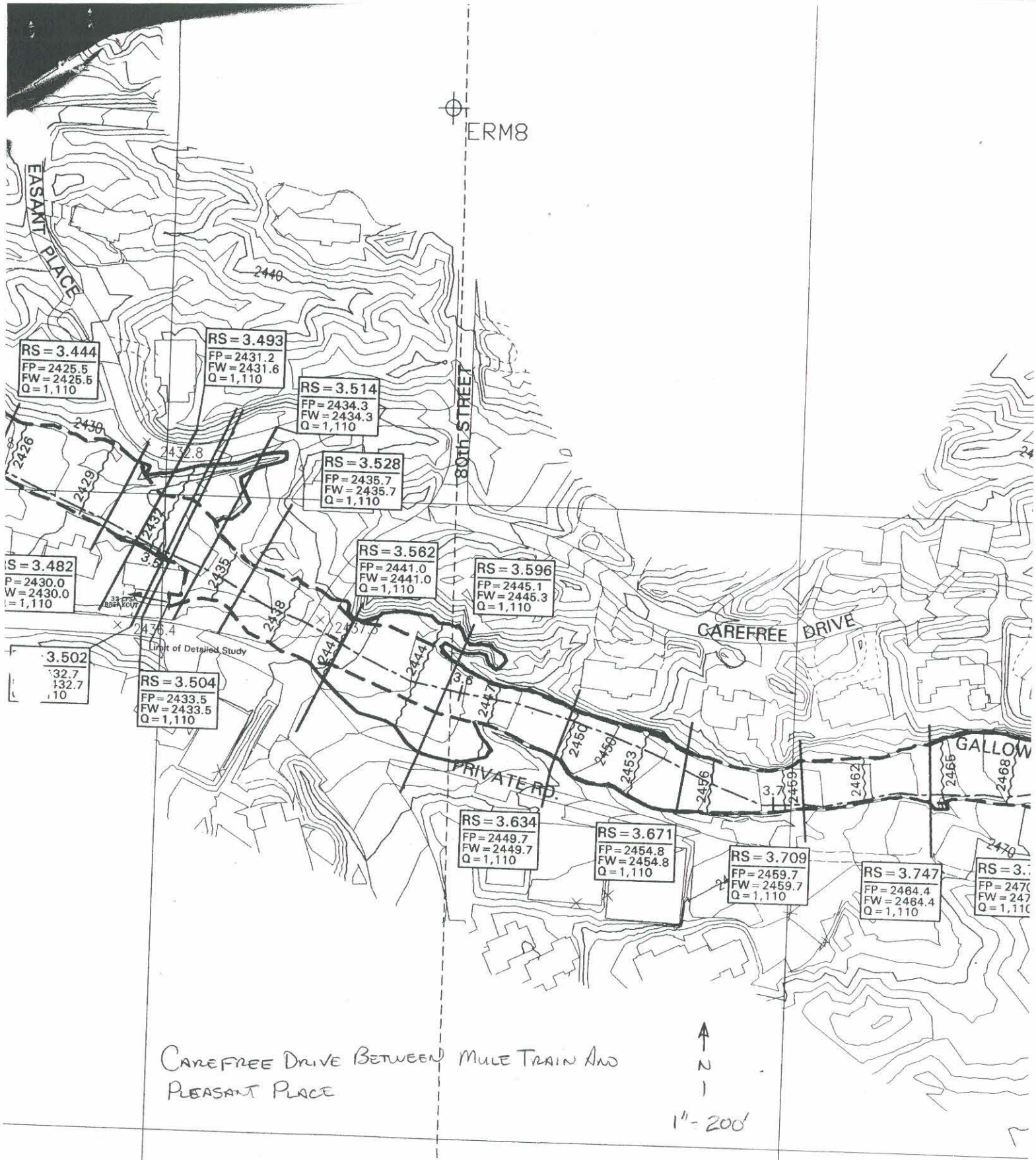
Location: Carefree Drive between Mule Train and Pleasant Place



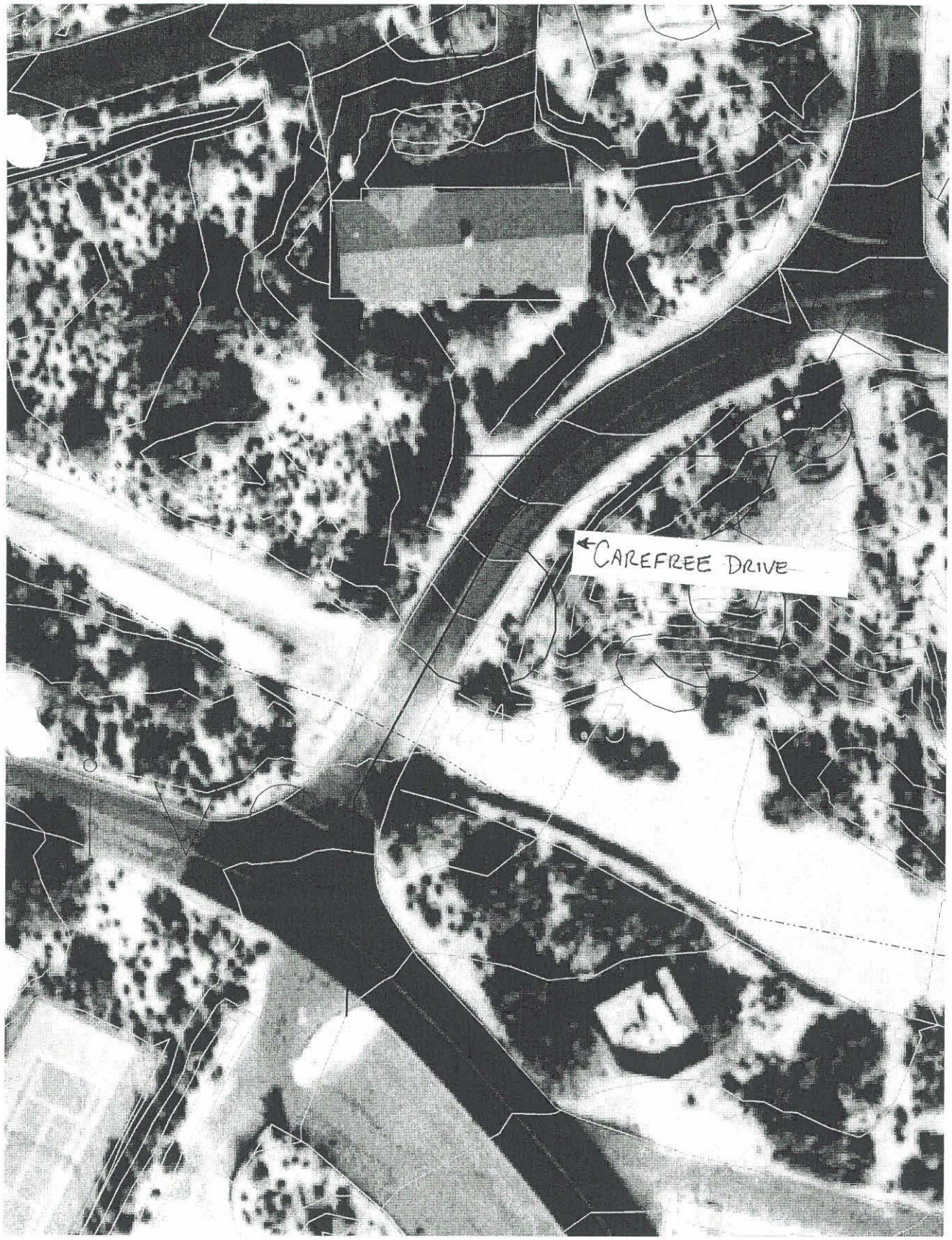
Material: paved dip crossing

Headwall: none

Notes: Mapped by JEF as part of Andora Hills and Galloway Washes Floodplain Delineation (see attached)

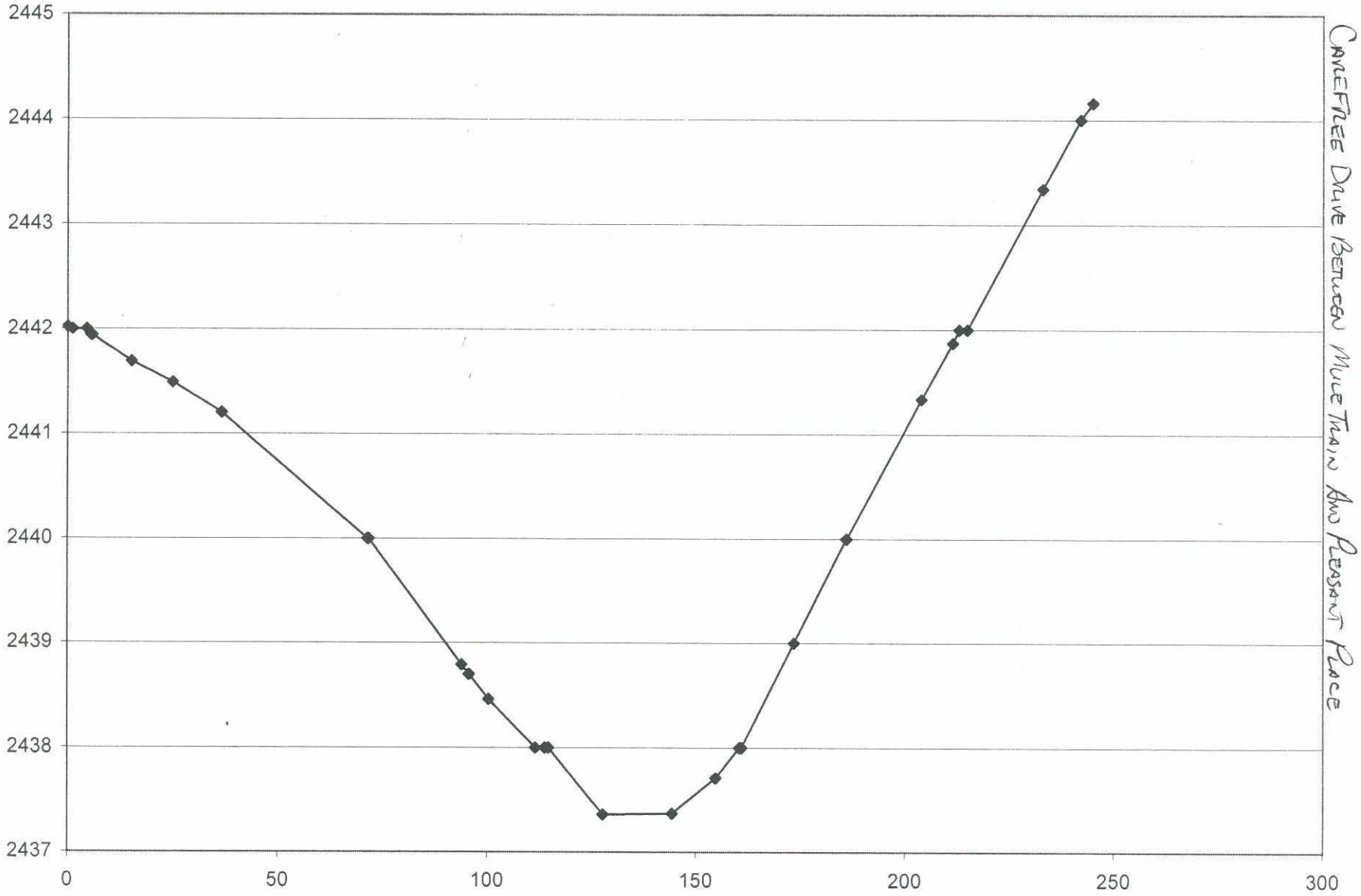


CAREFREE DRIVE BETWEEN MULE TRAIN AND PLEASANT PLACE



N

CAREFREE DRIVE BETWEEN
MULE TRAIN AND PLEASANT PLACE SCALE 1" = 60'


2445
2444
2443
2442
2441
2440
2439
2438
2437
0
50
100
150
200
250
300
CAMPFIRE DRIVE BETWEEN MULE TRAIN AND PLEASANT PLACE

Worksheet
Worksheet for Irregular Channel

CAREFREE DRIVE BETWEEN MULE TRAIN AND PLEASANT PLACE

Project Description	
Worksheet	JEF-33
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data		
Slope	027000	ft/ft
Discharg	,783.00	cfs

Options	
Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Results		
Mannings Coefficie	0.032	
Water Surface Elev	2,439.86	ft
Elevation Range	37.00 to 2,442.00	
Flow Area	177.0	ft²
Wetted Perimeter	116.75	ft
Top Width	116.59	ft
Actual Depth	2.86	ft
Critical Elevation	2,440.33	ft
Critical Slope	0.012366	ft/ft
Velocity	10.07	ft/s
Velocity Head	1.58	ft
Specific Energy	2,441.43	ft
Froude Number	1.44	
Flow Type	Supercritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+05	2+13	0.032

Natural Channel Points

Station (ft)	Elevation (ft)
0+05	2,442.00
0+37	2,441.20
1+12	2,438.00
1+28	2,437.40
1+36	2,437.00
1+44	2,437.40
1+55	2,437.70
1+61	2,438.00
2+13	2,442.00

Table
Rating Table for Irregular Channel

CAREFREE DRIVE BETWEEN MULE TRAIN AND PLEASANT PLACE

Project Description

Worksheet	JEF-33
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data

Slope	027000	ft/ft

Options

Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	1,800.00	10.00

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00	2,437.00	0.00	0.0	0.00	0.00
10.00	2,437.43	2.67	3.7	18.03	18.01
20.00	2,437.56	3.04	6.6	26.18	26.16
30.00	2,437.65	3.31	9.1	31.60	31.58
40.00	2,437.71	3.55	11.3	35.60	35.57
50.00	2,437.77	3.77	13.3	38.10	38.07
60.00	2,437.81	3.97	15.1	40.33	40.30
70.00	2,437.86	4.14	16.9	42.36	42.32
80.00	2,437.90	4.29	18.6	44.23	44.19
90.00	2,437.93	4.43	20.3	45.97	45.93
100.00	2,437.97	4.56	22.0	47.60	47.55
110.00	2,438.00	4.67	23.5	49.11	49.07
120.00	2,438.03	4.80	25.0	50.20	50.15
130.00	2,438.06	4.91	26.5	51.24	51.19
140.00	2,438.09	5.02	27.9	52.24	52.19
150.00	2,438.11	5.12	29.3	53.21	53.16
160.00	2,438.14	5.22	30.6	54.14	54.09
170.00	2,438.16	5.31	32.0	55.04	54.99
180.00	2,438.19	5.40	33.3	55.91	55.86
190.00	2,438.21	5.49	34.6	56.76	56.70
200.00	2,438.23	5.57	35.9	57.58	57.52
210.00	2,438.26	5.65	37.2	58.38	58.32
220.00	2,438.28	5.72	38.4	59.16	59.10
230.00	2,438.30	5.80	39.7	59.92	59.86
240.00	2,438.32	5.87	40.9	60.67	60.61
250.00	2,438.34	5.94	42.1	61.40	61.33
260.00	2,438.36	6.00	43.3	62.11	62.04
270.00	2,438.38	6.07	44.5	62.80	62.74
280.00	2,438.40	6.13	45.7	63.49	63.42
290.00	2,438.41	6.19	46.9	64.15	64.09
300.00	2,438.43	6.25	48.0	64.81	64.74
310.00	2,438.45	6.30	49.2	65.45	65.38
320.00	2,438.47	6.36	50.3	66.09	66.02
330.00	2,438.48	6.42	51.4	66.71	66.64

IMPASSABLE

Table
Rating Table for Irregular Channel

CARLEFREE DRIVE BETWEEN MULE TRAIN AND PLEASANT PLACE

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
340.00	2,438.50	6.47	52.6	67.32	67.25
350.00	2,438.52	6.52	53.7	67.92	67.85
360.00	2,438.53	6.57	54.8	68.51	68.44
370.00	2,438.55	6.62	55.9	69.09	69.02
380.00	2,438.57	6.67	57.0	69.67	69.59
390.00	2,438.58	6.72	58.0	70.23	70.16
400.00	2,438.60	6.77	59.1	70.79	70.71
410.00	2,438.61	6.81	60.2	71.34	71.26
420.00	2,438.63	6.86	61.2	71.88	71.80
430.00	2,438.64	6.90	62.3	72.42	72.33
440.00	2,438.65	6.95	63.4	72.94	72.86
450.00	2,438.67	6.99	64.4	73.46	73.38
460.00	2,438.68	7.03	65.4	73.98	73.89
470.00	2,438.70	7.07	66.5	74.49	74.40
480.00	2,438.71	7.11	67.5	74.99	74.90
490.00	2,438.72	7.15	68.5	75.48	75.40
500.00	2,438.74	7.19	69.5	75.97	75.89
510.00	2,438.75	7.23	70.5	76.46	76.37
520.00	2,438.76	7.27	71.5	76.94	76.85
530.00	2,438.78	7.31	72.5	77.41	77.32
540.00	2,438.79	7.34	73.5	77.88	77.79
550.00	2,438.80	7.38	74.5	78.34	78.25
560.00	2,438.82	7.42	75.5	78.80	78.71
570.00	2,438.83	7.45	76.5	79.25	79.16
580.00	2,438.84	7.49	77.5	79.70	79.61
590.00	2,438.85	7.52	78.4	80.15	80.05
600.00	2,438.86	7.56	79.4	80.59	80.49
610.00	2,438.88	7.59	80.4	81.02	80.93
620.00	2,438.89	7.62	81.3	81.46	81.36
630.00	2,438.90	7.66	82.3	81.88	81.79
640.00	2,438.91	7.69	83.2	82.31	82.21
650.00	2,438.92	7.72	84.2	82.73	82.63
660.00	2,438.93	7.75	85.1	83.15	83.05
670.00	2,438.95	7.78	86.1	83.56	83.46
680.00	2,438.96	7.81	87.0	83.97	83.87
690.00	2,438.97	7.84	88.0	84.37	84.27
700.00	2,438.98	7.87	88.9	84.78	84.68
710.00	2,438.99	7.90	89.8	85.18	85.07
720.00	2,439.00	7.93	90.7	85.57	85.47
730.00	2,439.01	7.96	91.7	85.96	85.86
740.00	2,439.02	7.99	92.6	86.35	86.25
750.00	2,439.03	8.02	93.5	86.74	86.64
760.00	2,439.04	8.05	94.4	87.12	87.02
770.00	2,439.05	8.08	95.3	87.51	87.40
780.00	2,439.06	8.11	96.2	87.88	87.78
790.00	2,439.07	8.13	97.1	88.26	88.15
800.00	2,439.08	8.16	98.0	88.63	88.52
810.00	2,439.09	8.19	98.9	89.00	88.89
820.00	2,439.10	8.21	99.8	89.37	89.26
830.00	2,439.11	8.24	100.7	89.73	89.62
840.00	2,439.12	8.27	101.6	90.09	89.98
850.00	2,439.13	8.29	102.5	90.45	90.34
860.00	2,439.14	8.32	103.4	90.81	90.70
870.00	2,439.15	8.34	104.3	91.16	91.05

Table
Rating Table for Irregular Channel

CAREFREE DRIVE BETWEEN MULE TRAIN AND PLEASANT PLACE

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
880.00	2,439.16	8.37	105.1	91.51	91.40
890.00	2,439.17	8.39	106.0	91.86	91.75
900.00	2,439.18	8.42	106.9	92.21	92.10
910.00	2,439.19	8.44	107.8	92.55	92.44
920.00	2,439.20	8.47	108.6	92.90	92.78
930.00	2,439.21	8.49	109.5	93.24	93.12
940.00	2,439.22	8.52	110.4	93.58	93.46
950.00	2,439.23	8.54	111.2	93.91	93.80
960.00	2,439.24	8.56	112.1	94.25	94.13
970.00	2,439.25	8.59	112.9	94.58	94.46
980.00	2,439.26	8.61	113.8	94.91	94.79
990.00	2,439.27	8.63	114.7	95.24	95.12
1,000.00	2,439.27	8.66	115.5	95.56	95.44
1,010.00	2,439.28	8.68	116.4	95.89	95.77
1,020.00	2,439.29	8.70	117.2	96.21	96.09
1,030.00	2,439.30	8.73	118.0	96.53	96.41
1,040.00	2,439.31	8.75	118.9	96.85	96.73
1,050.00	2,439.32	8.77	119.7	97.16	97.04
1,060.00	2,439.33	8.79	120.6	97.48	97.36
1,070.00	2,439.34	8.81	121.4	97.79	97.67
1,080.00	2,439.34	8.84	122.2	98.10	97.98
1,090.00	2,439.35	8.86	123.1	98.41	98.29
1,100.00	2,439.36	8.88	123.9	98.72	98.60
1,110.00	2,439.37	8.90	124.7	99.03	98.90
1,120.00	2,439.38	8.92	125.6	99.33	99.21
1,130.00	2,439.39	8.94	126.4	99.64	99.51
1,140.00	2,439.39	8.96	127.2	99.94	99.81
1,150.00	2,439.40	8.98	128.0	100.24	100.11
1,160.00	2,439.41	9.00	128.9	100.54	100.41
1,170.00	2,439.42	9.02	129.7	100.83	100.71
1,180.00	2,439.43	9.04	130.5	101.13	101.00
1,190.00	2,439.44	9.06	131.3	101.42	101.29
1,200.00	2,439.44	9.08	132.1	101.72	101.59
1,210.00	2,439.45	9.10	132.9	102.01	101.88
1,220.00	2,439.46	9.12	133.7	102.30	102.17
1,230.00	2,439.47	9.14	134.5	102.58	102.45
1,240.00	2,439.47	9.16	135.3	102.87	102.74
1,250.00	2,439.48	9.18	136.2	103.16	103.03
1,260.00	2,439.49	9.20	137.0	103.44	103.31
1,270.00	2,439.50	9.22	137.8	103.72	103.59
1,280.00	2,439.51	9.24	138.6	104.01	103.87
1,290.00	2,439.51	9.26	139.4	104.29	104.15
1,300.00	2,439.52	9.28	140.2	104.56	104.43
1,310.00	2,439.53	9.29	140.9	104.84	104.71
1,320.00	2,439.54	9.31	141.7	105.12	104.98
1,330.00	2,439.54	9.33	142.5	105.39	105.26
1,340.00	2,439.55	9.35	143.3	105.67	105.53
1,350.00	2,439.56	9.37	144.1	105.94	105.80
1,360.00	2,439.57	9.39	144.9	106.21	106.07
1,370.00	2,439.57	9.40	145.7	106.48	106.34
1,380.00	2,439.58	9.42	146.5	106.75	106.61
1,390.00	2,439.59	9.44	147.3	107.02	106.88
1,400.00	2,439.60	9.46	148.0	107.28	107.15
1,410.00	2,439.60	9.47	148.8	107.55	107.41

Table
Rating Table for Irregular Channel

CAREFREE DRIVE BETWEEN MULE TRAIN AND PLEASANT PLACE

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
1,420.00	2,439.61	9.49	149.6	107.81	107.68
1,430.00	2,439.62	9.51	150.4	108.08	107.94
1,440.00	2,439.62	9.53	151.2	108.34	108.20
1,450.00	2,439.63	9.54	151.9	108.60	108.46
1,460.00	2,439.64	9.56	152.7	108.86	108.72
1,470.00	2,439.65	9.58	153.5	109.12	108.98
1,480.00	2,439.65	9.60	154.2	109.38	109.24
1,490.00	2,439.66	9.61	155.0	109.64	109.49
1,500.00	2,439.67	9.63	155.8	109.89	109.75
1,510.00	2,439.67	9.65	156.6	110.15	110.00
1,520.00	2,439.68	9.66	157.3	110.40	110.26
1,530.00	2,439.69	9.68	158.1	110.65	110.51
1,540.00	2,439.69	9.69	158.8	110.91	110.76
1,550.00	2,439.70	9.71	159.6	111.16	111.01
1,560.00	2,439.71	9.73	160.4	111.41	111.26
1,570.00	2,439.72	9.74	161.1	111.65	111.51
1,580.00	2,439.72	9.76	161.9	111.90	111.76
1,590.00	2,439.73	9.78	162.6	112.15	112.00
1,600.00	2,439.74	9.79	163.4	112.40	112.25
1,610.00	2,439.74	9.81	164.2	112.64	112.49
1,620.00	2,439.75	9.82	164.9	112.89	112.74
1,630.00	2,439.76	9.84	165.7	113.13	112.98
1,640.00	2,439.76	9.85	166.4	113.37	113.22
1,650.00	2,439.77	9.87	167.2	113.61	113.46
1,660.00	2,439.78	9.89	167.9	113.85	113.71
1,670.00	2,439.78	9.90	168.7	114.09	113.94
1,680.00	2,439.79	9.92	169.4	114.33	114.18
1,690.00	2,439.80	9.93	170.2	114.57	114.42
1,700.00	2,439.80	9.95	170.9	114.81	114.66
1,710.00	2,439.81	9.96	171.6	115.04	114.89
1,720.00	2,439.81	9.98	172.4	115.28	115.13
1,730.00	2,439.82	9.99	173.1	115.52	115.36
1,740.00	2,439.83	10.01	173.9	115.75	115.60
1,750.00	2,439.83	10.02	174.6	115.98	115.83
1,760.00	2,439.84	10.04	175.3	116.21	116.06
1,770.00	2,439.85	10.05	176.1	116.45	116.29
1,780.00	2,439.85	10.07	176.8	116.68	116.52
1,790.00	2,439.86	10.08	177.6	116.91	116.75
1,800.00	2,439.87	10.10	178.3	117.14	116.98

33 (JEF)

GW 100 YR, 24 HR
FUTURE
CAREFREE DRIVE BETWEEN MULE TRAIN AND PLEASANT PLACE

```
1*************************************                                  *************************************
*                                   *                                  *                                   *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)*                                  *   U.S. ARMY CORPS OF ENGINEERS    *
*             JUN  1998             *                                  *  HYDROLOGIC ENGINEERING CENTER    *
*           VERSION 4.1             *                                  *        609 SECOND STREET          *
*                                   *                                  *     DAVIS, CALIFORNIA 95616       *
* RUN DATE   27NOV02  TIME  08:45:45*                                  *        (916) 756-1104             *
*                                   *                                  *                                   *
*************************************                                  *************************************

X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX         XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

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

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1                                                HEC-1 INPUT                                                    PAGE  1

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

    1           ID     FUTURE CONDITIONS HYDROLOGY FOR CAREFREE AREA DRAINAGE MASTER PLAN
    2           ID       BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC., DEC. 2001
    3           ID
    4           ID     FUTURE CONDITIONS LAND USE BASED ON CAVE CREEK WATERCOURSE MASTER PLAN
    5           ID     HYDROLOGY BY TETRA TECH, 2000.
    6           ID
    7           ID     BASE MODEL BASED ON:
    8           ID
    9           ID           FLOODPLAIN DELINEATION STUDY OF ANDORA HILLS & GALLOWAY WASHES
   10           ID           FCD 99-14
   11           ID           BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC.
   12           ID           FOR THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
   13           ID           REVISED MARCH 2002     FILENAME: GWM224R.DAT
   14           ID      ******************************************************************
   15           ID           100 YEAR ANALYSIS 24-HOUR STORM USING JD RECORDS
   16           ID           MCUHP2 USED FOR UNIT HYDROGRAPHS
   17           ID     ******************************************************************
   18           ID
   19           ID     DDM MCUHP2 GALLOWAY WASH FLOODPLAIN DELINEATION STUDY, FCD NO. 99-14
   20           ID
   21           ID    March 2002 revisions to original Dec. 1999 model include:
   22           ID
   23           ID    HC BLOCK ADDED FOR GRAPEVINE WASH (CP 295A)
   24           ID
   25           ID    SUBBASIN GWW1_3 FURTHER SUBDIVIDED ALONG GALLOWAY WASH PER FEMA COMMENTS
   26           ID    IN LETTER DATED FEB. 8, 2002
   27           ID
   28           ID    *** ADDITIONAL COMBINATION ADDED 10-17-02 TO PROVIDE TOTAL FLOW IN
   29           ID        NORTH GALLOWAY WASH BY TWL FOR CH2M HILL FOR CAREFREE DMP ***
   30           ID
   31           ID   DDM MCUHP2 Carefree Area Drainage Master Plan, Galloway Wash Future Condition
                *DIAGRAM
   32           IT       5 01DEC99    0005     400
   33           IO       5       2
   34           IN      15
   35           JD    4.80    0.01
   36           PC    .000    .002    .005    .008    .011    .014    .017    .020    .023    .026
   37           PC    .029    .032    .035    .038    .041    .044    .048    .052    .056    .060
   38           PC    .064    .068    .072    .076    .080    .085    .090    .095    .100    .105
   39           PC    .110    .115    .120    .126    .133    .140    .147    .155    .163    .172
   40           PC    .181    .191    .203    .218    .236    .257    .283    .387    .663    .707
   41           PC    .735    .758    .776    .791    .804    .815    .825    .834    .842    .849
   42           PC    .856    .863    .869    .875    .881    .887    .893    .898    .903    .908
   43           PC    .913    .918    .922    .926    .930    .934    .938    .942    .946    .950
   44           PC    .953    .956    .959    .962    .965    .968    .971    .974    .977    .980
   45           PC    .983    .986    .989    .992    .995    .998   1.000
   46           JD    4.78    1.00
   47           JD    4.51   10.00
   48           JD    4.37   20.00
   49           JD    4.11   70.00
                *
                * DDM   ***** Updated *****
1                                                HEC-1 INPUT                                                    PAGE  2

  LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
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CAREFREE DRIVE BETWEEN MULE TRAIN AND PLEASANT PLACE

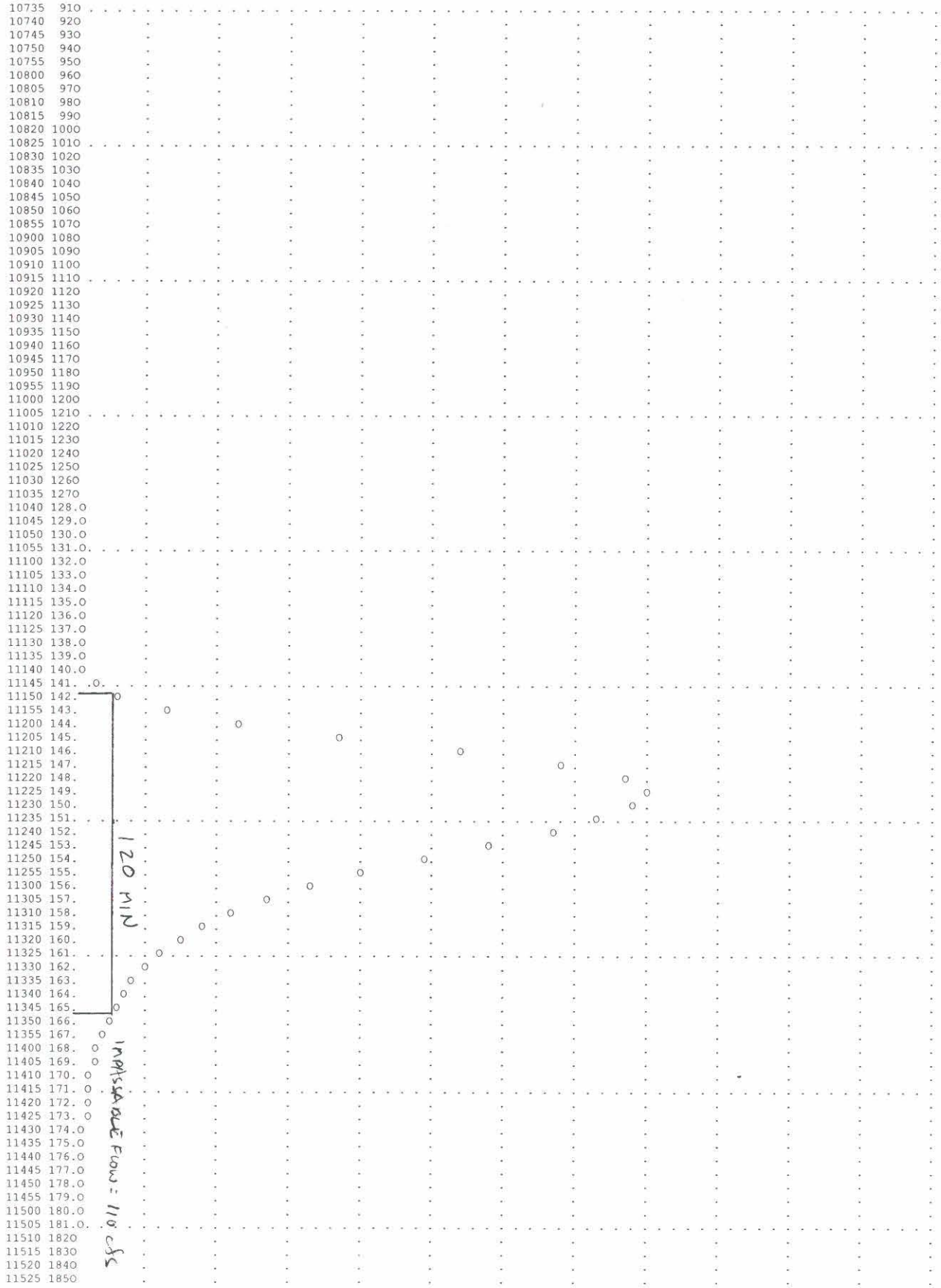
1 STATION CP285

(O) OUTFLOW

DAHRMN	PER	0.	200.	400.	600.	800.	1000.	1200.	1400.	1600.	0.	0.	0.	0.
10005	10													
10010	20													
10015	30													
10020	40													
10025	50													
10030	60													
10035	70													
10040	80													
10045	90													
10050	100													
10055	110													
10100	120													
10105	130													
10110	140													
10115	150													
10120	160													
10125	170													
10130	180													
10135	190													
10140	200													
10145	210													
10150	220													
10155	230													
10200	240													
10205	250													
10210	260													
10215	270													
10220	280													
10225	290													
10230	300													
10235	310													
10240	320													
10245	330													
10250	340													
10255	350													
10300	360													
10305	370													
10310	380													
10315	390													
10320	400													
10325	410													
10330	420													
10335	430													
10340	440													
10345	450													
10350	460													
10355	470													
10400	480													
10405	490													
10410	500													
10415	510													
10420	520													
10425	530													
10430	540													
10435	550													
10440	560													
10445	570													
10450	580													
10455	590													
10500	600													
10505	610													
10510	620													
10515	630													
10520	640													
10525	650													
10530	660													
10535	670													
10540	680													
10545	690													
10550	700													
10555	710													
10600	720													
10605	730													
10610	740													
10615	750													
10620	760													
10625	770													
10630	780													
10635	790													
10640	800													
10645	810													
10650	820													
10655	830													
10700	840													
10705	850													
10710	860													
10715	870													
10720	880													
10725	890													
10730	900													

CAREFREE DRIVE BETWEEN MULE TRAIN AND PLEASANT PEACE

200



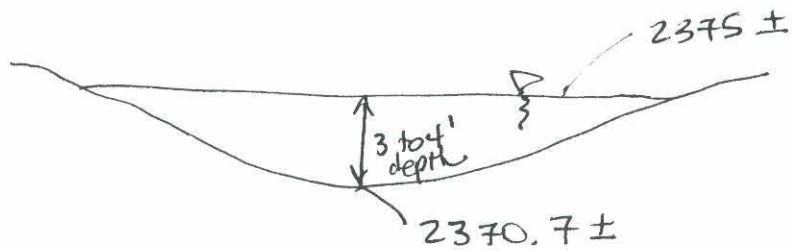
Tranquil Trail North of Sundance Trail
(JEF #35 and #55)

Carefree Drainage Master Plan
Dip Crossing Notes

ID Number: JEF 35, JEF 55

Source of Data: Floodplain Delineation of Andora Hills & Galloway Washes, June 2001 (preliminary.

Location: Tranquil Trail, north of Sundance Trail



See attached

Material: Paved Dip Crossing

Headwall: none

Notes:

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOODPLAIN DELINEATION STUDY OF ANDORA HILLS & GALLOWAY WASHES FCD 99-14

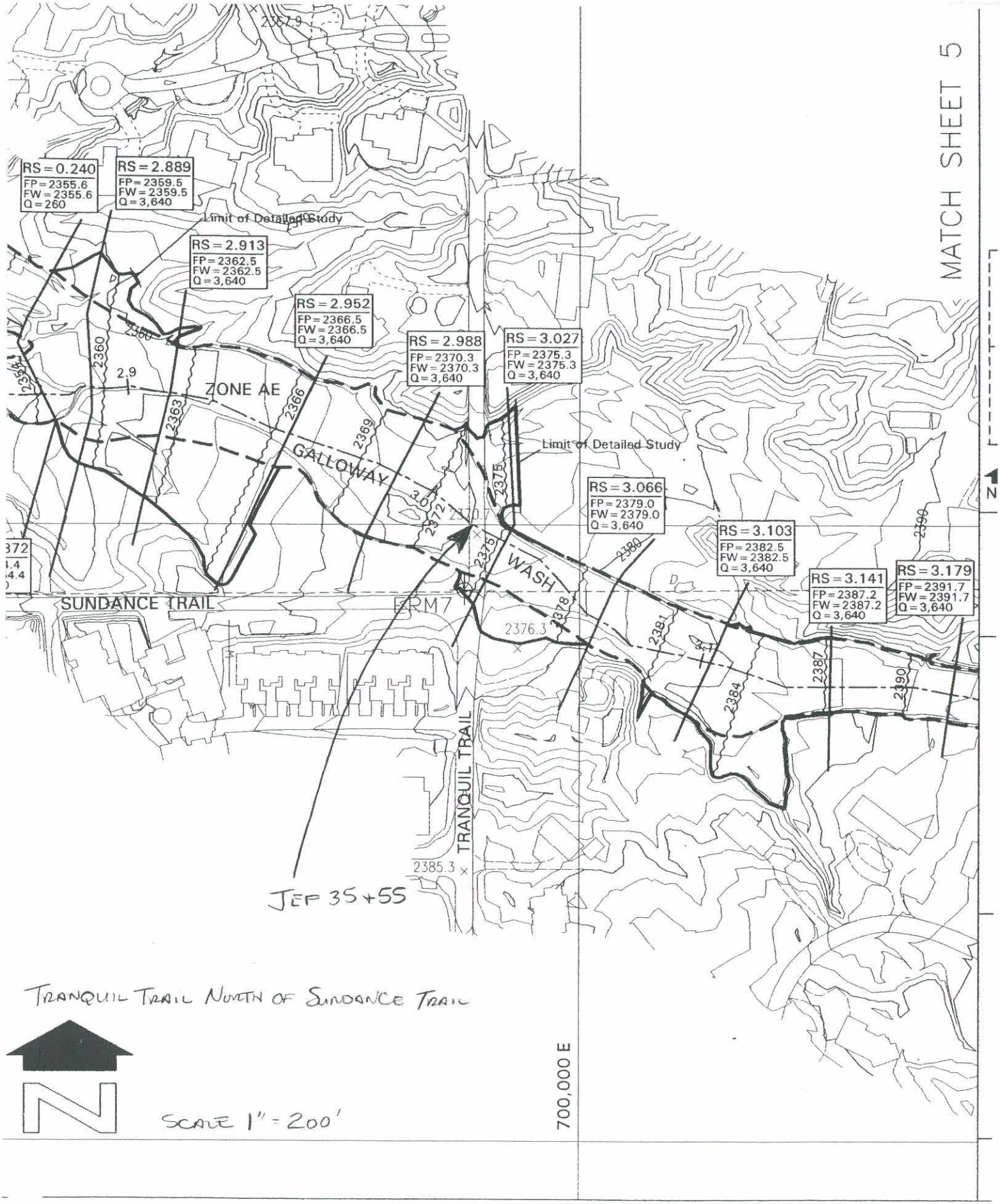
JUNE, 2001

LEGEND

100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	1.2 — 1.3
CROSS SECTION	RS = 0.300 (CROSS SECTION RIVER MILE DESIGNATION); FP = 2061.0 (FLOODPLAIN WATER SURFACE ELEVATION); FW = 2061.5 (ENCROACHED WATER SURFACE ELEVATION); Q = 13,700 (100 YEAR DISCHARGE)
ELEVATION REFERENCE MARK	ERM 4
BASE FLOOD ELEVATIONS	2060
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	TOWN OF CAVECREEK
SECTION LINE	

ELEVATION REFERENCE MARKS

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
ERM 6	2289.66	FCDMC BC ON TOP OF N END OF CULVERT HEADWALL ON E SIDE OF GALLOWAY RD, APPROX 0.25 MI N OF CAVE CREEK RD, SECTION 27, T6N, R4E (N1030149.93, E696383.49)
ERM 7	2373.76	BC STAMPED "RLS 11062, $\frac{1}{4}$ $\frac{26}{35}$, 1997", IN PAVEMENT APPROX 10 FT W & 15 FT N OF C/L INTERSECTION OF SUNDANCE TRAIL & TRANQUIL TRAIL S26, T6N, R4E (N1028893.58, E699813.23)



TRANQUIL TRAIL NORTH OF SUNDANCE TRAIL

SCALE 1" = 200'

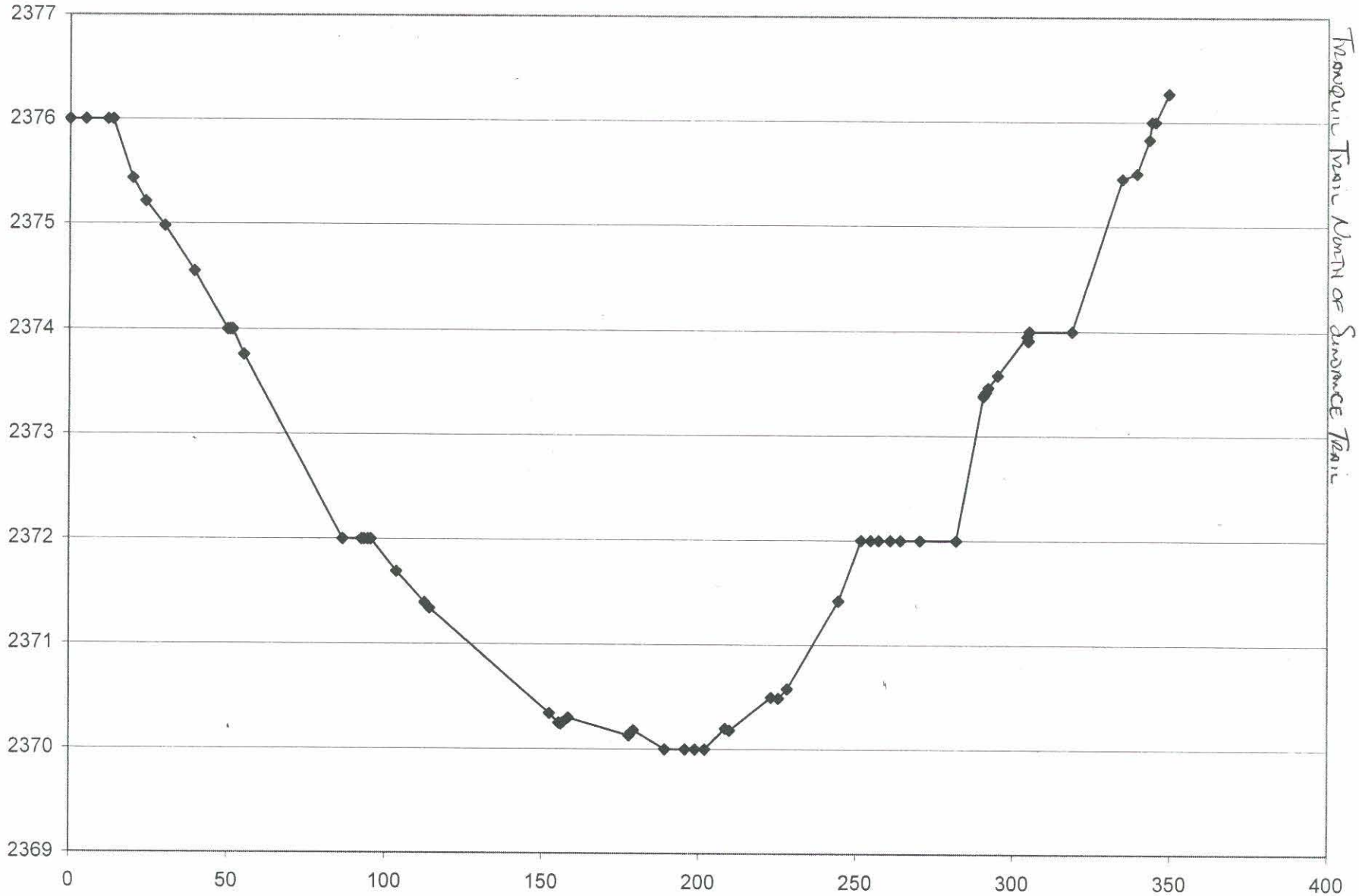
M&B AERIAL MAPPING COMPANY, LLC

GROUND CONTROL SURVEY DATA
PROVIDED BY A TEAM PROFESSIONAL ASSOC

TRANQUIL TRAIL NORTH OF SUNDANCE TRAIL

N

SCALE 1"=60'


2377
2376
2375
2374
2373
2372
2371
2370
2369
0
50
100
150
200
250
300
350
400
Tranquil Trail North of Sundance Trail

Worksheet
Worksheet for Irregular Channel

TRANQUIL TRAIL NORTH OF SUNDANCE TRAIL

Project Description	
Worksheet	JEF-35
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data		
Slope	020340	ft/ft
Discharg	,635.00	cfs

Options	
Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Results		
Mannings Coefficie	0.032	
Water Surface Elev	2,372.84	ft
Elevation Range	70.00 to 2,376.30	
Flow Area	375.0	ft²
Wetted Perimeter	211.71	ft
Top Width	211.54	ft
Actual Depth	2.84	ft
Critical Elevation	2,373.19	ft
Critical Slope	0.011789	ft/ft
Velocity	9.69	ft/s
Velocity Head	1.46	ft
Specific Energy	2,374.30	ft
Froude Number	1.28	
Flow Type	Supercritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+14	3+49	0.032

Natural Channel Points

Station (ft)	Elevation (ft)
0+14	2,376.00
0+30	2,375.00
0+93	2,372.00
1+14	2,371.30
1+53	2,370.30
1+78	2,370.20
1+89	2,370.00
2+02	2,370.00
2+23	2,370.50
2+44	2,371.40
2+52	2,372.00
2+82	2,372.00
2+90	2,373.40
3+05	2,374.00
3+19	2,374.00

Worksheet
Worksheet for Irregular Channel

TRANQUIL TRAIL NORTH OF SUNDANCE TRAIL

Natural Channel Points

Station (ft)	Elevation (ft)
3+49	2,376.30

Table
Rating Table for Irregular Channel

TranQuil Trail North of Sundance Trail

Project Description

Worksheet	JEF-35
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data

Slope 020340 ft/ft

Options

Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	3,700.00	10.00

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00	2,370.00	0.00	0.0	0.00	0.00
10.00	2,370.23	1.76	5.7	41.41	41.41
20.00	2,370.31	1.97	10.2	62.81	62.81
30.00	2,370.36	2.26	13.3	66.71	66.71
40.00	2,370.40	2.48	16.1	70.05	70.04
50.00	2,370.44	2.67	18.7	73.01	73.00
60.00	2,370.47	2.83	21.2	75.70	75.69
70.00	2,370.50	2.98	23.5	78.08	78.07
80.00	2,370.53	3.11	25.7	79.81	79.80
90.00	2,370.56	3.24	27.8	81.44	81.43
100.00	2,370.58	3.35	29.9	82.99	82.97
110.00	2,370.61	3.46	31.8	84.46	84.45
120.00	2,370.63	3.55	33.8	85.88	85.86
130.00	2,370.65	3.65	35.6	87.23	87.22
140.00	2,370.67	3.73	37.5	88.54	88.53
150.00	2,370.69	3.82	39.3	89.81	89.79
160.00	2,370.71	3.90	41.1	91.03	91.01
170.00	2,370.73	3.97	42.8	92.22	92.20
180.00	2,370.75	4.04	44.5	93.37	93.35
190.00	2,370.77	4.11	46.2	94.49	94.47
200.00	2,370.78	4.18	47.9	95.58	95.56
210.00	2,370.80	4.24	49.5	96.65	96.63
220.00	2,370.82	4.30	51.1	97.69	97.67
230.00	2,370.84	4.36	52.7	98.70	98.68
240.00	2,370.85	4.42	54.3	99.70	99.68
250.00	2,370.87	4.47	55.9	100.67	100.65
260.00	2,370.88	4.53	57.4	101.63	101.60
270.00	2,370.90	4.58	59.0	102.56	102.54
280.00	2,370.91	4.63	60.5	103.48	103.46
290.00	2,370.93	4.68	62.0	104.38	104.36
300.00	2,370.94	4.73	63.5	105.27	105.24
310.00	2,370.95	4.77	64.9	106.14	106.11
320.00	2,370.97	4.82	66.4	106.99	106.97
330.00	2,370.98	4.86	67.9	107.84	107.81

Table
Rating Table for Irregular Channel

TRANQUIL TRAIL NORTH OF SUNDANCE TRAIL

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
340.00	2,370.99	4.91	69.3	108.66	108.64
350.00	2,371.01	4.95	70.7	109.48	109.45
360.00	2,371.02	4.99	72.1	110.28	110.26
370.00	2,371.03	5.03	73.5	111.08	111.05
380.00	2,371.05	5.07	74.9	111.86	111.83
390.00	2,371.06	5.11	76.3	112.63	112.60
400.00	2,371.07	5.15	77.7	113.39	113.36
410.00	2,371.08	5.19	79.1	114.14	114.11
420.00	2,371.09	5.22	80.4	114.88	114.85
430.00	2,371.11	5.26	81.8	115.61	115.58
440.00	2,371.12	5.29	83.1	116.33	116.30
450.00	2,371.13	5.33	84.5	117.05	117.02
460.00	2,371.14	5.36	85.8	117.75	117.72
470.00	2,371.15	5.40	87.1	118.45	118.42
480.00	2,371.16	5.43	88.4	119.14	119.11
490.00	2,371.17	5.46	89.7	119.82	119.79
500.00	2,371.18	5.49	91.0	120.49	120.46
510.00	2,371.20	5.52	92.3	121.16	121.13
520.00	2,371.21	5.56	93.6	121.82	121.79
530.00	2,371.22	5.59	94.9	122.47	122.44
540.00	2,371.23	5.62	96.2	123.12	123.09
550.00	2,371.24	5.65	97.4	123.76	123.72
560.00	2,371.25	5.68	98.7	124.39	124.36
570.00	2,371.26	5.70	99.9	125.02	124.99
580.00	2,371.27	5.73	101.2	125.64	125.61
590.00	2,371.28	5.76	102.4	126.26	126.22
600.00	2,371.29	5.79	103.7	126.87	126.83
610.00	2,371.30	5.82	104.9	127.47	127.44
620.00	2,371.31	5.84	106.1	128.01	127.97
630.00	2,371.32	5.87	107.3	128.51	128.47
640.00	2,371.32	5.90	108.5	129.00	128.96
650.00	2,371.33	5.93	109.7	129.48	129.45
660.00	2,371.34	5.96	110.8	129.97	129.93
670.00	2,371.35	5.98	112.0	130.45	130.41
680.00	2,371.36	6.01	113.2	130.92	130.88
690.00	2,371.37	6.04	114.3	131.39	131.35
700.00	2,371.38	6.06	115.5	131.86	131.82
710.00	2,371.39	6.09	116.6	132.33	132.29
720.00	2,371.40	6.11	117.8	132.79	132.75
730.00	2,371.40	6.14	118.9	133.21	133.16
740.00	2,371.41	6.17	120.0	133.56	133.52
750.00	2,371.42	6.19	121.1	133.92	133.88
760.00	2,371.43	6.22	122.2	134.28	134.23
770.00	2,371.44	6.25	123.3	134.63	134.58
780.00	2,371.44	6.27	124.4	134.98	134.93
790.00	2,371.45	6.30	125.5	135.33	135.28
800.00	2,371.46	6.32	126.5	135.67	135.63
810.00	2,371.47	6.35	127.6	136.02	135.97
820.00	2,371.48	6.37	128.7	136.36	136.31
830.00	2,371.48	6.40	129.8	136.70	136.65
840.00	2,371.49	6.42	130.8	137.03	136.99
850.00	2,371.50	6.44	131.9	137.37	137.32
860.00	2,371.51	6.47	132.9	137.70	137.66
870.00	2,371.52	6.49	134.0	138.04	137.99

IMPASSABLE

Table
Rating Table for Irregular Channel

TRANQUIL TRAIL NORTH OF SUNDANCE TRAIL

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
880.00	2,371.52	6.52	135.0	138.37	138.32
890.00	2,371.53	6.54	136.1	138.69	138.65
900.00	2,371.54	6.56	137.1	139.02	138.97
910.00	2,371.55	6.59	138.2	139.35	139.30
920.00	2,371.55	6.61	139.2	139.67	139.62
930.00	2,371.56	6.63	140.3	139.99	139.94
940.00	2,371.57	6.65	141.3	140.31	140.26
950.00	2,371.57	6.68	142.3	140.63	140.58
960.00	2,371.58	6.70	143.3	140.94	140.89
970.00	2,371.59	6.72	144.4	141.26	141.21
980.00	2,371.60	6.74	145.4	141.57	141.52
990.00	2,371.60	6.76	146.4	141.88	141.83
1,000.00	2,371.61	6.78	147.4	142.19	142.14
1,010.00	2,371.62	6.80	148.4	142.50	142.45
1,020.00	2,371.63	6.83	149.4	142.81	142.75
1,030.00	2,371.63	6.85	150.4	143.11	143.06
1,040.00	2,371.64	6.87	151.4	143.42	143.36
1,050.00	2,371.65	6.89	152.4	143.72	143.66
1,060.00	2,371.65	6.91	153.4	144.02	143.96
1,070.00	2,371.66	6.93	154.4	144.32	144.26
1,080.00	2,371.67	6.95	155.4	144.62	144.56
1,090.00	2,371.67	6.97	156.4	144.91	144.86
1,100.00	2,371.68	6.99	157.4	145.21	145.15
1,110.00	2,371.69	7.01	158.4	145.50	145.45
1,120.00	2,371.69	7.03	159.4	145.80	145.74
1,130.00	2,371.70	7.05	160.4	146.09	146.03
1,140.00	2,371.71	7.07	161.3	146.38	146.32
1,150.00	2,371.71	7.09	162.3	146.67	146.61
1,160.00	2,371.72	7.10	163.3	146.96	146.90
1,170.00	2,371.73	7.12	164.3	147.24	147.18
1,180.00	2,371.73	7.14	165.2	147.53	147.47
1,190.00	2,371.74	7.16	166.2	147.81	147.75
1,200.00	2,371.75	7.18	167.2	148.09	148.03
1,210.00	2,371.75	7.20	168.1	148.38	148.32
1,220.00	2,371.76	7.22	169.1	148.66	148.60
1,230.00	2,371.77	7.23	170.0	148.94	148.88
1,240.00	2,371.77	7.25	171.0	149.21	149.15
1,250.00	2,371.78	7.27	171.9	149.49	149.43
1,260.00	2,371.79	7.29	172.9	149.77	149.71
1,270.00	2,371.79	7.31	173.8	150.04	149.98
1,280.00	2,371.80	7.32	174.8	150.32	150.25
1,290.00	2,371.80	7.34	175.7	150.59	150.53
1,300.00	2,371.81	7.36	176.7	150.86	150.80
1,310.00	2,371.82	7.38	177.6	151.13	151.07
1,320.00	2,371.82	7.39	178.6	151.40	151.34
1,330.00	2,371.83	7.41	179.5	151.67	151.61
1,340.00	2,371.84	7.43	180.4	151.94	151.87
1,350.00	2,371.84	7.44	181.4	152.20	152.14
1,360.00	2,371.85	7.46	182.3	152.47	152.40
1,370.00	2,371.85	7.48	183.2	152.73	152.67
1,380.00	2,371.86	7.49	184.2	153.00	152.93
1,390.00	2,371.87	7.51	185.1	153.26	153.19
1,400.00	2,371.87	7.53	186.0	153.52	153.45
1,410.00	2,371.88	7.54	186.9	153.78	153.72

Table
Rating Table for Irregular Channel

TRANQUIL TRAIL NORTH OF SUNDANCE TRAIL

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
1,420.00	2,371.88	7.56	187.9	154.04	153.97
1,430.00	2,371.89	7.58	188.8	154.30	154.23
1,440.00	2,371.90	7.59	189.7	154.56	154.49
1,450.00	2,371.90	7.61	190.6	154.82	154.75
1,460.00	2,371.91	7.62	191.5	155.07	155.00
1,470.00	2,371.91	7.64	192.4	155.33	155.26
1,480.00	2,371.92	7.65	193.3	155.58	155.51
1,490.00	2,371.93	7.67	194.3	155.84	155.77
1,500.00	2,371.93	7.69	195.2	156.09	156.02
1,510.00	2,371.94	7.70	196.1	156.34	156.27
1,520.00	2,371.94	7.72	197.0	156.59	156.52
1,530.00	2,371.95	7.73	197.9	156.84	156.77
1,540.00	2,372.05	7.18	214.6	190.29	190.21
1,550.00	2,372.05	7.19	215.5	190.42	190.34
1,560.00	2,372.05	7.21	216.4	190.54	190.46
1,570.00	2,372.06	7.23	217.3	190.67	190.59
1,580.00	2,372.06	7.24	218.2	190.79	190.71
1,590.00	2,372.07	7.26	219.1	190.92	190.84
1,600.00	2,372.07	7.27	219.9	191.04	190.96
1,610.00	2,372.08	7.29	220.8	191.17	191.08
1,620.00	2,372.08	7.31	221.7	191.29	191.21
1,630.00	2,372.09	7.32	222.6	191.41	191.33
1,640.00	2,372.09	7.34	223.5	191.54	191.45
1,650.00	2,372.10	7.36	224.3	191.66	191.57
1,660.00	2,372.10	7.37	225.2	191.78	191.70
1,670.00	2,372.11	7.39	226.1	191.90	191.82
1,680.00	2,372.11	7.40	226.9	192.02	191.94
1,690.00	2,372.11	7.42	227.8	192.14	192.06
1,700.00	2,372.12	7.43	228.7	192.27	192.18
1,710.00	2,372.12	7.45	229.5	192.39	192.30
1,720.00	2,372.13	7.47	230.4	192.51	192.42
1,730.00	2,372.13	7.48	231.3	192.63	192.54
1,740.00	2,372.14	7.50	232.1	192.75	192.66
1,750.00	2,372.14	7.51	233.0	192.87	192.78
1,760.00	2,372.15	7.53	233.8	192.98	192.89
1,770.00	2,372.15	7.54	234.7	193.10	193.01
1,780.00	2,372.15	7.56	235.5	193.22	193.13
1,790.00	2,372.16	7.57	236.4	193.34	193.25
1,800.00	2,372.16	7.59	237.2	193.46	193.37
1,810.00	2,372.17	7.60	238.1	193.57	193.48
1,820.00	2,372.17	7.62	238.9	193.69	193.60
1,830.00	2,372.18	7.63	239.8	193.81	193.72
1,840.00	2,372.18	7.65	240.6	193.93	193.83
1,850.00	2,372.19	7.66	241.5	194.04	193.95
1,860.00	2,372.19	7.68	242.3	194.16	194.06
1,870.00	2,372.19	7.69	243.1	194.27	194.18
1,880.00	2,372.20	7.71	244.0	194.39	194.29
1,890.00	2,372.20	7.72	244.8	194.51	194.41
1,900.00	2,372.21	7.73	245.6	194.62	194.52
1,910.00	2,372.21	7.75	246.5	194.74	194.64
1,920.00	2,372.22	7.76	247.3	194.85	194.75
1,930.00	2,372.22	7.78	248.1	194.96	194.87
1,940.00	2,372.22	7.79	249.0	195.08	194.98
1,950.00	2,372.23	7.81	249.8	195.19	195.09

Table
Rating Table for Irregular Channel

TRANQUIL TRAIL NORTH OF SUNDANCE TRAIL

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
1,960.00	2,372.23	7.82	250.6	195.31	195.21
1,970.00	2,372.24	7.83	251.5	195.42	195.32
1,980.00	2,372.24	7.85	252.3	195.53	195.43
1,990.00	2,372.24	7.86	253.1	195.64	195.54
2,000.00	2,372.25	7.88	253.9	195.76	195.66
2,010.00	2,372.25	7.89	254.7	195.87	195.77
2,020.00	2,372.26	7.90	255.6	195.98	195.88
2,030.00	2,372.26	7.92	256.4	196.09	195.99
2,040.00	2,372.27	7.93	257.2	196.21	196.10
2,050.00	2,372.27	7.95	258.0	196.32	196.21
2,060.00	2,372.27	7.96	258.8	196.43	196.32
2,070.00	2,372.28	7.97	259.6	196.54	196.43
2,080.00	2,372.28	7.99	260.4	196.65	196.54
2,090.00	2,372.29	8.00	261.2	196.76	196.65
2,100.00	2,372.29	8.01	262.1	196.87	196.76
2,110.00	2,372.29	8.03	262.9	196.98	196.87
2,120.00	2,372.30	8.04	263.7	197.09	196.98
2,130.00	2,372.30	8.05	264.5	197.20	197.09
2,140.00	2,372.31	8.07	265.3	197.31	197.20
2,150.00	2,372.31	8.08	266.1	197.42	197.31
2,160.00	2,372.32	8.09	266.9	197.53	197.42
2,170.00	2,372.32	8.11	267.7	197.63	197.53
2,180.00	2,372.32	8.12	268.5	197.74	197.63
2,190.00	2,372.33	8.13	269.3	197.85	197.74
2,200.00	2,372.33	8.15	270.1	197.96	197.85
2,210.00	2,372.34	8.16	270.9	198.07	197.96
2,220.00	2,372.34	8.17	271.7	198.17	198.06
2,230.00	2,372.34	8.19	272.4	198.28	198.17
2,240.00	2,372.35	8.20	273.2	198.39	198.28
2,250.00	2,372.35	8.21	274.0	198.50	198.38
2,260.00	2,372.36	8.22	274.8	198.60	198.49
2,270.00	2,372.36	8.24	275.6	198.71	198.60
2,280.00	2,372.36	8.25	276.4	198.82	198.70
2,290.00	2,372.37	8.26	277.2	198.92	198.81
2,300.00	2,372.37	8.27	278.0	199.03	198.91
2,310.00	2,372.37	8.29	278.7	199.13	199.02
2,320.00	2,372.38	8.30	279.5	199.24	199.12
2,330.00	2,372.38	8.31	280.3	199.34	199.23
2,340.00	2,372.39	8.32	281.1	199.45	199.33
2,350.00	2,372.39	8.34	281.9	199.55	199.44
2,360.00	2,372.39	8.35	282.7	199.66	199.54
2,370.00	2,372.40	8.36	283.4	199.76	199.64
2,380.00	2,372.40	8.37	284.2	199.87	199.75
2,390.00	2,372.41	8.39	285.0	199.97	199.85
2,400.00	2,372.41	8.40	285.8	200.07	199.96
2,410.00	2,372.41	8.41	286.5	200.18	200.06
2,420.00	2,372.42	8.42	287.3	200.28	200.16
2,430.00	2,372.42	8.44	288.1	200.39	200.26
2,440.00	2,372.43	8.45	288.8	200.49	200.37
2,450.00	2,372.43	8.46	289.6	200.59	200.47
2,460.00	2,372.43	8.47	290.4	200.69	200.57
2,470.00	2,372.44	8.48	291.1	200.80	200.67
2,480.00	2,372.44	8.50	291.9	200.90	200.78
2,490.00	2,372.44	8.51	292.7	201.00	200.88

Table
Rating Table for Irregular Channel

TRANQUIL TRAIL NORTH OF SUNDANCE TRAIL

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
2,500.00	2,372.45	8.52	293.4	201.10	200.98
2,510.00	2,372.45	8.53	294.2	201.21	201.08
2,520.00	2,372.46	8.54	295.0	201.31	201.18
2,530.00	2,372.46	8.56	295.7	201.41	201.28
2,540.00	2,372.46	8.57	296.5	201.51	201.38
2,550.00	2,372.47	8.58	297.2	201.61	201.48
2,560.00	2,372.47	8.59	298.0	201.71	201.59
2,570.00	2,372.47	8.60	298.8	201.81	201.69
2,580.00	2,372.48	8.61	299.5	201.91	201.79
2,590.00	2,372.48	8.63	300.3	202.01	201.89
2,600.00	2,372.49	8.64	301.0	202.11	201.99
2,610.00	2,372.49	8.65	301.8	202.21	202.09
2,620.00	2,372.49	8.66	302.5	202.31	202.19
2,630.00	2,372.50	8.67	303.3	202.41	202.28
2,640.00	2,372.50	8.68	304.0	202.51	202.38
2,650.00	2,372.50	8.69	304.8	202.61	202.48
2,660.00	2,372.51	8.71	305.5	202.71	202.58
2,670.00	2,372.51	8.72	306.3	202.81	202.68
2,680.00	2,372.52	8.73	307.0	202.91	202.78
2,690.00	2,372.52	8.74	307.8	203.01	202.88
2,700.00	2,372.52	8.75	308.5	203.11	202.98
2,710.00	2,372.53	8.76	309.3	203.21	203.07
2,720.00	2,372.53	8.77	310.0	203.30	203.17
2,730.00	2,372.53	8.78	310.8	203.40	203.27
2,740.00	2,372.54	8.80	311.5	203.50	203.37
2,750.00	2,372.54	8.81	312.2	203.60	203.46
2,760.00	2,372.55	8.82	313.0	203.70	203.56
2,770.00	2,372.55	8.83	313.7	203.79	203.66
2,780.00	2,372.55	8.84	314.5	203.89	203.76
2,790.00	2,372.56	8.85	315.2	203.99	203.85
2,800.00	2,372.56	8.86	315.9	204.08	203.95
2,810.00	2,372.56	8.87	316.7	204.18	204.05
2,820.00	2,372.57	8.88	317.4	204.28	204.14
2,830.00	2,372.57	8.90	318.1	204.37	204.24
2,840.00	2,372.57	8.91	318.9	204.47	204.33
2,850.00	2,372.58	8.92	319.6	204.57	204.43
2,860.00	2,372.58	8.93	320.3	204.66	204.53
2,870.00	2,372.58	8.94	321.1	204.76	204.62
2,880.00	2,372.59	8.95	321.8	204.86	204.72
2,890.00	2,372.59	8.96	322.5	204.95	204.81
2,900.00	2,372.60	8.97	323.3	205.05	204.91
2,910.00	2,372.60	8.98	324.0	205.14	205.00
2,920.00	2,372.60	8.99	324.7	205.24	205.10
2,930.00	2,372.61	9.00	325.5	205.33	205.19
2,940.00	2,372.61	9.01	326.2	205.43	205.29
2,950.00	2,372.61	9.02	326.9	205.52	205.38
2,960.00	2,372.62	9.03	327.6	205.62	205.47
2,970.00	2,372.62	9.05	328.4	205.71	205.57
2,980.00	2,372.62	9.06	329.1	205.81	205.66
2,990.00	2,372.63	9.07	329.8	205.90	205.76
3,000.00	2,372.63	9.08	330.5	205.99	205.85
3,010.00	2,372.63	9.09	331.2	206.09	205.94
3,020.00	2,372.64	9.10	332.0	206.18	206.04
3,030.00	2,372.64	9.11	332.7	206.28	206.13

Table
Rating Table for Irregular Channel

TRANQUIL TRAIL NORTH OF SUNDANCE TRAIL

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
3,040.00	2,372.64	9.12	333.4	206.37	206.22
3,050.00	2,372.65	9.13	334.1	206.46	206.32
3,060.00	2,372.65	9.14	334.8	206.56	206.41
3,070.00	2,372.66	9.15	335.6	206.65	206.50
3,080.00	2,372.66	9.16	336.3	206.74	206.59
3,090.00	2,372.66	9.17	337.0	206.83	206.69
3,100.00	2,372.67	9.18	337.7	206.93	206.78
3,110.00	2,372.67	9.19	338.4	207.02	206.87
3,120.00	2,372.67	9.20	339.1	207.11	206.96
3,130.00	2,372.68	9.21	339.8	207.20	207.06
3,140.00	2,372.68	9.22	340.6	207.30	207.15
3,150.00	2,372.68	9.23	341.3	207.39	207.24
3,160.00	2,372.69	9.24	342.0	207.48	207.33
3,170.00	2,372.69	9.25	342.7	207.57	207.42
3,180.00	2,372.69	9.26	343.4	207.66	207.51
3,190.00	2,372.70	9.27	344.1	207.76	207.60
3,200.00	2,372.70	9.28	344.8	207.85	207.69
3,210.00	2,372.70	9.29	345.5	207.94	207.79
3,220.00	2,372.71	9.30	346.2	208.03	207.88
3,230.00	2,372.71	9.31	346.9	208.12	207.97
3,240.00	2,372.71	9.32	347.6	208.21	208.06
3,250.00	2,372.72	9.33	348.3	208.30	208.15
3,260.00	2,372.72	9.34	349.0	208.39	208.24
3,270.00	2,372.72	9.35	349.7	208.48	208.33
3,280.00	2,372.73	9.36	350.4	208.57	208.42
3,290.00	2,372.73	9.37	351.1	208.66	208.51
3,300.00	2,372.73	9.38	351.8	208.75	208.60
3,310.00	2,372.74	9.39	352.5	208.84	208.69
3,320.00	2,372.74	9.40	353.2	208.93	208.78
3,330.00	2,372.74	9.41	353.9	209.02	208.87
3,340.00	2,372.75	9.42	354.6	209.11	208.96
3,350.00	2,372.75	9.43	355.3	209.20	209.05
3,360.00	2,372.75	9.44	356.0	209.29	209.13
3,370.00	2,372.76	9.45	356.7	209.38	209.22
3,380.00	2,372.76	9.46	357.4	209.47	209.31
3,390.00	2,372.76	9.47	358.1	209.56	209.40
3,400.00	2,372.77	9.48	358.8	209.65	209.49
3,410.00	2,372.77	9.49	359.5	209.74	209.58
3,420.00	2,372.77	9.49	360.2	209.83	209.67
3,430.00	2,372.78	9.50	360.9	209.91	209.75
3,440.00	2,372.78	9.51	361.6	210.00	209.84
3,450.00	2,372.78	9.52	362.3	210.09	209.93
3,460.00	2,372.79	9.53	363.0	210.18	210.02
3,470.00	2,372.79	9.54	363.7	210.27	210.11
3,480.00	2,372.79	9.55	364.3	210.36	210.19
3,490.00	2,372.80	9.56	365.0	210.44	210.28
3,500.00	2,372.80	9.57	365.7	210.53	210.37
3,510.00	2,372.80	9.58	366.4	210.62	210.46
3,520.00	2,372.81	9.59	367.1	210.71	210.54
3,530.00	2,372.81	9.60	367.8	210.79	210.63
3,540.00	2,372.81	9.61	368.5	210.88	210.72
3,550.00	2,372.82	9.62	369.2	210.97	210.80
3,560.00	2,372.82	9.63	369.8	211.06	210.89
3,570.00	2,372.82	9.63	370.5	211.14	210.98

Table
Rating Table for Irregular Channel

TRANQUIL TRAIL NORTH OF SUNDANCE TRAIL

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
3,580.00	2,372.83	9.64	371.2	211.23	211.06
3,590.00	2,372.83	9.65	371.9	211.32	211.15
3,600.00	2,372.83	9.66	372.6	211.40	211.24
3,610.00	2,372.84	9.67	373.3	211.49	211.32
3,620.00	2,372.84	9.68	373.9	211.58	211.41
3,630.00	2,372.84	9.69	374.6	211.66	211.49
3,640.00	2,372.85	9.70	375.3	211.75	211.58
3,650.00	2,372.85	9.71	376.0	211.83	211.67
3,660.00	2,372.85	9.72	376.7	211.92	211.75
3,670.00	2,372.85	9.73	377.3	212.01	211.84
3,680.00	2,372.86	9.74	378.0	212.09	211.92
3,690.00	2,372.86	9.74	378.7	212.18	212.01
3,700.00	2,372.86	9.75	379.4	212.26	212.09

35 (JEF)

GW 100 YR, 24 HR
FUTURE

TRANQUIL TRAIL NORTH OF SUNDANCE TRAIL

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1*************************************
 *                                   *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
 *             JUN  1998             *
 *           VERSION 4.1             *
 *                                   *
 *  RUN DATE   27NOV02  TIME  08:45:45  *
 *                                   *
 *************************************
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*************************************
*                                   *
*   U.S. ARMY CORPS OF ENGINEERS    *
*   HYDROLOGIC ENGINEERING CENTER   *
*         609 SECOND STREET         *
*      DAVIS, CALIFORNIA 95616      *
*          (916) 756-1104           *
*                                   *
*************************************
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X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX         XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

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

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1                                   HEC-1 INPUT                                          PAGE  1

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

    1           ID     FUTURE CONDITIONS HYDROLOGY FOR CAREFREE AREA DRAINAGE MASTER PLAN
    2           ID       BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC., DEC. 2001
    3           ID
    4           ID     FUTURE CONDITIONS LAND USE BASED ON CAVE CREEK WATERCOURSE MASTER PLAN
    5           ID     HYDROLOGY BY TETRA TECH, 2000.
    6           ID
    7           ID     BASE MODEL BASED ON:
    8           ID
    9           ID           FLOODPLAIN DELINEATION STUDY OF ANDORA HILLS & GALLOWAY WASHES
   10           ID           FCD 99-14
   11           ID           BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC.
   12           ID           FOR THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
   13           ID           REVISED MARCH 2002     FILENAME: GWM224R.DAT
   14           ID      ****************************************************************
   15           ID           100 YEAR ANALYSIS 24-HOUR STORM USING JD RECORDS
   16           ID           MCUHP2 USED FOR UNIT HYDROGRAPHS
   17           ID     ****************************************************************
   18           ID
   19           ID     DDM MCUHP2 GALLOWAY WASH FLOODPLAIN DELINEATION STUDY, FCD NO. 99-14
   20           ID
   21           ID    March 2002 revisions to original Dec. 1999 model include:
   22           ID
   23           ID    HC BLOCK ADDED FOR GRAPEVINE WASH (CP 295A)
   24           ID
   25           ID    SUBBASIN GWW1_3 FURTHER SUBDIVIDED ALONG GALLOWAY WASH PER FEMA COMMENTS
   26           ID    IN LETTER DATED FEB. 8, 2002
   27           ID
   28           ID    *** ADDITIONAL COMBINATION ADDED 10-17-02 TO PROVIDE TOTAL FLOW IN
   29           ID        NORTH GALLOWAY WASH BY TWL FOR CH2M HILL FOR CAREFREE DMP ***
   30           ID
   31           ID   DDM MCUHP2 Carefree Area Drainage Master Plan, Galloway Wash Future Condition
                *DIAGRAM
   32           IT       5 01DEC99    0005     400
   33           IO       5       2
   34           IN      15
   35           JD    4.80    0.01
   36           PC    .000    .002    .005    .008    .011    .014    .017    .020    .023    .026
   37           PC    .029    .032    .035    .038    .041    .044    .048    .052    .056    .060
   38           PC    .064    .068    .072    .076    .080    .085    .090    .095    .100    .105
   39           PC    .110    .115    .120    .126    .133    .140    .147    .155    .163    .172
   40           PC    .181    .191    .203    .218    .236    .257    .283    .387    .663    .707
   41           PC    .735    .758    .776    .791    .804    .815    .825    .834    .842    .849
   42           PC    .856    .863    .869    .875    .881    .887    .893    .898    .903    .908
   43           PC    .913    .918    .922    .926    .930    .934    .938    .942    .946    .950
   44           PC    .953    .956    .959    .962    .965    .968    .971    .974    .977    .980
   45           PC    .983    .986    .989    .992    .995    .998   1.000
   46           JD    4.78    1.00
   47           JD    4.51   10.00
   48           JD    4.37   20.00
   49           JD    4.11   70.00
                *
                * DDM    ***** Updated *****
1                                   HEC-1 INPUT                                          PAGE  2

  LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
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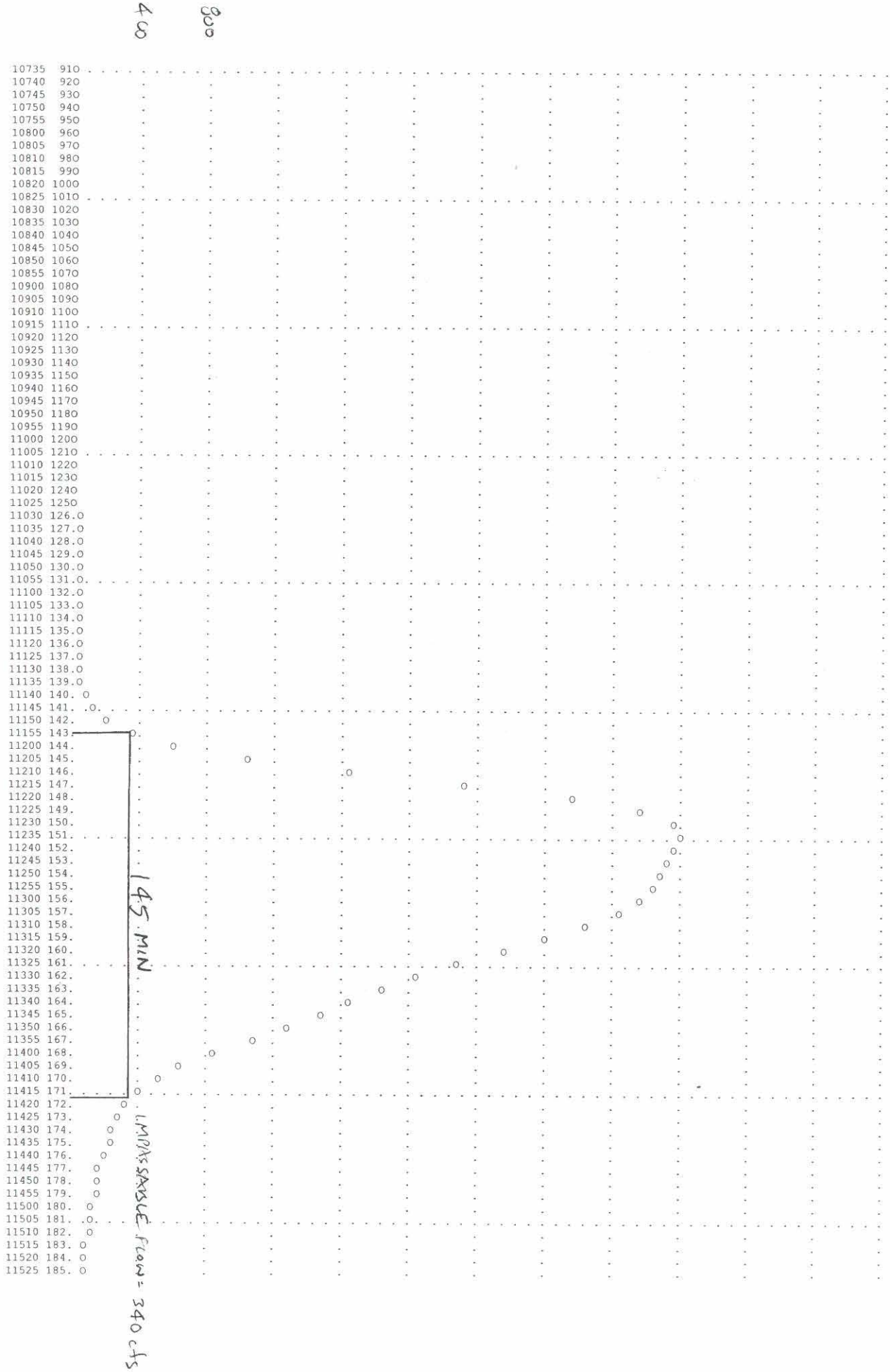
TRANQUIL TRAIL NORTH OF SUNDANCE TRAIL

1 STATION CP286

(O) OUTFLOW

DAHRMN	PER	0.	400.	800.	1200.	1600.	2000.	2400.	2800.	3200.	3600.	4000.	0.	0.
10005	10													
10010	20													
10015	30													
10020	40													
10025	50													
10030	60													
10035	70													
10040	80													
10045	90													
10050	100													
10055	110													
10100	120													
10105	130													
10110	140													
10115	150													
10120	160													
10125	170													
10130	180													
10135	190													
10140	200													
10145	210													
10150	220													
10155	230													
10200	240													
10205	250													
10210	260													
10215	270													
10220	280													
10225	290													
10230	300													
10235	310													
10240	320													
10245	330													
10250	340													
10255	350													
10300	360													
10305	370													
10310	380													
10315	390													
10320	400													
10325	410													
10330	420													
10335	430													
10340	440													
10345	450													
10350	460													
10355	470													
10400	480													
10405	490													
10410	500													
10415	510													
10420	520													
10425	530													
10430	540													
10435	550													
10440	560													
10445	570													
10450	580													
10455	590													
10500	600													
10505	610													
10510	620													
10515	630													
10520	640													
10525	650													
10530	660													
10535	670													
10540	680													
10545	690													
10550	700													
10555	710													
10600	720													
10605	730													
10610	740													
10615	750													
10620	760													
10625	770													
10630	780													
10635	790													
10640	800													
10645	810													
10650	820													
10655	830													
10700	840													
10705	850													
10710	860													
10715	870													
10720	880													
10725	890													
10730	900													

TRANQUIL TRAIL NORTH OF SUNDANCE TRAIL



Tom Darlington (#36)

Carefree Drainage Master Plan
Field Survey Notes

Culvert Number: 36

Date of Survey: Survey by Aztec Eng.

Location: Tom Darlington

See HECRAS model for Unnamed Central Tributary to Cave Creek.

Material: 3 - 60" CMP

Headwall: Yes - standard

Notes: See attached

Boundary Conditions and Flow Split Determination, Culvert No. 36, Unnamed Central Tributary to Cave Creek

TO: Tony Bokich

COPIES: File

FROM: Patrick Wolf

DATE: March 13, 2003 (Revised March 29, 2004)

Culvert No. 36 at Tom Darlington Road exists as the upstream boundary condition for the Unnamed Central Wash floodplain delineation. According to the hydrology of the project (*see Data Collection Report*), 1, 652 cfs will arrive at the culvert during the 100-year event. The flow was calculated based on the peak at the HEC-1 concentration point CP3149 and 93 percent of the UC50. Three - 60 inch diameter CMP's convey flow under Tom Darlington at this location.

For the boundary condition analysis, this effort was completed using Haestad Methods' CulvertMaster software. The analysis indicates that the culverts can handle approximately 721 cfs (*see attached*) using site specific geometry conditions. Since the tailwater elevation of this culvert will function as the upstream boundary condition of the model, a tailwater elevation obtained from the CulvertMaster program of 2266.35 ft will be used as the upstream boundary condition.

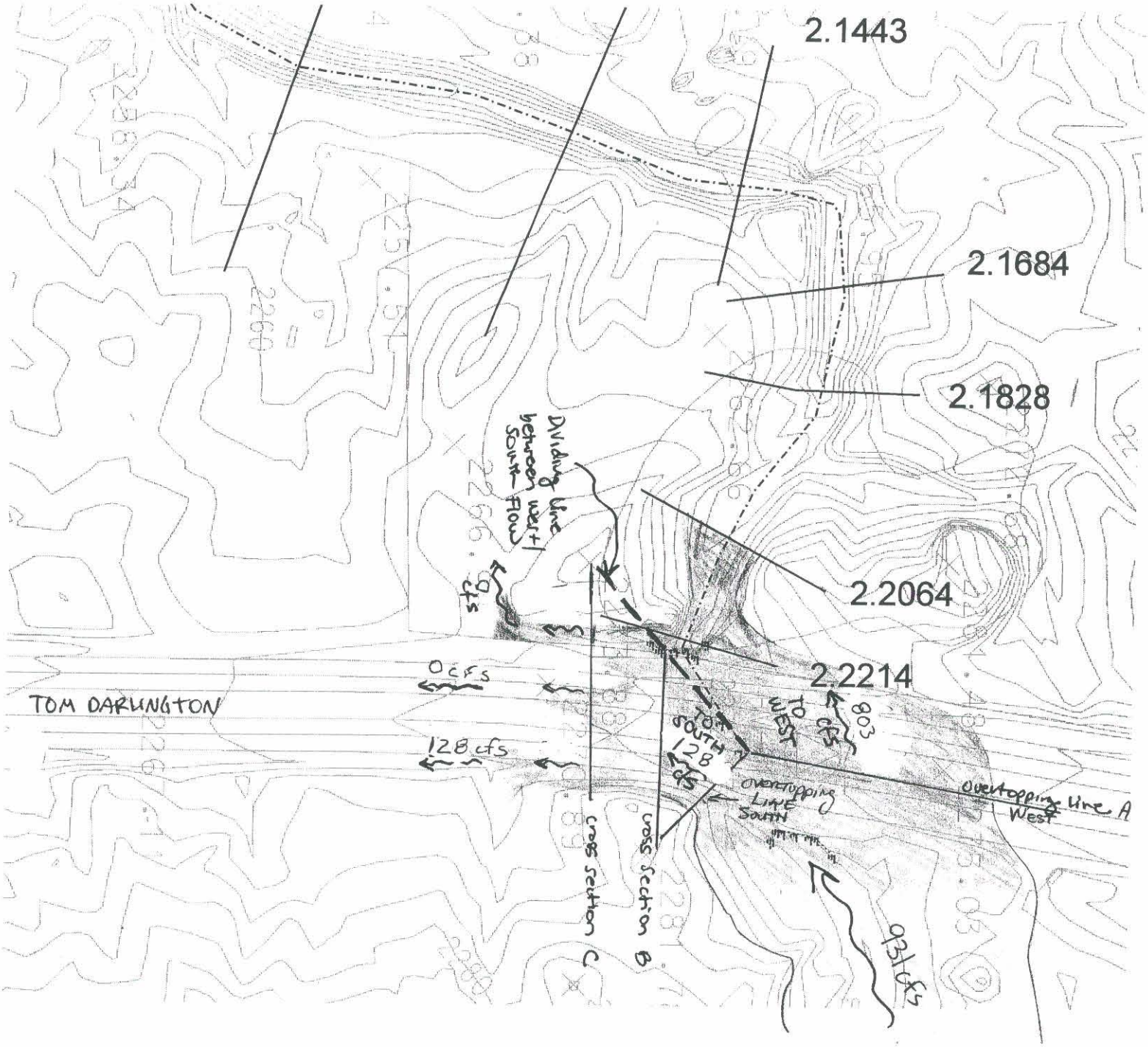
A plan view of the site (*see attached*) shows the overtopping line that the remainder of the flow, 931 cfs, will cross. The road does not have a confining dip section, so the flow that is not conveyed through the culverts will overtop road and flow both south and west, eventually joining back into the main channel. Because there is a cut section in the road at the overtopping line, not a roadside ditch, it appears that a majority, if not all, of the flow will rejoin the main channel by R.S. 2.2064 (*see attached sketch*). However, for modeling purposes, it is assumed that all of the flow is in the main channel for that entire reach as that is the more conservative assumption.

The overtopping analysis was performed to determine if the flow overtopping the road would rejoin the main channel, continue south along the west side of Tom Darlington and rejoin the main channel, or continue south along the east side of Tom Darlington and divert from the Unnamed Central Tributary to the Cave Creek floodplain model.

The results indicate that the overtopping flow will generally travel either west or south. A dividing line was established from inspection of the topography with a consideration for momentum of the overtopping flow. The amount of flow for each direction was determined by the percentage of area of each respective cross section. Several additional cross sections downstream were used to determine the amount of flow that will rejoin the

main channel, and the amount that will continue south towards the Carefree Highway intersection.

Of the 931 cfs that overtops the roadway, approximately 803 cfs will return to the main channel immediately downstream of the culvert headwall, and approximately 128 cfs will travel south, parallel to the road. The 128 cfs will continue south along the eastern roadside channel.



Boundary Condition For Flow Split —N→
Determination For Culvert No. 36

Scale 1" = 100'

Legend

2.2214 —— HEC Ras Cross Section

Culvert Designer/Analyzer Report
Number 36 Tom Darlington

Over topping Analysis, Tom Darlington

Analysis Component			
Storm Event	Design	Discharge	1,652.00 cfs

Peak Discharge Method: User-Specified			
Design Discharge	1,652.00 cfs	Check Discharge	1,652.00 cfs

Tailwater properties: Trapezoidal Channel

Tailwater conditions for Design Storm.			
Discharge	1,652.00 cfs	Bottom Elevation	2,261.75 ft
Depth	4.60 ft	Velocity	14.84 ft/s

Name	Description	Discharge	HW Elev.	Velocity	
Culvert-1	3-60 inch Circular	720.61 cfs	2,274.88 ft	12.71 ft/s	← Discharge of 3-60" CMP's
Weir	Roadway	930.90 cfs	2,274.88 ft	N/A	← Overtopping Roadway Discharge
Total	----------	1,651.51 cfs	2,274.88 ft	N/A	

Min Road Elev = 2271.60

D = 3.42

Culvert Designer/Analyzer Report
Number 36 Tom Darlington

Component:Culvert-1 Overtopping Analysis, Tom Darlington

Culvert Summary			
Computed Headwater Elevation	2,274.88 ft	Discharge	720.61 cfs
Inlet Control HW Elev.	2,274.88 ft	Tailwater Elevation	2,266.35 ft
Outlet Control HW Elev.	2,274.25 ft	Control Type	Inlet Control
Headwater Depth/Height	1.81		

Grades			
Upstream Invert	2,265.82 ft	Downstream Invert	2,261.75 ft
Length	155.00 ft	Constructed Slope	0.026258 ft/ft

Hydraulic Profile			
Profile	M1	Depth, Downstream	4.60 ft
Slope Type	Mild	Normal Depth	4.38 ft
Flow Regime	Subcritical	Critical Depth	4.36 ft
Velocity Downstream	12.71 ft/s	Critical Slope	0.026378 ft/ft

Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	5.00 ft
Section Size	60 inch	Rise	5.00 ft
Number Sections	3		

Outlet Control Properties			
Outlet Control HW Elev.	2,274.25 ft	Upstream Velocity Head	2.70 ft
Ke	0.50	Entrance Loss	1.35 ft

Inlet Control Properties			
Inlet Control HW Elev.	2,274.88 ft	Flow Control	Submerged
Inlet Type	Headwall	Area Full	58.9 ft^2
K	0.00780	HDS 5 Chart	2
M	2.00000	HDS 5 Scale	1
C	0.03790	Equation Form	1
Y	0.69000		

Culvert Designer/Analyzer Report
Number 36 Tom Darlington

Component:Weir

Overtopping Analysis, Tom Darlington

Hydraulic Component(s): Roadway

Discharge	930.90 cfs	Allowable HW Elevation	2,274.88 ft
Roadway Width	146.00 ft	Overtopping Coefficient	3.04 US
Low Point	2,271.52 ft	Headwater Elevation	2,274.88 ft
Discharge Coefficient (Cr)	3.04	Submergence Factor (Kt)	1.00
Tailwater Elevation	2,266.35 ft		

Sta (ft)	Elev. (ft)
0.00	2,281.56
35.37	2,278.50
58.10	2,271.52
79.01	2,272.85
89.70	2,273.07
111.20	2,273.08
213.55	2,274.59
308.96	2,275.80
343.24	2,276.29

Worksheet
Worksheet for Irregular Channel

Overtopping Analysis, Tom Darlington

Project Description	
Worksheet	A
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Slope	0.018400	ft/ft
Discharge	930.90	cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Method	Improved Lotter's Method
Closed Channel Weighting Method	Horton's Method

Results		
Mannings Coefficient	0.042	
Water Surface Elevation	2,272.76	ft
Elevation Range	2,268.50 to 2,281.30	
Flow Area	174.9	ft²
Wetted Perimeter	148.83	ft
Top Width	148.08	ft
Actual Depth	4.26	ft
Critical Elevation	2,272.61	ft
Critical Slope	0.025066	ft/ft
Velocity	5.32	ft/s ←
Velocity Head	0.44	ft
Specific Energy	2,273.20	ft
Froude Number	0.86	
Flow Type	Subcritical	

Calculation Messages:
Flow is divided.

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00	0+48	0.040
0+48	1+41	0.025
1+41	2+36	0.058
2+36	3+07	0.025

Natural Channel Points

Station (ft)	Elevation (ft)
0+00	2,281.10
0+28	2,278.70
0+48	2,271.60
0+65	2,272.40
1+07	2,272.50
1+41	2,273.10
1+57	2,271.40
1+75	2,268.50

← Overtopping Line Coordinates

Worksheet
Worksheet for Irregular Channel

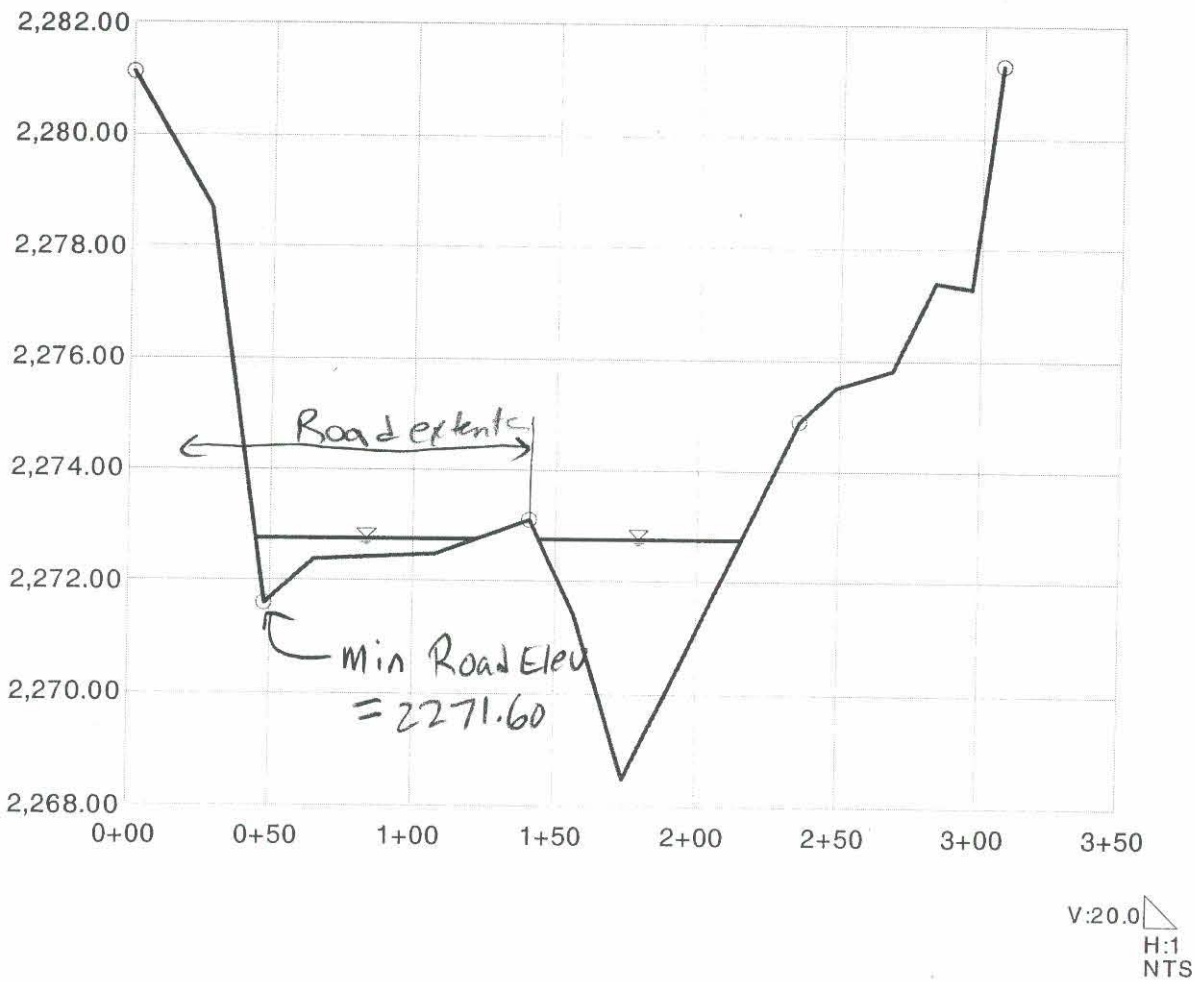
Natural Channel Points	
Station (ft)	Elevation (ft)
2+36	2,274.90
2+49	2,275.50
2+69	2,275.80
2+84	2,277.40
2+97	2,277.30
3+07	2,281.30

Cross Section
Cross Section for Irregular Channel

Overtopping Analysis, Tom Darlington

Project Description	
Worksheet	A
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coefficient	0.042
Slope	0.018400 ft/ft
Water Surface Elevation	2,272.76 ft
Elevation Range	2,268.50 to 2,281.30
Discharge	930.90 cfs



Rating Table Report
Number 36 Tom Darlington

Range Data:

	Minimum	Maximum	Increment
Discharge	0.00	2,000.00	20.00 cfs

Discharge (cfs)	HW Elev. (ft)
0.00	2,265.82
20.00	2,266.89
40.00	2,267.35
60.00	2,267.71
80.00	2,268.02
100.00	2,268.30
120.00	2,268.56
140.00	2,268.80
160.00	2,269.02
180.00	2,269.24
200.00	2,269.45
220.00	2,269.65
240.00	2,269.85
260.00	2,270.04
280.00	2,270.23
300.00	2,270.42
320.00	2,270.60
340.00	2,270.78
360.00	2,270.96
380.00	2,271.13
400.00	2,271.31
420.00	2,271.49
440.00	2,271.66
460.00	2,271.83
480.00	2,271.99
500.00	2,272.14
520.00	2,272.28
540.00	2,272.41
560.00	2,272.54 ← PASSABLE
580.00	2,272.66
600.00	2,272.77
620.00	2,272.88
640.00	2,272.98
660.00	2,273.08
680.00	2,273.17
700.00	2,273.25
720.00	2,273.32
740.00	2,273.38
760.00	2,273.44
780.00	2,273.50
800.00	2,273.56
820.00	2,273.61
840.00	2,273.66
860.00	2,273.71
880.00	2,273.75
900.00	2,273.80
920.00	2,273.84
940.00	2,273.88
960.00	2,273.92
980.00	2,273.96

Rating Table Report
Number 36 Tom Darlington

Discharge (cfs)	HW Elev. (ft)
1,000.00	2,274.00
1,020.00	2,274.03
1,040.00	2,274.07
1,060.00	2,274.10
1,080.00	2,274.14
1,100.00	2,274.17
1,120.00	2,274.20
1,140.00	2,274.24
1,160.00	2,274.27
1,180.00	2,274.30
1,200.00	2,274.33
1,220.00	2,274.36
1,240.00	2,274.39
1,260.00	2,274.42
1,280.00	2,274.44
1,300.00	2,274.47
1,320.00	2,274.50
1,340.00	2,274.52
1,360.00	2,274.55
1,380.00	2,274.58
1,400.00	2,274.60
1,420.00	2,274.63
1,440.00	2,274.65
1,460.00	2,274.67
1,480.00	2,274.69
1,500.00	2,274.72
1,520.00	2,274.74
1,540.00	2,274.76
1,560.00	2,274.78
1,580.00	2,274.80
1,600.00	2,274.82
1,620.00	2,274.84
1,640.00	2,274.86
1,660.00	2,274.89
1,680.00	2,274.91
1,700.00	2,274.93
1,720.00	2,274.95
1,740.00	2,274.96
1,760.00	2,274.98
1,780.00	2,275.00
1,800.00	2,275.02
1,820.00	2,275.04
1,840.00	2,275.06
1,860.00	2,275.08
1,880.00	2,275.10
1,900.00	2,275.12
1,920.00	2,275.13
1,940.00	2,275.15
1,960.00	2,275.17
1,980.00	2,275.19
2,000.00	2,275.21

UC 100 YR, 24 HR FUTURE

TOM DARLINGTON

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1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN  1998               *
*            VERSION 4.1               *
*                                      *
*  RUN DATE   27NOV02  TIME  08:53:50  *
*                                      *
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*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*            609 SECOND STREET         *
*         DAVIS, CALIFORNIA 95616      *
*            (916) 756-1104            *
*                                      *
****************************************
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X     X  XXXXXXX   XXXXX          X
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X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

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

1

HEC-1 INPUT PAGE 1

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

  1           ID         UC MODEL - UNNAMED WASH, CENTRAL
  2           ID         100-YEAR 24-HOUR MODEL  FILENAME: UC10024F.DAT
  3           ID         FUTURE CONDITIONS
  4           ID         CAREFREE DRAINAGE MASTER PLAN
  5           ID         FCD 2000C037
  6           ID         BY CH2M HILL
  7           ID         FOR THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
  8           ID         JANUARY 2002
  9           ID    ******************************************************************
 10           ID         100 YEAR ANALYSIS 24-HOUR STORM
 11           ID         SCS TYPE II DISTRIBUTION
 12           ID         GREEN AND AMPT LOSS RATE METHOD, NMIN=2
 13           ID         CLARK UNIT HYDROGRAPH, NORMAL DEPTH CHANNEL ROUTING
 14           ID   ************************************************************************
 15           ID     DEPTH-AREA REDUCT FACTORS BASED ON TABLE 2.1a OF FCDMC MANUAL
 16           ID     PC RECORDS ARE 24-HOUR SCS TYPE II RAINFALL DISTRIBUTION
 17           ID     PRELIMINARY
              *DIAGRAM
 18           IT       2                    500
 19           IO       5       2
 20           IN      15
 21           JD    4.60    0.01
 22           PC   0.000   0.002   0.005   0.008   0.011   0.013   0.016   0.019   0.022   0.025
 23           PC   0.028   0.032   0.035   0.038   0.041   0.044   0.048   0.053   0.056   0.060
 24           PC   0.063   0.067   0.071   0.075   0.080   0.084   0.089   0.093   0.098   0.103
 25           PC   0.109   0.114   0.120   0.127   0.133   0.140   0.147   0.155   0.163   0.172
 26           PC   0.181   0.192   0.204   0.220   0.235   0.259   0.283   0.473   0.663   0.699
 27           PC   0.735   0.754   0.772   0.785   0.799   0.810   0.820   0.829   0.838   0.846
 28           PC   0.854   0.861   0.868   0.874   0.880   0.885   0.891   0.900   0.902   0.910
 29           PC   0.912   0.920   0.921   0.926   0.929   0.930   0.937   0.941   0.945   0.950
 30           PC   0.952   0.957   0.959   0.962   0.965   0.970   0.972   0.973   0.978   0.981
 31           PC   0.984   0.987   0.989   0.992   0.995   0.998   1.000
 32           JD    4.57    1.00
 33           JD    4.46    5.00
              *

 34           KK     UC8
 35           KM   SUB-BASIN 8, UNNAMED WASH CENTRAL
 36           KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 37           KM    L= 1.04   Kb= 0.031   S=138.0
 38           BA    .054
 39           LG     .30     .36     4.9     .26    36.0
 40           UC    .225    .384
 41           UA       0       5      16      30      65      77      84      90      94      97
 42           UA     100
              *

 43           KK     UC9
 44           KM    SUBBASIN 9, UNNAMED WASH CENTRAL
 45           KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 46           KM    L= 0.91   Kb= 0.031   S=145.0
 47           BA    .047
 48           LG     .30     .36     5.0     .23    36.0
 49           UC    .208    .316
 50           UA       0       5      16      30      65      77      84      90      94      97
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1

HEC-1 INPUT PAGE 2

TOM DARLINGTON

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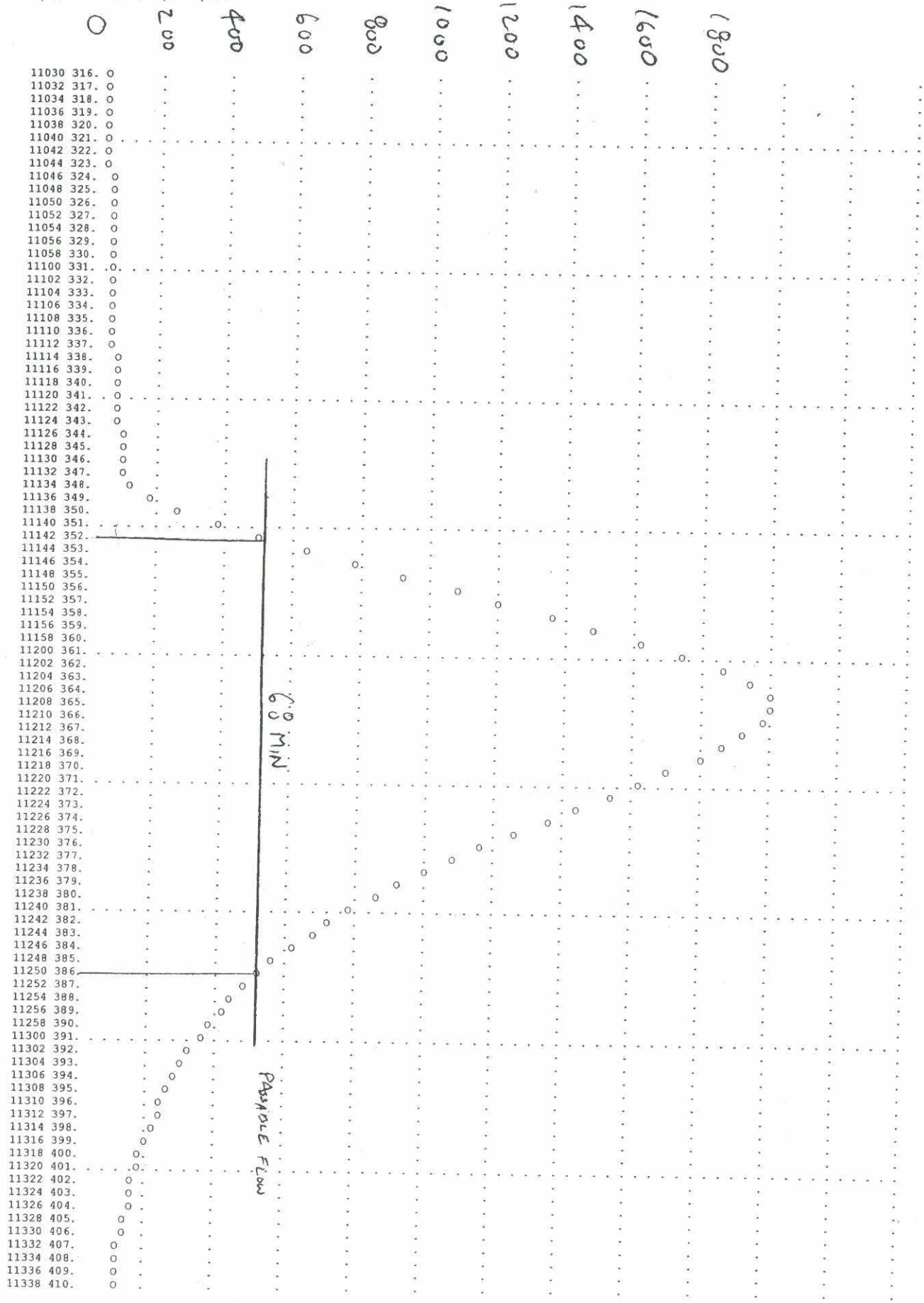
STATION CP3149

(O) OUTFLOW

DAHRMN	PER	0.	200.	400.	600.	800.	1000.	1200.	1400.	1600.	1800.	2000.	2200.	0.
10000	10													
10002	20													
10004	30													
10006	40													
10008	50													
10010	60													
10012	70													
10014	80													
10016	90													
10018	100													
10020	110													
10022	120													
10024	130													
10026	140													
10028	150													
10030	160													
10032	170													
10034	180													
10036	190													
10038	200													
10040	210													
10042	220													
10044	230													
10046	240													
10048	250													
10050	260													
10052	270													
10054	280													
10056	290													
10058	300													

TOM DARLINGTON



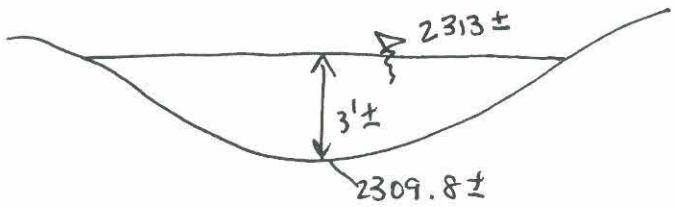
Scopa Trail (JEF #36)

Carefree Drainage Master Plan
Dip Crossing Notes

ID Number: JEF 36

Source of Data: Floodplain Delineation of Andora Hills & Galloway Washes, June 2001, preliminary

Location: Scopa Road (Scopa Trail)

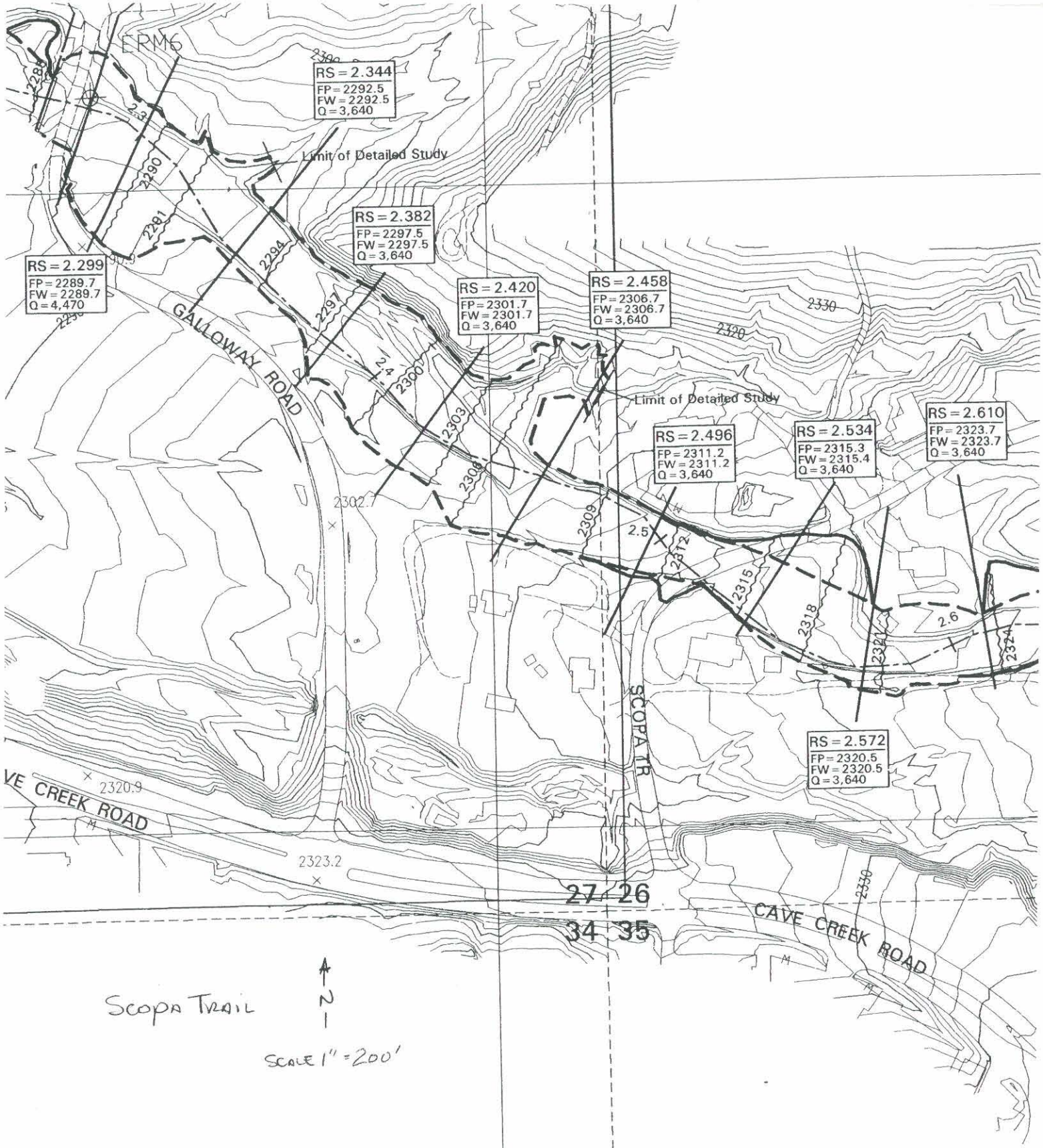


See attached

Material: Paved dip crossing.

Protection:

Notes: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RS = 2.420
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Q = 3,640
RS = 2.458
FP = 2306.7
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Q = 3,640
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Limit of Detailed Study
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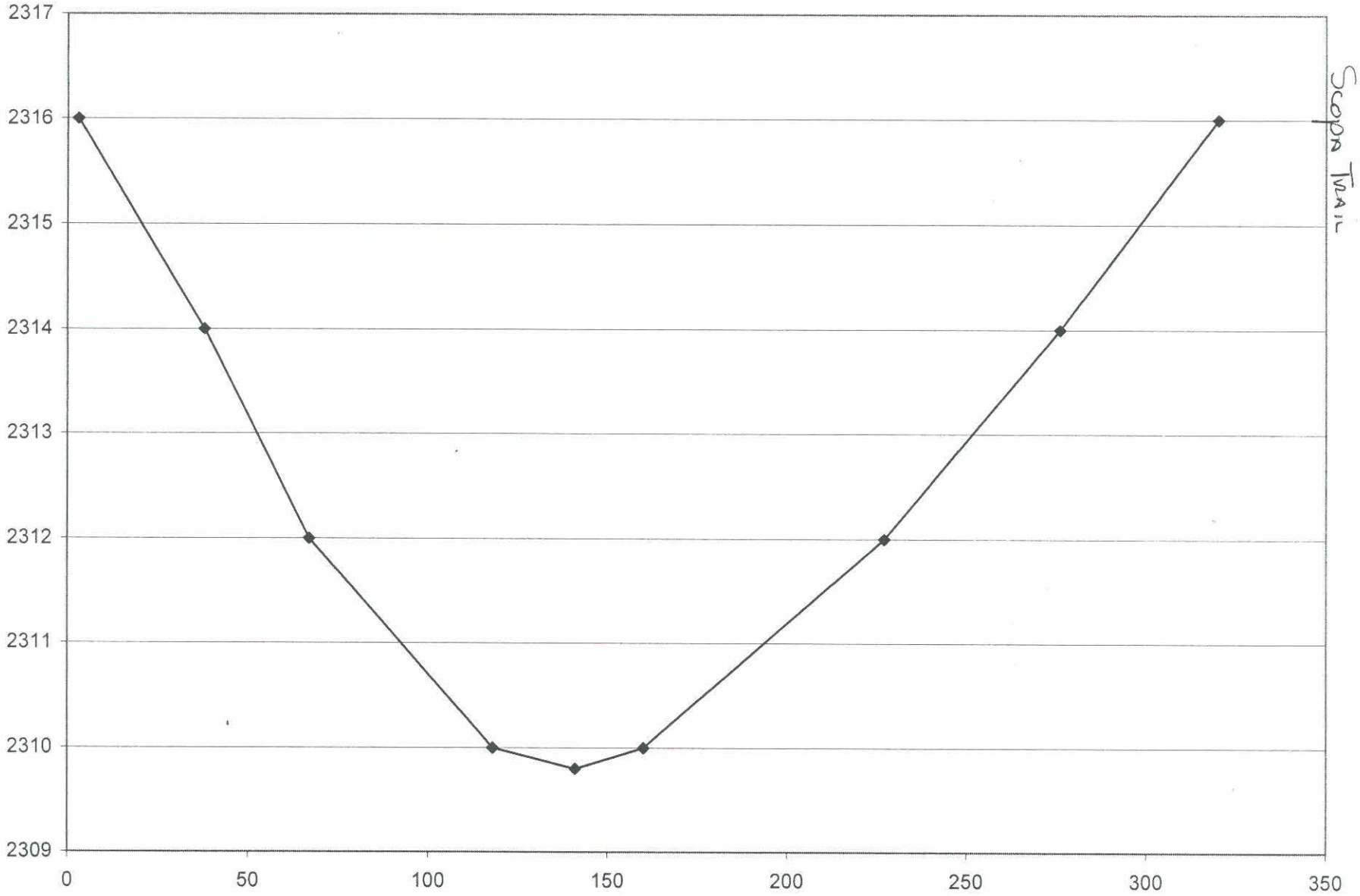
Q = 3,640
RS = 2.534
FP = 2315.3
FW = 2315.4
Q = 3,640
RS = 2.610
FP = 2323.7
FW = 2323.7
Q = 3,640
SCOPA TR
RS = 2.572
FP = 2320.5
FW = 2320.5
Q = 3,640
VE CREEK ROAD
CAVE CREEK ROAD
27 26
34 35
N
Scopa Trail
Scale 1" = 200'

SCOPA TRAIL — N →

SCALE 1" = 60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200
250
300
350
SCOPA TRAIL

Worksheet
Worksheet for Irregular Channel

Scopa Trail

Project Description	
Worksheet	JEF-36
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data		
Slope	022000	ft/ft
Discharg	,560.00	cfs

Options	
Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Results		
Mannings Coefficie	0.032	
Water Surface Elev	2,313.14	ft
Elevation Range	9.80 to 2,316.00	
Flow Area	413.9	ft²
Wetted Perimeter	204.59	ft
Top Width	204.45	ft
Actual Depth	3.34	ft
Critical Elevation	2,313.66	ft
Critical Slope	0.011252	ft/ft
Velocity	11.02	ft/s
Velocity Head	1.89	ft
Specific Energy	2,315.03	ft
Froude Number	1.37	
Flow Type	Supercritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+03	3+20	0.032

Natural Channel Points

Station (ft)	Elevation (ft)
0+03	2,316.00
0+38	2,314.00
0+67	2,312.00
1+18	2,310.00
1+41	2,309.80
1+60	2,310.00
2+27	2,312.00
2+76	2,314.00
3+20	2,316.00

Table
Rating Table for Irregular Channel

Scopa Trail

Project Description	
Worksheet	JEF-36
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data	
Slope	022000 ft/ft

Options	
Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	4,600.00	10.00

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00	2,309.80	0.00	0.0	0.00	0.00
10.00	2,310.03	1.76	5.7	44.04	44.04
20.00	2,310.10	2.24	8.9	48.20	48.19
30.00	2,310.16	2.56	11.7	51.47	51.46
40.00	2,310.21	2.82	14.2	54.26	54.26
50.00	2,310.25	3.03	16.5	56.74	56.73
60.00	2,310.29	3.20	18.7	58.98	58.97
70.00	2,310.32	3.36	20.8	61.05	61.03
80.00	2,310.36	3.50	22.8	62.97	62.96
90.00	2,310.39	3.63	24.8	64.77	64.76
100.00	2,310.41	3.75	26.7	66.48	66.46
110.00	2,310.44	3.86	28.5	68.09	68.08
120.00	2,310.47	3.96	30.3	69.64	69.62
130.00	2,310.49	4.05	32.1	71.11	71.10
140.00	2,310.52	4.14	33.8	72.53	72.51
150.00	2,310.54	4.22	35.5	73.90	73.88
160.00	2,310.56	4.30	37.2	75.22	75.19
170.00	2,310.58	4.38	38.8	76.49	76.47
180.00	2,310.61	4.45	40.4	77.72	77.70
190.00	2,310.63	4.52	42.0	78.92	78.90
200.00	2,310.65	4.59	43.6	80.09	80.06
210.00	2,310.66	4.65	45.1	81.22	81.19
220.00	2,310.68	4.72	46.6	82.32	82.30
230.00	2,310.70	4.78	48.2	83.40	83.37
240.00	2,310.72	4.83	49.7	84.45	84.42
250.00	2,310.74	4.89	51.1	85.48	85.45
260.00	2,310.75	4.94	52.6	86.48	86.45
270.00	2,310.77	5.00	54.0	87.47	87.44
280.00	2,310.79	5.05	55.5	88.43	88.40
290.00	2,310.80	5.10	56.9	89.37	89.34
300.00	2,310.82	5.15	58.3	90.30	90.27
310.00	2,310.83	5.19	59.7	91.21	91.18
320.00	2,310.85	5.24	61.1	92.10	92.07
330.00	2,310.86	5.28	62.5	92.98	92.95

IMPASSIBLE

Table
Rating Table for Irregular Channel

Scopa Trail

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
340.00	2,310.88	5.33	63.8	93.84	93.81
350.00	2,310.89	5.37	65.2	94.69	94.66
360.00	2,310.91	5.41	66.5	95.52	95.49
370.00	2,310.92	5.45	67.9	96.35	96.31
380.00	2,310.93	5.49	69.2	97.15	97.12
390.00	2,310.95	5.53	70.5	97.95	97.92
400.00	2,310.96	5.57	71.8	98.74	98.70
410.00	2,310.97	5.61	73.1	99.51	99.48
420.00	2,310.99	5.64	74.4	100.28	100.24
430.00	2,311.00	5.68	75.7	101.03	100.99
440.00	2,311.01	5.72	77.0	101.77	101.74
450.00	2,311.02	5.75	78.2	102.51	102.47
460.00	2,311.04	5.79	79.5	103.23	103.19
470.00	2,311.05	5.82	80.8	103.95	103.91
480.00	2,311.06	5.85	82.0	104.65	104.62
490.00	2,311.07	5.89	83.2	105.35	105.31
500.00	2,311.08	5.92	84.5	106.04	106.00
510.00	2,311.10	5.95	85.7	106.73	106.69
520.00	2,311.11	5.98	86.9	107.40	107.36
530.00	2,311.12	6.01	88.1	108.07	108.03
540.00	2,311.13	6.04	89.4	108.73	108.69
550.00	2,311.14	6.07	90.6	109.38	109.34
560.00	2,311.15	6.10	91.8	110.03	109.98
570.00	2,311.16	6.13	93.0	110.67	110.62
580.00	2,311.17	6.16	94.1	111.30	111.26
590.00	2,311.18	6.19	95.3	111.93	111.88
600.00	2,311.19	6.22	96.5	112.55	112.50
610.00	2,311.21	6.24	97.7	113.16	113.12
620.00	2,311.22	6.27	98.9	113.77	113.73
630.00	2,311.23	6.30	100.0	114.37	114.33
640.00	2,311.24	6.33	101.2	114.97	114.93
650.00	2,311.25	6.35	102.3	115.56	115.52
660.00	2,311.26	6.38	103.5	116.15	116.10
670.00	2,311.27	6.40	104.6	116.73	116.69
680.00	2,311.28	6.43	105.8	117.31	117.26
690.00	2,311.29	6.45	106.9	117.88	117.83
700.00	2,311.29	6.48	108.1	118.45	118.40
710.00	2,311.30	6.50	109.2	119.01	118.96
720.00	2,311.31	6.53	110.3	119.57	119.52
730.00	2,311.32	6.55	111.4	120.12	120.07
740.00	2,311.33	6.57	112.5	120.67	120.62
750.00	2,311.34	6.60	113.7	121.21	121.16
760.00	2,311.35	6.62	114.8	121.75	121.70
770.00	2,311.36	6.64	115.9	122.29	122.24
780.00	2,311.37	6.67	117.0	122.82	122.77
790.00	2,311.38	6.69	118.1	123.35	123.30
800.00	2,311.39	6.71	119.2	123.87	123.82
810.00	2,311.40	6.73	120.3	124.39	124.34
820.00	2,311.40	6.76	121.4	124.91	124.86
830.00	2,311.41	6.78	122.5	125.42	125.37
840.00	2,311.42	6.80	123.5	125.93	125.88
850.00	2,311.43	6.82	124.6	126.43	126.38
860.00	2,311.44	6.84	125.7	126.94	126.88
870.00	2,311.45	6.86	126.8	127.43	127.38

Table
Rating Table for Irregular Channel

SCOPA TRAIL

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
880.00	2,311.46	6.88	127.8	127.93	127.88
890.00	2,311.46	6.90	128.9	128.42	128.37
900.00	2,311.47	6.92	130.0	128.91	128.86
910.00	2,311.48	6.95	131.0	129.40	129.34
920.00	2,311.49	6.97	132.1	129.88	129.82
930.00	2,311.50	6.99	133.1	130.36	130.30
940.00	2,311.50	7.00	134.2	130.83	130.78
950.00	2,311.51	7.02	135.2	131.31	131.25
960.00	2,311.52	7.04	136.3	131.78	131.72
970.00	2,311.53	7.06	137.3	132.24	132.19
980.00	2,311.54	7.08	138.4	132.71	132.65
990.00	2,311.54	7.10	139.4	133.17	133.11
1,000.00	2,311.55	7.12	140.5	133.63	133.57
1,010.00	2,311.56	7.14	141.5	134.08	134.03
1,020.00	2,311.57	7.16	142.5	134.54	134.48
1,030.00	2,311.58	7.18	143.5	134.99	134.93
1,040.00	2,311.58	7.19	144.6	135.44	135.38
1,050.00	2,311.59	7.21	145.6	135.88	135.83
1,060.00	2,311.60	7.23	146.6	136.33	136.27
1,070.00	2,311.61	7.25	147.6	136.77	136.71
1,080.00	2,311.61	7.27	148.7	137.20	137.15
1,090.00	2,311.62	7.28	149.7	137.64	137.58
1,100.00	2,311.63	7.30	150.7	138.07	138.02
1,110.00	2,311.63	7.32	151.7	138.50	138.45
1,120.00	2,311.64	7.33	152.7	138.93	138.87
1,130.00	2,311.65	7.35	153.7	139.36	139.30
1,140.00	2,311.66	7.37	154.7	139.78	139.73
1,150.00	2,311.66	7.39	155.7	140.21	140.15
1,160.00	2,311.67	7.40	156.7	140.63	140.57
1,170.00	2,311.68	7.42	157.7	141.04	140.98
1,180.00	2,311.68	7.44	158.7	141.46	141.40
1,190.00	2,311.69	7.45	159.7	141.87	141.81
1,200.00	2,311.70	7.47	160.7	142.28	142.22
1,210.00	2,311.71	7.48	161.7	142.69	142.63
1,220.00	2,311.71	7.50	162.6	143.10	143.04
1,230.00	2,311.72	7.52	163.6	143.51	143.45
1,240.00	2,311.73	7.53	164.6	143.91	143.85
1,250.00	2,311.73	7.55	165.6	144.31	144.25
1,260.00	2,311.74	7.56	166.6	144.71	144.65
1,270.00	2,311.75	7.58	167.5	145.11	145.05
1,280.00	2,311.75	7.60	168.5	145.50	145.44
1,290.00	2,311.76	7.61	169.5	145.90	145.84
1,300.00	2,311.77	7.63	170.5	146.29	146.23
1,310.00	2,311.77	7.64	171.4	146.68	146.62
1,320.00	2,311.78	7.66	172.4	147.07	147.01
1,330.00	2,311.79	7.67	173.4	147.46	147.39
1,340.00	2,311.79	7.69	174.3	147.84	147.78
1,350.00	2,311.80	7.70	175.3	148.22	148.16
1,360.00	2,311.81	7.72	176.2	148.61	148.54
1,370.00	2,311.81	7.73	177.2	148.99	148.92
1,380.00	2,311.82	7.75	178.2	149.36	149.30
1,390.00	2,311.83	7.76	179.1	149.74	149.68
1,400.00	2,311.83	7.78	180.1	150.12	150.05
1,410.00	2,311.84	7.79	181.0	150.49	150.42

Table
Rating Table for Irregular Channel

Scopa Trail

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
1,420.00	2,311.84	7.80	182.0	150.86	150.80
1,430.00	2,311.85	7.82	182.9	151.23	151.17
1,440.00	2,311.86	7.83	183.8	151.60	151.53
1,450.00	2,311.86	7.85	184.8	151.97	151.90
1,460.00	2,311.87	7.86	185.7	152.33	152.27
1,470.00	2,311.88	7.87	186.7	152.70	152.63
1,480.00	2,311.88	7.89	187.6	153.06	152.99
1,490.00	2,311.89	7.90	188.6	153.42	153.35
1,500.00	2,311.89	7.92	189.5	153.78	153.71
1,510.00	2,311.90	7.93	190.4	154.14	154.07
1,520.00	2,311.91	7.94	191.4	154.50	154.43
1,530.00	2,311.91	7.96	192.3	154.85	154.78
1,540.00	2,311.92	7.97	193.2	155.21	155.14
1,550.00	2,311.92	7.98	194.1	155.56	155.49
1,560.00	2,311.93	8.00	195.1	155.91	155.84
1,570.00	2,311.94	8.01	196.0	156.26	156.19
1,580.00	2,311.94	8.02	196.9	156.61	156.54
1,590.00	2,311.95	8.04	197.8	156.96	156.89
1,600.00	2,311.95	8.05	198.8	157.30	157.23
1,610.00	2,311.96	8.06	199.7	157.65	157.58
1,620.00	2,311.96	8.08	200.6	157.99	157.92
1,630.00	2,311.97	8.09	201.5	158.33	158.26
1,640.00	2,311.98	8.10	202.4	158.67	158.60
1,650.00	2,311.98	8.11	203.3	159.01	158.94
1,660.00	2,311.99	8.13	204.3	159.35	159.28
1,670.00	2,311.99	8.14	205.2	159.69	159.62
1,680.00	2,312.00	8.15	206.1	160.03	159.95
1,690.00	2,312.00	8.17	206.9	160.25	160.18
1,700.00	2,312.01	8.18	207.8	160.45	160.38
1,710.00	2,312.01	8.20	208.6	160.66	160.58
1,720.00	2,312.02	8.21	209.4	160.86	160.79
1,730.00	2,312.03	8.23	210.3	161.06	160.99
1,740.00	2,312.03	8.24	211.1	161.27	161.19
1,750.00	2,312.04	8.26	211.9	161.47	161.39
1,760.00	2,312.04	8.27	212.8	161.67	161.60
1,770.00	2,312.05	8.29	213.6	161.87	161.80
1,780.00	2,312.05	8.30	214.4	162.07	162.00
1,790.00	2,312.06	8.32	215.3	162.27	162.19
1,800.00	2,312.06	8.33	216.1	162.47	162.39
1,810.00	2,312.07	8.34	216.9	162.67	162.59
1,820.00	2,312.07	8.36	217.7	162.86	162.79
1,830.00	2,312.08	8.37	218.6	163.06	162.99
1,840.00	2,312.08	8.39	219.4	163.26	163.18
1,850.00	2,312.09	8.40	220.2	163.45	163.38
1,860.00	2,312.09	8.42	221.0	163.65	163.57
1,870.00	2,312.10	8.43	221.8	163.84	163.77
1,880.00	2,312.10	8.44	222.7	164.04	163.96
1,890.00	2,312.11	8.46	223.5	164.23	164.16
1,900.00	2,312.11	8.47	224.3	164.43	164.35
1,910.00	2,312.12	8.49	225.1	164.62	164.54
1,920.00	2,312.12	8.50	225.9	164.81	164.74
1,930.00	2,312.13	8.51	226.7	165.00	164.93
1,940.00	2,312.13	8.53	227.5	165.20	165.12
1,950.00	2,312.14	8.54	228.3	165.39	165.31

Table
Rating Table for Irregular Channel

Scopa Trail

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
1,960.00	2,312.14	8.55	229.2	165.58	165.50
1,970.00	2,312.15	8.57	230.0	165.77	165.69
1,980.00	2,312.15	8.58	230.8	165.96	165.88
1,990.00	2,312.16	8.59	231.6	166.15	166.07
2,000.00	2,312.16	8.61	232.4	166.34	166.26
2,010.00	2,312.17	8.62	233.2	166.52	166.44
2,020.00	2,312.17	8.63	234.0	166.71	166.63
2,030.00	2,312.17	8.65	234.8	166.90	166.82
2,040.00	2,312.18	8.66	235.6	167.09	167.01
2,050.00	2,312.18	8.67	236.4	167.27	167.19
2,060.00	2,312.19	8.69	237.2	167.46	167.38
2,070.00	2,312.19	8.70	238.0	167.64	167.56
2,080.00	2,312.20	8.71	238.8	167.83	167.75
2,090.00	2,312.20	8.72	239.5	168.01	167.93
2,100.00	2,312.21	8.74	240.3	168.20	168.12
2,110.00	2,312.21	8.75	241.1	168.38	168.30
2,120.00	2,312.22	8.76	241.9	168.57	168.48
2,130.00	2,312.22	8.78	242.7	168.75	168.66
2,140.00	2,312.23	8.79	243.5	168.93	168.85
2,150.00	2,312.23	8.80	244.3	169.11	169.03
2,160.00	2,312.24	8.81	245.1	169.29	169.21
2,170.00	2,312.24	8.83	245.9	169.48	169.39
2,180.00	2,312.25	8.84	246.6	169.66	169.57
2,190.00	2,312.25	8.85	247.4	169.84	169.75
2,200.00	2,312.25	8.86	248.2	170.02	169.93
2,210.00	2,312.26	8.88	249.0	170.20	170.11
2,220.00	2,312.26	8.89	249.8	170.37	170.29
2,230.00	2,312.27	8.90	250.5	170.55	170.47
2,240.00	2,312.27	8.91	251.3	170.73	170.65
2,250.00	2,312.28	8.92	252.1	170.91	170.82
2,260.00	2,312.28	8.94	252.9	171.09	171.00
2,270.00	2,312.29	8.95	253.7	171.26	171.18
2,280.00	2,312.29	8.96	254.4	171.44	171.35
2,290.00	2,312.30	8.97	255.2	171.62	171.53
2,300.00	2,312.30	8.99	256.0	171.79	171.71
2,310.00	2,312.30	9.00	256.8	171.97	171.88
2,320.00	2,312.31	9.01	257.5	172.14	172.06
2,330.00	2,312.31	9.02	258.3	172.32	172.23
2,340.00	2,312.32	9.03	259.1	172.49	172.40
2,350.00	2,312.32	9.04	259.8	172.67	172.58
2,360.00	2,312.33	9.06	260.6	172.84	172.75
2,370.00	2,312.33	9.07	261.4	173.01	172.92
2,380.00	2,312.34	9.08	262.1	173.19	173.10
2,390.00	2,312.34	9.09	262.9	173.36	173.27
2,400.00	2,312.34	9.10	263.7	173.53	173.44
2,410.00	2,312.35	9.11	264.4	173.70	173.61
2,420.00	2,312.35	9.13	265.2	173.87	173.78
2,430.00	2,312.36	9.14	265.9	174.05	173.95
2,440.00	2,312.36	9.15	266.7	174.22	174.13
2,450.00	2,312.37	9.16	267.5	174.39	174.30
2,460.00	2,312.37	9.17	268.2	174.56	174.47
2,470.00	2,312.38	9.18	269.0	174.73	174.63
2,480.00	2,312.38	9.19	269.7	174.90	174.80
2,490.00	2,312.38	9.21	270.5	175.06	174.97

Table
Rating Table for Irregular Channel

Scopa Trail

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
2,500.00	2,312.39	9.22	271.3	175.23	175.14
2,510.00	2,312.39	9.23	272.0	175.40	175.31
2,520.00	2,312.40	9.24	272.8	175.57	175.48
2,530.00	2,312.40	9.25	273.5	175.74	175.64
2,540.00	2,312.41	9.26	274.3	175.90	175.81
2,550.00	2,312.41	9.27	275.0	176.07	175.98
2,560.00	2,312.41	9.28	275.8	176.24	176.14
2,570.00	2,312.42	9.29	276.5	176.40	176.31
2,580.00	2,312.42	9.30	277.3	176.57	176.48
2,590.00	2,312.43	9.32	278.0	176.73	176.64
2,600.00	2,312.43	9.33	278.8	176.90	176.81
2,610.00	2,312.44	9.34	279.5	177.07	176.97
2,620.00	2,312.44	9.35	280.3	177.23	177.13
2,630.00	2,312.44	9.36	281.0	177.39	177.30
2,640.00	2,312.45	9.37	281.8	177.56	177.46
2,650.00	2,312.45	9.38	282.5	177.72	177.63
2,660.00	2,312.46	9.39	283.2	177.88	177.79
2,670.00	2,312.46	9.40	284.0	178.05	177.95
2,680.00	2,312.46	9.41	284.7	178.21	178.11
2,690.00	2,312.47	9.42	285.5	178.37	178.28
2,700.00	2,312.47	9.43	286.2	178.54	178.44
2,710.00	2,312.48	9.44	286.9	178.70	178.60
2,720.00	2,312.48	9.45	287.7	178.86	178.76
2,730.00	2,312.49	9.47	288.4	179.02	178.92
2,740.00	2,312.49	9.48	289.2	179.18	179.08
2,750.00	2,312.49	9.49	289.9	179.34	179.24
2,760.00	2,312.50	9.50	290.6	179.50	179.40
2,770.00	2,312.50	9.51	291.4	179.66	179.56
2,780.00	2,312.51	9.52	292.1	179.82	179.72
2,790.00	2,312.51	9.53	292.8	179.98	179.88
2,800.00	2,312.51	9.54	293.6	180.14	180.04
2,810.00	2,312.52	9.55	294.3	180.30	180.20
2,820.00	2,312.52	9.56	295.0	180.46	180.36
2,830.00	2,312.53	9.57	295.8	180.61	180.52
2,840.00	2,312.53	9.58	296.5	180.77	180.67
2,850.00	2,312.53	9.59	297.2	180.93	180.83
2,860.00	2,312.54	9.60	297.9	181.09	180.99
2,870.00	2,312.54	9.61	298.7	181.24	181.14
2,880.00	2,312.55	9.62	299.4	181.40	181.30
2,890.00	2,312.55	9.63	300.1	181.56	181.46
2,900.00	2,312.55	9.64	300.9	181.71	181.61
2,910.00	2,312.56	9.65	301.6	181.87	181.77
2,920.00	2,312.56	9.66	302.3	182.03	181.92
2,930.00	2,312.57	9.67	303.0	182.18	182.08
2,940.00	2,312.57	9.68	303.8	182.34	182.23
2,950.00	2,312.57	9.69	304.5	182.49	182.39
2,960.00	2,312.58	9.70	305.2	182.65	182.54
2,970.00	2,312.58	9.71	305.9	182.80	182.70
2,980.00	2,312.59	9.72	306.6	182.95	182.85
2,990.00	2,312.59	9.73	307.4	183.11	183.00
3,000.00	2,312.59	9.74	308.1	183.26	183.16
3,010.00	2,312.60	9.75	308.8	183.41	183.31
3,020.00	2,312.60	9.76	309.5	183.57	183.46
3,030.00	2,312.61	9.77	310.2	183.72	183.62

Table
Rating Table for Irregular Channel

Scopa Trail

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
3,040.00	2,312.61	9.78	311.0	183.87	183.77
3,050.00	2,312.61	9.79	311.7	184.03	183.92
3,060.00	2,312.62	9.80	312.4	184.18	184.07
3,070.00	2,312.62	9.81	313.1	184.33	184.22
3,080.00	2,312.62	9.81	313.8	184.48	184.37
3,090.00	2,312.63	9.82	314.5	184.63	184.53
3,100.00	2,312.63	9.83	315.2	184.78	184.68
3,110.00	2,312.64	9.84	316.0	184.93	184.83
3,120.00	2,312.64	9.85	316.7	185.08	184.98
3,130.00	2,312.64	9.86	317.4	185.23	185.13
3,140.00	2,312.65	9.87	318.1	185.38	185.28
3,150.00	2,312.65	9.88	318.8	185.53	185.43
3,160.00	2,312.66	9.89	319.5	185.68	185.58
3,170.00	2,312.66	9.90	320.2	185.83	185.72
3,180.00	2,312.66	9.91	320.9	185.98	185.87
3,190.00	2,312.67	9.92	321.6	186.13	186.02
3,200.00	2,312.67	9.93	322.3	186.28	186.17
3,210.00	2,312.67	9.94	323.1	186.43	186.32
3,220.00	2,312.68	9.95	323.8	186.57	186.47
3,230.00	2,312.68	9.95	324.5	186.72	186.61
3,240.00	2,312.69	9.96	325.2	186.87	186.76
3,250.00	2,312.69	9.97	325.9	187.02	186.91
3,260.00	2,312.69	9.98	326.6	187.16	187.05
3,270.00	2,312.70	9.99	327.3	187.31	187.20
3,280.00	2,312.70	10.00	328.0	187.46	187.35
3,290.00	2,312.70	10.01	328.7	187.60	187.49
3,300.00	2,312.71	10.02	329.4	187.75	187.64
3,310.00	2,312.71	10.03	330.1	187.90	187.79
3,320.00	2,312.72	10.04	330.8	188.04	187.93
3,330.00	2,312.72	10.05	331.5	188.19	188.08
3,340.00	2,312.72	10.05	332.2	188.33	188.22
3,350.00	2,312.73	10.06	332.9	188.48	188.37
3,360.00	2,312.73	10.07	333.6	188.62	188.51
3,370.00	2,312.73	10.08	334.3	188.77	188.65
3,380.00	2,312.74	10.09	335.0	188.91	188.80
3,390.00	2,312.74	10.10	335.7	189.05	188.94
3,400.00	2,312.75	10.11	336.4	189.20	189.09
3,410.00	2,312.75	10.12	337.1	189.34	189.23
3,420.00	2,312.75	10.13	337.8	189.48	189.37
3,430.00	2,312.76	10.13	338.5	189.63	189.52
3,440.00	2,312.76	10.14	339.2	189.77	189.66
3,450.00	2,312.76	10.15	339.8	189.91	189.80
3,460.00	2,312.77	10.16	340.5	190.06	189.94
3,470.00	2,312.77	10.17	341.2	190.20	190.08
3,480.00	2,312.78	10.18	341.9	190.34	190.23
3,490.00	2,312.78	10.19	342.6	190.48	190.37
3,500.00	2,312.78	10.20	343.3	190.62	190.51
3,510.00	2,312.79	10.20	344.0	190.77	190.65
3,520.00	2,312.79	10.21	344.7	190.91	190.79
3,530.00	2,312.79	10.22	345.4	191.05	190.93
3,540.00	2,312.80	10.23	346.1	191.19	191.07
3,550.00	2,312.80	10.24	346.7	191.33	191.21
3,560.00	2,312.80	10.25	347.4	191.47	191.35
3,570.00	2,312.81	10.25	348.1	191.61	191.49

Table
Rating Table for Irregular Channel

SCOPA TRAIL

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
3,580.00	2,312.81	10.26	348.8	191.75	191.63
3,590.00	2,312.81	10.27	349.5	191.89	191.77
3,600.00	2,312.82	10.28	350.2	192.03	191.91
3,610.00	2,312.82	10.29	350.9	192.17	192.05
3,620.00	2,312.83	10.30	351.6	192.31	192.19
3,630.00	2,312.83	10.31	352.2	192.45	192.33
3,640.00	2,312.83	10.31	352.9	192.59	192.47
3,650.00	2,312.84	10.32	353.6	192.72	192.61
3,660.00	2,312.84	10.33	354.3	192.86	192.75
3,670.00	2,312.84	10.34	355.0	193.00	192.88
3,680.00	2,312.85	10.35	355.6	193.14	193.02
3,690.00	2,312.85	10.36	356.3	193.28	193.16
3,700.00	2,312.85	10.36	357.0	193.41	193.30
3,710.00	2,312.86	10.37	357.7	193.55	193.43
3,720.00	2,312.86	10.38	358.4	193.69	193.57
3,730.00	2,312.86	10.39	359.1	193.83	193.71
3,740.00	2,312.87	10.40	359.7	193.96	193.84
3,750.00	2,312.87	10.40	360.4	194.10	193.98
3,760.00	2,312.87	10.41	361.1	194.24	194.12
3,770.00	2,312.88	10.42	361.8	194.37	194.25
3,780.00	2,312.88	10.43	362.4	194.51	194.39
3,790.00	2,312.89	10.44	363.1	194.64	194.52
3,800.00	2,312.89	10.45	363.8	194.78	194.66
3,810.00	2,312.89	10.45	364.5	194.91	194.79
3,820.00	2,312.90	10.46	365.1	195.05	194.93
3,830.00	2,312.90	10.47	365.8	195.18	195.06
3,840.00	2,312.90	10.48	366.5	195.32	195.20
3,850.00	2,312.91	10.49	367.2	195.45	195.33
3,860.00	2,312.91	10.49	367.8	195.59	195.47
3,870.00	2,312.91	10.50	368.5	195.72	195.60
3,880.00	2,312.92	10.51	369.2	195.86	195.74
3,890.00	2,312.92	10.52	369.9	195.99	195.87
3,900.00	2,312.92	10.53	370.5	196.13	196.00
3,910.00	2,312.93	10.53	371.2	196.26	196.14
3,920.00	2,312.93	10.54	371.9	196.39	196.27
3,930.00	2,312.93	10.55	372.5	196.53	196.40
3,940.00	2,312.94	10.56	373.2	196.66	196.54
3,950.00	2,312.94	10.57	373.9	196.79	196.67
3,960.00	2,312.94	10.57	374.5	196.92	196.80
3,970.00	2,312.95	10.58	375.2	197.06	196.93
3,980.00	2,312.95	10.59	375.9	197.19	197.07
3,990.00	2,312.95	10.60	376.5	197.32	197.20
4,000.00	2,312.96	10.60	377.2	197.45	197.33
4,010.00	2,312.96	10.61	377.9	197.59	197.46
4,020.00	2,312.96	10.62	378.5	197.72	197.59
4,030.00	2,312.97	10.63	379.2	197.85	197.72
4,040.00	2,312.97	10.64	379.9	197.98	197.86
4,050.00	2,312.97	10.64	380.5	198.11	197.99
4,060.00	2,312.98	10.65	381.2	198.24	198.12
4,070.00	2,312.98	10.66	381.9	198.37	198.25
4,080.00	2,312.98	10.67	382.5	198.50	198.38
4,090.00	2,312.99	10.67	383.2	198.63	198.51
4,100.00	2,312.99	10.68	383.9	198.76	198.64
4,110.00	2,312.99	10.69	384.5	198.89	198.77

Table
Rating Table for Irregular Channel

Scopa Trail

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
4,120.00	2,313.00	10.70	385.2	199.02	198.90
4,130.00	2,313.00	10.70	385.8	199.15	199.03
4,140.00	2,313.00	10.71	386.5	199.28	199.16
4,150.00	2,313.01	10.72	387.2	199.41	199.29
4,160.00	2,313.01	10.73	387.8	199.54	199.42
4,170.00	2,313.01	10.73	388.5	199.67	199.55
4,180.00	2,313.02	10.74	389.1	199.80	199.67
4,190.00	2,313.02	10.75	389.8	199.93	199.80
4,200.00	2,313.02	10.76	390.5	200.06	199.93
4,210.00	2,313.03	10.76	391.1	200.19	200.06
4,220.00	2,313.03	10.77	391.8	200.31	200.19
4,230.00	2,313.03	10.78	392.4	200.44	200.32
4,240.00	2,313.04	10.79	393.1	200.57	200.44
4,250.00	2,313.04	10.79	393.7	200.70	200.57
4,260.00	2,313.04	10.80	394.4	200.83	200.70
4,270.00	2,313.05	10.81	395.1	200.95	200.83
4,280.00	2,313.05	10.82	395.7	201.08	200.95
4,290.00	2,313.05	10.82	396.4	201.21	201.08
4,300.00	2,313.06	10.83	397.0	201.34	201.21
4,310.00	2,313.06	10.84	397.7	201.46	201.33
4,320.00	2,313.06	10.85	398.3	201.59	201.46
4,330.00	2,313.07	10.85	399.0	201.72	201.59
4,340.00	2,313.07	10.86	399.6	201.84	201.71
4,350.00	2,313.07	10.87	400.3	201.97	201.84
4,360.00	2,313.08	10.87	400.9	202.09	201.96
4,370.00	2,313.08	10.88	401.6	202.22	202.09
4,380.00	2,313.08	10.89	402.2	202.35	202.22
4,390.00	2,313.09	10.90	402.9	202.47	202.34
4,400.00	2,313.09	10.90	403.5	202.60	202.47
4,410.00	2,313.09	10.91	404.2	202.72	202.59
4,420.00	2,313.10	10.92	404.8	202.85	202.72
4,430.00	2,313.10	10.92	405.5	202.97	202.84
4,440.00	2,313.10	10.93	406.1	203.10	202.97
4,450.00	2,313.10	10.94	406.8	203.22	203.09
4,460.00	2,313.11	10.95	407.4	203.35	203.22
4,470.00	2,313.11	10.95	408.1	203.47	203.34
4,480.00	2,313.11	10.96	408.7	203.60	203.46
4,490.00	2,313.12	10.97	409.4	203.72	203.59
4,500.00	2,313.12	10.97	410.0	203.84	203.71
4,510.00	2,313.12	10.98	410.7	203.97	203.84
4,520.00	2,313.13	10.99	411.3	204.09	203.96
4,530.00	2,313.13	11.00	412.0	204.22	204.08
4,540.00	2,313.13	11.00	412.6	204.34	204.21
4,550.00	2,313.14	11.01	413.3	204.46	204.33
4,560.00	2,313.14	11.02	413.9	204.59	204.45
4,570.00	2,313.14	11.02	414.5	204.71	204.57
4,580.00	2,313.15	11.03	415.2	204.83	204.70
4,590.00	2,313.15	11.04	415.8	204.95	204.82
4,600.00	2,313.15	11.05	416.5	205.08	204.94

GW 100 YR, 24 HR
FUTURE

36 (JEF)

Scopa Trail

```
1*************************************
*                                   *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN  1998            *
*           VERSION 4.1             *
*                                   *
*  RUN DATE   27NOV02  TIME  08:45:45  *
*                                   *
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```
*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*           (916) 756-1104          *
*                                   *
*************************************
```

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

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

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


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

  1           ID     FUTURE CONDITIONS HYDROLOGY FOR CAREFREE AREA DRAINAGE MASTER PLAN
  2           ID       BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC., DEC. 2001
  3           ID
  4           ID     FUTURE CONDITIONS LAND USE BASED ON CAVE CREEK WATERCOURSE MASTER PLAN
  5           ID     HYDROLOGY BY TETRA TECH, 2000.
  6           ID
  7           ID     BASE MODEL BASED ON:
  8           ID
  9           ID           FLOODPLAIN DELINEATION STUDY OF ANDORA HILLS & GALLOWAY WASHES
 10           ID           FCD 99-14
 11           ID           BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC.
 12           ID           FOR THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
 13           ID           REVISED MARCH 2002     FILENAME: GWM224R.DAT
 14           ID      ***************************************************************
 15           ID           100 YEAR ANALYSIS 24-HOUR STORM USING JD RECORDS
 16           ID           MCUHP2 USED FOR UNIT HYDROGRAPHS
 17           ID     ***************************************************************
 18           ID
 19           ID     DDM MCUHP2 GALLOWAY WASH FLOODPLAIN DELINEATION STUDY, FCD NO. 99-14
 20           ID
 21           ID    March 2002 revisions to original Dec. 1999 model include:
 22           ID
 23           ID    HC BLOCK ADDED FOR GRAPEVINE WASH (CP 295A)
 24           ID
 25           ID    SUBBASIN GWW1_3 FURTHER SUBDIVIDED ALONG GALLOWAY WASH PER FEMA COMMENTS
 26           ID    IN LETTER DATED FEB. 8, 2002
 27           ID
 28           ID    *** ADDITIONAL COMBINATION ADDED 10-17-02 TO PROVIDE TOTAL FLOW IN
 29           ID        NORTH GALLOWAY WASH BY TWL FOR CH2M HILL FOR CAREFREE DMP ***
 30           ID
 31           ID   DDM MCUHP2 Carefree Area Drainage Master Plan, Galloway Wash Future Condition
              *DIAGRAM
 32           IT       5 01DEC99    0005     400
 33           IO       5       2
 34           IN      15
 35           JD    4.80    0.01
 36           PC    .000    .002    .005    .008    .011    .014    .017    .020    .023    .026
 37           PC    .029    .032    .035    .038    .041    .044    .048    .052    .056    .060
 38           PC    .064    .068    .072    .076    .080    .085    .090    .095    .100    .105
 39           PC    .110    .115    .120    .126    .133    .140    .147    .155    .163    .172
 40           PC    .181    .191    .203    .218    .236    .257    .283    .387    .663    .707
 41           PC    .735    .758    .776    .791    .804    .815    .825    .834    .842    .849
 42           PC    .856    .863    .869    .875    .881    .887    .893    .898    .903    .908
 43           PC    .913    .918    .922    .926    .930    .934    .938    .942    .946    .950
 44           PC    .953    .956    .959    .962    .965    .968    .971    .974    .977    .980
 45           PC    .983    .986    .989    .992    .995    .998   1.000
 46           JD    4.78    1.00
 47           JD    4.51   10.00
 48           JD    4.37   20.00
 49           JD    4.11   70.00
              *
              * DDM   ***** Updated *****
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
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Scopa Trail

1 STATION CP287

(O) OUTFLOW

DAHRMN	PER	0.	500.	1000.	1500.	2000.	2500.	3000.	3500.	4000.	4500.	5000.	0.	0.
10005	10													
10010	20													
10015	30													
10020	40													
10025	50													
10030	60													
10035	70													
10040	80													
10045	90													
10050	100													
10055	110													
10100	120													
10105	130													
10110	140													
10115	150													
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10620	760													
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10630	780													
10635	790													
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10645	810													
10650	820													
10655	830													
10700	840													
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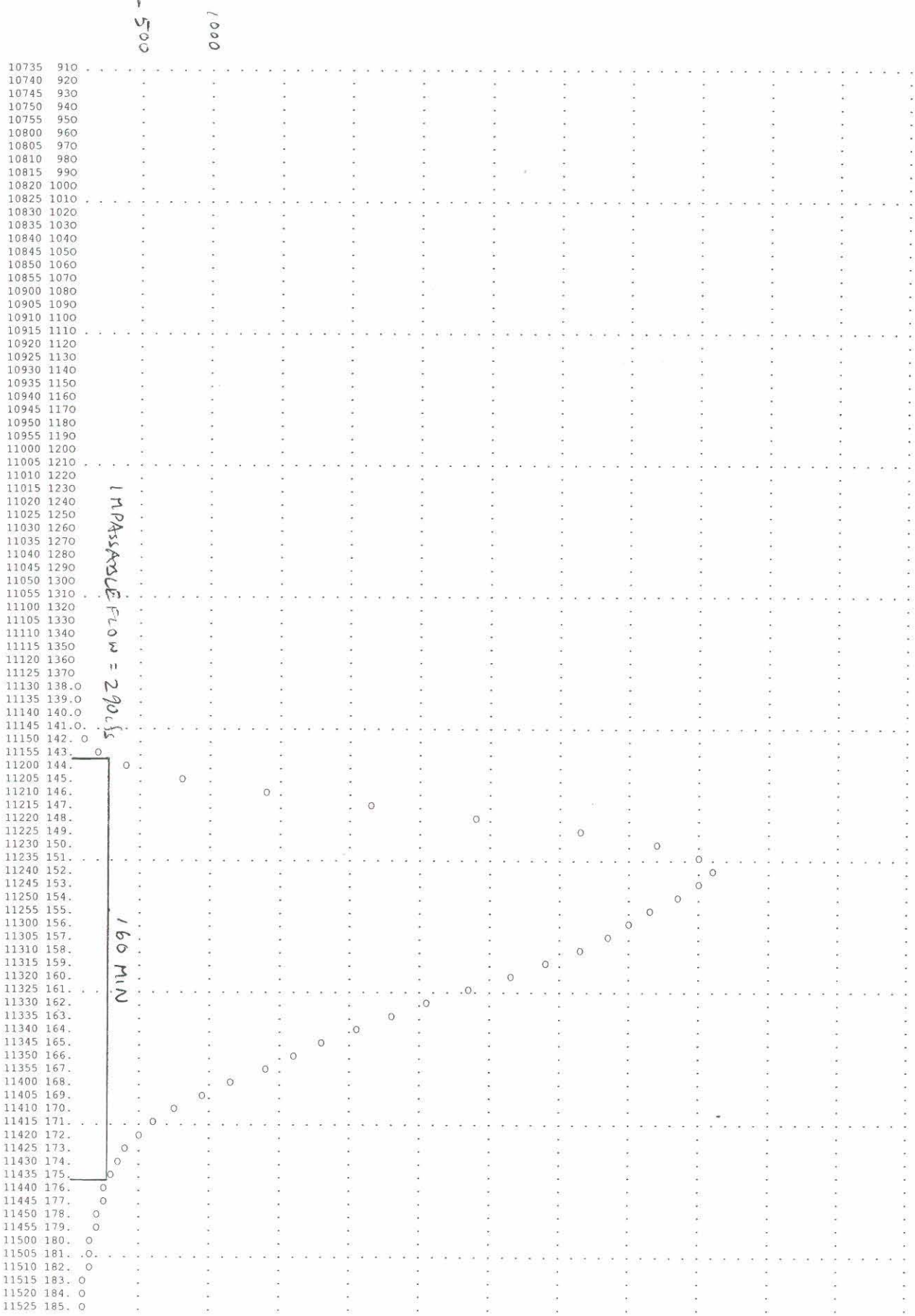
SCOPA TRAIL



Cow Track at Scottsdale Boundary (JEF #43)

Carefree Drainage Master Plan
Dip Crossing Notes

ID Number: 43 (JEF)

Source of Data: TOPO & HECRAS

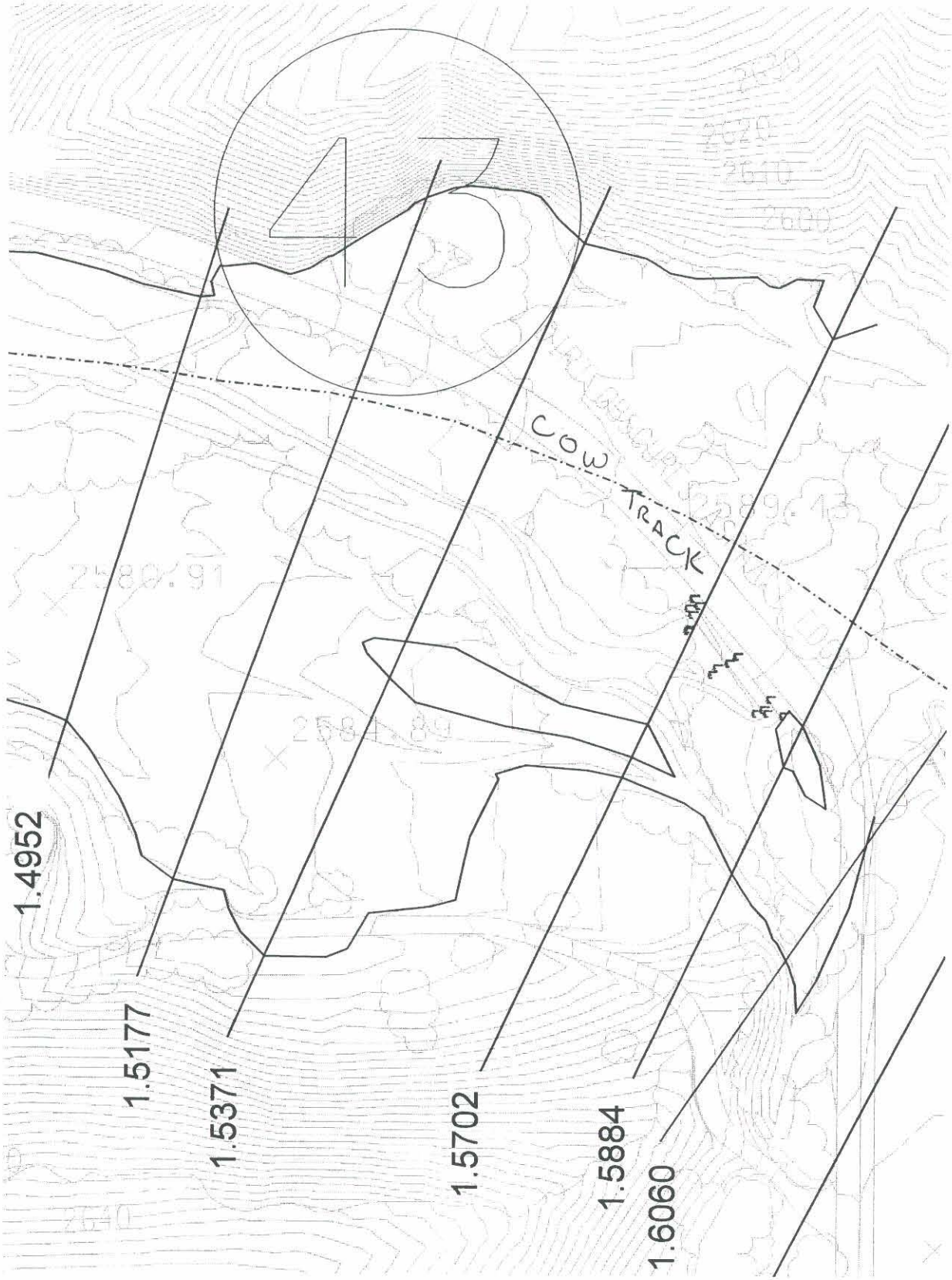
Location: Cow Track @ Scottsdale boundary

see attached

Material: Dip Crossing

Protection: Concrete Drop Structure

Notes: Part of Floodplain Delineation for Galloway Wash Middle Branch

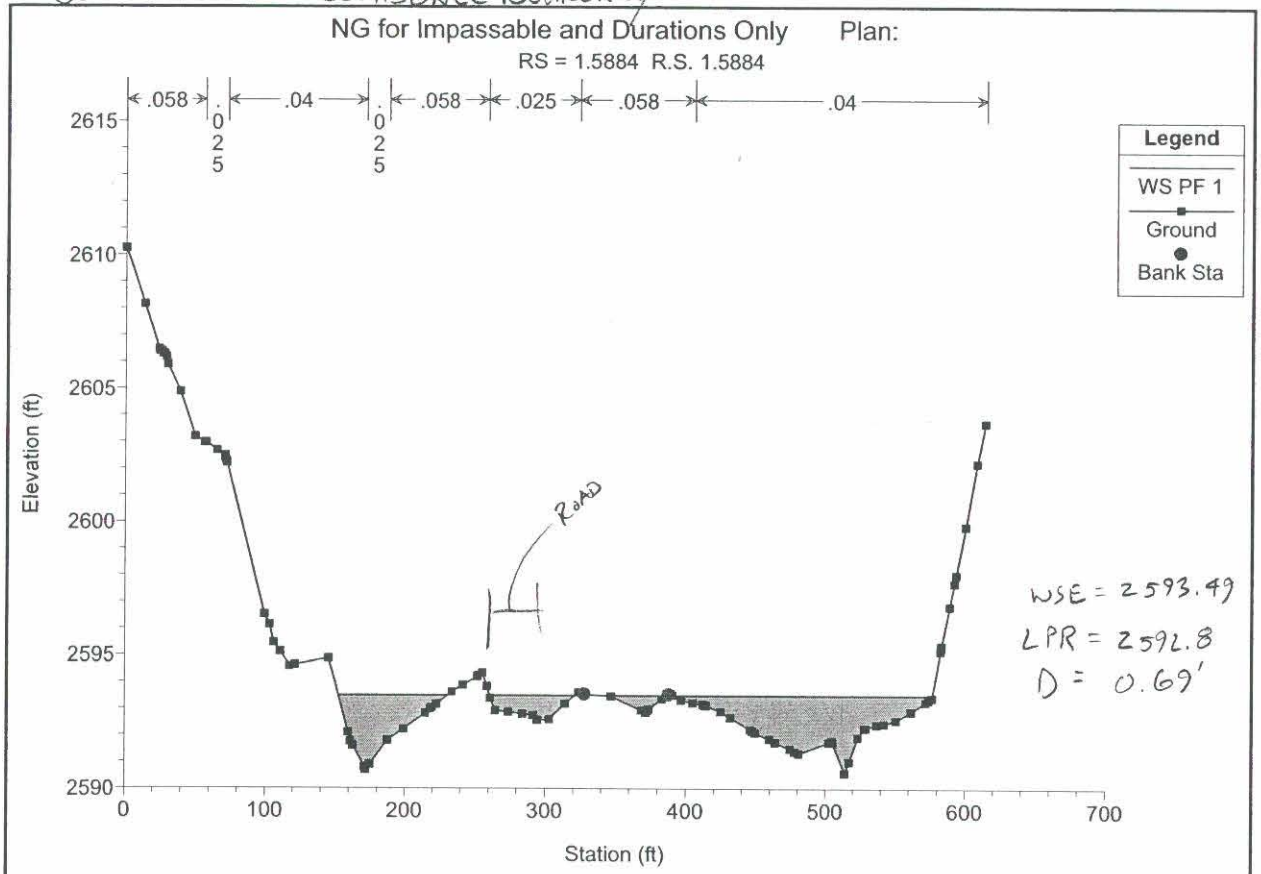


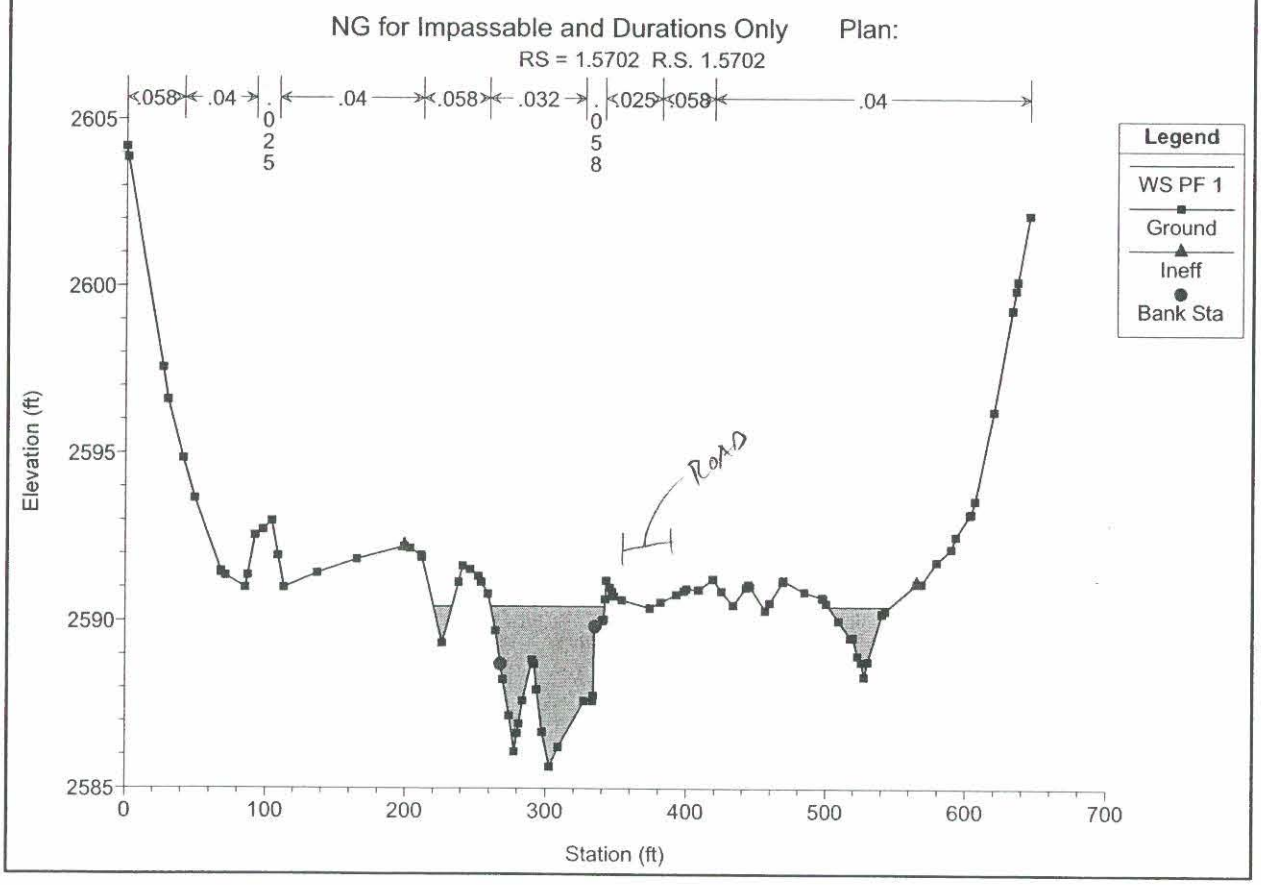
COW TRACK AT SCOTTSDALE BOUNDARY

N

SCALE 1" = 100'

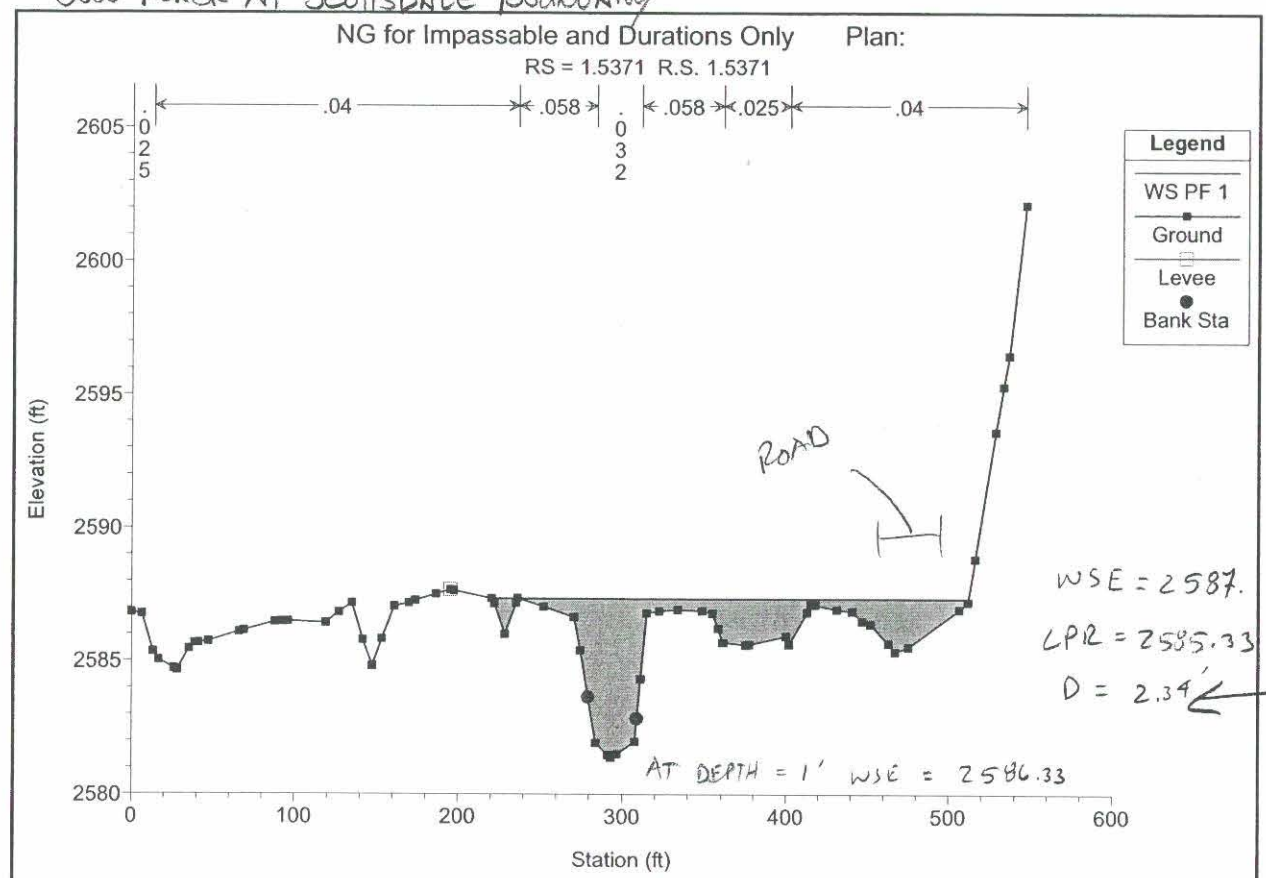
Cow Track At Scottsdale Boundary

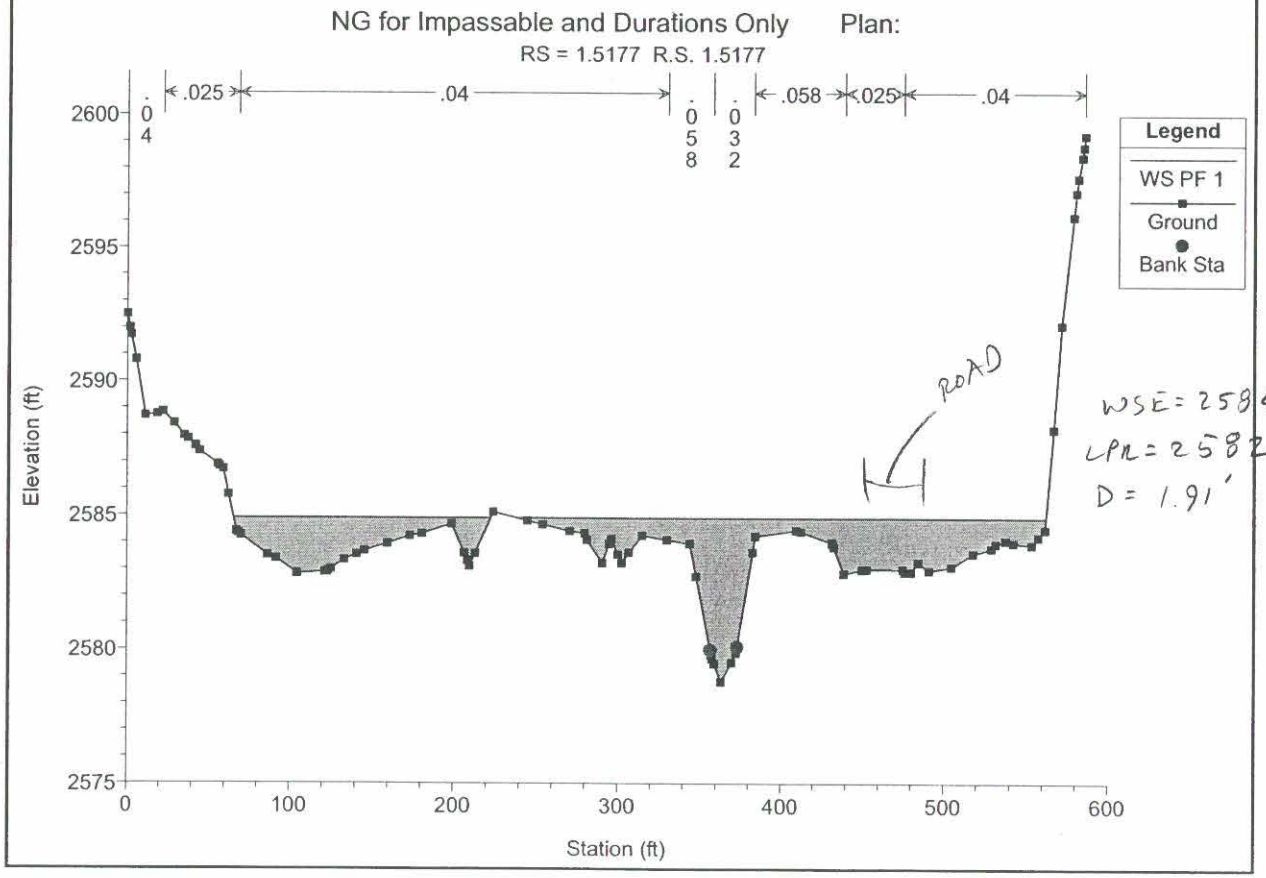




LPR = Low Point on Road

COW TRACK AT SCOTTSDALE BOUNDARY





Cow Track At Scottsdale Boundary

Plan: Plan 01 Galloway Wash Middle Branch RS: 1.5371 Profile: PF 1

E.G. Elev (ft)	2587.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.22	Wt. n-Val.	0.040	0.037	0.034
W.S. Elev (ft)	2587.67	Reach Len. (ft)	100.00	102.43	106.00
Crit W.S. (ft)	2587.67	Flow Area (sq ft)	338.15	171.99	279.29
E.G. Slope (ft/ft)	0.001679	Area (sq ft)	338.15	171.99	279.29
Q Total (cfs)	2124.00	Flow (cfs)	578.04	899.39	646.57
Top Width (ft)	513.15	Top Width (ft)	279.21	29.70	204.24
Vel Total (ft/s)	2.69	Avg. Vel. (ft/s)	1.71	5.23	2.32
Max Chl Dpth (ft)	6.30	Hydr. Depth (ft)	1.21	5.79	1.37
Conv. Total (cfs)	51841.9	Conv. (cfs)	14108.6	21952.0	15781.4
Length Wtd. (ft)	103.01	Wetted Per. (ft)	281.46	30.29	205.89
Min Ch El (ft)	2581.37	Shear (lb/sq ft)	0.13	0.60	0.14
Alpha	1.93	Stream Power (lb/ft s)	0.22	3.11	0.33
Frctn Loss (ft)	0.26	Cum Volume (acre-ft)	12.30	21.46	20.20
C & E Loss (ft)	0.03	Cum SA (acres)	11.18	6.84	15.77

Cow Track At Scottsdale Boundary

Plan: Plan 01 Galloway Wash Middle Branch RS: 1.5371 Profile: PF 5

E.G. Elev (ft)	2586.36	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.40	Wt. n-Val.	0.058	0.037	0.032
W.S. Elev (ft)	2584.96	Reach Len. (ft)	100.00	102.43	106.00
Crit W.S. (ft)	2584.96	Flow Area (sq ft)	2.43	91.37	3.25
E.G. Slope (ft/ft)	0.013153	Area (sq ft)	2.43	91.37	3.25
Q Total (cfs)	900.00	Flow (cfs)	5.17	877.29	17.55
Top Width (ft)	36.47	Top Width (ft)	3.72	29.70	3.05
Vel Total (ft/s)	9.27	Avg. Vel. (ft/s)	2.13	9.60	5.40
Max Chl Dpth (ft)	3.59	Hydr. Depth (ft)	0.65	3.08	1.07
Conv. Total (cfs)	7847.5	Conv. (cfs)	45.1	7649.4	153.0
Length Wtd. (ft)	102.74	Wetted Per. (ft)	3.94	30.29	3.71
Min Ch El (ft)	2581.37	Shear (lb/sq ft)	0.51	2.48	0.72
Alpha	1.05	Stream Power (lb/ft s)	1.08	23.78	3.89
Frctn Loss (ft)	0.70	Cum Volume (acre-ft)	5.80	18.49	12.98
C & E Loss (ft)	0.25	Cum SA (acres)	5.62	6.84	12.93

GW 100 YR, 24 HR
FUTURE

Cow Track At Scottsdale Boundary

```
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN  1998               *
*            VERSION 4.1               *
*                                      *
* RUN DATE   27NOV02  TIME  08:45:45   *
*                                      *
****************************************
```

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

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

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

1 HEC-1 INPUT PAGE 1

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

  1           ID     FUTURE CONDITIONS HYDROLOGY FOR CAREFREE AREA DRAINAGE MASTER PLAN
  2           ID       BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC., DEC. 2001
  3           ID
  4           ID     FUTURE CONDITIONS LAND USE BASED ON CAVE CREEK WATERCOURSE MASTER PLAN
  5           ID     HYDROLOGY BY TETRA TECH, 2000.
  6           ID
  7           ID     BASE MODEL BASED ON:
  8           ID
  9           ID           FLOODPLAIN DELINEATION STUDY OF ANDORA HILLS & GALLOWAY WASHES
 10           ID           FCD 99-14
 11           ID           BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC.
 12           ID           FOR THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
 13           ID           REVISED MARCH 2002     FILENAME: GWM224R.DAT
 14           ID      ***************************************************************
 15           ID           100 YEAR ANALYSIS 24-HOUR STORM USING JD RECORDS
 16           ID           MCUHP2 USED FOR UNIT HYDROGRAPHS
 17           ID     ***************************************************************
 18           ID
 19           ID     DDM MCUHP2 GALLOWAY WASH FLOODPLAIN DELINEATION STUDY, FCD NO. 99-14
 20           ID
 21           ID    March 2002 revisions to original Dec. 1999 model include:
 22           ID
 23           ID    HC BLOCK ADDED FOR GRAPEVINE WASH (CP 295A)
 24           ID
 25           ID    SUBBASIN GWW1_3 FURTHER SUBDIVIDED ALONG GALLOWAY WASH PER FEMA COMMENTS
 26           ID    IN LETTER DATED FEB. 8, 2002
 27           ID
 28           ID    *** ADDITIONAL COMBINATION ADDED 10-17-02 TO PROVIDE TOTAL FLOW IN
 29           ID        NORTH GALLOWAY WASH BY TWL FOR CH2M HILL FOR CAREFREE DMP ***
 30           ID
 31           ID   DDM MCUHP2 Carefree Area Drainage Master Plan, Galloway Wash Future Condition
              *DIAGRAM
 32           IT       5 01DEC99    0005     400
 33           IO       5       2
 34           IN      15
 35           JD    4.80    0.01
 36           PC    .000    .002    .005    .008    .011    .014    .017    .020    .023    .026
 37           PC    .029    .032    .035    .038    .041    .044    .048    .052    .056    .060
 38           PC    .064    .068    .072    .076    .080    .085    .090    .095    .100    .105
 39           PC    .110    .115    .120    .126    .133    .140    .147    .155    .163    .172
 40           PC    .181    .191    .203    .218    .236    .257    .283    .387    .663    .707
 41           PC    .735    .758    .776    .791    .804    .815    .825    .834    .842    .849
 42           PC    .856    .863    .869    .875    .881    .887    .893    .898    .903    .908
 43           PC    .913    .918    .922    .926    .930    .934    .938    .942    .946    .950
 44           PC    .953    .956    .959    .962    .965    .968    .971    .974    .977    .980
 45           PC    .983    .986    .989    .992    .995    .998   1.000
 46           JD    4.78    1.00
 47           JD    4.51   10.00
 48           JD    4.37   20.00
 49           JD    4.11   70.00
              *
              * DDM   ***** Updated *****
```

1 HEC-1 INPUT PAGE 2

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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
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Cow Track At Scottsdale Boundary

1 STATION GWW1_1

(O) OUTFLOW

DAHRMN	PER	0.	400.	800.	1200.	1600.	2000.	2400.	2800.	0.	0.	0.	0.	0.
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10010	20													
10015	30													
10020	40													
10025	50													
10030	60													
10035	70													
10040	80													
10045	90													
10050	100													
10055	110													
10100	120													
10105	130													
10110	140													
10115	150													
10120	160													
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10435	550													
10440	560													
10445	570													
10450	580													
10455	590													
10500	600													
10505	610													
10510	620													
10515	630													
10520	640													
10525	650													
10530	660													
10535	670													
10540	680													
10545	690													
10550	700													
10555	710													
10600	720													
10605	730													
10610	740													
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10620	760													
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10630	780													
10635	790													
10640	800													
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10650	820													
10655	830													
10700	840													
10705	850													
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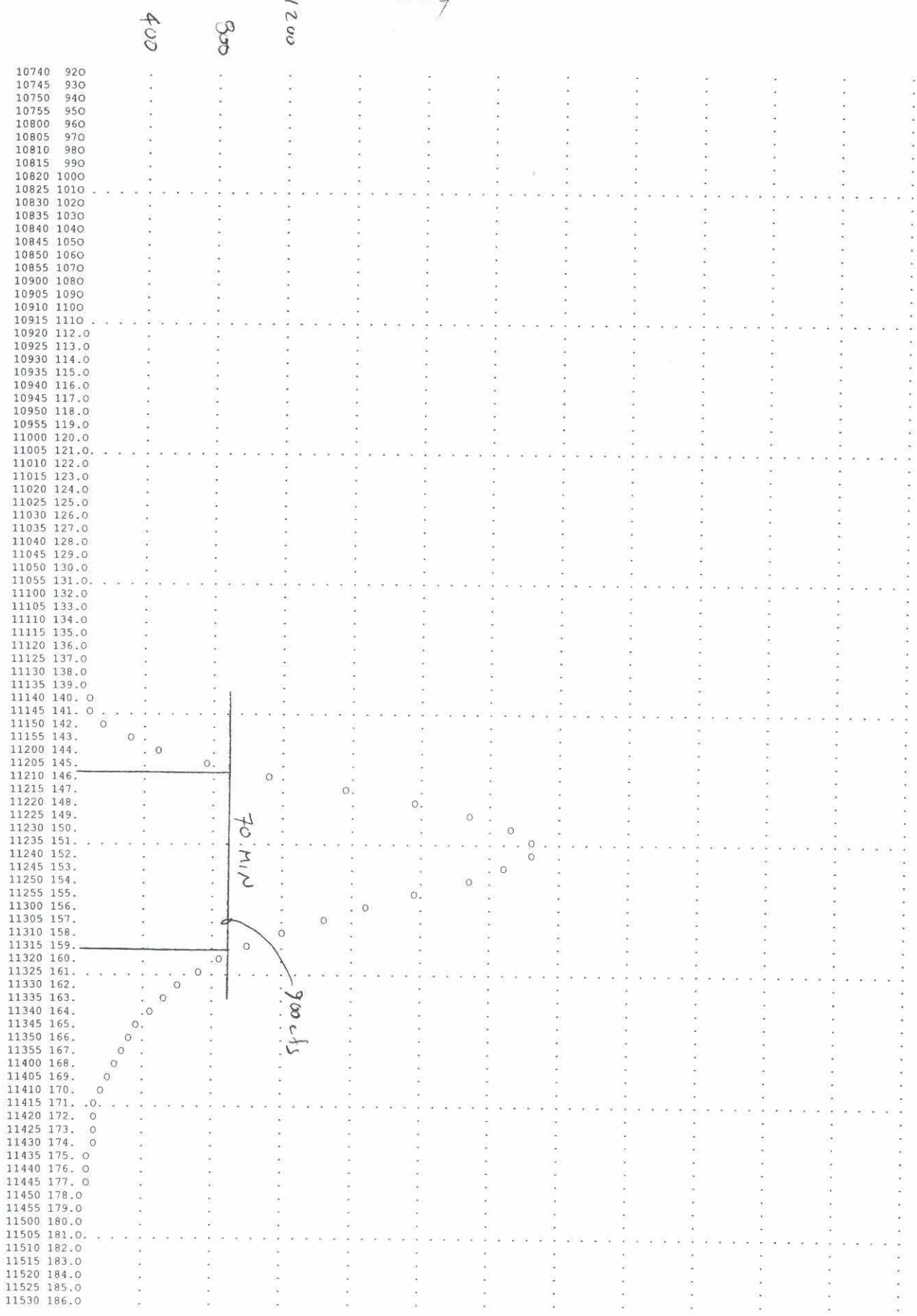
10725	890													
10730	900													
10735	910													

Cow Track At Scottsdale Boundary



Sombrero Road (JEF #44)

Carefree Drainage Master Plan
Dip Crossing Notes

ID Number: 44 (JEF)

Source of Data: TOPO, HECRAS

Location: Sombrero Road

see attached

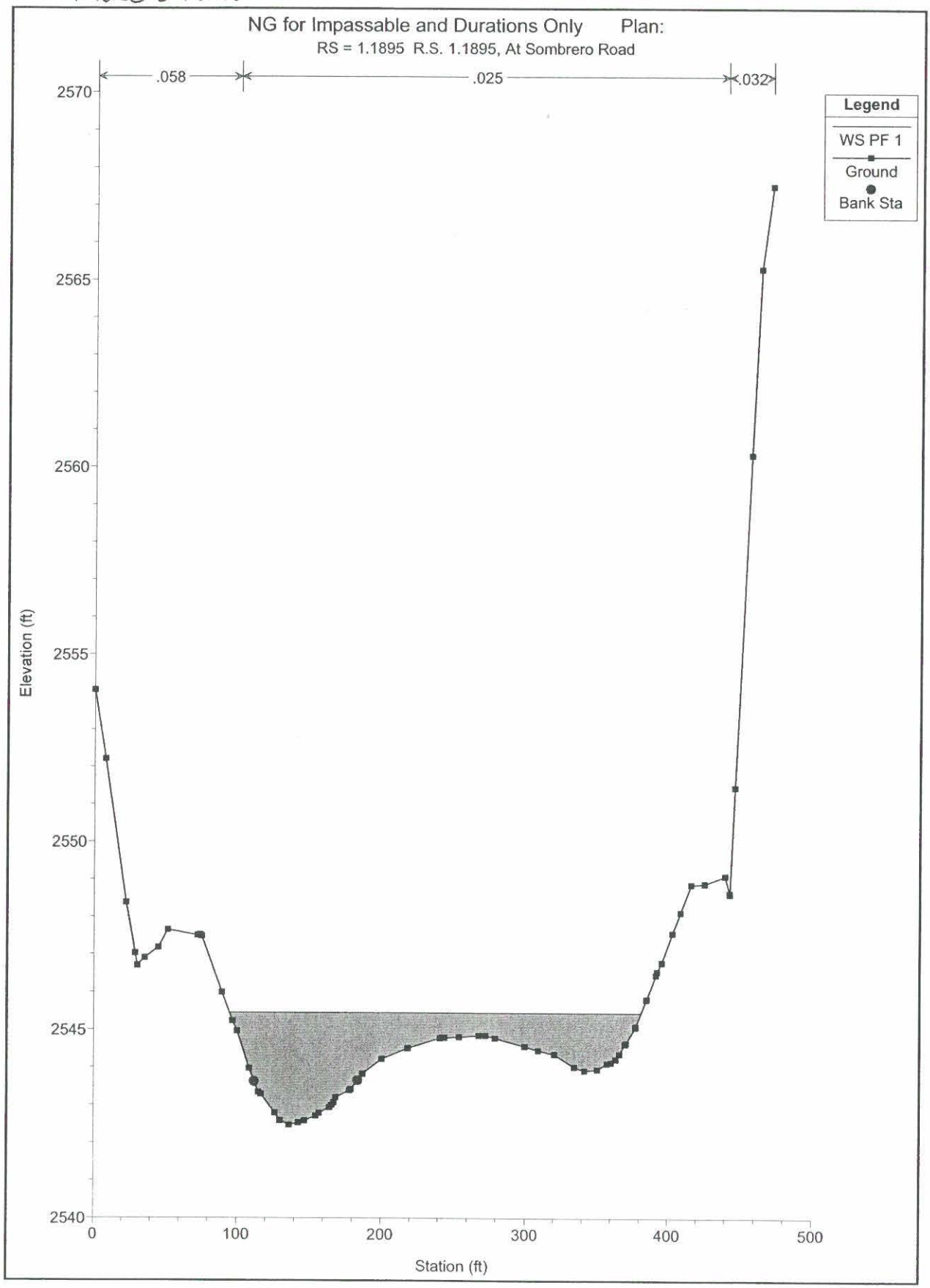
Material: Paved Dip Crossing

Protection:

Notes: Part of Floodplain Delineation for Galloway Wash Middle Branch

1.1546
1.1825
1.1895
1.1974
1.2355
Sumbrero Road
WSE 2543.69
Sumbrero Road
N
Scale 1" = 100'

Sombrero Road



Sombrero Road

Plan: Plan 01 Galloway Wash Middle Branch RS: 1.1895 Profile: PF 1

E.G. Elev (ft)	2546.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.60	Wt. n-Val.	0.025	0.025	0.025
W.S. Elev (ft)	2545.45	Reach Len. (ft)	36.79	36.79	36.79
Crit W.S. (ft)	2545.45	Flow Area (sq ft)	15.37	181.04	195.51
E.G. Slope (ft/ft)	0.004408	Area (sq ft)	15.37	181.04	195.51
Q Total (cfs)	2153.00	Flow (cfs)	62.74	1324.40	765.86
Top Width (ft)	286.32	Top Width (ft)	17.04	71.67	197.61
Vel Total (ft/s)	5.49	Avg. Vel. (ft/s)	4.08	7.32	3.92
Max Chl Dpth (ft)	2.98	Hydr. Depth (ft)	0.90	2.53	0.99
Conv. Total (cfs)	32429.1	Conv. (cfs)	945.0	19948.5	11535.6
Length Wtd. (ft)	36.79	Wetted Per. (ft)	17.14	71.73	197.68
Min Ch El (ft)	2542.47	Shear (lb/sq ft)	0.25	0.69	0.27
Alpha	1.29	Stream Power (lb/ft s)	1.01	5.08	1.07
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)	8.72	17.10	10.08
C & E Loss (ft)	0.02	Cum SA (acres)	6.98	5.61	7.86

SOMBRERO ROAD

Plan: Plan 01 Galloway Wash Middle Branch RS: 1.1895 Profile: PF 3

E.G. Elev (ft)	2543.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.30	Wt. n-Val.		0.025	
W.S. Elev (ft)	2543.46	Reach Len. (ft)	36.79	36.79	36.79
Crit W.S. (ft)	2543.46	Flow Area (sq ft)		38.76	
E.G. Slope (ft/ft)	0.011141	Area (sq ft)		38.76	
Q Total (cfs)	170.00	Flow (cfs)		170.00	
Top Width (ft)	66.25	Top Width (ft)		66.25	
Vel Total (ft/s)	4.39	Avg. Vel. (ft/s)		4.39	
Max Chl Dpth (ft)	0.99	Hydr. Depth (ft)		0.59	
Conv. Total (cfs)	1610.6	Conv. (cfs)		1610.6	
Length Wtd. (ft)	36.79	Wetted Per. (ft)		66.29	
Min Ch El (ft)	2542.47	Shear (lb/sq ft)		0.41	
Alpha	1.00	Stream Power (lb/ft s)		1.78	
Frctn Loss (ft)	0.40	Cum Volume (acre-ft)	2.98	9.98	3.36
C & E Loss (ft)	0.03	Cum SA (acres)	2.63	5.24	3.02

GW 100 YR, 24 HR
FUTURE

Sombrero Road

```
1****************************************
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*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN  1998               *
*            VERSION 4.1               *
*                                      *
*  RUN DATE   27NOV02  TIME  08:45:45  *
*                                      *
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```
****************************************
*                                      *
*   U.S. ARMY CORPS OF ENGINEERS       *
*   HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET            *
*      DAVIS, CALIFORNIA 95616         *
*          (916) 756-1104              *
*                                      *
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X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX         XXX
```

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

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


```
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  2           ID       BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC., DEC. 2001
  3           ID
  4           ID     FUTURE CONDITIONS LAND USE BASED ON CAVE CREEK WATERCOURSE MASTER PLAN
  5           ID     HYDROLOGY BY TETRA TECH, 2000.
  6           ID
  7           ID     BASE MODEL BASED ON:
  8           ID
  9           ID          FLOODPLAIN DELINEATION STUDY OF ANDORA HILLS & GALLOWAY WASHES
 10           ID          FCD 99-14
 11           ID          BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC.
 12           ID          FOR THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
 13           ID          REVISED MARCH 2002     FILENAME: GWM224R.DAT
 14           ID      ****************************************************************
 15           ID          100 YEAR ANALYSIS 24-HOUR STORM USING JD RECORDS
 16           ID          MCUHP2 USED FOR UNIT HYDROGRAPHS
 17           ID     ****************************************************************
 18           ID
 19           ID     DDM MCUHP2 GALLOWAY WASH FLOODPLAIN DELINEATION STUDY, FCD NO. 99-14
 20           ID
 21           ID    March 2002 revisions to original Dec. 1999 model include:
 22           ID
 23           ID    HC BLOCK ADDED FOR GRAPEVINE WASH (CP 295A)
 24           ID
 25           ID    SUBBASIN GWW1_3 FURTHER SUBDIVIDED ALONG GALLOWAY WASH PER FEMA COMMENTS
 26           ID    IN LETTER DATED FEB. 8, 2002
 27           ID
 28           ID    *** ADDITIONAL COMBINATION ADDED 10-17-02 TO PROVIDE TOTAL FLOW IN
 29           ID        NORTH GALLOWAY WASH BY TWL FOR CH2M HILL FOR CAREFREE DMP ***
 30           ID
 31           ID   DDM MCUHP2 Carefree Area Drainage Master Plan, Galloway Wash Future Condition
              *DIAGRAM
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 34           IN      15
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 38           PC    .064    .068    .072    .076    .080    .085    .090    .095    .100    .105
 39           PC    .110    .115    .120    .126    .133    .140    .147    .155    .163    .172
 40           PC    .181    .191    .203    .218    .236    .257    .283    .387    .663    .707
 41           PC    .735    .758    .776    .791    .804    .815    .825    .834    .842    .849
 42           PC    .856    .863    .869    .875    .881    .887    .893    .898    .903    .908
 43           PC    .913    .918    .922    .926    .930    .934    .938    .942    .946    .950
 44           PC    .953    .956    .959    .962    .965    .968    .971    .974    .977    .980
 45           PC    .983    .986    .989    .992    .995    .998   1.000
 46           JD    4.78    1.00
 47           JD    4.51   10.00
 48           JD    4.37   20.00
 49           JD    4.11   70.00
              *
              * DDM    ***** Updated *****
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
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Sombrero Road

1 STATION GWW1_1

(O) OUTFLOW

DAHRMN	PER	0.	400.	800.	1200.	1600.	2000.	2400.	2800.	0.	0.	0.	0.	0.
10005	10													
10010	20													
10015	30													
10020	40													
10025	50													
10030	60													
10035	70													
10040	80													
10045	90													
10050	100													
10055	110													
10100	120													
10105	130													
10110	140													
10115	150													
10120	160													
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10130	180													
10135	190													
10140	200													
10145	210													
10150	220													
10155	230													
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10205	250													
10210	260													
10215	270													
10220	280													
10225	290													
10230	300													
10235	310													
10240	320													
10245	330													
10250	340													
10255	350													
10300	360													
10305	370													
10310	380													
10315	390													
10320	400													
10325	410													
10330	420													
10335	430													
10340	440													
10345	450													
10350	460													
10355	470													
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10630	780													
10635	790													
10640	800													
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10650	820													
10655	830													
10700	840													
10705	850													
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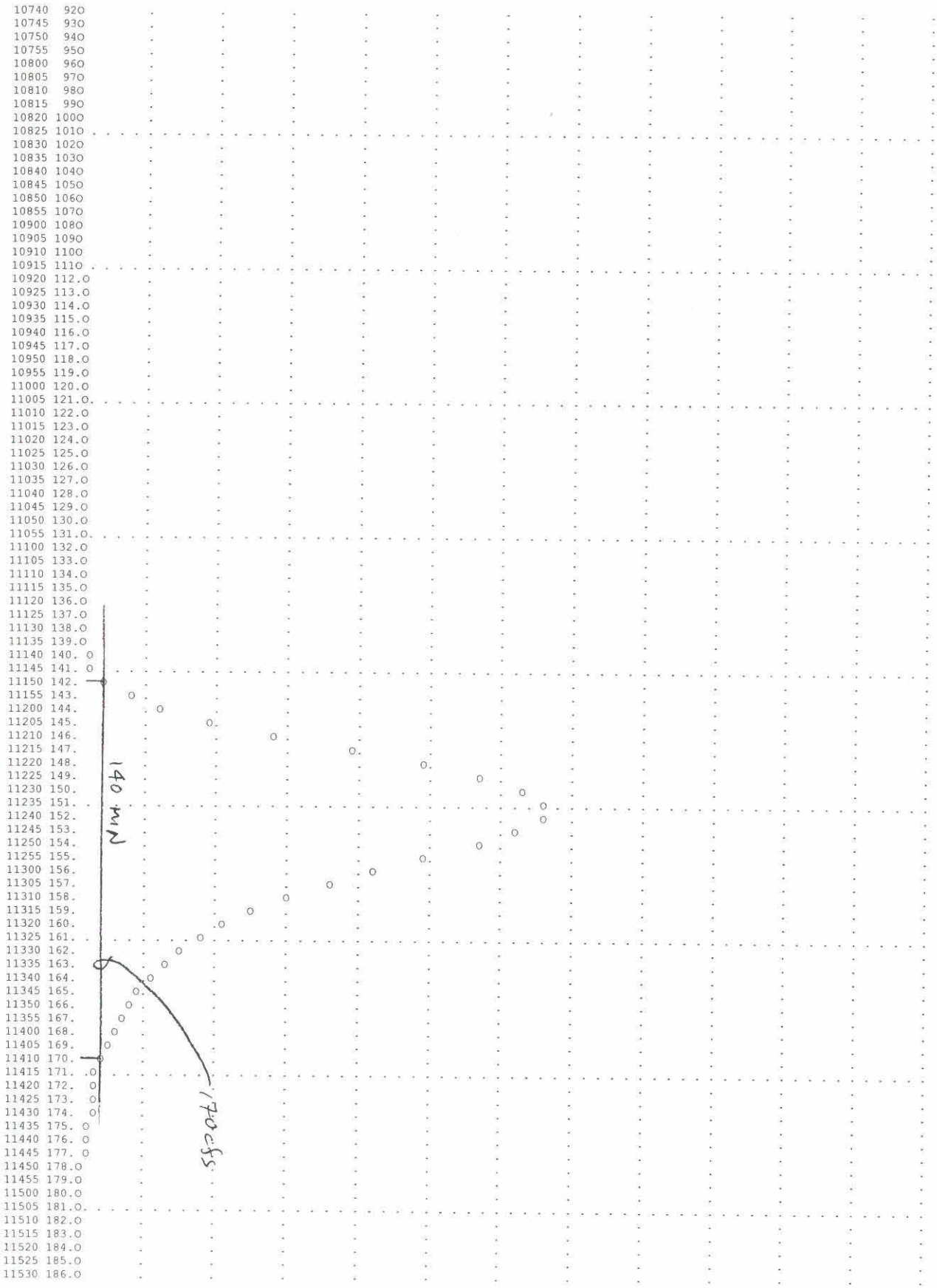
10725	890													
10730	900													
10735	910													

SOMBRERO ROAD

400 800



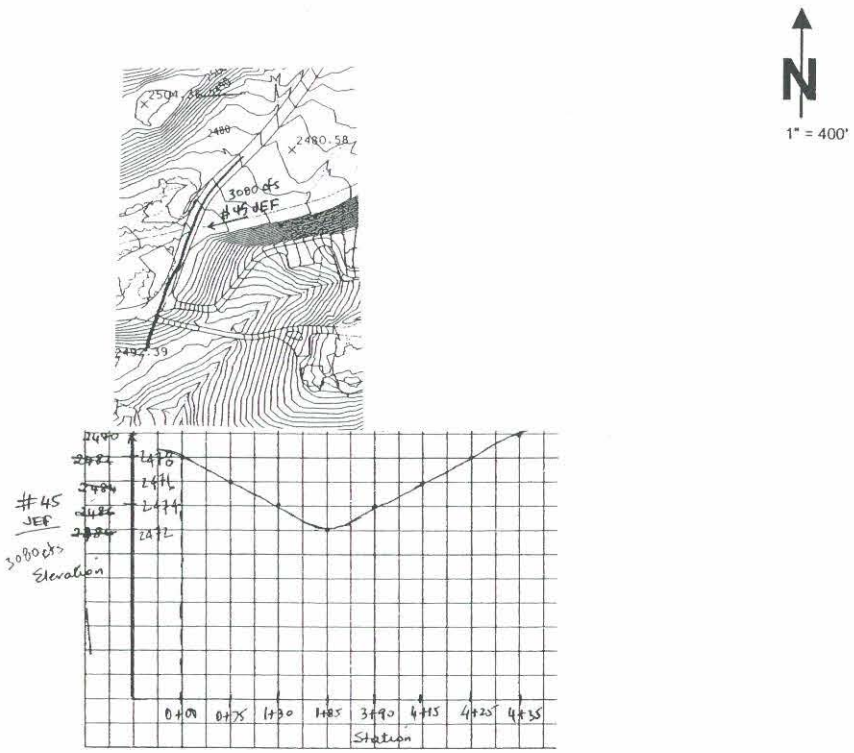
Cow Track Drive East of Paint Pony Drive (JEF #45)

Carefree Drainage Master Plan
Dip Crossing Notes

ID Number: # 45 (JEF)

Source of Data: TOPO

Location: COW TRACK DR - EAST OF PAINT PONY DR



Material: Paved Dip Crossing

Protection:

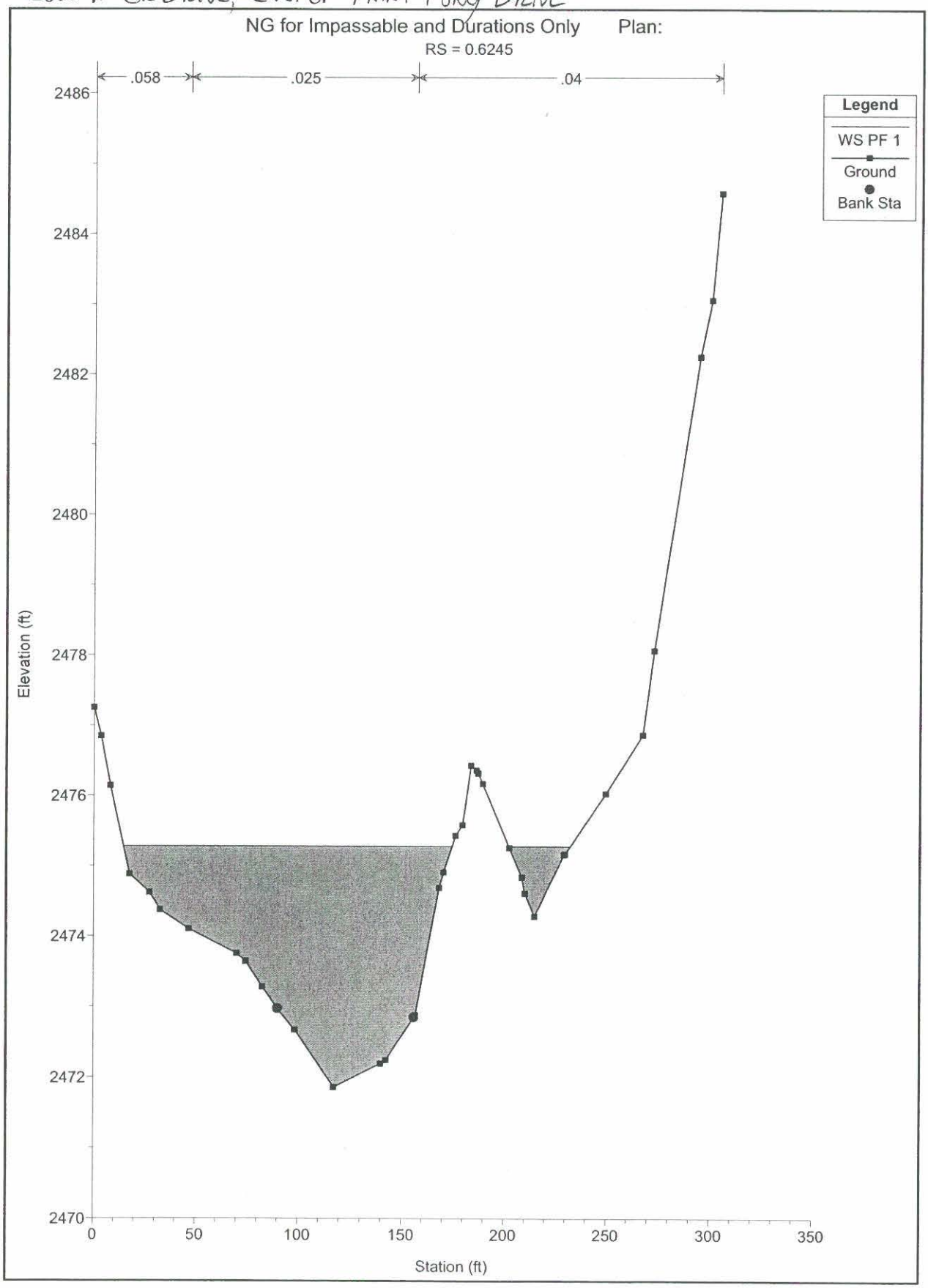
Notes: Part of Floodplain Delineation for Galloway Wash, Middle Branch

COW TRACK DRIVE, EAST OF PAINT PONY DRIVE

N

SCALE 1"=100'

Cow Track Drive, East of Paint Pony Drive



Cow Track Drive, East of Paint Pony Drive

Plan: Plan 01 Galloway Wash Middle Branch RS: 0.6245 Profile: PF 4

E.G. Elev (ft)	2473.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.30	Wt. n-Val.		0.025	0.000
W.S. Elev (ft)	2472.86	Reach Len. (ft)	140.00	153.75	160.00
Crit W.S. (ft)	2472.86	Flow Area (sq ft)		36.52	0.00
E.G. Slope (ft/ft)	0.011243	Area (sq ft)		36.52	0.00
Q Total (cfs)	160.00	Flow (cfs)		160.00	0.00
Top Width (ft)	63.26	Top Width (ft)		62.98	0.28
Vel Total (ft/s)	4.38	Avg. Vel. (ft/s)		4.38	0.20
Max Chl Dpth (ft)	1.00	Hydr. Depth (ft)		0.58	0.01
Conv. Total (cfs)	1509.0	Conv. (cfs)		1509.0	0.0
Length Wtd. (ft)	153.75	Wetted Per. (ft)		63.02	0.28
Min Ch El (ft)	2471.86	Shear (lb/sq ft)		0.41	
Alpha	1.00	Stream Power (lb/ft s)		1.78	
Frctn Loss (ft)	1.89	Cum Volume (acre-ft)	0.10	1.94	0.16
C & E Loss (ft)	0.00	Cum SA (acres)	0.19	1.73	0.06

Cow Track Drive, East of Paint Pony Drive

Plan: Plan 01 Galloway Wash Middle Branch RS: 0.6245 Profile: PF 1

E.G. Elev (ft)	2476.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.95	Wt. n-Val.	0.028	0.025	0.038
W.S. Elev (ft)	2475.28	Reach Len. (ft)	140.00	153.75	160.00
Crit W.S. (ft)	2475.28	Flow Area (sq ft)	93.82	195.87	35.30
E.G. Slope (ft/ft)	0.004913	Area (sq ft)	93.82	195.87	35.30
Q Total (cfs)	2204.00	Flow (cfs)	431.21	1684.49	88.30
Top Width (ft)	190.04	Top Width (ft)	75.44	66.00	48.59
Vel Total (ft/s)	6.78	Avg. Vel. (ft/s)	4.60	8.60	2.50
Max Chl Dpth (ft)	3.42	Hydr. Depth (ft)	1.24	2.97	0.73
Conv. Total (cfs)	31444.3	Conv. (cfs)	6152.1	24032.5	1259.7
Length Wtd. (ft)	150.76	Wetted Per. (ft)	75.50	66.04	48.84
Min Ch El (ft)	2471.86	Shear (lb/sq ft)	0.38	0.91	0.22
Alpha	1.32	Stream Power (lb/ft s)	1.75	7.82	0.55
Frctn Loss (ft)	0.80	Cum Volume (acre-ft)	2.72	6.90	2.23
C & E Loss (ft)	0.04	Cum SA (acres)	2.11	1.83	1.43

Curve
Plotted Curves for Irregular Channel

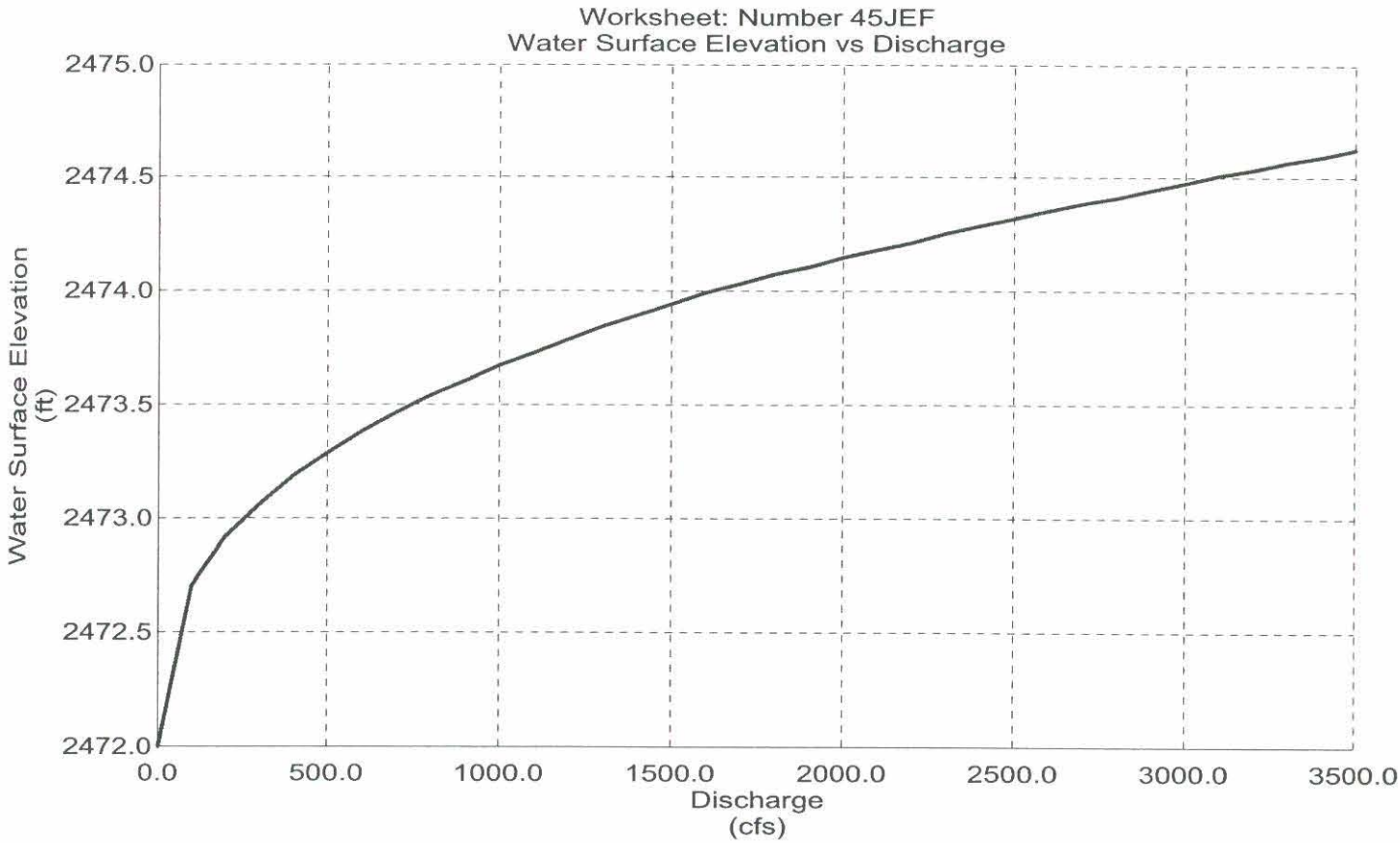
Cow Track Drive, East of Paint Pony Drive

Project Description	
Worksheet	Number 45JEF
Flow Element	Irregular Chan
Method	Manning's Forr
Solve For	Channel Depth

Input Data	
Slope	010000 ft/ft

Options	
Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	3,500.00	100.00



Curve
Plotted Curves for Irregular Channel

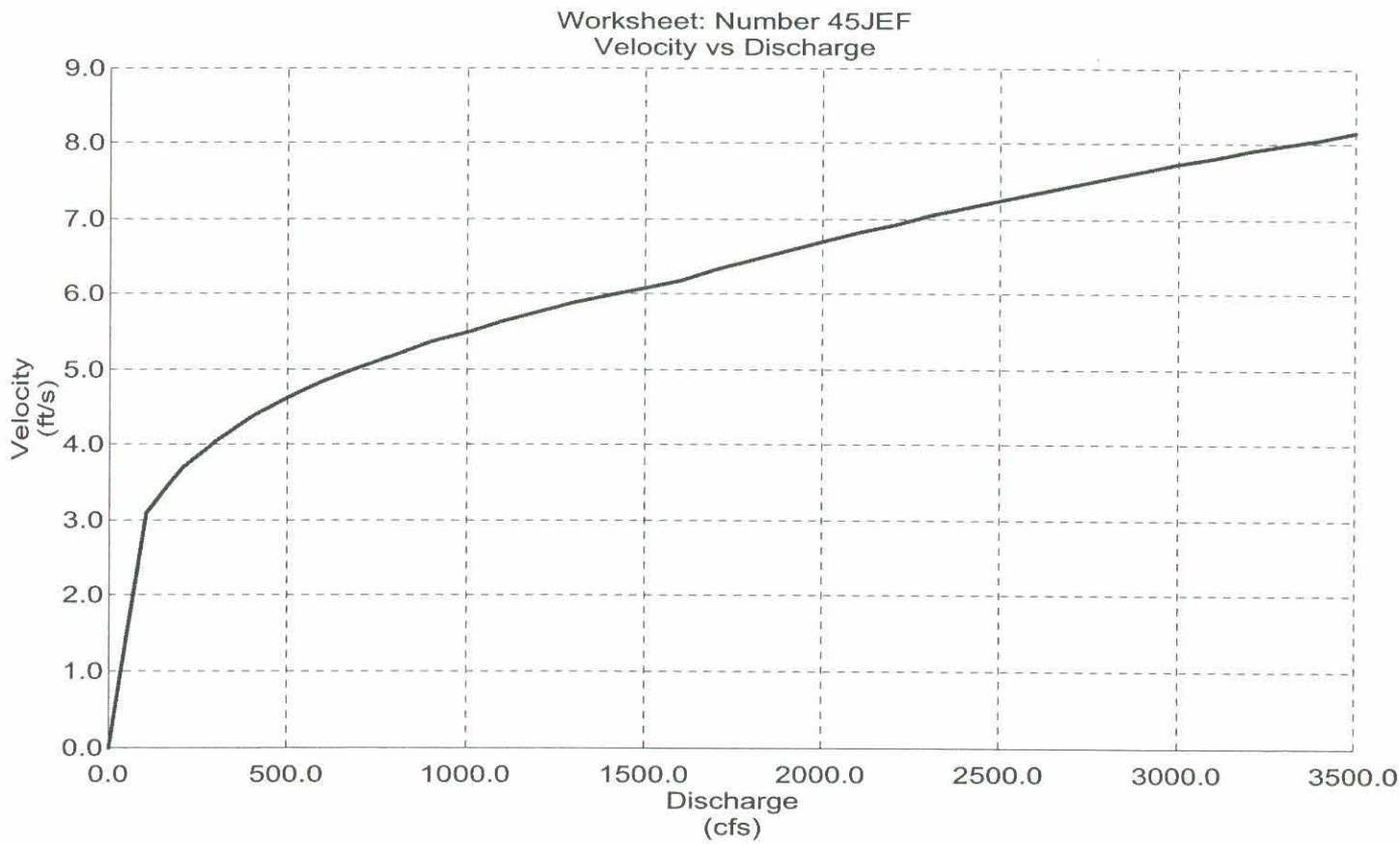
Cow Track Drive, East of Paint Pony Drive

Project Description	
Worksheet	Number 45JEF
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data	
Slope	010000 ft/ft

Options	
Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	3,500.00	100.00



Worksheet
Worksheet for Irregular Channel

Cow Track Drive, East of Paint Pony Drive

Project Description	
Worksheet	Number 45JEF
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data		
Slope	010000	ft/ft
Discharg	,080.00	cfs

Options	
Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Results		
Mannings Coefficie	0.024	
Water Surface Elev	2,474.50	ft
Elevation Range	72.00 to 2,476.00	
Flow Area	395.4	ft²
Wetted Perimeter	280.13	ft
Top Width	280.05	ft
Actual Depth	2.50	ft
Critical Elevation	2,474.65	ft
Critical Slope	0.007283	ft/ft
Velocity	7.79	ft/s
Velocity Head	0.94	ft
Specific Energy	2,475.44	ft
Froude Number	1.16	
Flow Type	Supercritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+75	4+15	0.024

Natural Channel Points

Station (ft)	Elevation (ft)
0+75	2,476.00
1+30	2,474.00
1+85	2,472.00
3+90	2,474.00
4+15	2,476.00

GW 100 YR, 24 HR
FUTURE
COW TRACK DRIVE, EAST OF PAINT PONY DRIVE

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1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN  1998               *
*            VERSION 4.1               *
*                                      *
*  RUN DATE   27NOV02  TIME  08:45:45  *
*                                      *
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*                                      *
*   U.S. ARMY CORPS OF ENGINEERS       *
*   HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET            *
*      DAVIS, CALIFORNIA 95616         *
*          (916) 756-1104              *
*                                      *
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X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX         XXX
```

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

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


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

  1           ID     FUTURE CONDITIONS HYDROLOGY FOR CAREFREE AREA DRAINAGE MASTER PLAN
  2           ID       BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC., DEC. 2001
  3           ID
  4           ID     FUTURE CONDITIONS LAND USE BASED ON CAVE CREEK WATERCOURSE MASTER PLAN
  5           ID     HYDROLOGY BY TETRA TECH, 2000.
  6           ID
  7           ID     BASE MODEL BASED ON:
  8           ID
  9           ID          FLOODPLAIN DELINEATION STUDY OF ANDORA HILLS & GALLOWAY WASHES
 10           ID          FCD 99-14
 11           ID          BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC.
 12           ID          FOR THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
 13           ID          REVISED MARCH 2002     FILENAME: GWM224R.DAT
 14           ID      ******************************************************************
 15           ID          100 YEAR ANALYSIS 24-HOUR STORM USING JD RECORDS
 16           ID          MCUHP2 USED FOR UNIT HYDROGRAPHS
 17           ID     ******************************************************************
 18           ID
 19           ID     DDM MCUHP2 GALLOWAY WASH FLOODPLAIN DELINEATION STUDY, FCD NO. 99-14
 20           ID
 21           ID    March 2002 revisions to original Dec. 1999 model include:
 22           ID
 23           ID    HC BLOCK ADDED FOR GRAPEVINE WASH (CP 295A)
 24           ID
 25           ID    SUBBASIN GWW1_3 FURTHER SUBDIVIDED ALONG GALLOWAY WASH PER FEMA COMMENTS
 26           ID    IN LETTER DATED FEB. 8, 2002
 27           ID
 28           ID    *** ADDITIONAL COMBINATION ADDED 10-17-02 TO PROVIDE TOTAL FLOW IN
 29           ID        NORTH GALLOWAY WASH BY TWL FOR CH2M HILL FOR CAREFREE DMP ***
 30           ID
 31           ID   DDM MCUHP2 Carefree Area Drainage Master Plan, Galloway Wash Future Condition
              *DIAGRAM
 32           IT       5 01DEC99    0005     400
 33           IO       5       2
 34           IN      15
 35           JD    4.80    0.01
 36           PC    .000    .002    .005    .008    .011    .014    .017    .020    .023    .026
 37           PC    .029    .032    .035    .038    .041    .044    .048    .052    .056    .060
 38           PC    .064    .068    .072    .076    .080    .085    .090    .095    .100    .105
 39           PC    .110    .115    .120    .126    .133    .140    .147    .155    .163    .172
 40           PC    .181    .191    .203    .218    .236    .257    .283    .387    .663    .707
 41           PC    .735    .758    .776    .791    .804    .815    .825    .834    .842    .849
 42           PC    .856    .863    .869    .875    .881    .887    .893    .898    .903    .908
 43           PC    .913    .918    .922    .926    .930    .934    .938    .942    .946    .950
 44           PC    .953    .956    .959    .962    .965    .968    .971    .974    .977    .980
 45           PC    .983    .986    .989    .992    .995    .998   1.000
 46           JD    4.78    1.00
 47           JD    4.51   10.00
 48           JD    4.37   20.00
 49           JD    4.11   70.00
              *
              * DDM   ***** Updated *****
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
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Cow Track Drive, East of Paint Pony Drive

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 20850 3940         .         .         .         .         .         .         .         .         .         .         .         .
 20855 3950         .         .         .         .         .         .         .         .         .         .         .         .
 20900 3960         .         .         .         .         .         .         .         .         .         .         .         .
 20905 3970         .         .         .         .         .         .         .         .         .         .         .         .
 20910 3980         .         .         .         .         .         .         .         .         .         .         .         .
 20915 3990         .         .         .         .         .         .         .         .         .         .         .         .
 20920 4000---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
1
1                                                            STATION    CP286R

                         (O) OUTFLOW
            0.       400.      800.     1200.     1600.     2000.     2400.     2800.        0.        0.        0.        0.        0.
DAHRMN PER
 10005   10---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
 10010   20         .         .         .         .         .         .         .         .         .         .         .         .
 10015   30         .         .         .         .         .         .         .         .         .         .         .         .
 10020   40         .         .         .         .         .         .         .         .         .         .         .         .
 10025   50         .         .         .         .         .         .         .         .         .         .         .         .
 10030   60         .         .         .         .         .         .         .         .         .         .         .         .
 10035   70         .         .         .         .         .         .         .         .         .         .         .         .
 10040   80         .         .         .         .         .         .         .         .         .         .         .         .
 10045   90         .         .         .         .         .         .         .         .         .         .         .         .
 10050  100         .         .         .         .         .         .         .         .         .         .         .         .
 10055  110 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10100  120         .         .         .         .         .         .         .         .         .         .         .         .
 10105  130         .         .         .         .         .         .         .         .         .         .         .         .
 10110  140         .         .         .         .         .         .         .         .         .         .         .         .
 10115  150         .         .         .         .         .         .         .         .         .         .         .         .
 10120  160         .         .         .         .         .         .         .         .         .         .         .         .
 10125  170         .         .         .         .         .         .         .         .         .         .         .         .
 10130  180         .         .         .         .         .         .         .         .         .         .         .         .
 10135  190         .         .         .         .         .         .         .         .         .         .         .         .
 10140  200         .         .         .         .         .         .         .         .         .         .         .         .
 10145  210 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10150  220         .         .         .         .         .         .         .         .         .         .         .         .
 10155  230         .         .         .         .         .         .         .         .         .         .         .         .
 10200  240         .         .         .         .         .         .         .         .         .         .         .         .
 10205  250         .         .         .         .         .         .         .         .         .         .         .         .
 10210  260         .         .         .         .         .         .         .         .         .         .         .         .
 10215  270         .         .         .         .         .         .         .         .         .         .         .         .
 10220  280         .         .         .         .         .         .         .         .         .         .         .         .
 10225  290         .         .         .         .         .         .         .         .         .         .         .         .
 10230  300         .         .         .         .         .         .         .         .         .         .         .         .
 10235  310 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10240  320         .         .         .         .         .         .         .         .         .         .         .         .
 10245  330         .         .         .         .         .         .         .         .         .         .         .         .
 10250  340         .         .         .         .         .         .         .         .         .         .         .         .
 10255  350         .         .         .         .         .         .         .         .         .         .         .         .
 10300  360         .         .         .         .         .         .         .         .         .         .         .         .
 10305  370         .         .         .         .         .         .         .         .         .         .         .         .
 10310  380         .         .         .         .         .         .         .         .         .         .         .         .
 10315  390         .         .         .         .         .         .         .         .         .         .         .         .
 10320  400         .         .         .         .         .         .         .         .         .         .         .         .
 10325  410 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10330  420         .         .         .         .         .         .         .         .         .         .         .         .
 10335  430         .         .         .         .         .         .         .         .         .         .         .         .
 10340  440         .         .         .         .         .         .         .         .         .         .         .         .
 10345  450         .         .         .         .         .         .         .         .         .         .         .         .
 10350  460         .         .         .         .         .         .         .         .         .         .         .         .
 10355  470         .         .         .         .         .         .         .         .         .         .         .         .
 10400  480         .         .         .         .         .         .         .         .         .         .         .         .
 10405  490         .         .         .         .         .         .         .         .         .         .         .         .
 10410  500         .         .         .         .         .         .         .         .         .         .         .         .
 10415  510 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10420  520         .         .         .         .         .         .         .         .         .         .         .         .
 10425  530         .         .         .         .         .         .         .         .         .         .         .         .
 10430  540         .         .         .         .         .         .         .         .         .         .         .         .
 10435  550         .         .         .         .         .         .         .         .         .         .         .         .
 10440  560         .         .         .         .         .         .         .         .         .         .         .         .
 10445  570         .         .         .         .         .         .         .         .         .         .         .         .
 10450  580         .         .         .         .         .         .         .         .         .         .         .         .
 10455  590         .         .         .         .         .         .         .         .         .         .         .         .
 10500  600         .         .         .         .         .         .         .         .         .         .         .         .
 10505  610 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10510  620         .         .         .         .         .         .         .         .         .         .         .         .
 10515  630         .         .         .         .         .         .         .         .         .         .         .         .
 10520  640         .         .         .         .         .         .         .         .         .         .         .         .
 10525  650         .         .         .         .         .         .         .         .         .         .         .         .
 10530  660         .         .         .         .         .         .         .         .         .         .         .         .
 10535  670         .         .         .         .         .         .         .         .         .         .         .         .
 10540  680         .         .         .         .         .         .         .         .         .         .         .         .
 10545  690         .         .         .         .         .         .         .         .         .         .         .         .
 10550  700         .         .         .         .         .         .         .         .         .         .         .         .
 10555  710 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10600  720         .         .         .         .         .         .         .         .         .         .         .         .
 10605  730         .         .         .         .         .         .         .         .         .         .         .         .
 10610  740         .         .         .         .         .         .         .         .         .         .         .         .
 10615  750         .         .         .         .         .         .         .         .         .         .         .         .
 10620  760         .         .         .         .         .         .         .         .         .         .         .         .
 10625  770         .         .         .         .         .         .         .         .         .         .         .         .
 10630  780         .         .         .         .         .         .         .         .         .         .         .         .
 10635  790         .         .         .         .         .         .         .         .         .         .         .         .
 10640  800         .         .         .         .         .         .         .         .         .         .         .         .
 10645  810 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10650  820         .         .         .         .         .         .         .         .         .         .         .         .
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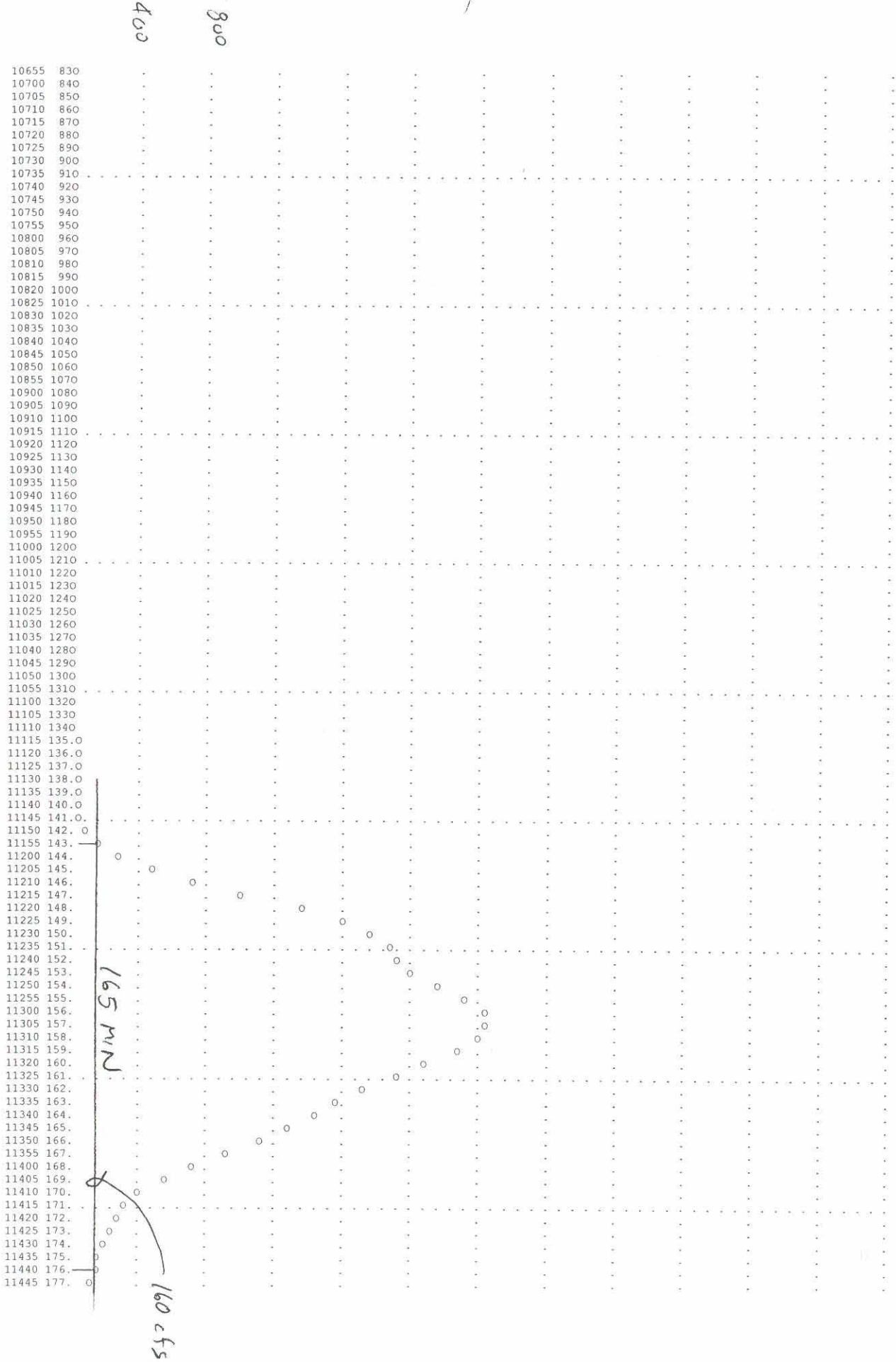
Cow Track Drive, East of Paint Pony Drive



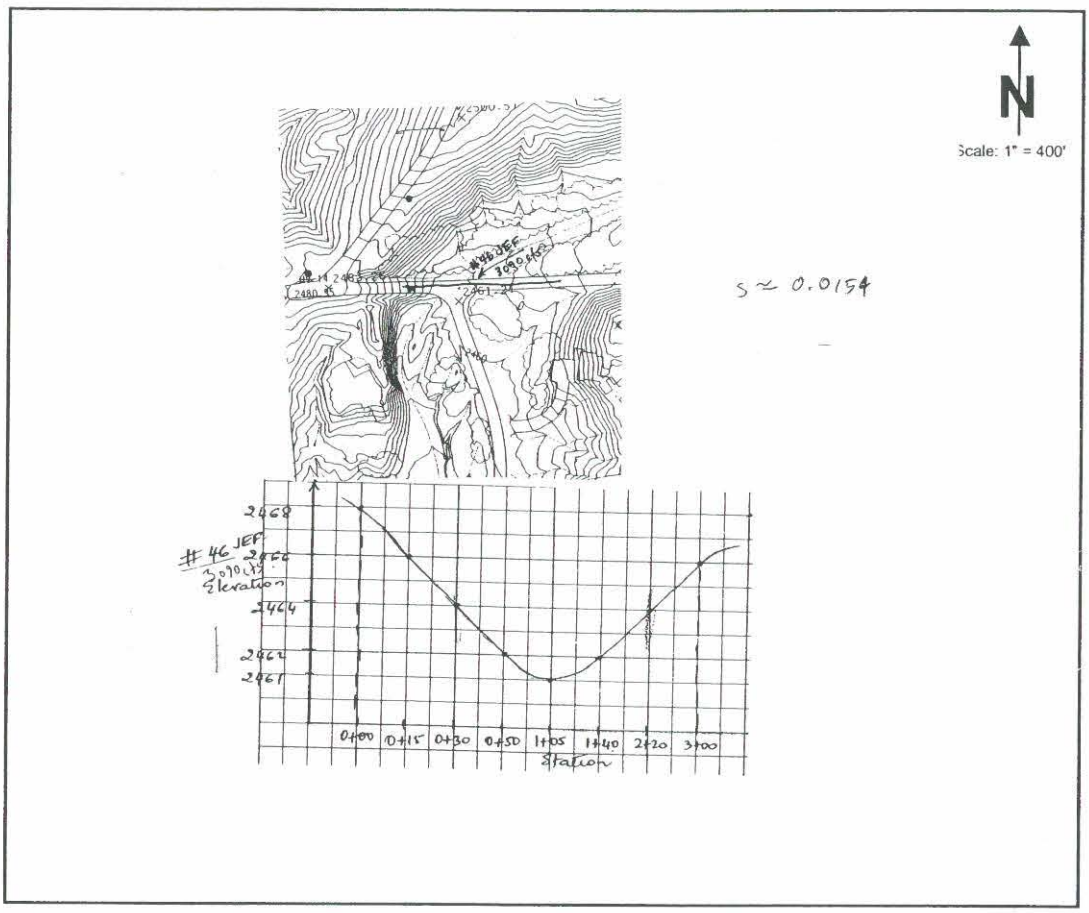
Cow Track Drive at Paint Pony Drive
(JEF #46)

Carefree Drainage Master Plan
Dip Crossing Notes

ID Number: #46 (JEF)

Source of Data: Topo, HECRAS model

Location: COW TRACK DR AT PAINT PONY DR



Material: PAVED DIP CROSSING

Protection:

Notes: Part of Floodplain Delineation for Galloway Wash Middle Branch

Worksheet
Worksheet for Irregular Channel

Cow Track Drive, East of Paint Pony Drive

Project Description

Worksheet	Number 46JEF
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data

Slope	015400	ft/ft
Discharg	,090.00	cfs

Options

Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Results

Mannings Coefficie	0.032	
Water Surface Elev	2,464.18	ft
Elevation Range	31.00 to 2,466.00	
Flow Area	360.6	ft²
Wetted Perimeter	198.87	ft
Top Width	198.70	ft
Actual Depth	3.18	ft
Critical Elevation	2,464.35	ft
Critical Slope	0.012043	ft/ft
Velocity	8.57	ft/s
Velocity Head	1.14	ft
Specific Energy	2,465.32	ft
Froude Number	1.12	
Flow Type	Supercritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+15	3+00	0.032

Natural Channel Points

Station (ft)	Elevation (ft)
0+15	2,466.00
0+30	2,464.00
0+50	2,462.00
1+05	2,461.00
1+40	2,462.00
2+20	2,464.00
3+00	2,466.00

Table
Rating Table for Irregular Channel

Cow Track Drive, East of Paint Pony Drive

Project Description

Worksheet	Number 46JEF
Flow Element	Irregular Chan
Method	Manning's Forr
Solve For	Channel Depth

Input Data

Slope 015400 ft/ft

Options

Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	3,200.00	10.00

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00	2,461.00	0.00	0.0	0.00	0.00
10.00	2,461.35	1.81	5.5	31.58	31.58
20.00	2,461.45	2.15	9.3	40.96	40.95
30.00	2,461.53	2.38	12.6	47.68	47.67
40.00	2,461.59	2.55	15.7	53.12	53.10
50.00	2,461.64	2.70	18.5	57.75	57.74
60.00	2,461.69	2.83	21.2	61.84	61.82
70.00	2,461.73	2.94	23.8	65.52	65.50
80.00	2,461.77	3.04	26.3	68.88	68.87
90.00	2,461.80	3.13	28.8	71.99	71.98
100.00	2,461.83	3.21	31.1	74.90	74.88
110.00	2,461.86	3.29	33.5	77.62	77.60
120.00	2,461.89	3.36	35.7	80.20	80.17
130.00	2,461.92	3.43	37.9	82.64	82.62
140.00	2,461.94	3.49	40.1	84.97	84.95
150.00	2,461.97	3.55	42.2	87.20	87.17
160.00	2,461.99	3.61	44.3	89.33	89.31
170.00	2,462.01	3.68	46.2	90.71	90.68
180.00	2,462.03	3.75	48.1	91.71	91.68
190.00	2,462.05	3.81	49.9	92.68	92.66
200.00	2,462.07	3.87	51.6	93.63	93.61
210.00	2,462.09	3.94	53.4	94.56	94.53
220.00	2,462.11	3.99	55.1	95.47	95.44
230.00	2,462.13	4.05	56.8	96.36	96.32
240.00	2,462.14	4.11	58.5	97.22	97.19
250.00	2,462.16	4.16	60.1	98.07	98.04
260.00	2,462.18	4.21	61.8	98.91	98.87
270.00	2,462.19	4.26	63.4	99.73	99.69
280.00	2,462.21	4.31	65.0	100.53	100.49
290.00	2,462.23	4.36	66.6	101.32	101.28
300.00	2,462.24	4.40	68.2	102.10	102.06
310.00	2,462.26	4.45	69.7	102.86	102.82
320.00	2,462.27	4.49	71.3	103.61	103.57
330.00	2,462.29	4.53	72.8	104.35	104.31

Table
Rating Table for Irregular Channel

Cow Track Drive, East of Paint Pony Drive

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
340.00	2,462.30	4.57	74.3	105.08	105.04
350.00	2,462.32	4.62	75.8	105.79	105.75
360.00	2,462.33	4.66	77.3	106.50	106.46
370.00	2,462.34	4.69	78.8	107.20	107.15
380.00	2,462.36	4.73	80.3	107.89	107.84
390.00	2,462.37	4.77	81.8	108.56	108.52
400.00	2,462.38	4.81	83.2	109.23	109.19
410.00	2,462.40	4.84	84.7	109.90	109.85
420.00	2,462.41	4.88	86.1	110.55	110.50
430.00	2,462.42	4.91	87.5	111.19	111.14
440.00	2,462.44	4.95	88.9	111.83	111.78
450.00	2,462.45	4.98	90.4	112.46	112.41
460.00	2,462.46	5.01	91.8	113.08	113.03
470.00	2,462.47	5.05	93.2	113.70	113.65
480.00	2,462.49	5.08	94.5	114.31	114.25
490.00	2,462.50	5.11	95.9	114.91	114.86
500.00	2,462.51	5.14	97.3	115.51	115.45
510.00	2,462.52	5.17	98.7	116.10	116.04
520.00	2,462.53	5.20	100.0	116.68	116.62
530.00	2,462.54	5.23	101.4	117.26	117.20
540.00	2,462.56	5.26	102.7	117.83	117.77
550.00	2,462.57	5.29	104.0	118.40	118.34
560.00	2,462.58	5.31	105.4	118.96	118.90
570.00	2,462.59	5.34	106.7	119.51	119.45
580.00	2,462.60	5.37	108.0	120.06	120.00
590.00	2,462.61	5.40	109.3	120.61	120.55
600.00	2,462.62	5.42	110.6	121.15	121.09
610.00	2,462.63	5.45	111.9	121.69	121.63
620.00	2,462.64	5.48	113.2	122.22	122.16
630.00	2,462.65	5.50	114.5	122.75	122.68
640.00	2,462.66	5.53	115.8	123.27	123.20
650.00	2,462.67	5.55	117.1	123.79	123.72
660.00	2,462.68	5.58	118.3	124.30	124.24
670.00	2,462.69	5.60	119.6	124.81	124.75
680.00	2,462.71	5.63	120.9	125.32	125.25
690.00	2,462.72	5.65	122.1	125.82	125.75
700.00	2,462.73	5.67	123.4	126.32	126.25
710.00	2,462.73	5.70	124.6	126.81	126.74
720.00	2,462.74	5.72	125.9	127.30	127.23
730.00	2,462.75	5.74	127.1	127.79	127.72
740.00	2,462.76	5.77	128.4	128.27	128.20
750.00	2,462.77	5.79	129.6	128.75	128.68
760.00	2,462.78	5.81	130.8	129.23	129.16
770.00	2,462.79	5.83	132.0	129.70	129.63
780.00	2,462.80	5.85	133.3	130.17	130.10
790.00	2,462.81	5.87	134.5	130.64	130.57
800.00	2,462.82	5.90	135.7	131.10	131.03
810.00	2,462.83	5.92	136.9	131.56	131.49
820.00	2,462.84	5.94	138.1	132.02	131.95
830.00	2,462.85	5.96	139.3	132.48	132.40
840.00	2,462.86	5.98	140.5	132.93	132.85
850.00	2,462.87	6.00	141.7	133.38	133.30
860.00	2,462.87	6.02	142.9	133.82	133.74
870.00	2,462.88	6.04	144.1	134.26	134.18

Table
Rating Table for Irregular Channel

Cow Track Drive, East of Paint Pony Drive

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
880.00	2,462.89	6.06	145.2	134.70	134.62
890.00	2,462.90	6.08	146.4	135.14	135.06
900.00	2,462.91	6.10	147.6	135.58	135.49
910.00	2,462.92	6.12	148.8	136.01	135.93
920.00	2,462.93	6.14	149.9	136.44	136.36
930.00	2,462.94	6.16	151.1	136.86	136.78
940.00	2,462.94	6.17	152.3	137.29	137.21
950.00	2,462.95	6.19	153.4	137.71	137.63
960.00	2,462.96	6.21	154.6	138.13	138.05
970.00	2,462.97	6.23	155.7	138.55	138.46
980.00	2,462.98	6.25	156.9	138.96	138.88
990.00	2,462.99	6.27	158.0	139.37	139.29
1,000.00	2,462.99	6.28	159.2	139.78	139.70
1,010.00	2,463.00	6.30	160.3	140.19	140.10
1,020.00	2,463.01	6.32	161.4	140.60	140.51
1,030.00	2,463.02	6.34	162.6	141.00	140.91
1,040.00	2,463.03	6.35	163.7	141.40	141.31
1,050.00	2,463.03	6.37	164.8	141.80	141.71
1,060.00	2,463.04	6.39	165.9	142.20	142.11
1,070.00	2,463.05	6.40	167.1	142.59	142.50
1,080.00	2,463.06	6.42	168.2	142.99	142.90
1,090.00	2,463.07	6.44	169.3	143.38	143.29
1,100.00	2,463.07	6.45	170.4	143.77	143.68
1,110.00	2,463.08	6.47	171.5	144.15	144.06
1,120.00	2,463.09	6.49	172.6	144.54	144.45
1,130.00	2,463.10	6.50	173.8	144.92	144.83
1,140.00	2,463.10	6.52	174.9	145.30	145.21
1,150.00	2,463.11	6.54	176.0	145.68	145.59
1,160.00	2,463.12	6.55	177.1	146.06	145.97
1,170.00	2,463.13	6.57	178.2	146.44	146.34
1,180.00	2,463.13	6.58	179.3	146.81	146.72
1,190.00	2,463.14	6.60	180.3	147.18	147.09
1,200.00	2,463.15	6.61	181.4	147.55	147.46
1,210.00	2,463.16	6.63	182.5	147.92	147.83
1,220.00	2,463.16	6.64	183.6	148.29	148.19
1,230.00	2,463.17	6.66	184.7	148.65	148.56
1,240.00	2,463.18	6.67	185.8	149.02	148.92
1,250.00	2,463.19	6.69	186.9	149.38	149.28
1,260.00	2,463.19	6.70	187.9	149.74	149.64
1,270.00	2,463.20	6.72	189.0	150.10	150.00
1,280.00	2,463.21	6.73	190.1	150.46	150.36
1,290.00	2,463.21	6.75	191.1	150.81	150.71
1,300.00	2,463.22	6.76	192.2	151.17	151.07
1,310.00	2,463.23	6.78	193.3	151.52	151.42
1,320.00	2,463.24	6.79	194.3	151.87	151.77
1,330.00	2,463.24	6.81	195.4	152.22	152.12
1,340.00	2,463.25	6.82	196.5	152.57	152.47
1,350.00	2,463.26	6.83	197.5	152.92	152.81
1,360.00	2,463.26	6.85	198.6	153.26	153.16
1,370.00	2,463.27	6.86	199.6	153.61	153.50
1,380.00	2,463.28	6.88	200.7	153.95	153.85
1,390.00	2,463.28	6.89	201.7	154.29	154.19
1,400.00	2,463.29	6.90	202.8	154.63	154.53
1,410.00	2,463.30	6.92	203.8	154.97	154.86

Table

Rating Table for Irregular Channel

Cow Track Drive, East of Paint Pony Drive

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
1,420.00	2,463.30	6.93	204.9	155.31	155.20
1,430.00	2,463.31	6.94	205.9	155.64	155.54
1,440.00	2,463.32	6.96	207.0	155.98	155.87
1,450.00	2,463.32	6.97	208.0	156.31	156.20
1,460.00	2,463.33	6.98	209.0	156.64	156.53
1,470.00	2,463.34	7.00	210.1	156.97	156.86
1,480.00	2,463.34	7.01	211.1	157.30	157.19
1,490.00	2,463.35	7.02	212.1	157.63	157.52
1,500.00	2,463.36	7.04	213.2	157.96	157.85
1,510.00	2,463.36	7.05	214.2	158.28	158.17
1,520.00	2,463.37	7.06	215.2	158.61	158.50
1,530.00	2,463.38	7.08	216.2	158.93	158.82
1,540.00	2,463.38	7.09	217.3	159.25	159.14
1,550.00	2,463.39	7.10	218.3	159.57	159.46
1,560.00	2,463.40	7.11	219.3	159.89	159.78
1,570.00	2,463.40	7.13	220.3	160.21	160.10
1,580.00	2,463.41	7.14	221.3	160.53	160.42
1,590.00	2,463.41	7.15	222.4	160.84	160.73
1,600.00	2,463.42	7.16	223.4	161.16	161.05
1,610.00	2,463.43	7.18	224.4	161.47	161.36
1,620.00	2,463.43	7.19	225.4	161.79	161.67
1,630.00	2,463.44	7.20	226.4	162.10	161.99
1,640.00	2,463.45	7.21	227.4	162.41	162.30
1,650.00	2,463.45	7.22	228.4	162.72	162.60
1,660.00	2,463.46	7.24	229.4	163.03	162.91
1,670.00	2,463.46	7.25	230.4	163.33	163.22
1,680.00	2,463.47	7.26	231.4	163.64	163.53
1,690.00	2,463.48	7.27	232.4	163.95	163.83
1,700.00	2,463.48	7.28	233.4	164.25	164.14
1,710.00	2,463.49	7.30	234.4	164.55	164.44
1,720.00	2,463.49	7.31	235.4	164.86	164.74
1,730.00	2,463.50	7.32	236.4	165.16	165.04
1,740.00	2,463.51	7.33	237.4	165.46	165.34
1,750.00	2,463.51	7.34	238.4	165.76	165.64
1,760.00	2,463.52	7.35	239.4	166.06	165.94
1,770.00	2,463.52	7.36	240.3	166.35	166.24
1,780.00	2,463.53	7.38	241.3	166.65	166.53
1,790.00	2,463.54	7.39	242.3	166.95	166.83
1,800.00	2,463.54	7.40	243.3	167.24	167.12
1,810.00	2,463.55	7.41	244.3	167.54	167.42
1,820.00	2,463.55	7.42	245.3	167.83	167.71
1,830.00	2,463.56	7.43	246.2	168.12	168.00
1,840.00	2,463.57	7.44	247.2	168.41	168.29
1,850.00	2,463.57	7.45	248.2	168.70	168.58
1,860.00	2,463.58	7.46	249.2	168.99	168.87
1,870.00	2,463.58	7.48	250.1	169.28	169.16
1,880.00	2,463.59	7.49	251.1	169.57	169.44
1,890.00	2,463.59	7.50	252.1	169.85	169.73
1,900.00	2,463.60	7.51	253.1	170.14	170.02
1,910.00	2,463.61	7.52	254.0	170.42	170.30
1,920.00	2,463.61	7.53	255.0	170.71	170.58
1,930.00	2,463.62	7.54	256.0	170.99	170.87
1,940.00	2,463.62	7.55	256.9	171.27	171.15
1,950.00	2,463.63	7.56	257.9	171.55	171.43

Table
Rating Table for Irregular Channel

Cow Track Drive, East of Paint Pony Drive

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
1,960.00	2,463.63	7.57	258.8	171.83	171.71
1,970.00	2,463.64	7.58	259.8	172.11	171.99
1,980.00	2,463.65	7.59	260.8	172.39	172.27
1,990.00	2,463.65	7.60	261.7	172.67	172.55
2,000.00	2,463.66	7.61	262.7	172.95	172.82
2,010.00	2,463.66	7.62	263.6	173.23	173.10
2,020.00	2,463.67	7.63	264.6	173.50	173.37
2,030.00	2,463.67	7.64	265.5	173.78	173.65
2,040.00	2,463.68	7.65	266.5	174.05	173.92
2,050.00	2,463.68	7.67	267.4	174.32	174.20
2,060.00	2,463.69	7.68	268.4	174.60	174.47
2,070.00	2,463.69	7.69	269.3	174.87	174.74
2,080.00	2,463.70	7.70	270.3	175.14	175.01
2,090.00	2,463.71	7.71	271.2	175.41	175.28
2,100.00	2,463.71	7.72	272.2	175.68	175.55
2,110.00	2,463.72	7.73	273.1	175.95	175.82
2,120.00	2,463.72	7.74	274.1	176.22	176.09
2,130.00	2,463.73	7.75	275.0	176.49	176.35
2,140.00	2,463.73	7.76	276.0	176.75	176.62
2,150.00	2,463.74	7.76	276.9	177.02	176.89
2,160.00	2,463.74	7.77	277.8	177.28	177.15
2,170.00	2,463.75	7.78	278.8	177.55	177.42
2,180.00	2,463.75	7.79	279.7	177.81	177.68
2,190.00	2,463.76	7.80	280.6	178.08	177.94
2,200.00	2,463.76	7.81	281.6	178.34	178.21
2,210.00	2,463.77	7.82	282.5	178.60	178.47
2,220.00	2,463.77	7.83	283.4	178.86	178.73
2,230.00	2,463.78	7.84	284.4	179.12	178.99
2,240.00	2,463.78	7.85	285.3	179.38	179.25
2,250.00	2,463.79	7.86	286.2	179.64	179.51
2,260.00	2,463.80	7.87	287.2	179.90	179.76
2,270.00	2,463.80	7.88	288.1	180.16	180.02
2,280.00	2,463.81	7.89	289.0	180.42	180.28
2,290.00	2,463.81	7.90	289.9	180.67	180.54
2,300.00	2,463.82	7.91	290.9	180.93	180.79
2,310.00	2,463.82	7.92	291.8	181.18	181.05
2,320.00	2,463.83	7.93	292.7	181.44	181.30
2,330.00	2,463.83	7.94	293.6	181.69	181.55
2,340.00	2,463.84	7.94	294.5	181.95	181.81
2,350.00	2,463.84	7.95	295.5	182.20	182.06
2,360.00	2,463.85	7.96	296.4	182.45	182.31
2,370.00	2,463.85	7.97	297.3	182.70	182.56
2,380.00	2,463.86	7.98	298.2	182.95	182.81
2,390.00	2,463.86	7.99	299.1	183.20	183.06
2,400.00	2,463.87	8.00	300.0	183.45	183.31
2,410.00	2,463.87	8.01	300.9	183.70	183.56
2,420.00	2,463.88	8.02	301.9	183.95	183.81
2,430.00	2,463.88	8.03	302.8	184.20	184.06
2,440.00	2,463.89	8.03	303.7	184.45	184.30
2,450.00	2,463.89	8.04	304.6	184.69	184.55
2,460.00	2,463.90	8.05	305.5	184.94	184.80
2,470.00	2,463.90	8.06	306.4	185.18	185.04
2,480.00	2,463.91	8.07	307.3	185.43	185.29
2,490.00	2,463.91	8.08	308.2	185.67	185.53

Table
Rating Table for Irregular Channel

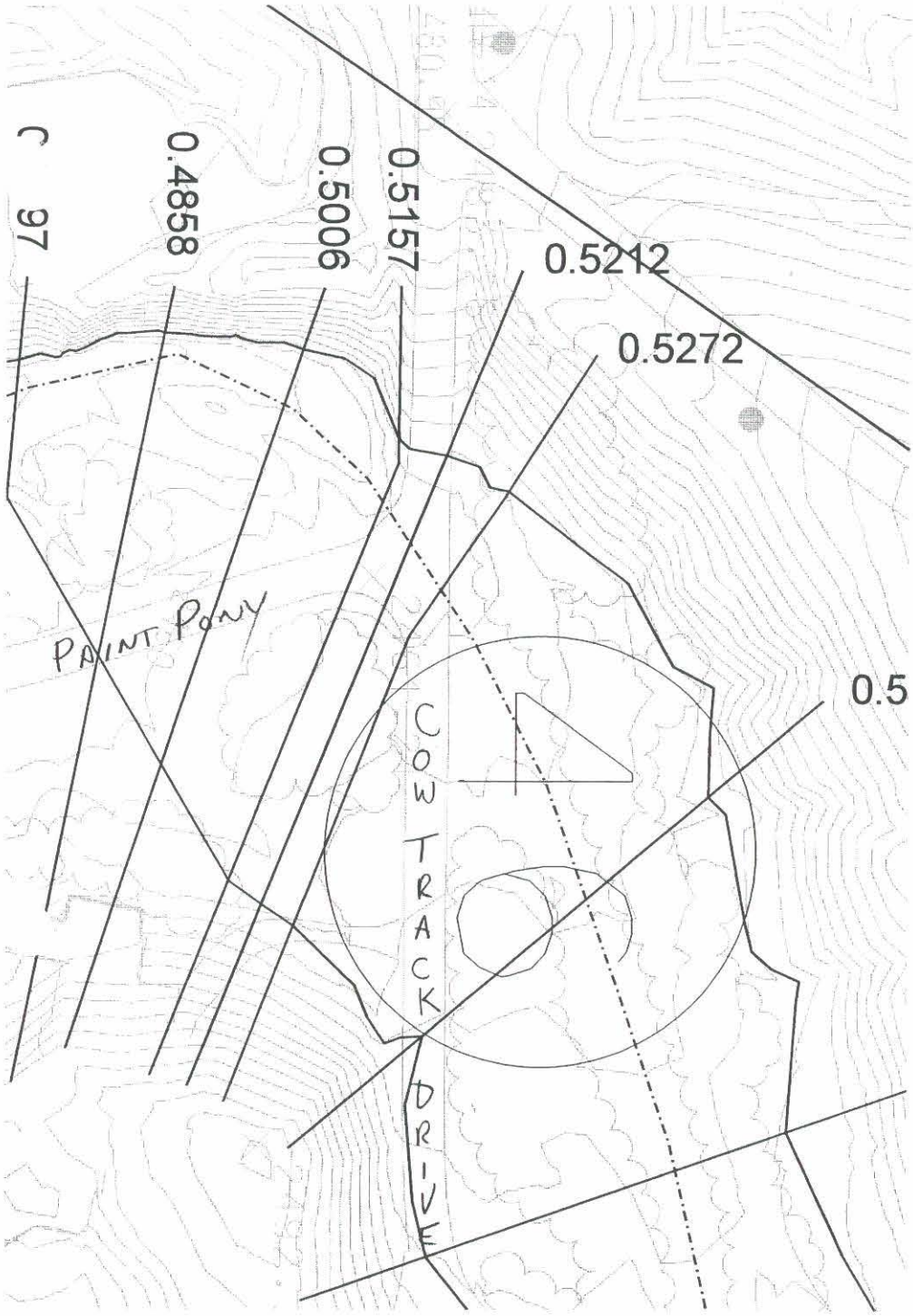
Cow Track Drive, East of Paint Pony Drive

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
2,500.00	2,463.92	8.09	309.1	185.92	185.77
2,510.00	2,463.92	8.10	310.0	186.16	186.02
2,520.00	2,463.93	8.10	310.9	186.40	186.26
2,530.00	2,463.93	8.11	311.8	186.65	186.50
2,540.00	2,463.93	8.12	312.7	186.89	186.74
2,550.00	2,463.94	8.13	313.6	187.13	186.98
2,560.00	2,463.94	8.14	314.5	187.37	187.22
2,570.00	2,463.95	8.15	315.4	187.61	187.46
2,580.00	2,463.95	8.16	316.3	187.85	187.70
2,590.00	2,463.96	8.16	317.2	188.09	187.94
2,600.00	2,463.96	8.17	318.1	188.33	188.18
2,610.00	2,463.97	8.18	319.0	188.56	188.42
2,620.00	2,463.97	8.19	319.9	188.80	188.65
2,630.00	2,463.98	8.20	320.8	189.04	188.89
2,640.00	2,463.98	8.21	321.7	189.27	189.13
2,650.00	2,463.99	8.22	322.6	189.51	189.36
2,660.00	2,463.99	8.22	323.5	189.74	189.60
2,670.00	2,464.00	8.23	324.4	189.98	189.83
2,680.00	2,464.00	8.24	325.2	190.21	190.06
2,690.00	2,464.01	8.25	326.1	190.43	190.28
2,700.00	2,464.01	8.26	327.0	190.65	190.50
2,710.00	2,464.02	8.27	327.9	190.87	190.72
2,720.00	2,464.02	8.27	328.8	191.09	190.94
2,730.00	2,464.02	8.28	329.6	191.30	191.15
2,740.00	2,464.03	8.29	330.5	191.52	191.37
2,750.00	2,464.03	8.30	331.4	191.74	191.59
2,760.00	2,464.04	8.31	332.2	191.95	191.80
2,770.00	2,464.04	8.32	333.1	192.17	192.02
2,780.00	2,464.05	8.32	334.0	192.39	192.23
2,790.00	2,464.05	8.33	334.9	192.60	192.45
2,800.00	2,464.06	8.34	335.7	192.82	192.66
2,810.00	2,464.06	8.35	336.6	193.03	192.88
2,820.00	2,464.07	8.36	337.5	193.24	193.09
2,830.00	2,464.07	8.36	338.3	193.46	193.30
2,840.00	2,464.07	8.37	339.2	193.67	193.52
2,850.00	2,464.08	8.38	340.1	193.88	193.73
2,860.00	2,464.08	8.39	340.9	194.10	193.94
2,870.00	2,464.09	8.40	341.8	194.31	194.15
2,880.00	2,464.09	8.40	342.7	194.52	194.36
2,890.00	2,464.10	8.41	343.5	194.73	194.57
2,900.00	2,464.10	8.42	344.4	194.94	194.78
2,910.00	2,464.11	8.43	345.2	195.15	194.99
2,920.00	2,464.11	8.44	346.1	195.36	195.20
2,930.00	2,464.11	8.44	347.0	195.57	195.41
2,940.00	2,464.12	8.45	347.8	195.78	195.62
2,950.00	2,464.12	8.46	348.7	195.99	195.83
2,960.00	2,464.13	8.47	349.5	196.20	196.04
2,970.00	2,464.13	8.48	350.4	196.40	196.24
2,980.00	2,464.14	8.48	351.2	196.61	196.45
2,990.00	2,464.14	8.49	352.1	196.82	196.66
3,000.00	2,464.14	8.50	353.0	197.02	196.86
3,010.00	2,464.15	8.51	353.8	197.23	197.07
3,020.00	2,464.15	8.52	354.7	197.44	197.28
3,030.00	2,464.16	8.52	355.5	197.64	197.48

Table
Rating Table for Irregular Channel

Cow Track Drive, East of Paint Pony Drive

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
3,040.00	2,464.16	8.53	356.4	197.85	197.69
3,050.00	2,464.17	8.54	357.2	198.05	197.89
3,060.00	2,464.17	8.55	358.1	198.25	198.09
3,070.00	2,464.17	8.55	358.9	198.46	198.30
3,080.00	2,464.18	8.56	359.8	198.66	198.50
3,090.00	2,464.18	8.57	360.6	198.87	198.70
3,100.00	2,464.19	8.58	361.5	199.07	198.91
3,110.00	2,464.19	8.58	362.3	199.27	199.11
3,120.00	2,464.20	8.59	363.1	199.47	199.31
3,130.00	2,464.20	8.60	364.0	199.67	199.51
3,140.00	2,464.20	8.61	364.8	199.88	199.71
3,150.00	2,464.21	8.61	365.7	200.08	199.91
3,160.00	2,464.21	8.62	366.5	200.28	200.11
3,170.00	2,464.22	8.63	367.4	200.48	200.31
3,180.00	2,464.22	8.64	368.2	200.68	200.51
3,190.00	2,464.23	8.64	369.0	200.88	200.71
3,200.00	2,464.23	8.65	369.9	201.08	200.91

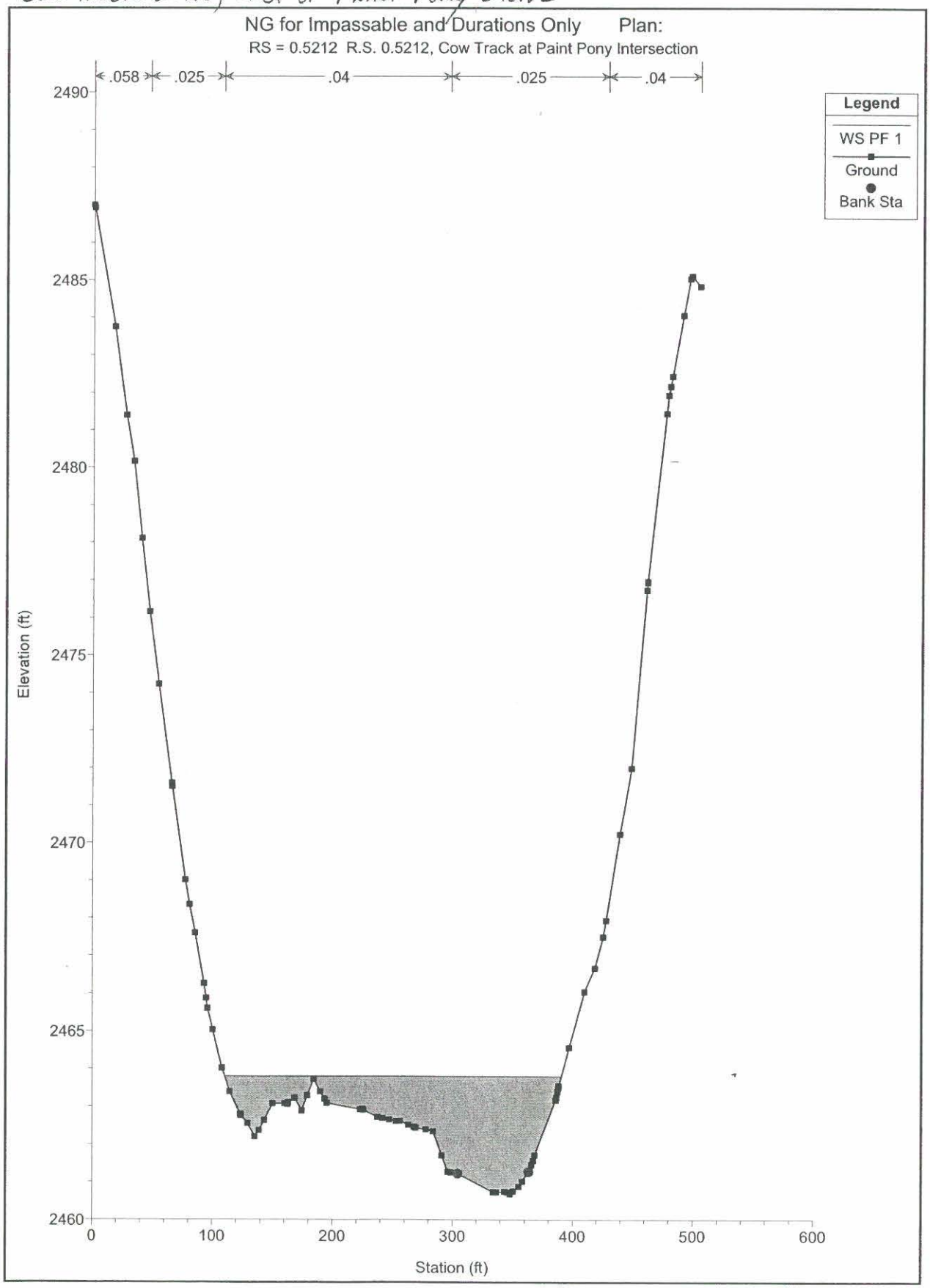


COW TRACK DRIVE, EAST
OF PAINT PONY DRIVE

N

SCALE 1"=100

Cow Track Drive, East of Paint Pony Drive



Cow Track Drive, East of Paint Pony Drive

Plan: Plan 01 Galloway Wash Middle Branch RS: 0.5212 Profile: PF 1

E.G. Elev (ft)	2464.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.74	Wt. n-Val.	0.036	0.025	0.025
W.S. Elev (ft)	2463.79	Reach Len. (ft)	28.70	28.70	30.00
Crit W.S. (ft)	2463.79	Flow Area (sq ft)	205.57	170.10	36.51
E.G. Slope (ft/ft)	0.004677	Area (sq ft)	205.57	170.10	36.51
Q Total (cfs)	2210.00	Flow (cfs)	626.87	1402.20	180.94
Top Width (ft)	279.95	Top Width (ft)	194.08	58.88	26.99
Vel Total (ft/s)	5.36	Avg. Vel. (ft/s)	3.05	8.24	4.96
Max Chl Dpth (ft)	3.11	Hydr. Depth (ft)	1.06	2.89	1.35
Conv. Total (cfs)	32315.0	Conv. (cfs)	9166.2	20503.2	2645.7
Length Wtd. (ft)	28.79	Wetted Per. (ft)	194.28	58.90	27.12
Min Ch El (ft)	2460.68	Shear (lb/sq ft)	0.31	0.84	0.39
Alpha	1.66	Stream Power (lb/ft s)	0.94	6.95	1.95
Frctn Loss (ft)	0.14	Cum Volume (acre-ft)	1.18	4.78	1.52
C & E Loss (ft)	0.01	Cum SA (acres)	0.78	1.11	0.78

Cow Track Drive, East of Paint Pony Drive

Plan: Plan 01 Galloway Wash Middle Branch RS: 0.5212 Profile: PF 4

E.G. Elev (ft)	2462.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.34	Wt. n-Val.	0.026	0.025	0.025
W.S. Elev (ft)	2461.67	Reach Len. (ft)	28.70	28.70	30.00
Crit W.S. (ft)	2461.67	Flow Area (sq ft)	4.49	44.96	1.08
E.G. Slope (ft/ft)	0.009280	Area (sq ft)	4.49	44.96	1.08
Q Total (cfs)	230.00	Flow (cfs)	12.62	215.04	2.34
Top Width (ft)	76.57	Top Width (ft)	13.06	58.88	4.62
Vel Total (ft/s)	4.55	Avg. Vel. (ft/s)	2.81	4.78	2.17
Max Chl Dpth (ft)	0.99	Hydr. Depth (ft)	0.34	0.76	0.23
Conv. Total (cfs)	2387.6	Conv. (cfs)	131.0	2232.3	24.3
Length Wtd. (ft)	28.71	Wetted Per. (ft)	13.08	58.90	4.64
Min Ch El (ft)	2460.68	Shear (lb/sq ft)	0.20	0.44	0.13
Alpha	1.06	Stream Power (lb/ft s)	0.56	2.12	0.29
Frctn Loss (ft)	0.26	Cum Volume (acre-ft)	0.08	1.08	0.01
C & E Loss (ft)	0.02	Cum SA (acres)	0.14	1.05	0.02

GW 100 YR, 24 HR
FUTURE
Cow Track Drive, East of Point Pony Drive

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1*************************************
*                                   *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*             JUN  1998             *
*           VERSION 4.1             *
*                                   *
* RUN DATE   27NOV02  TIME  08:45:45 *
*                                   *
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                                    *************************************
                                    *                                   *
                                    *   U.S. ARMY CORPS OF ENGINEERS    *
                                    *   HYDROLOGIC ENGINEERING CENTER   *
                                    *         609 SECOND STREET         *
                                    *      DAVIS, CALIFORNIA 95616      *
                                    *         (916) 756-1104            *
                                    *                                   *
                                    *************************************

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

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

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

1                                   HEC-1 INPUT                                   PAGE  1

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

  1           ID     FUTURE CONDITIONS HYDROLOGY FOR CAREFREE AREA DRAINAGE MASTER PLAN
  2           ID       BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC., DEC. 2001
  3           ID
  4           ID     FUTURE CONDITIONS LAND USE BASED ON CAVE CREEK WATERCOURSE MASTER PLAN
  5           ID     HYDROLOGY BY TETRA TECH, 2000.
  6           ID
  7           ID     BASE MODEL BASED ON:
  8           ID
  9           ID          FLOODPLAIN DELINEATION STUDY OF ANDORA HILLS & GALLOWAY WASHES
 10           ID          FCD 99-14
 11           ID          BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC.
 12           ID          FOR THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
 13           ID          REVISED MARCH 2002     FILENAME: GWM224R.DAT
 14           ID      ****************************************************************
 15           ID          100 YEAR ANALYSIS 24-HOUR STORM USING JD RECORDS
 16           ID          MCUHP2 USED FOR UNIT HYDROGRAPHS
 17           ID     ******************************************************************
 18           ID
 19           ID     DDM MCUHP2 GALLOWAY WASH FLOODPLAIN DELINEATION STUDY, FCD NO. 99-14
 20           ID
 21           ID    March 2002 revisions to original Dec. 1999 model include:
 22           ID
 23           ID    HC BLOCK ADDED FOR GRAPEVINE WASH (CP 295A)
 24           ID
 25           ID    SUBBASIN GWW1_3 FURTHER SUBDIVIDED ALONG GALLOWAY WASH PER FEMA COMMENTS
 26           ID    IN LETTER DATED FEB. 8, 2002
 27           ID
 28           ID    *** ADDITIONAL COMBINATION ADDED 10-17-02 TO PROVIDE TOTAL FLOW IN
 29           ID        NORTH GALLOWAY WASH BY TWL FOR CH2M HILL FOR CAREFREE DMP ***
 30           ID
 31           ID   DDM MCUHP2 Carefree Area Drainage Master Plan, Galloway Wash Future Condition
              *DIAGRAM
 32           IT       5 01DEC99    0005     400
 33           IO       5       2
 34           IN      15
 35           JD    4.80    0.01
 36           PC    .000    .002    .005    .008    .011    .014    .017    .020    .023    .026
 37           PC    .029    .032    .035    .038    .041    .044    .048    .052    .056    .060
 38           PC    .064    .068    .072    .076    .080    .085    .090    .095    .100    .105
 39           PC    .110    .115    .120    .126    .133    .140    .147    .155    .163    .172
 40           PC    .181    .191    .203    .218    .236    .257    .283    .387    .663    .707
 41           PC    .735    .758    .776    .791    .804    .815    .825    .834    .842    .849
 42           PC    .856    .863    .869    .875    .881    .887    .893    .898    .903    .908
 43           PC    .913    .918    .922    .926    .930    .934    .938    .942    .946    .950
 44           PC    .953    .956    .959    .962    .965    .968    .971    .974    .977    .980
 45           PC    .983    .986    .989    .992    .995    .998   1.000
 46           JD    4.78    1.00
 47           JD    4.51   10.00
 48           JD    4.37   20.00
 49           JD    4.11   70.00
              *
              * DDM   ***** Updated *****
1                                   HEC-1 INPUT                                   PAGE  2

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
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Cow Track Drive, East of Paint Pony Drive

```
 20850 3940
 20855 3950
 20900 3960
 20905 3970
 20910 3980
 20915 3990
 20920 4000
1
1                                                    STATION   CP286R

                        (O) OUTFLOW
          0.      400.      800.     1200.     1600.     2000.     2400.     2800.       0.       0.       0.       0.       0.
DAHRMN PER
 10005   10
 10010   20
 10015   30
 10020   40
 10025   50
 10030   60
 10035   70
 10040   80
 10045   90
 10050  100
 10055  110
 10100  120
 10105  130
 10110  140
 10115  150
 10120  160
 10125  170
 10130  180
 10135  190
 10140  200
 10145  210
 10150  220
 10155  230
 10200  240
 10205  250
 10210  260
 10215  270
 10220  280
 10225  290
 10230  300
 10235  310
 10240  320
 10245  330
 10250  340
 10255  350
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 10335  430
 10340  440
 10345  450
 10350  460
 10355  470
 10400  480
 10405  490
 10410  500
 10415  510
 10420  520
 10425  530
 10430  540
 10435  550
 10440  560
 10445  570
 10450  580
 10455  590
 10500  600
 10505  610
 10510  620
 10515  630
 10520  640
 10525  650
 10530  660
 10535  670
 10540  680
 10545  690
 10550  700
 10555  710
 10600  720
 10605  730
 10610  740
 10615  750
 10620  760
 10625  770
 10630  780
 10635  790
 10640  800
 10645  810
 10650  820
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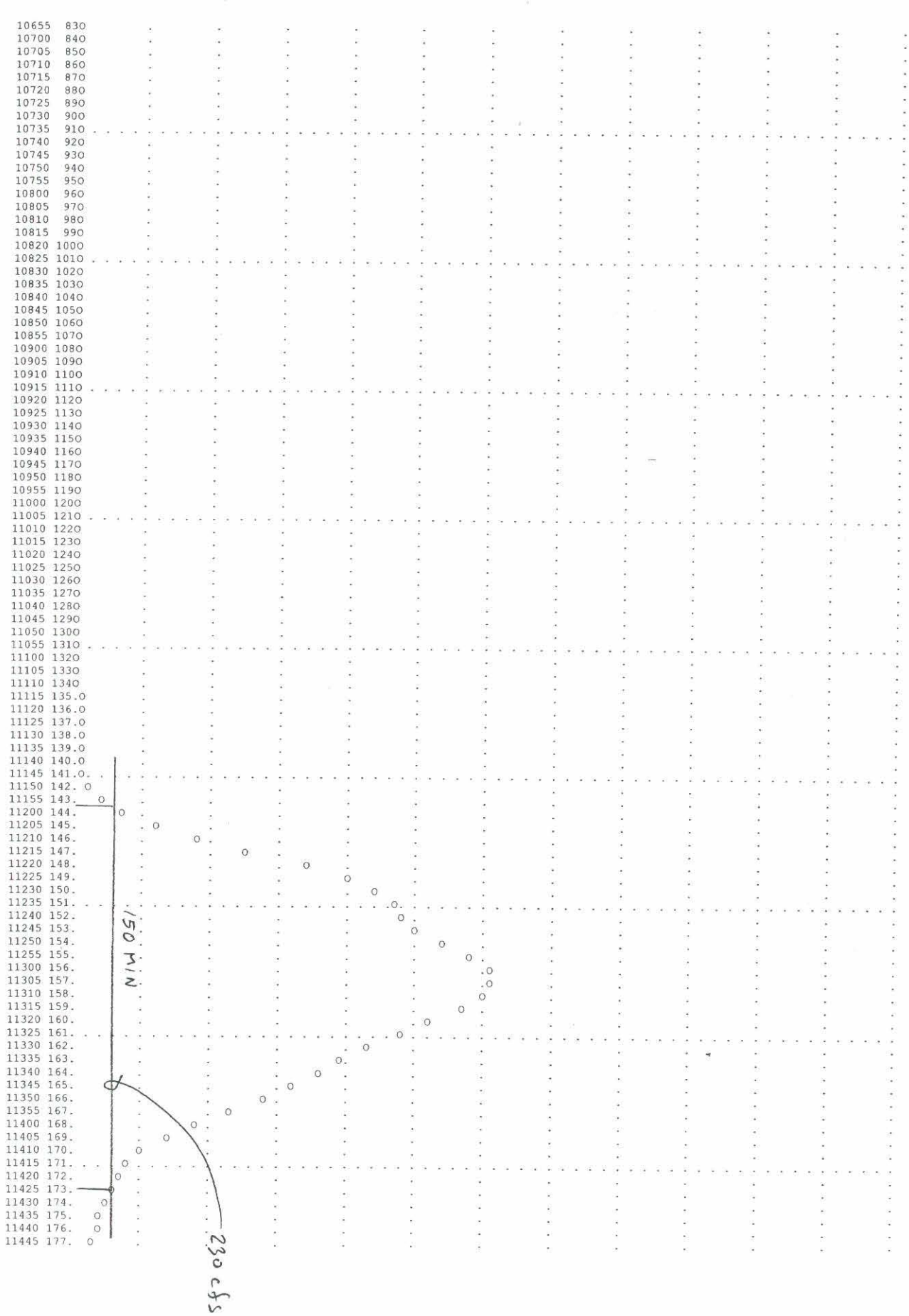
Cow Track Drive, East of Paint Pony Drive



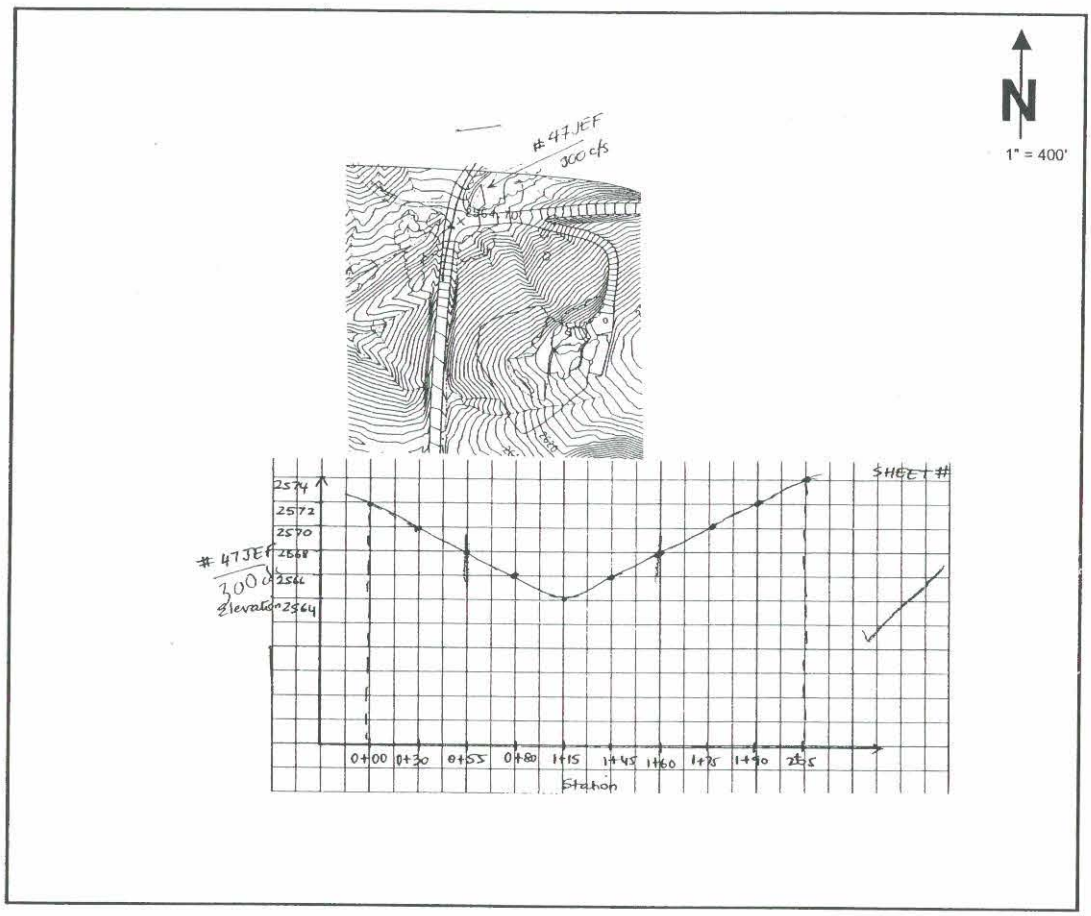
Silver Saddle Drive (JEF #47)

Carefree Drainage Master Plan
Dip Crossing Notes

ID Number: #47 (JEF)

Source of Data: TOPO

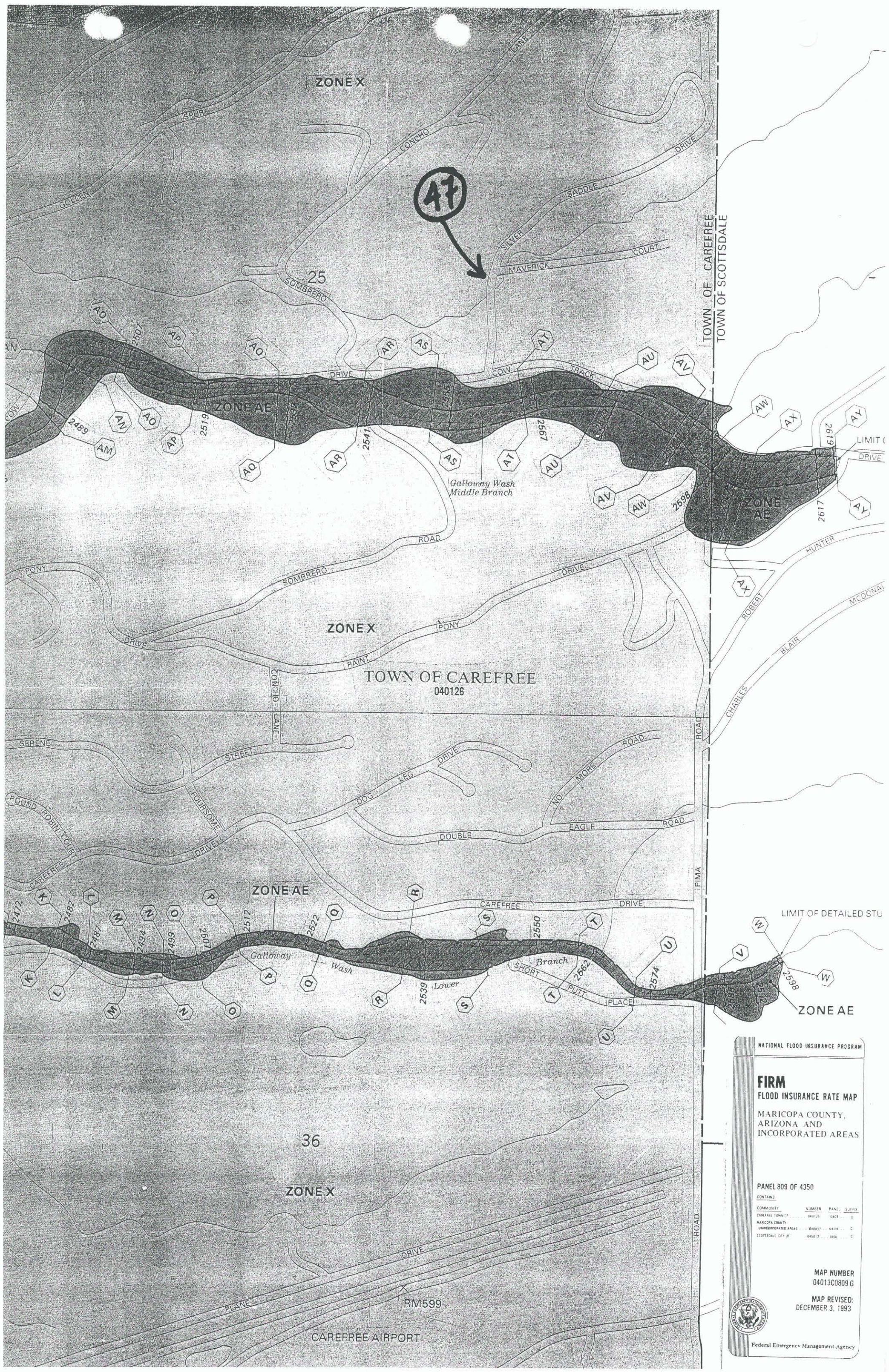
Location: SILVER SADDLE DR

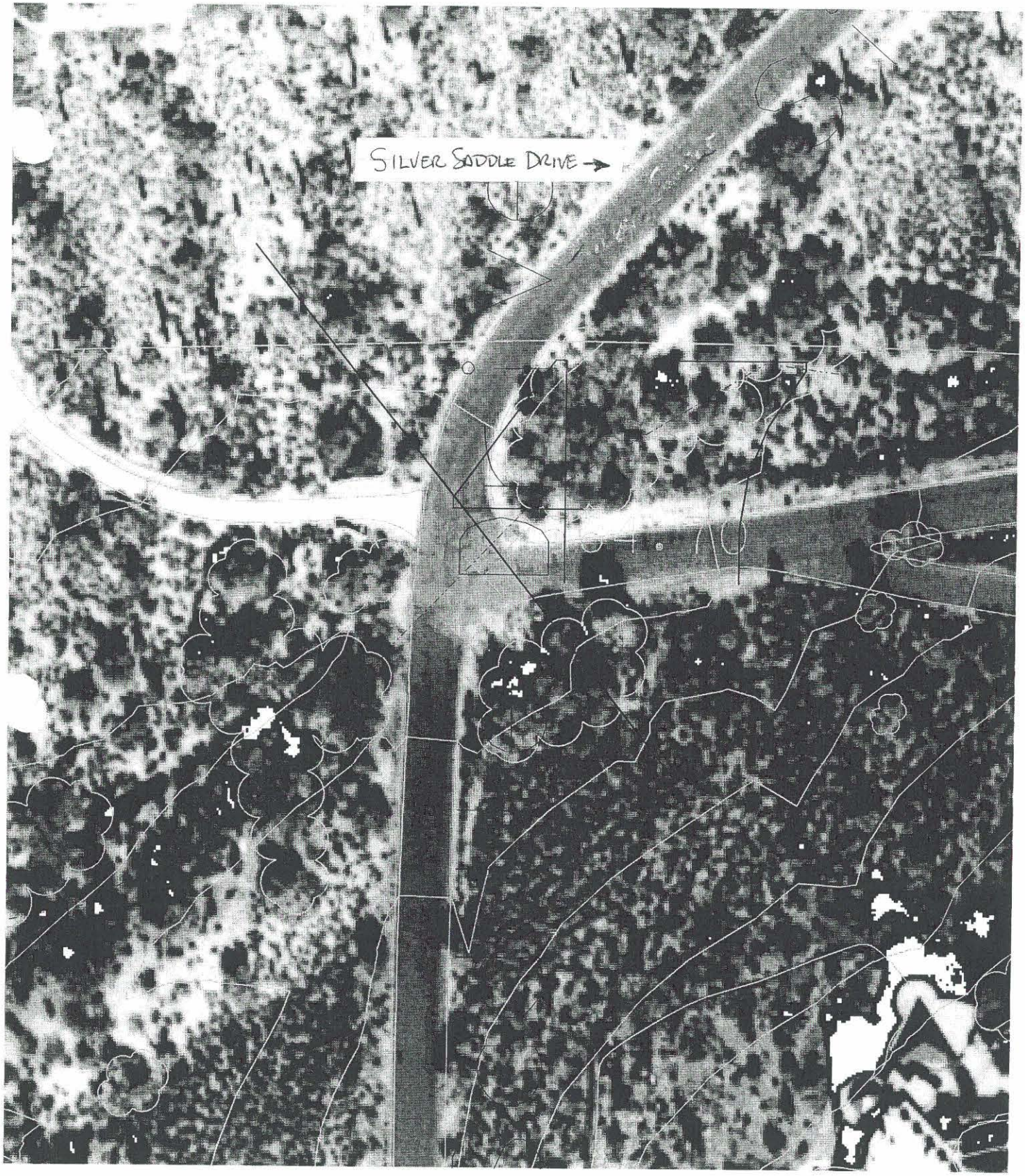


Material: Dip Crossing

Protection:

Notes:

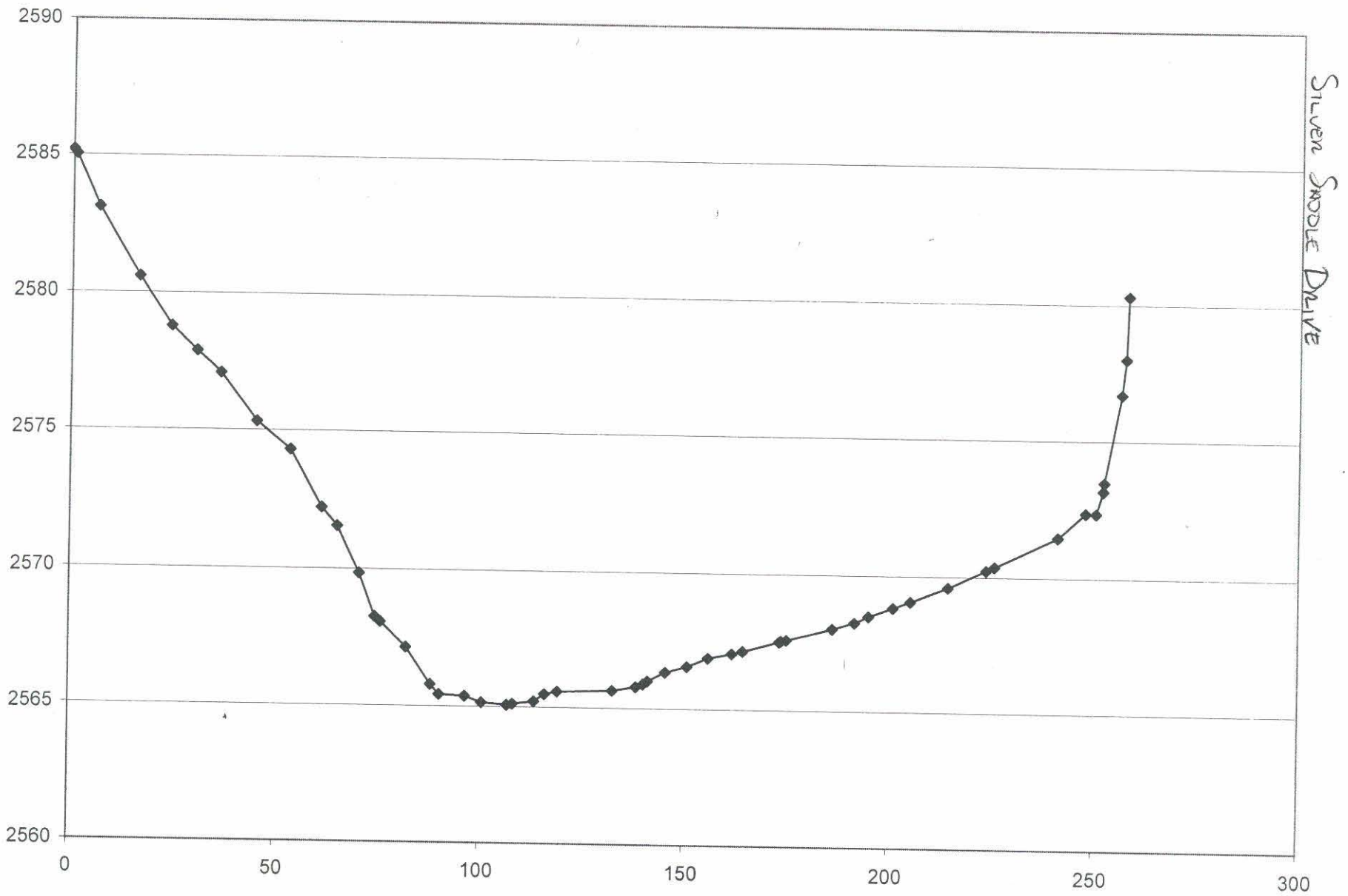

ZONE X
SPUR
CONCHO
LANE
GOLDEN
DRIVE
SADDLE
SILVER
COURT
MAVERICK
47
25
SOMBRERO
TOWN OF CAREFREE
TOWN OF SCOTTSDALE
DRIVE
COW
TRACK
ZONE AE
Galloway Wash Middle Branch
ROAD
HUNTER
ROBERT
MCDONAL
BLAIR
CHARLES
LIMIT
PONY
PAINT
TOWN OF CAREFREE
040126
SERENE
STREET
FOURSOME
DOG
LEG
NO
MORE
ROUND ROBIN COURT
DOUBLE
EAGLE
CAREFREE
PIMA
LIMIT OF DETAILED STU
Galloway Wash Lower Branch
SHORT
PUTT
PLACE
36
PLANE
RM599
CAREFREE AIRPORT
NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
MARICOPA COUNTY, ARIZONA AND INCORPORATED AREAS
PANEL 809 OF 4350
CONTAINS
COMMUNITY NUMBER PANEL SUFFIX
CAREFREE TOWN OF 040125 0809 G
MARICOPA COUNTY
UNINCORPORATED AREAS 040037 0809 G
SCOTTSDALE CITY OF 045012 0809 G
MAP NUMBER
04013C0809 G
MAP REVISED:
DECEMBER 3, 1993
Federal Emergency Management Agency



SILVER SADDLE DRIVE

↑ N

SCALE 1" = 60'


2590
2585
2580
2575
2570
2565
2560
0
50
100
150
200
250
300
Silver Saddle Drive

Worksheet
Worksheet for Irregular Channel

SILVER SADDLE DRIVE

Project Description

Worksheet	JEF-47
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data

Slope	031100	ft/ft
Discharg	302.00	cfs

Options

Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Results

Mannings Coefficie	0.036	
Water Surface Elev	2,566.36	ft
Elevation Range	5.10 to 2,580.60	
Flow Area	49.5	ft²
Wetted Perimeter	63.57	ft
Top Width	63.45	ft
Actual Depth	1.26	ft
Critical Elevation	2,566.48	ft
Critical Slope	0.020237	ft/ft
Velocity	6.10	ft/s
Velocity Head	0.58	ft
Specific Energy	2,566.94	ft
Froude Number	1.22	
Flow Type	Supercritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+16	1+01	0.040
1+01	2+58	0.035

Natural Channel Points

Station (ft)	Elevation (ft)
0+16	2,580.60
0+54	2,574.30
0+74	2,568.30
0+90	2,565.40
1+01	2,565.15
1+07	2,565.10
1+19	2,565.60
1+38	2,565.80
2+41	2,571.50
2+52	2,573.20
2+58	2,580.30

Table
Rating Table for Irregular Channel

SILVER SADDLE DRIVE

Project Description

Worksheet	JEF-47
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data

Slope 031100 ft/ft

Options

Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	350.00	5.00

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00	2,565.10	0.00	0.0	0.00	0.00
5.00	2,565.34	1.86	2.7	19.82	19.81
10.00	2,565.41	2.33	4.3	24.43	24.42
15.00	2,565.46	2.63	5.7	26.08	26.07
20.00	2,565.51	2.88	6.9	27.47	27.45
25.00	2,565.55	3.08	8.1	28.69	28.67
30.00	2,565.59	3.26	9.2	29.80	29.77
35.00	2,565.63	3.31	10.6	33.47	33.43
40.00	2,565.67	3.34	12.0	37.41	37.37
45.00	2,565.71	3.39	13.3	40.74	40.70
50.00	2,565.73	3.45	14.5	43.67	43.63
55.00	2,565.76	3.51	15.7	46.33	46.28
60.00	2,565.79	3.56	16.8	48.77	48.72
65.00	2,565.81	3.64	17.9	50.40	50.35
70.00	2,565.82	3.74	18.7	50.80	50.74
75.00	2,565.84	3.84	19.5	51.18	51.13
80.00	2,565.85	3.93	20.4	51.56	51.50
85.00	2,565.87	4.02	21.1	51.92	51.86
90.00	2,565.89	4.11	21.9	52.27	52.21
95.00	2,565.90	4.19	22.7	52.62	52.56
100.00	2,565.91	4.27	23.4	52.96	52.89
105.00	2,565.93	4.34	24.2	53.29	53.22
110.00	2,565.94	4.42	24.9	53.61	53.54
115.00	2,565.95	4.49	25.6	53.93	53.86
120.00	2,565.97	4.56	26.3	54.24	54.17
125.00	2,565.98	4.63	27.0	54.54	54.47
130.00	2,565.99	4.69	27.7	54.84	54.77
135.00	2,566.01	4.76	28.4	55.13	55.06
140.00	2,566.02	4.82	29.1	55.42	55.34
145.00	2,566.03	4.88	29.7	55.70	55.63
150.00	2,566.04	4.94	30.4	55.98	55.91
155.00	2,566.05	4.99	31.0	56.26	56.18
160.00	2,566.06	5.05	31.7	56.53	56.45
165.00	2,566.08	5.11	32.3	56.80	56.71

Table
Rating Table for Irregular Channel

SILVER SADDLE DRIVE

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
170.00	2,566.09	5.16	32.9	57.06	56.98
175.00	2,566.10	5.21	33.6	57.32	57.24
180.00	2,566.11	5.26	34.2	57.58	57.49
185.00	2,566.12	5.31	34.8	57.83	57.74
190.00	2,566.13	5.36	35.4	58.08	57.99
195.00	2,566.14	5.41	36.0	58.33	58.24
200.00	2,566.15	5.46	36.6	58.57	58.48
205.00	2,566.16	5.51	37.2	58.81	58.72
210.00	2,566.17	5.55	37.8	59.05	58.96
215.00	2,566.18	5.60	38.4	59.29	59.19
220.00	2,566.19	5.64	39.0	59.52	59.42
225.00	2,566.20	5.69	39.6	59.75	59.65
230.00	2,566.21	5.72	40.2	60.00	59.90
235.00	2,566.22	5.77	40.8	60.22	60.12
240.00	2,566.23	5.81	41.3	60.45	60.35
245.00	2,566.24	5.85	41.9	60.67	60.57
250.00	2,566.27	5.74	43.5	61.31	61.20
255.00	2,566.28	5.78	44.1	61.54	61.43
260.00	2,566.29	5.82	44.7	61.76	61.65
265.00	2,566.29	5.85	45.3	61.98	61.87
270.00	2,566.30	5.89	45.9	62.20	62.09
275.00	2,566.31	5.92	46.4	62.42	62.31
280.00	2,566.32	5.96	47.0	62.64	62.52
285.00	2,566.33	5.99	47.6	62.85	62.74
290.00	2,566.34	6.03	48.1	63.06	62.95
295.00	2,566.35	6.06	48.7	63.27	63.16
300.00	2,566.36	6.09	49.3	63.48	63.37
305.00	2,566.37	6.12	49.8	63.69	63.57
310.00	2,566.38	6.16	50.4	63.90	63.78
315.00	2,566.38	6.19	50.9	64.10	63.98
320.00	2,566.39	6.22	51.5	64.30	64.18
325.00	2,566.40	6.25	52.0	64.51	64.38
330.00	2,566.41	6.28	52.5	64.70	64.58
335.00	2,566.42	6.31	53.1	64.90	64.78
340.00	2,566.43	6.34	53.6	65.10	64.98
345.00	2,566.43	6.37	54.2	65.30	65.17
350.00	2,566.44	6.40	54.7	65.49	65.36

IMPASSABLE

GW 100 YR 6 HR
FUTURE

47 (JEF

SILVER SADDLE DRIVE...

```
1*************************************
*                                   *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN   1998           *
*            VERSION 4.1            *
*                                   *
*  RUN DATE   27NOV02  TIME  08:49:21  *
*                                   *
*************************************
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*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*           (916) 756-1104          *
*                                   *
*************************************
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X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX        XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

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

1 HEC-1 INPUT PAGE 1

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

  1           ID     FUTURE CONDITIONS HYDROLOGY FOR CAREFREE AREA DRAINAGE MASTER PLAN
  2           ID       BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC., DEC. 2001
  3           ID
  4           ID     FUTURE CONDITIONS LAND USE BASED ON CAVE CREEK WATERCOURSE MASTER PLAN
  5           ID     HYDROLOGY BY TETRA TECH, 2000.
  6           ID
  7           ID     BASE MODEL BASED ON:
  8           ID
  9           ID           FLOODPLAIN DELINEATION STUDY OF ANDORA HILLS & GALLOWAY WASHES
 10           ID           FCD 99-14
 11           ID           BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC.
 12           ID           FOR THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
 13           ID           REVISED MARCH 2002     FILENAME: GWM224R.DAT
 14           ID      ****************************************************************
 15           ID           100 YEAR ANALYSIS 24-HOUR STORM USING JD RECORDS
 16           ID           MCUHP2 USED FOR UNIT HYDROGRAPHS
 17           ID     ****************************************************************
 18           ID
 19           ID     DDM MCUHP2 GALLOWAY WASH FLOODPLAIN DELINEATION STUDY, FCD NO. 99-14
 20           ID
 21           ID    March 2002 revisions to original Dec. 1999 model include:
 22           ID
 23           ID    HC BLOCK ADDED FOR GRAPEVINE WASH (CP 295A)
 24           ID
 25           ID    SUBBASIN GWW1_3 FURTHER SUBDIVIDED ALONG GALLOWAY WASH PER FEMA COMMENTS
 26           ID    IN LETTER DATED FEB. 8, 2002
 27           ID
 28           ID    *** ADDITIONAL COMBINATION ADDED 10-17-02 TO PROVIDE TOTAL FLOW IN
 29           ID        NORTH GALLOWAY WASH BY TWL FOR CH2M HILL FOR CAREFREE DMP ***
 30           ID
 31           ID   DDM MCUHP2 Carefree Area Drainage Master Plan, Galloway Wash Future Condition
              *DIAGRAM
 32           IT       5 01DEC99    0005     400
 33           IO       5       2
 34           IN      15
 35           JD    3.50    0.01
 36           PC    .000    .008    .016    .025    .033    .041    .050    .058    .066    .074
 37           PC    .087    .099    .118    .138    .216    .377    .834    .911    .931    .950
 38           PC    .962    .972    .983    .991   1.000
 39           JD    3.48    0.50
 40           JD    3.43    2.80
 41           PC    .000    .009    .016    .025    .034    .042    .051    .059    .067    .076
 42           PC    .087    .100    .120    .163    .252    .451    .694    .837    .900    .938
 43           PC    .950    .963    .975    .988   1.000
 44           JD    3.23    16.0
 45           PC    .000    .015    .020    .030    .048    .063    .076    .090    .105    .119
 46           PC    .135    .152    .175    .222    .304    .472    .670    .796    .868    .912
 47           PC    .946    .960    .973    .987   1.000
 48           JD    2.84    90.0
 49           PC    .000    .021    .035    .051    .071    .087    .105    .125    .143    .160
 50           PC    .179    .201    .232    .281    .364    .500    .658    .773    .841    .888
 51           PC    .927    .945    .964    .982   1.000
              *
              * DDM   ***** Updated *****
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1 HEC-1 INPUT PAGE 2

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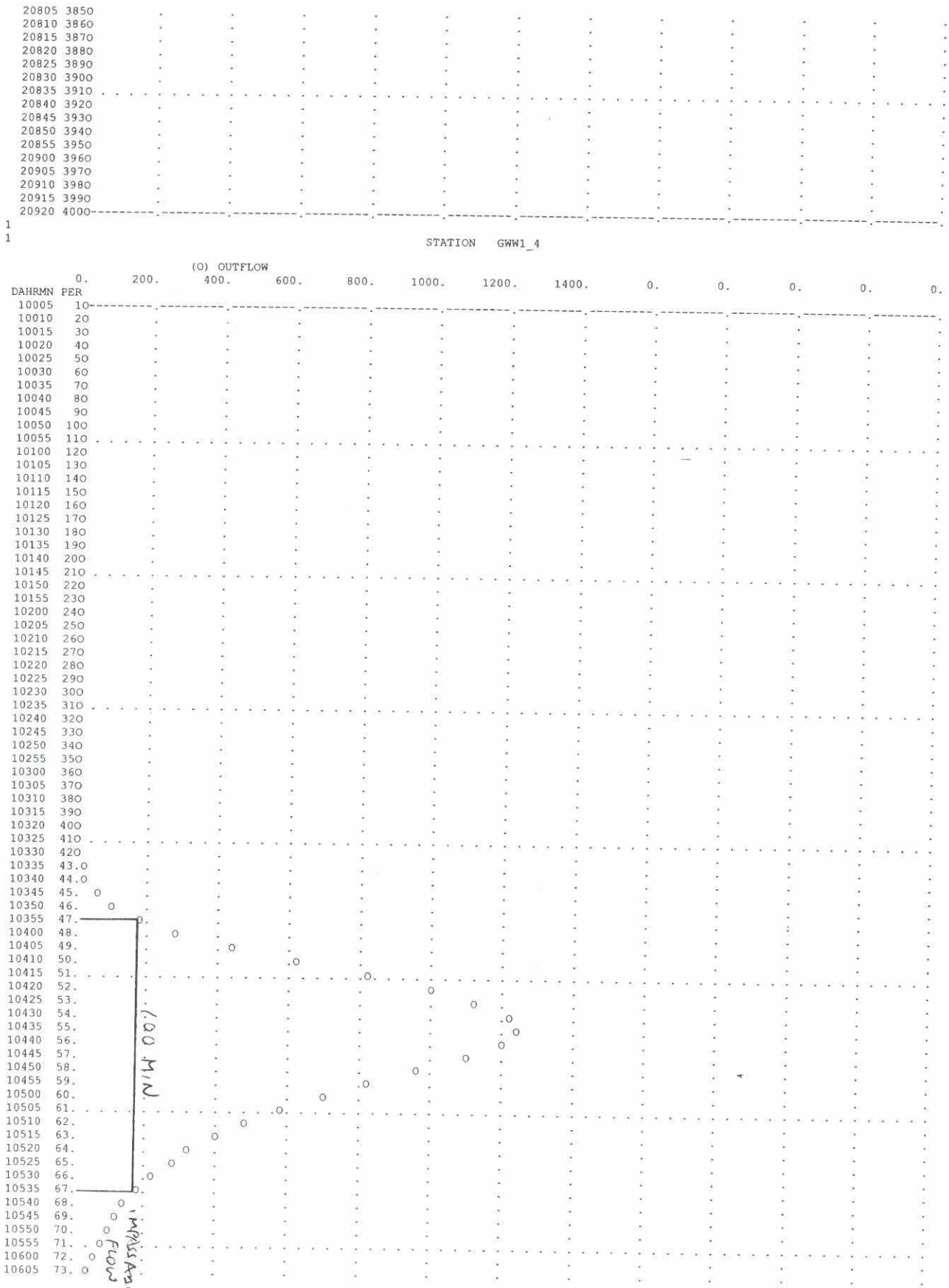
SILVER SADDLE DRIVE



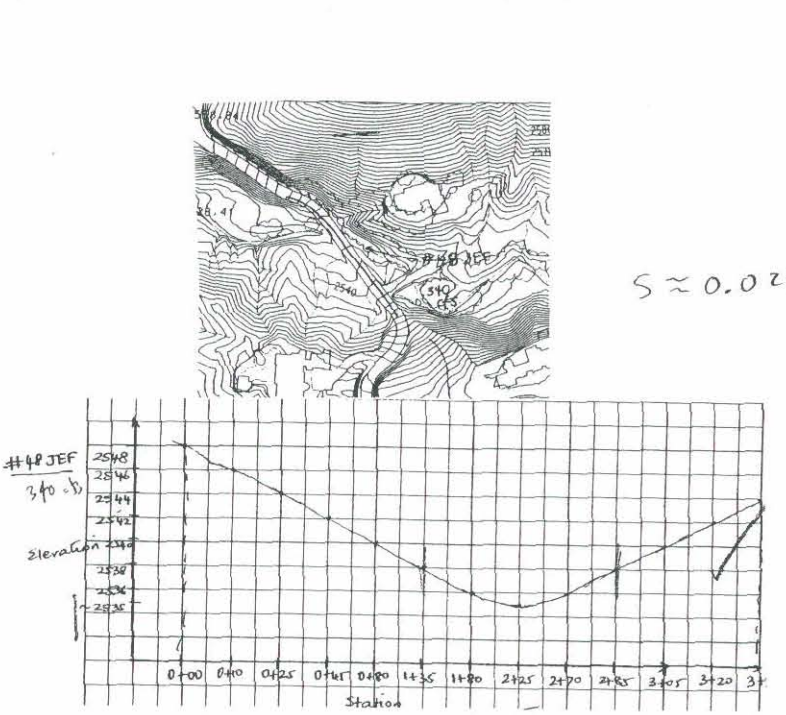
Concho Lane (JEF #48)

Carefree Drainage Master Plan
Dip Crossing Notes

ID Number: #48 (JEF)

Source of Data: TOPO

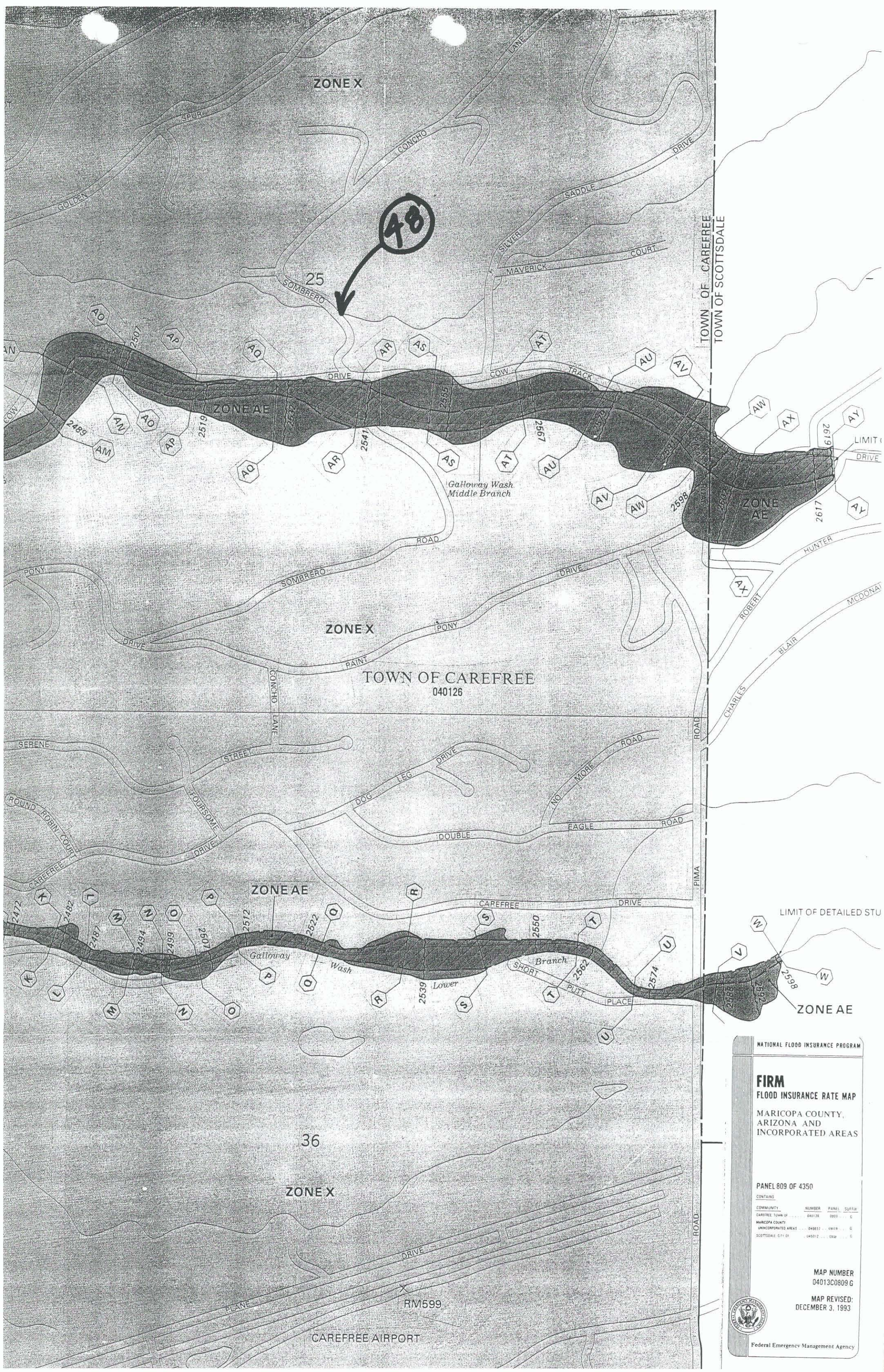
Location: CONCHO LANE



Material: PAVED DIP CROSSING

Protection:

Notes:


ZONE X
SPUR
CONCHO
LANE
GOLDEN
SADDLE
DRIVE
SILVER
COURT
MAVERICK
SOMBRERO
25
48
TOWN OF CAREFREE
TOWN OF SCOTTSDALE
DRIVE
COW
TRACK
ZONE AE
2489
2507
2519
2541
2565
2567
2583
2598
2617
2619
Galloway Wash
Middle Branch
LIMIT
ROAD
HUNTER
PONY
SOMBRERO
DRIVE
PAINT
TOWN OF CAREFREE
040126
CONCHO
LANE
ROBERT
CHARLES
BLAIR
SERENE
STREET
FOURSOME
DOG
LEG
NO
MORE
ROUND ROBIN COURT
DOUBLE
EAGLE
CAREFREE
PIMA
2472
2482
2487
2494
2499
2507
2512
2522
2539
2550
2562
2574
2588
2592
Lower
SHORT
PUTT
PLACE
36
PLANE
RM599
CAREFREE AIRPORT
LIMIT OF DETAILED STU
NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
MARICOPA COUNTY, ARIZONA AND INCORPORATED AREAS
PANEL 809 OF 4350
CONTAINS
COMMUNITY NUMBER PANEL SUFFIX
CAREFREE TOWN OF 040126 0809 G
MARICOPA COUNTY
UNINCORPORATED AREAS 040037 0809 G
SCOTTSDALE CITY OF 045012 0809 G
MAP NUMBER
04013C0809 G
MAP REVISED:
DECEMBER 3, 1993
Federal Emergency Management Agency

Worksheet
Worksheet for Irregular Channel

CONCHO LANE

Project Description	
Worksheet	Number 48JEF
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data		
Slope	023100	ft/ft
Discharg	344.00	cfs

Options	
Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Results		
Mannings Coefficie	0.032	
Water Surface Elev	2,536.20	ft
Elevation Range	35.00 to 2,538.00	
Flow Area	64.0	ft²
Wetted Perimeter	96.15	ft
Top Width	96.11	ft
Actual Depth	1.20	ft
Critical Elevation	2,536.28	ft
Critical Slope	0.016625	ft/ft
Velocity	5.38	ft/s
Velocity Head	0.45	ft
Specific Energy	2,536.65	ft
Froude Number	1.16	
Flow Type	Supercritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
1+35	2+85	0.032

Natural Channel Points

Station (ft)	Elevation (ft)
1+35	2,538.00
1+80	2,536.00
2+25	2,535.00
2+70	2,536.00
2+85	2,538.00

Table
Rating Table for Irregular Channel

CONCHO LANE

Project Description

Worksheet	Number 48JEF
Flow Element	Irregular Chan
Method	Manning's Forr
Solve For	Channel Depth

Input Data

Slope 023100 ft/ft

Options

Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	400.00	5.00

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00	2,535.00	0.00	0.0	0.00	0.00
5.00	2,535.25	1.77	2.8	22.57	22.57
10.00	2,535.33	2.10	4.8	29.27	29.26
15.00	2,535.38	2.33	6.4	34.08	34.07
20.00	2,535.42	2.50	8.0	37.96	37.95
25.00	2,535.46	2.64	9.5	41.27	41.26
30.00	2,535.49	2.77	10.8	44.19	44.18
35.00	2,535.52	2.87	12.2	46.82	46.81
40.00	2,535.55	2.97	13.5	49.23	49.22
45.00	2,535.57	3.06	14.7	51.45	51.44
50.00	2,535.59	3.14	15.9	53.52	53.51
55.00	2,535.62	3.22	17.1	55.47	55.46
60.00	2,535.64	3.29	18.2	57.31	57.30
65.00	2,535.66	3.36	19.4	59.06	59.04
70.00	2,535.67	3.42	20.5	60.72	60.71
75.00	2,535.69	3.48	21.6	62.31	62.30
80.00	2,535.71	3.53	22.6	63.84	63.82
85.00	2,535.73	3.59	23.7	65.31	65.29
90.00	2,535.74	3.64	24.7	66.72	66.71
95.00	2,535.76	3.69	25.7	68.09	68.07
100.00	2,535.77	3.74	26.8	69.41	69.39
105.00	2,535.79	3.78	27.8	70.69	70.68
110.00	2,535.80	3.83	28.7	71.94	71.92
115.00	2,535.81	3.87	29.7	73.15	73.13
120.00	2,535.83	3.91	30.7	74.32	74.31
125.00	2,535.84	3.95	31.6	75.47	75.45
130.00	2,535.85	3.99	32.6	76.59	76.57
135.00	2,535.86	4.03	33.5	77.68	77.66
140.00	2,535.87	4.07	34.4	78.75	78.73
145.00	2,535.89	4.10	35.4	79.79	79.77
150.00	2,535.90	4.14	36.3	80.81	80.79
155.00	2,535.91	4.17	37.2	81.81	81.79
160.00	2,535.92	4.20	38.1	82.79	82.77
165.00	2,535.93	4.24	38.9	83.75	83.73

Table
Rating Table for Irregular Channel

CONCHO LANE

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
170.00	2,535.94	4.27	39.8	84.69	84.67
175.00	2,535.95	4.30	40.7	85.62	85.60
180.00	2,535.96	4.33	41.6	86.53	86.51
185.00	2,535.97	4.36	42.4	87.42	87.40
190.00	2,535.98	4.39	43.3	88.30	88.28
195.00	2,535.99	4.42	44.1	89.17	89.14
200.00	2,536.00	4.45	45.0	90.02	89.99
205.00	2,536.01	4.48	45.7	90.26	90.24
210.00	2,536.02	4.52	46.4	90.50	90.48
215.00	2,536.02	4.56	47.1	90.73	90.71
220.00	2,536.03	4.60	47.8	90.97	90.94
225.00	2,536.04	4.64	48.5	91.20	91.17
230.00	2,536.05	4.67	49.2	91.43	91.40
235.00	2,536.05	4.71	49.9	91.65	91.63
240.00	2,536.06	4.74	50.6	91.88	91.85
245.00	2,536.07	4.78	51.3	92.10	92.07
250.00	2,536.08	4.81	52.0	92.32	92.29
255.00	2,536.08	4.84	52.6	92.54	92.51
260.00	2,536.09	4.88	53.3	92.76	92.73
265.00	2,536.10	4.91	54.0	92.97	92.94
270.00	2,536.11	4.94	54.6	93.18	93.15
275.00	2,536.11	4.98	55.3	93.39	93.36
280.00	2,536.12	5.01	55.9	93.60	93.57
285.00	2,536.13	5.04	56.6	93.81	93.78
290.00	2,536.13	5.07	57.2	94.02	93.98
295.00	2,536.14	5.10	57.9	94.22	94.19
300.00	2,536.15	5.13	58.5	94.43	94.39
305.00	2,536.15	5.16	59.1	94.63	94.59
310.00	2,536.16	5.19	59.8	94.83	94.79
315.00	2,536.17	5.22	60.4	95.03	94.99
320.00	2,536.17	5.25	61.0	95.22	95.19
325.00	2,536.18	5.27	61.6	95.42	95.38
330.00	2,536.19	5.30	62.2	95.62	95.58
335.00	2,536.19	5.33	62.9	95.81	95.77
340.00	2,536.20	5.36	63.5	96.00	95.96
345.00	2,536.21	5.38	64.1	96.19	96.15
350.00	2,536.21	5.41	64.7	96.38	96.34
355.00	2,536.22	5.44	65.3	96.57	96.53
360.00	2,536.22	5.46	65.9	96.76	96.72
365.00	2,536.23	5.49	66.5	96.94	96.90
370.00	2,536.24	5.51	67.1	97.13	97.09
375.00	2,536.24	5.54	67.7	97.31	97.27
380.00	2,536.25	5.57	68.3	97.49	97.45
385.00	2,536.25	5.59	68.9	97.68	97.63
390.00	2,536.26	5.62	69.5	97.86	97.81
395.00	2,536.27	5.64	70.0	98.04	97.99
400.00	2,536.27	5.66	70.6	98.22	98.17

IMPASSIBLE

GW 100 YR 6 HR
FUTURE

48 (JEF)

CONCHO LANE

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1*************************************
*                                   *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN  1998            *
*            VERSION 4.1            *
*                                   *
*  RUN DATE   27NOV02  TIME  08:49:21  *
*                                   *
*************************************
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*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*           (916) 756-1104          *
*                                   *
*************************************
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X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX        XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

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

1 HEC-1 INPUT PAGE 1

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

   1          ID     FUTURE CONDITIONS HYDROLOGY FOR CAREFREE AREA DRAINAGE MASTER PLAN
   2          ID       BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC., DEC. 2001
   3          ID
   4          ID     FUTURE CONDITIONS LAND USE BASED ON CAVE CREEK WATERCOURSE MASTER PLAN
   5          ID     HYDROLOGY BY TETRA TECH, 2000.
   6          ID
   7          ID     BASE MODEL BASED ON:
   8          ID
   9          ID          FLOODPLAIN DELINEATION STUDY OF ANDORA HILLS & GALLOWAY WASHES
  10          ID          FCD 99-14
  11          ID          BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC.
  12          ID          FOR THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
  13          ID          REVISED MARCH 2002     FILENAME: GWM224R.DAT
  14          ID      ****************************************************************
  15          ID          100 YEAR ANALYSIS 24-HOUR STORM USING JD RECORDS
  16          ID          MCUHP2 USED FOR UNIT HYDROGRAPHS
  17          ID      ****************************************************************
  18          ID
  19          ID     DDM MCUHP2 GALLOWAY WASH FLOODPLAIN DELINEATION STUDY, FCD NO. 99-14
  20          ID
  21          ID    March 2002 revisions to original Dec. 1999 model include:
  22          ID
  23          ID    HC BLOCK ADDED FOR GRAPEVINE WASH (CP 295A)
  24          ID
  25          ID    SUBBASIN GWW1_3 FURTHER SUBDIVIDED ALONG GALLOWAY WASH PER FEMA COMMENTS
  26          ID    IN LETTER DATED FEB. 8, 2002
  27          ID
  28          ID    *** ADDITIONAL COMBINATION ADDED 10-17-02 TO PROVIDE TOTAL FLOW IN
  29          ID        NORTH GALLOWAY WASH BY TWL FOR CH2M HILL FOR CAREFREE DMP ***
  30          ID
  31          ID   DDM MCUHP2 Carefree Area Drainage Master Plan, Galloway Wash Future Condition
              *DIAGRAM
  32          IT       5 01DEC99    0005     400
  33          IO       5       2
  34          IN      15
  35          JD    3.50    0.01
  36          PC    .000    .008    .016    .025    .033    .041    .050    .058    .066    .074
  37          PC    .087    .099    .118    .138    .216    .377    .834    .911    .931    .950
  38          PC    .962    .972    .983    .991   1.000
  39          JD    3.48    0.50
  40          JD    3.43    2.80
  41          PC    .000    .009    .016    .025    .034    .042    .051    .059    .067    .076
  42          PC    .087    .100    .120    .163    .252    .451    .694    .837    .900    .938
  43          PC    .950    .963    .975    .988   1.000
  44          JD    3.23    16.0
  45          PC    .000    .015    .020    .030    .048    .063    .076    .090    .105    .119
  46          PC    .135    .152    .175    .222    .304    .472    .670    .796    .868    .912
  47          PC    .946    .960    .973    .987   1.000
  48          JD    2.84    90.0
  49          PC    .000    .021    .035    .051    .071    .087    .105    .125    .143    .160
  50          PC    .179    .201    .232    .281    .364    .500    .658    .773    .841    .888
  51          PC    .927    .945    .964    .982   1.000
              *
              * DDM    ***** Updated *****
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1 HEC-1 INPUT PAGE 2

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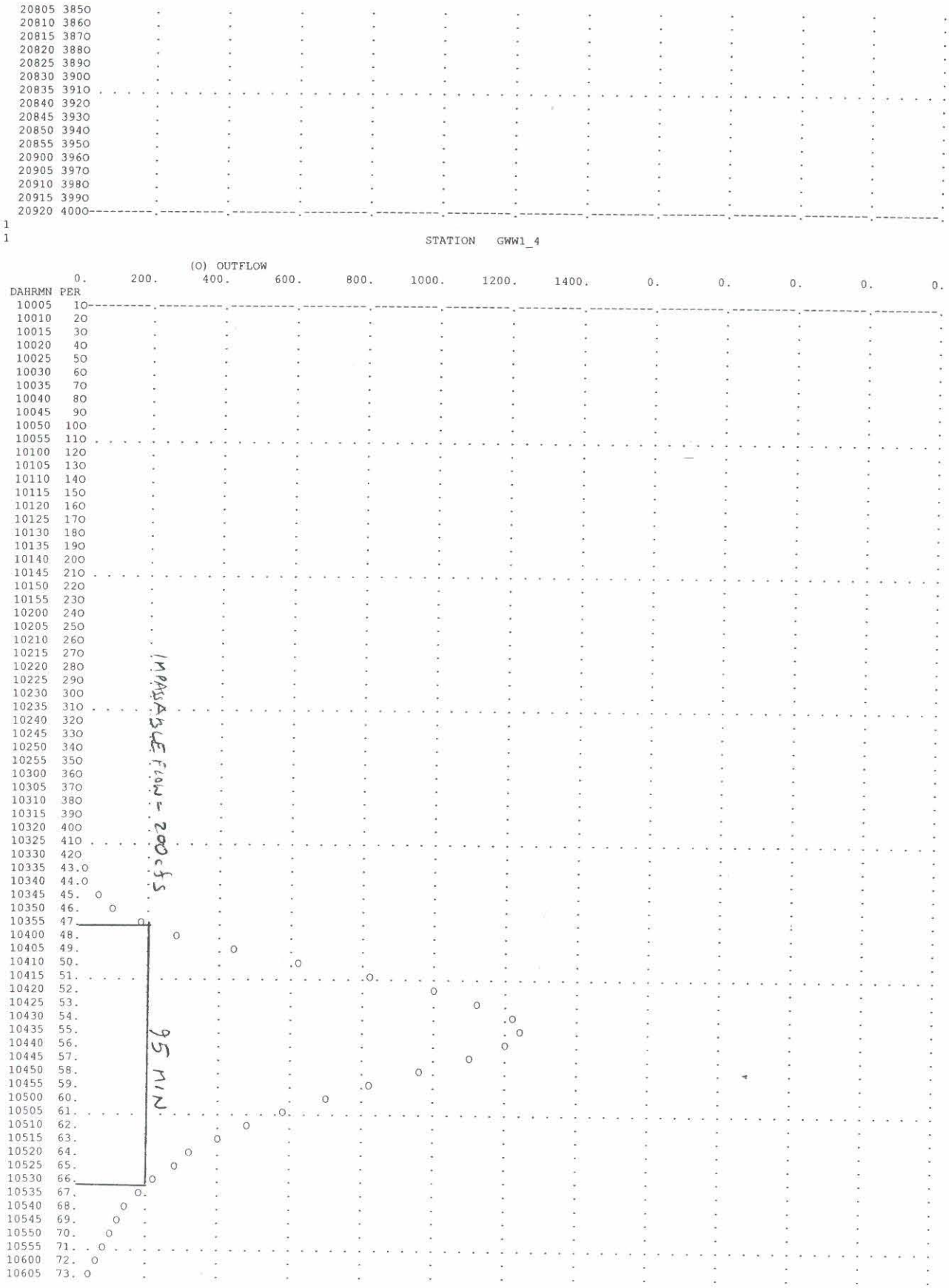
CONCHO LANE


STATION GWW1_4
(O) OUTFLOW
0. 200. 400. 600. 800. 1000. 1200. 1400. 0. 0. 0. 0. 0.
DAHRMN PER
IMPASSABLE FLOW = 200 cfs
95 MIN

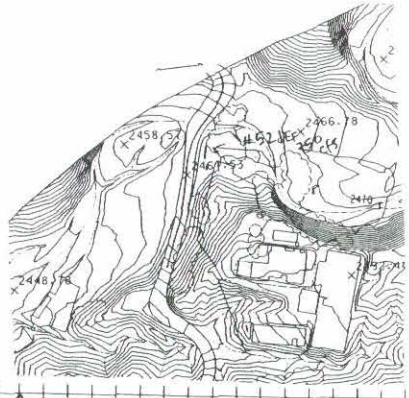
Golden Spur Lane (JEF #52)

Carefree Drainage Master Plan
Dip Crossing Notes

ID Number: #52 (JEF)

Source of Data: TOPO

Location: GOLDEN SPUR LANE



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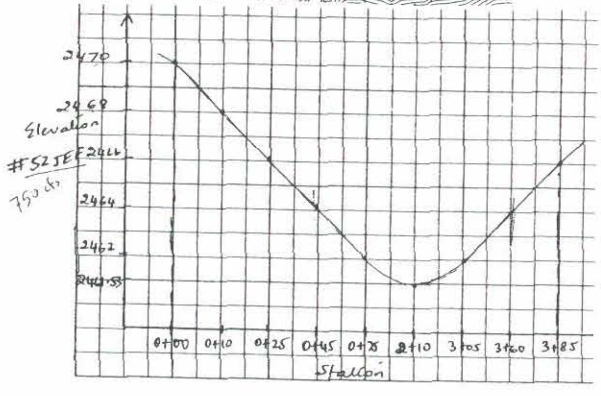


Material: Dip Crossing

Protection:

Notes:

NOTE: MAP AREA SHOWN IS LOCATED WITHIN TOWNSHIP 5 NORTH, RANGE 4 EAST AND TOWNSHIP 6 NORTH, RANGE 4 EAST.

ZONE AE

ZONE X

TOWN OF CAVE CREEK
040129

TOWN OF CAREFREE
040126

TOWN OF CAVE CREEK
TOWN OF CAREFREE

27

26

25

52

GRAPEVINE

STEVENS ROAD

HORIZON DRIVE

SPANISH BOOT ROAD

TRAIN ROAD

COW TRACK DRIVE

RISING SUN ROAD

CELESTIAL STREET

MULE DREAM STREET

SCOPA TRAIL

SUNDANCE TRAIL

CREEK ROAD

HUM HO ROAD

CAREFREE DRIVE

CHAIR ROAD

ROCKING HAPPY STREET

SERENE ROAD

PLEASANT PLACE

TEE TIME COURT

Galloway Wash

Middle Branch

Galloway Wash Lower Branch

Footbridge

RM135

RM136

JOINS PANEL 0809

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA AND INCORPORATED AREAS

PANEL 808 OF 4350

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CAREFREE, TOWN OF	040126	0808	G
CAVE CREEK, TOWN OF	040129	0808	G
SCOTTSDALE, CITY OF	045012	0808	G

MAP NUMBER
04013C0808G

MAP REVISED:
DECEMBER 3, 1993

Federal Emergency Management Agency

Table
Rating Table for Irregular Channel

Golden Spur Lane

Project Description

Worksheet	Number 52JEF
Flow Element	Irregular Chan
Method	Manning's Forr
Solve For	Channel Depth

Input Data

Slope 019400 ft/ft

Options

Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	800.00	5.00

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00	2,461.53	0.00	0.0	0.00	0.00
5.00	2,461.67	1.01	4.9	70.09	70.09
10.00	2,461.71	1.22	8.2	86.73	86.72
15.00	2,461.74	1.40	10.7	92.45	92.41
20.00	2,461.76	1.54	13.0	97.33	97.26
25.00	2,461.79	1.66	15.1	101.65	101.57
30.00	2,461.80	1.76	17.1	105.58	105.47
35.00	2,461.82	1.84	19.0	109.20	109.07
40.00	2,461.84	1.92	20.8	112.56	112.42
45.00	2,461.85	1.99	22.6	115.72	115.57
50.00	2,461.87	2.06	24.3	118.71	118.54
55.00	2,461.88	2.12	26.0	121.55	121.37
60.00	2,461.90	2.17	27.6	124.26	124.06
65.00	2,461.91	2.22	29.2	126.85	126.64
70.00	2,461.92	2.27	30.8	129.34	129.12
75.00	2,461.93	2.32	32.3	131.74	131.51
80.00	2,461.94	2.36	33.9	134.06	133.81
85.00	2,461.96	2.40	35.3	136.30	136.04
90.00	2,461.97	2.44	36.8	138.47	138.20
95.00	2,461.98	2.48	38.3	140.58	140.30
100.00	2,461.99	2.52	39.7	142.62	142.33
105.00	2,462.00	2.56	41.1	144.62	144.32
110.00	2,462.01	2.60	42.3	145.45	145.15
115.00	2,462.01	2.64	43.5	145.68	145.37
120.00	2,462.02	2.69	44.7	145.91	145.59
125.00	2,462.03	2.73	45.8	146.13	145.80
130.00	2,462.04	2.77	46.9	146.35	146.01
135.00	2,462.04	2.81	48.0	146.57	146.22
140.00	2,462.05	2.85	49.1	146.78	146.42
145.00	2,462.06	2.89	50.2	146.99	146.63
150.00	2,462.07	2.93	51.3	147.19	146.82
155.00	2,462.07	2.96	52.3	147.40	147.02
160.00	2,462.08	3.00	53.3	147.60	147.21
165.00	2,462.09	3.04	54.4	147.79	147.40

Table
Rating Table for Irregular Channel

GOLDEN SPUR LANE

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)	
440.00	2,462.39	4.39	100.2	156.41	155.71	
445.00	2,462.39	4.41	100.9	156.54	155.84	
450.00	2,462.40	4.43	101.6	156.67	155.97	
455.00	2,462.40	4.45	102.3	156.80	156.09	
460.00	2,462.41	4.47	103.0	156.93	156.22	
465.00	2,462.41	4.48	103.7	157.06	156.34	
470.00	2,462.42	4.50	104.4	157.19	156.46	
475.00	2,462.42	4.52	105.1	157.32	156.59	
480.00	2,462.43	4.54	105.8	157.44	156.71	
485.00	2,462.43	4.55	106.5	157.57	156.83	
490.00	2,462.43	4.57	107.2	157.70	156.95	
495.00	2,462.44	4.59	107.9	157.82	157.07	
500.00	2,462.44	4.61	108.6	157.95	157.19	
505.00	2,462.45	4.62	109.2	158.07	157.31	
510.00	2,462.45	4.64	109.9	158.19	157.43	
515.00	2,462.46	4.66	110.6	158.32	157.55	
520.00	2,462.46	4.67	111.3	158.44	157.67	
525.00	2,462.46	4.69	112.0	158.56	157.79	
530.00	2,462.47	4.71	112.6	158.68	157.90	
535.00	2,462.47	4.72	113.3	158.80	158.02	
540.00	2,462.48	4.74	114.0	158.92	158.14	
545.00	2,462.48	4.75	114.6	159.04	158.25	
550.00	2,462.49	4.77	115.3	159.16	158.37	
555.00	2,462.49	4.79	116.0	159.28	158.48	
560.00	2,462.49	4.80	116.6	159.40	158.60	
565.00	2,462.50	4.82	117.3	159.52	158.71	
570.00	2,462.50	4.83	117.9	159.64	158.83	
575.00	2,462.51	4.85	118.6	159.76	158.94	
580.00	2,462.51	4.86	119.3	159.87	159.05	
585.00	2,462.52	4.88	119.9	159.99	159.16	
590.00	2,462.52	4.89	120.6	160.11	159.28	
595.00	2,462.52	4.91	121.2	160.22	159.39	
600.00	2,462.53	4.92	121.8	160.34	159.50	IMPASSABLE
605.00	2,462.53	4.94	122.5	160.45	159.61	
610.00	2,462.54	4.95	123.1	160.57	159.72	
615.00	2,462.54	4.97	123.8	160.68	159.83	
620.00	2,462.54	4.98	124.4	160.79	159.94	
625.00	2,462.55	5.00	125.0	160.91	160.05	
630.00	2,462.55	5.01	125.7	161.02	160.16	
635.00	2,462.56	5.03	126.3	161.13	160.27	
640.00	2,462.56	5.04	126.9	161.25	160.38	
645.00	2,462.56	5.06	127.6	161.36	160.48	
650.00	2,462.57	5.07	128.2	161.47	160.59	
655.00	2,462.57	5.08	128.8	161.58	160.70	
660.00	2,462.57	5.10	129.5	161.69	160.80	
665.00	2,462.58	5.11	130.1	161.80	160.91	
670.00	2,462.58	5.13	130.7	161.91	161.02	
675.00	2,462.59	5.14	131.3	162.02	161.12	
680.00	2,462.59	5.15	131.9	162.13	161.23	
685.00	2,462.59	5.17	132.6	162.24	161.33	
690.00	2,462.60	5.18	133.2	162.35	161.44	
695.00	2,462.60	5.20	133.8	162.46	161.54	
700.00	2,462.61	5.21	134.4	162.57	161.65	
705.00	2,462.61	5.22	135.0	162.67	161.75	

Worksheet
Worksheet for Irregular Channel

GOLDEN SPUR LANE

Project Description

Worksheet	Number 52JEF
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data

Slope	019400	ft/ft
Discharg	747.00	cfs

Options

Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Results

Mannings Coefficie	0.035	
Water Surface Elev	2,462.64	ft
Elevation Range	61.53 to 2,464.00	
Flow Area	140.1	ft²
Wetted Perimeter	163.57	ft
Top Width	162.61	ft
Actual Depth	1.11	ft
Critical Elevation	2,462.65	ft
Critical Slope	0.018860	ft/ft
Velocity	5.33	ft/s
Velocity Head	0.44	ft
Specific Energy	2,463.08	ft
Froude Number	1.01	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.94044134 ft.

Roughness Segments

Start Station	End Station	Mannings Coefficient
1+60	3+60	0.035

Natural Channel Points

Station (ft)	Elevation (ft)
1+60	2,461.70
2+10	2,461.53
3+05	2,462.00
3+60	2,464.00

Rising Sun Road (JEF #53)

Carefree Drainage Master Plan
Field Survey Notes

Culvert Number: 53-JEF (190)

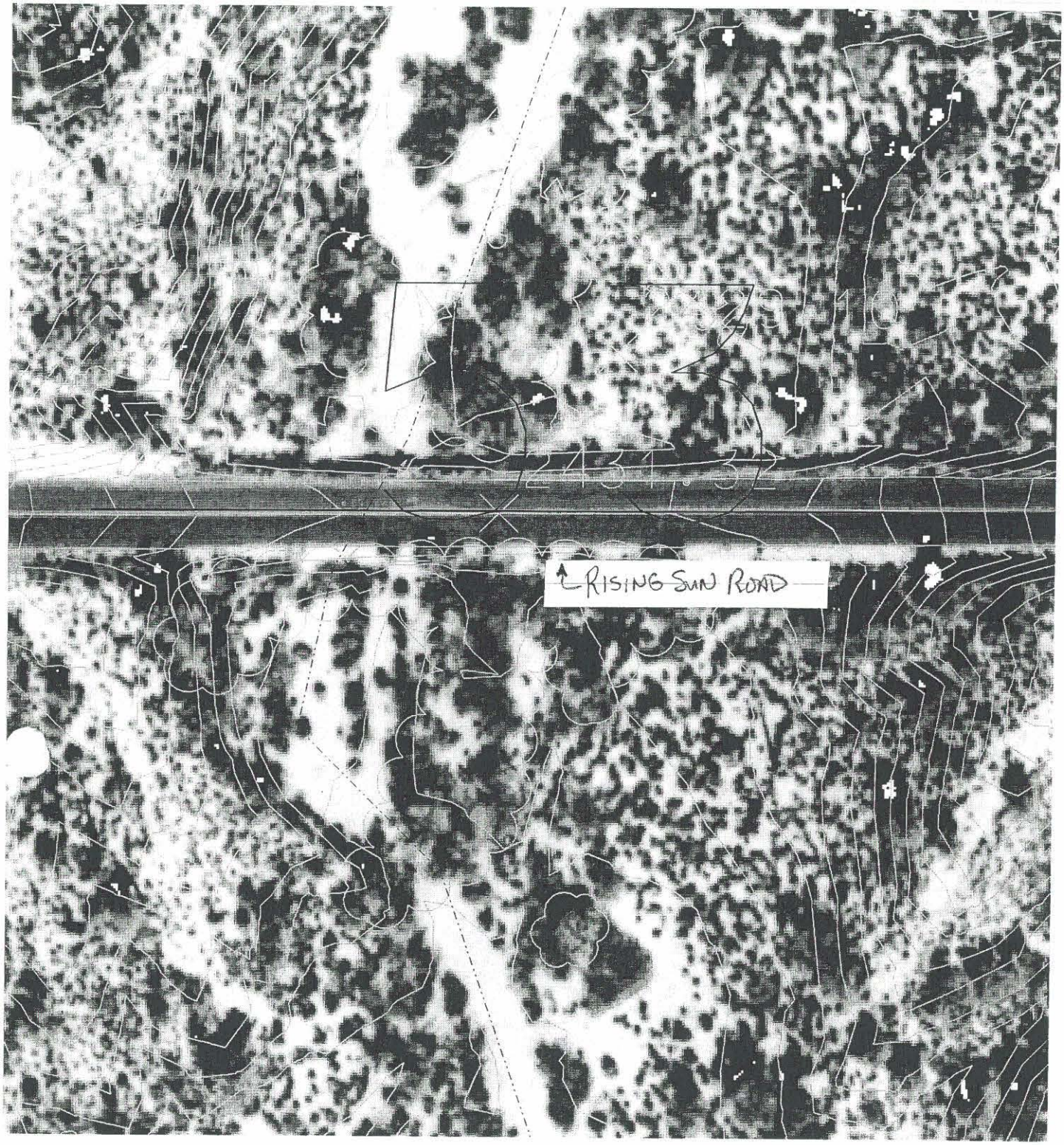
Date of Survey:

Location: RISING SUN ROAD

Material: 60"x36" CMPA & 54" CMP

Headwall:

Notes:



Rising Sun Road

N

SCALE 1"=60'

NOTE: MAP AREA SHOWN IS LOCATED WITHIN TOWNSHIP 5 NORTH, RANGE 4 EAST AND TOWNSHIP 6 NORTH, RANGE 4 EAST.

ZONE AE

ZONE X

TOWN OF CAREFREE
040126

TOWN OF CAVE CREEK
040129

TOWN OF CAVE CREEK
TOWN OF CAREFREE

27

26

25

53

GRAPEVINE

STEVENS ROAD

HORIZON DRIVE

SPANISH BOOT ROAD

TRAIN ROAD

COW TRACT DRIVE

RISING SUN ROAD

CELESTIAL STREET

MULE DREAM STREET

SCOPA TRAIL

CREEK ROAD

SUNDANCE TRAIL

HUM HO ROAD

CAREFREE DRIVE

HAPPY CAVE STREET

ROCKING CHAIR ROAD

SERENE ROAD

PLEASANT PLACE

TEE TIME COURT

Galloway Wash

Middle Branch

Galloway Wash Lower Branch

Footbridge

RM135

RM136

JOINS PANEL 0809

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA AND INCORPORATED AREAS

PANEL 808 OF 4350

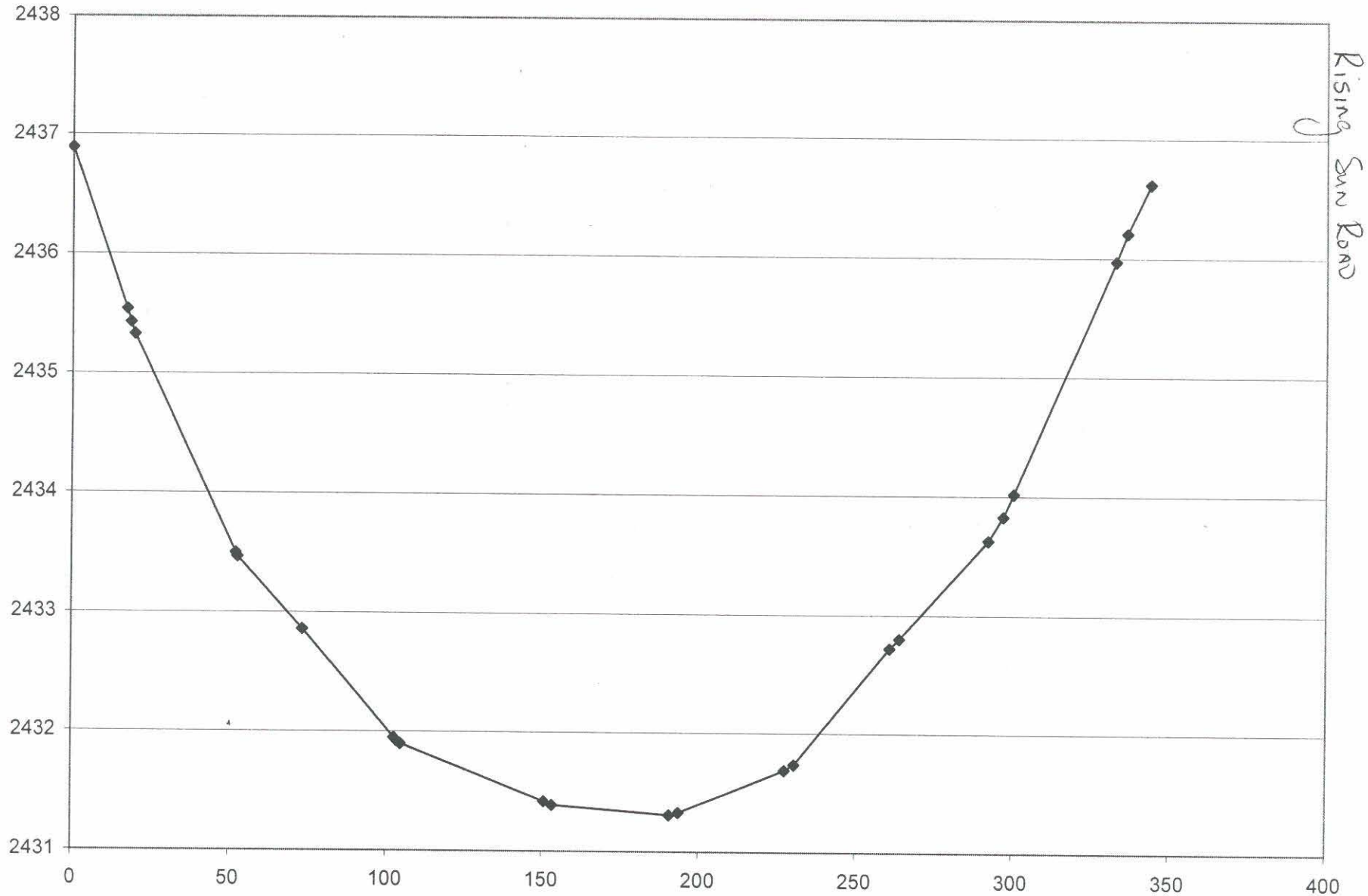
CONTAINS

COMMUNITY	NUMBER	PANEL	SUFFIX
CAREFREE, TOWN OF	040126	0808	G
CAVE CREEK, TOWN OF	040129	0808	G
SCOTTSDALE, CITY OF	045012	0808	G

MAP NUMBER
04013C0808G

MAP REVISED:
DECEMBER 3, 1993

Federal Emergency Management Agency


2438
2437
2436
2435
2434
2433
2432
2431
0
50
100
150
200
250
300
350
400
Rising Sun Road

Culvert Designer/Analyzer Report
#53-JEF

Rising Sun Road

Analysis Component

Storm Event	Design	Discharge	834.00 cfs

Peak Discharge Method: User-Specified

Design Discharge	834.00 cfs	Check Discharge	0.00 cfs

Tailwater properties: Irregular Channel

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00	0+30	0.040
0+30	1+30	0.035
1+30	1+60	0.040

Natural Channel Points

Station (ft)	Elevation (ft)
0+00	2,434.30
0+30	2,427.30
1+30	2,427.30
1+60	2,434.30

Tailwater conditions for Design Storm.

Discharge	834.00 cfs	Actual Depth	1.33 ft
Velocity	5.96 ft/s		

Name	Description	Discharge	HW Elev.	Velocity
Culvert-1	1-54 inch Circular	89.68 cfs	2,432.85 ft	8.70 ft/s
Culvert-2	1-58 x 36 inch Arch	71.88 cfs	2,432.85 ft	9.39 ft/s
Weir	Roadway	672.89 cfs	2,432.86 ft	N/A
Total	----------	834.45 cfs	2,432.85 ft	N/A

Culvert Designer/Analyzer Report
#53-JEF

Rising Sun Road

Component:Culvert-1

Culvert Summary					
Computed Headwater Elev	2,432.86	ft	Discharge	89.68	cfs
Inlet Control HW Elev.	2,432.53	ft	Tailwater Elevation	2,428.63	ft
Outlet Control HW Elev.	2,432.86	ft	Control Type	Outlet Control	
Headwater Depth/Height	1.03				

Grades					
Upstream Invert	2,428.20	ft	Downstream Invert	2,427.80	ft
Length	*50.00*	*ft*	*Constructed Slope*	0.008000	ft/ft

Hydraulic Profile					
Profile	*M2*		*Depth, Downstream*	2.78	ft
Slope Type	Mild		Normal Depth	3.47	ft
Flow Regime	Subcritical		Critical Depth	2.78	ft
Velocity Downstream	8.70	ft/s	Critical Slope	0.014421	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.024	
Section Material	CMP		Span	4.50	ft
Section Size	54 inch		Rise	4.50	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	2,432.86	ft	Upstream Velocity Head	0.82	ft
Ke	0.70		Entrance Loss	0.58	ft

Inlet Control Properties					
Inlet Control HW Elev.	2,432.53	ft	Flow Control	Unsubmerged	
Inlet Type	Mitered to slope		Area Full	15.9	ft²
K	0.02100		HDS 5 Chart	2	
M	*1.33000*		*HDS 5 Scale*	2	
C	0.04630		Equation Form	1	
Y	0.75000				

Culvert Designer/Analyzer Report
#53-JEF

Rising Sun Road

Component:Culvert-2

Culvert Summary					
Computed Headwater Elev	2,432.86	ft	Discharge	71.88	cfs
Inlet Control HW Elev.	2,432.73	ft	Tailwater Elevation	2,428.63	ft
Outlet Control HW Elev.	2,432.86	ft	Control Type	Entrance Control	
Headwater Depth/Height	1.29				

Grades					
Upstream Invert	2,429.00	ft	Downstream Invert	2,427.80	ft
Length	50.00	ft	Constructed Slope	0.024000	ft/ft

Hydraulic Profile					
Profile	S2		Depth, Downstream	1.79	ft
Slope Type	Steep		Normal Depth	1.79	ft
Flow Regime	Supercritical		Critical Depth	2.02	ft
Velocity Downstream	9.39	ft/s	Critical Slope	0.017738	ft/ft

Section					
Section Shape	Arch		Mannings Coefficient	0.025	
Section Material	Aluminum Var CR Historic		Span	4.83	ft
Section Size	58 x 36 inch		Rise	3.00	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	2,432.86	ft	Upstream Velocity Head	1.08	ft
Ke	0.70		Entrance Loss	0.75	ft

Inlet Control Properties					
Inlet Control HW Elev.	2,432.73	ft	Flow Control	Transition	
Inlet Type	Mitered to slope (arch)		Area Full	11.4	ft^2
K	0.03000		HDS 5 Chart	34	
M	1.00000		HDS 5 Scale	2	
C	0.04630		Equation Form	1	
Y	0.75000				

Culvert Designer/Analyzer Report
#53-JEF

Rising Sun Road

Component: Weir

Hydraulic Component(s): Roadway					
Discharge	672.89	cfs	Allowable HW Elevation	2,432.86	ft
Roadway Width	25.00	ft	Overtopping Coefficient	3.02	US
Low Point	2,431.30	ft	Headwater Elevation	2,432.86	ft
Discharge Coefficient (Cr)	3.02		Submergence Factor (Kt)	1.00	
Tailwater Elevation	2,428.63	ft			

Sta (ft)	Elev. (ft)
0.00	2,436.90
19.00	2,435.40
53.00	2,433.50
104.00	2,431.90
153.00	2,431.40
191.00	2,431.30
230.00	2,431.70
297.00	2,433.80
344.00	2,436.60

Worksheet
Worksheet for Irregular Channel

Rising Sun Road

Project Description	
Worksheet	JEF-53
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data		
Slope	010000	ft/ft
Discharg	672.89	cfs

Options	
Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Results		
Mannings Coefficie	0.025	
Water Surface Elev	2,432.45	ft
Elevation Range	31.30 to 2,436.90	
Flow Area	132.5	ft²
Wetted Perimeter	167.73	ft
Top Width	167.70	ft
Actual Depth	1.15	ft
Critical Elevation	2,432.46	ft
Critical Slope	0.009841	ft/ft
Velocity	5.08	ft/s
Velocity Head	0.40	ft
Specific Energy	2,432.85	ft
Froude Number	1.01	
Flow Type	Supercritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00	3+44	0.025

Natural Channel Points

Station (ft)	Elevation (ft)
0+00	2,436.90
0+19	2,435.40
0+53	2,433.50
1+04	2,431.90
1+53	2,431.40
1+91	2,431.30
2+30	2,431.70
2+97	2,433.80
3+44	2,436.60

Table
Rating Table for Irregular Channel

Rising Sun Road

Project Description

Worksheet	JEF-53
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data

Slope 010000 ft/ft

Options

Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	700.00	5.00

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00	2,431.30	0.00	0.0	0.00	0.00
5.00	2,431.44	1.11	4.5	55.74	55.74
10.00	2,431.49	1.38	7.2	64.63	64.63
15.00	2,431.52	1.56	9.6	71.45	71.45
20.00	2,431.55	1.70	11.8	77.15	77.15
25.00	2,431.58	1.81	13.8	82.13	82.13
30.00	2,431.60	1.91	15.7	86.60	86.59
35.00	2,431.62	1.99	17.6	90.67	90.66
40.00	2,431.64	2.07	19.4	94.42	94.42
45.00	2,431.66	2.13	21.1	97.92	97.92
50.00	2,431.67	2.20	22.8	101.21	101.21
55.00	2,431.69	2.26	24.4	104.32	104.31
60.00	2,431.70	2.31	25.9	106.94	106.93
65.00	2,431.72	2.37	27.4	108.69	108.69
70.00	2,431.73	2.43	28.8	110.38	110.37
75.00	2,431.74	2.48	30.2	112.01	112.00
80.00	2,431.76	2.53	31.6	113.59	113.58
85.00	2,431.77	2.58	32.9	115.12	115.11
90.00	2,431.78	2.63	34.3	116.60	116.60
95.00	2,431.79	2.67	35.6	118.04	118.04
100.00	2,431.80	2.71	36.9	119.45	119.45
105.00	2,431.81	2.75	38.1	120.82	120.82
110.00	2,431.82	2.79	39.4	122.16	122.16
115.00	2,431.83	2.83	40.6	123.47	123.46
120.00	2,431.84	2.87	41.8	124.75	124.74
125.00	2,431.85	2.90	43.0	126.00	126.00
130.00	2,431.86	2.94	44.2	127.23	127.22
135.00	2,431.87	2.97	45.4	128.43	128.43
140.00	2,431.88	3.00	46.6	129.61	129.61
145.00	2,431.89	3.04	47.8	130.77	130.77
150.00	2,431.90	3.07	48.9	131.91	131.90
155.00	2,431.90	3.10	50.0	132.68	132.67
160.00	2,431.91	3.14	51.0	133.18	133.17
165.00	2,431.92	3.17	52.1	133.67	133.66

Table
Rating Table for Irregular Channel

Rising Sun Road

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
170.00	2,431.93	3.20	53.1	134.15	134.14
175.00	2,431.94	3.24	54.1	134.63	134.62
180.00	2,431.94	3.27	55.1	135.10	135.10
185.00	2,431.95	3.30	56.1	135.57	135.56
190.00	2,431.96	3.33	57.1	136.03	136.02
195.00	2,431.96	3.36	58.0	136.49	136.48
200.00	2,431.97	3.39	59.0	136.94	136.93
205.00	2,431.98	3.42	60.0	137.39	137.38
210.00	2,431.99	3.45	60.9	137.83	137.82
215.00	2,431.99	3.48	61.8	138.26	138.25
220.00	2,432.00	3.50	62.8	138.70	138.68
225.00	2,432.01	3.53	63.7	139.12	139.11
230.00	2,432.01	3.56	64.6	139.55	139.54
235.00	2,432.02	3.58	65.6	139.97	139.95
240.00	2,432.03	3.61	66.5	140.38	140.37
245.00	2,432.03	3.64	67.4	140.79	140.78
250.00	2,432.04	3.66	68.3	141.20	141.19
255.00	2,432.04	3.69	69.2	141.60	141.59
260.00	2,432.05	3.71	70.1	142.00	141.99
265.00	2,432.06	3.74	70.9	142.40	142.39
270.00	2,432.06	3.76	71.8	142.79	142.78
275.00	2,432.07	3.78	72.7	143.18	143.17
280.00	2,432.08	3.81	73.6	143.57	143.56
285.00	2,432.08	3.83	74.4	143.96	143.94
290.00	2,432.09	3.85	75.3	144.34	144.32
295.00	2,432.09	3.87	76.1	144.71	144.70
300.00	2,432.10	3.90	77.0	145.09	145.08
305.00	2,432.10	3.92	77.8	145.46	145.45
310.00	2,432.11	3.94	78.7	145.83	145.82
315.00	2,432.12	3.96	79.5	146.20	146.18
320.00	2,432.12	3.98	80.4	146.56	146.55
325.00	2,432.13	4.00	81.2	146.92	146.91
330.00	2,432.13	4.02	82.0	147.28	147.27
335.00	2,432.14	4.04	82.8	147.64	147.62
340.00	2,432.14	4.06	83.7	147.99	147.98
345.00	2,432.15	4.08	84.5	148.34	148.33
350.00	2,432.16	4.10	85.3	148.69	148.68
355.00	2,432.16	4.12	86.1	149.04	149.02
360.00	2,432.17	4.14	86.9	149.39	149.37
365.00	2,432.17	4.16	87.7	149.73	149.71
370.00	2,432.18	4.18	88.5	150.07	150.05
375.00	2,432.18	4.20	89.3	150.41	150.39
380.00	2,432.19	4.22	90.1	150.74	150.73
385.00	2,432.19	4.24	90.9	151.08	151.06
390.00	2,432.20	4.25	91.7	151.41	151.39
395.00	2,432.20	4.27	92.5	151.74	151.72
400.00	2,432.21	4.29	93.2	152.07	152.05
405.00	2,432.21	4.31	94.0	152.39	152.37
410.00	2,432.22	4.33	94.8	152.72	152.70
415.00	2,432.22	4.34	95.6	153.04	153.02
420.00	2,432.23	4.36	96.3	153.36	153.34
425.00	2,432.23	4.38	97.1	153.68	153.66
430.00	2,432.24	4.39	97.9	154.00	153.98
435.00	2,432.24	4.41	98.6	154.31	154.29

Table
Rating Table for Irregular Channel

Rising Sun Road

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)	
440.00	2,432.25	4.43	99.4	154.63	154.61	
445.00	2,432.25	4.44	100.1	154.94	154.92	
450.00	2,432.26	4.46	100.9	155.25	155.23	
455.00	2,432.26	4.48	101.7	155.56	155.54	
460.00	2,432.27	4.49	102.4	155.86	155.84	
465.00	2,432.27	4.51	103.2	156.17	156.15	
470.00	2,432.28	4.52	103.9	156.47	156.45	
475.00	2,432.28	4.54	104.6	156.78	156.76	
480.00	2,432.29	4.55	105.4	157.08	157.06	
485.00	2,432.29	4.57	106.1	157.38	157.36	
490.00	2,432.30	4.59	106.9	157.67	157.65	IMPASSIBLE
495.00	2,432.30	4.60	107.6	157.97	157.95	
500.00	2,432.31	4.62	108.3	158.27	158.25	
505.00	2,432.31	4.63	109.0	158.56	158.54	
510.00	2,432.31	4.65	109.8	158.85	158.83	
515.00	2,432.32	4.66	110.5	159.14	159.12	
520.00	2,432.32	4.68	111.2	159.43	159.41	
525.00	2,432.33	4.69	111.9	159.72	159.70	
530.00	2,432.33	4.70	112.7	160.01	159.99	
535.00	2,432.34	4.72	113.4	160.30	160.27	
540.00	2,432.34	4.73	114.1	160.58	160.56	
545.00	2,432.35	4.75	114.8	160.86	160.84	
550.00	2,432.35	4.76	115.5	161.15	161.12	
555.00	2,432.36	4.77	116.2	161.43	161.40	
560.00	2,432.36	4.79	116.9	161.71	161.68	
565.00	2,432.36	4.80	117.6	161.99	161.96	
570.00	2,432.37	4.82	118.4	162.26	162.24	
575.00	2,432.37	4.83	119.1	162.54	162.52	
580.00	2,432.38	4.84	119.8	162.81	162.79	
585.00	2,432.38	4.86	120.5	163.09	163.06	
590.00	2,432.39	4.87	121.2	163.36	163.34	
595.00	2,432.39	4.88	121.8	163.63	163.61	
600.00	2,432.39	4.90	122.5	163.90	163.88	
605.00	2,432.40	4.91	123.2	164.17	164.15	
610.00	2,432.40	4.92	123.9	164.44	164.42	
615.00	2,432.41	4.94	124.6	164.71	164.68	
620.00	2,432.41	4.95	125.3	164.97	164.95	
625.00	2,432.41	4.96	126.0	165.24	165.22	
630.00	2,432.42	4.97	126.7	165.50	165.48	
635.00	2,432.42	4.99	127.4	165.77	165.74	
640.00	2,432.43	5.00	128.0	166.03	166.00	
645.00	2,432.43	5.01	128.7	166.29	166.27	
650.00	2,432.44	5.02	129.4	166.55	166.53	
655.00	2,432.44	5.04	130.1	166.81	166.79	
660.00	2,432.44	5.05	130.8	167.07	167.04	
665.00	2,432.45	5.06	131.4	167.33	167.30	
670.00	2,432.45	5.07	132.1	167.58	167.56	
675.00	2,432.46	5.08	132.8	167.84	167.81	
680.00	2,432.46	5.10	133.4	168.09	168.07	
685.00	2,432.46	5.11	134.1	168.35	168.32	
690.00	2,432.47	5.12	134.8	168.60	168.57	
695.00	2,432.47	5.13	135.4	168.85	168.83	
700.00	2,432.48	5.14	136.1	169.10	169.08	

GW 100YR 6 HR
FUTURE

531 JEF

Rising Sun Road

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1*************************************
*                                   *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN  1998            *
*            VERSION 4.1            *
*                                   *
*  RUN DATE   27NOV02  TIME  08:49:21  *
*                                   *
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*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*           (916) 756-1104          *
*                                   *
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X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX         XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

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

1 HEC-1 INPUT PAGE 1

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

  1           ID     FUTURE CONDITIONS HYDROLOGY FOR CAREFREE AREA DRAINAGE MASTER PLAN
  2           ID       BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC., DEC. 2001
  3           ID
  4           ID     FUTURE CONDITIONS LAND USE BASED ON CAVE CREEK WATERCOURSE MASTER PLAN
  5           ID     HYDROLOGY BY TETRA TECH, 2000.
  6           ID
  7           ID     BASE MODEL BASED ON:
  8           ID
  9           ID          FLOODPLAIN DELINEATION STUDY OF ANDORA HILLS & GALLOWAY WASHES
 10           ID          FCD 99-14
 11           ID          BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC.
 12           ID          FOR THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
 13           ID          REVISED MARCH 2002     FILENAME: GWM224R.DAT
 14           ID      ****************************************************************
 15           ID          100 YEAR ANALYSIS 24-HOUR STORM USING JD RECORDS
 16           ID          MCUHP2 USED FOR UNIT HYDROGRAPHS
 17           ID     ****************************************************************
 18           ID
 19           ID     DDM MCUHP2 GALLOWAY WASH FLOODPLAIN DELINEATION STUDY, FCD NO. 99-14
 20           ID
 21           ID    March 2002 revisions to original Dec. 1999 model include:
 22           ID
 23           ID    HC BLOCK ADDED FOR GRAPEVINE WASH (CP 295A)
 24           ID
 25           ID    SUBBASIN GWW1_3 FURTHER SUBDIVIDED ALONG GALLOWAY WASH PER FEMA COMMENTS
 26           ID    IN LETTER DATED FEB. 8, 2002
 27           ID
 28           ID    *** ADDITIONAL COMBINATION ADDED 10-17-02 TO PROVIDE TOTAL FLOW IN
 29           ID        NORTH GALLOWAY WASH BY TWL FOR CH2M HILL FOR CAREFREE DMP ***
 30           ID
 31           ID   DDM MCUHP2 Carefree Area Drainage Master Plan, Galloway Wash Future Condition
              *DIAGRAM
 32           IT       5 01DEC99    0005     400
 33           IO       5       2
 34           IN      15
 35           JD    3.50    0.01
 36           PC    .000    .008    .016    .025    .033    .041    .050    .058    .066    .074
 37           PC    .087    .099    .118    .138    .216    .377    .834    .911    .931    .950
 38           PC    .962    .972    .983    .991   1.000
 39           JD    3.48    0.50
 40           JD    3.43    2.80
 41           PC    .000    .009    .016    .025    .034    .042    .051    .059    .067    .076
 42           PC    .087    .100    .120    .163    .252    .451    .694    .837    .900    .938
 43           PC    .950    .963    .975    .988   1.000
 44           JD    3.23    16.0
 45           PC    .000    .015    .020    .030    .048    .063    .076    .090    .105    .119
 46           PC    .135    .152    .175    .222    .304    .472    .670    .796    .868    .912
 47           PC    .946    .960    .973    .987   1.000
 48           JD    2.84    90.0
 49           PC    .000    .021    .035    .051    .071    .087    .105    .125    .143    .160
 50           PC    .179    .201    .232    .281    .364    .500    .658    .773    .841    .888
 51           PC    .927    .945    .964    .982   1.000
              *
              * DDM   ***** Updated *****
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1 HEC-1 INPUT PAGE 2

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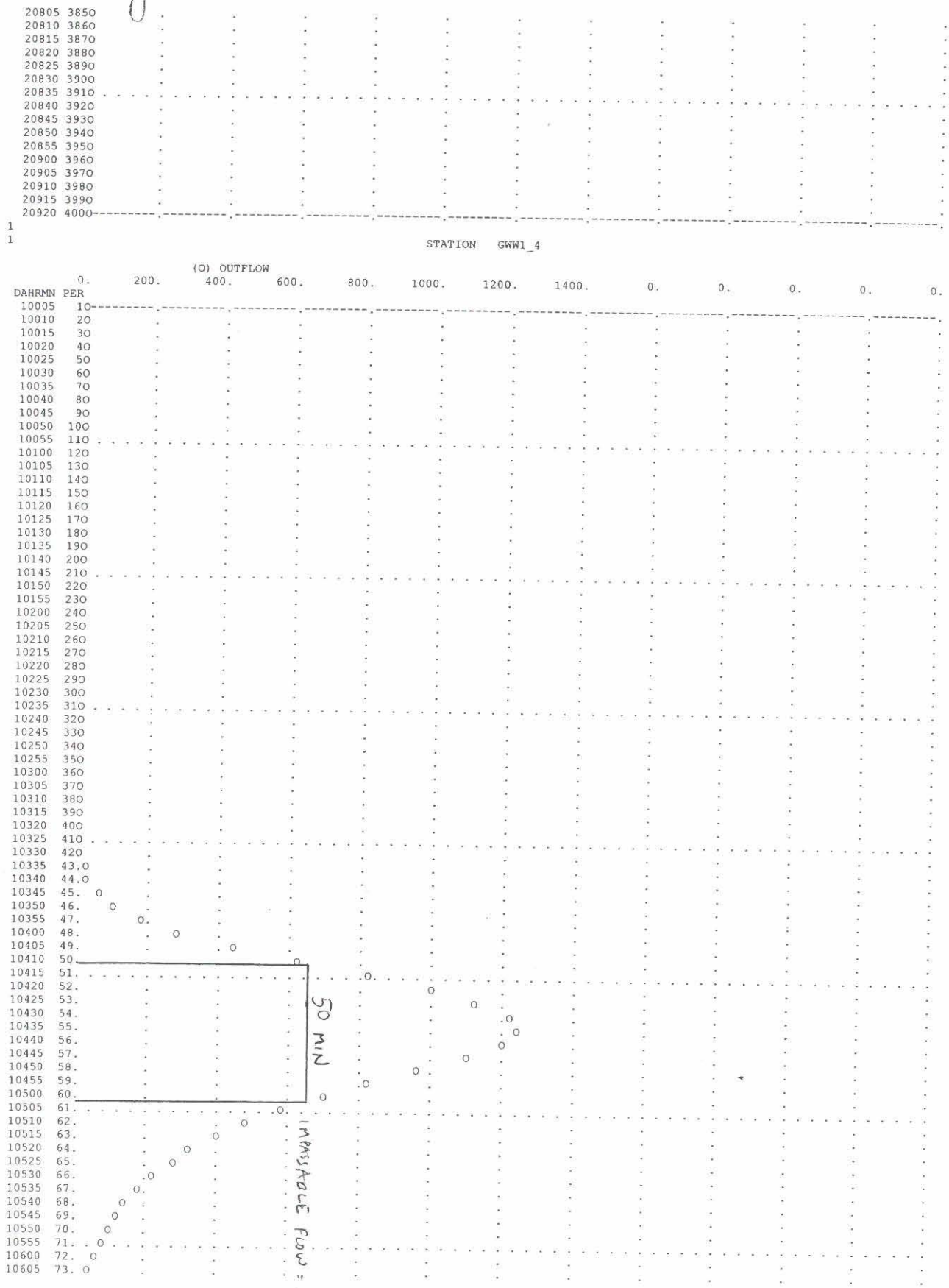
Rising Sun Road



Celestial Street (JEF #54)

Carefree Drainage Master Plan
Dip Crossing Notes

ID Number: 54-JEF

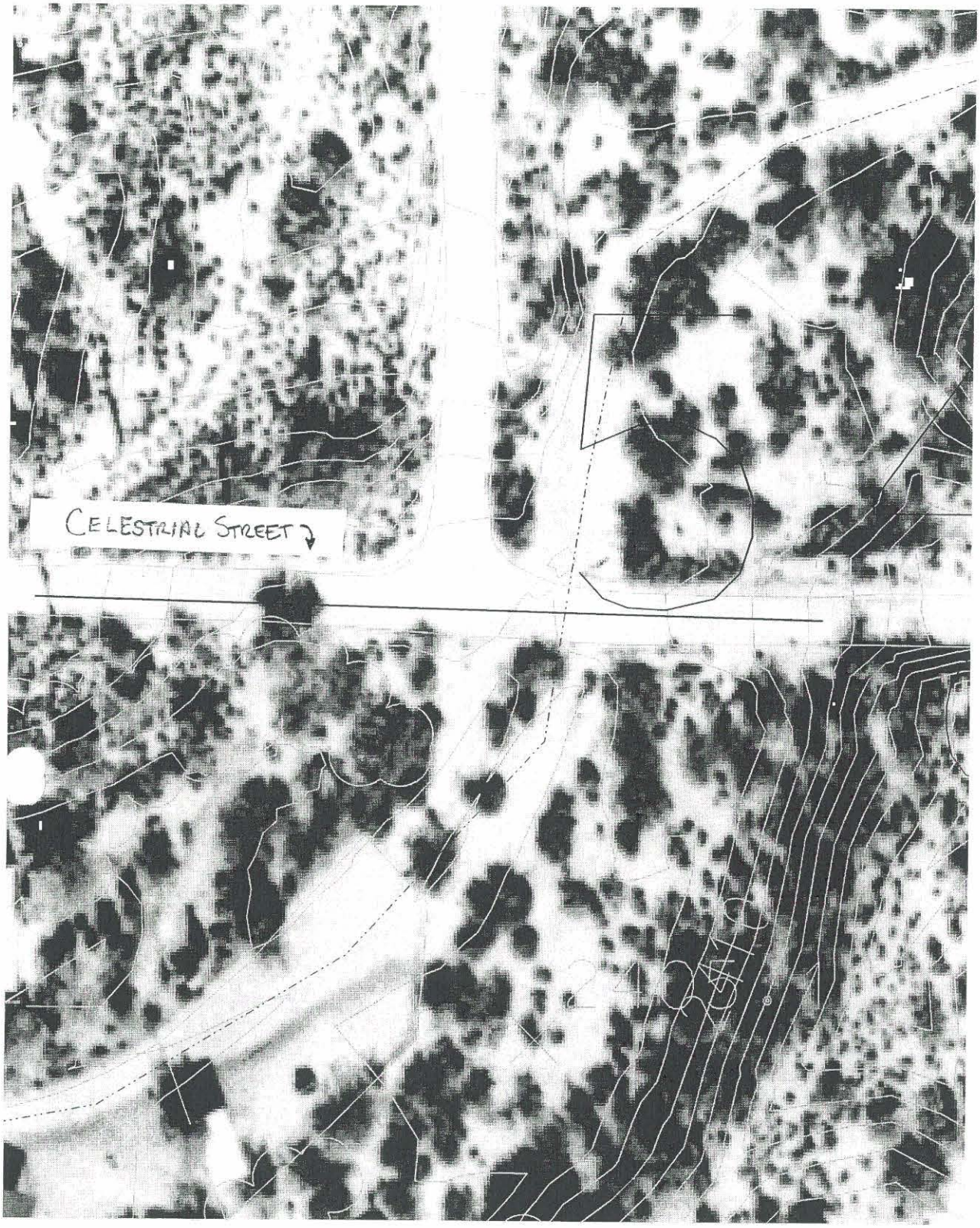
Source of Data: TOPO

Location: CELESTIAL STREET

Material: UNPAVED DIP CROSSING

Protection: None

Notes:



CELESTIAL STREET

N

SCALE 1" = 50'

54 (JEF)

NOTE: MAP AREA SHOWN IS LOCATED WITHIN TOWNSHIP 5 NORTH, RANGE 4 EAST AND TOWNSHIP 6 NORTH, RANGE 4 EAST.

ZONE AE

ZONE X

TOWN OF CAREFREE
040126

TOWN OF CAVE CREEK
040129

TOWN OF CAVE CREEK
TOWN OF CAREFREE

27

26

25

54

GRAPEVINE

STEVENS ROAD

HORIZON DRIVE

SPANISH BOOT ROAD

TRAIN ROAD

TRACY DRIVE

RISING SUN ROAD

CELESTIAL STREET

SCOPA TRAIL

SUNDANCE TRAIL

CREEK ROAD

HO ROAD

CAREFREE DRIVE

CHAIR ROAD

SERENE ROAD

PLEASANT PLACE

TEE TIME COURT

MULE DREAM STREET

ROCKING HARPY

Galloway Wash

Middle Branch

Galloway Wash Lower Branch

Footbridge

RM135

RM136

JOINS PANEL 0809

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA AND INCORPORATED AREAS

PANEL 808 OF 4350

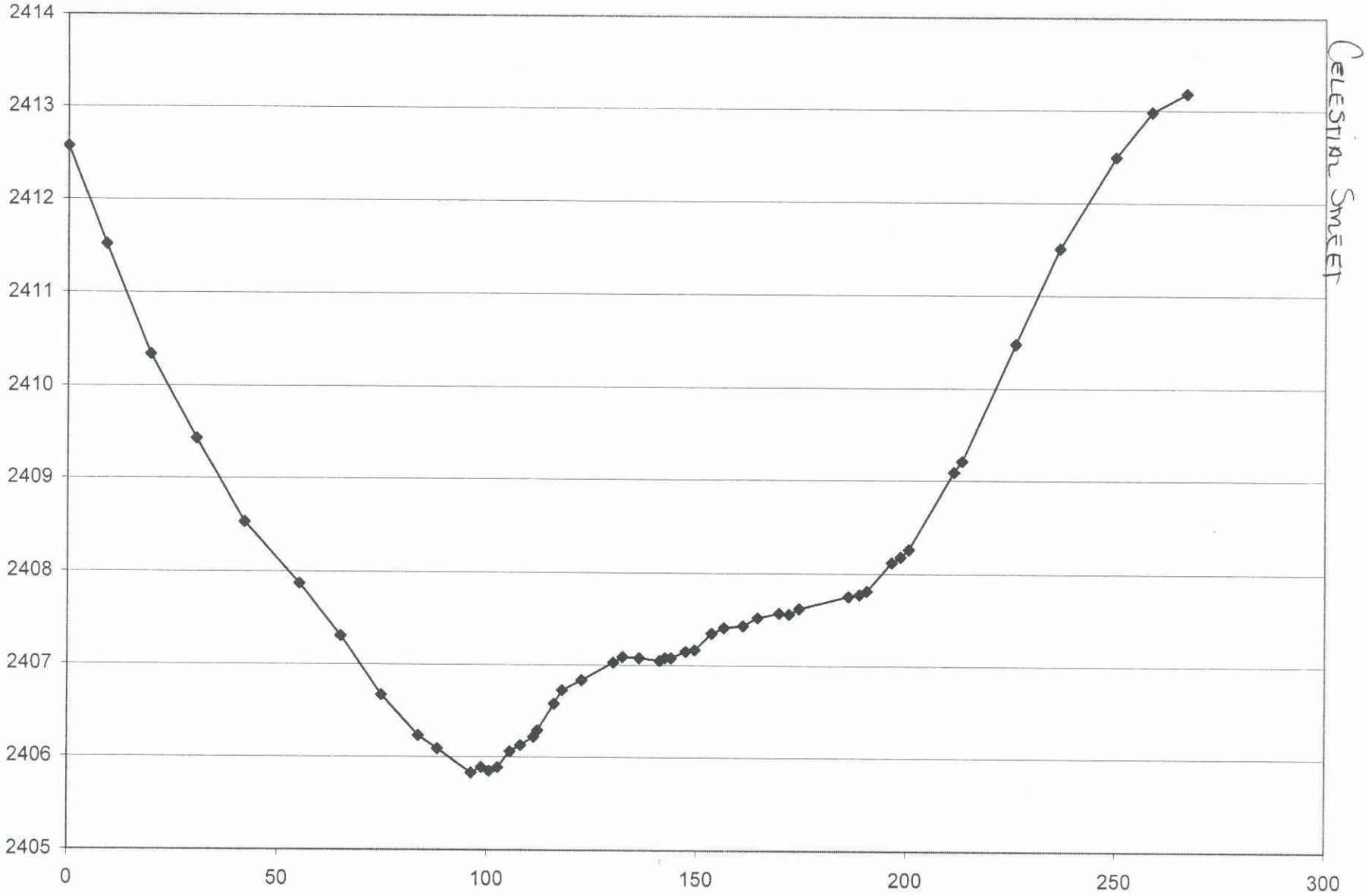
CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CAREFREE, TOWN OF	040126	0808	G
CAVE CREEK, TOWN OF	040129	0808	G
SCOTTSDALE, CITY OF	045012	0808	G

MAP NUMBER
04013C0808G

MAP REVISED:
DECEMBER 3, 1993

Federal Emergency Management Agency


2414
2413
2412
2411
2410
2409
2408
2407
2406
2405
0
50
100
150
200
250
300
CELESTIAL SMEET

Worksheet
Worksheet for Irregular Channel

CELESTIAL STREET

Project Description

Worksheet	JEF-54
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data

Slope	018800	ft/ft
Discharg	864.00	cfs

Options

Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Results

Mannings Coefficie	0.032	
Water Surface Elev	2,407.99	ft
Elevation Range	05.80 to 2,413.20	
Flow Area	136.5	ft²
Wetted Perimeter	137.70	ft
Top Width	137.60	ft
Actual Depth	2.19	ft
Critical Elevation	2,408.07	ft
Critical Slope	0.014661	ft/ft
Velocity	6.33	ft/s
Velocity Head	0.62	ft
Specific Energy	2,408.61	ft
Froude Number	1.12	
Flow Type	Supercritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00	2+67	0.032

Natural Channel Points

Station (ft)	Elevation (ft)
0+00	2,412.60
0+20	2,410.30
0+84	2,406.20
0+96	2,405.80
1+00	2,405.90
1+18	2,406.70
1+32	2,407.10
1+44	2,407.10
1+56	2,407.40
1+91	2,407.80
2+67	2,413.20

Table
Rating Table for Irregular Channel

CELESTIAL STREET

Project Description

Worksheet	JEF-54
Flow Element	Irregular Chan
Method	Manning's Forr
Solve For	Channel Depth

Input Data

Slope	018800	ft/ft

Options

Current Roughness Metho	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	900.00	5.00

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00	2,405.80	0.00	0.0	0.00	0.00
5.00	2,406.09	1.85	2.7	17.21	17.20
10.00	2,406.19	2.21	4.5	22.08	22.07
15.00	2,406.25	2.49	6.0	24.73	24.71
20.00	2,406.30	2.70	7.4	26.76	26.74
25.00	2,406.35	2.88	8.7	28.52	28.50
30.00	2,406.39	3.03	9.9	30.11	30.08
35.00	2,406.43	3.17	11.1	31.55	31.52
40.00	2,406.47	3.28	12.2	32.88	32.85
45.00	2,406.50	3.39	13.3	34.12	34.09
50.00	2,406.53	3.49	14.3	35.28	35.25
55.00	2,406.56	3.58	15.4	36.38	36.35
60.00	2,406.58	3.67	16.4	37.42	37.39
65.00	2,406.61	3.75	17.3	38.41	38.38
70.00	2,406.63	3.82	18.3	39.36	39.33
75.00	2,406.66	3.89	19.3	40.27	40.24
80.00	2,406.68	3.96	20.2	41.15	41.11
85.00	2,406.70	4.02	21.1	42.06	42.02
90.00	2,406.73	4.07	22.1	43.22	43.18
95.00	2,406.75	4.12	23.1	44.34	44.29
100.00	2,406.77	4.16	24.0	45.41	45.36
105.00	2,406.79	4.21	25.0	46.44	46.40
110.00	2,406.81	4.25	25.9	47.44	47.40
115.00	2,406.83	4.29	26.8	48.41	48.36
120.00	2,406.85	4.33	27.7	49.35	49.30
125.00	2,406.87	4.37	28.6	50.26	50.21
130.00	2,406.88	4.41	29.5	51.15	51.10
135.00	2,406.90	4.45	30.4	52.01	51.96
140.00	2,406.92	4.48	31.2	52.85	52.80
145.00	2,406.93	4.52	32.1	53.67	53.62
150.00	2,406.95	4.55	32.9	54.47	54.42
155.00	2,406.96	4.59	33.8	55.26	55.20
160.00	2,406.98	4.62	34.6	56.02	55.97
165.00	2,406.99	4.65	35.5	56.77	56.72

IMPASSABLE

Table
Rating Table for Irregular Channel

Celestial Street

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
440.00	2,407.56	5.34	82.5	107.49	107.41
445.00	2,407.57	5.34	83.3	108.25	108.17
450.00	2,407.58	5.35	84.1	109.00	108.92
455.00	2,407.58	5.36	84.8	109.75	109.67
460.00	2,407.59	5.37	85.6	110.49	110.41
465.00	2,407.60	5.38	86.4	111.22	111.14
470.00	2,407.60	5.39	87.2	111.94	111.86
475.00	2,407.61	5.40	88.0	112.66	112.58
480.00	2,407.62	5.41	88.8	113.37	113.29
485.00	2,407.63	5.42	89.5	114.07	113.99
490.00	2,407.63	5.43	90.3	114.77	114.69
495.00	2,407.64	5.44	91.1	115.46	115.38
500.00	2,407.65	5.44	91.8	116.14	116.06
505.00	2,407.65	5.45	92.6	116.82	116.74
510.00	2,407.66	5.46	93.4	117.49	117.41
515.00	2,407.67	5.47	94.1	118.16	118.08
520.00	2,407.67	5.48	94.9	118.82	118.74
525.00	2,407.68	5.49	95.6	119.48	119.39
530.00	2,407.68	5.50	96.4	120.13	120.04
535.00	2,407.69	5.51	97.2	120.77	120.69
540.00	2,407.70	5.52	97.9	121.41	121.33
545.00	2,407.70	5.52	98.6	122.05	121.96
550.00	2,407.71	5.53	99.4	122.68	122.59
555.00	2,407.72	5.54	100.1	123.30	123.22
560.00	2,407.72	5.55	100.9	123.92	123.84
565.00	2,407.73	5.56	101.6	124.54	124.45
570.00	2,407.73	5.57	102.4	125.15	125.06
575.00	2,407.74	5.58	103.1	125.75	125.67
580.00	2,407.74	5.59	103.8	126.36	126.27
585.00	2,407.75	5.59	104.6	126.95	126.87
590.00	2,407.76	5.60	105.3	127.55	127.46
595.00	2,407.76	5.61	106.0	128.14	128.05
600.00	2,407.77	5.62	106.8	128.72	128.63
605.00	2,407.77	5.63	107.5	129.30	129.21
610.00	2,407.78	5.64	108.2	129.88	129.79
615.00	2,407.78	5.65	108.9	130.45	130.36
620.00	2,407.79	5.65	109.7	131.02	130.93
625.00	2,407.80	5.66	110.4	131.59	131.50
630.00	2,407.80	5.67	111.1	132.08	132.00
635.00	2,407.80	5.69	111.6	132.21	132.12
640.00	2,407.81	5.70	112.2	132.34	132.25
645.00	2,407.81	5.72	112.8	132.47	132.38
650.00	2,407.82	5.73	113.3	132.60	132.51
655.00	2,407.82	5.75	113.9	132.72	132.63
660.00	2,407.83	5.77	114.5	132.85	132.76
665.00	2,407.83	5.78	115.0	132.98	132.89
670.00	2,407.83	5.80	115.6	133.10	133.01
675.00	2,407.84	5.81	116.2	133.23	133.14
680.00	2,407.84	5.83	116.7	133.35	133.26
685.00	2,407.85	5.84	117.3	133.48	133.38
690.00	2,407.85	5.86	117.8	133.60	133.51
695.00	2,407.86	5.87	118.4	133.72	133.63
700.00	2,407.86	5.89	118.9	133.85	133.76
705.00	2,407.86	5.90	119.5	133.97	133.88

GW 100 YR 6 HR
FUTURE

54 (JEF)

CELESTIAL STREET

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1*************************************
*                                   *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN  1998            *
*           VERSION 4.1             *
*                                   *
* RUN DATE   27NOV02  TIME  08:49:21  *
*                                   *
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*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*           (916) 756-1104          *
*                                   *
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

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

1 HEC-1 INPUT PAGE 1

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  2           ID       BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC., DEC. 2001
  3           ID
  4           ID     FUTURE CONDITIONS LAND USE BASED ON CAVE CREEK WATERCOURSE MASTER PLAN
  5           ID     HYDROLOGY BY TETRA TECH, 2000.
  6           ID
  7           ID     BASE MODEL BASED ON:
  8           ID
  9           ID           FLOODPLAIN DELINEATION STUDY OF ANDORA HILLS & GALLOWAY WASHES
 10           ID           FCD 99-14
 11           ID           BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC.
 12           ID           FOR THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
 13           ID           REVISED MARCH 2002     FILENAME: GWM224R.DAT
 14           ID      ***************************************************************
 15           ID           100 YEAR ANALYSIS 24-HOUR STORM USING JD RECORDS
 16           ID           MCUHP2 USED FOR UNIT HYDROGRAPHS
 17           ID     ***************************************************************
 18           ID
 19           ID     DDM MCUHP2 GALLOWAY WASH FLOODPLAIN DELINEATION STUDY, FCD NO. 99-14
 20           ID
 21           ID    March 2002 revisions to original Dec. 1999 model include:
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 28           ID    *** ADDITIONAL COMBINATION ADDED 10-17-02 TO PROVIDE TOTAL FLOW IN
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 30           ID
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              *DIAGRAM
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 33           IO       5       2
 34           IN      15
 35           JD    3.50    0.01
 36           PC    .000    .008    .016    .025    .033    .041    .050    .058    .066    .074
 37           PC    .087    .099    .118    .138    .216    .377    .834    .911    .931    .950
 38           PC    .962    .972    .983    .991   1.000
 39           JD    3.48    0.50
 40           JD    3.43    2.80
 41           PC    .000    .009    .016    .025    .034    .042    .051    .059    .067    .076
 42           PC    .087    .100    .120    .163    .252    .451    .694    .837    .900    .938
 43           PC    .950    .963    .975    .988   1.000
 44           JD    3.23    16.0
 45           PC    .000    .015    .020    .030    .048    .063    .076    .090    .105    .119
 46           PC    .135    .152    .175    .222    .304    .472    .670    .796    .868    .912
 47           PC    .946    .960    .973    .987   1.000
 48           JD    2.84    90.0
 49           PC    .000    .021    .035    .051    .071    .087    .105    .125    .143    .160
 50           PC    .179    .201    .232    .281    .364    .500    .658    .773    .841    .888
 51           PC    .927    .945    .964    .982   1.000
              *
              * DDM   ***** Updated *****
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1 HEC-1 INPUT PAGE 2

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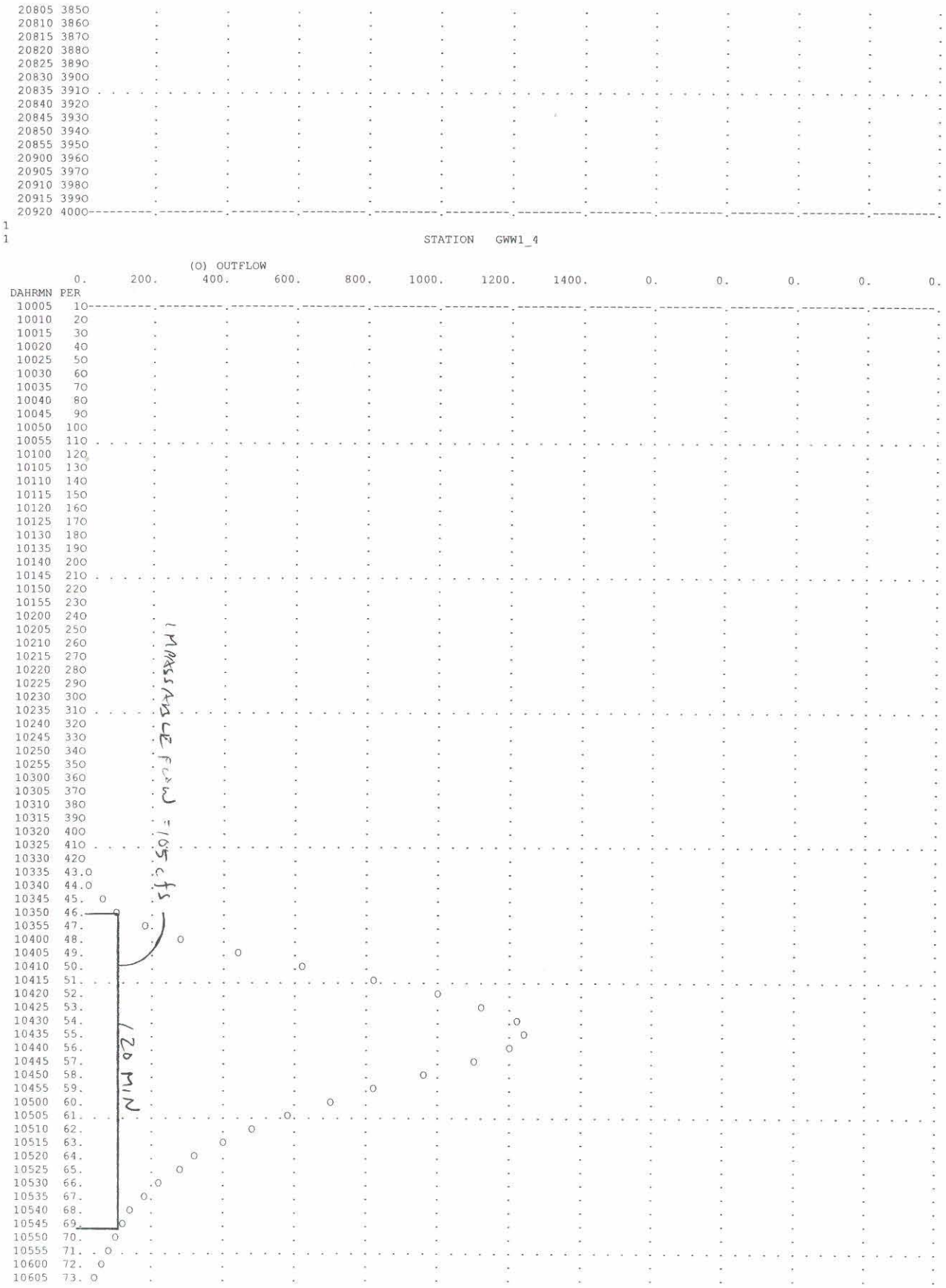
CELESTIAL STREET



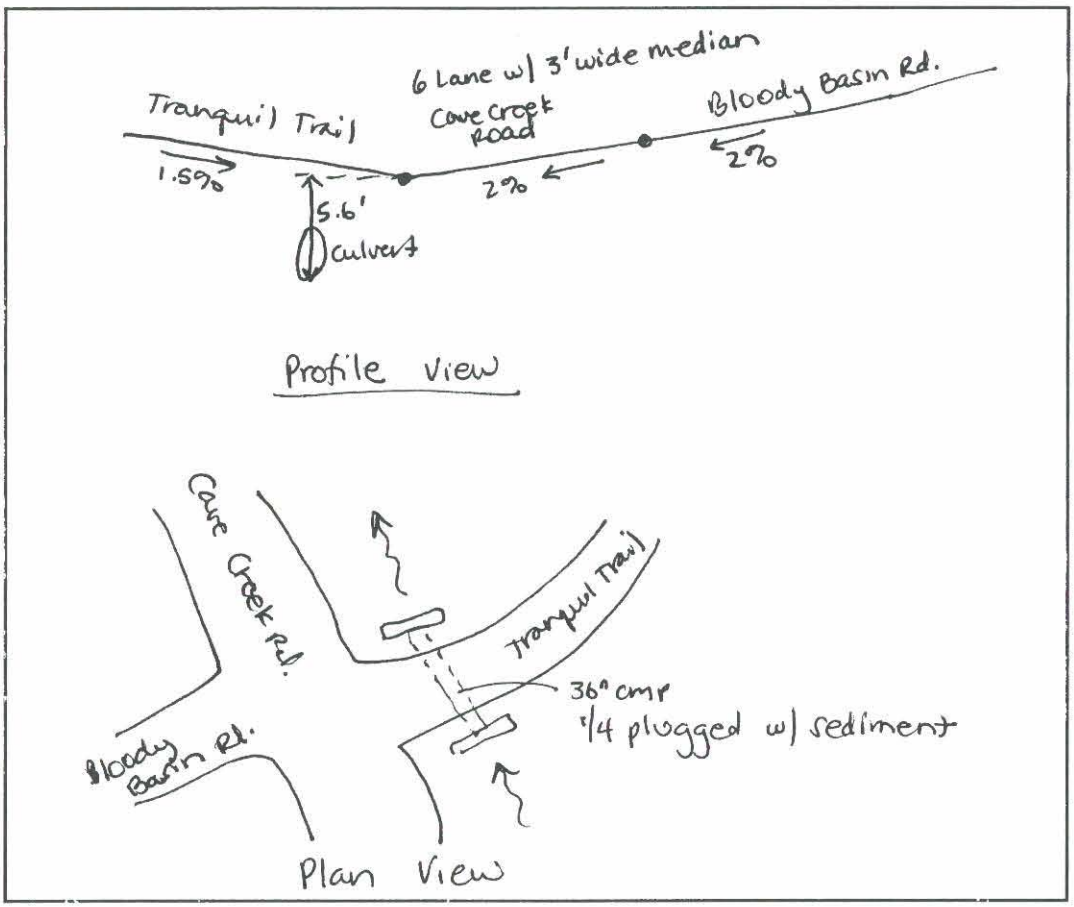
Tranquil Trail at Cave Creek Road (#63)

Carefree Drainage Master Plan
Field Survey Notes

Culvert Number: #63

Date of Survey: 10/9/02

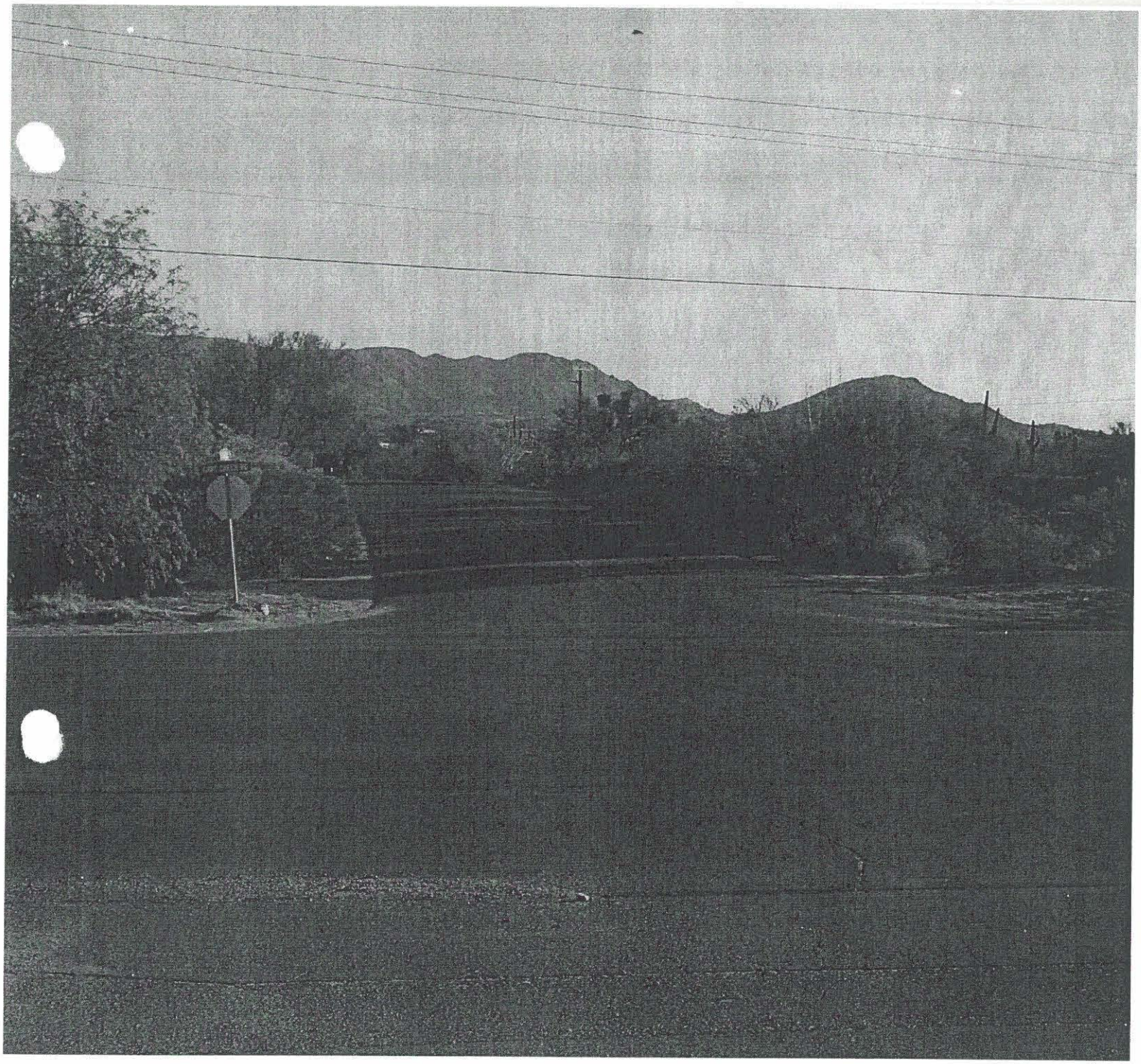
Location: Tranquil Trail at Cave Creek Road



Material: 36" cmp culvert

Headwall: concrete, straight across (no wing walls)

Notes: Very wide overtopping area



TRANQUIL TRAIL AT CAVE CREEK ROAD (#63)

10/9/02

Culvert Designer/Analyzer Report
#63 Tranquil Trail

TRANQUIL TRAIL AT CAVE CREEK ROAD

Analysis Component			
Storm Event	Design	Discharge	947.00 cfs

Peak Discharge Method: User-Specified			
Design Discharge	947.00 cfs	Check Discharge	0.00 cfs

Tailwater properties: Irregular Channel

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00	1+12	0.040
1+12	1+32	0.028
1+32	2+44	0.040

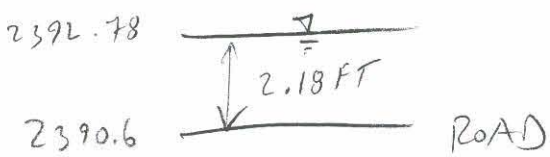
Natural Channel Points

Station (ft)	Elevation (ft)
0+00	2,396.50
1+00	2,386.50
1+12	2,384.00
1+32	2,384.00
1+44	2,386.50
2+44	2,396.50

Tailwater conditions for Design Storm.

Discharge	947.00 cfs	Actual Depth	3.61 ft
Velocity	6.71 ft/s		

Name	Description	Discharge	HW Elev.	Velocity
Culvert-1	1-36 inch Circular	71.63 cfs	2,392.78 ft	10.75 ft/s
Weir	Roadway	875.74 cfs	2,392.78 ft	N/A
Total	----------	947.38 cfs	2,392.78 ft	N/A



Culvert Designer/Analyzer Report
#63 Tranquil Trail

TRANQUIL TRAIL AT CAVE CREEK ROAD

Component:Culvert-1

Culvert Summary			
Computed Headwater Elev	2,392.78 ft	Discharge	71.63 cfs
Inlet Control HW Elev.	2,390.97 ft	Tailwater Elevation	2,387.61 ft
Outlet Control HW Elev.	2,392.78 ft	Control Type	Outlet Control
Headwater Depth/Height	2.59		

Grades			
Upstream Invert	2,385.01 ft	Downstream Invert	2,385.00 ft
Length	64.00 ft	Constructed Slope	0.000156 ft/ft

Hydraulic Profile			
Profile	CompositeM2PressureProfile	Depth, Downstream	2.68 ft
Slope Type	Mild	Normal Depth	N/A ft
Flow Regime	Subcritical	Critical Depth	2.68 ft
Velocity Downstream	10.75 ft/s	Critical Slope	0.034848 ft/ft

Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	3.00 ft
Section Size	36 inch	Rise	3.00 ft
Number Sections	1		

Outlet Control Properties			
Outlet Control HW Elev.	2,392.78 ft	Upstream Velocity Head	1.60 ft
Ke	0.50	Entrance Loss	0.80 ft

Inlet Control Properties			
Inlet Control HW Elev.	2,390.97 ft	Flow Control	Submerged
Inlet Type	Headwall	Area Full	7.1 ft²
K	0.00780	HDS 5 Chart	2
M	2.00000	HDS 5 Scale	1
C	0.03790	Equation Form	1
Y	0.69000		

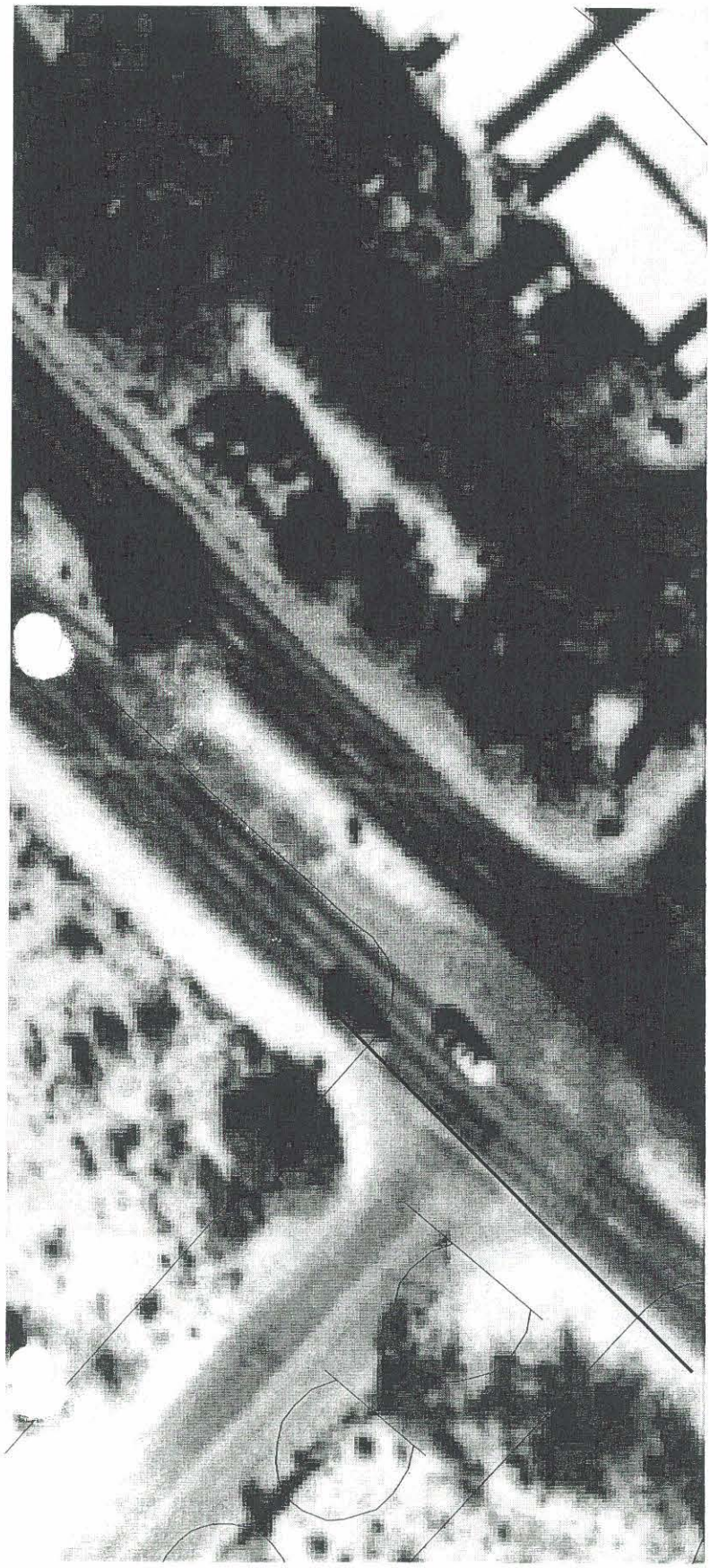
Culvert Designer/Analyzer Report
#63 Tranquil Trail

TRANQUIL TRAIL AT CAVE CREEK ROAD

Component:Weir

Hydraulic Component(s): Roadway					
Discharge	875.74	cfs	Allowable HW Elevation	2,392.78	ft
Roadway Width	50.00	ft	Overtopping Coefficient	3.04	US
Low Point	2,390.60	ft	Headwater Elevation	2,392.78	ft
Discharge Coefficient (Cr)	3.04		Submergence Factor (Kt)	1.00	
Tailwater Elevation	2,387.61	ft			

Sta (ft)	Elev. (ft)
0.00	2,398.10
500.00	2,390.60
1,000.00	2,400.60



TRANQUIL TRAIL AT CAVE CREEK ROAD

N

SCALE 1" = 40'

NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
MARICOPA COUNTY, ARIZONA AND INCORPORATED AREAS
PANEL 808 OF 4350
CONTAINS:
COMMUNITY NUMBER PANEL SUFFIX
CAREFREE, TOWN OF . . . . . 040129 . . . 0808 . . . G
CAVE CREEK, TOWN OF . . . . . 040129 . . . 0808 . . . G
SCOTTSDALE, CITY OF . . . . . 045012 . . . 0808 . . . G
MAP NUMBER
04013C0808G
MAP REVISED:
DECEMBER 3, 1993
Federal Emergency Management Agency
ZONE X
ZONE AE
ZONE D
LIMIT OF DETAILED STUDY
RM136
RM135
RM134
RM133
RM598
Galloway Wash
Galloway Wash Lower Branch
Footbridge
SUNDANCE TRAIL
SERENE ROAD
CHAIR ROAD
CAREFREE DRIVE
HOLIDAY
BURRO ROAD
NEVER MIND TRAIL
BLOODY BASIN ROAD
SIDEWINDER ROAD
LAZY LANE
NONCHALANT AVENUE
PRIMROSE PATH
RAMBLING ROAD
BREATHLESS DRIVE
RADIANT COURT
PEACEFUL PL
SCOTTSDALE
RIFLE ROAD
DERRINGER
SIX GUN
BENT BARREL
UP & DOWN
LONG AVENUE
MULE TRAIN
DREAM STREET
TRANQUIL TRAIL
ROCKING STREET
PLEASANT PLACE
HUM ROAD
HO ROAD
EASY STREET
CAVE CREEK
HAPPY HOLLOW
DARLINGTON DRIVE
TOM ELBOW
34
35
36
63

Worksheet
Worksheet for Irregular Channel

TRANQUIL TRAIL AT CAVE CREEK ROAD

Project Description

Worksheet	63
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data

Slope	010000	ft/ft
Discharg	875.74	cfs

Options

Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Results

Mannings Coefficie	0.025	
Water Surface Elev	2,392.28	ft
Elevation Range	0.60 to 2,400.60	
Flow Area	165.3	ft²
Wetted Perimeter	196.42	ft
Top Width	196.39	ft
Actual Depth	1.68	ft
Critical Elevation	2,392.30	ft
Critical Slope	0.009625	ft/ft
Velocity	5.30	ft/s
Velocity Head	0.44	ft
Specific Energy	2,392.72	ft
Froude Number	1.02	
Flow Type	Supercritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00	10+00	0.025

Natural Channel Points

Station (ft)	Elevation (ft)
0+00	2,398.10
5+00	2,390.60
10+00	2,400.60

© Haestad Methods, Inc.
CH2M Hill
37 Brookside Road Waterbury, CT 06708 USA (203) 755-1666

Table
Rating Table for Irregular Channel

TRANQUIL TRAIL AT CAVE CREEK ROAD

Project Description	
Worksheet	63
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data	
Slope	010000 ft/ft

Options	
Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	900.00	5.00

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00	2,390.60	0.00	0.0	0.00	0.00
5.00	2,390.84	1.46	3.4	28.31	28.30
10.00	2,390.91	1.73	5.8	36.71	36.71
15.00	2,390.97	1.92	7.8	42.74	42.73
20.00	2,391.01	2.06	9.7	47.61	47.60
25.00	2,391.04	2.18	11.5	51.76	51.76
30.00	2,391.08	2.28	13.2	55.43	55.42
35.00	2,391.10	2.37	14.8	58.72	58.72
40.00	2,391.13	2.45	16.3	61.74	61.73
45.00	2,391.15	2.52	17.8	64.53	64.52
50.00	2,391.18	2.59	19.3	67.13	67.12
55.00	2,391.20	2.65	20.7	69.57	69.56
60.00	2,391.22	2.71	22.1	71.88	71.87
65.00	2,391.23	2.77	23.5	74.07	74.06
70.00	2,391.25	2.82	24.8	76.16	76.15
75.00	2,391.27	2.87	26.2	78.15	78.14
80.00	2,391.29	2.91	27.5	80.07	80.06
85.00	2,391.30	2.96	28.7	81.91	81.90
90.00	2,391.32	3.00	30.0	83.68	83.67
95.00	2,391.33	3.04	31.2	85.40	85.38
100.00	2,391.35	3.08	32.5	87.06	87.04
105.00	2,391.36	3.12	33.7	88.66	88.65
110.00	2,391.37	3.15	34.9	90.22	90.21
115.00	2,391.39	3.19	36.1	91.74	91.73
120.00	2,391.40	3.22	37.2	93.22	93.20
125.00	2,391.41	3.26	38.4	94.65	94.64
130.00	2,391.42	3.29	39.5	96.06	96.04
135.00	2,391.43	3.32	40.7	97.43	97.41
140.00	2,391.45	3.35	41.8	98.76	98.75
145.00	2,391.46	3.38	42.9	100.07	100.06
150.00	2,391.47	3.41	44.0	101.35	101.34
155.00	2,391.48	3.44	45.1	102.61	102.59
160.00	2,391.49	3.46	46.2	103.83	103.82
165.00	2,391.50	3.49	47.3	105.04	105.02

Table
Rating Table for Irregular Channel

TRANQUIL TRAIL AT CAVE CREEK ROAD

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
170.00	2,391.51	3.52	48.3	106.22	106.21
175.00	2,391.52	3.54	49.4	107.38	107.37
180.00	2,391.53	3.57	50.5	108.52	108.51
185.00	2,391.54	3.59	51.5	109.64	109.63
190.00	2,391.55	3.62	52.5	110.75	110.73
195.00	2,391.56	3.64	53.6	111.83	111.81
200.00	2,391.57	3.66	54.6	112.90	112.88
205.00	2,391.58	3.69	55.6	113.95	113.93
210.00	2,391.59	3.71	56.6	114.98	114.96
215.00	2,391.59	3.73	57.7	116.00	115.98
220.00	2,391.60	3.75	58.7	117.01	116.99
225.00	2,391.61	3.77	59.7	118.00	117.98
230.00	2,391.62	3.79	60.6	118.97	118.95
235.00	2,391.63	3.81	61.6	119.94	119.92
240.00	2,391.64	3.83	62.6	120.89	120.87
245.00	2,391.64	3.85	63.6	121.82	121.81
250.00	2,391.65	3.87	64.6	122.75	122.73
255.00	2,391.66	3.89	65.5	123.67	123.65
260.00	2,391.67	3.91	66.5	124.57	124.55
265.00	2,391.68	3.93	67.4	125.46	125.44
270.00	2,391.68	3.95	68.4	126.35	126.33
275.00	2,391.69	3.97	69.3	127.22	127.20
280.00	2,391.70	3.98	70.3	128.08	128.06
285.00	2,391.70	4.00	71.2	128.93	128.91
290.00	2,391.71	4.02	72.2	129.78	129.76
295.00	2,391.72	4.04	73.1	130.61	130.59
300.00	2,391.73	4.05	74.0	131.44	131.42
305.00	2,391.73	4.07	74.9	132.25	132.23
310.00	2,391.74	4.09	75.9	133.06	133.04
315.00	2,391.75	4.10	76.8	133.86	133.84
320.00	2,391.75	4.12	77.7	134.66	134.64
325.00	2,391.76	4.14	78.6	135.44	135.42
330.00	2,391.77	4.15	79.5	136.22	136.20
335.00	2,391.77	4.17	80.4	136.99	136.97
340.00	2,391.78	4.18	81.3	137.75	137.73
345.00	2,391.79	4.20	82.2	138.51	138.49
350.00	2,391.79	4.21	83.1	139.26	139.24
355.00	2,391.80	4.23	84.0	140.00	139.98
360.00	2,391.81	4.24	84.9	140.74	140.72
365.00	2,391.81	4.26	85.7	141.47	141.45
370.00	2,391.82	4.27	86.6	142.19	142.17
375.00	2,391.82	4.29	87.5	142.91	142.89
380.00	2,391.83	4.30	88.4	143.62	143.60
385.00	2,391.84	4.31	89.2	144.33	144.30
390.00	2,391.84	4.33	90.1	145.03	145.00
395.00	2,391.85	4.34	91.0	145.72	145.70
400.00	2,391.85	4.36	91.8	146.41	146.39
405.00	2,391.86	4.37	92.7	147.09	147.07
410.00	2,391.87	4.38	93.6	147.77	147.75
415.00	2,391.87	4.40	94.4	148.44	148.42
420.00	2,391.88	4.41	95.3	149.11	149.09
425.00	2,391.88	4.42	96.1	149.78	149.75
430.00	2,391.89	4.43	97.0	150.43	150.41
435.00	2,391.89	4.45	97.8	151.09	151.07

IMPASSIBLE

Table
Rating Table for Irregular Channel

TRANQUIL TRAIL AT COVE CREEK ROAD

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
440.00	2,391.90	4.46	98.6	151.74	151.71
445.00	2,391.91	4.47	99.5	152.38	152.36
450.00	2,391.91	4.49	100.3	153.02	153.00
455.00	2,391.92	4.50	101.2	153.66	153.63
460.00	2,391.92	4.51	102.0	154.29	154.26
465.00	2,391.93	4.52	102.8	154.91	154.89
470.00	2,391.93	4.53	103.6	155.54	155.51
475.00	2,391.94	4.55	104.5	156.16	156.13
480.00	2,391.94	4.56	105.3	156.77	156.75
485.00	2,391.95	4.57	106.1	157.38	157.36
490.00	2,391.95	4.58	106.9	157.99	157.96
495.00	2,391.96	4.59	107.8	158.59	158.57
500.00	2,391.96	4.61	108.6	159.19	159.16
505.00	2,391.97	4.62	109.4	159.78	159.76
510.00	2,391.97	4.63	110.2	160.37	160.35
515.00	2,391.98	4.64	111.0	160.96	160.94
520.00	2,391.98	4.65	111.8	161.55	161.52
525.00	2,391.99	4.66	112.6	162.13	162.10
530.00	2,391.99	4.67	113.4	162.70	162.68
535.00	2,392.00	4.68	114.2	163.28	163.25
540.00	2,392.00	4.69	115.0	163.85	163.82
545.00	2,392.01	4.71	115.8	164.42	164.39
550.00	2,392.01	4.72	116.6	164.98	164.96
555.00	2,392.02	4.73	117.4	165.54	165.52
560.00	2,392.02	4.74	118.2	166.10	166.07
565.00	2,392.03	4.75	119.0	166.65	166.63
570.00	2,392.03	4.76	119.8	167.21	167.18
575.00	2,392.04	4.77	120.6	167.75	167.73
580.00	2,392.04	4.78	121.4	168.30	168.27
585.00	2,392.05	4.79	122.1	168.84	168.82
590.00	2,392.05	4.80	122.9	169.38	169.36
595.00	2,392.06	4.81	123.7	169.92	169.89
600.00	2,392.06	4.82	124.5	170.45	170.43
605.00	2,392.07	4.83	125.3	170.98	170.96
610.00	2,392.07	4.84	126.0	171.51	171.49
615.00	2,392.07	4.85	126.8	172.04	172.01
620.00	2,392.08	4.86	127.6	172.56	172.54
625.00	2,392.08	4.87	128.3	173.08	173.06
630.00	2,392.09	4.88	129.1	173.60	173.57
635.00	2,392.09	4.89	129.9	174.12	174.09
640.00	2,392.10	4.90	130.7	174.63	174.60
645.00	2,392.10	4.91	131.4	175.14	175.11
650.00	2,392.11	4.92	132.2	175.65	175.62
655.00	2,392.11	4.93	132.9	176.15	176.13
660.00	2,392.11	4.94	133.7	176.65	176.63
665.00	2,392.12	4.95	134.5	177.16	177.13
670.00	2,392.12	4.95	135.2	177.65	177.63
675.00	2,392.13	4.96	136.0	178.15	178.12
680.00	2,392.13	4.97	136.7	178.64	178.62
685.00	2,392.14	4.98	137.5	179.13	179.11
690.00	2,392.14	4.99	138.2	179.62	179.60
695.00	2,392.14	5.00	139.0	180.11	180.08
700.00	2,392.15	5.01	139.7	180.60	180.57
705.00	2,392.15	5.02	140.5	181.08	181.05

Table
Rating Table for Irregular Channel

TRANQUIL TRAIL AT CAVE CREEK ROAD

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
710.00	2,392.16	5.03	141.2	181.56	181.53
715.00	2,392.16	5.04	142.0	182.04	182.01
720.00	2,392.16	5.04	142.7	182.51	182.49
725.00	2,392.17	5.05	143.5	182.99	182.96
730.00	2,392.17	5.06	144.2	183.46	183.43
735.00	2,392.18	5.07	144.9	183.93	183.90
740.00	2,392.18	5.08	145.7	184.40	184.37
745.00	2,392.18	5.09	146.4	184.87	184.84
750.00	2,392.19	5.10	147.2	185.33	185.30
755.00	2,392.19	5.11	147.9	185.79	185.76
760.00	2,392.20	5.11	148.6	186.25	186.22
765.00	2,392.20	5.12	149.4	186.71	186.68
770.00	2,392.20	5.13	150.1	187.17	187.14
775.00	2,392.21	5.14	150.8	187.62	187.59
780.00	2,392.21	5.15	151.6	188.08	188.05
785.00	2,392.22	5.16	152.3	188.53	188.50
790.00	2,392.22	5.16	153.0	188.98	188.95
795.00	2,392.22	5.17	153.7	189.42	189.40
800.00	2,392.23	5.18	154.5	189.87	189.84
805.00	2,392.23	5.19	155.2	190.31	190.29
810.00	2,392.23	5.20	155.9	190.76	190.73
815.00	2,392.24	5.20	156.6	191.20	191.17
820.00	2,392.24	5.21	157.3	191.64	191.61
825.00	2,392.25	5.22	158.1	192.07	192.04
830.00	2,392.25	5.23	158.8	192.51	192.48
835.00	2,392.25	5.24	159.5	192.94	192.91
840.00	2,392.26	5.24	160.2	193.38	193.35
845.00	2,392.26	5.25	160.9	193.81	193.78
850.00	2,392.26	5.26	161.6	194.24	194.21
855.00	2,392.27	5.27	162.4	194.66	194.63
860.00	2,392.27	5.27	163.1	195.09	195.06
865.00	2,392.28	5.28	163.8	195.51	195.48
870.00	2,392.28	5.29	164.5	195.94	195.91
875.00	2,392.28	5.30	165.2	196.36	196.33
880.00	2,392.29	5.30	165.9	196.78	196.75
885.00	2,392.29	5.31	166.6	197.20	197.17
890.00	2,392.29	5.32	167.3	197.61	197.58
895.00	2,392.30	5.33	168.0	198.03	198.00
900.00	2,392.30	5.33	168.7	198.44	198.41

GW 100YR 6 HR
FUTURE

TRANQUIL TRAIL AT CAVE CREEK ROAD

```
1*************************************
*                                   *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*             JUN  1998             *
*           VERSION 4.1             *
*                                   *
* RUN DATE   27NOV02  TIME  08:49:21 *
*                                   *
*************************************
```

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

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

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

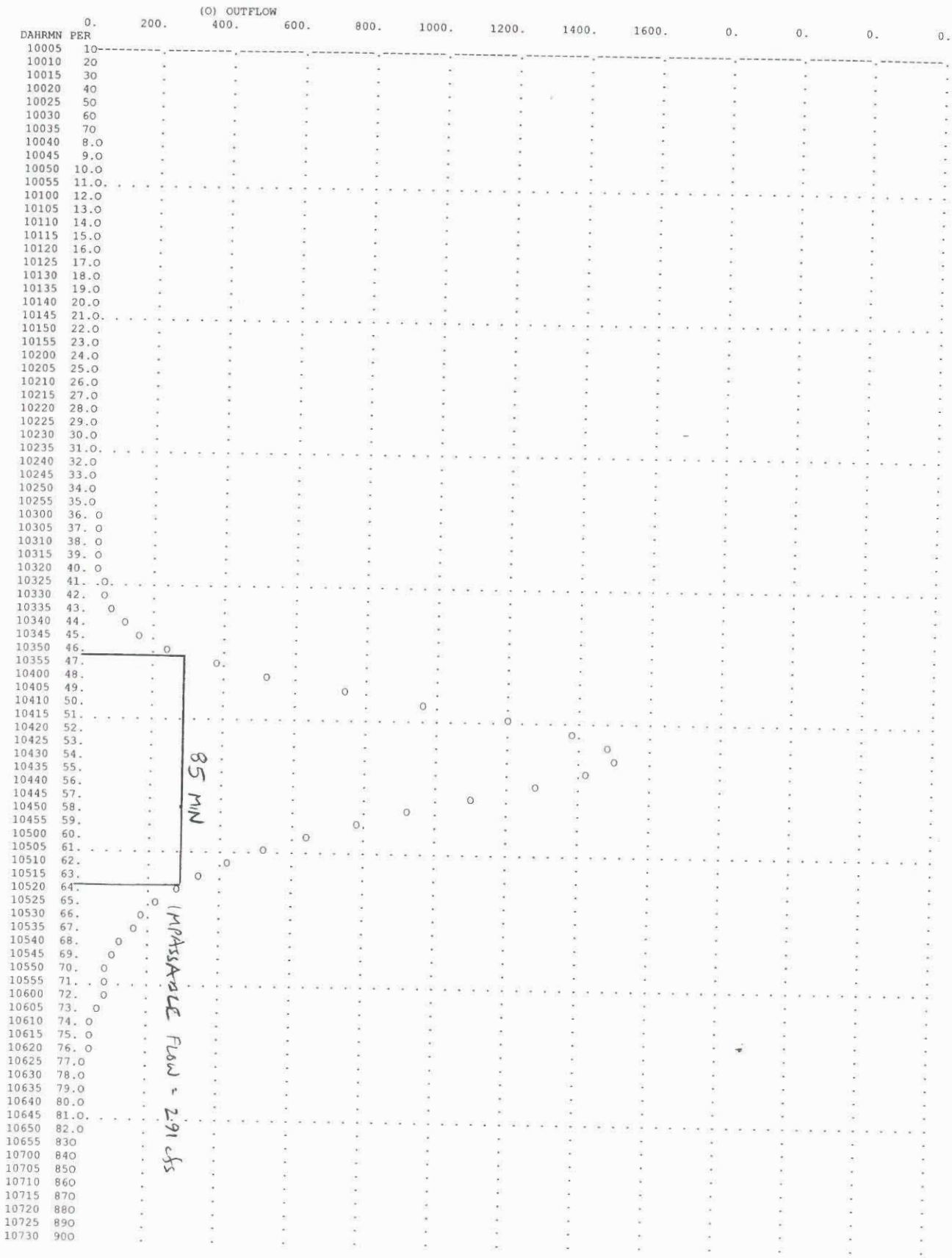
```
1                                    HEC-1 INPUT                                    PAGE  1

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

  1           ID     FUTURE CONDITIONS HYDROLOGY FOR CAREFREE AREA DRAINAGE MASTER PLAN
  2           ID       BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC., DEC. 2001
  3           ID
  4           ID     FUTURE CONDITIONS LAND USE BASED ON CAVE CREEK WATERCOURSE MASTER PLAN
  5           ID     HYDROLOGY BY TETRA TECH, 2000.
  6           ID
  7           ID     BASE MODEL BASED ON:
  8           ID
  9           ID          FLOODPLAIN DELINEATION STUDY OF ANDORA HILLS & GALLOWAY WASHES
 10           ID          FCD 99-14
 11           ID          BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC.
 12           ID          FOR THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
 13           ID          REVISED MARCH 2002     FILENAME: GWM224R.DAT
 14           ID      ***************************************************************
 15           ID          100 YEAR ANALYSIS 24-HOUR STORM USING JD RECORDS
 16           ID          MCUHP2 USED FOR UNIT HYDROGRAPHS
 17           ID     ***************************************************************
 18           ID
 19           ID     DDM MCUHP2 GALLOWAY WASH FLOODPLAIN DELINEATION STUDY, FCD NO. 99-14
 20           ID
 21           ID    March 2002 revisions to original Dec. 1999 model include:
 22           ID
 23           ID    HC BLOCK ADDED FOR GRAPEVINE WASH (CP 295A)
 24           ID
 25           ID    SUBBASIN GWW1_3 FURTHER SUBDIVIDED ALONG GALLOWAY WASH PER FEMA COMMENTS
 26           ID    IN LETTER DATED FEB. 8, 2002
 27           ID
 28           ID    *** ADDITIONAL COMBINATION ADDED 10-17-02 TO PROVIDE TOTAL FLOW IN
 29           ID        NORTH GALLOWAY WASH BY TWL FOR CH2M HILL FOR CAREFREE DMP ***
 30           ID
 31           ID   DDM MCUHP2 Carefree Area Drainage Master Plan, Galloway Wash Future Condition
              *DIAGRAM
 32           IT       5 01DEC99    0005     400
 33           IO       5       2
 34           IN      15
 35           JD    3.50    0.01
 36           PC    .000    .008    .016    .025    .033    .041    .050    .058    .066    .074
 37           PC    .087    .099    .118    .138    .216    .377    .834    .911    .931    .950
 38           PC    .962    .972    .983    .991   1.000
 39           JD    3.48    0.50
 40           JD    3.43    2.80
 41           PC    .000    .009    .016    .025    .034    .042    .051    .059    .067    .076
 42           PC    .087    .100    .120    .163    .252    .451    .694    .837    .900    .938
 43           PC    .950    .963    .975    .988   1.000
 44           JD    3.23    16.0
 45           PC    .000    .015    .020    .030    .048    .063    .076    .090    .105    .119
 46           PC    .135    .152    .175    .222    .304    .472    .670    .796    .868    .912
 47           PC    .946    .960    .973    .987   1.000
 48           JD    2.84    90.0
 49           PC    .000    .021    .035    .051    .071    .087    .105    .125    .143    .160
 50           PC    .179    .201    .232    .281    .364    .500    .658    .773    .841    .888
 51           PC    .927    .945    .964    .982   1.000
              *
              * DDM    ***** Updated *****
1                                    HEC-1 INPUT                                    PAGE  2

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

TRANQUIL TRAIL AT CALE CREEK ROAD

1

STATION GWW1_5

(O) OUTFLOW



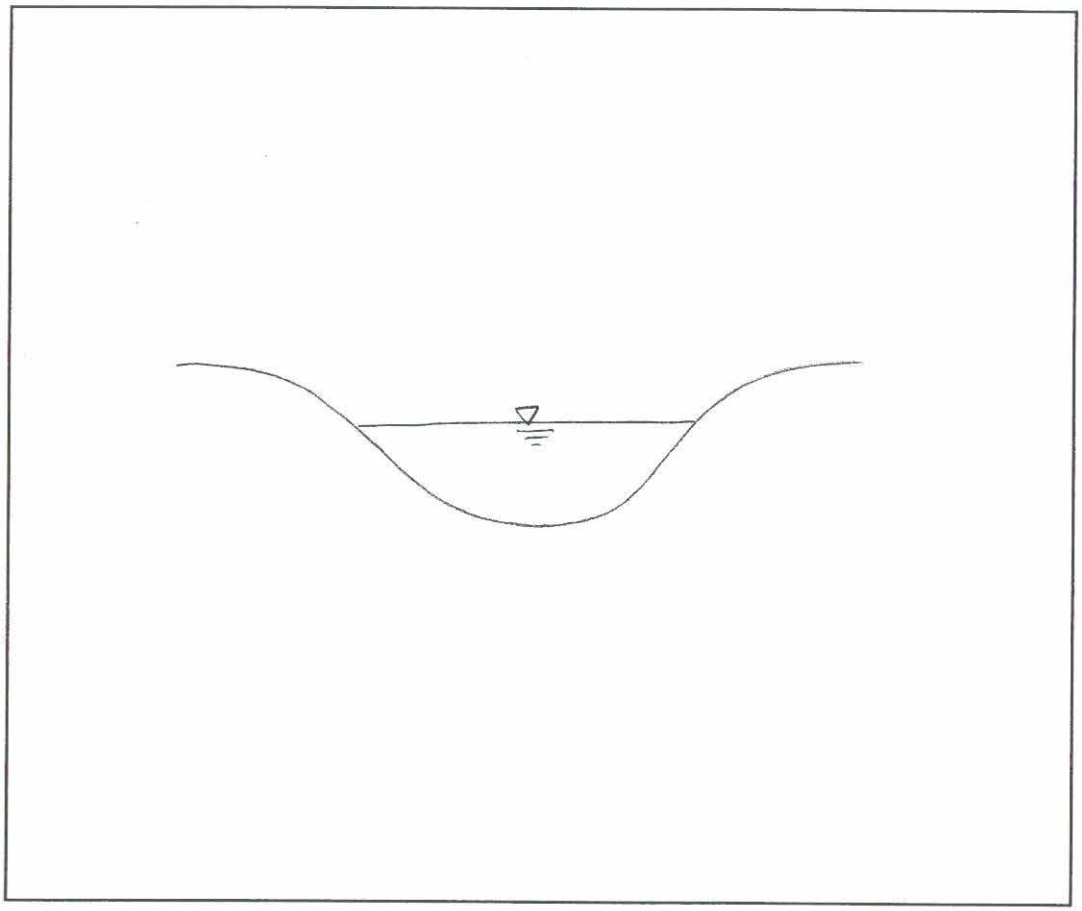
Grapevine Road North of Scopa Trail (JEF #65)

Carefree Drainage Master Plan
Dip Crossing Notes

ID Number: 65-JEF

Source of Data:

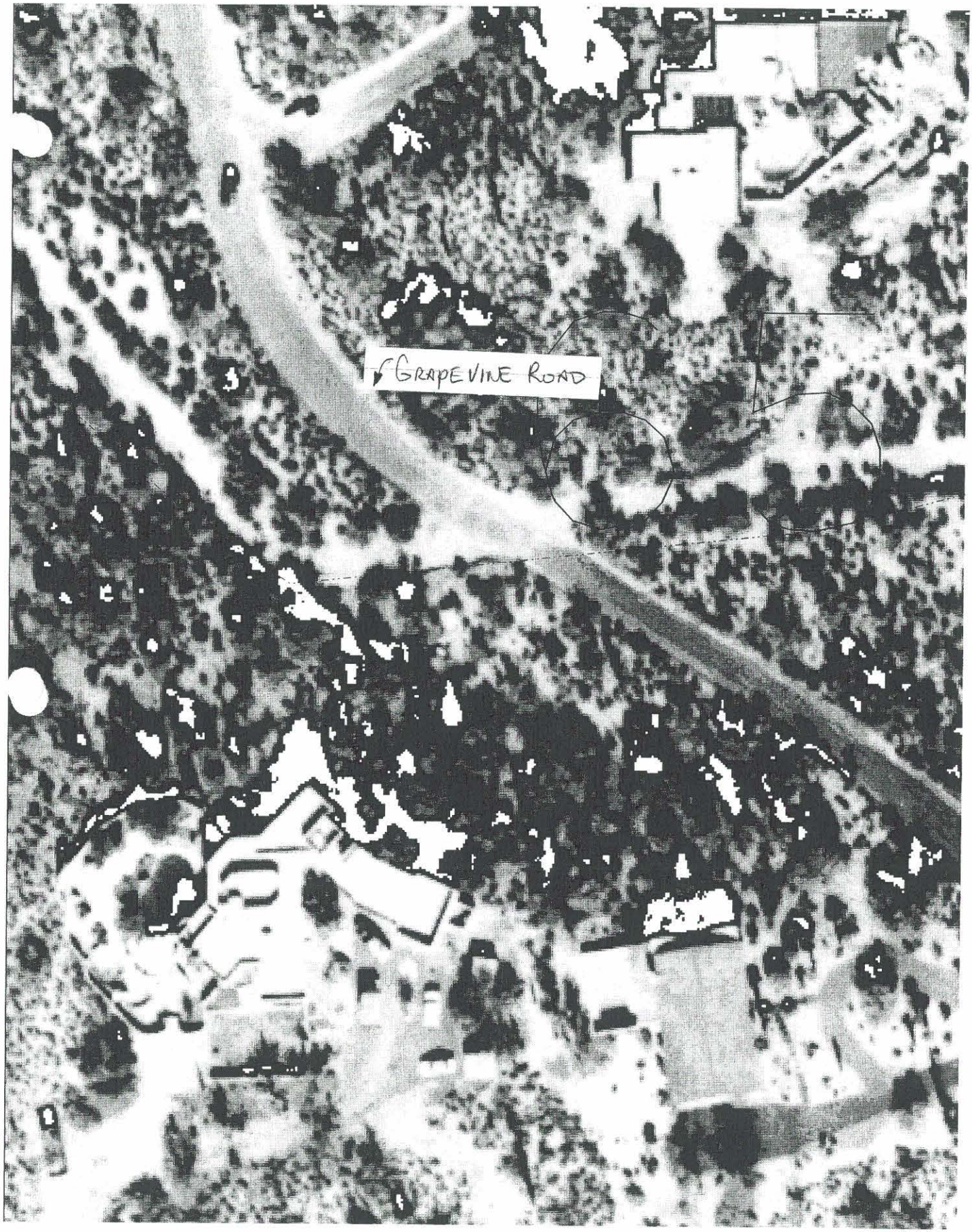
Location: GRAPEVINE ROAD NORTH OF SCOPA TRAIL



Material: PAVED DIP CROSSING

Protection: None

Notes:



GRAPEVINE ROAD NORTH OF SCOPA TRAIL

N

SCALE 1" = 80'

65 (JEF)

NOTE: MAP AREA SHOWN IS LOCATED WITHIN TOWNSHIP 5 NORTH, RANGE 4 EAST AND TOWNSHIP 6 NORTH, RANGE 4 EAST.

ZONE AE

ZONE X

TOWN OF CAREFREE
040126

TOWN OF CAVE CREEK
040129

TOWN OF CAVE CREEK
TOWN OF CAREFREE

27

26

25

65

GRAPEVINE

STEVENS ROAD

HORIZON DRIVE

HORIZON DRIVE

SPANISH BOOT ROAD

SPANISH BOOT ROAD

TRAIN ROAD

COW TRACK DRIVE

RISING SUN ROAD

CELESTIAL STREET

MULE TRAIL

ROSCH ROAD

SCOPA TRAIL

CREEK

SUNDANCE TRAIL

ROAD

DRIVE

HO HUM ROAD

CAREFREE DRIVE

HAPPY CAVE

EASY STREET

CHAIR ROAD

ROCKING STREET

DREAM PLACE

PLEASANT PLACE

SERENE ROAD

TEE TIME COURT

CAREFREE DRIVE

Middle Branch Galloway Wash

Galloway Wash Lower Branch

Footbridge

RM135

RM136

2248 2250 2256 2258 2273 2282 2290 2297 2305 2314 2320 2324 2330 2350 2360 2370 2380 2367 2375 2385 2396 2408 2421 2424 2432 2435 2448 2461

JOINS PANEL 0809

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA AND INCORPORATED AREAS

PANEL 808 OF 4350

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CAREFREE, TOWN OF	040126	0808	G
CAVE CREEK, TOWN OF	040129	0808	G
SCOTTSDALE, CITY OF	045012	0808	G

MAP NUMBER
04013C0808G

MAP REVISED:
DECEMBER 3, 1993

Federal Emergency Management Agency

Table
Rating Table for Irregular Channel

GRAPEVINE ROAD NORTH OF SCOPA TRAIL

Project Description

Worksheet	Generic 200 foot v
Flow Element	Irregular Channel
Method	Manning's Formul
Solve For	Channel Depth

Input Data

Slope	010000 ft/ft

Options

Current Roughness Methc	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	1,600.00	5.00

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00	0.00	0.00	0.0	0.00	0.00
5.00	0.26	1.20	4.2	31.60	31.60
10.00	0.34	1.43	7.0	40.99	40.98
15.00	0.40	1.58	9.5	47.72	47.71
20.00	0.44	1.70	11.8	53.15	53.15
25.00	0.48	1.80	13.9	57.79	57.78
30.00	0.52	1.88	16.0	61.88	61.87
35.00	0.55	1.95	17.9	65.56	65.55
40.00	0.57	2.02	19.8	68.93	68.92
45.00	0.60	2.08	21.6	72.04	72.03
50.00	0.62	2.14	23.4	74.95	74.94
55.00	0.65	2.19	25.1	77.67	77.66
60.00	0.67	2.24	26.8	80.25	80.24
65.00	0.69	2.28	28.5	82.70	82.68
70.00	0.71	2.32	30.1	85.03	85.01
75.00	0.73	2.36	31.7	87.25	87.24
80.00	0.74	2.40	33.3	89.39	89.38
85.00	0.76	2.44	34.8	91.45	91.43
90.00	0.78	2.48	36.4	93.43	93.42
95.00	0.79	2.51	37.9	95.34	95.33
100.00	0.81	2.54	39.4	97.19	97.18
105.00	0.82	2.57	40.8	98.99	98.97
110.00	0.84	2.60	42.3	100.73	100.72
115.00	0.85	2.63	43.7	102.42	102.41
120.00	0.87	2.66	45.1	104.07	104.06
125.00	0.88	2.69	46.5	105.68	105.66
130.00	0.89	2.71	47.9	107.24	107.23
135.00	0.91	2.74	49.3	108.77	108.76
140.00	0.92	2.76	50.6	110.27	110.25
145.00	0.93	2.79	52.0	111.73	111.71
150.00	0.94	2.81	53.3	113.16	113.14
155.00	0.95	2.84	54.7	114.56	114.54
160.00	0.97	2.86	56.0	115.93	115.91
165.00	0.98	2.88	57.3	117.27	117.26

Table
Rating Table for Irregular Channel

GRAPEVINE ROAD NORTH OF SCOPA TRAIL

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
170.00	0.99	2.90	58.6	118.59	118.58
175.00	1.00	2.92	59.9	119.89	119.87
180.00	1.01	2.95	61.0	120.35	120.33
185.00	1.02	2.98	62.1	120.71	120.69
190.00	1.03	3.01	63.1	121.06	121.04
195.00	1.03	3.04	64.2	121.41	121.40
200.00	1.04	3.06	65.3	121.76	121.74
205.00	1.05	3.09	66.3	122.11	122.09
210.00	1.06	3.12	67.4	122.45	122.43
215.00	1.07	3.14	68.4	122.79	122.77
220.00	1.08	3.17	69.4	123.12	123.10
225.00	1.09	3.19	70.4	123.45	123.43
230.00	1.09	3.22	71.4	123.78	123.76
235.00	1.10	3.24	72.5	124.10	124.08
240.00	1.11	3.27	73.4	124.42	124.40
245.00	1.12	3.29	74.4	124.74	124.72
250.00	1.13	3.31	75.4	125.06	125.04
255.00	1.13	3.34	76.4	125.37	125.35
260.00	1.14	3.36	77.4	125.68	125.66
265.00	1.15	3.38	78.3	125.99	125.96
270.00	1.16	3.40	79.3	126.29	126.27
275.00	1.16	3.43	80.3	126.60	126.57
280.00	1.17	3.45	81.2	126.90	126.87
285.00	1.18	3.47	82.1	127.19	127.17
290.00	1.19	3.49	83.1	127.49	127.46
295.00	1.19	3.51	84.0	127.78	127.76
300.00	1.20	3.53	84.9	128.07	128.05
305.00	1.21	3.55	85.9	128.36	128.33
310.00	1.22	3.57	86.8	128.65	128.62
315.00	1.22	3.59	87.7	128.93	128.90
320.00	1.23	3.61	88.6	129.21	129.19
325.00	1.24	3.63	89.5	129.50	129.47
330.00	1.24	3.65	90.4	129.77	129.75
335.00	1.25	3.67	91.3	130.05	130.02
340.00	1.26	3.69	92.2	130.33	130.30
345.00	1.26	3.71	93.1	130.60	130.57
350.00	1.27	3.72	94.0	130.87	130.84
355.00	1.28	3.74	94.9	131.14	131.11
360.00	1.28	3.76	95.7	131.41	131.38
365.00	1.29	3.78	96.6	131.67	131.64
370.00	1.30	3.80	97.5	131.94	131.91
375.00	1.30	3.81	98.4	132.20	132.17
380.00	1.31	3.83	99.2	132.46	132.43
385.00	1.32	3.85	100.1	132.72	132.69
390.00	1.32	3.86	100.9	132.98	132.95
395.00	1.33	3.88	101.8	133.24	133.20
400.00	1.34	3.90	102.6	133.49	133.46
405.00	1.34	3.91	103.5	133.75	133.71
410.00	1.35	3.93	104.3	134.00	133.96
415.00	1.36	3.95	105.2	134.25	134.21
420.00	1.36	3.96	106.0	134.50	134.46
425.00	1.37	3.98	106.8	134.75	134.71
430.00	1.37	3.99	107.7	134.99	134.96
435.00	1.38	4.01	108.5	135.24	135.20

IMPASSABLE

Table
Rating Table for Irregular Channel

Grapevine Road North of Scoda Trail

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
440.00	1.39	4.02	109.3	135.48	135.45
445.00	1.39	4.04	110.1	135.73	135.69
450.00	1.40	4.06	111.0	135.97	135.93
455.00	1.40	4.07	111.8	136.21	136.17
460.00	1.41	4.09	112.6	136.45	136.41
465.00	1.42	4.10	113.4	136.69	136.65
470.00	1.42	4.11	114.2	136.92	136.89
475.00	1.43	4.13	115.0	137.16	137.12
480.00	1.43	4.14	115.8	137.39	137.36
485.00	1.44	4.16	116.6	137.63	137.59
490.00	1.45	4.17	117.4	137.86	137.82
495.00	1.45	4.19	118.2	138.09	138.05
500.00	1.46	4.20	119.0	138.32	138.28
505.00	1.46	4.21	119.8	138.55	138.51
510.00	1.47	4.23	120.6	138.78	138.74
515.00	1.47	4.24	121.4	139.01	138.97
520.00	1.48	4.26	122.2	139.23	139.19
525.00	1.49	4.27	123.0	139.46	139.42
530.00	1.49	4.28	123.7	139.68	139.64
535.00	1.50	4.30	124.5	139.90	139.86
540.00	1.50	4.31	125.3	140.13	140.08
545.00	1.51	4.32	126.1	140.35	140.31
550.00	1.51	4.34	126.8	140.57	140.53
555.00	1.52	4.35	127.6	140.79	140.74
560.00	1.52	4.36	128.4	141.01	140.96
565.00	1.53	4.37	129.1	141.22	141.18
570.00	1.53	4.39	129.9	141.44	141.40
575.00	1.54	4.40	130.7	141.66	141.61
580.00	1.55	4.41	131.4	141.87	141.83
585.00	1.55	4.43	132.2	142.08	142.04
590.00	1.56	4.44	132.9	142.30	142.25
595.00	1.56	4.45	133.7	142.51	142.46
600.00	1.57	4.46	134.5	142.72	142.68
605.00	1.57	4.47	135.2	142.93	142.89
610.00	1.58	4.49	136.0	143.14	143.10
615.00	1.58	4.50	136.7	143.35	143.30
620.00	1.59	4.51	137.4	143.56	143.51
625.00	1.59	4.52	138.2	143.77	143.72
630.00	1.60	4.53	138.9	143.97	143.93
635.00	1.60	4.55	139.7	144.18	144.13
640.00	1.61	4.56	140.4	144.38	144.34
645.00	1.61	4.57	141.2	144.59	144.54
650.00	1.62	4.58	141.9	144.79	144.74
655.00	1.62	4.59	142.6	144.99	144.95
660.00	1.63	4.60	143.4	145.20	145.15
665.00	1.63	4.62	144.1	145.40	145.35
670.00	1.64	4.63	144.8	145.60	145.55
675.00	1.64	4.64	145.5	145.80	145.75
680.00	1.65	4.65	146.3	146.00	145.95
685.00	1.65	4.66	147.0	146.20	146.15
690.00	1.66	4.67	147.7	146.39	146.35
695.00	1.66	4.68	148.4	146.59	146.54
700.00	1.67	4.69	149.2	146.79	146.74
705.00	1.67	4.70	149.9	146.98	146.93

Table
Rating Table for Irregular Channel

GRAPEVINE ROAD NORTH OF SEQUA TRAIL

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
710.00	1.68	4.71	150.6	147.18	147.13
715.00	1.68	4.73	151.3	147.37	147.32
720.00	1.69	4.74	152.0	147.57	147.52
725.00	1.69	4.75	152.7	147.76	147.71
730.00	1.70	4.76	153.4	147.95	147.90
735.00	1.70	4.77	154.1	148.15	148.09
740.00	1.71	4.78	154.9	148.34	148.29
745.00	1.71	4.79	155.6	148.53	148.48
750.00	1.72	4.80	156.3	148.72	148.67
755.00	1.72	4.81	157.0	148.91	148.86
760.00	1.73	4.82	157.7	149.10	149.04
765.00	1.73	4.83	158.4	149.29	149.23
770.00	1.74	4.84	159.1	149.47	149.42
775.00	1.74	4.85	159.8	149.66	149.61
780.00	1.74	4.86	160.5	149.85	149.79
785.00	1.75	4.87	161.2	150.03	149.98
790.00	1.75	4.88	161.9	150.22	150.16
795.00	1.76	4.89	162.6	150.40	150.35
800.00	1.76	4.90	163.3	150.59	150.53
805.00	1.77	4.91	163.9	150.77	150.72
810.00	1.77	4.92	164.6	150.96	150.90
815.00	1.78	4.93	165.3	151.14	151.08
820.00	1.78	4.94	166.0	151.32	151.26
825.00	1.79	4.95	166.7	151.50	151.45
830.00	1.79	4.96	167.4	151.68	151.63
835.00	1.80	4.97	168.1	151.86	151.81
840.00	1.80	4.98	168.8	152.04	151.99
845.00	1.80	4.99	169.4	152.22	152.17
850.00	1.81	5.00	170.1	152.40	152.35
855.00	1.81	5.01	170.8	152.58	152.52
860.00	1.82	5.02	171.5	152.76	152.70
865.00	1.82	5.02	172.1	152.94	152.88
870.00	1.83	5.03	172.8	153.11	153.06
875.00	1.83	5.04	173.5	153.29	153.23
880.00	1.84	5.05	174.2	153.47	153.41
885.00	1.84	5.06	174.8	153.64	153.58
890.00	1.84	5.07	175.5	153.82	153.76
895.00	1.85	5.08	176.2	153.99	153.93
900.00	1.85	5.09	176.9	154.17	154.11
905.00	1.86	5.10	177.5	154.34	154.28
910.00	1.86	5.11	178.2	154.51	154.45
915.00	1.87	5.12	178.9	154.69	154.63
920.00	1.87	5.12	179.5	154.86	154.80
925.00	1.87	5.13	180.2	155.03	154.97
930.00	1.88	5.14	180.9	155.20	155.14
935.00	1.88	5.15	181.5	155.37	155.31
940.00	1.89	5.16	182.2	155.54	155.48
945.00	1.89	5.17	182.8	155.71	155.65
950.00	1.90	5.18	183.5	155.88	155.82
955.00	1.90	5.19	184.2	156.05	155.99
960.00	1.90	5.19	184.8	156.22	156.16
965.00	1.91	5.20	185.5	156.39	156.33
970.00	1.91	5.21	186.1	156.56	156.50
975.00	1.92	5.22	186.8	156.72	156.66

Table
Rating Table for Irregular Channel

Grapevine Road North of Scupa Trail

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
980.00	1.92	5.23	187.4	156.89	156.83
985.00	1.92	5.24	188.1	157.06	157.00
990.00	1.93	5.25	188.7	157.23	157.16
995.00	1.93	5.25	189.4	157.39	157.33
1,000.00	1.94	5.26	190.1	157.56	157.49
1,005.00	1.94	5.27	190.7	157.72	157.66
1,010.00	1.95	5.28	191.3	157.89	157.82
1,015.00	1.95	5.29	192.0	158.05	157.99
1,020.00	1.95	5.29	192.6	158.21	158.15
1,025.00	1.96	5.30	193.3	158.38	158.31
1,030.00	1.96	5.31	193.9	158.54	158.48
1,035.00	1.97	5.32	194.6	158.70	158.64
1,040.00	1.97	5.33	195.2	158.87	158.80
1,045.00	1.97	5.34	195.9	159.03	158.96
1,050.00	1.98	5.34	196.5	159.19	159.12
1,055.00	1.98	5.35	197.1	159.35	159.28
1,060.00	1.99	5.36	197.8	159.51	159.45
1,065.00	1.99	5.37	198.4	159.67	159.61
1,070.00	1.99	5.38	199.1	159.83	159.77
1,075.00	2.00	5.38	199.7	159.99	159.92
1,080.00	2.00	5.39	200.3	160.15	160.08
1,085.00	2.01	5.40	201.0	160.31	160.24
1,090.00	2.01	5.41	201.6	160.47	160.40
1,095.00	2.01	5.41	202.2	160.63	160.56
1,100.00	2.02	5.42	202.9	160.78	160.72
1,105.00	2.02	5.43	203.5	160.94	160.87
1,110.00	2.03	5.44	204.1	161.10	161.03
1,115.00	2.03	5.45	204.8	161.26	161.19
1,120.00	2.03	5.45	205.4	161.41	161.34
1,125.00	2.04	5.46	206.0	161.57	161.50
1,130.00	2.04	5.47	206.7	161.72	161.66
1,135.00	2.05	5.48	207.3	161.88	161.81
1,140.00	2.05	5.48	207.9	162.03	161.97
1,145.00	2.05	5.49	208.5	162.19	162.12
1,150.00	2.06	5.50	209.2	162.34	162.27
1,155.00	2.06	5.51	209.8	162.50	162.43
1,160.00	2.06	5.51	210.4	162.65	162.58
1,165.00	2.07	5.52	211.0	162.81	162.74
1,170.00	2.07	5.53	211.7	162.96	162.89
1,175.00	2.08	5.54	212.3	163.11	163.04
1,180.00	2.08	5.54	212.9	163.26	163.19
1,185.00	2.08	5.55	213.5	163.42	163.35
1,190.00	2.09	5.56	214.1	163.57	163.50
1,195.00	2.09	5.56	214.8	163.72	163.65
1,200.00	2.09	5.57	215.4	163.87	163.80
1,205.00	2.10	5.58	216.0	164.02	163.95
1,210.00	2.10	5.59	216.6	164.17	164.10
1,215.00	2.11	5.59	217.2	164.32	164.25
1,220.00	2.11	5.60	217.8	164.47	164.40
1,225.00	2.11	5.61	218.5	164.62	164.55
1,230.00	2.12	5.61	219.1	164.77	164.70
1,235.00	2.12	5.62	219.7	164.92	164.85
1,240.00	2.12	5.63	220.3	165.07	165.00
1,245.00	2.13	5.64	220.9	165.22	165.15

Table
Rating Table for Irregular Channel

GRAPEVINE ROAD NORTH OF SEQUOIA TRAIL

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
1,250.00	2.13	5.64	221.5	165.37	165.29
1,255.00	2.14	5.65	222.1	165.51	165.44
1,260.00	2.14	5.66	222.7	165.66	165.59
1,265.00	2.14	5.66	223.4	165.81	165.74
1,270.00	2.15	5.67	224.0	165.96	165.88
1,275.00	2.15	5.68	224.6	166.10	166.03
1,280.00	2.15	5.68	225.2	166.25	166.17
1,285.00	2.16	5.69	225.8	166.40	166.32
1,290.00	2.16	5.70	226.4	166.54	166.47
1,295.00	2.17	5.70	227.0	166.69	166.61
1,300.00	2.17	5.71	227.6	166.83	166.76
1,305.00	2.17	5.72	228.2	166.98	166.90
1,310.00	2.18	5.73	228.8	167.12	167.05
1,315.00	2.18	5.73	229.4	167.27	167.19
1,320.00	2.18	5.74	230.0	167.41	167.33
1,325.00	2.19	5.75	230.6	167.55	167.48
1,330.00	2.19	5.75	231.2	167.70	167.62
1,335.00	2.19	5.76	231.8	167.84	167.77
1,340.00	2.20	5.77	232.4	167.98	167.91
1,345.00	2.20	5.77	233.0	168.13	168.05
1,350.00	2.20	5.78	233.6	168.27	168.19
1,355.00	2.21	5.79	234.2	168.41	168.34
1,360.00	2.21	5.79	234.8	168.55	168.48
1,365.00	2.22	5.80	235.4	168.70	168.62
1,370.00	2.22	5.81	236.0	168.84	168.76
1,375.00	2.22	5.81	236.6	168.98	168.90
1,380.00	2.23	5.82	237.2	169.12	169.04
1,385.00	2.23	5.82	237.8	169.26	169.18
1,390.00	2.23	5.83	238.4	169.40	169.32
1,395.00	2.24	5.84	239.0	169.54	169.46
1,400.00	2.24	5.84	239.6	169.68	169.60
1,405.00	2.24	5.85	240.2	169.82	169.74
1,410.00	2.25	5.86	240.7	169.96	169.88
1,415.00	2.25	5.86	241.3	170.10	170.02
1,420.00	2.25	5.87	241.9	170.24	170.16
1,425.00	2.26	5.88	242.5	170.38	170.30
1,430.00	2.26	5.88	243.1	170.52	170.44
1,435.00	2.26	5.89	243.7	170.65	170.57
1,440.00	2.27	5.89	244.3	170.79	170.71
1,445.00	2.27	5.90	244.9	170.93	170.85
1,450.00	2.27	5.91	245.5	171.07	170.99
1,455.00	2.28	5.91	246.0	171.21	171.12
1,460.00	2.28	5.92	246.6	171.34	171.26
1,465.00	2.28	5.93	247.2	171.48	171.40
1,470.00	2.29	5.93	247.8	171.62	171.53
1,475.00	2.29	5.94	248.4	171.75	171.67
1,480.00	2.30	5.94	249.0	171.89	171.81
1,485.00	2.30	5.95	249.6	172.02	171.94
1,490.00	2.30	5.96	250.1	172.16	172.08
1,495.00	2.31	5.96	250.7	172.30	172.21
1,500.00	2.31	5.97	251.3	172.43	172.35
1,505.00	2.31	5.98	251.9	172.57	172.48
1,510.00	2.32	5.98	252.5	172.70	172.62
1,515.00	2.32	5.99	253.0	172.83	172.75

Table
Rating Table for Irregular Channel

GRAPEVINE ROAD NORTH OF SCOPA TRAIL

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
1,520.00	2.32	5.99	253.6	172.97	172.89
1,525.00	2.33	6.00	254.2	173.10	173.02
1,530.00	2.33	6.01	254.8	173.24	173.15
1,535.00	2.33	6.01	255.4	173.37	173.29
1,540.00	2.34	6.02	255.9	173.50	173.42
1,545.00	2.34	6.02	256.5	173.64	173.55
1,550.00	2.34	6.03	257.1	173.77	173.69
1,555.00	2.35	6.03	257.7	173.90	173.82
1,560.00	2.35	6.04	258.2	174.04	173.95
1,565.00	2.35	6.05	258.8	174.17	174.08
1,570.00	2.36	6.05	259.4	174.30	174.22
1,575.00	2.36	6.06	260.0	174.43	174.35
1,580.00	2.36	6.06	260.5	174.56	174.48
1,585.00	2.37	6.07	261.1	174.70	174.61
1,590.00	2.37	6.08	261.7	174.83	174.74
1,595.00	2.37	6.08	262.3	174.96	174.87
1,600.00	2.38	6.09	262.8	175.09	175.00

GW 100 YR 6 HR

FUTURE

65 (JEF)

Grapevine Road North of Scopa Trail

```
1*************************************
*                                   *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)*
*             JUN  1998             *
*           VERSION 4.1             *
*                                   *
* RUN DATE   27NOV02  TIME  08:49:21 *
*                                   *
*************************************
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*************************************
*                                   *
*   U.S. ARMY CORPS OF ENGINEERS    *
*   HYDROLOGIC ENGINEERING CENTER   *
*         609 SECOND STREET         *
*      DAVIS, CALIFORNIA 95616      *
*          (916) 756-1104           *
*                                   *
*************************************
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```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX         XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

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

1 HEC-1 INPUT PAGE 1

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

  1           ID     FUTURE CONDITIONS HYDROLOGY FOR CAREFREE AREA DRAINAGE MASTER PLAN
  2           ID       BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC., DEC. 2001
  3           ID
  4           ID     FUTURE CONDITIONS LAND USE BASED ON CAVE CREEK WATERCOURSE MASTER PLAN
  5           ID     HYDROLOGY BY TETRA TECH, 2000.
  6           ID
  7           ID     BASE MODEL BASED ON:
  8           ID
  9           ID           FLOODPLAIN DELINEATION STUDY OF ANDORA HILLS & GALLOWAY WASHES
 10           ID           FCD 99-14
 11           ID           BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC.
 12           ID           FOR THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
 13           ID           REVISED MARCH 2002     FILENAME: GWM224R.DAT
 14           ID      ***************************************************************
 15           ID           100 YEAR ANALYSIS 24-HOUR STORM USING JD RECORDS
 16           ID           MCUHP2 USED FOR UNIT HYDROGRAPHS
 17           ID     ***************************************************************
 18           ID
 19           ID     DDM MCUHP2 GALLOWAY WASH FLOODPLAIN DELINEATION STUDY, FCD NO. 99-14
 20           ID
 21           ID    March 2002 revisions to original Dec. 1999 model include:
 22           ID
 23           ID    HC BLOCK ADDED FOR GRAPEVINE WASH (CP 295A)
 24           ID
 25           ID    SUBBASIN GWW1_3 FURTHER SUBDIVIDED ALONG GALLOWAY WASH PER FEMA COMMENTS
 26           ID    IN LETTER DATED FEB. 8, 2002
 27           ID
 28           ID    *** ADDITIONAL COMBINATION ADDED 10-17-02 TO PROVIDE TOTAL FLOW IN
 29           ID        NORTH GALLOWAY WASH BY TWL FOR CH2M HILL FOR CAREFREE DMP ***
 30           ID
 31           ID   DDM MCUHP2 Carefree Area Drainage Master Plan, Galloway Wash Future Condition
              *DIAGRAM
 32           IT       5 01DEC99    0005     400
 33           IO       5       2
 34           IN      15
 35           JD    3.50    0.01
 36           PC    .000    .008    .016    .025    .033    .041    .050    .058    .066    .074
 37           PC    .087    .099    .118    .138    .216    .377    .834    .911    .931    .950
 38           PC    .962    .972    .983    .991   1.000
 39           JD    3.48    0.50
 40           JD    3.43    2.80
 41           PC    .000    .009    .016    .025    .034    .042    .051    .059    .067    .076
 42           PC    .087    .100    .120    .163    .252    .451    .694    .837    .900    .938
 43           PC    .950    .963    .975    .988   1.000
 44           JD    3.23    16.0
 45           PC    .000    .015    .020    .030    .048    .063    .076    .090    .105    .119
 46           PC    .135    .152    .175    .222    .304    .472    .670    .796    .868    .912
 47           PC    .946    .960    .973    .987   1.000
 48           JD    2.84    90.0
 49           PC    .000    .021    .035    .051    .071    .087    .105    .125    .143    .160
 50           PC    .179    .201    .232    .281    .364    .500    .658    .773    .841    .888
 51           PC    .927    .945    .964    .982   1.000
              *
              * DDM   ***** Updated *****
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1 HEC-1 INPUT PAGE 2

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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
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Grapevine Road North of Scopa Trail

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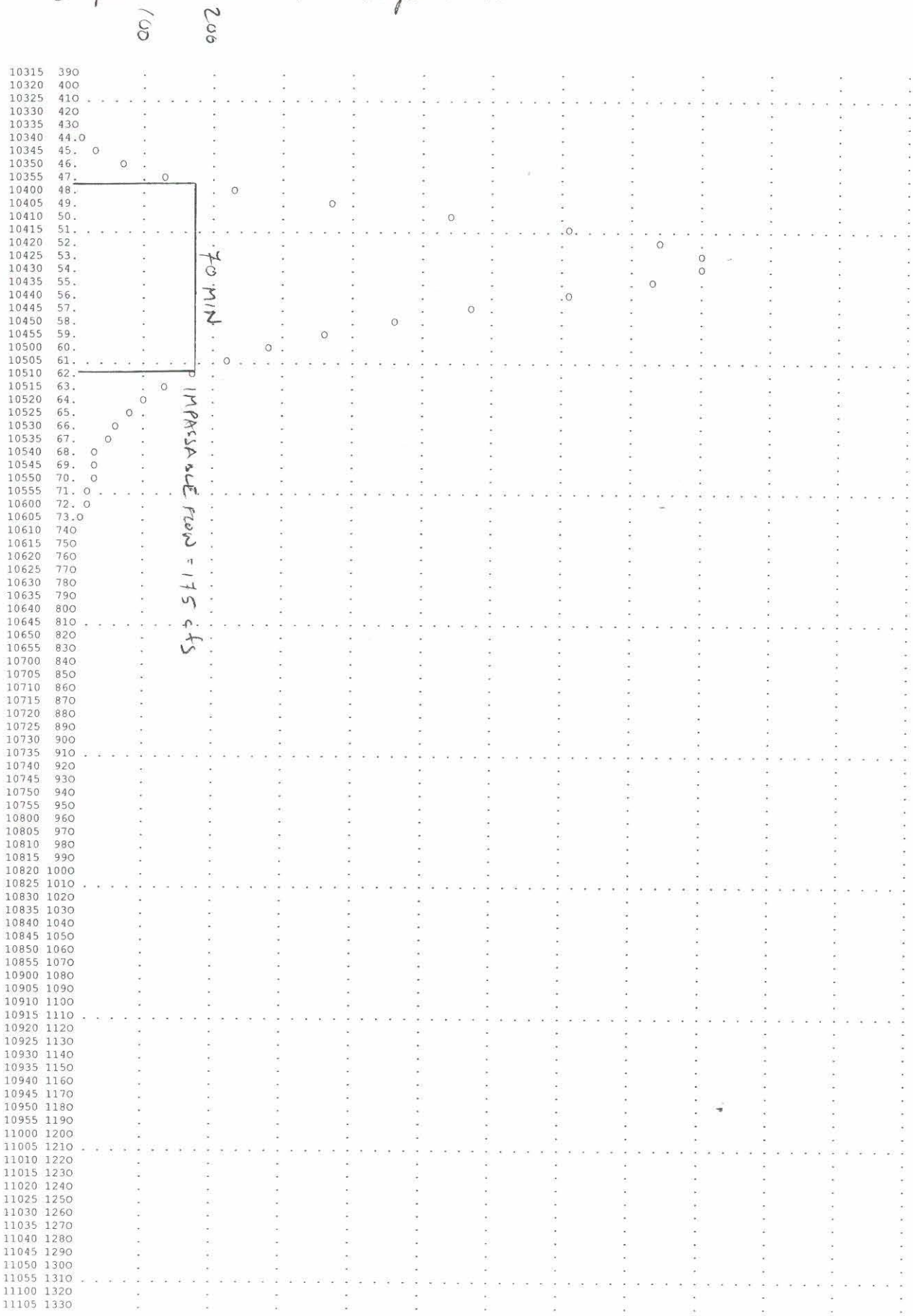
20510 3500
20515 3510
20520 3520
20525 3530
20530 3540
20535 3550
20540 3560
20545 3570
20550 3580
20555 3590
20600 3600
20605 3610
20610 3620
20615 3630
20620 3640
20625 3650
20630 3660
20635 3670
20640 3680
20645 3690
20650 3700
20655 3710
20700 3720
20705 3730
20710 3740
20715 3750
20720 3760
20725 3770
20730 3780
20735 3790
20740 3800
20745 3810
20750 3820
20755 3830
20800 3840
20805 3850
20810 3860
20815 3870
20820 3880
20825 3890
20830 3900
20835 3910
20840 3920
20845 3930
20850 3940
20855 3950
20900 3960
20905 3970
20910 3980
20915 3990
20920 4000---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
1
1                                                STATION   GWW1_6

                    (O) OUTFLOW
          0.      100.      200.      300.      400.      500.      600.      700.      800.      900.     1000.        0.        0.
DAHRMN PER
 10005   10---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
 10010   20
 10015   30
 10020   40
 10025   50
 10030   60
 10035   70
 10040   80
 10045   90
 10050  100
 10055  110
 10100  120
 10105  130
 10110  140
 10115  150
 10120  160
 10125  170
 10130  180
 10135  190
 10140  200
 10145  210
 10150  220
 10155  230
 10200  240
 10205  250
 10210  260
 10215  270
 10220  280
 10225  290
 10230  300
 10235  310
 10240  320
 10245  330
 10250  340
 10255  350
 10300  360
 10305  370
 10310  380
```

GRAPEVINE ROAD NORTH OF SEQUOIA TRAIL



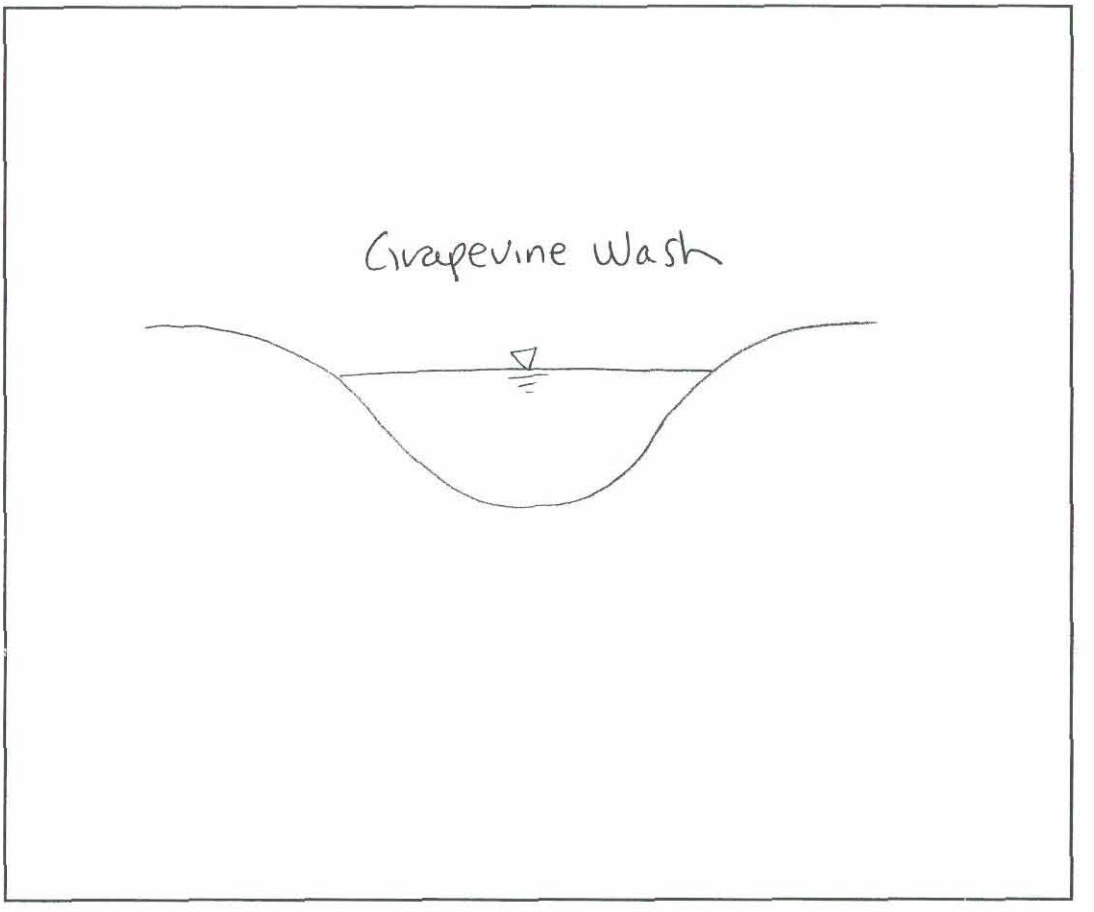
Father Keno Trail (JEF #68)

Carefree Drainage Master Plan
Dip Crossing Notes

ID Number: 68-JEF

Source of Data: FEMA

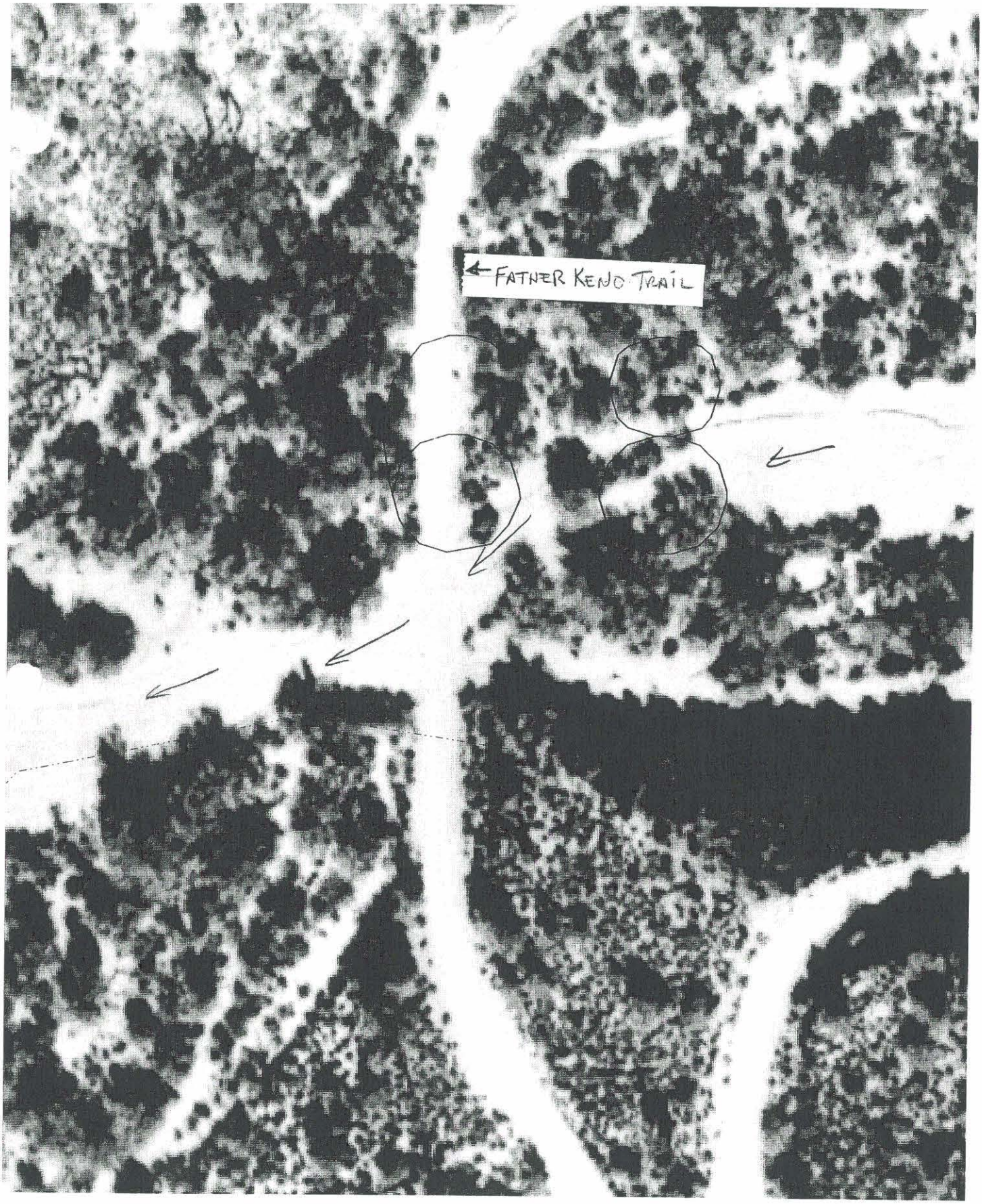
Location: FATHER KINO TRAIL



Material: UNPAVED DIP CROSSING

Protection: None

Notes: on Grapevine Wash - Previous Floodplain Delineation done - see attached FEMA maps



FATHER KINO TRAIL

N

SCALE 1" = 60

NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
MARICOPA COUNTY, ARIZONA AND INCORPORATED AREAS
PANEL 807 OF 4035
CONTAINS:
COMMUNITY NUMBER PANEL SUFFIX
CAREFREE, TOWN OF . . . . . 040126 . . . 0807 . . . G
MARICOPA COUNTY
UNINCORPORATED AREAS . . . . 040037 . . . 0807 . . . G
SCOTTSDALE, CITY OF . . . 045012 . . 0807 . . . G
MAP NUMBER
04013C0807G
MAP REVISED:
DECEMBER 3, 1993
Federal Emergency Management Agency
MARICOPA COUNTY
TOWN OF CAREFREE
Town of Carefree
040126
ZONE A
ZONE AE
ZONE D
ZONE X
LIMIT OF DETAILED STUDY
TOWN OF CAREFREE
CITY OF SCOTTSDALE
RM 1108
FATHER KINO TRAIL
TUBAC TRAIL
TUMACACORI WAY
CIBOLA DRIVE
MONTEZUMA ROAD
CORONADO TRAIL
Rowe Wash
R. 4 E.
R. 5 E.
24
19
68
JOINS PANEL 0809

Worksheet
Worksheet for Irregular Channel

FATHER KENO TRAIL

Project Description

Worksheet	Generic 200 foot v
Flow Element	Irregular Channel
Method	Manning's Formul
Solve For	Channel Depth

Input Data

Slope	010000 ft/ft
Discharg	,408.00 cfs

Options

Current Roughness Metho	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Results

Mannings Coefficie	0.032	
Water Surface Elev	4.30	ft
Elevation Range	.00 to 3.00	
Flow Area	640.7	ft²
Wetted Perimeter	202.72	ft
Top Width	200.00	ft
Actual Depth	4.30	ft
Critical Elevation	4.27	ft
Critical Slope	0.010336	ft/ft
Velocity	10.00	ft/s
Velocity Head	1.55	ft
Specific Energy	5.86	ft
Froude Number	0.99	
Flow Type	Subcritical	

Calculation Messages:
Water elevation exceeds lowest end station by 1.3037496 ft.

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00	2+00	0.032

Natural Channel Points

Station (ft)	Elevation (ft)
0+00	3.00
0+20	2.00
0+40	1.00
1+00	0.00
1+60	1.00
1+80	2.00
2+00	3.00

Table
Rating Table for Irregular Channel

FATHER KENO TRAIL

Project Description

Worksheet	Generic 200 foot v
Flow Element	Irregular Channel
Method	Manning's Formul
Solve For	Channel Depth

Input Data

Slope 010000 ft/ft

Options

Current Roughness Metho	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	6,500.00	10.00

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00	0.00	0.00	0.0	0.00	0.00
10.00	0.34	1.43	7.0	40.99	40.98
20.00	0.44	1.70	11.8	53.15	53.15
30.00	0.52	1.88	16.0	61.88	61.87
40.00	0.57	2.02	19.8	68.93	68.92
50.00	0.62	2.14	23.4	74.95	74.94
60.00	0.67	2.24	26.8	80.25	80.24
70.00	0.71	2.32	30.1	85.03	85.01
80.00	0.74	2.40	33.3	89.39	89.38
90.00	0.78	2.48	36.4	93.43	93.42
100.00	0.81	2.54	39.4	97.19	97.18
110.00	0.84	2.60	42.3	100.73	100.72
120.00	0.87	2.66	45.1	104.07	104.06
130.00	0.89	2.71	47.9	107.24	107.23
140.00	0.92	2.76	50.6	110.27	110.25
150.00	0.94	2.81	53.3	113.16	113.14
160.00	0.97	2.86	56.0	115.93	115.91
170.00	0.99	2.90	58.6	118.59	118.58
180.00	1.01	2.95	61.0	120.35	120.33
190.00	1.03	3.01	63.1	121.06	121.04
200.00	1.04	3.06	65.3	121.76	121.74
210.00	1.06	3.12	67.4	122.45	122.43
220.00	1.08	3.17	69.4	123.12	123.10
230.00	1.09	3.22	71.4	123.78	123.76
240.00	1.11	3.27	73.4	124.42	124.40
250.00	1.13	3.31	75.4	125.06	125.04
260.00	1.14	3.36	77.4	125.68	125.66
270.00	1.16	3.40	79.3	126.29	126.27
280.00	1.17	3.45	81.2	126.90	126.87
290.00	1.19	3.49	83.1	127.49	127.46
300.00	1.20	3.53	84.9	128.07	128.05
310.00	1.22	3.57	86.8	128.65	128.62
320.00	1.23	3.61	88.6	129.21	129.19
330.00	1.24	3.65	90.4	129.77	129.75

IMPASSABLE

Table
Rating Table for Irregular Channel

FATHER KENO TRAIL

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
340.00	1.26	3.69	92.2	130.33	130.30
350.00	1.27	3.72	94.0	130.87	130.84
360.00	1.28	3.76	95.7	131.41	131.38
370.00	1.30	3.80	97.5	131.94	131.91
380.00	1.31	3.83	99.2	132.46	132.43
390.00	1.32	3.86	100.9	132.98	132.95
400.00	1.34	3.90	102.6	133.49	133.46
410.00	1.35	3.93	104.3	134.00	133.96
420.00	1.36	3.96	106.0	134.50	134.46
430.00	1.37	3.99	107.7	134.99	134.96
440.00	1.39	4.02	109.3	135.48	135.45
450.00	1.40	4.06	111.0	135.97	135.93
460.00	1.41	4.09	112.6	136.45	136.41
470.00	1.42	4.11	114.2	136.92	136.89
480.00	1.43	4.14	115.8	137.39	137.36
490.00	1.45	4.17	117.4	137.86	137.82
500.00	1.46	4.20	119.0	138.32	138.28
510.00	1.47	4.23	120.6	138.78	138.74
520.00	1.48	4.26	122.2	139.23	139.19
530.00	1.49	4.28	123.7	139.68	139.64
540.00	1.50	4.31	125.3	140.13	140.08
550.00	1.51	4.34	126.8	140.57	140.53
560.00	1.52	4.36	128.4	141.01	140.96
570.00	1.53	4.39	129.9	141.44	141.40
580.00	1.55	4.41	131.4	141.87	141.83
590.00	1.56	4.44	132.9	142.30	142.25
600.00	1.57	4.46	134.5	142.72	142.68
610.00	1.58	4.49	136.0	143.14	143.10
620.00	1.59	4.51	137.4	143.56	143.51
630.00	1.60	4.53	138.9	143.97	143.93
640.00	1.61	4.56	140.4	144.38	144.34
650.00	1.62	4.58	141.9	144.79	144.74
660.00	1.63	4.60	143.4	145.20	145.15
670.00	1.64	4.63	144.8	145.60	145.55
680.00	1.65	4.65	146.3	146.00	145.95
690.00	1.66	4.67	147.7	146.39	146.35
700.00	1.67	4.69	149.2	146.79	146.74
710.00	1.68	4.71	150.6	147.18	147.13
720.00	1.69	4.74	152.0	147.57	147.52
730.00	1.70	4.76	153.4	147.95	147.90
740.00	1.71	4.78	154.9	148.34	148.29
750.00	1.72	4.80	156.3	148.72	148.67
760.00	1.73	4.82	157.7	149.10	149.04
770.00	1.74	4.84	159.1	149.47	149.42
780.00	1.74	4.86	160.5	149.85	149.79
790.00	1.75	4.88	161.9	150.22	150.16
800.00	1.76	4.90	163.3	150.59	150.53
810.00	1.77	4.92	164.6	150.96	150.90
820.00	1.78	4.94	166.0	151.32	151.26
830.00	1.79	4.96	167.4	151.68	151.63
840.00	1.80	4.98	168.8	152.04	151.99
850.00	1.81	5.00	170.1	152.40	152.35
860.00	1.82	5.02	171.5	152.76	152.70
870.00	1.83	5.03	172.8	153.11	153.06

Table
Rating Table for Irregular Channel

FATNER KEMO TRAIL

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
880.00	1.84	5.05	174.2	153.47	153.41
890.00	1.84	5.07	175.5	153.82	153.76
900.00	1.85	5.09	176.9	154.17	154.11
910.00	1.86	5.11	178.2	154.51	154.45
920.00	1.87	5.12	179.5	154.86	154.80
930.00	1.88	5.14	180.9	155.20	155.14
940.00	1.89	5.16	182.2	155.54	155.48
950.00	1.90	5.18	183.5	155.88	155.82
960.00	1.90	5.19	184.8	156.22	156.16
970.00	1.91	5.21	186.1	156.56	156.50
980.00	1.92	5.23	187.4	156.89	156.83
990.00	1.93	5.25	188.7	157.23	157.16
1,000.00	1.94	5.26	190.1	157.56	157.49
1,010.00	1.95	5.28	191.3	157.89	157.82
1,020.00	1.95	5.29	192.6	158.21	158.15
1,030.00	1.96	5.31	193.9	158.54	158.48
1,040.00	1.97	5.33	195.2	158.87	158.80
1,050.00	1.98	5.34	196.5	159.19	159.12
1,060.00	1.99	5.36	197.8	159.51	159.45
1,070.00	1.99	5.38	199.1	159.83	159.77
1,080.00	2.00	5.39	200.3	160.15	160.08
1,090.00	2.01	5.41	201.6	160.47	160.40
1,100.00	2.02	5.42	202.9	160.78	160.72
1,110.00	2.03	5.44	204.1	161.10	161.03
1,120.00	2.03	5.45	205.4	161.41	161.34
1,130.00	2.04	5.47	206.7	161.72	161.66
1,140.00	2.05	5.48	207.9	162.03	161.97
1,150.00	2.06	5.50	209.2	162.34	162.27
1,160.00	2.06	5.51	210.4	162.65	162.58
1,170.00	2.07	5.53	211.7	162.96	162.89
1,180.00	2.08	5.54	212.9	163.26	163.19
1,190.00	2.09	5.56	214.1	163.57	163.50
1,200.00	2.09	5.57	215.4	163.87	163.80
1,210.00	2.10	5.59	216.6	164.17	164.10
1,220.00	2.11	5.60	217.8	164.47	164.40
1,230.00	2.12	5.61	219.1	164.77	164.70
1,240.00	2.12	5.63	220.3	165.07	165.00
1,250.00	2.13	5.64	221.5	165.37	165.29
1,260.00	2.14	5.66	222.7	165.66	165.59
1,270.00	2.15	5.67	224.0	165.96	165.88
1,280.00	2.15	5.68	225.2	166.25	166.17
1,290.00	2.16	5.70	226.4	166.54	166.47
1,300.00	2.17	5.71	227.6	166.83	166.76
1,310.00	2.18	5.73	228.8	167.12	167.05
1,320.00	2.18	5.74	230.0	167.41	167.33
1,330.00	2.19	5.75	231.2	167.70	167.62
1,340.00	2.20	5.77	232.4	167.98	167.91
1,350.00	2.20	5.78	233.6	168.27	168.19
1,360.00	2.21	5.79	234.8	168.55	168.48
1,370.00	2.22	5.81	236.0	168.84	168.76
1,380.00	2.23	5.82	237.2	169.12	169.04
1,390.00	2.23	5.83	238.4	169.40	169.32
1,400.00	2.24	5.84	239.6	169.68	169.60
1,410.00	2.25	5.86	240.7	169.96	169.88

Table
Rating Table for Irregular Channel

FATHER KEMP TRAIL

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
1,420.00	2.25	5.87	241.9	170.24	170.16
1,430.00	2.26	5.88	243.1	170.52	170.44
1,440.00	2.27	5.89	244.3	170.79	170.71
1,450.00	2.27	5.91	245.5	171.07	170.99
1,460.00	2.28	5.92	246.6	171.34	171.26
1,470.00	2.29	5.93	247.8	171.62	171.53
1,480.00	2.30	5.94	249.0	171.89	171.81
1,490.00	2.30	5.96	250.1	172.16	172.08
1,500.00	2.31	5.97	251.3	172.43	172.35
1,510.00	2.32	5.98	252.5	172.70	172.62
1,520.00	2.32	5.99	253.6	172.97	172.89
1,530.00	2.33	6.01	254.8	173.24	173.15
1,540.00	2.34	6.02	255.9	173.50	173.42
1,550.00	2.34	6.03	257.1	173.77	173.69
1,560.00	2.35	6.04	258.2	174.04	173.95
1,570.00	2.36	6.05	259.4	174.30	174.22
1,580.00	2.36	6.06	260.5	174.56	174.48
1,590.00	2.37	6.08	261.7	174.83	174.74
1,600.00	2.38	6.09	262.8	175.09	175.00
1,610.00	2.38	6.10	264.0	175.35	175.26
1,620.00	2.39	6.11	265.1	175.61	175.52
1,630.00	2.39	6.12	266.2	175.87	175.78
1,640.00	2.40	6.13	267.4	176.13	176.04
1,650.00	2.41	6.14	268.5	176.39	176.30
1,660.00	2.41	6.16	269.6	176.64	176.56
1,670.00	2.42	6.17	270.8	176.90	176.81
1,680.00	2.43	6.18	271.9	177.15	177.07
1,690.00	2.43	6.19	273.0	177.41	177.32
1,700.00	2.44	6.20	274.2	177.66	177.57
1,710.00	2.45	6.21	275.3	177.92	177.83
1,720.00	2.45	6.22	276.4	178.17	178.08
1,730.00	2.46	6.23	277.5	178.42	178.33
1,740.00	2.46	6.24	278.6	178.67	178.58
1,750.00	2.47	6.26	279.8	178.92	178.83
1,760.00	2.48	6.27	280.9	179.17	179.08
1,770.00	2.48	6.28	282.0	179.42	179.33
1,780.00	2.49	6.29	283.1	179.67	179.58
1,790.00	2.50	6.30	284.2	179.91	179.82
1,800.00	2.50	6.31	285.3	180.16	180.07
1,810.00	2.51	6.32	286.4	180.41	180.31
1,820.00	2.51	6.33	287.5	180.65	180.56
1,830.00	2.52	6.34	288.6	180.90	180.80
1,840.00	2.53	6.35	289.7	181.14	181.05
1,850.00	2.53	6.36	290.8	181.38	181.29
1,860.00	2.54	6.37	291.9	181.63	181.53
1,870.00	2.54	6.38	293.0	181.87	181.77
1,880.00	2.55	6.39	294.1	182.11	182.01
1,890.00	2.56	6.40	295.2	182.35	182.25
1,900.00	2.56	6.41	296.3	182.59	182.49
1,910.00	2.57	6.42	297.4	182.83	182.73
1,920.00	2.57	6.43	298.5	183.07	182.97
1,930.00	2.58	6.44	299.6	183.30	183.21
1,940.00	2.59	6.45	300.7	183.54	183.45
1,950.00	2.59	6.46	301.7	183.78	183.68

Table
Rating Table for Irregular Channel

FATHER KINO TRAIL

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
1,960.00	2.60	6.47	302.8	184.01	183.92
1,970.00	2.60	6.48	303.9	184.25	184.15
1,980.00	2.61	6.49	305.0	184.48	184.39
1,990.00	2.62	6.50	306.1	184.72	184.62
2,000.00	2.62	6.51	307.1	184.95	184.85
2,010.00	2.63	6.52	308.2	185.18	185.09
2,020.00	2.63	6.53	309.3	185.42	185.32
2,030.00	2.64	6.54	310.4	185.65	185.55
2,040.00	2.64	6.55	311.4	185.88	185.78
2,050.00	2.65	6.56	312.5	186.11	186.01
2,060.00	2.66	6.57	313.6	186.34	186.24
2,070.00	2.66	6.58	314.6	186.57	186.47
2,080.00	2.67	6.59	315.7	186.80	186.70
2,090.00	2.67	6.60	316.8	187.03	186.93
2,100.00	2.68	6.61	317.8	187.25	187.15
2,110.00	2.68	6.62	318.9	187.48	187.38
2,120.00	2.69	6.63	320.0	187.71	187.61
2,130.00	2.70	6.64	321.0	187.93	187.83
2,140.00	2.70	6.64	322.1	188.16	188.06
2,150.00	2.71	6.65	323.1	188.38	188.28
2,160.00	2.71	6.66	324.2	188.61	188.51
2,170.00	2.72	6.67	325.2	188.83	188.73
2,180.00	2.72	6.68	326.3	189.06	188.95
2,190.00	2.73	6.69	327.3	189.28	189.18
2,200.00	2.73	6.70	328.4	189.50	189.40
2,210.00	2.74	6.71	329.4	189.72	189.62
2,220.00	2.75	6.72	330.5	189.94	189.84
2,230.00	2.75	6.73	331.5	190.16	190.06
2,240.00	2.76	6.74	332.6	190.38	190.28
2,250.00	2.76	6.74	333.6	190.60	190.50
2,260.00	2.77	6.75	334.7	190.82	190.72
2,270.00	2.77	6.76	335.7	191.04	190.94
2,280.00	2.78	6.77	336.7	191.26	191.15
2,290.00	2.78	6.78	337.8	191.48	191.37
2,300.00	2.79	6.79	338.8	191.69	191.59
2,310.00	2.80	6.80	339.9	191.91	191.80
2,320.00	2.80	6.81	340.9	192.13	192.02
2,330.00	2.81	6.81	341.9	192.34	192.24
2,340.00	2.81	6.82	343.0	192.56	192.45
2,350.00	2.82	6.83	344.0	192.77	192.66
2,360.00	2.82	6.84	345.0	192.99	192.88
2,370.00	2.83	6.85	346.1	193.20	193.09
2,380.00	2.83	6.86	347.1	193.41	193.30
2,390.00	2.84	6.87	348.1	193.63	193.52
2,400.00	2.84	6.87	349.1	193.84	193.73
2,410.00	2.85	6.88	350.2	194.05	193.94
2,420.00	2.85	6.89	351.2	194.26	194.15
2,430.00	2.86	6.90	352.2	194.47	194.36
2,440.00	2.86	6.91	353.2	194.68	194.57
2,450.00	2.87	6.92	354.3	194.89	194.78
2,460.00	2.87	6.92	355.3	195.10	194.99
2,470.00	2.88	6.93	356.3	195.31	195.20
2,480.00	2.89	6.94	357.3	195.52	195.41
2,490.00	2.89	6.95	358.3	195.73	195.62

Table
Rating Table for Irregular Channel

FATHER KENO TRAIL

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
2,500.00	2.90	6.96	359.3	195.94	195.82
2,510.00	2.90	6.97	360.4	196.14	196.03
2,520.00	2.91	6.97	361.4	196.35	196.24
2,530.00	2.91	6.98	362.4	196.56	196.44
2,540.00	2.92	6.99	363.4	196.76	196.65
2,550.00	2.92	7.00	364.4	196.97	196.85
2,560.00	2.93	7.01	365.4	197.17	197.06
2,570.00	2.93	7.01	366.4	197.38	197.26
2,580.00	2.94	7.02	367.4	197.58	197.47
2,590.00	2.94	7.03	368.4	197.79	197.67
2,600.00	2.95	7.04	369.4	197.99	197.87
2,610.00	2.95	7.05	370.4	198.19	198.08
2,620.00	2.96	7.05	371.4	198.39	198.28
2,630.00	2.96	7.06	372.4	198.60	198.48
2,640.00	2.97	7.07	373.4	198.80	198.68
2,650.00	2.97	7.08	374.4	199.00	198.88
2,660.00	2.98	7.09	375.4	199.20	199.09
2,670.00	2.98	7.09	376.4	199.40	199.29
2,680.00	2.99	7.10	377.4	199.60	199.49
2,690.00	2.99	7.11	378.4	199.80	199.69
2,700.00	3.00	7.12	379.4	200.00	199.88
2,710.00	3.00	7.12	380.4	200.12	200.00
2,720.00	3.01	7.14	381.2	200.13	200.00
2,730.00	3.01	7.15	382.1	200.14	200.00
2,740.00	3.01	7.16	382.9	200.15	200.00
2,750.00	3.02	7.17	383.7	200.15	200.00
2,760.00	3.02	7.18	384.6	200.16	200.00
2,770.00	3.03	7.19	385.4	200.17	200.00
2,780.00	3.03	7.20	386.3	200.18	200.00
2,790.00	3.04	7.21	387.1	200.19	200.00
2,800.00	3.04	7.22	387.9	200.20	200.00
2,810.00	3.04	7.23	388.8	200.20	200.00
2,820.00	3.05	7.24	389.6	200.21	200.00
2,830.00	3.05	7.25	390.5	200.22	200.00
2,840.00	3.06	7.26	391.3	200.23	200.00
2,850.00	3.06	7.27	392.1	200.24	200.00
2,860.00	3.06	7.28	393.0	200.25	200.00
2,870.00	3.07	7.29	393.8	200.25	200.00
2,880.00	3.07	7.30	394.6	200.26	200.00
2,890.00	3.08	7.31	395.4	200.27	200.00
2,900.00	3.08	7.32	396.3	200.28	200.00
2,910.00	3.09	7.33	397.1	200.29	200.00
2,920.00	3.09	7.34	397.9	200.30	200.00
2,930.00	3.09	7.35	398.7	200.30	200.00
2,940.00	3.10	7.36	399.6	200.31	200.00
2,950.00	3.10	7.37	400.4	200.32	200.00
2,960.00	3.11	7.38	401.2	200.33	200.00
2,970.00	3.11	7.39	402.0	200.34	200.00
2,980.00	3.11	7.40	402.8	200.35	200.00
2,990.00	3.12	7.41	403.7	200.35	200.00
3,000.00	3.12	7.42	404.5	200.36	200.00
3,010.00	3.13	7.43	405.3	200.37	200.00
3,020.00	3.13	7.44	406.1	200.38	200.00
3,030.00	3.13	7.45	406.9	200.39	200.00

GW 100 YR, 24 HR
FUTURE

68 (JEF)

FATHER KEND TRAIL

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1*************************************
*                                   *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*             JUN   1998            *
*           VERSION 4.1             *
*                                   *
* RUN DATE   27NOV02  TIME  08:45:45 *
*                                   *
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*                                   *
*   U.S. ARMY CORPS OF ENGINEERS    *
*   HYDROLOGIC ENGINEERING CENTER   *
*         609 SECOND STREET         *
*      DAVIS, CALIFORNIA 95616      *
*          (916) 756-1104           *
*                                   *
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X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX         XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

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

1 HEC-1 INPUT PAGE 1

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

   1          ID     FUTURE CONDITIONS HYDROLOGY FOR CAREFREE AREA DRAINAGE MASTER PLAN
   2          ID       BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC., DEC. 2001
   3          ID
   4          ID     FUTURE CONDITIONS LAND USE BASED ON CAVE CREEK WATERCOURSE MASTER PLAN
   5          ID     HYDROLOGY BY TETRA TECH, 2000.
   6          ID
   7          ID     BASE MODEL BASED ON:
   8          ID
   9          ID           FLOODPLAIN DELINEATION STUDY OF ANDORA HILLS & GALLOWAY WASHES
  10          ID           FCD 99-14
  11          ID           BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC.
  12          ID           FOR THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
  13          ID           REVISED MARCH 2002     FILENAME: GWM224R.DAT
  14          ID      ****************************************************************
  15          ID           100 YEAR ANALYSIS 24-HOUR STORM USING JD RECORDS
  16          ID           MCUHP2 USED FOR UNIT HYDROGRAPHS
  17          ID      ****************************************************************
  18          ID
  19          ID     DDM MCUHP2 GALLOWAY WASH FLOODPLAIN DELINEATION STUDY, FCD NO. 99-14
  20          ID
  21          ID    March 2002 revisions to original Dec. 1999 model include:
  22          ID
  23          ID    HC BLOCK ADDED FOR GRAPEVINE WASH (CP 295A)
  24          ID
  25          ID    SUBBASIN GWW1_3 FURTHER SUBDIVIDED ALONG GALLOWAY WASH PER FEMA COMMENTS
  26          ID    IN LETTER DATED FEB. 8, 2002
  27          ID
  28          ID    *** ADDITIONAL COMBINATION ADDED 10-17-02 TO PROVIDE TOTAL FLOW IN
  29          ID        NORTH GALLOWAY WASH BY TWL FOR CH2M HILL FOR CAREFREE DMP ***
  30          ID
  31          ID   DDM MCUHP2 Carefree Area Drainage Master Plan, Galloway Wash Future Condition
              *DIAGRAM
  32          IT       5 01DEC99    0005     400
  33          IO       5       2
  34          IN      15
  35          JD    4.80    0.01
  36          PC    .000    .002    .005    .008    .011    .014    .017    .020    .023    .026
  37          PC    .029    .032    .035    .038    .041    .044    .048    .052    .056    .060
  38          PC    .064    .068    .072    .076    .080    .085    .090    .095    .100    .105
  39          PC    .110    .115    .120    .126    .133    .140    .147    .155    .163    .172
  40          PC    .181    .191    .203    .218    .236    .257    .283    .387    .663    .707
  41          PC    .735    .758    .776    .791    .804    .815    .825    .834    .842    .849
  42          PC    .856    .863    .869    .875    .881    .887    .893    .898    .903    .908
  43          PC    .913    .918    .922    .926    .930    .934    .938    .942    .946    .950
  44          PC    .953    .956    .959    .962    .965    .968    .971    .974    .977    .980
  45          PC    .983    .986    .989    .992    .995    .998   1.000
  46          JD    4.78    1.00
  47          JD    4.51   10.00
  48          JD    4.37   20.00
  49          JD    4.11   70.00
              *
              * DDM    ***** Updated *****
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1 HEC-1 INPUT PAGE 2

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

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  20855 3950          .         .         .         .         .         .         .         .         .         .         .         .
  20900 3960          .         .         .         .         .         .         .         .         .         .         .         .
  20905 3970          .         .         .         .         .         .         .         .         .         .         .         .
  20910 3980          .         .         .         .         .         .         .         .         .         .         .         .
  20915 3990          .         .         .         .         .         .         .         .         .         .         .         .
  20920 4000---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
1
 -----DSS---ZWRITE Unit  71; Vers.    7:  //GVW2/FLOW/01DEC1999/5MIN//
 -----DSS---ZWRITE Unit  71; Vers.    7:  //GVW2/FLOW/02DEC1999/5MIN//
1                                                        STATION     GVW2

                           (O) OUTFLOW
            0.      1000.     2000.     3000.     4000.     5000.     6000.     7000.        0.        0.        0.        0.        0.
 DAHRMN PER
  10005   10---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
  10010   20          .         .         .         .         .         .         .         .         .         .         .         .
  10015   30          .         .         .         .         .         .         .         .         .         .         .         .
  10020   40          .         .         .         .         .         .         .         .         .         .         .         .
  10025   50          .         .         .         .         .         .         .         .         .         .         .         .
  10030   60          .         .         .         .         .         .         .         .         .         .         .         .
  10035   70          .         .         .         .         .         .         .         .         .         .         .         .
  10040   80          .         .         .         .         .         .         .         .         .         .         .         .
  10045   90          .         .         .         .         .         .         .         .         .         .         .         .
  10050  100          .         .         .         .         .         .         .         .         .         .         .         .
  10055  110 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10100  120          .         .         .         .         .         .         .         .         .         .         .         .
  10105  130          .         .         .         .         .         .         .         .         .         .         .         .
  10110  140          .         .         .         .         .         .         .         .         .         .         .         .
  10115  150          .         .         .         .         .         .         .         .         .         .         .         .
  10120  160          .         .         .         .         .         .         .         .         .         .         .         .
  10125  170          .         .         .         .         .         .         .         .         .         .         .         .
  10130  180          .         .         .         .         .         .         .         .         .         .         .         .
  10135  190          .         .         .         .         .         .         .         .         .         .         .         .
  10140  200          .         .         .         .         .         .         .         .         .         .         .         .
  10145  210 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10150  220          .         .         .         .         .         .         .         .         .         .         .         .
  10155  230          .         .         .         .         .         .         .         .         .         .         .         .
  10200  240          .         .         .         .         .         .         .         .         .         .         .         .
  10205  25.0         .         .         .         .         .         .         .         .         .         .         .         .
  10210  26.0         .         .         .         .         .         .         .         .         .         .         .         .
  10215  27.0         .         .         .         .         .         .         .         .         .         .         .         .
  10220  28.0         .         .         .         .         .         .         .         .         .         .         .         .
  10225  29.0         .         .         .         .         .         .         .         .         .         .         .         .
  10230  30.0         .         .         .         .         .         .         .         .         .         .         .         .
  10235  31.0. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10240  32.0         .         .         .         .         .         .         .         .         .         .         .         .
  10245  33.0         .         .         .         .         .         .         .         .         .         .         .         .
  10250  34.0         .         .         .         .         .         .         .         .         .         .         .         .
  10255  35.0         .         .         .         .         .         .         .         .         .         .         .         .
  10300  36.0         .         .         .         .         .         .         .         .         .         .         .         .
  10305  37.0         .         .         .         .         .         .         .         .         .         .         .         .
  10310  38.0         .         .         .         .         .         .         .         .         .         .         .         .
  10315  39.0         .         .         .         .         .         .         .         .         .         .         .         .
  10320  40.0         .         .         .         .         .         .         .         .         .         .         .         .
  10325  41.0. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10330  42.0         .         .         .         .         .         .         .         .         .         .         .         .
  10335  43.0         .         .         .         .         .         .         .         .         .         .         .         .
  10340  44.0         .         .         .         .         .         .         .         .         .         .         .         .
  10345  45.0         .         .         .         .         .         .         .         .         .         .         .         .
  10350  46.0         .         .         .         .         .         .         .         .         .         .         .         .
  10355  47.0         .         .         .         .         .         .         .         .         .         .         .         .
  10400  48.0         .         .         .         .         .         .         .         .         .         .         .         .
  10405  49.0         .         .         .         .         .         .         .         .         .         .         .         .
  10410  50.0         .         .         .         .         .         .         .         .         .         .         .         .
  10415  51.0. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10420  52.0         .         .         .         .         .         .         .         .         .         .         .         .
  10425  53.0         .         .         .         .         .         .         .         .         .         .         .         .
  10430  54.0         .         .         .         .         .         .         .         .         .         .         .         .
  10435  55.0         .         .         .         .         .         .         .         .         .         .         .         .
  10440  56.0         .         .         .         .         .         .         .         .         .         .         .         .
  10445  57.0         .         .         .         .         .         .         .         .         .         .         .         .
  10450  58.0         .         .         .         .         .         .         .         .         .         .         .         .
  10455  59.0         .         .         .         .         .         .         .         .         .         .         .         .
  10500  60.0         .         .         .         .         .         .         .         .         .         .         .         .
  10505  61.0. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10510  62.0         .         .         .         .         .         .         .         .         .         .         .         .
  10515  63.0         .         .         .         .         .         .         .         .         .         .         .         .
  10520  64.0         .         .         .         .         .         .         .         .         .         .         .         .
  10525  65.0         .         .         .         .         .         .         .         .         .         .         .         .
  10530  66.0         .         .         .         .         .         .         .         .         .         .         .         .
  10535  67.0         .         .         .         .         .         .         .         .         .         .         .         .
  10540  68.0         .         .         .         .         .         .         .         .         .         .         .         .
  10545  69.0         .         .         .         .         .         .         .         .         .         .         .         .
  10550  70.0         .         .         .         .         .         .         .         .         .         .         .         .
  10555  71.0. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10600  72.0         .         .         .         .         .         .         .         .         .         .         .         .
  10605  73.0         .         .         .         .         .         .         .         .         .         .         .         .
  10610  74.0         .         .         .         .         .         .         .         .         .         .         .         .
  10615  75.0         .         .         .         .         .         .         .         .         .         .         .         .
  10620  76.0         .         .         .         .         .         .         .         .         .         .         .         .
  10625  77.0         .         .         .         .         .         .         .         .         .         .         .         .
  10630  78.0         .         .         .         .         .         .         .         .         .         .         .         .
  10635  79.0         .         .         .         .         .         .         .         .         .         .         .         .
  10640  80.0         .         .         .         .         .         .         .         .         .         .         .         .
  10645  81.0. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
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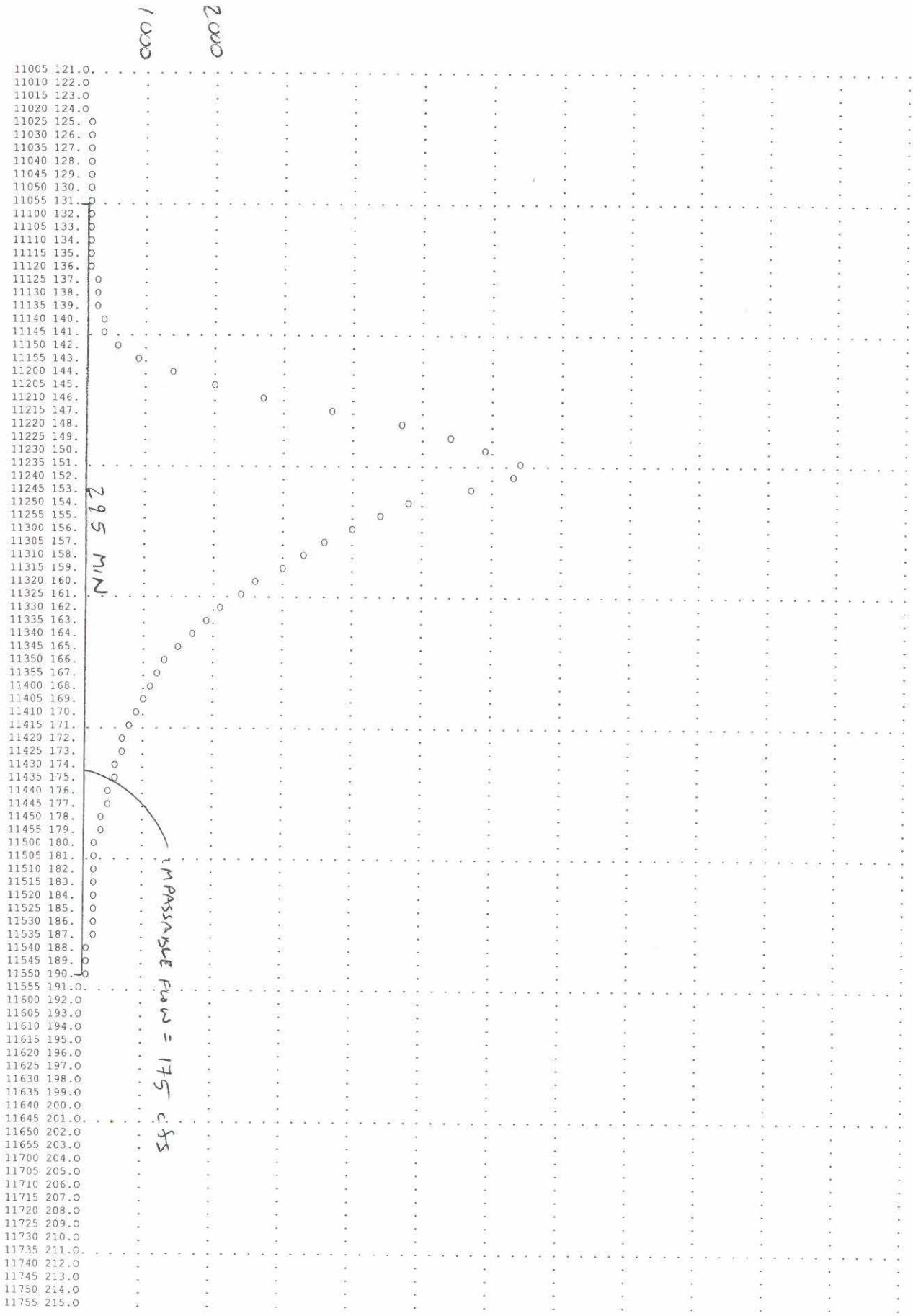
FATHER KENO TRAIL



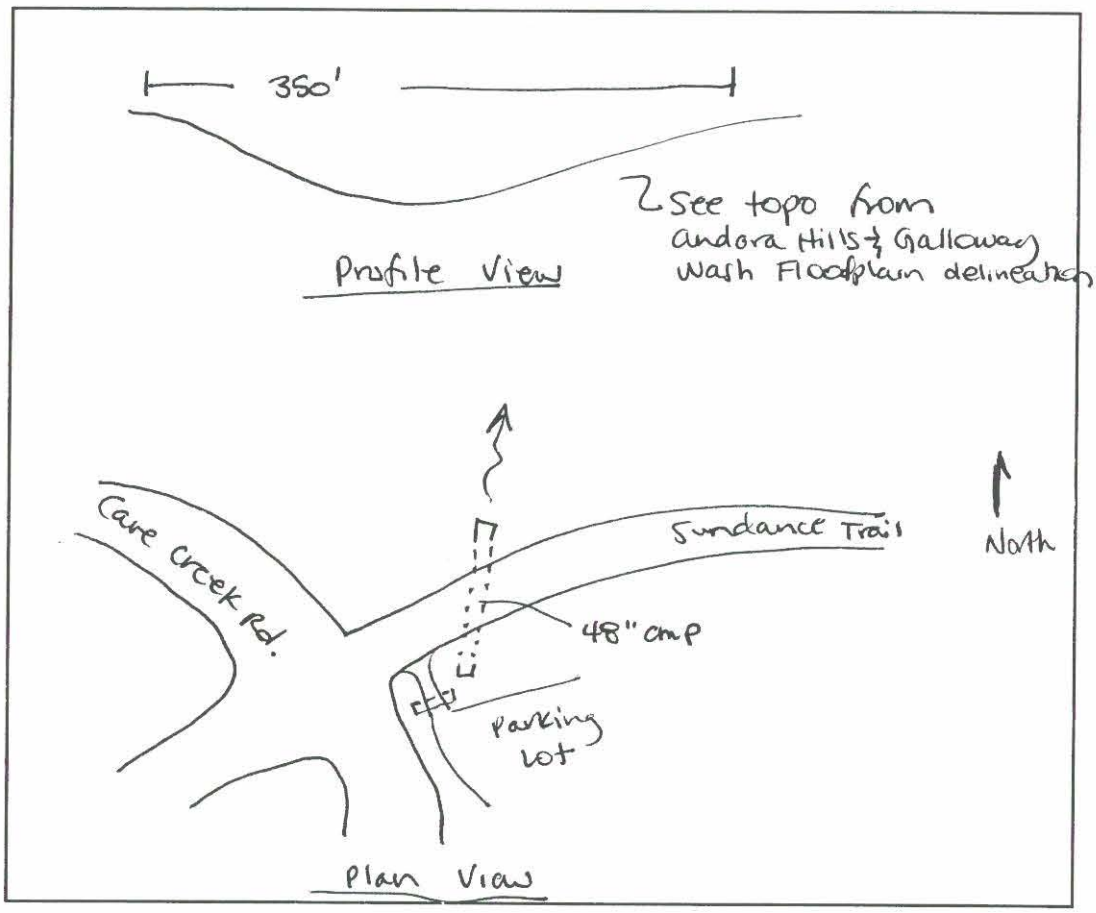
Sundance Trail Near Cave Creek Road (#70)

Carefree Drainage Master Plan
Field Survey Notes

Culvert Number: #70

Date of Survey: 10/8/02

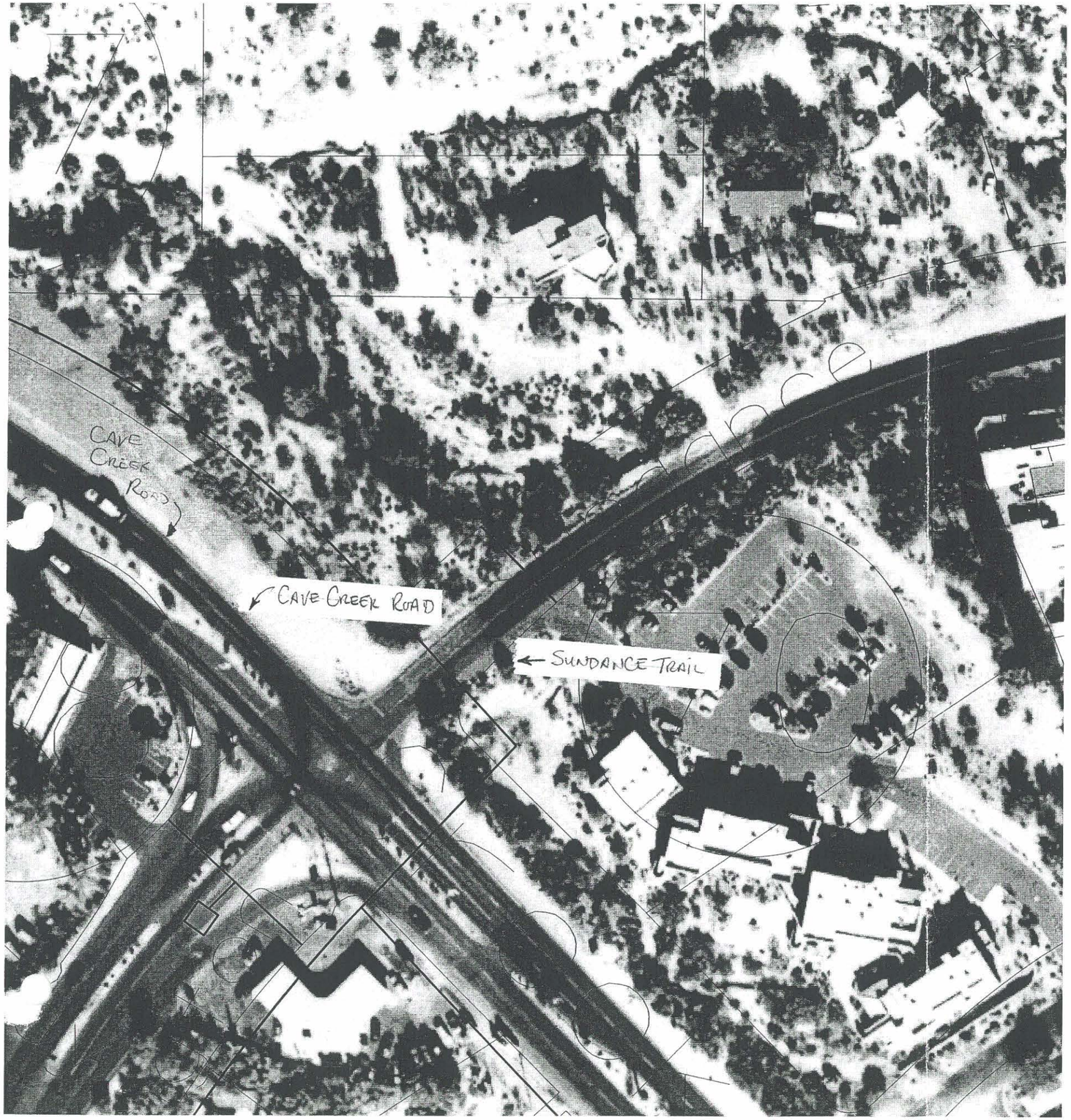
Location: Sundance Trail near Cave Creek Road



Material: cmp

Headwall: None - projecting

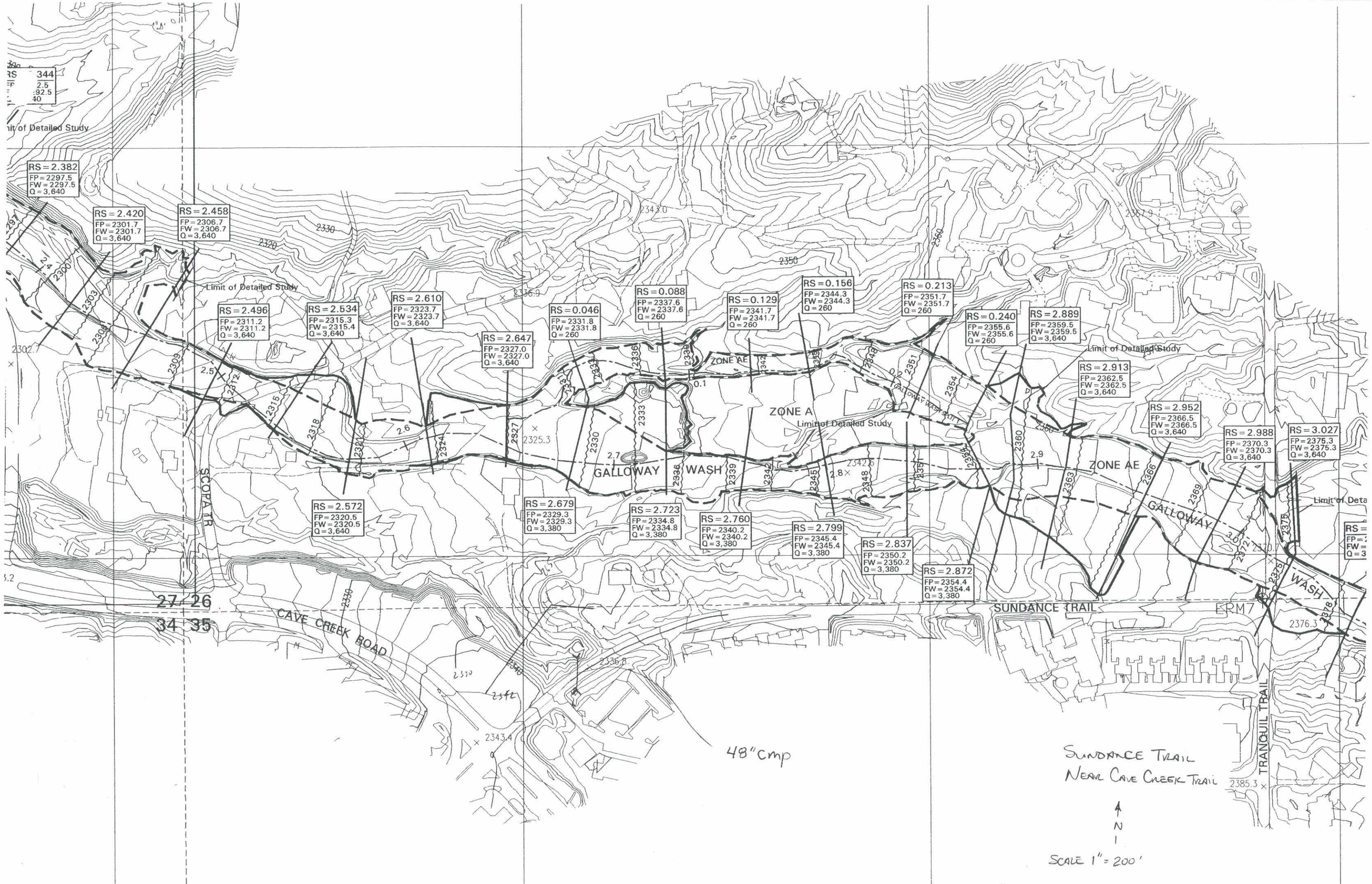
Notes:



SUNDANCE TRAIL NEAR
CAVE CREEK ROAD

N

SCALE 1" = 80'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FP = 2297.5
FW = 2297.5
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RS = 2.420
FP = 2301.7
FW = 2301.7
Q = 3,640
RS = 2.458
FP = 2306.7
FW = 2306.7
Q = 3,640
RS = 2.496
FP = 2311.2
FW = 2311.2
Q = 3,640
RS = 2.534
FP = 2315.3
FW = 2315.4
Q = 3,640
RS = 2.610
FP = 2323.7
FW = 2323.7
Q = 3,640
RS = 2.647
FP = 2327.0
FW = 2327.0
Q = 3,640
RS = 0.046
FP = 2331.8
FW = 2331.8
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RS = 0.088
FP = 2337.6
FW = 2337.6
Q = 260
RS = 0.129
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FW = 2341.7
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RS = 0.156
FP = 2344.3
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RS = 0.213
FP = 2351.7
FW = 2351.7
Q = 260
RS = 0.240
FP = 2355.6
FW = 2355.6
Q = 260
RS = 2.889
FP = 2359.5
FW = 2359.5
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RS = 2.913
FP = 2362.5
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FW = 2375.3
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FW = 2320.5
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RS = 2.723
FP = 2334.8
FW = 2334.8
Q = 3,380
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FP = 2350.2
FW = 2350.2
Q = 3,380
RS = 2.872
FP = 2354.4
FW = 2354.4
Q = 3,380
Limit of Detailed Study
ZONE AE
ZONE A
GALLOWAY WASH
SCOPA TR
CAVE CREEK ROAD
SUNDANCE TRAIL
TRANQUIL TRAIL
27 26
34 35
48" cmp
SUNDANCE TRAIL
NEAR CAVE CREEK TRAIL
N
SCALE 1" = 200'

Culvert Designer/Analyzer Report
#70 Sundance Trail

SUNDANCE TRAIL NEAR CAVE CREEK ROAD

Analysis Component

Storm Event	Design	Discharge	1,296.00 cfs

Peak Discharge Method: User-Specified

Design Discharge	1,296.00 cfs	Check Discharge	0.00 cfs

Tailwater properties: Irregular Channel

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00	1+50	0.058
1+50	1+70	0.028
1+70	3+50	0.040

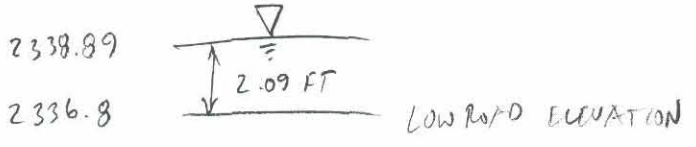
Natural Channel Points

Station (ft)	Elevation (ft)
0+00	2,342.00
0+90	2,340.00
1+50	2,324.00
1+65	2,324.00
1+70	2,326.00
2+00	2,330.00
2+50	2,336.00
2+60	2,338.00
3+50	2,340.00

Tailwater conditions for Design Storm.

Discharge	1,296.00 cfs	Actual Depth	3.92 ft
Velocity	11.15 ft/s		

Name	Description	Discharge	HW Elev.	Velocity
Culvert-1	1-48 inch Circular	138.74 cfs	2,338.89 ft	11.90 ft/s
Weir	Roadway	1,157.38 cfs	2,338.89 ft	N/A
Total	----------	1,296.12 cfs	2,338.89 ft	N/A



Culvert Designer/Analyzer Report
#70 Sundance Trail

SUNDANCE TRAIL NEAR CALE CREEK ROAD

Component:Culvert-1

Culvert Summary			
Computed Headwater Elev	2,338.89 ft	Discharge	138.74 cfs
Inlet Control HW Elev.	2,338.35 ft	Tailwater Elevation	2,327.92 ft
Outlet Control HW Elev.	2,338.89 ft	Control Type	Outlet Control
Headwater Depth/Height	1.97		

Grades			
Upstream Invert	2,331.00 ft	Downstream Invert	2,330.00 ft
Length	72.00 ft	Constructed Slope	0.013889 ft/ft

Hydraulic Profile			
Profile	CompositeM2PressureProfile	Depth, Downstream	3.50 ft
Slope Type	Mild	Normal Depth	N/A ft
Flow Regime	Subcritical	Critical Depth	3.50 ft
Velocity Downstream	11.90 ft/s	Critical Slope	0.028811 ft/ft

Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	4.00 ft
Section Size	48 inch	Rise	4.00 ft
Number Sections	1		

Outlet Control Properties			
Outlet Control HW Elev.	2,338.89 ft	Upstream Velocity Head	1.89 ft
Ke	0.50	Entrance Loss	0.95 ft

Inlet Control Properties			
Inlet Control HW Elev.	2,338.35 ft	Flow Control	Submerged
Inlet Type	Headwall	Area Full	12.6 ft²
K	0.00780	HDS 5 Chart	2
M	2.00000	HDS 5 Scale	1
C	0.03790	Equation Form	1
Y	0.69000		

Culvert Designer/Analyzer Report
#70 Sundance Trail

SUNDANCE TRAIL NEAR CAVE CREEK ROAD

Component:Weir

Hydraulic Component(s): Roadway					
Discharge	1,157.38	cfs	Allowable HW Elevation	2,338.89	ft
Roadway Width	30.00	ft	Overtopping Coefficient	3.03	US
Low Point	2,336.80	ft	Headwater Elevation	2,338.89	ft
Discharge Coefficient (Cr)	3.03		Submergence Factor (Kt)	1.00	
Tailwater Elevation	2,327.92	ft			

Sta (ft)	Elev. (ft)
0.00	2,343.00
100.00	2,342.00
200.00	2,338.00
320.00	2,336.80
400.00	2,338.00
700.00	2,346.00

Worksheet
Worksheet for Irregular Channel

SUNDANCE TRAIL NEAR CAVE CREEK ROAD

Project Description	
Worksheet	70
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data		
Slope	010000	ft/ft
Discharg	,157.38	cfs

Options	
Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Results		
Mannings Coefficie	0.025	
Water Surface Elev	2,338.41	ft
Elevation Range	36.80 to 2,346.00	
Flow Area	206.5	ft²
Wetted Perimeter	225.44	ft
Top Width	225.41	ft
Actual Depth	1.61	ft
Critical Elevation	2,338.43	ft
Critical Slope	0.009325	ft/ft
Velocity	5.61	ft/s
Velocity Head	0.49	ft
Specific Energy	2,338.89	ft
Froude Number	1.03	
Flow Type	Supercritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00	7+00	0.025

Natural Channel Points

Station (ft)	Elevation (ft)
0+00	2,343.00
1+00	2,342.00
2+00	2,338.00
3+20	2,336.80
4+00	2,338.00
7+00	2,346.00

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CH2M Hill
37 Brookside Road Waterbury, CT 06708 USA (203) 755-1666

Table
Rating Table for Irregular Channel

SUNDANCE TRAIL NEAR CAVE CREEK ROAD

Project Description

Worksheet	70
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data

Slope 010000 ft/ft

Options

Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	1,200.00	5.00

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00	2,336.80	0.00	0.0	0.00	0.00
5.00	2,337.01	1.33	3.8	35.37	35.37
10.00	2,337.08	1.58	6.3	45.87	45.87
15.00	2,337.12	1.75	8.6	53.41	53.40
20.00	2,337.16	1.88	10.6	59.49	59.49
25.00	2,337.19	1.99	12.6	64.68	64.68
30.00	2,337.22	2.08	14.4	69.26	69.26
35.00	2,337.24	2.17	16.2	73.38	73.38
40.00	2,337.26	2.24	17.9	77.15	77.15
45.00	2,337.28	2.31	19.5	80.64	80.63
50.00	2,337.30	2.37	21.1	83.88	83.88
55.00	2,337.32	2.43	22.7	86.94	86.93
60.00	2,337.34	2.48	24.2	89.82	89.81
65.00	2,337.36	2.53	25.7	92.56	92.55
70.00	2,337.37	2.58	27.2	95.17	95.16
75.00	2,337.39	2.62	28.6	97.66	97.65
80.00	2,337.40	2.66	30.0	100.05	100.05
85.00	2,337.41	2.70	31.4	102.35	102.35
90.00	2,337.43	2.74	32.8	104.57	104.56
95.00	2,337.44	2.78	34.2	106.71	106.70
100.00	2,337.45	2.82	35.5	108.79	108.78
105.00	2,337.46	2.85	36.8	110.79	110.79
110.00	2,337.48	2.89	38.1	112.74	112.74
115.00	2,337.49	2.92	39.4	114.64	114.63
120.00	2,337.50	2.95	40.7	116.48	116.47
125.00	2,337.51	2.98	42.0	118.28	118.27
130.00	2,337.52	3.01	43.2	120.03	120.02
135.00	2,337.53	3.04	44.5	121.74	121.73
140.00	2,337.54	3.06	45.7	123.41	123.41
145.00	2,337.55	3.09	46.9	125.05	125.04
150.00	2,337.56	3.12	48.1	126.65	126.64
155.00	2,337.57	3.14	49.3	128.22	128.21
160.00	2,337.58	3.17	50.5	129.75	129.74
165.00	2,337.59	3.19	51.7	131.26	131.25

Table
Rating Table for Irregular Channel

SUNDANCE TRAIL NEAR CAVE CREEK ROAD

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
440.00	2,337.94	4.08	107.8	189.61	189.60
445.00	2,337.94	4.09	108.8	190.42	190.40
450.00	2,337.95	4.10	109.7	191.22	191.20
455.00	2,337.95	4.11	110.6	192.01	192.00
460.00	2,337.96	4.13	111.5	192.80	192.78
465.00	2,337.96	4.14	112.4	193.58	193.57
470.00	2,337.97	4.15	113.3	194.36	194.35
475.00	2,337.97	4.16	114.2	195.13	195.12
480.00	2,337.98	4.17	115.1	195.90	195.89
485.00	2,337.98	4.18	116.0	196.66	196.65
490.00	2,337.98	4.19	116.9	197.42	197.41
495.00	2,337.99	4.20	117.8	198.17	198.16
500.00	2,337.99	4.21	118.7	198.92	198.91
505.00	2,338.00	4.22	119.6	199.67	199.65
510.00	2,338.00	4.24	120.4	200.14	200.13
515.00	2,338.01	4.25	121.2	200.38	200.37
520.00	2,338.01	4.26	121.9	200.62	200.60
525.00	2,338.01	4.28	122.7	200.85	200.84
530.00	2,338.02	4.29	123.4	201.09	201.08
535.00	2,338.02	4.31	124.2	201.33	201.31
540.00	2,338.02	4.32	125.0	201.56	201.54
545.00	2,338.03	4.34	125.7	201.79	201.78
550.00	2,338.03	4.35	126.5	202.02	202.01
555.00	2,338.04	4.36	127.2	202.26	202.24
560.00	2,338.04	4.38	127.9	202.49	202.47
565.00	2,338.04	4.39	128.7	202.71	202.70
570.00	2,338.05	4.40	129.4	202.94	202.93
575.00	2,338.05	4.42	130.2	203.17	203.15
580.00	2,338.05	4.43	130.9	203.40	203.38
585.00	2,338.06	4.44	131.6	203.62	203.61
590.00	2,338.06	4.46	132.4	203.85	203.83
595.00	2,338.06	4.47	133.1	204.07	204.05
600.00	2,338.07	4.48	133.8	204.29	204.28
605.00	2,338.07	4.50	134.6	204.52	204.50
610.00	2,338.08	4.51	135.3	204.74	204.72
615.00	2,338.08	4.52	136.0	204.96	204.94
620.00	2,338.08	4.53	136.7	205.18	205.16
625.00	2,338.09	4.55	137.4	205.40	205.38
630.00	2,338.09	4.56	138.2	205.62	205.60
635.00	2,338.09	4.57	138.9	205.83	205.82
640.00	2,338.10	4.58	139.6	206.05	206.03
645.00	2,338.10	4.60	140.3	206.27	206.25
650.00	2,338.10	4.61	141.0	206.48	206.46
655.00	2,338.11	4.62	141.7	206.70	206.68
660.00	2,338.11	4.63	142.4	206.91	206.89
665.00	2,338.11	4.65	143.1	207.12	207.10
670.00	2,338.12	4.66	143.8	207.34	207.32
675.00	2,338.12	4.67	144.5	207.55	207.53
680.00	2,338.12	4.68	145.2	207.76	207.74
685.00	2,338.13	4.69	145.9	207.97	207.95
690.00	2,338.13	4.71	146.6	208.18	208.16
695.00	2,338.13	4.72	147.3	208.39	208.37
700.00	2,338.14	4.73	148.0	208.59	208.58
705.00	2,338.14	4.74	148.7	208.80	208.78

Table
Rating Table for Irregular Channel

SUNDANCE TRAIL NEAR CALE CREEK ROAD

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
980.00	2,338.31	5.30	184.8	219.35	219.32
985.00	2,338.31	5.31	185.4	219.53	219.50
990.00	2,338.31	5.32	186.1	219.71	219.68
995.00	2,338.32	5.33	186.7	219.88	219.86
1,000.00	2,338.32	5.34	187.3	220.06	220.03
1,005.00	2,338.32	5.35	187.9	220.24	220.21
1,010.00	2,338.33	5.36	188.6	220.41	220.39
1,015.00	2,338.33	5.37	189.2	220.59	220.56
1,020.00	2,338.33	5.37	189.8	220.76	220.74
1,025.00	2,338.33	5.38	190.4	220.94	220.91
1,030.00	2,338.34	5.39	191.0	221.11	221.09
1,035.00	2,338.34	5.40	191.7	221.29	221.26
1,040.00	2,338.34	5.41	192.3	221.46	221.44
1,045.00	2,338.35	5.42	192.9	221.63	221.61
1,050.00	2,338.35	5.43	193.5	221.81	221.78
1,055.00	2,338.35	5.44	194.1	221.98	221.95
1,060.00	2,338.35	5.44	194.7	222.15	222.13
1,065.00	2,338.36	5.45	195.3	222.33	222.30
1,070.00	2,338.36	5.46	195.9	222.50	222.47
1,075.00	2,338.36	5.47	196.6	222.67	222.64
1,080.00	2,338.36	5.48	197.2	222.84	222.81
1,085.00	2,338.37	5.49	197.8	223.01	222.98
1,090.00	2,338.37	5.49	198.4	223.18	223.15
1,095.00	2,338.37	5.50	199.0	223.35	223.32
1,100.00	2,338.38	5.51	199.6	223.52	223.49
1,105.00	2,338.38	5.52	200.2	223.69	223.66
1,110.00	2,338.38	5.53	200.8	223.86	223.83
1,115.00	2,338.38	5.54	201.4	224.02	224.00
1,120.00	2,338.39	5.54	202.0	224.19	224.16
1,125.00	2,338.39	5.55	202.6	224.36	224.33
1,130.00	2,338.39	5.56	203.2	224.53	224.50
1,135.00	2,338.39	5.57	203.8	224.69	224.67
1,140.00	2,338.40	5.58	204.4	224.86	224.83
1,145.00	2,338.40	5.59	205.0	225.03	225.00
1,150.00	2,338.40	5.59	205.6	225.19	225.16
1,155.00	2,338.41	5.60	206.2	225.36	225.33
1,160.00	2,338.41	5.61	206.8	225.52	225.50
1,165.00	2,338.41	5.62	207.4	225.69	225.66
1,170.00	2,338.41	5.63	208.0	225.85	225.82
1,175.00	2,338.42	5.63	208.6	226.02	225.99
1,180.00	2,338.42	5.64	209.2	226.18	226.15
1,185.00	2,338.42	5.65	209.8	226.35	226.32
1,190.00	2,338.42	5.66	210.3	226.51	226.48
1,195.00	2,338.43	5.67	210.9	226.67	226.64
1,200.00	2,338.43	5.67	211.5	226.83	226.80

GW 100 YR, 24 HR
FUTURE
SUNDANCE TRAIL NEAR CAVE CREEK ROAD

```
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN  1998               *
*            VERSION 4.1               *
*                                      *
*  RUN DATE   27NOV02  TIME  08:45:45  *
*                                      *
****************************************
```

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

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

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

```
1                                    HEC-1 INPUT                                                    PAGE  1

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

    1           ID     FUTURE CONDITIONS HYDROLOGY FOR CAREFREE AREA DRAINAGE MASTER PLAN
    2           ID       BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC., DEC. 2001
    3           ID
    4           ID     FUTURE CONDITIONS LAND USE BASED ON CAVE CREEK WATERCOURSE MASTER PLAN
    5           ID     HYDROLOGY BY TETRA TECH, 2000.
    6           ID
    7           ID     BASE MODEL BASED ON:
    8           ID
    9           ID          FLOODPLAIN DELINEATION STUDY OF ANDORA HILLS & GALLOWAY WASHES
   10           ID          FCD 99-14
   11           ID          BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC.
   12           ID          FOR THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
   13           ID          REVISED MARCH 2002     FILENAME: GWM224R.DAT
   14           ID      ****************************************************************
   15           ID          100 YEAR ANALYSIS 24-HOUR STORM USING JD RECORDS
   16           ID          MCUHP2 USED FOR UNIT HYDROGRAPHS
   17           ID     ****************************************************************
   18           ID
   19           ID     DDM MCUHP2 GALLOWAY WASH FLOODPLAIN DELINEATION STUDY, FCD NO. 99-14
   20           ID
   21           ID    March 2002 revisions to original Dec. 1999 model include:
   22           ID
   23           ID    HC BLOCK ADDED FOR GRAPEVINE WASH (CP 295A)
   24           ID
   25           ID    SUBBASIN GWW1_3 FURTHER SUBDIVIDED ALONG GALLOWAY WASH PER FEMA COMMENTS
   26           ID    IN LETTER DATED FEB. 8, 2002
   27           ID
   28           ID    *** ADDITIONAL COMBINATION ADDED 10-17-02 TO PROVIDE TOTAL FLOW IN
   29           ID        NORTH GALLOWAY WASH BY TWL FOR CH2M HILL FOR CAREFREE DMP ***
   30           ID
   31           ID   DDM MCUHP2 Carefree Area Drainage Master Plan, Galloway Wash Future Condition
                *DIAGRAM
   32           IT       5 01DEC99    0005     400
   33           IO       5       2
   34           IN      15
   35           JD    4.80    0.01
   36           PC    .000    .002    .005    .008    .011    .014    .017    .020    .023    .026
   37           PC    .029    .032    .035    .038    .041    .044    .048    .052    .056    .060
   38           PC    .064    .068    .072    .076    .080    .085    .090    .095    .100    .105
   39           PC    .110    .115    .120    .126    .133    .140    .147    .155    .163    .172
   40           PC    .181    .191    .203    .218    .236    .257    .283    .387    .663    .707
   41           PC    .735    .758    .776    .791    .804    .815    .825    .834    .842    .849
   42           PC    .856    .863    .869    .875    .881    .887    .893    .898    .903    .908
   43           PC    .913    .918    .922    .926    .930    .934    .938    .942    .946    .950
   44           PC    .953    .956    .959    .962    .965    .968    .971    .974    .977    .980
   45           PC    .983    .986    .989    .992    .995    .998   1.000
   46           JD    4.78    1.00
   47           JD    4.51   10.00
   48           JD    4.37   20.00
   49           JD    4.11   70.00
                *
                * DDM   ***** Updated *****
1                                    HEC-1 INPUT                                                    PAGE  2

  LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
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SUNDANCE TRAIL NEAR CAVE CREEK ROAD

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20410 3380
20415 3390
20420 3400
20425 3410
20430 3420
20435 3430
20440 3440
20445 3450
20450 3460
20455 3470
20500 3480
20505 3490
20510 3500
20515 3510
20520 3520
20525 3530
20530 3540
20535 3550
20540 3560
20545 3570
20550 3580
20555 3590
20600 3600
20605 3610
20610 3620
20615 3630
20620 3640
20625 3650
20630 3660
20635 3670
20640 3680
20645 3690
20650 3700
20655 3710
20700 3720
20705 3730
20710 3740
20715 3750
20720 3760
20725 3770
20730 3780
20735 3790
20740 3800
20745 3810
20750 3820
20755 3830
20800 3840
20805 3850
20810 3860
20815 3870
20820 3880
20825 3890
20830 3900
20835 3910
20840 3920
20845 3930
20850 3940
20855 3950
20900 3960
20905 3970
20910 3980
20915 3990
20920 4000--------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
1
1                                                STATION   GWW1_5

                    (O) OUTFLOW
          0.     200.     400.     600.     800.    1000.    1200.    1400.       0.       0.       0.       0.       0.
DAHRMN PER
 10005   10--------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
 10010   20
 10015   30
 10020   40
 10025   50
 10030   60
 10035   70
 10040   80
 10045   90
 10050  100
 10055  110
 10100  120
 10105  130
 10110  140
 10115  15.0
 10120  16.0
 10125  17.0
 10130  18.0
 10135  19.0
 10140  20.0
 10145  21.0
 10150  22.0
 10155  23.0
 10200  24.0
 10205  25.0
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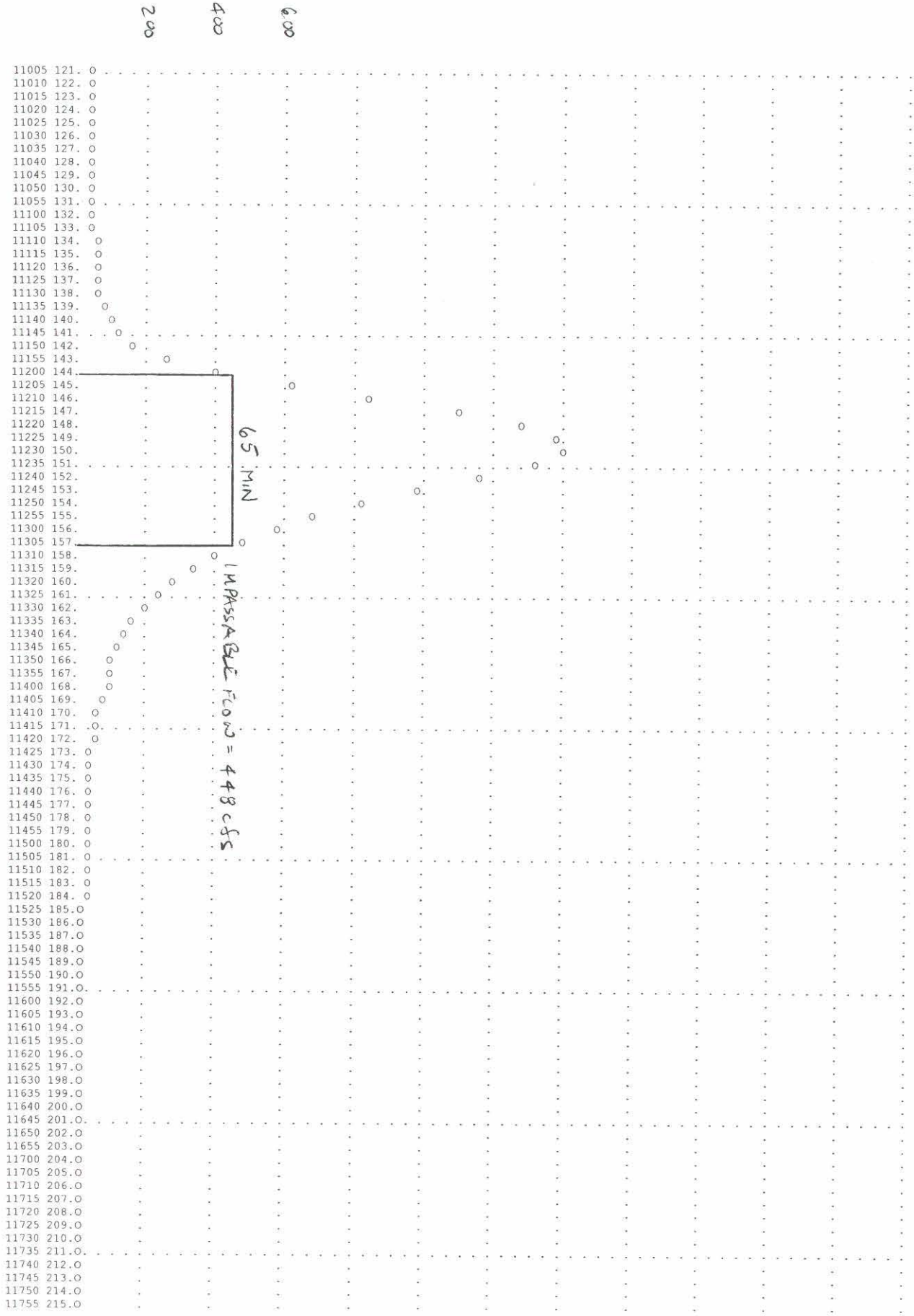
SUNDANCE TRAIL NEAR CAVE CREEK ROAD



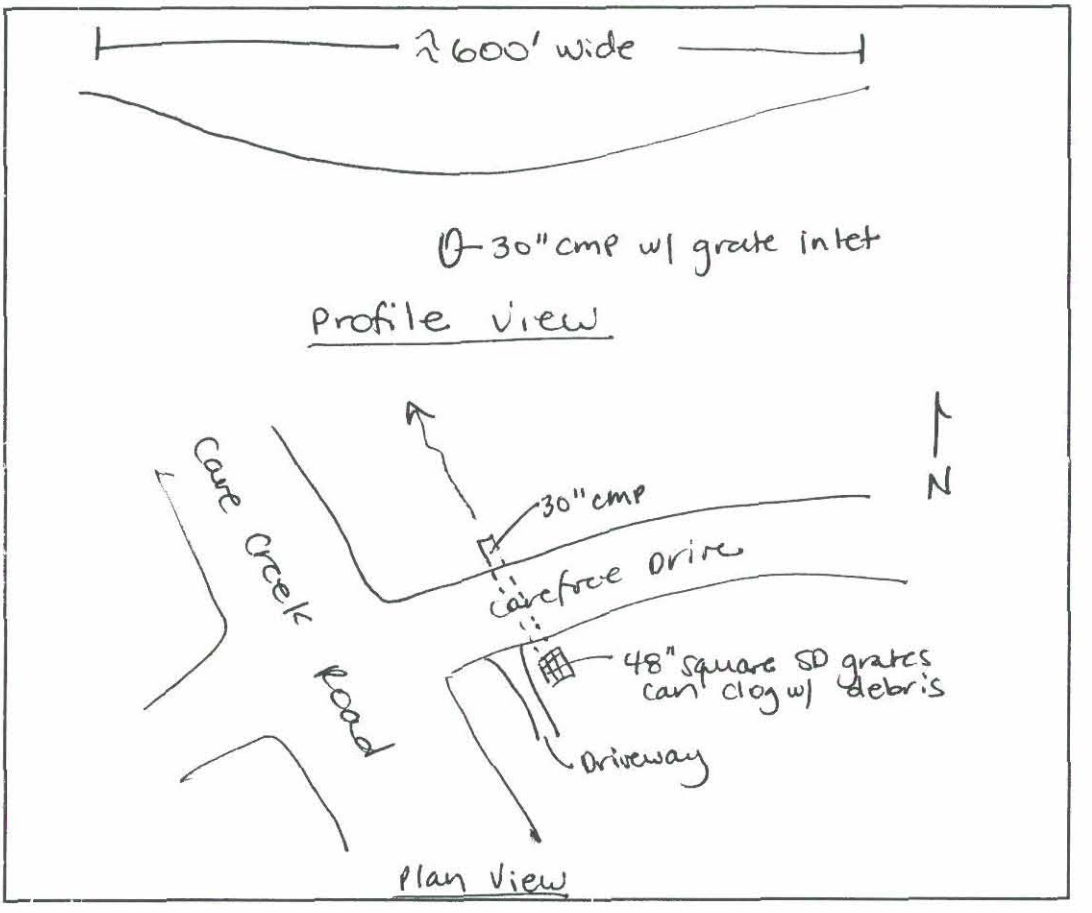
Carefree Drive Near Cave Creek Road
(#71, JEF #27)

Carefree Drainage Master Plan
Field Survey Notes

Culvert Number: # 71, JEF # 27

Date of Survey: 10/9/02

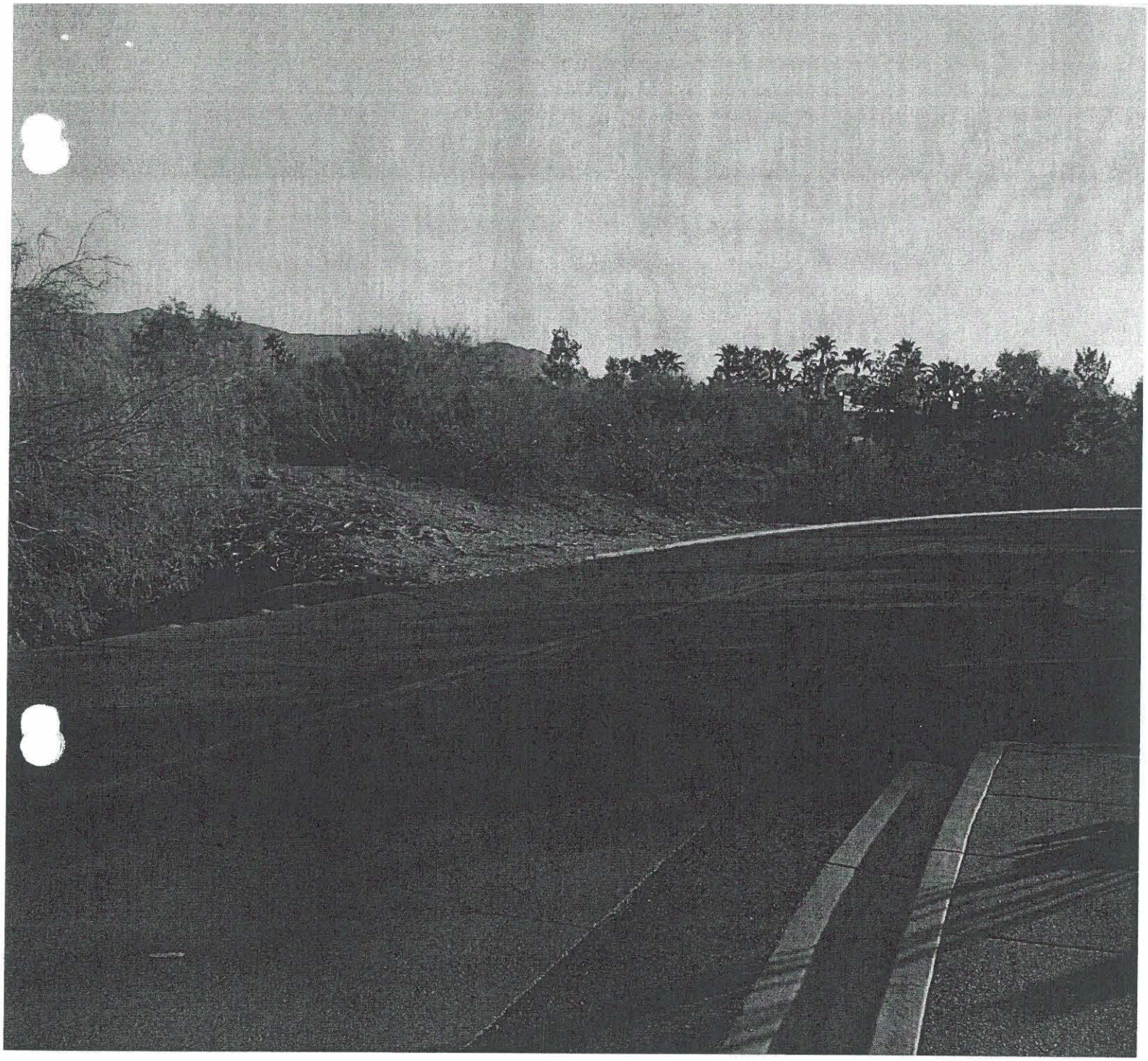
Location: Carefree Drive near Care Creek Road



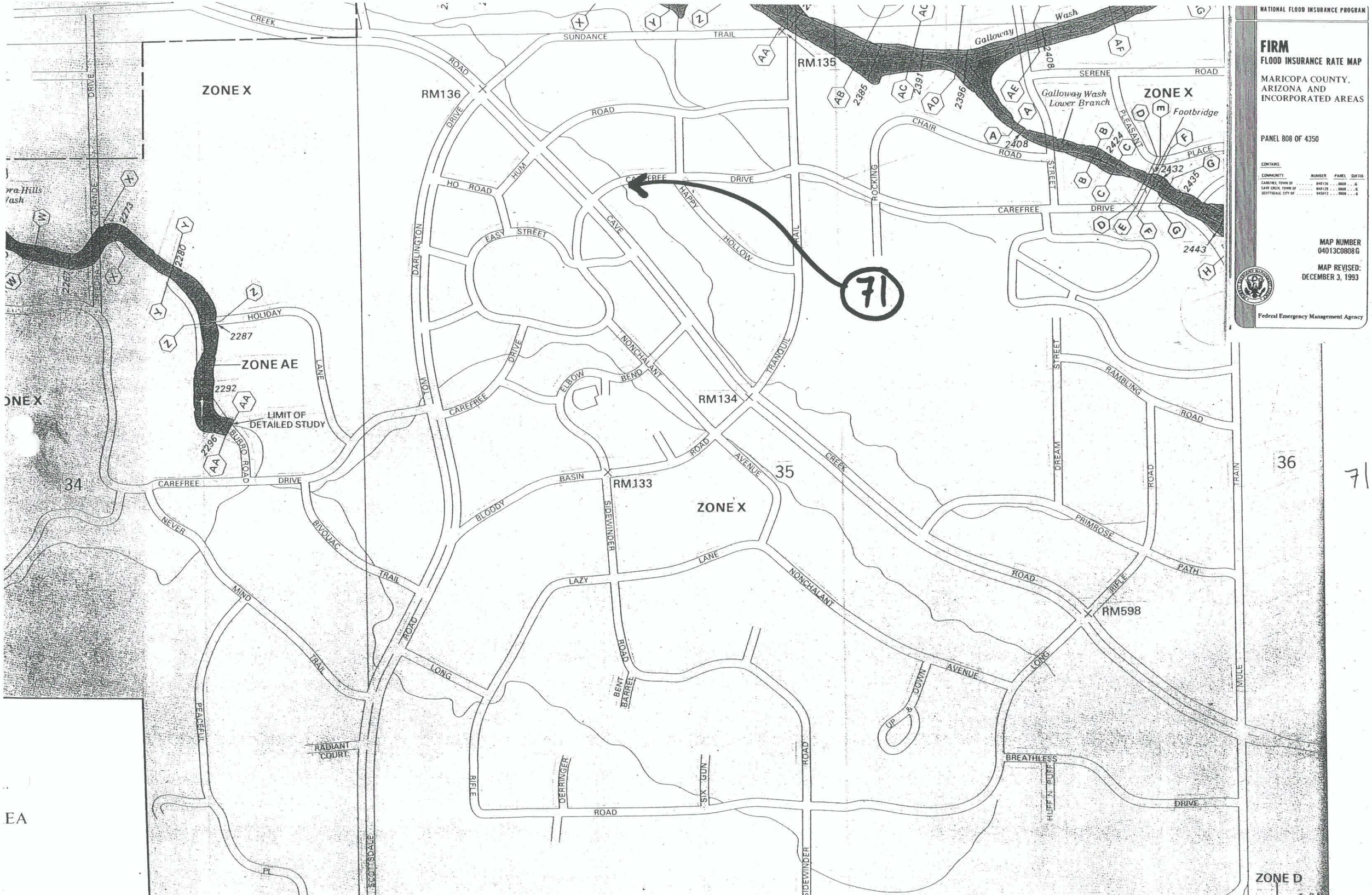
Material: 30" cmp w/ grate inlet

Headwall: Inlet (no headwall)

Notes: Grates seen w/ a lot of debris



CAVEFREE DRIVE NEAR CAVE CREEK ROAD


NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
MARICOPA COUNTY, ARIZONA AND INCORPORATED AREAS
PANEL 808 OF 4350
CONTAINS:
COMMUNITY NUMBER PANEL SUFFIX
CAREFREE, TOWN OF 040126 0808 G
CAVE CREEK, TOWN OF 040129 0808 G
SCOTTSDALE, CITY OF 045012 0808 G
MAP NUMBER 04013C0808G
MAP REVISED: DECEMBER 3, 1993
Federal Emergency Management Agency
ZONE X
ZONE AE
ZONE D
LIMIT OF DETAILED STUDY
Galloway Wash
Galloway Wash Lower Branch
Footbridge
RM136
RM135
RM134
RM133
RM598
CAREFREE DRIVE
SUNDANCE TRAIL
SERENE ROAD
CHAIR ROAD
HOLIDAY LANE
BURRO ROAD
BLOODY BASIN ROAD
SIDEWINDER ROAD
NONCHALANT AVENUE
RAMBLING ROAD
PRIMROSE PATH
BREATHLESS DRIVE
RIFLE ROAD
LONG ROAD
BIVOUAC TRAIL
NEVER MIND TRAIL
RADIANT COURT
PEACEFUL PL
SCOTTSDALE
DARLINGTON DRIVE
HO ROAD
HUM ROAD
EASY STREET
CAVE CREEK ROAD
HAPPY HOLLOW
ROCKING STREET
PLEASANT PLACE
DREAM STREET
TRAIN ROAD
MULE TRAIL
TOM ROAD
ELBOW BEND
TRANQUIL TRAIL
LAZY LANE
BENT BARREL
UP & DOWN
DERRINGER
SIX GUN
HUFF N PUFF
GRANDE DRIVE
SIERRA DRIVE
34
35
36
71

Worksheet
Worksheet for Ditch Inlet On Grade

CAREFREE DRIVE NEAR CAVE CREEK ROAD

Project Description

Worksheet	71 - Ditch Inlet
Type	Ditch Inlet On Gr:
Solve For	Efficiency

Input Data

Mannings Coeffic	0.035	
Slope	0.010000	ft/ft
Left Side Slope	4.00	V : H
Right Side Slope	4.00	V : H
Bottom Width	4.00	ft
Grate Width	4.00	ft
Grate Length	4.00	ft
Grate Type	Reticuline	
Clogging	50.0	%
Discharge	1,244.00	cfs

Options

Grate Flow Op :lude None

Results

Efficiency	0.60	
Intercepted Flow	740.53	cfs ← PIPE CAPACITY WILL CONTROL
Bypass Flow	503.47	cfs
Flow Area	128.1	ft²
Wetted Perimeter	36.99	ft
Top Width	12.00	ft
Velocity	9.71	ft/s
Splash Over Velc	4.20	ft/s
Frontal Flow Fact	0.50	
Side Flow Factor	0.69	
Grate Flow Ratio	0.50	
Active Grate Leng	2.00	ft
Critical Depth	11.34	ft
Critical Slope	0.035724	ft/ft
Froude Number	0.52	
Flow Type	Subcritical	
Specific Energy	17.47	ft
Velocity Head	1.47	ft
Depth	16.00	ft

Worksheet
Worksheet for Circular Channel

CAREFREE DRIVE NEAR CAVE CREEK ROAD

Project Description

Worksheet	71 - Circular Char
Flow Element	Circular Channel
Method	Manning's Formul
Solve For	Full Flow Capacity

Input Data

Mannings Coeffic	0.024	
Slope	042900	ft/ft
Diameter	30	in

70 LF 30" CMP

$IE_{u/s}$ = 2354.0

$IE_{d/s}$ = 2351.0

S = 0.0429

Results

Depth	2.50	ft
Discharge	46.02	cfs
Flow Area	4.9	ft²
Wetted Perime	7.85	ft
Top Width	0.00	ft
Critical Depth	2.24	ft
Percent Full	100.0	%
Critical Slope	037873	ft/ft
Velocity	9.37	ft/s
Velocity Head	1.37	ft
Specific Energ	3.87	ft
Froude Numbe	0.00	
Maximum Disc	49.50	cfs
Discharge Full	46.02	cfs
Slope Full	042900	ft/ft
Flow Type	N/A	

← FLOW OVER ROAD = 1244 cfs - 46 cfs = 1198 cfs

Worksheet
Worksheet for Irregular Channel

CAREFREE DRIVE NEAR CAVE CREEK ROAD

Project Description	
Worksheet	71
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data		
Slope	010000	ft/ft
Discharg	,198.00	cfs

Options	
Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Results		
Mannings Coefficie	0.025	
Water Surface Elev	1.88	ft
Elevation Range	0.00 to 3.00	
Flow Area	181.6	ft²
Wetted Perimeter	155.40	ft
Top Width	155.34	ft
Actual Depth	1.88	ft
Critical Elevation	1.95	ft
Critical Slope	0.008542	ft/ft
Velocity	6.60	ft/s
Velocity Head	0.68	ft
Specific Energy	2.56	ft
Froude Number	1.08	
Flow Type	Supercritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00	2+00	0.025

Natural Channel Points

Station (ft)	Elevation (ft)
0+00	3.00
0+20	2.00
0+40	1.00
1+00	0.00
1+60	1.00
1+80	2.00
2+00	3.00

Table
Rating Table for Irregular Channel

CAREFREE DRIVE NEAR CAVE CREEK ROAD

Project Description

Worksheet	71
Flow Element	Irregular Chani
Method	Manning's Forr
Solve For	Channel Depth

Input Data

Slope	010000 ft/ft

Options

Current Roughness Methc	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	1,300.00	10.00

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00	0.00	0.00	0.0	0.00	0.00
10.00	0.31	1.72	5.8	37.36	37.36
20.00	0.40	2.05	9.8	48.45	48.45
30.00	0.47	2.26	13.3	56.41	56.40
40.00	0.52	2.43	16.4	62.84	62.83
50.00	0.57	2.57	19.4	68.32	68.31
60.00	0.61	2.69	22.3	73.15	73.14
70.00	0.65	2.80	25.0	77.51	77.50
80.00	0.68	2.89	27.7	81.49	81.48
90.00	0.71	2.98	30.2	85.17	85.16
100.00	0.74	3.06	32.7	88.60	88.59
110.00	0.77	3.13	35.1	91.82	91.81
120.00	0.79	3.20	37.5	94.87	94.86
130.00	0.81	3.27	39.8	97.76	97.75
140.00	0.84	3.33	42.1	100.52	100.50
150.00	0.86	3.38	44.3	103.15	103.14
160.00	0.88	3.44	46.5	105.68	105.66
170.00	0.90	3.49	48.7	108.11	108.09
180.00	0.92	3.54	50.8	110.45	110.43
190.00	0.94	3.59	52.9	112.71	112.70
200.00	0.96	3.64	55.0	114.90	114.88
210.00	0.98	3.68	57.0	117.02	117.01
220.00	0.99	3.72	59.1	119.08	119.06
230.00	1.01	3.78	60.9	120.32	120.31
240.00	1.02	3.83	62.6	120.88	120.87
250.00	1.04	3.89	64.3	121.44	121.42
260.00	1.05	3.94	65.9	121.98	121.96
270.00	1.06	4.00	67.6	122.51	122.49
280.00	1.08	4.05	69.2	123.04	123.02
290.00	1.09	4.10	70.8	123.55	123.53
300.00	1.10	4.15	72.3	124.06	124.04
310.00	1.11	4.20	73.9	124.56	124.54
320.00	1.13	4.24	75.4	125.06	125.04
330.00	1.14	4.29	76.9	125.55	125.52

IMPASSIBLE

Table
Rating Table for Irregular Channel

CAREFREE DRIVE NEAR CAVE CREEK ROAD

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
340.00	1.15	4.33	78.5	126.03	126.00
350.00	1.16	4.38	80.0	126.50	126.48
360.00	1.17	4.42	81.4	126.97	126.95
370.00	1.19	4.46	82.9	127.43	127.41
380.00	1.20	4.50	84.4	127.89	127.86
390.00	1.21	4.54	85.8	128.34	128.32
400.00	1.22	4.58	87.2	128.79	128.76
410.00	1.23	4.62	88.7	129.23	129.20
420.00	1.24	4.66	90.1	129.67	129.64
430.00	1.25	4.70	91.5	130.10	130.07
440.00	1.26	4.74	92.9	130.53	130.50
450.00	1.27	4.77	94.3	130.95	130.92
460.00	1.28	4.81	95.6	131.37	131.34
470.00	1.29	4.85	97.0	131.79	131.76
480.00	1.30	4.88	98.4	132.20	132.17
490.00	1.31	4.91	99.7	132.61	132.58
500.00	1.32	4.95	101.0	133.01	132.98
510.00	1.33	4.98	102.4	133.41	133.38
520.00	1.34	5.01	103.7	133.81	133.77
530.00	1.35	5.05	105.0	134.20	134.17
540.00	1.36	5.08	106.3	134.59	134.56
550.00	1.37	5.11	107.6	134.98	134.94
560.00	1.38	5.14	108.9	135.36	135.33
570.00	1.39	5.17	110.2	135.74	135.71
580.00	1.40	5.20	111.5	136.12	136.08
590.00	1.41	5.23	112.8	136.49	136.46
600.00	1.42	5.26	114.0	136.86	136.83
610.00	1.43	5.29	115.3	137.23	137.19
620.00	1.44	5.32	116.5	137.60	137.56
630.00	1.45	5.35	117.8	137.96	137.92
640.00	1.46	5.38	119.0	138.32	138.28
650.00	1.47	5.40	120.3	138.68	138.64
660.00	1.47	5.43	121.5	139.03	138.99
670.00	1.48	5.46	122.7	139.39	139.35
680.00	1.49	5.49	123.9	139.74	139.70
690.00	1.50	5.51	125.2	140.08	140.04
700.00	1.51	5.54	126.4	140.43	140.39
710.00	1.52	5.57	127.6	140.77	140.73
720.00	1.53	5.59	128.8	141.11	141.07
730.00	1.54	5.62	130.0	141.45	141.41
740.00	1.54	5.64	131.1	141.79	141.75
750.00	1.55	5.67	132.3	142.12	142.08
760.00	1.56	5.69	133.5	142.46	142.41
770.00	1.57	5.72	134.7	142.79	142.74
780.00	1.58	5.74	135.9	143.12	143.07
790.00	1.58	5.77	137.0	143.44	143.40
800.00	1.59	5.79	138.2	143.77	143.72
810.00	1.60	5.81	139.4	144.09	144.04
820.00	1.61	5.84	140.5	144.41	144.36
830.00	1.62	5.86	141.7	144.73	144.68
840.00	1.62	5.88	142.8	145.05	145.00
850.00	1.63	5.91	143.9	145.36	145.31
860.00	1.64	5.93	145.1	145.67	145.63
870.00	1.65	5.95	146.2	145.99	145.94

Table
Rating Table for Irregular Channel

CAREFREE DRIVE NEAR CAVE CREEK ROAD

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
880.00	1.66	5.97	147.3	146.30	146.25
890.00	1.66	5.99	148.5	146.60	146.55
900.00	1.67	6.02	149.6	146.91	146.86
910.00	1.68	6.04	150.7	147.22	147.17
920.00	1.69	6.06	151.8	147.52	147.47
930.00	1.69	6.08	153.0	147.82	147.77
940.00	1.70	6.10	154.1	148.12	148.07
950.00	1.71	6.12	155.2	148.42	148.37
960.00	1.72	6.14	156.3	148.72	148.67
970.00	1.72	6.16	157.4	149.01	148.96
980.00	1.73	6.18	158.5	149.31	149.26
990.00	1.74	6.20	159.6	149.60	149.55
1,000.00	1.75	6.22	160.6	149.89	149.84
1,010.00	1.75	6.24	161.7	150.18	150.13
1,020.00	1.76	6.26	162.8	150.47	150.42
1,030.00	1.77	6.28	163.9	150.76	150.71
1,040.00	1.77	6.30	165.0	151.05	150.99
1,050.00	1.78	6.32	166.1	151.33	151.28
1,060.00	1.79	6.34	167.1	151.62	151.56
1,070.00	1.80	6.36	168.2	151.90	151.84
1,080.00	1.80	6.38	169.3	152.18	152.12
1,090.00	1.81	6.40	170.3	152.46	152.40
1,100.00	1.82	6.42	171.4	152.74	152.68
1,110.00	1.82	6.44	172.4	153.01	152.96
1,120.00	1.83	6.46	173.5	153.29	153.23
1,130.00	1.84	6.47	174.6	153.57	153.51
1,140.00	1.84	6.49	175.6	153.84	153.78
1,150.00	1.85	6.51	176.7	154.11	154.05
1,160.00	1.86	6.53	177.7	154.38	154.32
1,170.00	1.86	6.55	178.7	154.65	154.59
1,180.00	1.87	6.56	179.8	154.92	154.86
1,190.00	1.88	6.58	180.8	155.19	155.13
1,200.00	1.88	6.60	181.9	155.46	155.40
1,210.00	1.89	6.62	182.9	155.72	155.66
1,220.00	1.90	6.63	183.9	155.99	155.93
1,230.00	1.90	6.65	184.9	156.25	156.19
1,240.00	1.91	6.67	186.0	156.52	156.45
1,250.00	1.92	6.68	187.0	156.78	156.71
1,260.00	1.92	6.70	188.0	157.04	156.98
1,270.00	1.93	6.72	189.0	157.30	157.23
1,280.00	1.94	6.74	190.1	157.56	157.49
1,290.00	1.94	6.75	191.1	157.81	157.75
1,300.00	1.95	6.77	192.1	158.07	158.01

GW 100 YR 6 HR

FUTURE

CAREFREE DRIVE NEAR CAVE CREEK ROAD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1**************************************
*                                    *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)*
*              JUN  1998             *
*           VERSION 4.1              *
*                                    *
* RUN DATE   27NOV02  TIME  08:49:21 *
*                                    *
**************************************
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************************************
*                                  *
*   U.S. ARMY CORPS OF ENGINEERS   *
*   HYDROLOGIC ENGINEERING CENTER  *
*         609 SECOND STREET        *
*      DAVIS, CALIFORNIA 95616     *
*          (916) 756-1104          *
*                                  *
************************************
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X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX         XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

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

1 HEC-1 INPUT PAGE 1

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

  1           ID     FUTURE CONDITIONS HYDROLOGY FOR CAREFREE AREA DRAINAGE MASTER PLAN
  2           ID       BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC., DEC. 2001
  3           ID
  4           ID     FUTURE CONDITIONS LAND USE BASED ON CAVE CREEK WATERCOURSE MASTER PLAN
  5           ID     HYDROLOGY BY TETRA TECH, 2000.
  6           ID
  7           ID     BASE MODEL BASED ON:
  8           ID
  9           ID          FLOODPLAIN DELINEATION STUDY OF ANDORA HILLS & GALLOWAY WASHES
 10           ID          FCD 99-14
 11           ID          BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC.
 12           ID          FOR THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
 13           ID          REVISED MARCH 2002     FILENAME: GWM224R.DAT
 14           ID      ****************************************************************
 15           ID          100 YEAR ANALYSIS 24-HOUR STORM USING JD RECORDS
 16           ID          MCUHP2 USED FOR UNIT HYDROGRAPHS
 17           ID     ****************************************************************
 18           ID
 19           ID     DDM MCUHP2 GALLOWAY WASH FLOODPLAIN DELINEATION STUDY, FCD NO. 99-14
 20           ID
 21           ID    March 2002 revisions to original Dec. 1999 model include:
 22           ID
 23           ID    HC BLOCK ADDED FOR GRAPEVINE WASH (CP 295A)
 24           ID
 25           ID    SUBBASIN GWW1_3 FURTHER SUBDIVIDED ALONG GALLOWAY WASH PER FEMA COMMENTS
 26           ID    IN LETTER DATED FEB. 8, 2002
 27           ID
 28           ID    *** ADDITIONAL COMBINATION ADDED 10-17-02 TO PROVIDE TOTAL FLOW IN
 29           ID        NORTH GALLOWAY WASH BY TWL FOR CH2M HILL FOR CAREFREE DMP ***
 30           ID
 31           ID   DDM MCUHP2 Carefree Area Drainage Master Plan, Galloway Wash Future Condition
              *DIAGRAM
 32           IT       5 01DEC99    0005     400
 33           IO       5       2
 34           IN      15
 35           JD    3.50    0.01
 36           PC    .000    .008    .016    .025    .033    .041    .050    .058    .066    .074
 37           PC    .087    .099    .118    .138    .216    .377    .834    .911    .931    .950
 38           PC    .962    .972    .983    .991   1.000
 39           JD    3.48    0.50
 40           JD    3.43    2.80
 41           PC    .000    .009    .016    .025    .034    .042    .051    .059    .067    .076
 42           PC    .087    .100    .120    .163    .252    .451    .694    .837    .900    .938
 43           PC    .950    .963    .975    .988   1.000
 44           JD    3.23    16.0
 45           PC    .000    .015    .020    .030    .048    .063    .076    .090    .105    .119
 46           PC    .135    .152    .175    .222    .304    .472    .670    .796    .868    .912
 47           PC    .946    .960    .973    .987   1.000
 48           JD    2.84    90.0
 49           PC    .000    .021    .035    .051    .071    .087    .105    .125    .143    .160
 50           PC    .179    .201    .232    .281    .364    .500    .658    .773    .841    .888
 51           PC    .927    .945    .964    .982   1.000
              *
              * DDM   ***** Updated *****
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1 HEC-1 INPUT PAGE 2

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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
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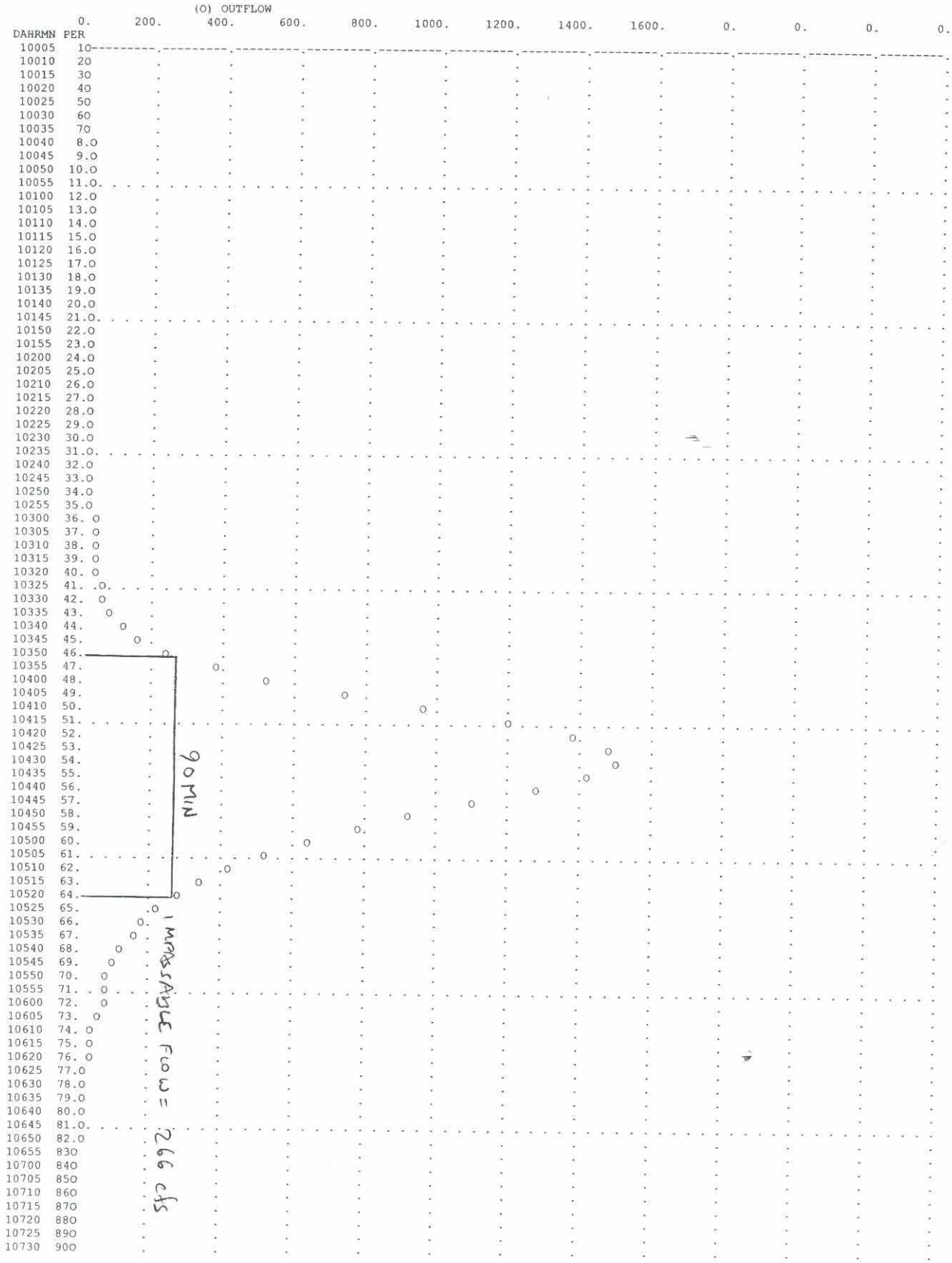
CAREFREE DRIVE NEAR CAVE CREEK ROAD

1

STATION GWW1_5

(O) OUTFLOW



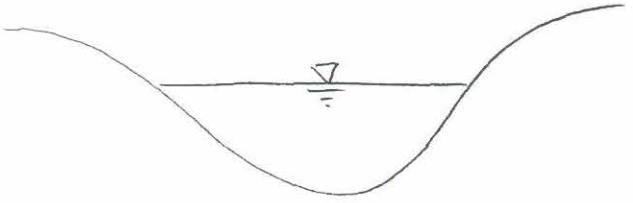
Unnamed Road North of Grapevine Road (JEF #71)

Carefree Drainage Master Plan
Dip Crossing Notes

ID Number: 71-JEF

Source of Data: None

Location: UNNAMED ROAD NORTH OF GRAPEVINE ROAD



Material: UNPAVED DIP CROSSING

Protection:

Notes: assumed overtopping geometry

UNNAMED ROAD NORTH OF GRAPEVINE ROAD

N

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA AND INCORPORATED AR

PANEL 806 OF 4350

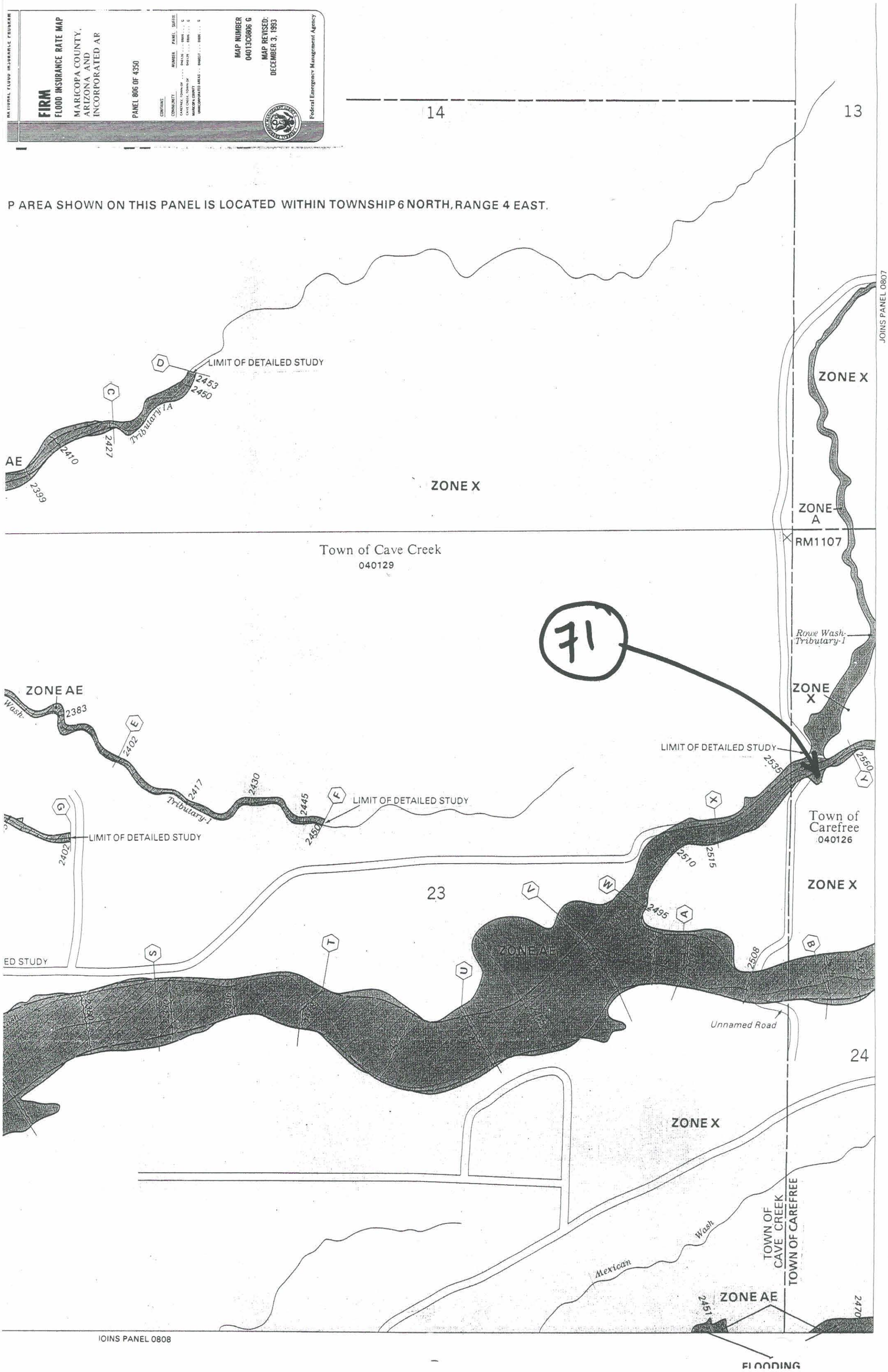
CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CAREFREE, TOWN OF	040126	0806	G
CAVE CREEK, TOWN OF	040129	0806	G
MARICOPA COUNTY UNINCORPORATED AREAS	040037	0806	G

MAP NUMBER
04013C0806 G

MAP REVISED:
DECEMBER 3, 1993

Federal Emergency Management Agency



Worksheet
Worksheet for Irregular Channel

UNNAMED ROAD NORTH OF GRAPEVINE ROAD

Project Description	
Worksheet	Generic 200 foot v
Flow Element	Irregular Channel
Method	Manning's Formul
Solve For	Channel Depth

Input Data		
Slope	010000	ft/ft
Discharg	683.00	cfs

Options	
Current Roughness Metho	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Results		
Mannings Coefficie	0.032	
Water Surface Elev	1.65	ft
Elevation Range	.00 to 3.00	
Flow Area	146.7	ft²
Wetted Perimeter	146.12	ft
Top Width	146.07	ft
Actual Depth	1.65	ft
Critical Elevation	1.51	ft
Critical Slope	0.015448	ft/ft
Velocity	4.66	ft/s
Velocity Head	0.34	ft
Specific Energy	1.99	ft
Froude Number	0.82	
Flow Type	Subcritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00	2+00	0.032

Natural Channel Points

Station (ft)	Elevation (ft)
0+00	3.00
0+20	2.00
0+40	1.00
1+00	0.00
1+60	1.00
1+80	2.00
2+00	3.00

Table
Rating Table for Irregular Channel

UNNAMED ROAD NORTH OF GRAPEVINE ROAD

Project Description

Worksheet	Generic 200 foot v
Flow Element	Irregular Channel
Method	Manning's Formul
Solve For	Channel Depth

Input Data

Slope	010000	ft/ft

Options

Current Roughness Metho	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	700.00	5.00

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00	0.00	0.00	0.0	0.00	0.00
5.00	0.26	1.20	4.2	31.60	31.60
10.00	0.34	1.43	7.0	40.99	40.98
15.00	0.40	1.58	9.5	47.72	47.71
20.00	0.44	1.70	11.8	53.15	53.15
25.00	0.48	1.80	13.9	57.79	57.78
30.00	0.52	1.88	16.0	61.88	61.87
35.00	0.55	1.95	17.9	65.56	65.55
40.00	0.57	2.02	19.8	68.93	68.92
45.00	0.60	2.08	21.6	72.04	72.03
50.00	0.62	2.14	23.4	74.95	74.94
55.00	0.65	2.19	25.1	77.67	77.66
60.00	0.67	2.24	26.8	80.25	80.24
65.00	0.69	2.28	28.5	82.70	82.68
70.00	0.71	2.32	30.1	85.03	85.01
75.00	0.73	2.36	31.7	87.25	87.24
80.00	0.74	2.40	33.3	89.39	89.38
85.00	0.76	2.44	34.8	91.45	91.43
90.00	0.78	2.48	36.4	93.43	93.42
95.00	0.79	2.51	37.9	95.34	95.33
100.00	0.81	2.54	39.4	97.19	97.18
105.00	0.82	2.57	40.8	98.99	98.97
110.00	0.84	2.60	42.3	100.73	100.72
115.00	0.85	2.63	43.7	102.42	102.41
120.00	0.87	2.66	45.1	104.07	104.06
125.00	0.88	2.69	46.5	105.68	105.66
130.00	0.89	2.71	47.9	107.24	107.23
135.00	0.91	2.74	49.3	108.77	108.76
140.00	0.92	2.76	50.6	110.27	110.25
145.00	0.93	2.79	52.0	111.73	111.71
150.00	0.94	2.81	53.3	113.16	113.14
155.00	0.95	2.84	54.7	114.56	114.54
160.00	0.97	2.86	56.0	115.93	115.91
165.00	0.98	2.88	57.3	117.27	117.26

Table
Rating Table for Irregular Channel

UNNAMED ROAD NORTH OF GRAPEVINE ROAD

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)	
170.00	0.99	2.90	58.6	118.59	118.58	
175.00	1.00	2.92	59.9	119.89	119.87	IMPASSABLE
180.00	1.01	2.95	61.0	120.35	120.33	
185.00	1.02	2.98	62.1	120.71	120.69	
190.00	1.03	3.01	63.1	121.06	121.04	
195.00	1.03	3.04	64.2	121.41	121.40	
200.00	1.04	3.06	65.3	121.76	121.74	
205.00	1.05	3.09	66.3	122.11	122.09	
210.00	1.06	3.12	67.4	122.45	122.43	
215.00	1.07	3.14	68.4	122.79	122.77	
220.00	1.08	3.17	69.4	123.12	123.10	
225.00	1.09	3.19	70.4	123.45	123.43	
230.00	1.09	3.22	71.4	123.78	123.76	
235.00	1.10	3.24	72.5	124.10	124.08	
240.00	1.11	3.27	73.4	124.42	124.40	
245.00	1.12	3.29	74.4	124.74	124.72	
250.00	1.13	3.31	75.4	125.06	125.04	
255.00	1.13	3.34	76.4	125.37	125.35	
260.00	1.14	3.36	77.4	125.68	125.66	
265.00	1.15	3.38	78.3	125.99	125.96	
270.00	1.16	3.40	79.3	126.29	126.27	
275.00	1.16	3.43	80.3	126.60	126.57	
280.00	1.17	3.45	81.2	126.90	126.87	
285.00	1.18	3.47	82.1	127.19	127.17	
290.00	1.19	3.49	83.1	127.49	127.46	
295.00	1.19	3.51	84.0	127.78	127.76	
300.00	1.20	3.53	84.9	128.07	128.05	
305.00	1.21	3.55	85.9	128.36	128.33	
310.00	1.22	3.57	86.8	128.65	128.62	
315.00	1.22	3.59	87.7	128.93	128.90	
320.00	1.23	3.61	88.6	129.21	129.19	
325.00	1.24	3.63	89.5	129.50	129.47	
330.00	1.24	3.65	90.4	129.77	129.75	
335.00	1.25	3.67	91.3	130.05	130.02	
340.00	1.26	3.69	92.2	130.33	130.30	
345.00	1.26	3.71	93.1	130.60	130.57	
350.00	1.27	3.72	94.0	130.87	130.84	
355.00	1.28	3.74	94.9	131.14	131.11	
360.00	1.28	3.76	95.7	131.41	131.38	
365.00	1.29	3.78	96.6	131.67	131.64	
370.00	1.30	3.80	97.5	131.94	131.91	
375.00	1.30	3.81	98.4	132.20	132.17	
380.00	1.31	3.83	99.2	132.46	132.43	
385.00	1.32	3.85	100.1	132.72	132.69	
390.00	1.32	3.86	100.9	132.98	132.95	
395.00	1.33	3.88	101.8	133.24	133.20	
400.00	1.34	3.90	102.6	133.49	133.46	
405.00	1.34	3.91	103.5	133.75	133.71	
410.00	1.35	3.93	104.3	134.00	133.96	
415.00	1.36	3.95	105.2	134.25	134.21	
420.00	1.36	3.96	106.0	134.50	134.46	
425.00	1.37	3.98	106.8	134.75	134.71	
430.00	1.37	3.99	107.7	134.99	134.96	
435.00	1.38	4.01	108.5	135.24	135.20	

Table
Rating Table for Irregular Channel

UNNAMED ROAD NORTH OF GRAPEVINE ROAD

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
440.00	1.39	4.02	109.3	135.48	135.45
445.00	1.39	4.04	110.1	135.73	135.69
450.00	1.40	4.06	111.0	135.97	135.93
455.00	1.40	4.07	111.8	136.21	136.17
460.00	1.41	4.09	112.6	136.45	136.41
465.00	1.42	4.10	113.4	136.69	136.65
470.00	1.42	4.11	114.2	136.92	136.89
475.00	1.43	4.13	115.0	137.16	137.12
480.00	1.43	4.14	115.8	137.39	137.36
485.00	1.44	4.16	116.6	137.63	137.59
490.00	1.45	4.17	117.4	137.86	137.82
495.00	1.45	4.19	118.2	138.09	138.05
500.00	1.46	4.20	119.0	138.32	138.28
505.00	1.46	4.21	119.8	138.55	138.51
510.00	1.47	4.23	120.6	138.78	138.74
515.00	1.47	4.24	121.4	139.01	138.97
520.00	1.48	4.26	122.2	139.23	139.19
525.00	1.49	4.27	123.0	139.46	139.42
530.00	1.49	4.28	123.7	139.68	139.64
535.00	1.50	4.30	124.5	139.90	139.86
540.00	1.50	4.31	125.3	140.13	140.08
545.00	1.51	4.32	126.1	140.35	140.31
550.00	1.51	4.34	126.8	140.57	140.53
555.00	1.52	4.35	127.6	140.79	140.74
560.00	1.52	4.36	128.4	141.01	140.96
565.00	1.53	4.37	129.1	141.22	141.18
570.00	1.53	4.39	129.9	141.44	141.40
575.00	1.54	4.40	130.7	141.66	141.61
580.00	1.55	4.41	131.4	141.87	141.83
585.00	1.55	4.43	132.2	142.08	142.04
590.00	1.56	4.44	132.9	142.30	142.25
595.00	1.56	4.45	133.7	142.51	142.46
600.00	1.57	4.46	134.5	142.72	142.68
605.00	1.57	4.47	135.2	142.93	142.89
610.00	1.58	4.49	136.0	143.14	143.10
615.00	1.58	4.50	136.7	143.35	143.30
620.00	1.59	4.51	137.4	143.56	143.51
625.00	1.59	4.52	138.2	143.77	143.72
630.00	1.60	4.53	138.9	143.97	143.93
635.00	1.60	4.55	139.7	144.18	144.13
640.00	1.61	4.56	140.4	144.38	144.34
645.00	1.61	4.57	141.2	144.59	144.54
650.00	1.62	4.58	141.9	144.79	144.74
655.00	1.62	4.59	142.6	144.99	144.95
660.00	1.63	4.60	143.4	145.20	145.15
665.00	1.63	4.62	144.1	145.40	145.35
670.00	1.64	4.63	144.8	145.60	145.55
675.00	1.64	4.64	145.5	145.80	145.75
680.00	1.65	4.65	146.3	146.00	145.95
685.00	1.65	4.66	147.0	146.20	146.15
690.00	1.66	4.67	147.7	146.39	146.35
695.00	1.66	4.68	148.4	146.59	146.54
700.00	1.67	4.69	149.2	146.79	146.74

71 (JEF)

GW 100 YR, 24 HR
FUTURE

UNNAMED ROAD NORTH OF GRAPEVINE ROAD

```
1*************************************
*                                   *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN   1998           *
*            VERSION 4.1            *
*                                   *
*  RUN DATE   27NOV02  TIME  08:45:45  *
*                                   *
*************************************
```

```
*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*           (916) 756-1104          *
*                                   *
*************************************
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X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX         XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

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

1 HEC-1 INPUT PAGE 1

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

  1           ID     FUTURE CONDITIONS HYDROLOGY FOR CAREFREE AREA DRAINAGE MASTER PLAN
  2           ID       BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC., DEC. 2001
  3           ID
  4           ID     FUTURE CONDITIONS LAND USE BASED ON CAVE CREEK WATERCOURSE MASTER PLAN
  5           ID     HYDROLOGY BY TETRA TECH, 2000.
  6           ID
  7           ID     BASE MODEL BASED ON:
  8           ID
  9           ID           FLOODPLAIN DELINEATION STUDY OF ANDORA HILLS & GALLOWAY WASHES
 10           ID           FCD 99-14
 11           ID           BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC.
 12           ID           FOR THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
 13           ID           REVISED MARCH 2002     FILENAME: GWM224R.DAT
 14           ID      ****************************************************************
 15           ID           100 YEAR ANALYSIS 24-HOUR STORM USING JD RECORDS
 16           ID           MCUHP2 USED FOR UNIT HYDROGRAPHS
 17           ID     ****************************************************************
 18           ID
 19           ID     DDM MCUHP2 GALLOWAY WASH FLOODPLAIN DELINEATION STUDY, FCD NO. 99-14
 20           ID
 21           ID    March 2002 revisions to original Dec. 1999 model include:
 22           ID
 23           ID    HC BLOCK ADDED FOR GRAPEVINE WASH (CP 295A)
 24           ID
 25           ID    SUBBASIN GWW1_3 FURTHER SUBDIVIDED ALONG GALLOWAY WASH PER FEMA COMMENTS
 26           ID    IN LETTER DATED FEB. 8, 2002
 27           ID
 28           ID    *** ADDITIONAL COMBINATION ADDED 10-17-02 TO PROVIDE TOTAL FLOW IN
 29           ID        NORTH GALLOWAY WASH BY TWL FOR CH2M HILL FOR CAREFREE DMP ***
 30           ID
 31           ID   DDM MCUHP2 Carefree Area Drainage Master Plan, Galloway Wash Future Condition
              *DIAGRAM
 32           IT       5 01DEC99    0005     400
 33           IO       5       2
 34           IN      15
 35           JD    4.80    0.01
 36           PC    .000    .002    .005    .008    .011    .014    .017    .020    .023    .026
 37           PC    .029    .032    .035    .038    .041    .044    .048    .052    .056    .060
 38           PC    .064    .068    .072    .076    .080    .085    .090    .095    .100    .105
 39           PC    .110    .115    .120    .126    .133    .140    .147    .155    .163    .172
 40           PC    .181    .191    .203    .218    .236    .257    .283    .387    .663    .707
 41           PC    .735    .758    .776    .791    .804    .815    .825    .834    .842    .849
 42           PC    .856    .863    .869    .875    .881    .887    .893    .898    .903    .908
 43           PC    .913    .918    .922    .926    .930    .934    .938    .942    .946    .950
 44           PC    .953    .956    .959    .962    .965    .968    .971    .974    .977    .980
 45           PC    .983    .986    .989    .992    .995    .998   1.000
 46           JD    4.78    1.00
 47           JD    4.51   10.00
 48           JD    4.37   20.00
 49           JD    4.11   70.00
              *
              * DDM   ***** Updated *****
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1 HEC-1 INPUT PAGE 2

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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
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UNNAMED ROAD NORTH OF GRAPEVINE ROAD

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 20340 3320
 20345 3330
 20350 3340
 20355 3350
 20400 3360
 20405 3370
 20410 3380
 20415 3390
 20420 3400
 20425 3410
 20430 3420
 20435 3430
 20440 3440
 20445 3450
 20450 3460
 20455 3470
 20500 3480
 20505 3490
 20510 3500
 20515 3510
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 20530 3540
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 20540 3560
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 20550 3580
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 20600 3600
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 20635 3670
 20640 3680
 20645 3690
 20650 3700
 20655 3710
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 20735 3790
 20740 3800
 20745 3810
 20750 3820
 20755 3830
 20800 3840
 20805 3850
 20810 3860
 20815 3870
 20820 3880
 20825 3890
 20830 3900
 20835 3910
 20840 3920
 20845 3930
 20850 3940
 20855 3950
 20900 3960
 20905 3970
 20910 3980
 20915 3990
 20920 4000---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
1
 -----DSS---ZWRITE Unit  71; Vers.    7:  //GVW1/FLOW/01DEC1999/5MIN//
 -----DSS---ZWRITE Unit  71; Vers.    7:  //GVW1/FLOW/02DEC1999/5MIN//
1                                                    STATION     GVW1

                        (O) OUTFLOW
          0.      400.      800.     1200.     1600.     2000.     2400.     2800.     3200.     3600.     4000.     4400.        0.
 DAHRMN PER
  10005   10---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
  10010   20
  10015   30
  10020   40
  10025   50
  10030   60
  10035   70
  10040   80
  10045   90
  10050  100
  10055  110
  10100  120
  10105  130
  10110  140
  10115  150
  10120  160
  10125  170
  10130  180
```
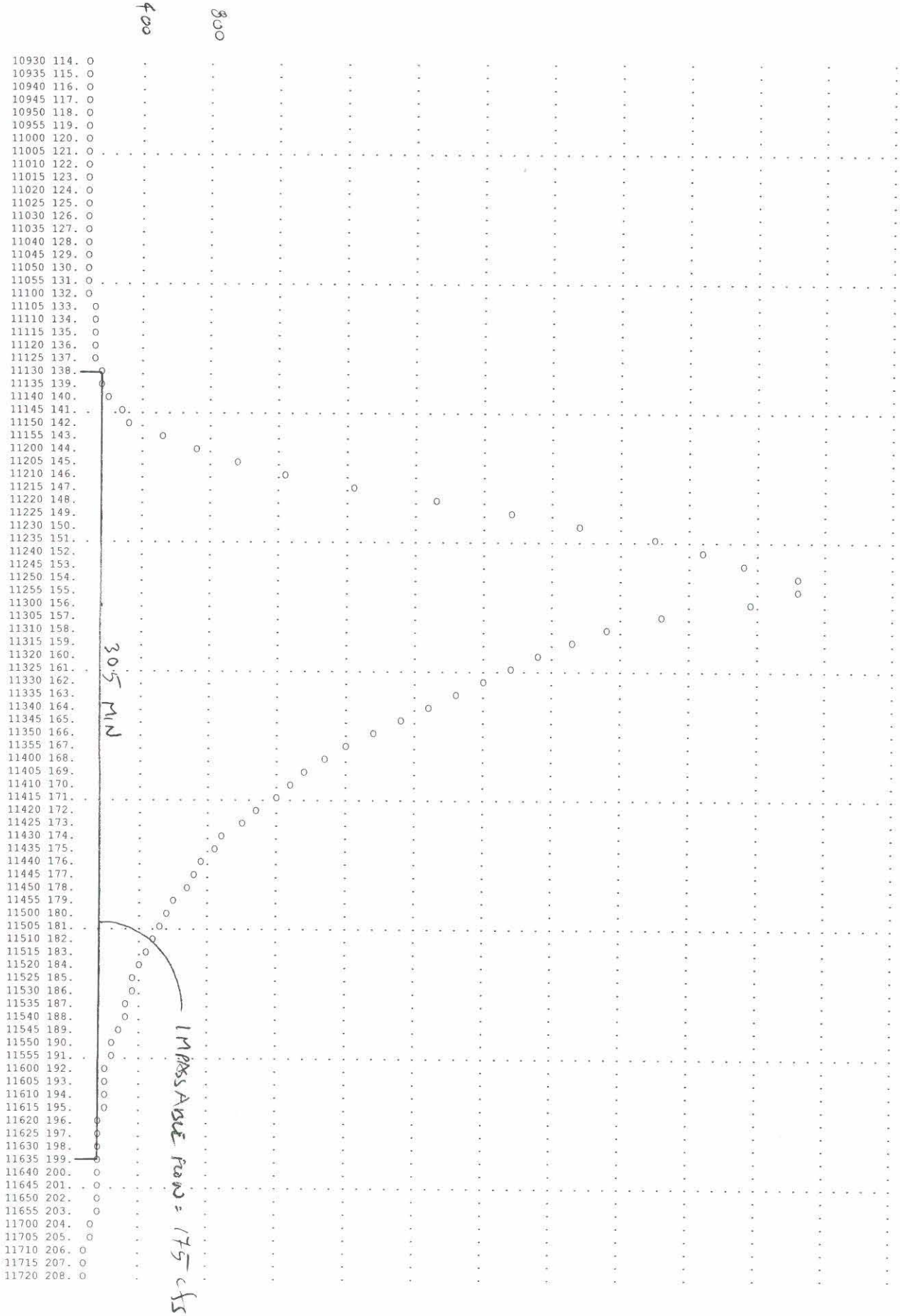

UNNAMED ROAD NORTH OF GRAPEVINE ROAD



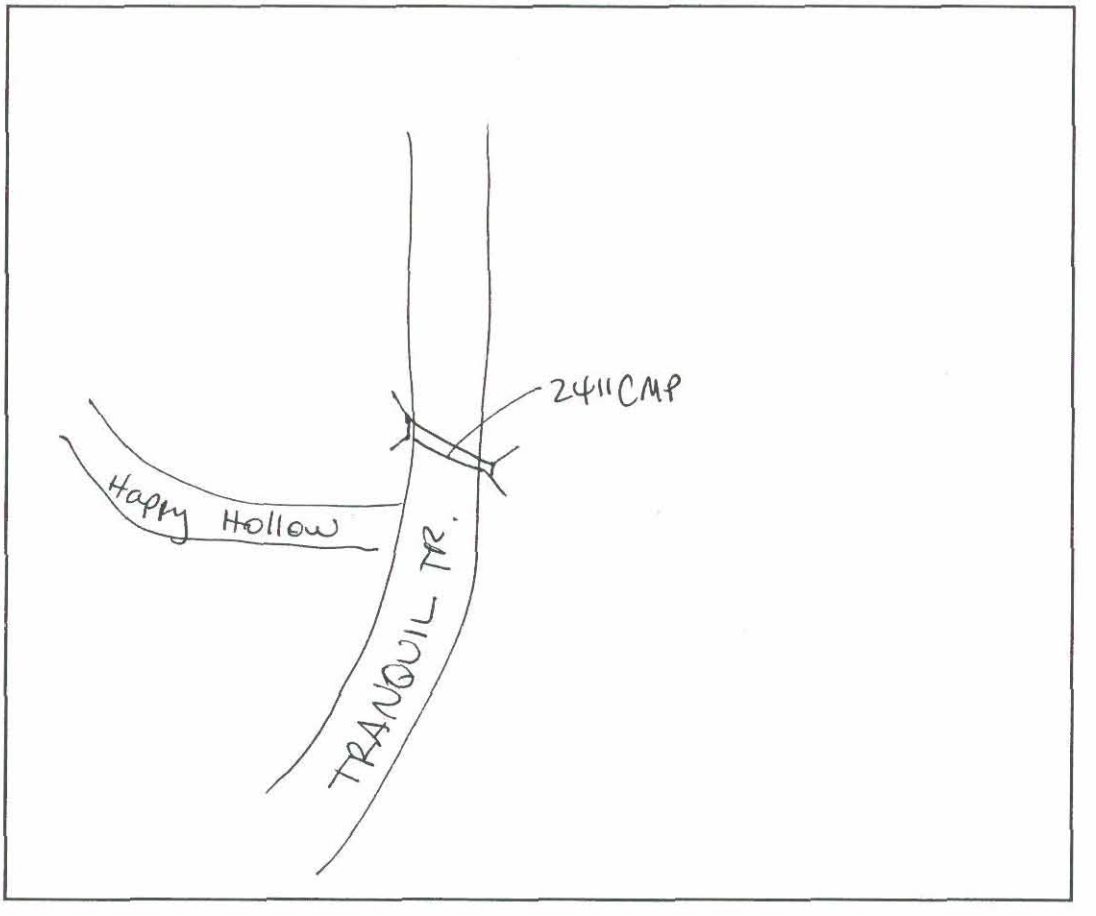
Tranquil Trail North of Happy Hollow Drive (#72)

Carefree Drainage Master Plan
Field Survey Notes

Culvert Number: 72

Date of Survey:

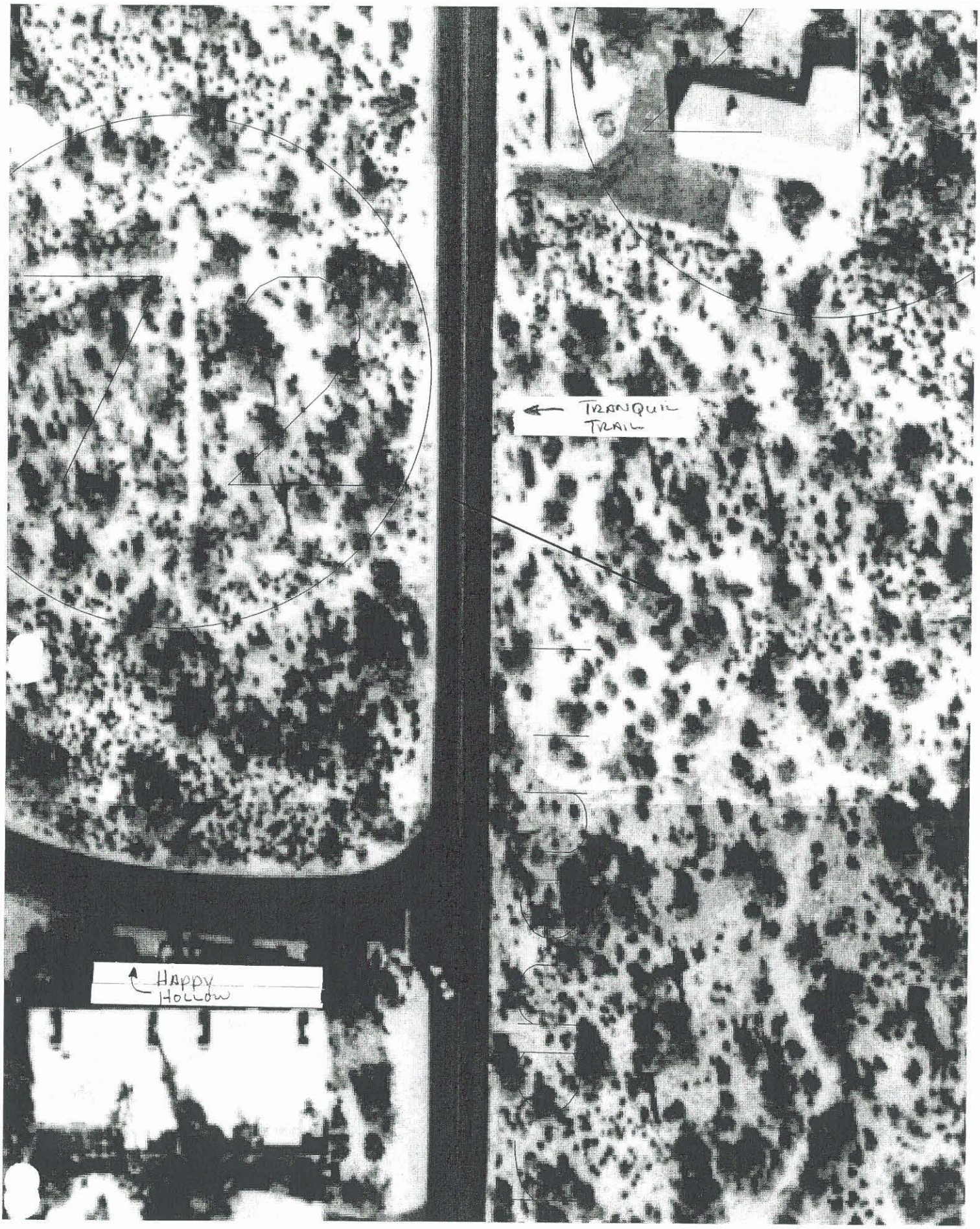
Location: TRANQUIL TRAIL NORTH OF HAPPY HOLLOW DRIVE



Material: 24" CMP

Headwall: YES

Notes: Impassable during 100-year event



TRANQUIL TRAIL NORTH OF HAPPY HOLLOW

N

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA AND INCORPORATED AREAS

PANEL 808 OF 4350

CONTAINS

COMMUNITY	NUMBER	PANEL	SUFFIX
CAREFREE, TOWN OF	040126	0808	G
CAVE CREEK, TOWN OF	040129	0808	G
SCOTTSDALE, CITY OF	045012	0808	G

MAP NUMBER
04013C0808G

MAP REVISED:
DECEMBER 3, 1993

Federal Emergency Management Agency

ZONE AE

ZONE X

ZONE X

ZONE AE

ZONE X

ZONE

LIMIT OF DETAILED STUDY

Galloway Wash

Middle Galloway Wash

Galloway Wash Lower Branch

Andora Hills Wash

RM136

RM135

RM134

RM133

RM598

34

35

36

72

72

SUNDANCE TRAIL ROAD

CREEK

DRIVE

GRANDE

PIEDRA

HOLIDAY LANE

BURRO ROAD

CAREFREE DRIVE

NEVER MIND TRAIL

PEACEFUL

RADIANT COURT

DARLINGTON DRIVE

TOM ROAD

HO HUM ROAD

EASY STREET

CAVE CREEK ROAD

HAPPY HOLLOW

NONCHALANT TRAIL

TRANQUIL TRAIL

ELBOW BEND

BLOODY BASIN ROAD

BIVOUAC TRAIL

SIDEWINDER ROAD

LAZY LANE

LONG ROAD

BENT BARREL

DERRINGER

SIX GUN

RIFLE ROAD

SCOTTSDALE ROAD

NONCHALANT AVENUE

UP & DOWN

LONG AVENUE

BREATHLESS DRIVE

HUFF N PUFF

CHAIR ROAD

ROCKING STREET

SERENE

PLEASANT

CAREFREE DRIVE

DREAM STREET

RAMBLING ROAD

PRIMROSE ROAD

RIFLE PATH

MULE TRAIN ROAD

Culvert Designer/Analyzer Report
No. 72 Tranquil Trail S. of Carefree Dr.

TRANQUIL TRAIL NORTH OF HAPPY HOLLOW DRIVE

Component:Culvert-1

Culvert Summary					
Computed Headwater Elev	110.73	ft	Discharge	29.40	cfs
Inlet Control HW Elev.	106.68	ft	Tailwater Elevation	103.39	ft
Outlet Control HW Elev.	110.73	ft	Control Type	Outlet Control	
Headwater Depth/Height	4.37				

Grades					
Upstream Invert	102.00	ft	Downstream Invert	100.00	ft
Length	92.00	ft	Constructed Slope	0.021739	ft/ft

Hydraulic Profile					
Profile	PressureProfile		Depth, Downstream	3.39	ft
Slope Type	N/A		Normal Depth	N/A	ft
Flow Regime	N/A		Critical Depth	1.85	ft
Velocity Downstream	9.36	ft/s	Critical Slope	0.049840	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.024	
Section Material	CMP		Span	2.00	ft
Section Size	24 inch		Rise	2.00	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	110.73	ft	Upstream Velocity Head	1.36	ft
Ke	0.50		Entrance Loss	0.68	ft

Inlet Control Properties					
Inlet Control HW Elev.	106.68	ft	Flow Control	Submerged	
Inlet Type	Headwall		Area Full	3.1	ft^2
K	0.00780		HDS 5 Chart	2	
M	2.00000		HDS 5 Scale	1	
C	0.03790		Equation Form	1	
Y	0.69000				

Culvert Designer/Analyzer Report
No. 72 Tranquil Trail S. of Carefree Dr.

Tranquil Trail North of Happy Hollow Drive

Analysis Component

Storm Event	Design	Discharge	546.00 cfs

Peak Discharge Method: User-Specified

Design Discharge	546.00 cfs	Check Discharge	0.00 cfs

Tailwater properties: Trapezoidal Channel

Tailwater conditions for Design Storm.

Discharge	546.00 cfs	Bottom Elevation	100.00 ft
Depth	3.39 ft	Velocity	6.89 ft/s

Name	Description	Discharge	HW Elev.	Velocity
Culvert-1	1-24 inch Circular	29.40 cfs	110.73 ft	9.36 ft/s
Weir	Roadway	516.26 cfs	110.73 ft	N/A
Total	----------	545.66 cfs	110.73 ft	N/A

Culvert Designer/Analyzer Report
No. 72 Tranquil Trail S. of Carefree Dr.

TRANQUIL TRAIL NORTH OF HAPPY HOLLOW DRIVE

Component:Weir

Hydraulic Component(s): Roadway					
Discharge	516.26	cfs	Allowable HW Elevation	110.73	ft
Roadway Width	28.00	ft	Overtopping Coefficient	3.03	US
Low Point	109.00	ft	Headwater Elevation	110.73	ft
Discharge Coefficient (Cr)	3.03		Submergence Factor (Kt)	1.00	
Tailwater Elevation	103.39	ft			

Sta (ft)	Elev. (ft)
0.00	112.00
40.00	110.00
100.00	109.00
160.00	110.00
200.00	112.00

Table
Rating Table for Irregular Channel

TRANQUIL TRAIL NORTH OF HAPPY HOLLOW DRIVE

Project Description	
Worksheet	Generic 200 foot v
Flow Element	Irregular Channel
Method	Manning's Formul
Solve For	Channel Depth

Input Data	
Slope	010000 ft/ft

Options	
Current Roughness Methc	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	600.00	5.00

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00	0.00	0.00	0.0	0.00	0.00
5.00	0.24	1.49	3.4	28.37	28.37
10.00	0.31	1.77	5.6	36.80	36.79
15.00	0.36	1.96	7.6	42.84	42.83
20.00	0.40	2.11	9.5	47.72	47.71
25.00	0.43	2.23	11.2	51.88	51.87
30.00	0.46	2.33	12.9	55.55	55.55
35.00	0.49	2.43	14.4	58.86	58.85
40.00	0.52	2.51	16.0	61.88	61.87
45.00	0.54	2.58	17.4	64.68	64.67
50.00	0.56	2.65	18.9	67.28	67.27
55.00	0.58	2.72	20.3	69.73	69.72
60.00	0.60	2.78	21.6	72.04	72.03
65.00	0.62	2.83	23.0	74.24	74.23
70.00	0.64	2.88	24.3	76.33	76.32
75.00	0.65	2.93	25.6	78.33	78.32
80.00	0.67	2.98	26.8	80.25	80.24
85.00	0.68	3.03	28.1	82.10	82.08
90.00	0.70	3.07	29.3	83.87	83.86
95.00	0.71	3.11	30.5	85.59	85.58
100.00	0.73	3.15	31.7	87.25	87.24
105.00	0.74	3.19	32.9	88.87	88.85
110.00	0.75	3.23	34.1	90.43	90.42
115.00	0.77	3.27	35.2	91.95	91.94
120.00	0.78	3.30	36.4	93.43	93.42
125.00	0.79	3.33	37.5	94.87	94.86
130.00	0.80	3.37	38.6	96.28	96.26
135.00	0.81	3.40	39.7	97.65	97.63
140.00	0.82	3.43	40.8	98.99	98.97
145.00	0.84	3.46	41.9	100.30	100.29
150.00	0.85	3.49	43.0	101.58	101.57
155.00	0.86	3.52	44.1	102.84	102.83
160.00	0.87	3.55	45.1	104.07	104.06
165.00	0.88	3.57	46.2	105.28	105.27

Table
Rating Table for Irregular Channel

TRANQUIL TRAIL NORTH OF HAPPY HOLLOW DRIVE

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
170.00	0.89	3.60	47.2	106.46	106.45
175.00	0.90	3.63	48.3	107.63	107.61
180.00	0.91	3.65	49.3	108.77	108.76
185.00	0.92	3.68	50.3	109.89	109.88
190.00	0.92	3.70	51.3	111.00	110.98
195.00	0.93	3.73	52.3	112.09	112.07
200.00	0.94	3.75	53.3	113.16	113.14
205.00	0.95	3.77	54.3	114.21	114.19
210.00	0.96	3.80	55.3	115.24	115.23
215.00	0.97	3.82	56.3	116.27	116.25
220.00	0.98	3.84	57.3	117.27	117.26
225.00	0.99	3.86	58.3	118.27	118.25
230.00	0.99	3.88	59.2	119.24	119.23
235.00	1.00	3.91	60.2	120.07	120.06
240.00	1.01	3.94	61.0	120.35	120.33
245.00	1.01	3.96	61.8	120.62	120.60
250.00	1.02	3.99	62.6	120.88	120.87
255.00	1.03	4.02	63.4	121.15	121.13
260.00	1.03	4.05	64.2	121.41	121.40
265.00	1.04	4.08	65.0	121.68	121.66
270.00	1.05	4.10	65.8	121.94	121.92
275.00	1.05	4.13	66.6	122.19	122.17
280.00	1.06	4.16	67.4	122.45	122.43
285.00	1.07	4.18	68.1	122.70	122.68
290.00	1.07	4.21	68.9	122.95	122.93
295.00	1.08	4.23	69.7	123.20	123.18
300.00	1.09	4.26	70.4	123.45	123.43
305.00	1.09	4.28	71.2	123.70	123.68
310.00	1.10	4.31	72.0	123.94	123.92
315.00	1.10	4.33	72.7	124.18	124.16
320.00	1.11	4.36	73.4	124.42	124.40
325.00	1.12	4.38	74.2	124.66	124.64
330.00	1.12	4.40	74.9	124.90	124.88
335.00	1.13	4.43	75.7	125.14	125.11
340.00	1.13	4.45	76.4	125.37	125.35
345.00	1.14	4.47	77.1	125.60	125.58
350.00	1.15	4.50	77.9	125.84	125.81
355.00	1.15	4.52	78.6	126.07	126.04
360.00	1.16	4.54	79.3	126.29	126.27
365.00	1.16	4.56	80.0	126.52	126.50
370.00	1.17	4.58	80.7	126.75	126.72
375.00	1.17	4.60	81.4	126.97	126.95
380.00	1.18	4.63	82.1	127.19	127.17
385.00	1.18	4.65	82.9	127.42	127.39
390.00	1.19	4.67	83.6	127.64	127.61
395.00	1.20	4.69	84.3	127.85	127.83
400.00	1.20	4.71	84.9	128.07	128.05
405.00	1.21	4.73	85.6	128.29	128.26
410.00	1.21	4.75	86.3	128.50	128.48
415.00	1.22	4.77	87.0	128.72	128.69
420.00	1.22	4.79	87.7	128.93	128.90
425.00	1.23	4.81	88.4	129.14	129.12
430.00	1.23	4.83	89.1	129.36	129.33
435.00	1.24	4.85	89.7	129.57	129.54

IMPASSIBLE

Table
Rating Table for Irregular Channel

TRANQUIL TRAIL NORTH OF HAPPY HOLLOW DRIVE

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
440.00	1.24	4.87	90.4	129.77	129.75
445.00	1.25	4.88	91.1	129.98	129.95
450.00	1.25	4.90	91.8	130.19	130.16
455.00	1.26	4.92	92.4	130.39	130.36
460.00	1.26	4.94	93.1	130.60	130.57
465.00	1.27	4.96	93.8	130.80	130.77
470.00	1.27	4.98	94.4	131.00	130.97
475.00	1.28	5.00	95.1	131.21	131.18
480.00	1.28	5.01	95.7	131.41	131.38
485.00	1.29	5.03	96.4	131.61	131.58
490.00	1.29	5.05	97.1	131.81	131.77
495.00	1.30	5.07	97.7	132.00	131.97
500.00	1.30	5.08	98.4	132.20	132.17
505.00	1.31	5.10	99.0	132.40	132.36
510.00	1.31	5.12	99.7	132.59	132.56
515.00	1.32	5.13	100.3	132.79	132.75
520.00	1.32	5.15	100.9	132.98	132.95
525.00	1.33	5.17	101.6	133.17	133.14
530.00	1.33	5.19	102.2	133.36	133.33
535.00	1.34	5.20	102.9	133.56	133.52
540.00	1.34	5.22	103.5	133.75	133.71
545.00	1.35	5.23	104.1	133.93	133.90
550.00	1.35	5.25	104.7	134.12	134.09
555.00	1.36	5.27	105.4	134.31	134.28
560.00	1.36	5.28	106.0	134.50	134.46
565.00	1.37	5.30	106.6	134.68	134.65
570.00	1.37	5.31	107.3	134.87	134.83
575.00	1.38	5.33	107.9	135.05	135.02
580.00	1.38	5.35	108.5	135.24	135.20
585.00	1.38	5.36	109.1	135.42	135.39
590.00	1.39	5.38	109.7	135.60	135.57
595.00	1.39	5.39	110.4	135.79	135.75
600.00	1.40	5.41	111.0	135.97	135.93

GW 100 YR 6 HR

FUTURE

TRANQUIL TRAIL NORTH OF HAPPY HOLLOW DRIVE


```
1*************************************
*                                   *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN  1998            *
*            VERSION 4.1            *
*                                   *
* RUN DATE   27NOV02  TIME  08:49:21 *
*                                   *
*************************************
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```
*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*           (916) 756-1104          *
*                                   *
*************************************
```

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

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

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

1 HEC-1 INPUT PAGE 1

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

  1           ID     FUTURE CONDITIONS HYDROLOGY FOR CAREFREE AREA DRAINAGE MASTER PLAN
  2           ID       BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC., DEC. 2001
  3           ID
  4           ID     FUTURE CONDITIONS LAND USE BASED ON CAVE CREEK WATERCOURSE MASTER PLAN
  5           ID     HYDROLOGY BY TETRA TECH, 2000.
  6           ID
  7           ID     BASE MODEL BASED ON:
  8           ID
  9           ID           FLOODPLAIN DELINEATION STUDY OF ANDORA HILLS & GALLOWAY WASHES
 10           ID           FCD 99-14
 11           ID           BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC.
 12           ID           FOR THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
 13           ID           REVISED MARCH 2002     FILENAME: GWM224R.DAT
 14           ID      ****************************************************************
 15           ID           100 YEAR ANALYSIS 24-HOUR STORM USING JD RECORDS
 16           ID           MCUHP2 USED FOR UNIT HYDROGRAPHS
 17           ID     ****************************************************************
 18           ID
 19           ID     DDM MCUHP2 GALLOWAY WASH FLOODPLAIN DELINEATION STUDY, FCD NO. 99-14
 20           ID
 21           ID    March 2002 revisions to original Dec. 1999 model include:
 22           ID
 23           ID    HC BLOCK ADDED FOR GRAPEVINE WASH (CP 295A)
 24           ID
 25           ID    SUBBASIN GWW1_3 FURTHER SUBDIVIDED ALONG GALLOWAY WASH PER FEMA COMMENTS
 26           ID    IN LETTER DATED FEB. 8, 2002
 27           ID
 28           ID    *** ADDITIONAL COMBINATION ADDED 10-17-02 TO PROVIDE TOTAL FLOW IN
 29           ID        NORTH GALLOWAY WASH BY TWL FOR CH2M HILL FOR CAREFREE DMP ***
 30           ID
 31           ID   DDM MCUHP2 Carefree Area Drainage Master Plan, Galloway Wash Future Condition
              *DIAGRAM
 32           IT       5 01DEC99    0005     400
 33           IO       5       2
 34           IN      15
 35           JD    3.50    0.01
 36           PC    .000    .008    .016    .025    .033    .041    .050    .058    .066    .074
 37           PC    .087    .099    .118    .138    .216    .377    .834    .911    .931    .950
 38           PC    .962    .972    .983    .991   1.000
 39           JD    3.48    0.50
 40           JD    3.43    2.80
 41           PC    .000    .009    .016    .025    .034    .042    .051    .059    .067    .076
 42           PC    .087    .100    .120    .163    .252    .451    .694    .837    .900    .938
 43           PC    .950    .963    .975    .988   1.000
 44           JD    3.23    16.0
 45           PC    .000    .015    .020    .030    .048    .063    .076    .090    .105    .119
 46           PC    .135    .152    .175    .222    .304    .472    .670    .796    .868    .912
 47           PC    .946    .960    .973    .987   1.000
 48           JD    2.84    90.0
 49           PC    .000    .021    .035    .051    .071    .087    .105    .125    .143    .160
 50           PC    .179    .201    .232    .281    .364    .500    .658    .773    .841    .888
 51           PC    .927    .945    .964    .982   1.000
              *
              * DDM   ***** Updated *****
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1 HEC-1 INPUT PAGE 2

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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
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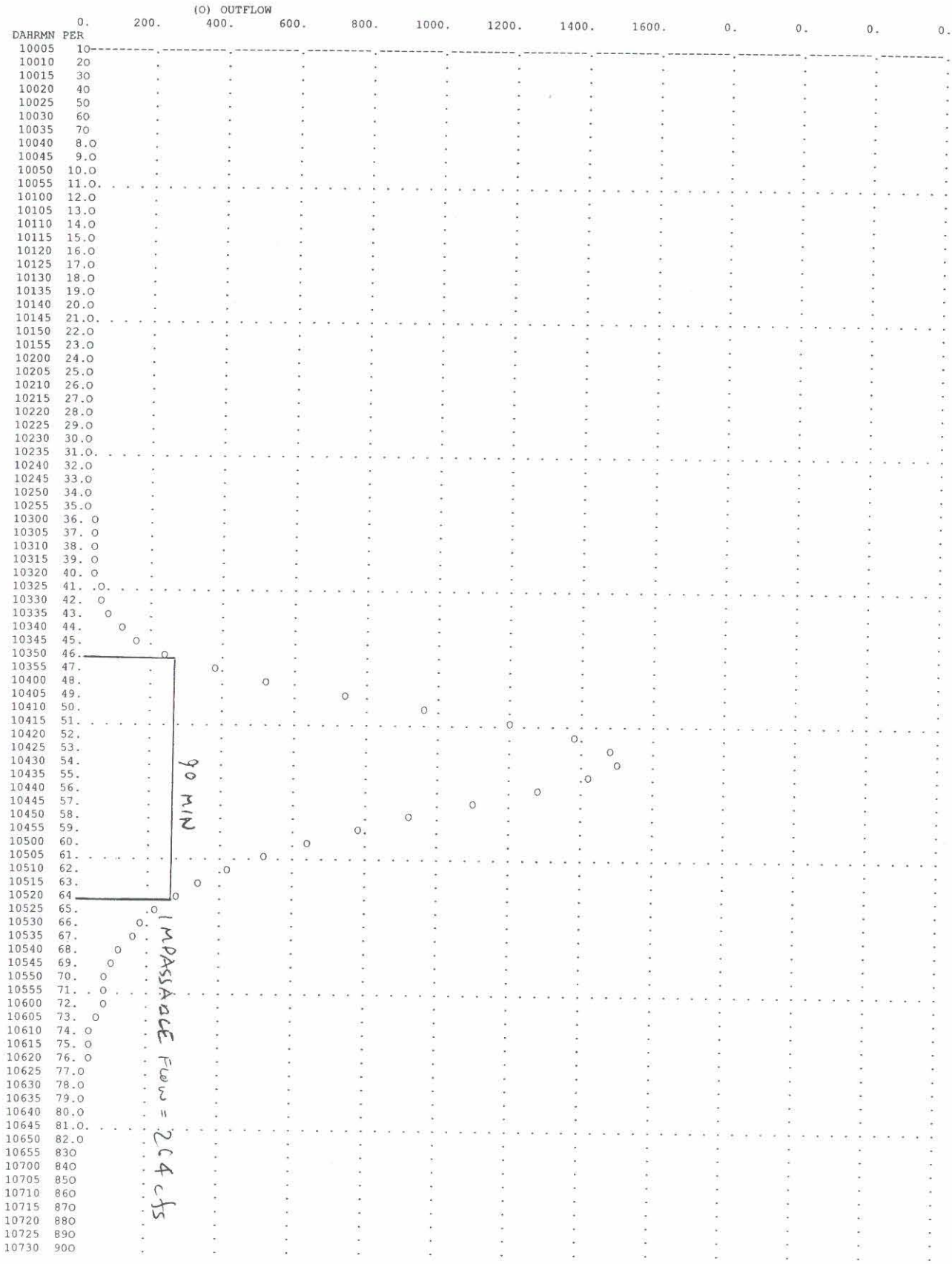
Tranquil Trail North of Happy Hollow Drive

1

STATION GWW1_5

(O) OUTFLOW



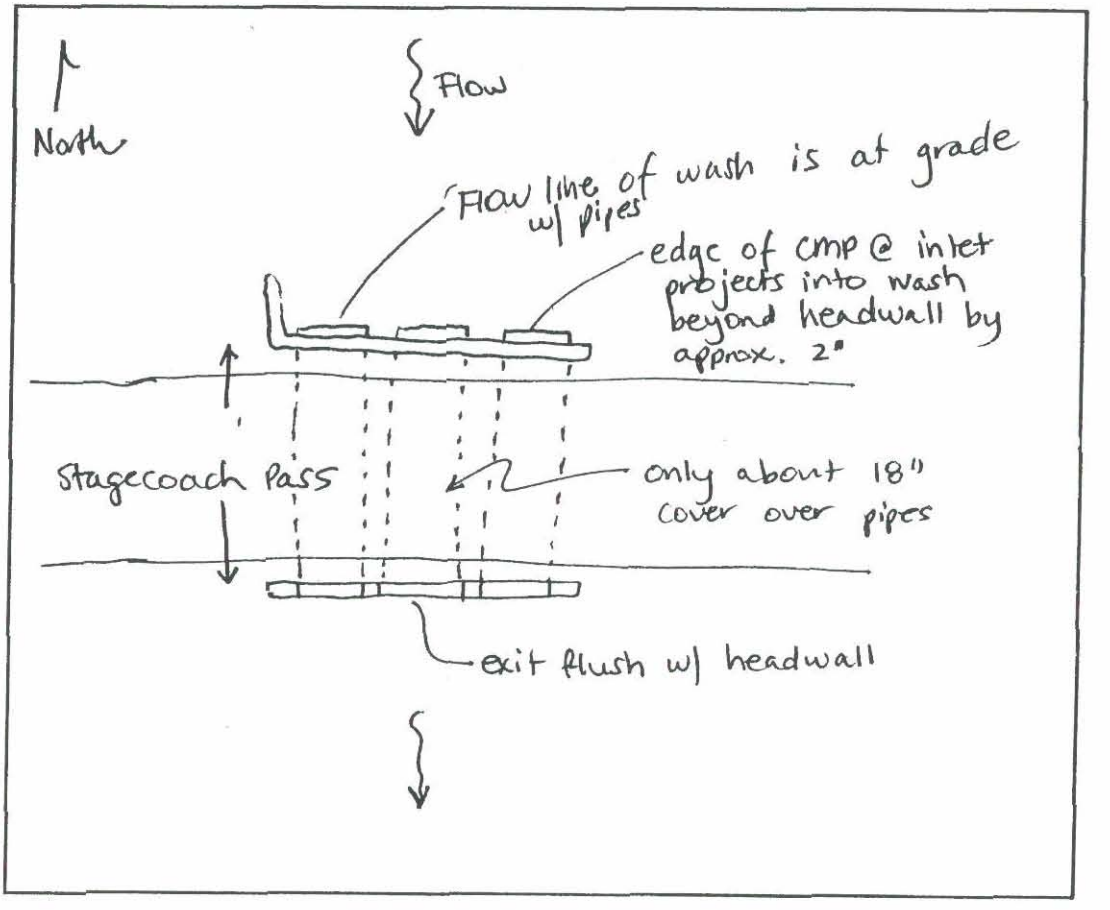
Stagecoach Pass Between Windmill Road and Mule Train Road (#104)

Carefree Drainage Master Plan
Field Survey Notes

Culvert Number: #104

Date of Survey: 10/9/02

Location: Stagecoach Pass between Windmill Rd. and Mule Train Road



Material: Triple 48" CMP

Headwall: L-shaped inlet headwall, pipes project from headwall

Notes: Survey by L. Johnson, not much cover over pipes.

Boundary Conditions, Culvert No. 104, Windmill Wash

TO: Tony Bokich

COPIES: File

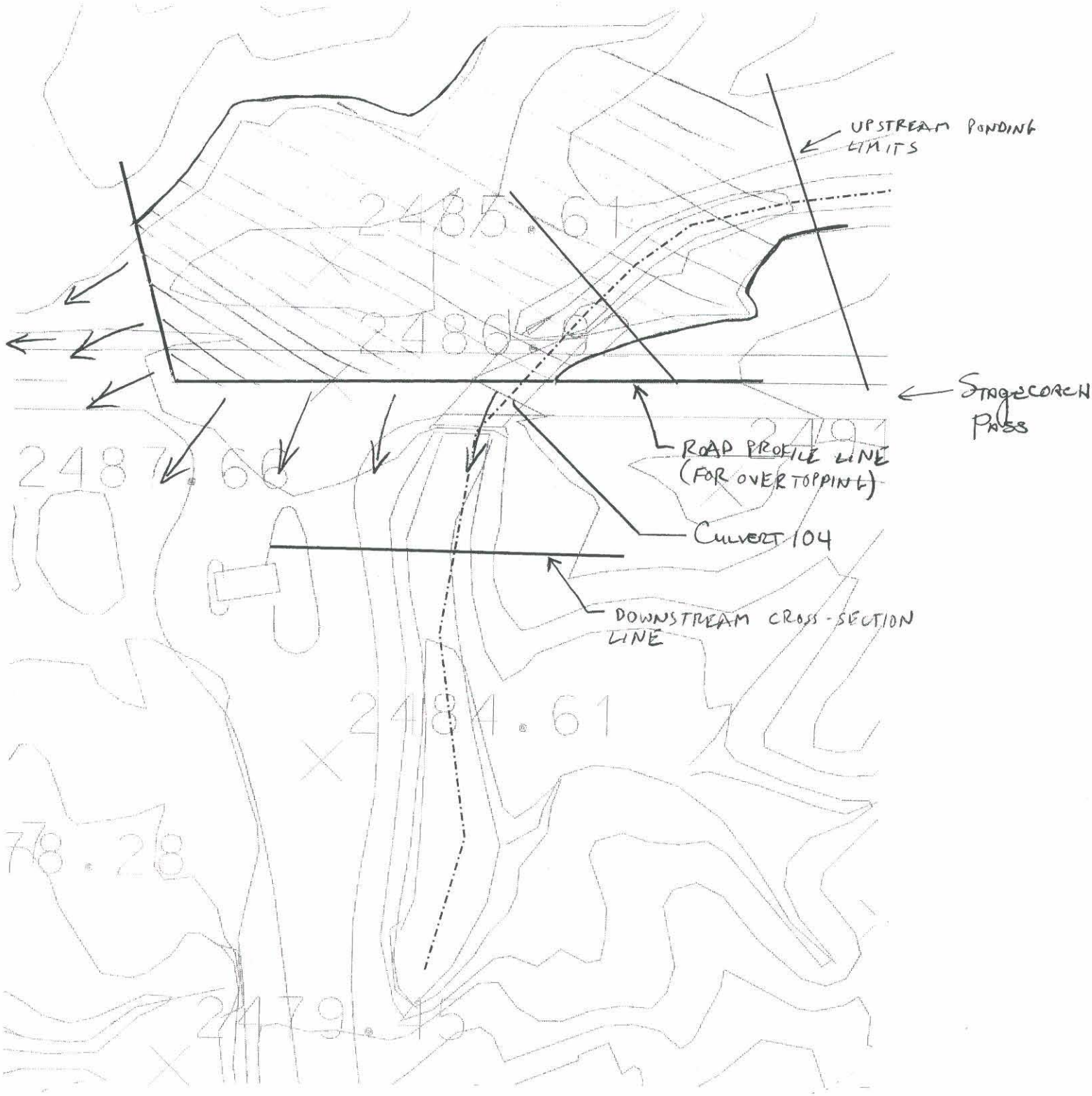
FROM: Patrick Wolf

DATE: October 29, 2002 (Revised 3/29/04)

Culvert No. 104 at Stagecoach Pass between Windmill Road and Mule Train Road exists as the downstream boundary condition for Windmill Wash. According to the hydrology of the project (*see Data Collection Report*), 338 cfs will arrive at the culvert during the 100-year event. Triple 48" corrugated metal pipes exist under Stagecoach Pass at this location.

Hydraulic analysis using Haestad Methods' CulvertMaster software indicates that the culverts can handle approximately 65 cfs (*see attached*) using site specific geometry conditions. A plan view of the site (*see attached*) shows the overtopping line that the remainder of the flow, 273 cfs, will cross. The road does not have a confining dip section, so the flow that is not conveyed through the culverts will overtop road and flow both south and west, eventually joining back into the main channel. It appears that a large amount of the flow will rejoin the main channel downstream several hundred feet (*see attached sketch*).

Since the headwater elevation of this culvert will function as the downstream boundary condition of the model, a headwater elevation obtained from the CulvertMaster program of 2487.42 will be used.



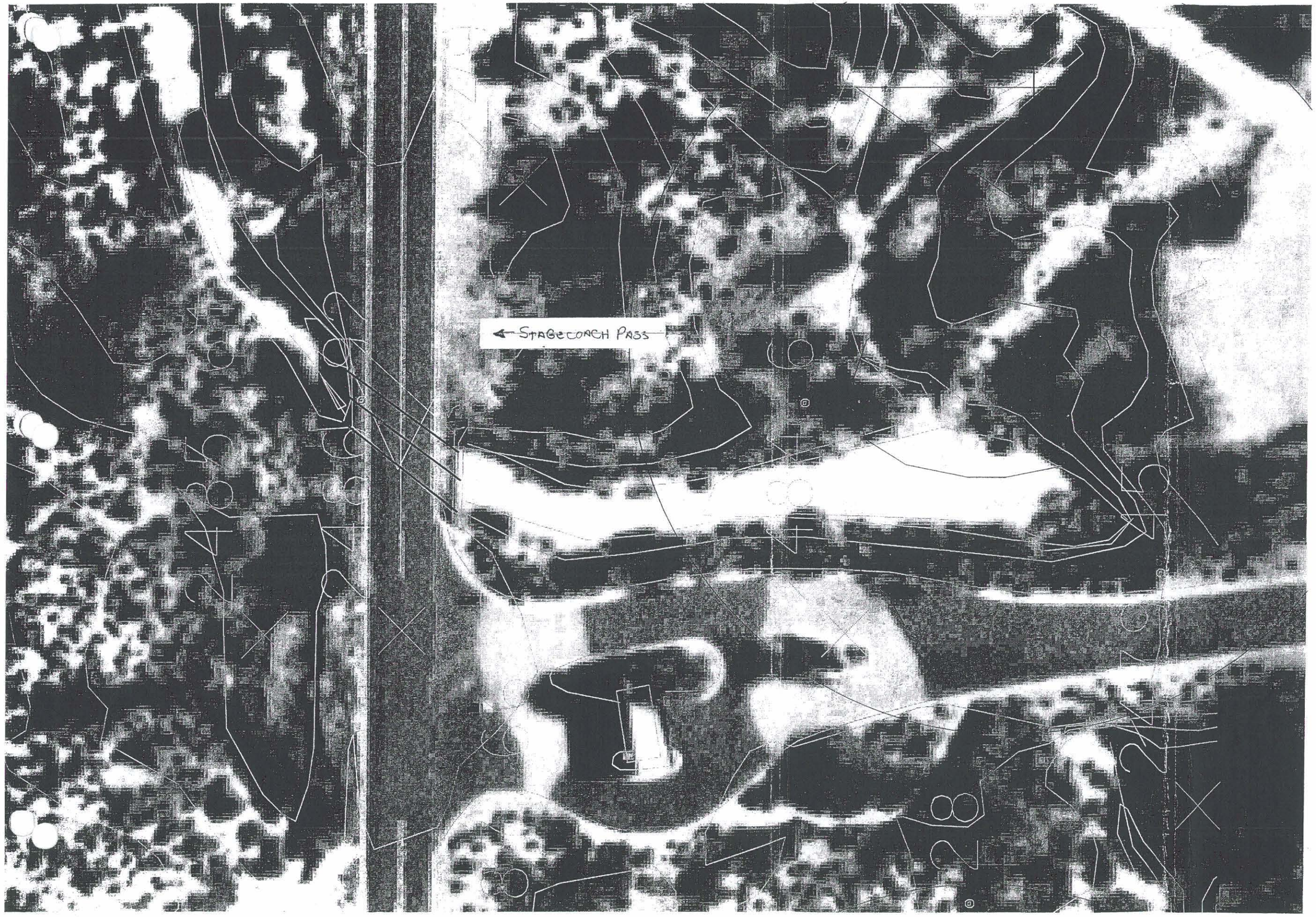
CULVERT 104, WINDMILL WASH 1" = 50' N

LEGEND

-·-·- THALWEG

— HEC RAS CROSS SECTION LOCATION

APPROXIMATE FLOODPLAIN



STAGECOACH PASS BETWEEN WINDMILL ROAD AND MULE TRAIN ROAD

— N →

SCALE 1" = 30'

Culvert Designer/Analyzer Report
104

Windmill Wash - Culvert 104

Comments: Design Flow came from the HEC-1 Model for Unnamed Central. It is a prorated calculation adding 96% of UC29 to CP2223

Analysis Component			
Storm Event	Design	Discharge	338.00 cfs

Peak Discharge Method: User-Specified			
Design Discharge	338.00 cfs	Check Discharge	0.00 cfs

Tailwater properties: Irregular Channel

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+06	0+64	0.040
0+64	0+80	0.028
0+80	0+96	0.040

Natural Channel Points	
Station (ft)	Elevation (ft)
0+06	2,488.90
0+48	2,486.02
0+64	2,482.57
0+80	2,482.30
0+92	2,485.56
0+96	2,485.63

Tailwater conditions for Design Storm.			
Discharge	338.00 cfs	Actual Depth	1.73 ft
Velocity	9.38 ft/s		

Name	Description	Discharge	HW Elev.	Velocity
Culvert-1	3-48 inch Circular	64.96 cfs	2,487.42 ft	6.52 ft/s
Weir	Roadway	273.28 cfs	2,487.42 ft	N/A
Total	----------	338.23 cfs	2,487.42 ft	N/A

Culvert Designer/Analyzer Report
104

Component:Culvert-1

Culvert Summary			
Computed Headwater Elevation	2,487.42 ft	Discharge	64.96 cfs
Inlet Control HW Elev.	2,487.16 ft	Tailwater Elevation	2,484.03 ft
Outlet Control HW Elev.	2,487.42 ft	Control Type	Entrance Control
Headwater Depth/Height	0.53		

Grades			
Upstream Invert	2,485.30 ft	Downstream Invert	2,484.50 ft
Length	45.00 ft	Constructed Slope	0.017778 ft/ft

Hydraulic Profile			
Profile	S2	Depth, Downstream	1.24 ft
Slope Type	Steep	Normal Depth	1.24 ft
Flow Regime	Supercritical	Critical Depth	1.37 ft
Velocity Downstream	6.52 ft/s	Critical Slope	0.012113 ft/ft

Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	4.00 ft
Section Size	48 inch	Rise	4.00 ft
Number Sections	3		

Outlet Control Properties			
Outlet Control HW Elev.	2,487.42 ft	Upstream Velocity Head	0.50 ft
Ke	0.50	Entrance Loss	0.25 ft

Inlet Control Properties			
Inlet Control HW Elev.	2,487.16 ft	Flow Control	Unsubmerged
Inlet Type	Headwall	Area Full	37.7 ft^2
K	0.00780	HDS 5 Chart	2
M	2.00000	HDS 5 Scale	1
C	0.03790	Equation Form	1
Y	0.69000		

Culvert Designer/Analyzer Report
104

Component:Weir

Hydraulic Component(s): Roadway					
Discharge	273.28	cfs	Allowable HW Elevation	2,487.42	ft
Roadway Width	25.00	ft	Overtopping Coefficient	3.02	US
Low Point	2,485.65	ft	Headwater Elevation	2,487.42	ft
Discharge Coefficient (Cr)	3.02		Submergence Factor (Kt)	1.00	
Tailwater Elevation	2,484.03	ft			

Sta (ft)	Elev. (ft)
0.00	2,490.29
158.00	2,486.92
229.00	2,486.12
234.00	2,485.65
242.00	2,486.96
244.00	2,487.02
253.00	2,486.85
262.00	2,486.99
301.00	2,490.70

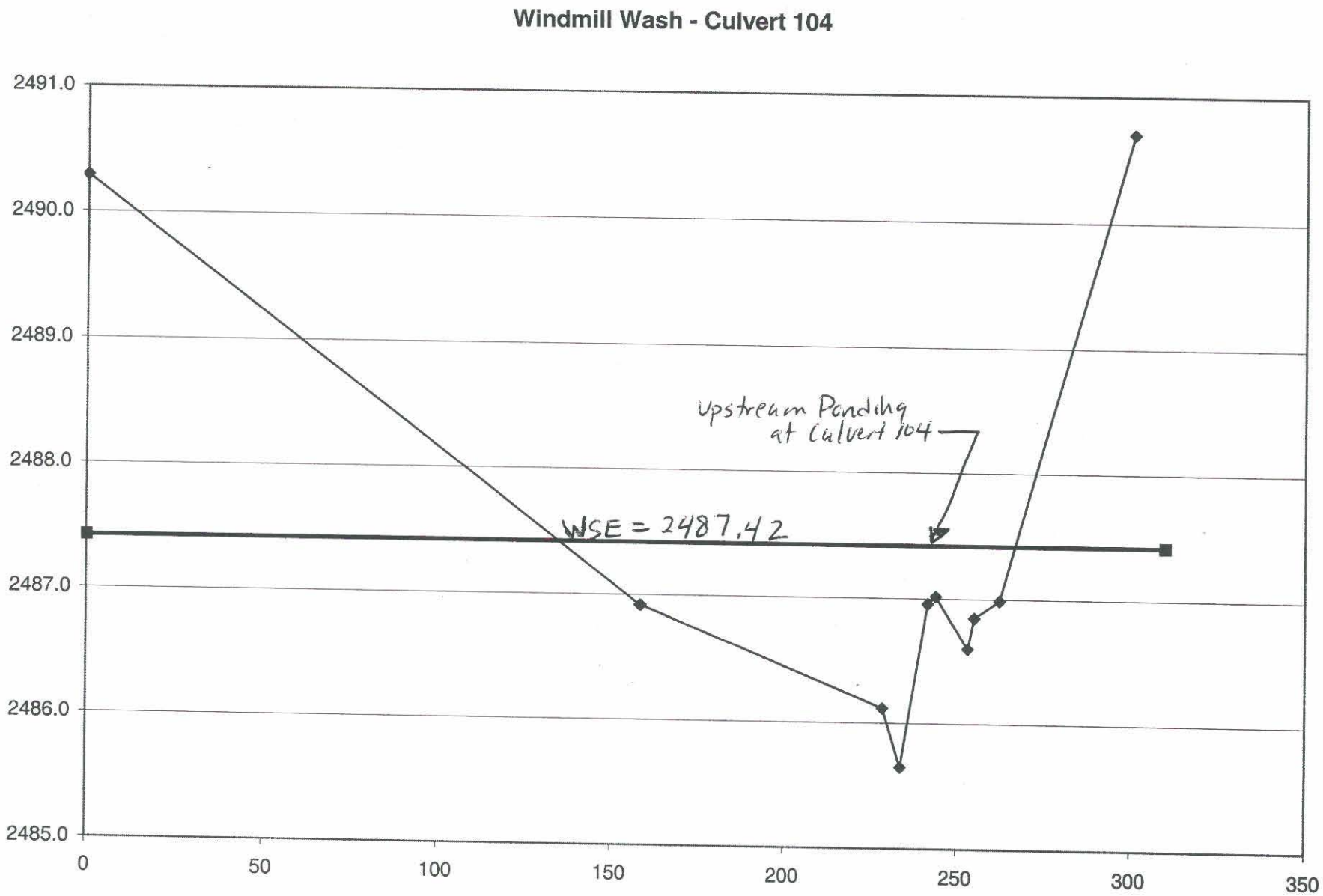

Windmill Wash - Culvert 104
2491.0
2490.0
2489.0
2488.0
2487.0
2486.0
2485.0
0
50
100
150
200
250
300
350
Upstream Ponding at Culvert 104
WSE = 2487.42

Table
Rating Table for Irregular Channel

STAGECOACH PASS BETWEEN WINDMILL ROAD AND MULE TRAIN ROAD

Project Description

Worksheet	104
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data

Slope	010000 ft/ft

Options

Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	300.00	10.00

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00	2,485.70	0.00	0.0	0.00	0.00
10.00	2,486.36	1.49	6.7	32.19	32.12
20.00	2,486.49	1.74	11.5	44.06	43.98
30.00	2,486.58	1.91	15.7	52.27	52.18
40.00	2,486.65	2.02	19.8	60.61	60.51
50.00	2,486.71	2.10	23.8	68.13	68.02
60.00	2,486.76	2.18	27.5	74.56	74.43
70.00	2,486.81	2.25	31.0	80.22	80.09
80.00	2,486.85	2.32	34.5	85.33	85.19
90.00	2,486.89	2.38	37.8	90.00	89.85
100.00	2,486.93	2.41	41.5	96.50	96.35
110.00	2,486.96	2.45	44.9	101.55	101.40
120.00	2,487.00	2.49	48.3	106.25	106.09
130.00	2,487.02	2.53	51.4	110.23	110.07
140.00	2,487.05	2.59	54.0	111.57	111.41
150.00	2,487.07	2.65	56.6	112.87	112.71
160.00	2,487.09	2.71	59.1	114.13	113.97
170.00	2,487.11	2.76	61.5	115.35	115.19
180.00	2,487.14	2.82	63.9	116.54	116.38
190.00	2,487.16	2.87	66.3	117.70	117.54
200.00	2,487.18	2.91	68.7	118.84	118.67
210.00	2,487.20	2.96	71.0	119.94	119.77
220.00	2,487.21	3.00	73.2	121.02	120.85
230.00	2,487.23	3.05	75.5	122.08	121.91
240.00	2,487.25	3.09	77.7	123.11	122.94
250.00	2,487.27	3.13	79.9	124.13	123.95
260.00	2,487.29	3.17	82.1	125.12	124.95
270.00	2,487.30	3.21	84.2	126.10	125.92
280.00	2,487.32	3.24	86.4	127.06	126.88
290.00	2,487.34	3.28	88.5	128.00	127.82
300.00	2,487.35	3.31	90.5	128.93	128.75

IMPASSABLE

UC 100YR, 6 HR
FUTURE
STAGECOACH PASS BETWEEN WINDMILL ROAD AND MULE TRAIN ROAD

```
1*************************************                                    *************************************
*                                   *                                    *                                   *
*  FLOOD HYDROGRAPH PACKAGE (HEC-1) *                                    *  U.S. ARMY CORPS OF ENGINEERS     *
*            JUN  1998              *                                    *  HYDROLOGIC ENGINEERING CENTER    *
*          VERSION 4.1              *                                    *        609 SECOND STREET          *
*                                   *                                    *     DAVIS, CALIFORNIA 95616       *
* RUN DATE   27NOV02  TIME  08:54:26 *                                    *        (916) 756-1104             *
*                                   *                                    *                                   *
*************************************                                    *************************************

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

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

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

1                                          HEC-1 INPUT                                                    PAGE  1

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  2           ID         100-YEAR 6-HOUR MODEL  FILENAME: UC1006F.DAT
  3           ID         FUTURE CONDITIONS
  4           ID         CAREFREE DRAINAGE MASTER PLAN
  5           ID         FCD 2000C037
  6           ID         BY CH2M HILL
  7           ID         FOR THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
  8           ID         JANUARY 2002
  9           ID    ******************************************************************
 10           ID         100 YEAR ANALYSIS 6-HOUR STORM
 11           ID         SCS TYPE II DISTRIBUTION
 12           ID         GREEN AND AMPT LOSS RATE METHOD, NMIN=2
 13           ID         CLARK UNIT HYDROGRAPH, NORMAL DEPTH CHANNEL ROUTING
 14           ID    ******************************************************************
 15           ID      DEPTH-AREA REDUCT FACTORS BASED ON TABLE 2.1a OF FCDMC MANUAL
 16           ID      PC RECORDS ARE 6-HOUR STORM WITH A PATTERN NO. OF 2.57
 17           ID      PRELIMINARY
              *DIAGRAM
 18           IT       2                    500
 19           IO       5       2
 20           IN      15
 21           JD    3.40    0.01
 22           PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
 23           PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
 24           PC   0.962   0.972   0.983   0.991   1.000
 25           JD    3.38    0.50
 26           JD    3.30    2.80
 27           PC   0.000   0.009   0.016   0.025   0.034   0.042   0.051   0.059   0.067   0.076
 28           PC   0.087   0.100   0.120   0.163   0.252   0.451   0.694   0.837   0.900   0.938
 29           PC   0.950   0.963   0.975   0.988   1.000
              *

 30           KK     UC8
 31           KM   SUB-BASIN 8, UNNAMED WASH CENTRAL
 32           KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 33           KM    L= 1.04   Kb= 0.031   S=138.0
 34           BA    .054
 35           LG     .30     .36     4.9     .26    36.0
 36           UC    .296    .521
 37           UA       0       5      16      30      65      77      84      90      94      97
 38           UA     100
              *

 39           KK     UC9
 40           KM    SUBBASIN 9, UNNAMED WASH CENTRAL
 41           KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 42           KM    L= 0.91   Kb= 0.031   S=145.0
 43           BA    .047
 44           LG     .30     .36     5.0     .23    36.0
 45           UC    .267    .416
 46           UA       0       5      16      30      65      77      84      90      94      97
 47           UA     100
              *

1                                          HEC-1 INPUT                                                    PAGE  2

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
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Stagecoach Pass Between Windmill Road And Mule Train Road

1

STATION CP2223

(O) OUTFLOW

DAHRMN	PER	0.	40.	80.	120.	160.	200.	240.	280.	320.	360.	0.	0.	0.
10000	10													
10002	20													
10004	30													
10006	40													
10008	50													
10010	60													
10012	70													
10014	80													
10016	90													
10018	100													
10020	110													
10022	120													
10024	130													
10026	140													
10028	150													
10030	160													
10032	170													
10034	180													
10036	190													
10038	200													
10040	210													
10042	220													
10044	23.0													
10046	24.0													
10048	25.0													
10050	26.0													
10052	27.0													
10054	28.0													
10056	29.0													
10058	30.0													
10100	31.0													
10102	32.0													
10104	33.0													
10106	34.0													
10108	35.0													
10110	36.0													
10112	37.0													
10114	38.0													
10116	39.0													
10118	40.0													
10120	41.0													
10122	42.0													
10124	43.0													
10126	44.0													
10128	45.0													
10130	46.0													
10132	47.0													
10134	48.0													
10136	49.0													
10138	50.0													
10140	51.0													
10142	52.0													
10144	53.0													
10146	54.0													
10148	55.0													
10150	56.0													
10152	57.0													
10154	58.0													
10156	59.0													
10158	60.0													
10200	61.0													
10202	62.0													
10204	63.0													
10206	64.0													
10208	65.0													
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10212	67.0													
10214	68.0													
10216	69.0													
10218	70.0													
10220	71.0													
10222	72.0													
10224	73.0													
10226	74.0													
10228	75.0													
10230	76.0													
10232	77.0													
10234	78.0													
10236	79.0													
10238	80.0													
10240	81.0													
10242	82.0													
10244	83.0													
10246	84.0													
10248	85.0													
10250	86.0													
10252	87.0													
10254	88.0													
10256	89.0													
10258	90.0													

Stagecoach Pass (#116)

Carefree Drainage Master Plan
DIP **Crossing Notes**

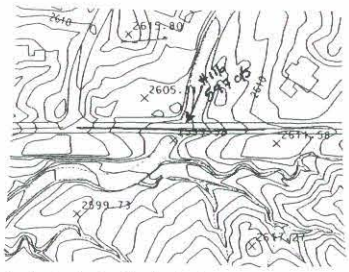
ID Number: #116

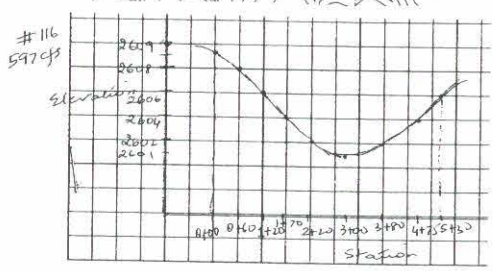
Source of Data: Topo

Location: Stagecoach Pass

N

1" = 400'

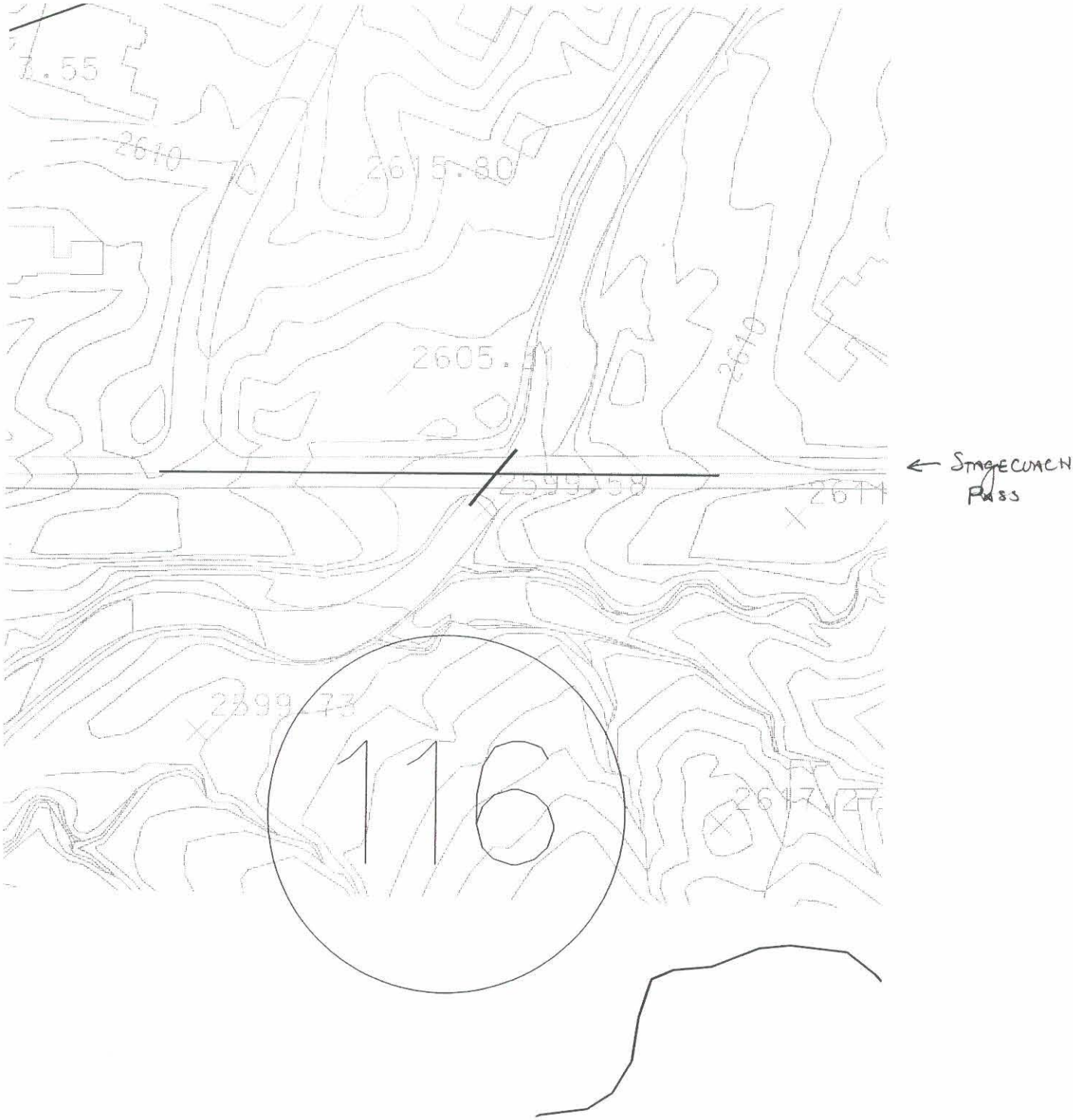




Material: Dip Crossing

Protection:

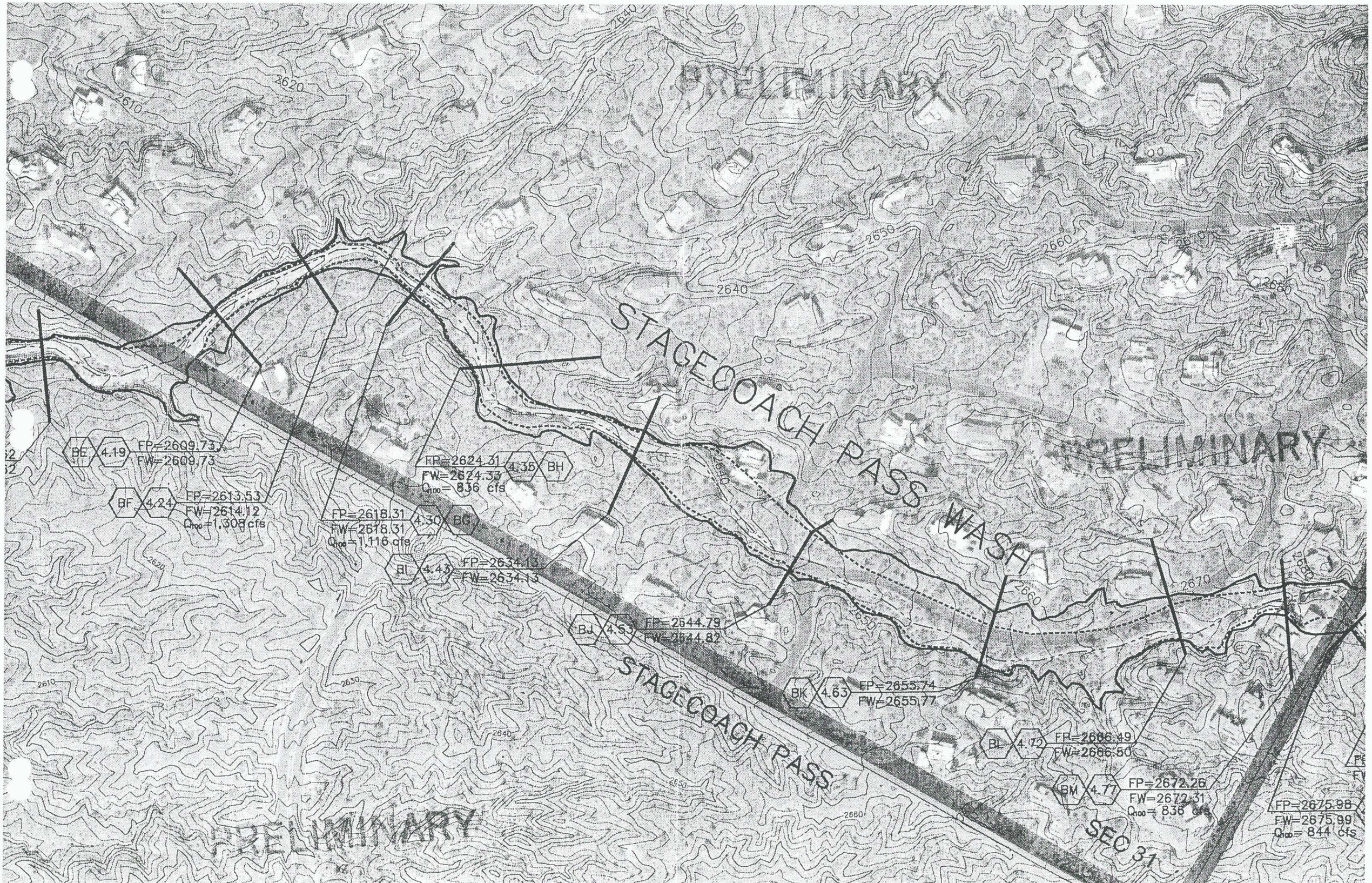
Notes: Part of Floodplain Delineation done by DEI for Stagecoach Pass Wash

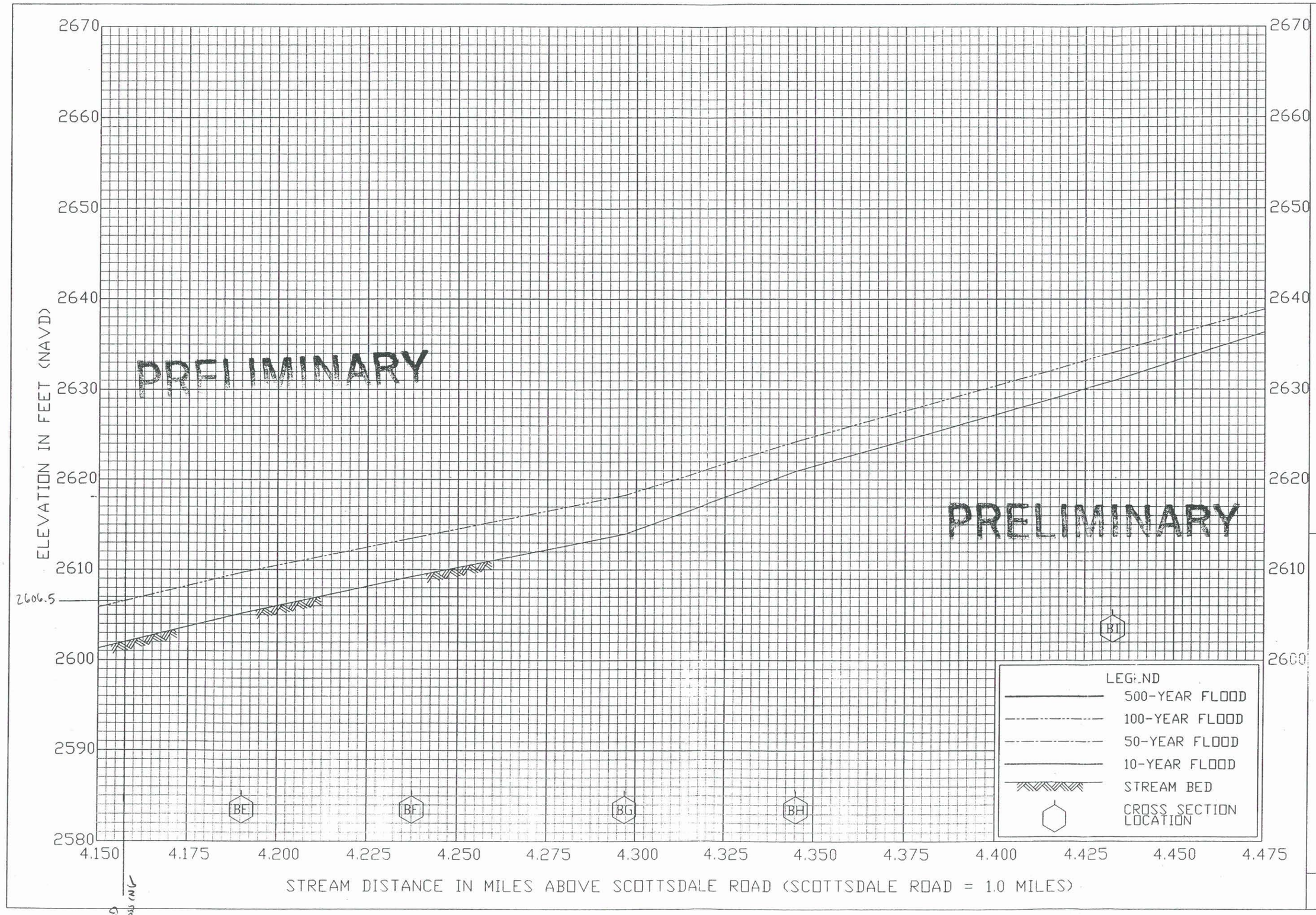


STAGECOACH PASS

N

SCALE 1" = 100'


PRELIMINARY
STAGECOACH PASS WASH
STAGECOACH PASS
PRELIMINARY
SEC 31
2610
2620
2630
2640
2650
2660
2670
2680
BE 4.19 FP=2609.73 FW=2609.73
BF 4.24 FP=2613.53 FW=2614.12 Q100=1,308 cfs
FP=2624.31 FW=2624.33 Q100= 836 cfs 4.35 BH
FP=2618.31 FW=2618.31 Q100=1,116 cfs 4.30 BG
BI 4.45 FP=2634.13 FW=2634.13
BJ 4.53 FP=2644.79 FW=2644.82
BK 4.63 FP=2655.74 FW=2655.77
BL 4.72 FP=2666.49 FW=2666.50
BM 4.77 FP=2672.26 FW=2672.31 Q100= 836 cfs
FP=2675.98 FW=2675.99 Q100= 844 cfs



FLOOD PROFILES

STAGECOACH PASS WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ
AND INCORPORATED AREAS

Worksheet
Worksheet for Irregular Channel

STAGECOACH PASS

Project Description

Worksheet	116
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data

Slope	010000	ft/ft
Discharg	,140.00	cfs

Options

Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Results

Mannings Coefficie	0.035	
Water Surface Elev	2,603.11	ft
Elevation Range	0.60 to 2,608.20	
Flow Area	218.0	ft²
Wetted Perimeter	159.40	ft
Top Width	159.30	ft
Actual Depth	2.51	ft
Critical Elevation	2,602.87	ft
Critical Slope	0.016638	ft/ft
Velocity	5.23	ft/s
Velocity Head	0.43	ft
Specific Energy	2,603.54	ft
Froude Number	0.79	
Flow Type	Subcritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00	3+89	0.035

Natural Channel Points

Station (ft)	Elevation (ft)
0+00	2,608.20
0+63	2,605.40
1+43	2,600.60
1+62	2,600.80
2+18	2,602.00
2+79	2,603.60
3+37	2,606.60
3+89	2,608.20

Table
Rating Table for Irregular Channel

STAGECOACH PASS

Project Description

Worksheet	116
Flow Element	Irregular Chani
Method	Manning's Forr
Solve For	Channel Depth

Input Data

Slope 010000 ft/ft

Options

Current Roughness Methc	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

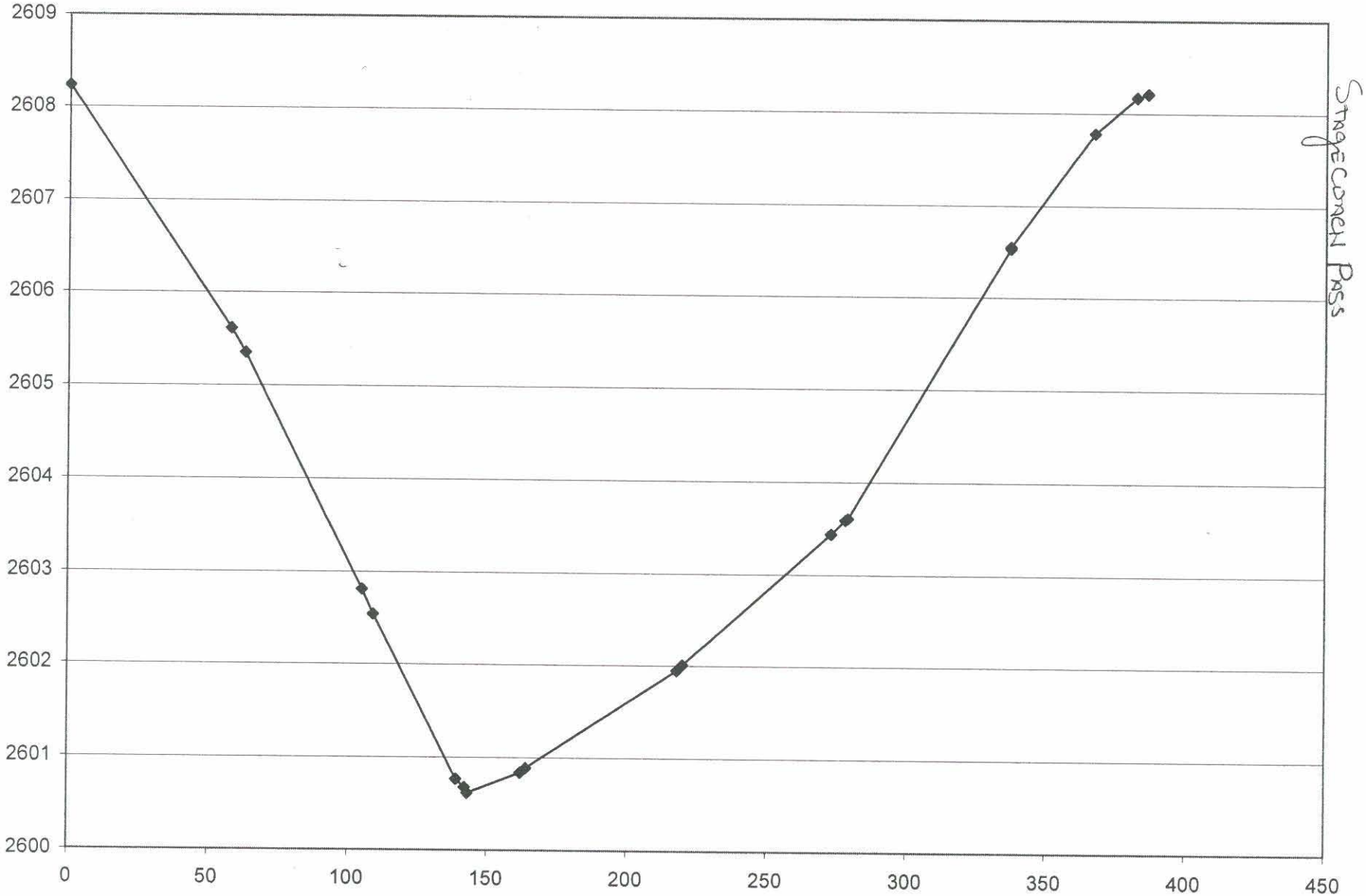
Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	1,200.00	20.00

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)	
0.00	2,600.60	0.00	0.0	0.00	0.00	
20.00	2,601.08	1.80	11.1	40.32	40.30	
40.00	2,601.25	2.17	18.4	50.55	50.52	
60.00	2,601.36	2.41	24.9	58.05	58.02	
80.00	2,601.46	2.60	30.8	64.16	64.13	
100.00	2,601.54	2.76	36.3	69.41	69.38	
120.00	2,601.62	2.89	41.6	74.06	74.02	IMPASSABLE
140.00	2,601.68	3.00	46.6	78.26	78.22	
160.00	2,601.74	3.11	51.5	82.11	82.06	
180.00	2,601.80	3.20	56.2	85.67	85.62	
200.00	2,601.85	3.29	60.8	89.00	88.95	
220.00	2,601.90	3.37	65.2	92.13	92.08	
240.00	2,601.95	3.45	69.6	95.09	95.04	
260.00	2,601.99	3.52	73.9	97.90	97.85	
280.00	2,602.03	3.59	78.0	100.23	100.18	
300.00	2,602.07	3.66	82.0	102.40	102.34	
320.00	2,602.11	3.73	85.9	104.48	104.42	
340.00	2,602.15	3.79	89.8	106.49	106.43	
360.00	2,602.18	3.85	93.6	108.43	108.37	
380.00	2,602.22	3.90	97.3	110.31	110.25	
400.00	2,602.25	3.96	101.0	112.14	112.07	
420.00	2,602.28	4.01	104.7	113.91	113.85	
440.00	2,602.31	4.06	108.3	115.64	115.57	
460.00	2,602.35	4.11	111.9	117.32	117.25	
480.00	2,602.38	4.16	115.4	118.96	118.89	
500.00	2,602.40	4.21	118.9	120.57	120.49	
520.00	2,602.43	4.25	122.3	122.13	122.06	
540.00	2,602.46	4.29	125.8	123.66	123.58	
560.00	2,602.49	4.34	129.2	125.16	125.08	
580.00	2,602.51	4.38	132.5	126.62	126.55	
600.00	2,602.54	4.42	135.9	128.06	127.98	
620.00	2,602.57	4.45	139.2	129.47	129.39	
640.00	2,602.59	4.49	142.5	130.85	130.77	
660.00	2,602.62	4.53	145.7	132.21	132.13	

Table
Rating Table for Irregular Channel

STAGECOACH PASS

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
680.00	2,602.64	4.57	148.9	133.54	133.46
700.00	2,602.67	4.60	152.1	134.86	134.77
720.00	2,602.69	4.64	155.3	136.14	136.06
740.00	2,602.71	4.67	158.5	137.41	137.33
760.00	2,602.73	4.70	161.6	138.66	138.57
780.00	2,602.76	4.73	164.7	139.89	139.80
800.00	2,602.78	4.77	167.8	141.10	141.01
820.00	2,602.80	4.80	170.9	142.29	142.20
840.00	2,602.82	4.83	174.0	143.47	143.38
860.00	2,602.84	4.86	177.0	144.63	144.53
880.00	2,602.86	4.89	180.1	145.77	145.68
900.00	2,602.88	4.92	183.1	146.90	146.80
920.00	2,602.90	4.94	186.1	148.01	147.92
940.00	2,602.92	4.97	189.0	149.11	149.01
960.00	2,602.94	5.00	192.0	150.19	150.10
980.00	2,602.96	5.03	194.9	151.27	151.17
1,000.00	2,602.98	5.05	197.9	152.32	152.23
1,020.00	2,603.00	5.08	200.8	153.37	153.27
1,040.00	2,603.02	5.11	203.7	154.40	154.30
1,060.00	2,603.04	5.13	206.6	155.43	155.33
1,080.00	2,603.06	5.16	209.4	156.44	156.33
1,100.00	2,603.08	5.18	212.3	157.44	157.33
1,120.00	2,603.09	5.21	215.1	158.42	158.32
1,140.00	2,603.11	5.23	218.0	159.40	159.30
1,160.00	2,603.13	5.25	220.8	160.37	160.27
1,180.00	2,603.15	5.28	223.6	161.33	161.22
1,200.00	2,603.17	5.30	226.4	162.28	162.17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2607
2606
2605
2604
2603
2602
2601
2600
0
50
100
150
200
250
300
350
400
450
Stagecoach Pass

NS 100 YR, 6 HR
FUTURE

STAGECOACH PASS

```
1*************************************
*                                   *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN  1998            *
*            VERSION 4.1            *
*                                   *
* RUN DATE   27NOV02  TIME  08:52:05 *
*                                   *
*************************************
```

```
*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*          (916) 756-1104           *
*                                   *
*************************************
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X     X  X        X     X        XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX         XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

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

1 HEC-1 INPUT PAGE 1

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

  1           ID   Project ID: 01131.12 - Major Basin: NS - Return Period: 100 Years
  2           ID
  3           ID   NORTH SCOTTSDALE 100-YR FLOODPLAIN DELINEATION STUDY
  4           ID   MAY 2002
  5           ID
  6           ID   FILE NAME:  NS.DAT
  7           ID   THIS MODEL REPRESENTS THE FUTURE LAND USE CONDITIONS OF THE WATERSHEDS.
  8           ID   THE TOTAL DRAINAGE AREA FOR THE ENTIRE STUDY IS 11.2 SQUARE MILES.
  9           ID
 10           ID   100-YEAR, 6-HOUR FREQUENCY
 11           ID
 12           ID   METHODOLOGY:
 13           ID   THE US CORPS OF ENGINEERS FLOOD HYROLOGY MODEL HEC-1, DATED JUNE 1998,
 14           ID   VERSION 4.1
 15           ID   MULTIPLE STORMS
 16           ID   CLARK UNIT HYDROGRAPH
 17           ID   GREEN AMPT LOSS METHOD
 18           ID   NORMAL DEPTH BASIN AND REACH ROUTING METHOD
 19           ID
 20           ID   LAND USES PER CITY OF SCOTTSDALE PROVIDED GIS
 21           ID
 22           ID   PROJECT WASHES INCLUDE: STAGE COACH PASS (SCP)
 23           ID                           UPPER BOULDERS WASH (UB)
 24           ID                           FAN 6C (F6C)
 25           ID                           FAN 6A NORTH (F6AN)
 26           ID                           FAN 6A SOULTH (F6AS)
 27           ID                           FAN 6A (F6A)
 28           ID                           UPPER FAN 5 (UF5)
 29           ID
 30           ID   PROJECT SUB-BASINS DESIGNATED AS SUB-BASIN NAME ABREVIATION FOLLOWED BY BASIN
 31           ID   NUMBER.  I.E. STAGE COACH PASS SUB-BASIN 14 IS DESIGNATED AS SCP-14.
 32           ID
 33           ID   PROJECT CONCENTRATION POINTS DESIGNATED AS C FOLLOWED BY SUB-BASIN NAME AND
 34           ID   CONCENTRATION POINT NUMBER.  CONCENTRATION POINT NUMBER IS CHOOSEN BY THE SUB
 35           ID   BASIN THE CONCENTRATION POINT IS LOCATED IN.  I.E.  CONCENTRATION POINT IN
 36           ID   SUB-BASIN 06 OF UPPER BOULDERS WASH IS DESIGNATED AS CUB06.
 37           ID
 38           ID   PROJECT ROUTES ARE DESIGNATED AS R FOLLOWED BY SUB-BASIN NAME AND ROUTE
 39           ID   NUMBER. ROUTE NUMBER IS CHOOSEN BY THE SUB-BASIN IN WHICH THE ROUTE BEGINS.
 40           ID   IE A ROUTE FROM SUB-BASIN 4 IN FAN 6C IS DESIGNATED AS RF6C4.
 41           ID
 42           ID
 43           ID
 44           ID
 45           IT       1                    2000
 46           IO       5       2
 47           IN      15
 48           JD    3.50    0.01
 49           PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
 50           PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
 51           PC   0.962   0.972   0.983   0.991   1.000
 52           JD   3.477    0.50
 53           JD   3.412    2.80
 54           PC   0.000   0.009   0.016   0.025   0.034   0.042   0.051   0.059   0.067   0.076
 55           PC   0.087   0.100   0.120   0.163   0.252   0.451   0.694   0.837   0.900   0.938
```

1 HEC-1 INPUT PAGE 2

STAGECOACH PASS

1

STATION CSCP06

(O) OUTFLOW

DAHRMN	PER	0.	200.	400.	600.	800.	1000.	1200.	1400.	0.	0.	0.	0.	0.
10000	10													
10001	20													
10002	30													
10003	40													
10004	50													
10005	60													
10006	70													
10007	80													
10008	90													
10009	100													
10010	110													
10011	120													
10012	130													
10013	140													
10014	150													
10015	160													
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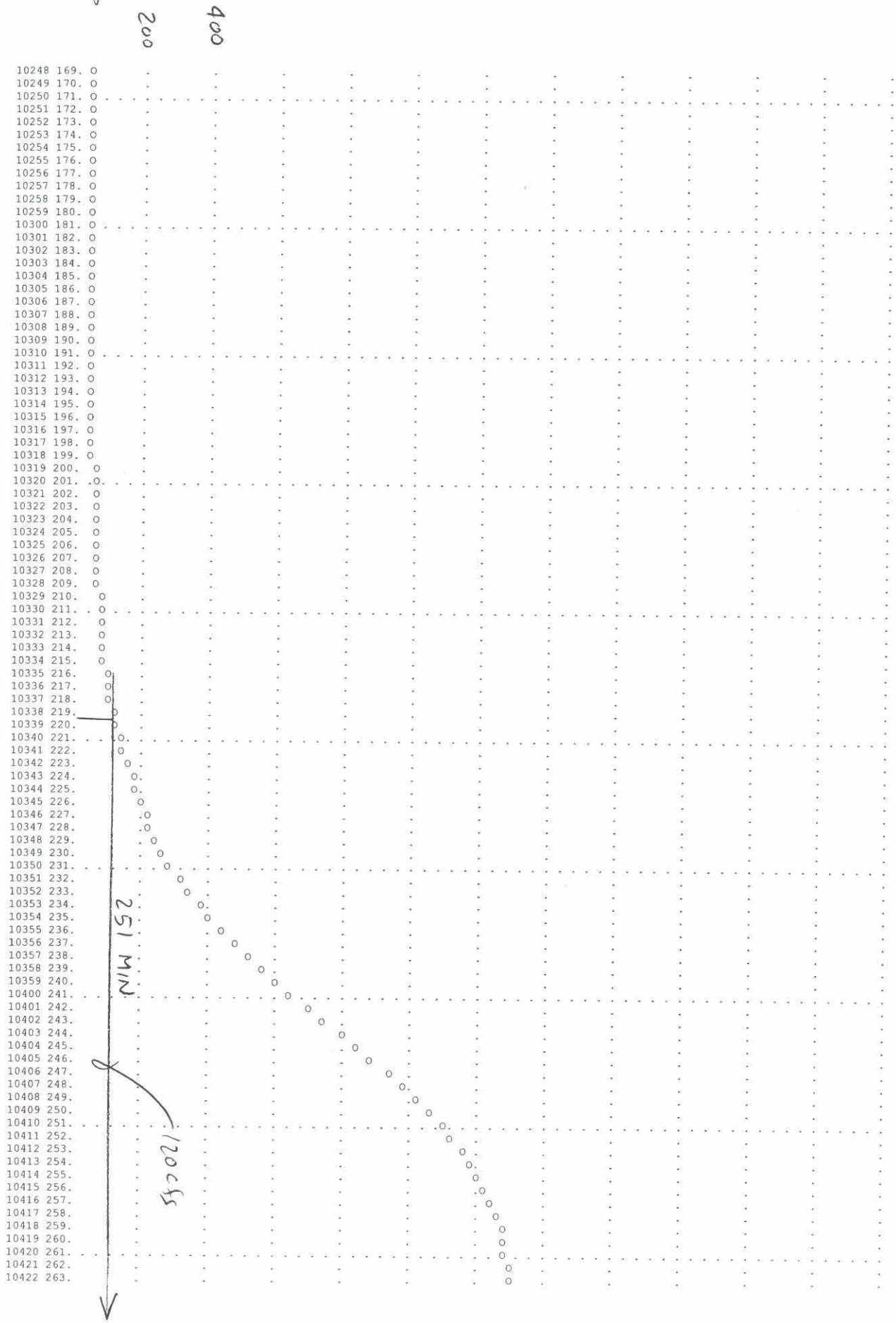
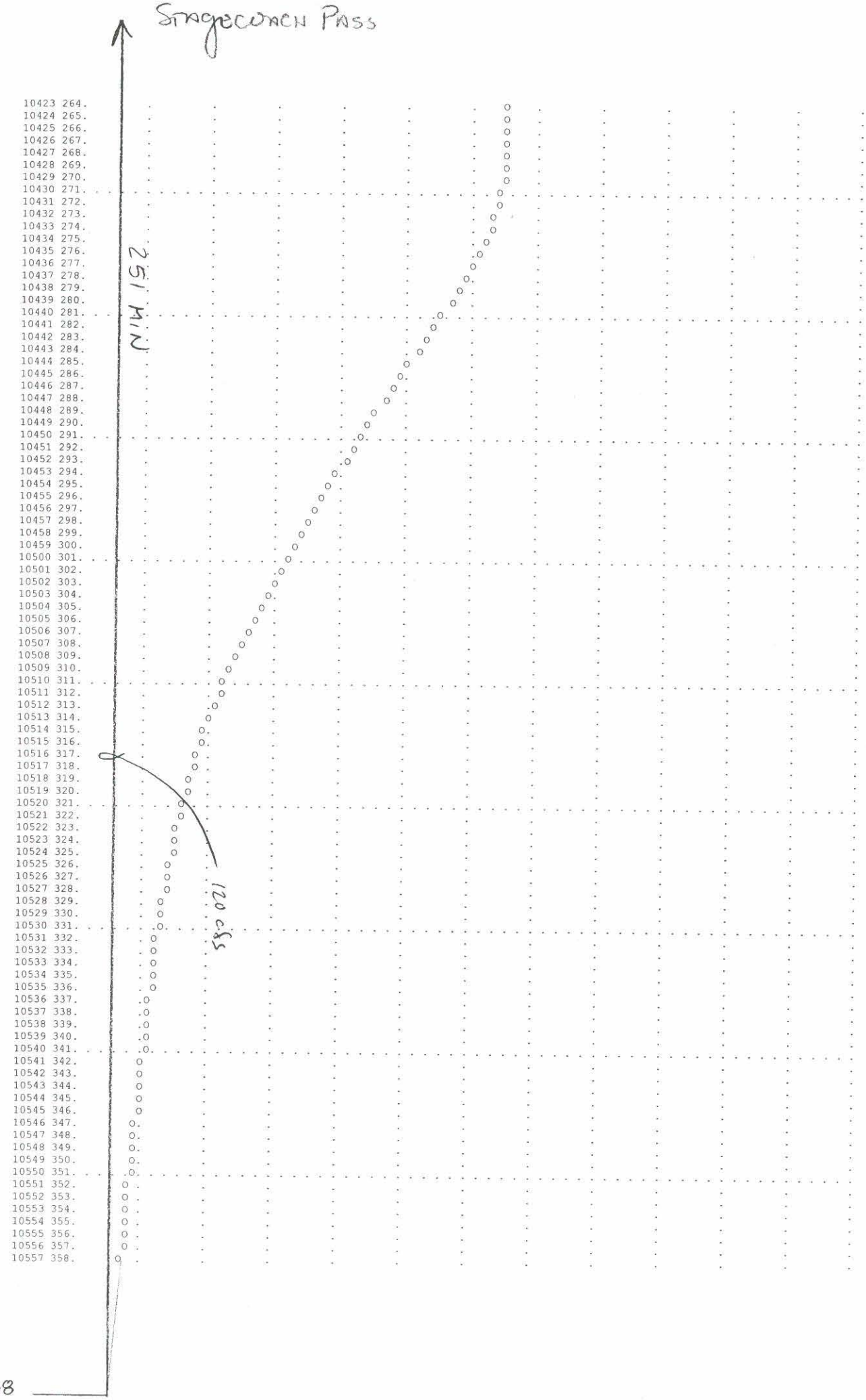
STAGECOACH PASS



Stagecoach Pass



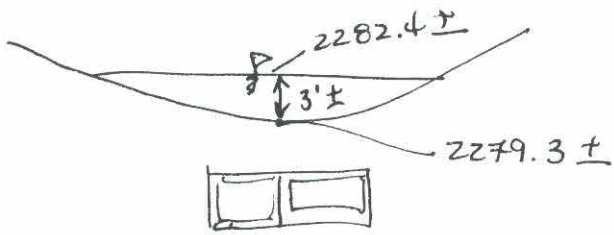
Lazy Burro Road at Terrace Estates Circle (#132)

Carefree Drainage Master Plan
Crossing Notes

ID Number: #132

Source of Data: Floodplain Delineation Study of Andora Hills & Galloway Washes, June 2001, preliminary (attached)

Location: Lazy Burro Rd. @ Terrace Estates Circle



Despite culvert, water still over road per Floodplain Delineation 100-yr. event

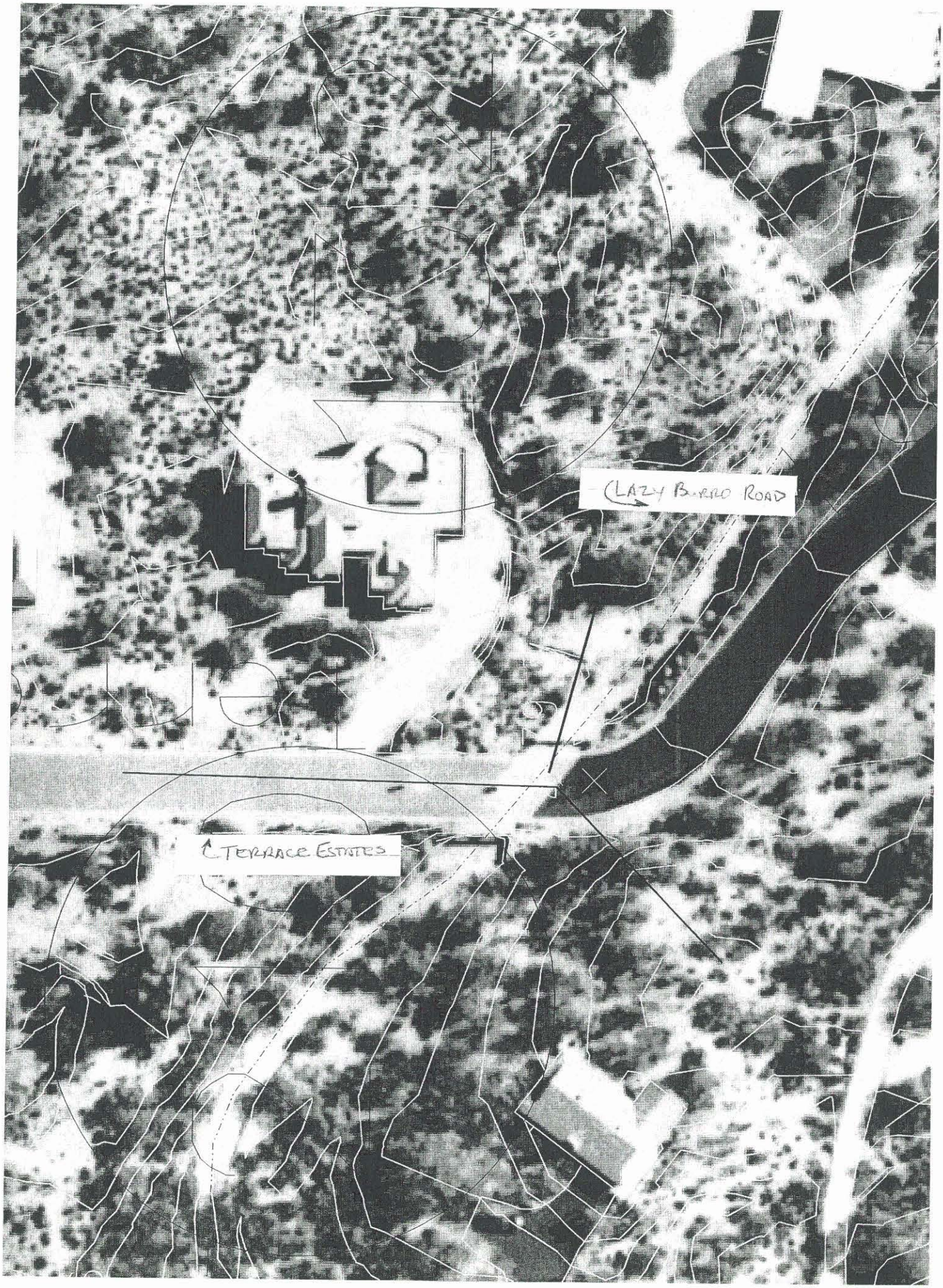
Material: 2 - 20' x 4' RCB + Dip Crossing

Protection:

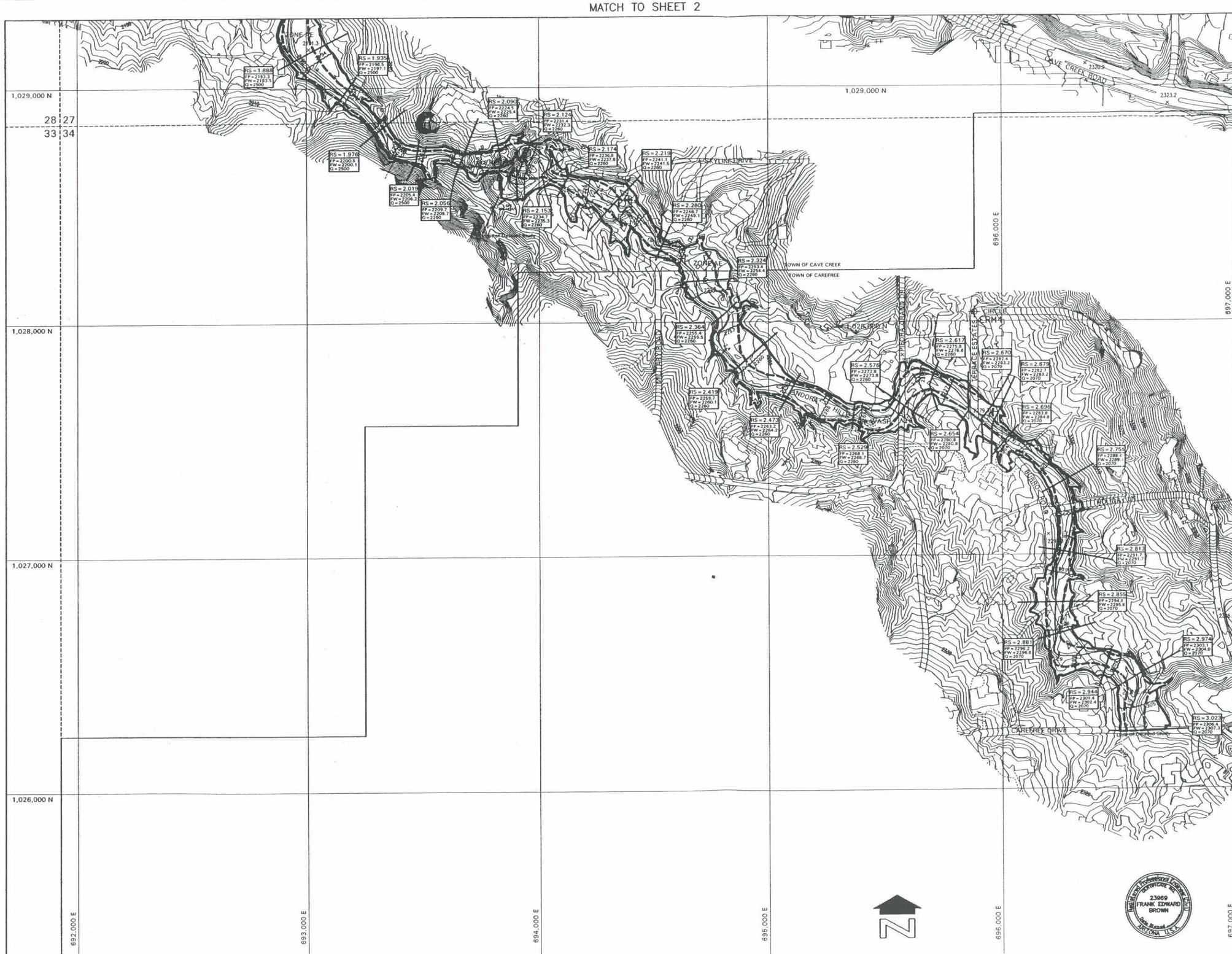
Notes: - at entrance into gated community w/ no other access

- Over 300' of roadway inundated w/ flow

← N — LAZY BURRO ROAD AT TERRACE ESTATES CIRCLE SCALE 1" = 60'



MATCH TO SHEET 2



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOODPLAIN DELINEATION STUDY OF ANDORA HILLS & GALLOWAY WASHES FCD 99-14

JUNE, 2001

LEGEND

100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	1.2 1.3
CROSS SECTION	RS = 0.300 FP = 2061.0 FW = 2061.5 Q = 13,700
ELEVATION REFERENCE MARK	ERM 4
BASE FLOOD ELEVATIONS	2080
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	TOWN OF CAVECREEK
SECTION LINE	

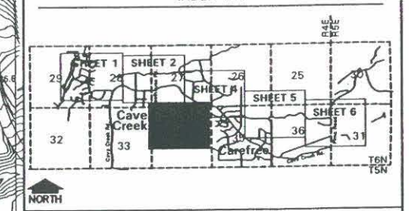
ELEVATION REFERENCE MARKS

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
ERM 4	2290.43	BC IN C/L OF TERRACE ESTATES CIRCLE, APPROXIMATELY 1000 FEET NORTH OF INTERSECTION OF BURRO ROAD AND HOLIDAY LANE, S34, T6N, R4E (N1028038.50, E695882.82)

NOTES

1. THE HYDRAULIC BASE LINE IS CROSS SECTION STATION 10,000 UNLESS NOTED OTHERWISE.
2. HORIZONTAL PROJECTION IS ARIZONA STATEPLANE, CENTRAL ZONE, NORTH AMERICAN DATUM OF 1983.
3. ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929. CONVERSION FACTOR: 1988 NGVD = 2.05 + 1929 NGVD

INDEX MAP



200 0' 200 400

SCALE: 1"= 200 FEET

CONTOUR INTERVAL = 2 FEET

REGISTERED LAND SURVEYOR CERTIFICATE NO. 24530 DAVID A. RHINE Date Signed ARIZONA, U.S.A.

REGISTERED PROFESSIONAL ENGINEER (CIVIL) CERTIFICATE NO. 23069 FRANK EDWARD BROWN Date Signed ARIZONA, U.S.A.

JE FULLER HYDROLOGY & GEOMORPHOLOGY, INC.

in association with

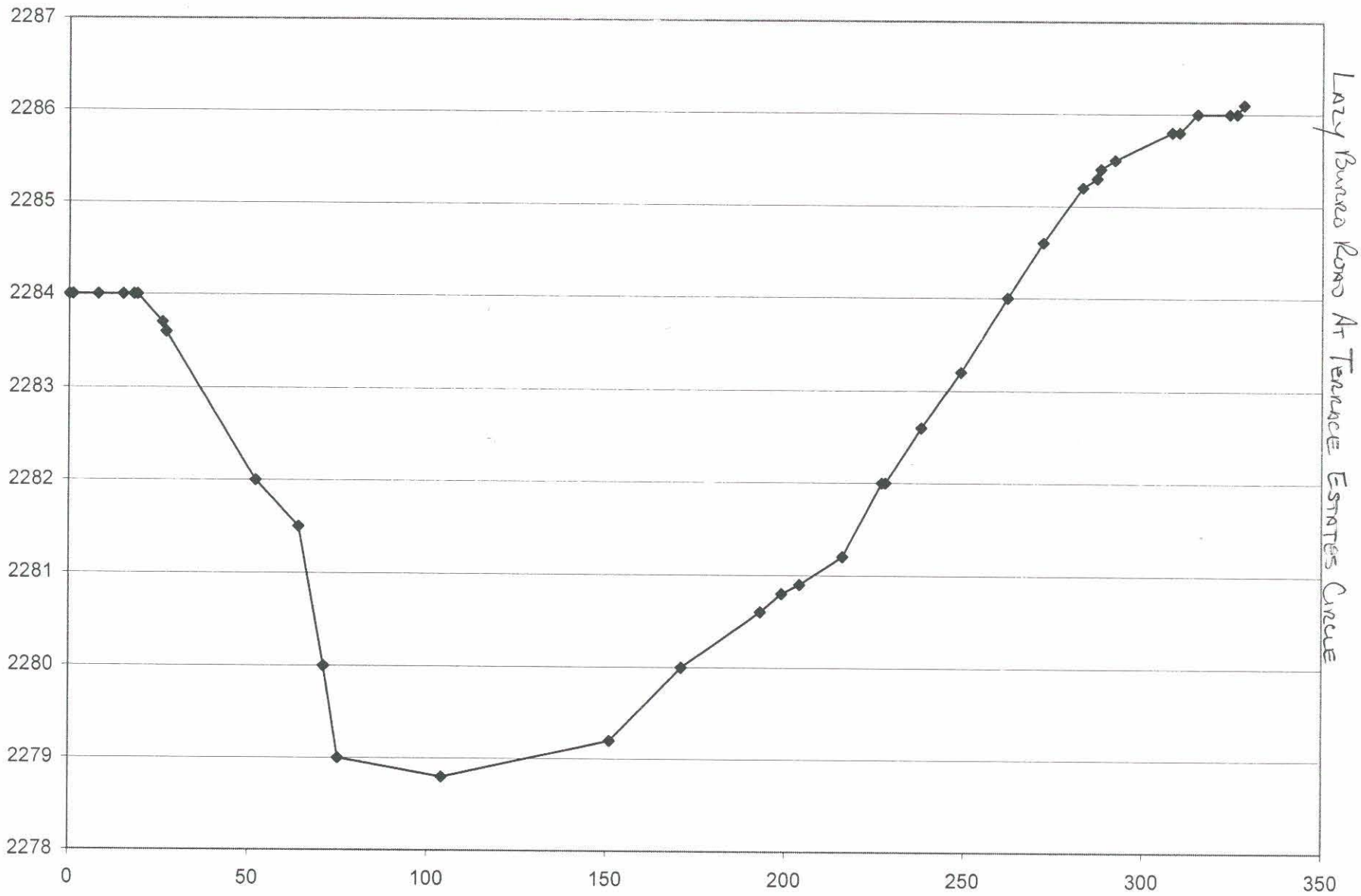
DIBBLE & ASSOCIATES CONSULTING ENGINEERS

SHEET 3 OF 8

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS FOR 1"= 200' HORIZONTAL SCALE AND 2' CONTOUR INTERVALS. FLIGHT DATE: 9/30/99

M&S AERIAL MAPPING COMPANY, LLC

GROUND CONTROL SURVEY DATA PROVIDED BY A TEAM PROFESSIONAL ASSOCIATES, INC.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2281
2280
2279
2278
0
50
100
150
200
250
300
350
LAZY BURRO ROAD AT TERRACE ESTATES CIRCLE

Culvert Designer/Analyzer Report
132

LAZY BURRO ROAD AT TERRACE ESTATES CIRCLE

Comments: TW Elevation Taken off of the Floodplain Delineation Study of Andora Hills & Galloway Washes at RS 2.654

Analysis Component			
Storm Event	Design	Discharge	2,449.00 cfs

Peak Discharge Method: User-Specified			
Design Discharge	2,449.00 cfs	Check Discharge	0.00 cfs

Tailwater Conditions: Constant Tailwater	
Tailwater Elevation	2,280.80 ft

Name	Description	Discharge	HW Elev.	Velocity
Culvert-1	2-10 x 4 ft Box	557.44 cfs	2,282.11 ft	6.97 ft/s
Weir	Roadway	1,892.11 cfs	2,282.11 ft	N/A
Total	----------	2,449.55 cfs	2,282.11 ft	N/A

Culvert Designer/Analyzer Report

132

LAZY BURRO ROAD AT TERRACE ESTATES CIRCLE

Component:Culvert-1

Culvert Summary					
Computed Headwater Elev	2,282.11	ft	Discharge	557.44	cfs
Inlet Control HW Elev.	2,280.80	ft	Tailwater Elevation	2,280.80	ft
Outlet Control HW Elev.	2,282.11	ft	Control Type	Outlet Control	
Headwater Depth/Height	2.07				

Grades					
Upstream Invert	2,273.82	ft	Downstream Invert	2,273.55	ft
Length	78.00	ft	Constructed Slope	0.003462	ft/ft

Hydraulic Profile					
Profile	PressureProfile		Depth, Downstream	7.25	ft
Slope Type	N/A		Normal Depth	2.80	ft
Flow Regime	N/A		Critical Depth	2.89	ft
Velocity Downstream	6.97	ft/s	Critical Slope	0.003176	ft/ft

Section					
Section Shape	Box		Mannings Coefficient	0.013	
Section Material	Concrete		Span	10.00	ft
Section Size	10 x 4 ft		Rise	4.00	ft
Number Sections	2				

Outlet Control Properties					
Outlet Control HW Elev.	2,282.11	ft	Upstream Velocity Head	0.75	ft
Ke	0.50		Entrance Loss	0.38	ft

Inlet Control Properties					
Inlet Control HW Elev.	2,280.80	ft	Flow Control	Unsubmerged	
Inlet Type	45° Wingwalls; 10 - 45° skewed headwall		Area Full	80.0	ft²
K	0.49800		HDS 5 Chart	11	
M	0.66700		HDS 5 Scale	4	
C	0.03270		Equation Form	2	
Y	0.75000				

Culvert Designer/Analyzer Report

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LAZY BURRO ROAD AT TERRACE ESTATES CIRCLE

Component:Weir

Hydraulic Component(s): Roadway					
Discharge	1,892.11	cfs	Allowable HW Elevation	2,282.11	ft
Roadway Width	35.00	ft	Overtopping Coefficient	3.03	US
Low Point	2,278.80	ft	Headwater Elevation	2,282.11	ft
Discharge Coefficient (Cr)	3.03		Submergence Factor (Kt)	1.00	
Tailwater Elevation	2,280.80	ft			

Sta (ft)	Elev. (ft)
19.00	2,284.00
26.00	2,283.70
52.00	2,282.00
64.00	2,281.50
75.00	2,279.00
104.00	2,278.80
151.00	2,279.20
171.00	2,280.00
216.00	2,281.20
283.00	2,285.20

Worksheet
Worksheet for Irregular Channel

LAZY BURRO ROAD AT TERRACE ESTATES CIRCLE

Project Description	
Worksheet	132
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data		
Slope	010000	ft/ft
Discharg	,892.11	cfs

Options	
Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Results		
Mannings Coefficie	0.025	
Water Surface Elev	2,281.18	ft
Elevation Range	78.80 to 2,285.20	
Flow Area	236.9	ft²
Wetted Perimeter	150.17	ft
Top Width	149.89	ft
Actual Depth	2.38	ft
Critical Elevation	2,281.32	ft
Critical Slope	0.007812	ft/ft
Velocity	7.99	ft/s
Velocity Head	0.99	ft
Specific Energy	2,282.17	ft
Froude Number	1.12	
Flow Type	Supercritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+19	0+75	0.040
0+75	2+83	0.025

Natural Channel Points

Station (ft)	Elevation (ft)
0+19	2,284.00
0+26	2,283.70
0+52	2,282.00
0+64	2,281.50
0+75	2,279.00
1+04	2,278.80
1+51	2,279.20
1+71	2,280.00
2+16	2,281.20
2+83	2,285.20

Table
Rating Table for Irregular Channel

LAZY BURRO ROAD AT TERRACE ESTATES CIRCLE

Project Description

Worksheet	132
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data

Slope	010000 ft/ft

Options

Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	2,000.00	10.00

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00	2,278.80	0.00	0.0	0.00	0.00
10.00	2,279.03	1.46	6.8	56.09	56.09
20.00	2,279.10	1.82	11.0	64.49	64.47
30.00	2,279.15	2.06	14.6	70.96	70.94
40.00	2,279.20	2.24	17.9	76.40	76.37
50.00	2,279.23	2.43	20.6	77.82	77.79
60.00	2,279.26	2.60	23.1	78.77	78.74
70.00	2,279.29	2.75	25.5	79.65	79.62
80.00	2,279.32	2.89	27.7	80.49	80.44
90.00	2,279.35	3.01	29.9	81.28	81.23
100.00	2,279.37	3.13	32.0	82.03	81.98
110.00	2,279.40	3.24	34.0	82.75	82.70
120.00	2,279.42	3.34	35.9	83.45	83.39
130.00	2,279.44	3.43	37.9	84.12	84.06
140.00	2,279.47	3.53	39.7	84.77	84.71
150.00	2,279.49	3.61	41.5	85.40	85.34
160.00	2,279.51	3.69	43.3	86.02	85.95
170.00	2,279.53	3.77	45.1	86.61	86.55
180.00	2,279.55	3.85	46.8	87.20	87.12
190.00	2,279.57	3.92	48.4	87.76	87.69
200.00	2,279.59	3.99	50.1	88.32	88.24
210.00	2,279.60	4.06	51.7	88.86	88.79
220.00	2,279.62	4.12	53.3	89.40	89.32
230.00	2,279.64	4.19	54.9	89.92	89.84
240.00	2,279.66	4.25	56.5	90.43	90.35
250.00	2,279.68	4.31	58.0	90.94	90.85
260.00	2,279.69	4.37	59.6	91.43	91.34
270.00	2,279.71	4.42	61.1	91.92	91.83
280.00	2,279.72	4.48	62.6	92.40	92.30
290.00	2,279.74	4.53	64.0	92.87	92.77
300.00	2,279.76	4.58	65.5	93.33	93.23
310.00	2,279.77	4.63	66.9	93.79	93.69
320.00	2,279.79	4.68	68.4	94.24	94.14
330.00	2,279.80	4.73	69.8	94.68	94.58

IMPASSIBLE

Table
Rating Table for Irregular Channel

LAZY BURRO ROAD AT TERRACE ESTATES CIRCLE

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
340.00	2,279.82	4.77	71.2	95.12	95.02
350.00	2,279.83	4.82	72.6	95.56	95.45
360.00	2,279.85	4.87	74.0	95.98	95.87
370.00	2,279.85	4.99	74.2	96.05	95.94
380.00	2,279.86	5.04	75.3	96.40	96.29
390.00	2,279.87	5.09	76.7	96.80	96.69
400.00	2,279.89	5.13	78.0	97.20	97.09
410.00	2,279.90	5.17	79.3	97.59	97.48
420.00	2,279.91	5.21	80.5	97.98	97.86
430.00	2,279.93	5.26	81.8	98.37	98.25
440.00	2,279.94	5.30	83.1	98.75	98.62
450.00	2,279.95	5.34	84.3	99.12	99.00
460.00	2,279.96	5.37	85.6	99.50	99.37
470.00	2,279.98	5.41	86.8	99.86	99.74
480.00	2,279.99	5.45	88.1	100.23	100.10
490.00	2,280.00	5.49	89.3	100.62	100.49
500.00	2,280.01	5.52	90.6	101.16	101.03
510.00	2,280.03	5.55	91.9	101.69	101.55
520.00	2,280.04	5.58	93.2	102.21	102.08
530.00	2,280.05	5.61	94.4	102.74	102.60
540.00	2,280.06	5.64	95.7	103.25	103.11
550.00	2,280.08	5.67	96.9	103.76	103.62
560.00	2,280.09	5.70	98.2	104.27	104.13
570.00	2,280.10	5.73	99.4	104.77	104.62
580.00	2,280.11	5.76	100.7	105.26	105.12
590.00	2,280.12	5.79	101.9	105.76	105.61
600.00	2,280.14	5.82	103.1	106.24	106.10
610.00	2,280.15	5.85	104.4	106.73	106.58
620.00	2,280.16	5.87	105.6	107.20	107.05
630.00	2,280.17	5.90	106.8	107.68	107.53
640.00	2,280.18	5.93	108.0	108.15	108.00
650.00	2,280.19	5.95	109.2	108.62	108.46
660.00	2,280.20	5.98	110.4	109.08	108.92
670.00	2,280.21	6.00	111.6	109.54	109.38
680.00	2,280.23	6.03	112.8	110.00	109.84
690.00	2,280.24	6.05	114.0	110.45	110.29
700.00	2,280.25	6.08	115.1	110.90	110.74
710.00	2,280.26	6.10	116.3	111.34	111.18
720.00	2,280.27	6.13	117.5	111.78	111.62
730.00	2,280.28	6.15	118.7	112.22	112.06
740.00	2,280.29	6.18	119.8	112.66	112.49
750.00	2,280.30	6.20	121.0	113.09	112.92
760.00	2,280.31	6.22	122.1	113.52	113.35
770.00	2,280.32	6.25	123.3	113.95	113.78
780.00	2,280.33	6.27	124.4	114.37	114.20
790.00	2,280.34	6.29	125.6	114.79	114.62
800.00	2,280.35	6.31	126.7	115.21	115.03
810.00	2,280.36	6.34	127.9	115.62	115.45
820.00	2,280.37	6.36	129.0	116.03	115.86
830.00	2,280.38	6.38	130.1	116.44	116.26
840.00	2,280.39	6.40	131.2	116.85	116.67
850.00	2,280.40	6.42	132.4	117.25	117.07
860.00	2,280.41	6.44	133.5	117.65	117.47
870.00	2,280.42	6.46	134.6	118.05	117.87

Table
Rating Table for Irregular Channel

LAZY BURRO ROAD AT TERRACE ESTATES CIRCLE

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
880.00	2,280.43	6.48	135.7	118.45	118.27
890.00	2,280.44	6.50	136.8	118.84	118.66
900.00	2,280.45	6.52	137.9	119.23	119.05
910.00	2,280.45	6.54	139.0	119.62	119.44
920.00	2,280.46	6.56	140.1	120.01	119.82
930.00	2,280.47	6.58	141.2	120.40	120.21
940.00	2,280.48	6.60	142.3	120.78	120.59
950.00	2,280.49	6.62	143.4	121.16	120.96
960.00	2,280.50	6.64	144.5	121.53	121.34
970.00	2,280.51	6.66	145.6	121.91	121.72
980.00	2,280.52	6.68	146.7	122.28	122.09
990.00	2,280.53	6.70	147.8	122.66	122.46
1,000.00	2,280.54	6.72	148.8	123.02	122.83
1,010.00	2,280.54	6.74	149.9	123.39	123.19
1,020.00	2,280.55	6.76	151.0	123.76	123.56
1,030.00	2,280.56	6.77	152.1	124.12	123.92
1,040.00	2,280.57	6.79	153.1	124.48	124.28
1,050.00	2,280.58	6.81	154.2	124.84	124.64
1,060.00	2,280.59	6.83	155.3	125.20	125.00
1,070.00	2,280.60	6.85	156.3	125.56	125.35
1,080.00	2,280.60	6.86	157.4	125.91	125.70
1,090.00	2,280.61	6.88	158.4	126.26	126.05
1,100.00	2,280.62	6.90	159.5	126.61	126.40
1,110.00	2,280.63	6.91	160.5	126.96	126.75
1,120.00	2,280.64	6.93	161.6	127.31	127.10
1,130.00	2,280.65	6.95	162.6	127.65	127.44
1,140.00	2,280.65	6.97	163.7	128.00	127.78
1,150.00	2,280.66	6.98	164.7	128.34	128.12
1,160.00	2,280.67	7.00	165.7	128.68	128.46
1,170.00	2,280.68	7.02	166.8	129.02	128.80
1,180.00	2,280.69	7.03	167.8	129.35	129.14
1,190.00	2,280.69	7.05	168.8	129.69	129.47
1,200.00	2,280.70	7.06	169.9	130.02	129.80
1,210.00	2,280.71	7.08	170.9	130.36	130.14
1,220.00	2,280.72	7.10	171.9	130.69	130.47
1,230.00	2,280.73	7.11	173.0	131.02	130.79
1,240.00	2,280.73	7.13	174.0	131.34	131.12
1,250.00	2,280.74	7.14	175.0	131.67	131.45
1,260.00	2,280.75	7.16	176.0	131.99	131.77
1,270.00	2,280.76	7.17	177.0	132.32	132.09
1,280.00	2,280.76	7.19	178.0	132.64	132.41
1,290.00	2,280.77	7.20	179.1	132.96	132.73
1,300.00	2,280.78	7.22	180.1	133.28	133.05
1,310.00	2,280.79	7.23	181.1	133.60	133.37
1,320.00	2,280.79	7.25	182.1	133.91	133.68
1,330.00	2,280.80	7.26	183.1	134.23	134.00
1,340.00	2,280.81	7.28	184.1	134.54	134.31
1,350.00	2,280.82	7.29	185.1	134.86	134.62
1,360.00	2,280.82	7.31	186.1	135.17	134.93
1,370.00	2,280.83	7.32	187.1	135.48	135.24
1,380.00	2,280.84	7.34	188.1	135.79	135.55
1,390.00	2,280.85	7.35	189.1	136.09	135.86
1,400.00	2,280.85	7.37	190.1	136.40	136.16
1,410.00	2,280.86	7.38	191.0	136.70	136.46

Table
Rating Table for Irregular Channel

LAZY BURRO ROAD AT TERRACE ESTATES CIRCLE

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
1,420.00	2,280.87	7.39	192.0	137.01	136.77
1,430.00	2,280.88	7.41	193.0	137.31	137.07
1,440.00	2,280.88	7.42	194.0	137.61	137.37
1,450.00	2,280.89	7.44	195.0	137.91	137.67
1,460.00	2,280.90	7.45	196.0	138.21	137.97
1,470.00	2,280.90	7.46	196.9	138.51	138.26
1,480.00	2,280.91	7.48	197.9	138.80	138.56
1,490.00	2,280.92	7.49	198.9	139.10	138.85
1,500.00	2,280.92	7.51	199.9	139.39	139.15
1,510.00	2,280.93	7.52	200.8	139.69	139.44
1,520.00	2,280.94	7.53	201.8	139.98	139.73
1,530.00	2,280.95	7.55	202.8	140.27	140.02
1,540.00	2,280.95	7.56	203.7	140.56	140.31
1,550.00	2,280.96	7.57	204.7	140.85	140.60
1,560.00	2,280.97	7.58	205.7	141.14	140.89
1,570.00	2,280.97	7.60	206.6	141.43	141.17
1,580.00	2,280.98	7.61	207.6	141.71	141.46
1,590.00	2,280.99	7.62	208.6	142.00	141.74
1,600.00	2,280.99	7.64	209.5	142.28	142.03
1,610.00	2,281.00	7.65	210.5	142.56	142.31
1,620.00	2,281.01	7.66	211.4	142.85	142.59
1,630.00	2,281.01	7.67	212.4	143.13	142.87
1,640.00	2,281.02	7.69	213.3	143.41	143.15
1,650.00	2,281.03	7.70	214.3	143.69	143.43
1,660.00	2,281.03	7.71	215.2	143.96	143.70
1,670.00	2,281.04	7.72	216.2	144.24	143.98
1,680.00	2,281.05	7.74	217.1	144.52	144.25
1,690.00	2,281.05	7.75	218.1	144.79	144.53
1,700.00	2,281.06	7.76	219.0	145.07	144.80
1,710.00	2,281.07	7.77	220.0	145.34	145.07
1,720.00	2,281.07	7.79	220.9	145.61	145.35
1,730.00	2,281.08	7.80	221.8	145.88	145.62
1,740.00	2,281.09	7.81	222.8	146.15	145.89
1,750.00	2,281.09	7.82	223.7	146.42	146.16
1,760.00	2,281.10	7.83	224.7	146.69	146.42
1,770.00	2,281.10	7.85	225.6	146.96	146.69
1,780.00	2,281.11	7.86	226.5	147.23	146.96
1,790.00	2,281.12	7.87	227.5	147.49	147.22
1,800.00	2,281.12	7.88	228.4	147.76	147.49
1,810.00	2,281.13	7.89	229.3	148.02	147.75
1,820.00	2,281.14	7.90	230.2	148.29	148.01
1,830.00	2,281.14	7.92	231.2	148.55	148.28
1,840.00	2,281.15	7.93	232.1	148.81	148.54
1,850.00	2,281.16	7.94	233.0	149.07	148.80
1,860.00	2,281.16	7.95	233.9	149.33	149.06
1,870.00	2,281.17	7.96	234.9	149.59	149.32
1,880.00	2,281.17	7.97	235.8	149.85	149.58
1,890.00	2,281.18	7.98	236.7	150.11	149.83
1,900.00	2,281.19	8.00	237.6	150.37	150.09
1,910.00	2,281.19	8.01	238.5	150.63	150.35
1,920.00	2,281.20	8.02	239.5	150.88	150.60
1,930.00	2,281.20	8.03	240.3	151.04	150.76
1,940.00	2,281.21	8.05	241.1	151.16	150.87
1,950.00	2,281.21	8.06	242.0	151.27	150.99

Table

Rating Table for Irregular Channel

LAZY BURRO ROAD AT TERRACE ESTATES CIRCLE

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
1,960.00	2,281.22	8.07	242.8	151.39	151.10
1,970.00	2,281.23	8.09	243.6	151.50	151.22
1,980.00	2,281.23	8.10	244.4	151.62	151.33
1,990.00	2,281.24	8.12	245.2	151.73	151.45
2,000.00	2,281.24	8.13	246.0	151.85	151.56

AW 100 YR, 6 HR
FUTURE
LAZY BURRO ROAD AT TERRACE ESTATES CIRCLE

132

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1*************************************
*                                   *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN  1998            *
*            VERSION 4.1            *
*                                   *
*  RUN DATE   27NOV02  TIME  08:23:52  *
*                                   *
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*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*           (916) 756-1104          *
*                                   *
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X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX         XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

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

```
1                                    HEC-1 INPUT                                                    PAGE  1

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

  1           ID   ANDORA HILLS WASH FUTURE CONDITIONS
  2           ID
  3           ID    100-YEAR 6-HOUR MODEL  FILENAME: AW1006F.DAT
  4           ID      MODIFIED BY JEF, INC. FOR CAREFREE AREA DRAINAGE MASTER PLAN
  5           ID      MODIFICATIONS INCLUDE:
  6           ID      1)  CHANGES TO WATERSHED DELINATION BETWEEN S320 AND S340L
  7           ID          EXAMINATION OF AERIAL PHOTOGRAPHS REVEALED AREA WITHIN
  8           ID          S320 THAT ACTUALLY FLOWS THROUGH S340L NEAR THE SW CORNER
  9           ID          OF S340L OFF THE BLACK MOUNTAIN HILLS.
 10           ID      2)  ADDITION OF NEW COMBINATION BLOCKS TO SEPARATE COMBINATIONS WITH
 11           ID          MORE THAN TWO HYDROGRAPHS IN THE ORIGINAL MODEL.
 12           ID      3)  FUTURE CONDITIONS LAND USE INTERPRETED FROM FUTURE LAND USE IN
 13           ID          CAVE CREEK WATERCOURSE MASTER PLAN BY TETRA TECH, 2001
 14           ID
 15           ID    BASED ON:
 16           ID
 17           ID        Cave Creek Above Carefree Highway FPD Study       File: AW100-6.IH1
 18           ID           by  GVSCE for Maricopa County FCD 95-28    Original: 06-17-96     mcg
 19           ID           Project:            84                       Revised:
 20           ID
 21           ID         Andora Hills Wash sub-watershed model
 22           ID           100-year, 6-hr rainfall with FCDMC Design Manual distribution
 23           ID           Green & Ampt Loss Rate Method
 24           ID           NMIN = 2
 25           ID           Clark Unit Hydrograph
 26           ID           Modified Puls, normal depth channel routing
              *
              *
              *
 27           IT       2                      900
 28           IO       5       2
 29           IN      15
              *
              *DIAGRAM
              *
              *  Depth-Area reduction factors taken from Table 2.2 of FCDMC Design Manual
              *
              *  6-hr rainfall distributions per Table 2.4 and Figure 2.17 of Design Manual
              *
 30           JD    3.40    0.01
 31           PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
 32           PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
 33           PC   0.962   0.972   0.983   0.991   1.000
 34           JD    3.38    0.50
 35           JD    3.30    2.80
 36           PC   0.000   0.009   0.016   0.025   0.034   0.042   0.051   0.059   0.067   0.076
 37           PC   0.087   0.100   0.120   0.163   0.252   0.451   0.694   0.837   0.900   0.938
 38           PC   0.950   0.963   0.975   0.988   1.000
              *
              *
1                                    HEC-1 INPUT                                                    PAGE  2

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

 39           KK    S320
 40           KM   SUB-BASIN AHW1
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LAZY BURRO ROAD AT TERRACE ESTATES CIRCLE

```
 20548 8950
 20550 8960
 20552 8970
 20554 8980
 20556 8990
 20558 9000---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
1
1                                                   STATION     C350

                        (O) OUTFLOW
          0.      400.      800.     1200.     1600.     2000.     2400.       0.       0.       0.       0.       0.       0.
DAHRMN PER
 10000   10---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
 10002   20
 10004   30
 10006   40
 10008   50
 10010   60
 10012   70
 10014   80
 10016   90
 10018  100
 10020  110
 10022  120
 10024  130
 10026  140
 10028  150
 10030  160
 10032  170
 10034  180
 10036  190
 10038  200
 10040  210
 10042  220
 10044  230
 10046  240
 10048  250
 10050  260
 10052  270
 10054  280
 10056  290
 10058  300
 10100  310
 10102  320
 10104  33.0
 10106  34.0
 10108  35.0
 10110  36.0
 10112  37.0
 10114  38.0
 10116  39.0
 10118  40.0
 10120  41.0
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 10124  43.0
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 10130  46.0
 10132  47.0
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 10136  49.0
 10138  50.0
 10140  51.0
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 10150  56.0
 10152  57.0
 10154  58.0
 10156  59.0
 10158  60.0
 10200  61.0
 10202  62.0
 10204  63.0
 10206  64.0
 10208  65.0
 10210  66.0
 10212  67.0
 10214  68.0
 10216  69.0
 10218  70.0
 10220  71.0
 10222  72.0
 10224  73.0
 10226  74.0
 10228  75.0
 10230  76.0
 10232  77.0
 10234  78.0
 10236  79.0
 10238  80.0
 10240  81.0
 10242  82.0
 10244  83.0
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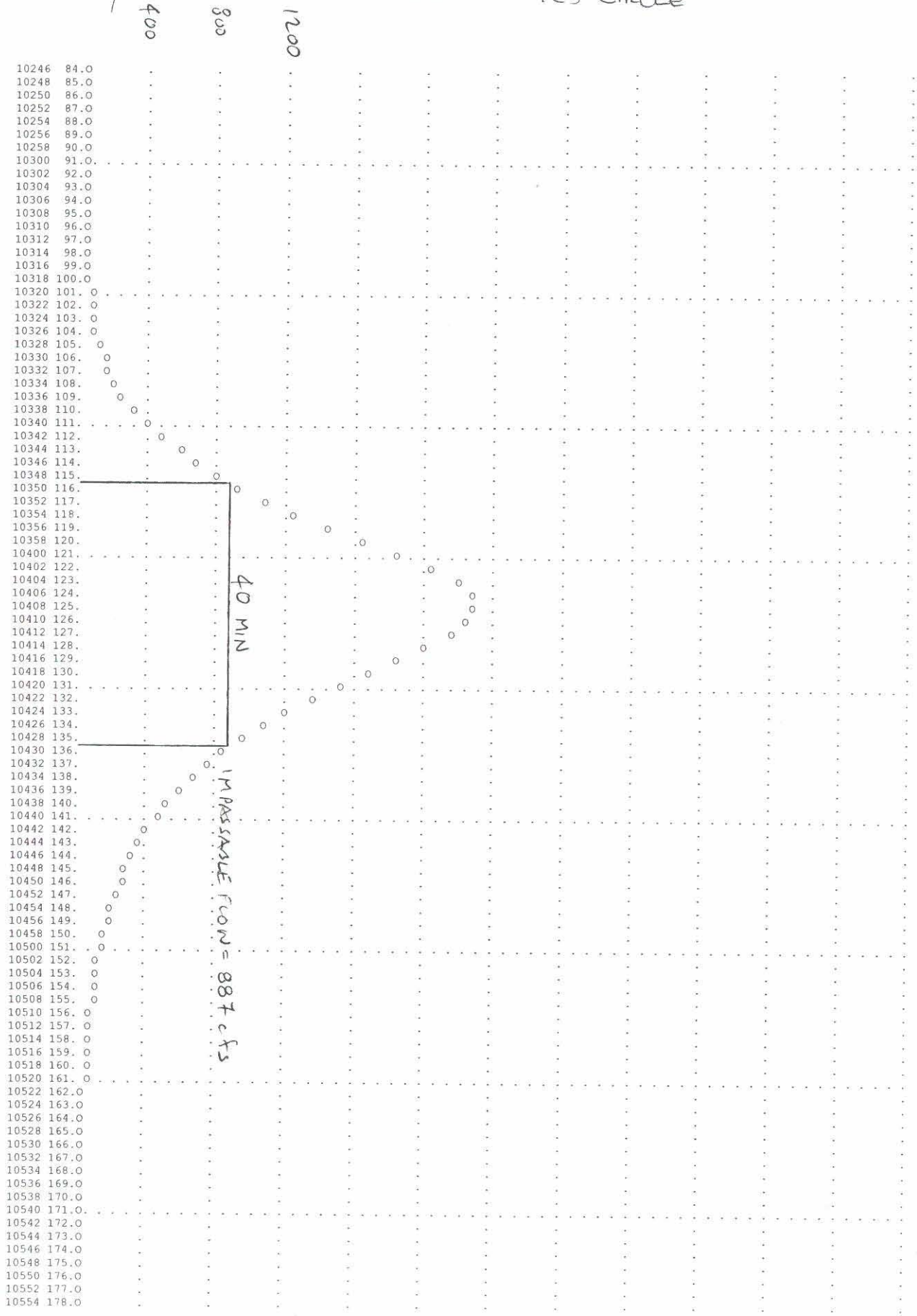
LAZY BURRO ROAD AT TERRACE ESTATES CIRCLE



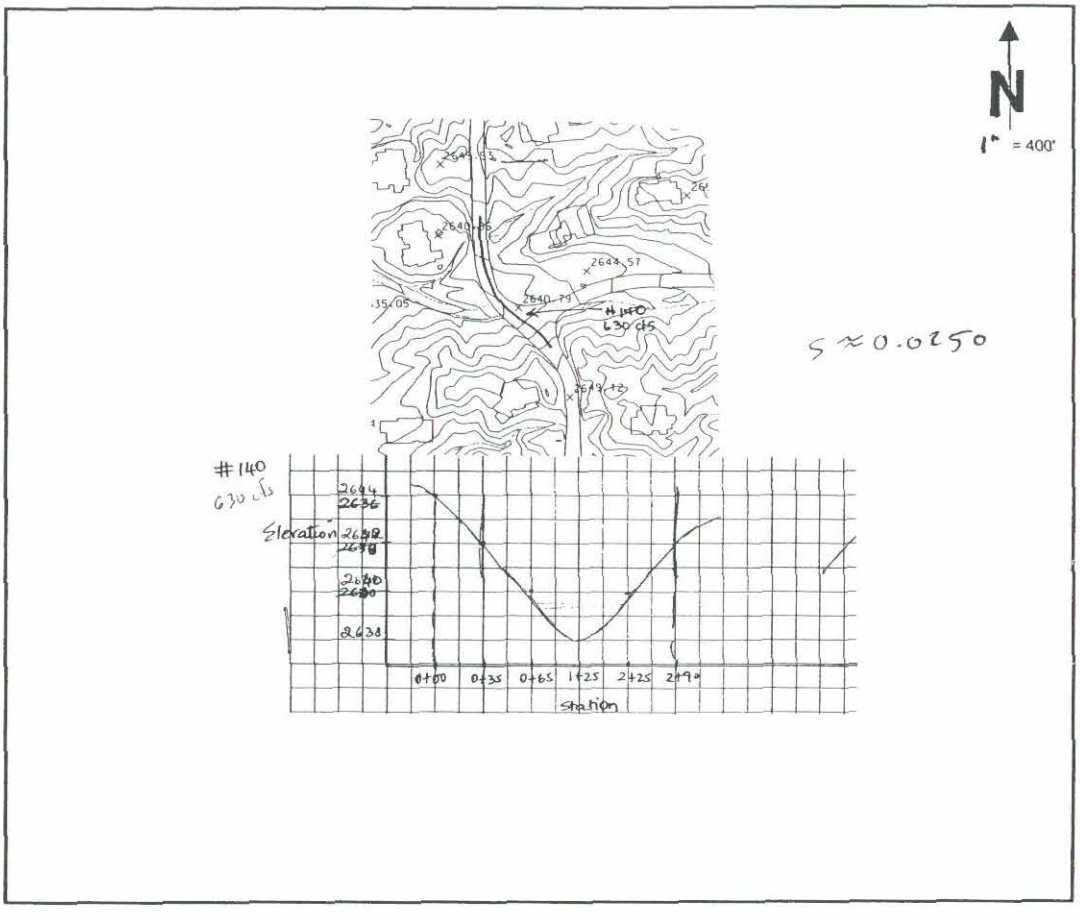
Wild Flower Road (#140)

Carefree Drainage Master Plan
Dip Crossing Notes

ID Number: # 140

Source of Data: TOPO

Location: WILD FLOWER ROAD



Material: Dip Crossing

Protection:

Notes: DEI did Floodplain Delineation for this part of Stagecoach Pass Wash

Worksheet
Worksheet for Irregular Channel

WILD FLOWER ROAD

Project Description

Worksheet	Number 140
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data

Slope	025000	ft/ft
Discharg	912.00	cfs

Options

Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Results

Mannings Coefficie	0.032	
Water Surface Elev	2,639.82	ft
Elevation Range	38.00 to 2,644.00	
Flow Area	132.4	ft²
Wetted Perimeter	145.57	ft
Top Width	145.52	ft
Actual Depth	1.82	ft
Critical Elevation	2,640.00	ft
Critical Slope	0.014916	ft/ft
Velocity	6.89	ft/s
Velocity Head	0.74	ft
Specific Energy	2,640.56	ft
Froude Number	1.27	
Flow Type	Supercritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00	2+90	0.032

Natural Channel Points

Station (ft)	Elevation (ft)
0+00	2,644.00
0+35	2,642.00
0+65	2,640.00
1+25	2,638.00
2+25	2,640.00
2+90	2,642.00

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CH2M Hill
37 Brookside Road Waterbury, CT 06708 USA (203) 755-1666

Table
Rating Table for Irregular Channel

WILD FLOWER ROAD

Project Description	
Worksheet	Number 140
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data	
Slope	025000 ft/ft

Options	
Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	1,000.00	5.00

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00	2,638.00	0.00	0.0	0.00	0.00
5.00	2,638.26	1.87	2.7	20.66	20.66
10.00	2,638.33	2.23	4.5	26.80	26.79
15.00	2,638.39	2.47	6.1	31.20	31.19
20.00	2,638.43	2.65	7.5	34.75	34.74
25.00	2,638.47	2.80	8.9	37.78	37.77
30.00	2,638.51	2.93	10.2	40.46	40.44
35.00	2,638.54	3.05	11.5	42.86	42.85
40.00	2,638.56	3.15	12.7	45.07	45.05
45.00	2,638.59	3.25	13.9	47.10	47.09
50.00	2,638.61	3.33	15.0	49.00	48.98
55.00	2,638.63	3.41	16.1	50.78	50.77
60.00	2,638.66	3.49	17.2	52.47	52.45
65.00	2,638.68	3.56	18.3	54.07	54.05
70.00	2,638.69	3.63	19.3	55.59	55.57
75.00	2,638.71	3.69	20.3	57.05	57.03
80.00	2,638.73	3.75	21.3	58.44	58.42
85.00	2,638.75	3.81	22.3	59.79	59.77
90.00	2,638.76	3.86	23.3	61.08	61.06
95.00	2,638.78	3.91	24.3	62.33	62.31
100.00	2,638.79	3.97	25.2	63.54	63.52
105.00	2,638.81	4.01	26.2	64.72	64.70
110.00	2,638.82	4.06	27.1	65.86	65.83
115.00	2,638.84	4.11	28.0	66.96	66.94
120.00	2,638.85	4.15	28.9	68.04	68.02
125.00	2,638.86	4.19	29.8	69.09	69.07
130.00	2,638.88	4.23	30.7	70.11	70.09
135.00	2,638.89	4.27	31.6	71.11	71.09
140.00	2,638.90	4.31	32.5	72.09	72.07
145.00	2,638.91	4.35	33.3	73.04	73.02
150.00	2,638.92	4.39	34.2	73.98	73.95
155.00	2,638.94	4.42	35.0	74.89	74.87
160.00	2,638.95	4.46	35.9	75.79	75.77
165.00	2,638.96	4.49	36.7	76.67	76.65

Table
Rating Table for Irregular Channel

WILD FLOWER ROAD

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
170.00	2,638.97	4.53	37.5	77.53	77.51
175.00	2,638.98	4.56	38.4	78.38	78.36
180.00	2,638.99	4.59	39.2	79.21	79.19
185.00	2,639.00	4.62	40.0	80.03	80.01
190.00	2,639.01	4.66	40.8	80.84	80.81
195.00	2,639.02	4.69	41.6	81.63	81.60
200.00	2,639.03	4.72	42.4	82.41	82.38
205.00	2,639.04	4.74	43.2	83.17	83.15
210.00	2,639.05	4.77	44.0	83.93	83.90
215.00	2,639.06	4.80	44.8	84.67	84.64
220.00	2,639.07	4.83	45.6	85.41	85.38
225.00	2,639.08	4.86	46.3	86.13	86.10
230.00	2,639.09	4.88	47.1	86.84	86.81
235.00	2,639.09	4.91	47.9	87.54	87.51
240.00	2,639.10	4.94	48.6	88.24	88.21
245.00	2,639.11	4.96	49.4	88.92	88.89
250.00	2,639.12	4.99	50.1	89.60	89.57
255.00	2,639.13	5.01	50.9	90.27	90.24
260.00	2,639.14	5.04	51.6	90.93	90.90
265.00	2,639.14	5.06	52.4	91.58	91.55
270.00	2,639.15	5.08	53.1	92.22	92.19
275.00	2,639.16	5.11	53.9	92.86	92.83
280.00	2,639.17	5.13	54.6	93.49	93.46
285.00	2,639.18	5.15	55.3	94.11	94.08
290.00	2,639.18	5.17	56.0	94.73	94.70
295.00	2,639.19	5.20	56.8	95.34	95.30
300.00	2,639.20	5.22	57.5	95.94	95.91
305.00	2,639.21	5.24	58.2	96.54	96.50
310.00	2,639.21	5.26	58.9	97.13	97.09
315.00	2,639.22	5.28	59.6	97.71	97.68
320.00	2,639.23	5.30	60.3	98.29	98.26
325.00	2,639.24	5.32	61.0	98.86	98.83
330.00	2,639.24	5.34	61.7	99.43	99.40
335.00	2,639.25	5.36	62.4	99.99	99.96
340.00	2,639.26	5.38	63.1	100.55	100.52
345.00	2,639.26	5.40	63.8	101.10	101.07
350.00	2,639.27	5.42	64.5	101.65	101.61
355.00	2,639.28	5.44	65.2	102.19	102.16
360.00	2,639.28	5.46	65.9	102.73	102.69
365.00	2,639.29	5.48	66.6	103.26	103.23
370.00	2,639.30	5.50	67.3	103.79	103.75
375.00	2,639.30	5.52	68.0	104.31	104.28
380.00	2,639.31	5.54	68.6	104.83	104.80
385.00	2,639.32	5.55	69.3	105.35	105.31
390.00	2,639.32	5.57	70.0	105.86	105.82
395.00	2,639.33	5.59	70.7	106.37	106.33
400.00	2,639.34	5.61	71.3	106.87	106.83
405.00	2,639.34	5.63	72.0	107.37	107.33
410.00	2,639.35	5.64	72.7	107.86	107.83
415.00	2,639.35	5.66	73.3	108.35	108.32
420.00	2,639.36	5.68	74.0	108.84	108.81
425.00	2,639.37	5.69	74.7	109.33	109.29
430.00	2,639.37	5.71	75.3	109.81	109.77
435.00	2,639.38	5.73	76.0	110.28	110.25

IMPASSABLE

Table
Rating Table for Irregular Channel

WILD FLOWER ROAD

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
440.00	2,639.38	5.74	76.6	110.76	110.72
445.00	2,639.39	5.76	77.3	111.23	111.19
450.00	2,639.40	5.78	77.9	111.69	111.66
455.00	2,639.40	5.79	78.6	112.16	112.12
460.00	2,639.41	5.81	79.2	112.62	112.58
465.00	2,639.41	5.82	79.9	113.08	113.04
470.00	2,639.42	5.84	80.5	113.53	113.49
475.00	2,639.42	5.85	81.1	113.98	113.94
480.00	2,639.43	5.87	81.8	114.43	114.39
485.00	2,639.44	5.88	82.4	114.88	114.84
490.00	2,639.44	5.90	83.1	115.32	115.28
495.00	2,639.45	5.91	83.7	115.76	115.72
500.00	2,639.45	5.93	84.3	116.20	116.16
505.00	2,639.46	5.94	85.0	116.63	116.59
510.00	2,639.46	5.96	85.6	117.06	117.02
515.00	2,639.47	5.97	86.2	117.49	117.45
520.00	2,639.47	5.99	86.8	117.92	117.88
525.00	2,639.48	6.00	87.5	118.34	118.30
530.00	2,639.48	6.02	88.1	118.76	118.72
535.00	2,639.49	6.03	88.7	119.18	119.14
540.00	2,639.49	6.04	89.3	119.60	119.56
545.00	2,639.50	6.06	90.0	120.01	119.97
550.00	2,639.50	6.07	90.6	120.42	120.38
555.00	2,639.51	6.09	91.2	120.83	120.79
560.00	2,639.51	6.10	91.8	121.24	121.20
565.00	2,639.52	6.11	92.4	121.64	121.60
570.00	2,639.53	6.13	93.0	122.05	122.01
575.00	2,639.53	6.14	93.6	122.45	122.41
580.00	2,639.54	6.15	94.3	122.85	122.80
585.00	2,639.54	6.17	94.9	123.24	123.20
590.00	2,639.54	6.18	95.5	123.64	123.59
595.00	2,639.55	6.19	96.1	124.03	123.99
600.00	2,639.55	6.21	96.7	124.42	124.38
605.00	2,639.56	6.22	97.3	124.81	124.76
610.00	2,639.56	6.23	97.9	125.19	125.15
615.00	2,639.57	6.24	98.5	125.58	125.53
620.00	2,639.57	6.26	99.1	125.96	125.91
625.00	2,639.58	6.27	99.7	126.34	126.29
630.00	2,639.58	6.28	100.3	126.71	126.67
635.00	2,639.59	6.29	100.9	127.09	127.05
640.00	2,639.59	6.31	101.5	127.47	127.42
645.00	2,639.60	6.32	102.1	127.84	127.80
650.00	2,639.60	6.33	102.7	128.21	128.17
655.00	2,639.61	6.34	103.3	128.58	128.53
660.00	2,639.61	6.36	103.8	128.94	128.90
665.00	2,639.62	6.37	104.4	129.31	129.27
670.00	2,639.62	6.38	105.0	129.67	129.63
675.00	2,639.62	6.39	105.6	130.04	129.99
680.00	2,639.63	6.40	106.2	130.40	130.35
685.00	2,639.63	6.41	106.8	130.76	130.71
690.00	2,639.64	6.43	107.4	131.11	131.07
695.00	2,639.64	6.44	108.0	131.47	131.42
700.00	2,639.65	6.45	108.5	131.82	131.78
705.00	2,639.65	6.46	109.1	132.17	132.13

Table
Rating Table for Irregular Channel

WILD FLOWER ROAD

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
710.00	2,639.66	6.47	109.7	132.52	132.48
715.00	2,639.66	6.48	110.3	132.87	132.83
720.00	2,639.66	6.50	110.9	133.22	133.18
725.00	2,639.67	6.51	111.4	133.57	133.52
730.00	2,639.67	6.52	112.0	133.91	133.87
735.00	2,639.68	6.53	112.6	134.26	134.21
740.00	2,639.68	6.54	113.2	134.60	134.55
745.00	2,639.69	6.55	113.7	134.94	134.89
750.00	2,639.69	6.56	114.3	135.28	135.23
755.00	2,639.69	6.57	114.9	135.61	135.57
760.00	2,639.70	6.58	115.4	135.95	135.91
765.00	2,639.70	6.59	116.0	136.29	136.24
770.00	2,639.71	6.61	116.6	136.62	136.57
775.00	2,639.71	6.62	117.1	136.95	136.90
780.00	2,639.72	6.63	117.7	137.28	137.24
785.00	2,639.72	6.64	118.3	137.61	137.56
790.00	2,639.72	6.65	118.8	137.94	137.89
795.00	2,639.73	6.66	119.4	138.27	138.22
800.00	2,639.73	6.67	120.0	138.59	138.54
805.00	2,639.74	6.68	120.5	138.91	138.87
810.00	2,639.74	6.69	121.1	139.24	139.19
815.00	2,639.74	6.70	121.6	139.56	139.51
820.00	2,639.75	6.71	122.2	139.88	139.83
825.00	2,639.75	6.72	122.8	140.20	140.15
830.00	2,639.76	6.73	123.3	140.52	140.47
835.00	2,639.76	6.74	123.9	140.83	140.79
840.00	2,639.76	6.75	124.4	141.15	141.10
845.00	2,639.77	6.76	125.0	141.46	141.42
850.00	2,639.77	6.77	125.5	141.78	141.73
855.00	2,639.78	6.78	126.1	142.09	142.04
860.00	2,639.78	6.79	126.7	142.40	142.35
865.00	2,639.78	6.80	127.2	142.71	142.66
870.00	2,639.79	6.81	127.8	143.02	142.97
875.00	2,639.79	6.82	128.3	143.33	143.28
880.00	2,639.79	6.83	128.9	143.63	143.59
885.00	2,639.80	6.84	129.4	143.94	143.89
890.00	2,639.80	6.85	130.0	144.24	144.20
895.00	2,639.81	6.86	130.5	144.55	144.50
900.00	2,639.81	6.87	131.0	144.85	144.80
905.00	2,639.81	6.88	131.6	145.15	145.10
910.00	2,639.82	6.89	132.1	145.45	145.40
915.00	2,639.82	6.90	132.7	145.75	145.70
920.00	2,639.82	6.91	133.2	146.05	146.00
925.00	2,639.83	6.92	133.8	146.35	146.30
930.00	2,639.83	6.92	134.3	146.64	146.59
935.00	2,639.84	6.93	134.8	146.94	146.89
940.00	2,639.84	6.94	135.4	147.23	147.18
945.00	2,639.84	6.95	135.9	147.52	147.47
950.00	2,639.85	6.96	136.5	147.82	147.77
955.00	2,639.85	6.97	137.0	148.11	148.06
960.00	2,639.85	6.98	137.5	148.40	148.35
965.00	2,639.86	6.99	138.1	148.69	148.64
970.00	2,639.86	7.00	138.6	148.98	148.93
975.00	2,639.87	7.01	139.2	149.26	149.21

Table
Rating Table for Irregular Channel

WILD FLOWER ROAD

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
980.00	2,639.87	7.02	139.7	149.55	149.50
985.00	2,639.87	7.02	140.2	149.84	149.79
990.00	2,639.88	7.03	140.8	150.12	150.07
995.00	2,639.88	7.04	141.3	150.40	150.35
1,000.00	2,639.88	7.05	141.8	150.69	150.64

Table
Rating Table for Irregular Channel

TWILIGHT TRAIL

Project Description	
Worksheet	159
Flow Element	Irregular Chan
Method	Manning's Forr
Solve For	Channel Depth

Input Data	
Slope	022600 ft/ft

Options	
Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	600.00	10.00

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00	2,616.10	0.00	0.0	0.00	0.00
10.00	2,616.44	2.13	4.7	24.45	24.44
20.00	2,616.55	2.60	7.7	29.67	29.66
30.00	2,616.63	2.93	10.3	33.03	33.01
40.00	2,616.69	3.21	12.5	35.07	35.04
50.00	2,616.75	3.43	14.6	36.87	36.84
60.00	2,616.80	3.63	16.5	38.49	38.46
70.00	2,616.85	3.80	18.4	39.98	39.95
80.00	2,616.90	3.96	20.2	41.37	41.33
90.00	2,616.94	4.10	22.0	42.66	42.62
100.00	2,616.98	4.23	23.7	43.89	43.84
110.00	2,617.01	4.35	25.3	45.05	45.00
120.00	2,617.05	4.46	26.9	46.15	46.10
130.00	2,617.08	4.56	28.5	47.21	47.16
140.00	2,617.12	4.66	30.1	48.22	48.17
150.00	2,617.15	4.75	31.6	49.19	49.14
160.00	2,617.18	4.84	33.1	50.13	50.07
170.00	2,617.21	4.92	34.5	51.04	50.98
180.00	2,617.24	5.00	36.0	51.92	51.86
190.00	2,617.26	5.08	37.4	52.77	52.70
200.00	2,617.29	5.15	38.8	53.59	53.53
210.00	2,617.32	5.22	40.2	54.40	54.33
220.00	2,617.34	5.29	41.6	55.18	55.11
230.00	2,617.36	5.35	43.0	55.94	55.87
240.00	2,617.39	5.42	44.3	56.69	56.62
250.00	2,617.41	5.48	45.6	57.41	57.34
260.00	2,617.43	5.54	47.0	58.12	58.05
270.00	2,617.46	5.59	48.3	58.82	58.74
280.00	2,617.48	5.65	49.6	59.50	59.42
290.00	2,617.50	5.70	50.8	60.17	60.09
300.00	2,617.52	5.76	52.1	60.82	60.74
310.00	2,617.54	5.81	53.4	61.46	61.38
320.00	2,617.56	5.86	54.6	62.09	62.01
330.00	2,617.58	5.91	55.9	62.71	62.63

IMPASSABLE

Table
Rating Table for Irregular Channel

TWILIGHT TRAIL

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
340.00	2,617.60	5.96	57.1	63.31	63.22
350.00	2,617.62	6.01	58.3	63.79	63.70
360.00	2,617.64	6.06	59.4	64.26	64.17
370.00	2,617.66	6.11	60.6	64.72	64.63
380.00	2,617.67	6.16	61.7	65.18	65.09
390.00	2,617.69	6.20	62.9	65.63	65.54
400.00	2,617.71	6.25	64.0	66.08	65.98
410.00	2,617.73	6.29	65.1	66.52	66.42
420.00	2,617.74	6.34	66.3	66.95	66.86
430.00	2,617.76	6.38	67.4	67.38	67.28
440.00	2,617.78	6.42	68.5	67.80	67.70
450.00	2,617.79	6.47	69.6	68.22	68.12
460.00	2,617.81	6.51	70.7	68.64	68.53
470.00	2,617.82	6.55	71.8	69.04	68.94
480.00	2,617.84	6.59	72.8	69.45	69.34
490.00	2,617.86	6.63	73.9	69.85	69.74
500.00	2,617.87	6.67	75.0	70.24	70.14
510.00	2,617.89	6.71	76.1	70.63	70.52
520.00	2,617.90	6.74	77.1	71.02	70.91
530.00	2,617.92	6.78	78.2	71.40	71.29
540.00	2,617.93	6.82	79.2	71.78	71.67
550.00	2,617.94	6.85	80.3	72.16	72.04
560.00	2,617.96	6.89	81.3	72.53	72.41
570.00	2,617.97	6.92	82.3	72.90	72.78
580.00	2,617.99	6.96	83.4	73.26	73.14
590.00	2,618.00	6.99	84.4	73.63	73.51
600.00	2,618.02	7.02	85.4	74.03	73.91

Curve
Plotted Curves for Irregular Channel

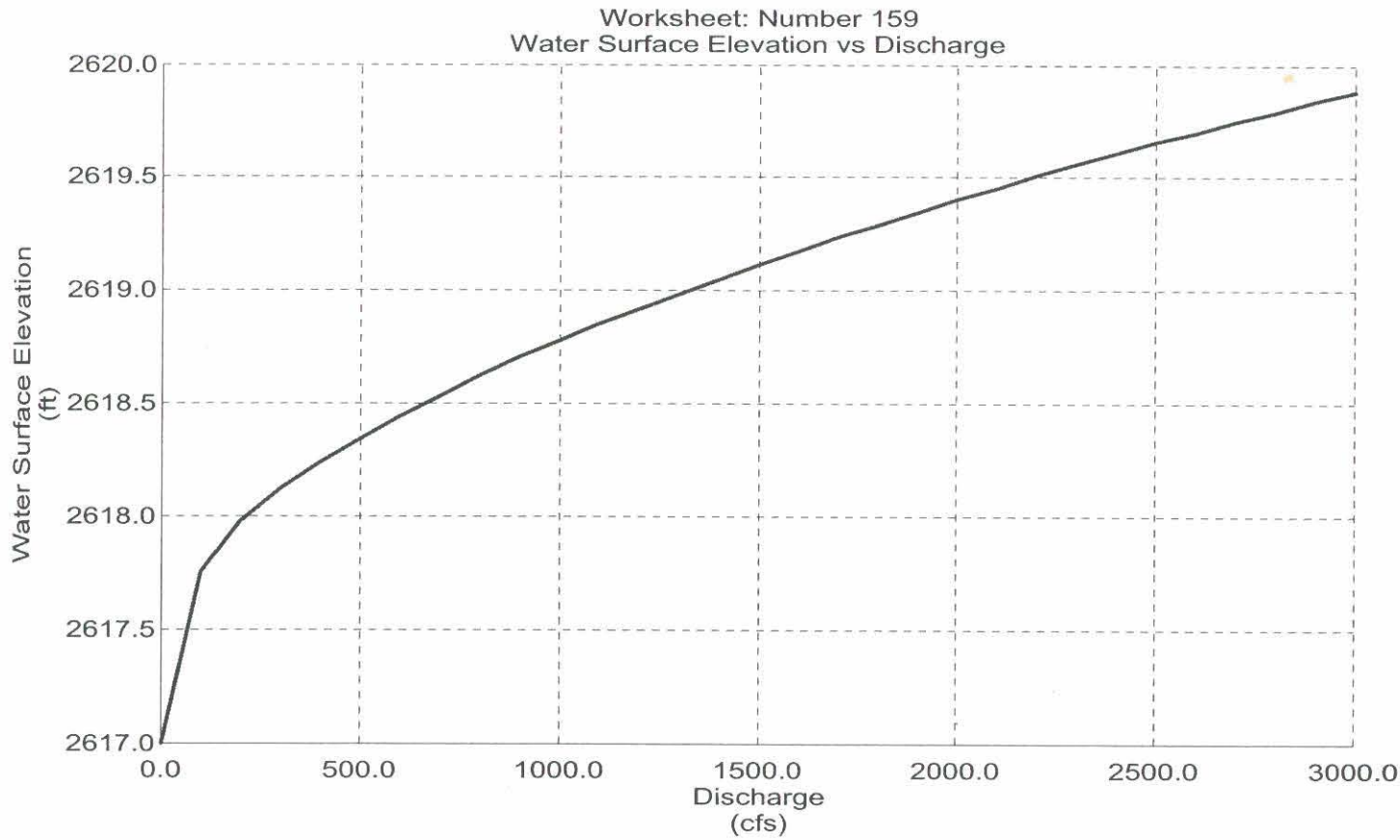
TWILIGHT TRAIL

Project Description	
Worksheet	Number 159
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data	
Slope	010000 ft/ft

Options	
Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	3,000.00	100.00



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CH2M Hill
37 Brookside Road Waterbury, CT 06708 USA (203) 755-1666
Project Engineer: Robert Lyons

Curve
Plotted Curves for Irregular Channel

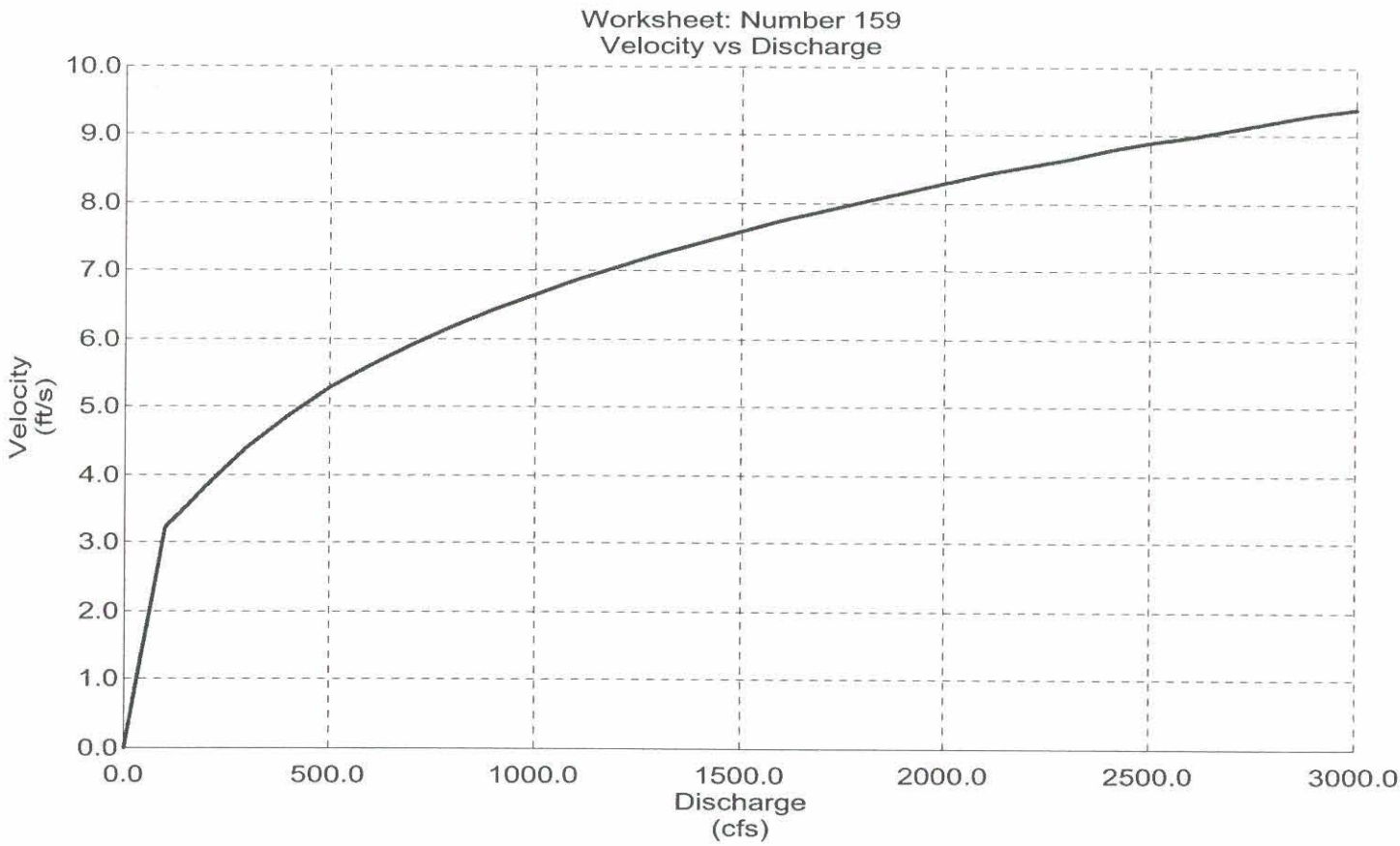
TWILIGHT TRAIL

Project Description	
Worksheet	Number 159
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data	
Slope	010000 ft/ft

Options	
Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	3,000.00	100.00



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Worksheet
Worksheet for Irregular Channel

TWILIGHT TRAIL

Project Description	
Worksheet	Number 159
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data		
Slope	010000	ft/ft
Discharg	,056.00	cfs

Options	
Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Results		
Mannings Coefficie	0.024	
Water Surface Elev	2,618.82	ft
Elevation Range	17.00 to 2,624.00	
Flow Area	156.1	ft²
Wetted Perimeter	136.73	ft
Top Width	136.65	ft
Actual Depth	1.82	ft
Critical Elevation	2,618.91	ft
Critical Slope	0.007881	ft/ft
Velocity	6.76	ft/s
Velocity Head	0.71	ft
Specific Energy	2,619.53	ft
Froude Number	1.12	
Flow Type	Supercritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00	3+65	0.024

Natural Channel Points

Station (ft)	Elevation (ft)
0+00	2,624.00
0+25	2,622.00
0+45	2,620.00
0+65	2,618.00
1+20	2,617.00
1+75	2,618.00
2+20	2,620.00
2+90	2,622.00
3+65	2,624.00

NS 100 YR, 6 HR
FUTURE

Twilight Trail

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN  1998                *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   27NOV02  TIME  08:52:05   *
*                                       *
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****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*           (916) 756-1104             *
*                                      *
****************************************
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X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X                X
XXXXXXX  XXXX     X        XXXXX   X
X     X  X        X                X
X     X  X        X     X          X
X     X  XXXXXXX   XXXXX          XXX
```

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

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


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

   1          ID   Project ID: 01131.12 - Major Basin: NS - Return Period: 100 Years
   2          ID
   3          ID   NORTH SCOTTSDALE 100-YR FLOODPLAIN DELINEATION STUDY
   4          ID   MAY 2002
   5          ID
   6          ID   FILE NAME:  NS.DAT
   7          ID   THIS MODEL REPRESENTS THE FUTURE LAND USE CONDITIONS OF THE WATERSHEDS.
   8          ID   THE TOTAL DRAINAGE AREA FOR THE ENTIRE STUDY IS 11.2 SQUARE MILES.
   9          ID
  10          ID   100-YEAR, 6-HOUR FREQUENCY
  11          ID
  12          ID   METHODOLOGY:
  13          ID   THE US CORPS OF ENGINEERS FLOOD HYROLOGY MODEL HEC-1, DATED JUNE 1998,
  14          ID   VERSION 4.1
  15          ID   MULTIPLE STORMS
  16          ID   CLARK UNIT HYDROGRAPH
  17          ID   GREEN AMPT LOSS METHOD
  18          ID   NORMAL DEPTH BASIN AND REACH ROUTING METHOD
  19          ID
  20          ID   LAND USES PER CITY OF SCOTTSDALE PROVIDED GIS
  21          ID
  22          ID   PROJECT WASHES INCLUDE: STAGE COACH PASS (SCP)
  23          ID                           UPPER BOULDERS WASH (UB)
  24          ID                           FAN 6C (F6C)
  25          ID                           FAN 6A NORTH (F6AN)
  26          ID                           FAN 6A SOULTH (F6AS)
  27          ID                           FAN 6A (F6A)
  28          ID                           UPPER FAN 5 (UF5)
  29          ID
  30          ID   PROJECT SUB-BASINS DESIGNATED AS SUB-BASIN NAME ABREVIATION FOLLOWED BY BASIN
  31          ID   NUMBER.  I.E. STAGE COACH PASS SUB-BASIN 14 IS DESIGNATED AS SCP-14.
  32          ID
  33          ID   PROJECT CONCENTRATION POINTS DESIGNATED AS C FOLLOWED BY SUB-BASIN NAME AND
  34          ID   CONCENTRATION POINT NUMBER.  CONCENTRATION POINT NUMBER IS CHOOSEN BY THE SUB
  35          ID   BASIN THE CONCENTRATION POINT IS LOCATED IN.  I.E.  CONCENTRATION POINT IN
  36          ID   SUB-BASIN 06 OF UPPER BOULDERS WASH IS DESIGNATED AS CUB06.
  37          ID
  38          ID   PROJECT ROUTES ARE DESIGNATED AS R FOLLOWED BY SUB-BASIN NAME AND ROUTE
  39          ID   NUMBER. ROUTE NUMBER IS CHOOSEN BY THE SUB-BASIN IN WHICH THE ROUTE BEGINS.
  40          ID   IE A ROUTE FROM SUB-BASIN 4 IN FAN 6C IS DESIGNATED AS RF6C4.
  41          ID
  42          ID
  43          ID
  44          ID
  45          IT       1                    2000
  46          IO       5       2
  47          IN      15
  48          JD    3.50    0.01
  49          PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
  50          PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
  51          PC   0.962   0.972   0.983   0.991   1.000
  52          JD   3.477    0.50
  53          JD   3.412    2.80
  54          PC   0.000   0.009   0.016   0.025   0.034   0.042   0.051   0.059   0.067   0.076
  55          PC   0.087   0.100   0.120   0.163   0.252   0.451   0.694   0.837   0.900   0.938
```

Twilight Trail

1

STATION CSCP08

(O) OUTFLOW

DAHRMN	PER	0.	100.	200.	300.	400.	500.	600.	700.	800.	900.	0.	0.	0.
10000	10													
10001	20													
10002	30													
10003	40													
10004	50													
10005	60													
10006	70													
10007	80													
10008	90													
10009	100													
10010	110													
10011	120													
10012	130													
10013	140													
10014	150													
10015	160													
10016	170													
10017	180													
10018	190													
10019	200													
10020	210													
10021	220													
10022	230													
10023	240													
10024	250													
10025	260													
10026	270													
10027	280													
10028	290													
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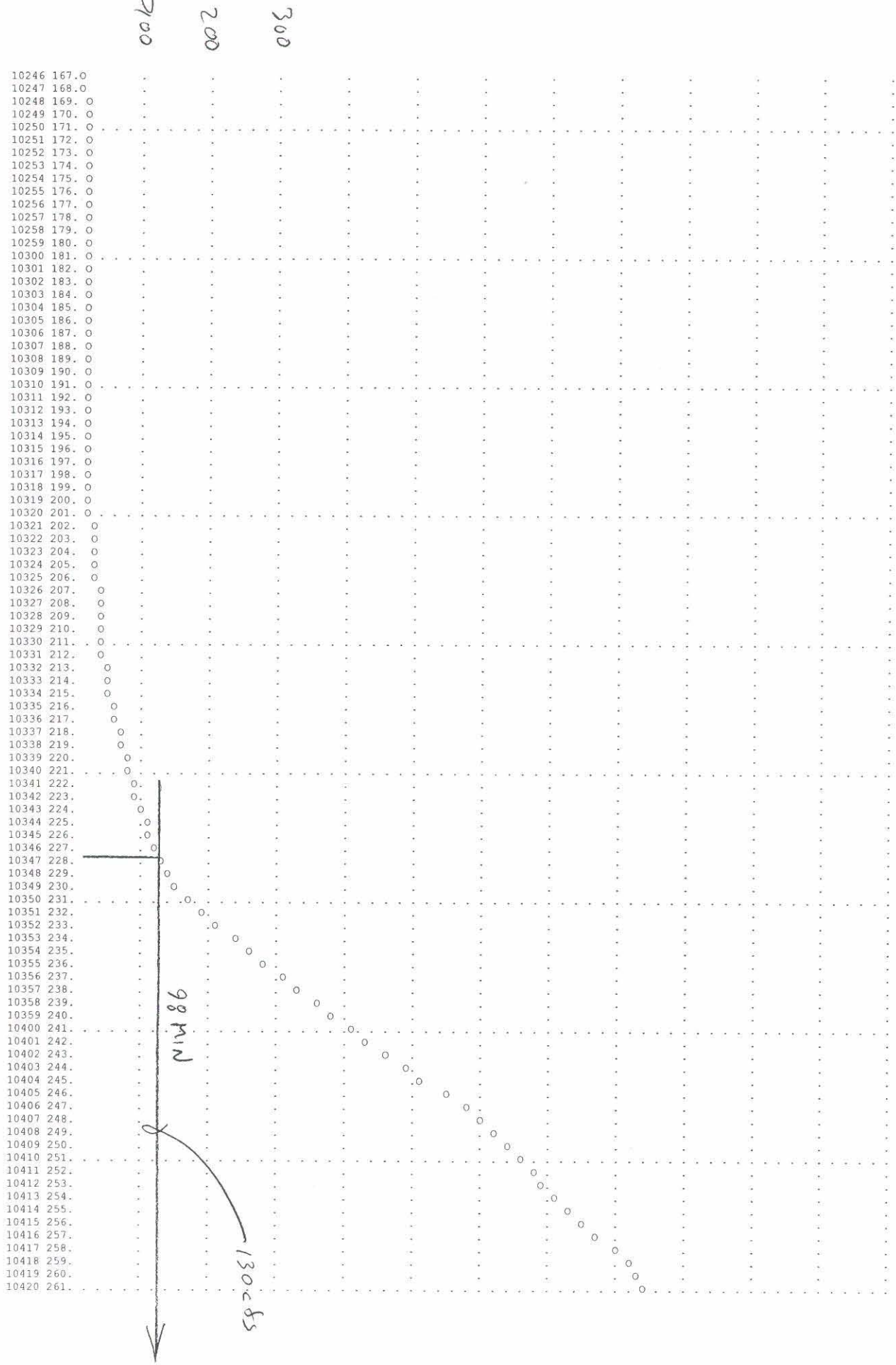
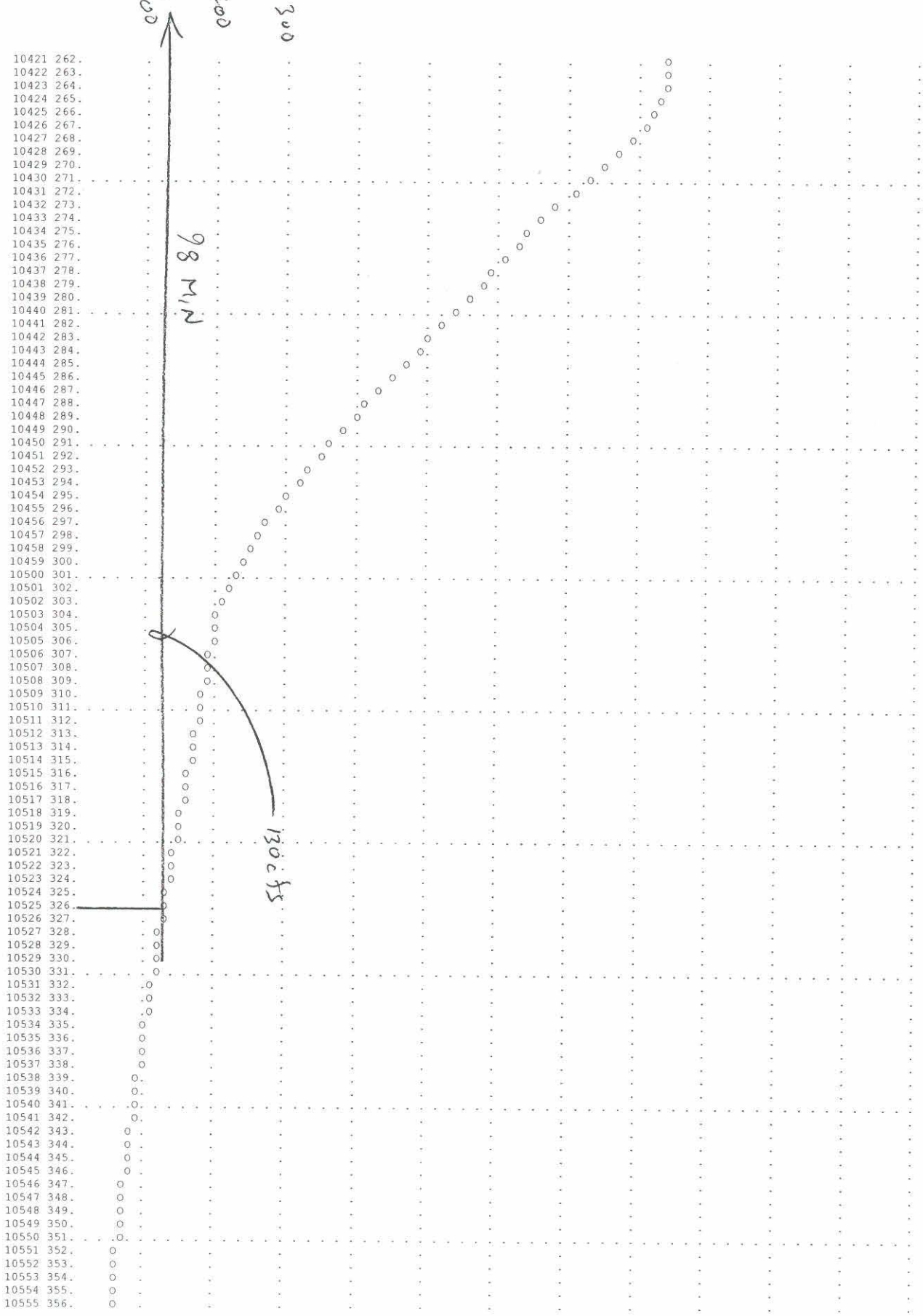
10102	63.0													
10103	64.0													
10104	65.0													
10105	66.0													
10106	67.0													
10107	68.0													
10108	69.0													
10109	70.0													
10110	71.0													

TWILIGHT TRAIL



TWILIGHT TRAIL



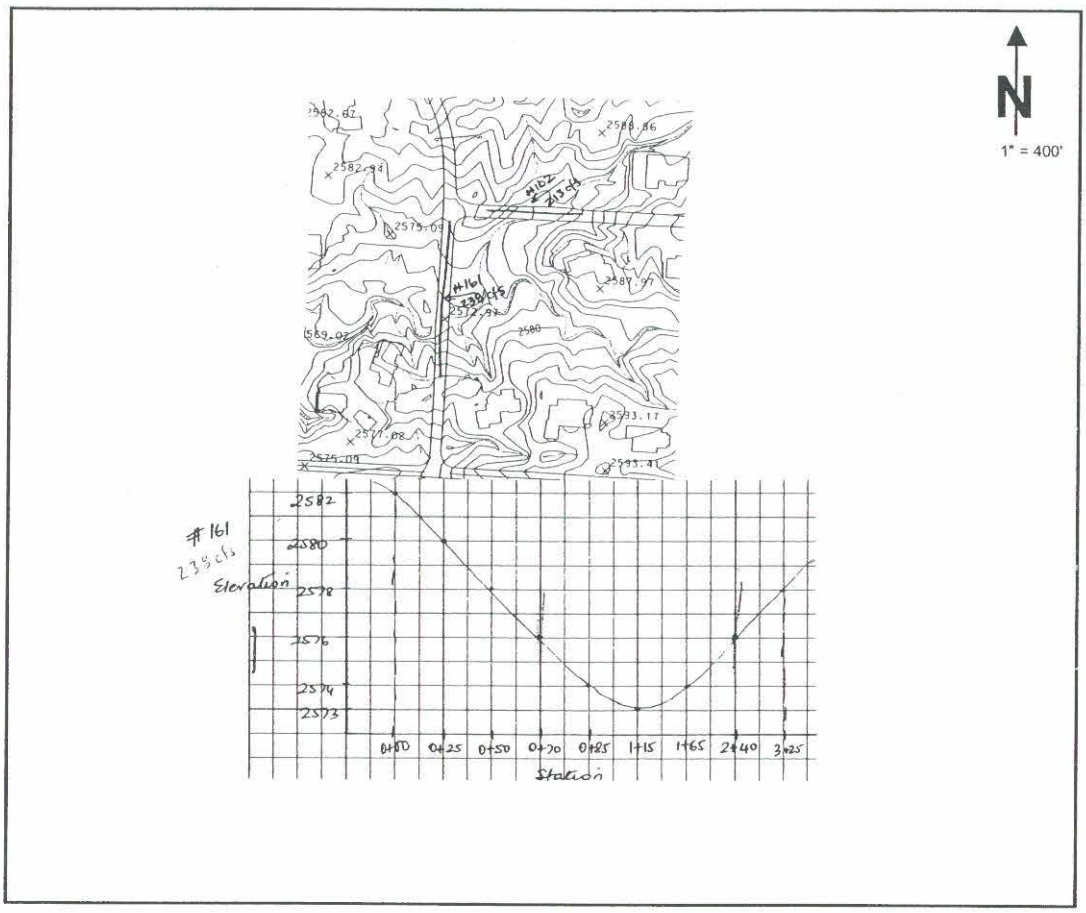
Placid Place (#161)

Carefree Drainage Master Plan
Dip Crossing Notes

ID Number: 161

Source of Data: Topo

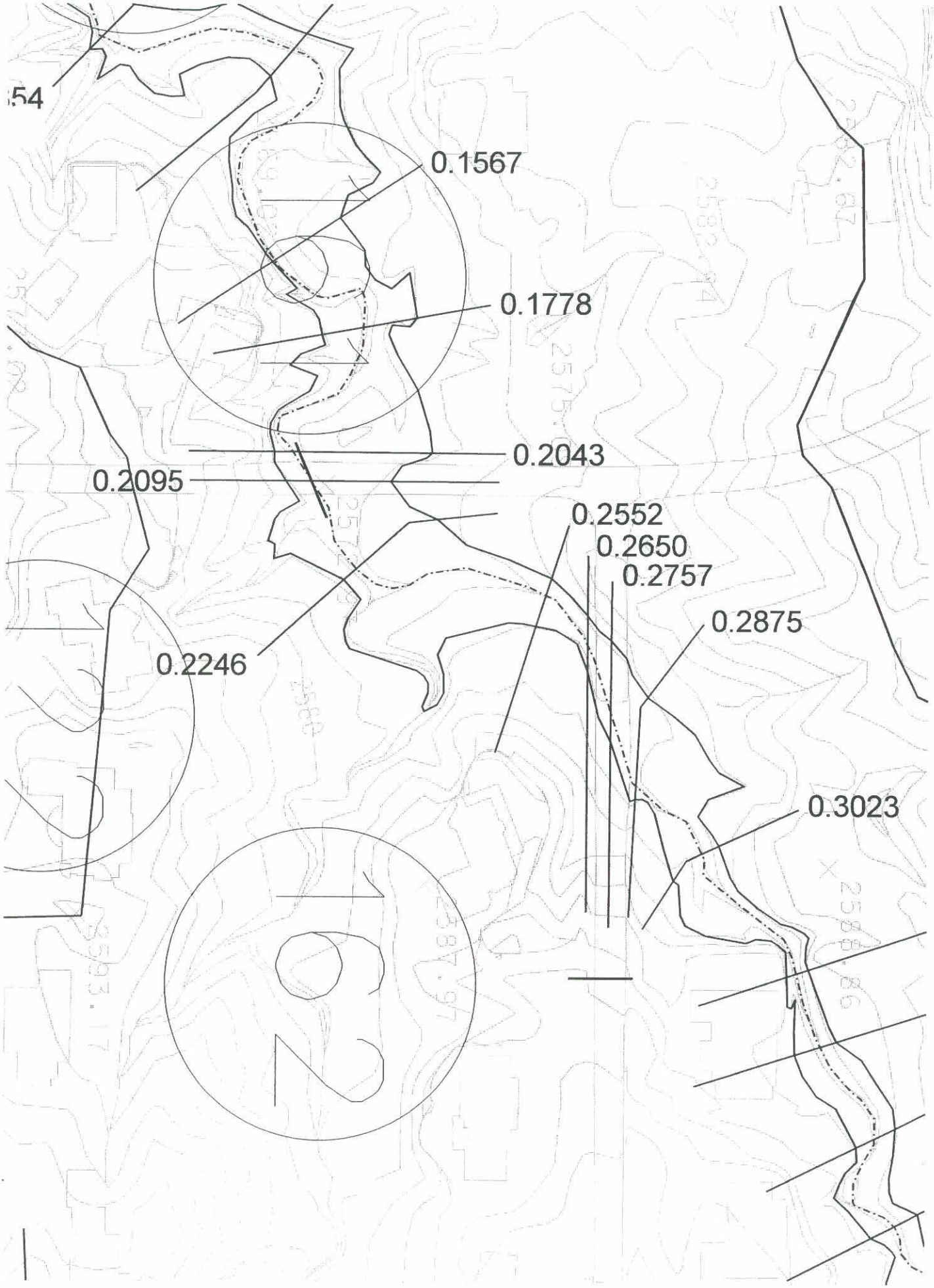
Location: Placid Place



Material: Dip Crossing

Protection:

Notes: Part of Floodplain Delineation Study - Eastern Pima Wash

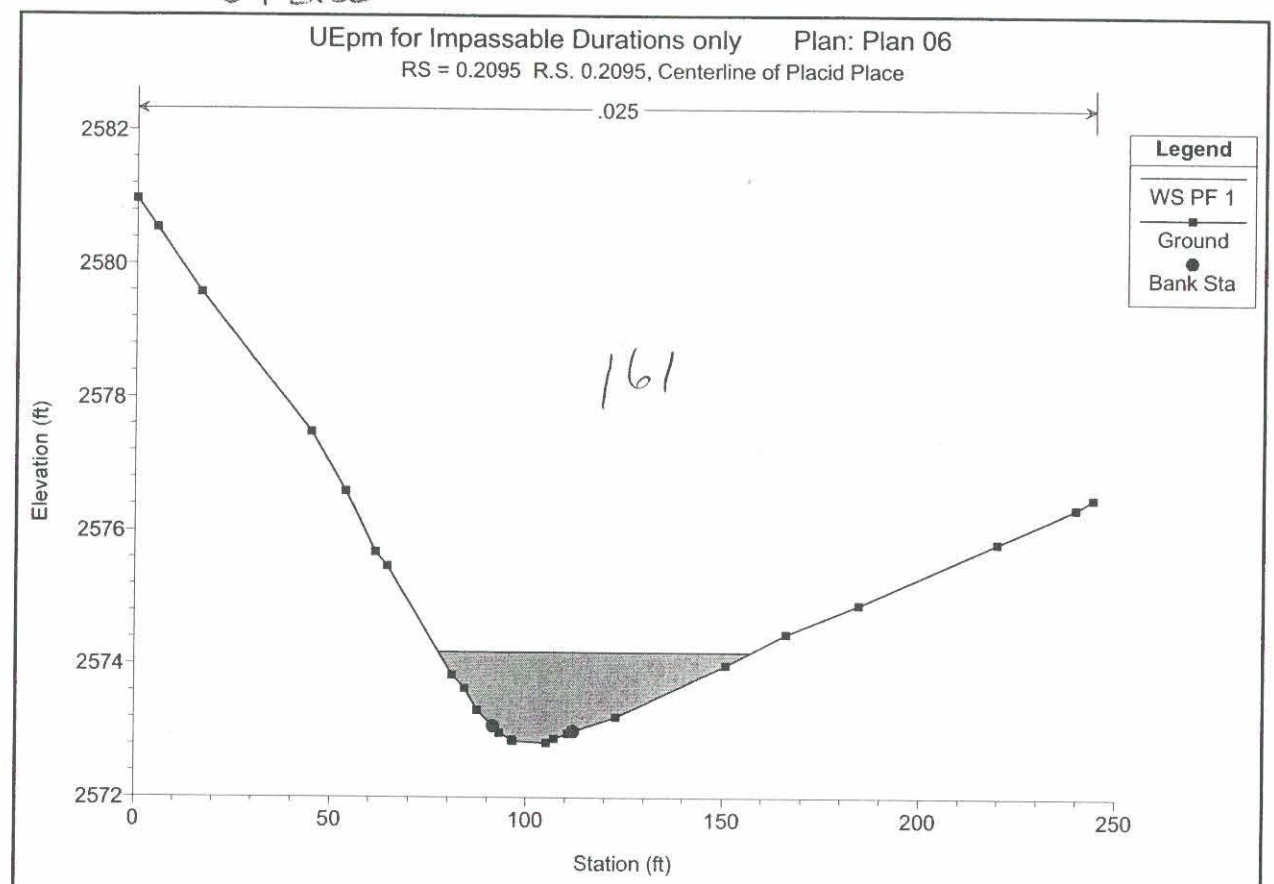


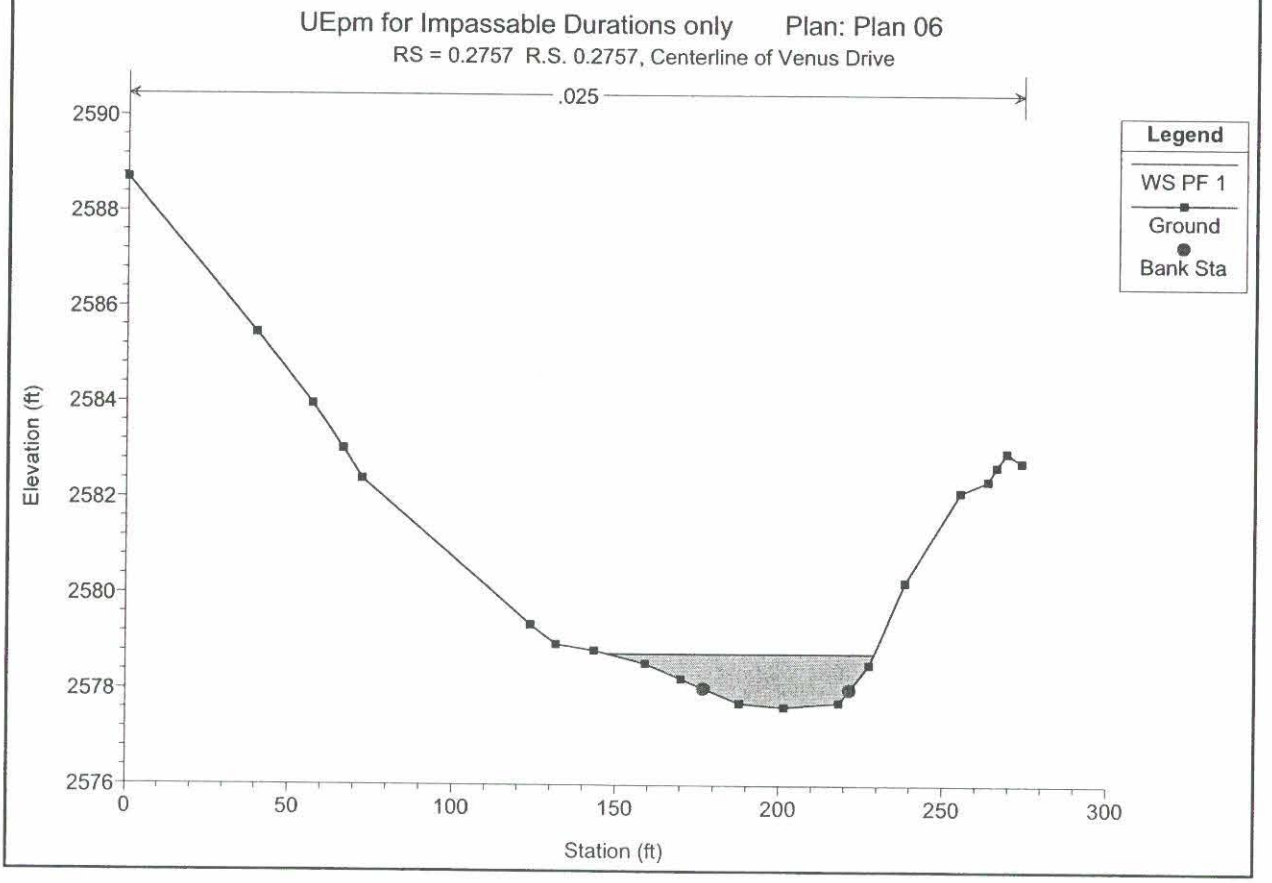
PLACID PLACE

—N→

SCALE 1" = 100'

PLACID PLACE





PLACID PLACE

Plan: Plan 01 Unnamed Eastern Pima RS: 0.2095 Profile: PF 1

E.G. Elev (ft)	2574.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.40	Wt. n-Val.	0.025	0.025	0.025
W.S. Elev (ft)	2574.18	Reach Len. (ft)	27.45	27.45	27.45
Crit W.S. (ft)	2574.18	Flow Area (sq ft)	8.27	26.39	28.53
E.G. Slope (ft/ft)	0.007315	Area (sq ft)	8.27	26.39	28.53
Q Total (cfs)	295.00	Flow (cfs)	29.55	158.70	106.75
Top Width (ft)	79.65	Top Width (ft)	14.00	20.50	45.15
Vel Total (ft/s)	4.67	Avg. Vel. (ft/s)	3.57	6.01	3.74
Max Chl Dpth (ft)	1.35	Hydr. Depth (ft)	0.59	1.29	0.63
Conv. Total (cfs)	3449.3	Conv. (cfs)	345.6	1855.6	1248.2
Length Wtd. (ft)	27.45	Wetted Per. (ft)	14.05	20.51	45.16
Min Ch El (ft)	2572.82	Shear (lb/sq ft)	0.27	0.59	0.29
Alpha	1.18	Stream Power (lb/ft s)	0.96	3.53	1.08
Frctn Loss (ft)	0.23	Cum Volume (acre-ft)	0.47	0.63	0.59
C & E Loss (ft)	0.09	Cum SA (acres)	0.53	0.30	0.74

PLACID PLACE

Plan: Plan 01 Unnamed Eastern Pima RS: 0.2095 Profile: PF 3

E.G. Elev (ft)	2574.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.30	Wt. n-Val.	0.025	0.025	0.025
W.S. Elev (ft)	2573.81	Reach Len. (ft)	27.45	27.45	27.45
Crit W.S. (ft)	2573.81	Flow Area (sq ft)	3.87	18.97	14.37
E.G. Slope (ft/ft)	0.007939	Area (sq ft)	3.87	18.97	14.37
Q Total (cfs)	150.00	Flow (cfs)	10.70	95.38	43.92
Top Width (ft)	63.50	Top Width (ft)	10.23	20.50	32.77
Vel Total (ft/s)	4.03	Avg. Vel. (ft/s)	2.76	5.03	3.06
Max Chl Dpth (ft)	0.99	Hydr. Depth (ft)	0.38	0.93	0.44
Conv. Total (cfs)	1683.5	Conv. (cfs)	120.1	1070.6	492.9
Length Wtd. (ft)	27.45	Wetted Per. (ft)	10.26	20.51	32.78
Min Ch El (ft)	2572.82	Shear (lb/sq ft)	0.19	0.46	0.22
Alpha	1.19	Stream Power (lb/ft s)	0.52	2.31	0.66
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	0.17	0.48	0.47
C & E Loss (ft)	0.03	Cum SA (acres)	0.36	0.30	0.68

Curve
Plotted Curves for Irregular Channel

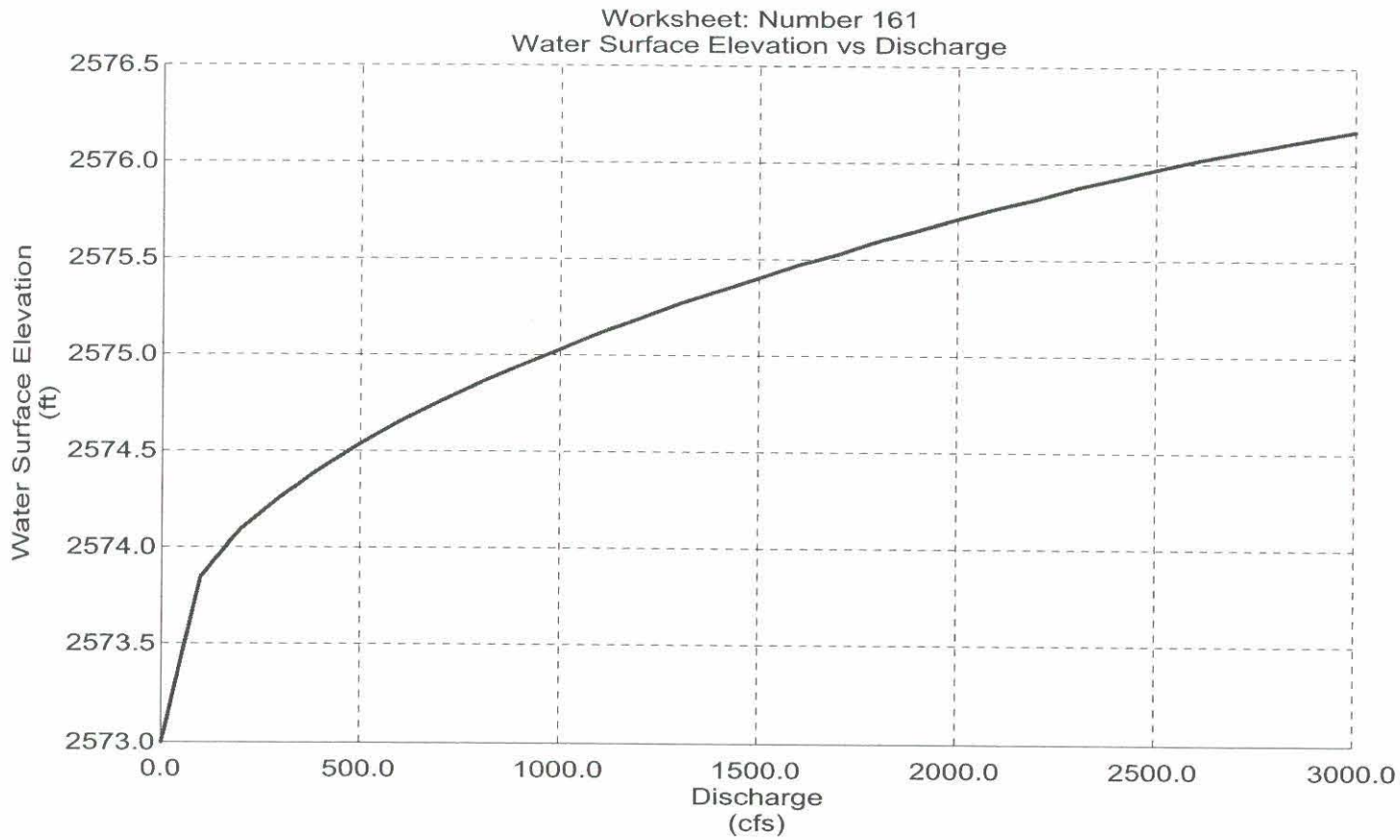
PLACID PLACE

Project Description	
Worksheet	Number 161
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data	
Slope	010000 ft/ft

Options	
Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	3,000.00	100.00



Curve
Plotted Curves for Irregular Channel

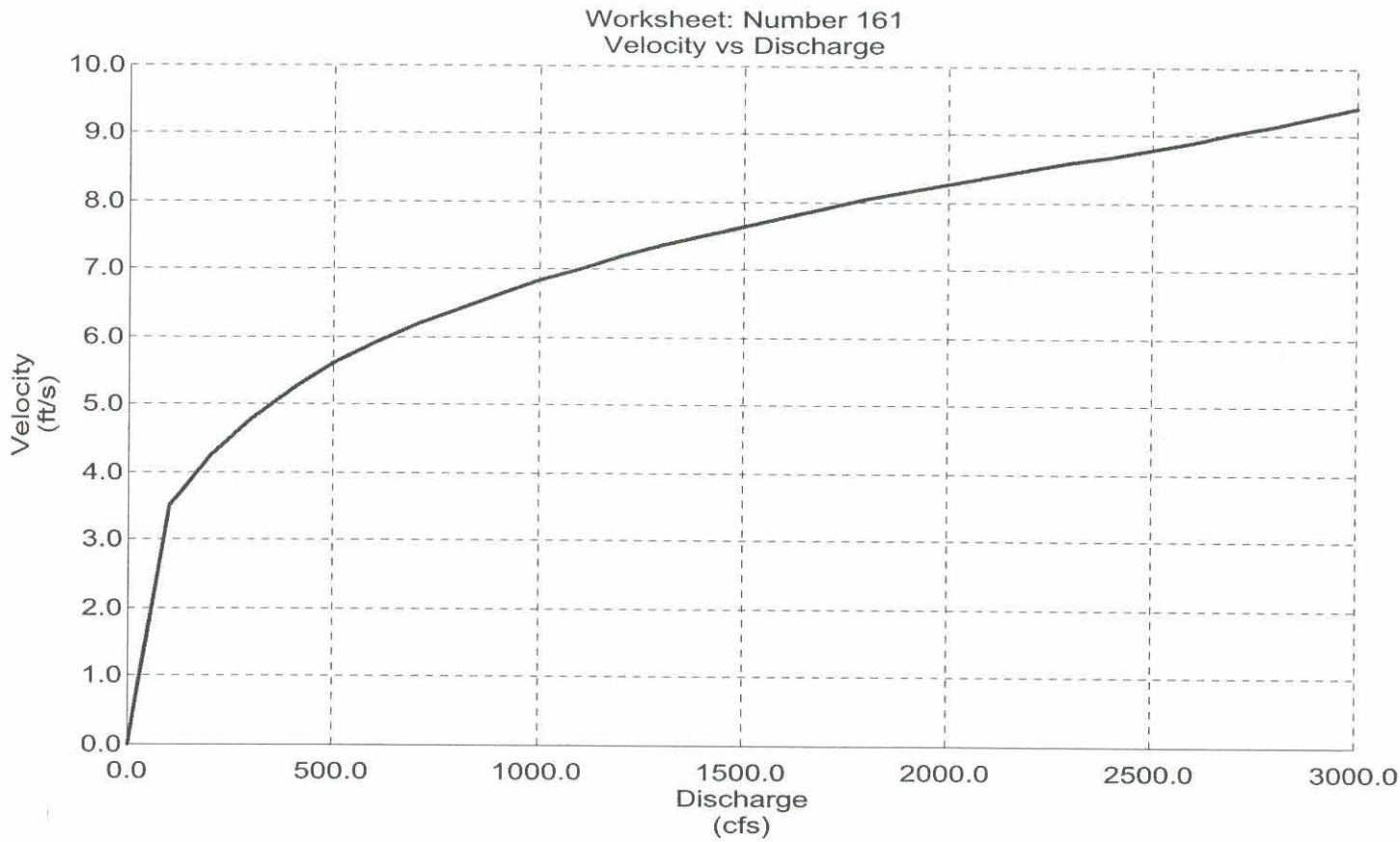
PLACID PLACE

Project Description	
Worksheet	Number 161
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data	
Slope	010000 ft/ft

Options	
Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	3,000.00	100.00



Worksheet
Worksheet for Irregular Channel

PLACID PLACE

Project Description	
Worksheet	Number 161
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data		
Slope	010000	ft/ft
Discharg	238.00	cfs

Options	
Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Results		
Mannings Coefficie	0.024	
Water Surface Elev	2,574.16	ft
Elevation Range	73.00 to 2,576.00	
Flow Area	53.3	ft²
Wetted Perimeter	87.23	ft
Top Width	87.19	ft
Actual Depth	1.16	ft
Critical Elevation	2,574.16	ft
Critical Slope	0.009883	ft/ft
Velocity	4.46	ft/s
Velocity Head	0.31	ft
Specific Energy	2,574.47	ft
Froude Number	1.01	
Flow Type	Supercritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+70	2+40	0.024

Natural Channel Points

Station (ft)	Elevation (ft)
0+70	2,576.00
0+85	2,574.00
1+15	2,573.00
1+65	2,574.00
2+40	2,576.00

NS 100 YR, 6 HR
FUTURE

PLACID PLACE

```
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN   1998              *
*            VERSION 4.1               *
*                                      *
*  RUN DATE   27NOV02  TIME  08:52:05  *
*                                      *
****************************************
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****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*           (916) 756-1104             *
*                                      *
****************************************
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X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX          XXX
```

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

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


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

   1          ID   Project ID: 01131.12 - Major Basin: NS - Return Period: 100 Years
   2          ID
   3          ID   NORTH SCOTTSDALE 100-YR FLOODPLAIN DELINEATION STUDY
   4          ID   MAY 2002
   5          ID
   6          ID   FILE NAME:  NS.DAT
   7          ID   THIS MODEL REPRESENTS THE FUTURE LAND USE CONDITIONS OF THE WATERSHEDS.
   8          ID   THE TOTAL DRAINAGE AREA FOR THE ENTIRE STUDY IS 11.2 SQUARE MILES.
   9          ID
  10          ID   100-YEAR, 6-HOUR FREQUENCY
  11          ID
  12          ID   METHODOLOGY:
  13          ID   THE US CORPS OF ENGINEERS FLOOD HYROLOGY MODEL HEC-1, DATED JUNE 1998,
  14          ID   VERSION 4.1
  15          ID   MULTIPLE STORMS
  16          ID   CLARK UNIT HYDROGRAPH
  17          ID   GREEN AMPT LOSS METHOD
  18          ID   NORMAL DEPTH BASIN AND REACH ROUTING METHOD
  19          ID
  20          ID   LAND USES PER CITY OF SCOTTSDALE PROVIDED GIS
  21          ID
  22          ID   PROJECT WASHES INCLUDE: STAGE COACH PASS (SCP)
  23          ID                           UPPER BOULDERS WASH (UB)
  24          ID                           FAN 6C (F6C)
  25          ID                           FAN 6A NORTH (F6AN)
  26          ID                           FAN 6A SOULTH (F6AS)
  27          ID                           FAN 6A (F6A)
  28          ID                           UPPER FAN 5 (UF5)
  29          ID
  30          ID   PROJECT SUB-BASINS DESIGNATED AS SUB-BASIN NAME ABREVIATION FOLLOWED BY BASIN
  31          ID   NUMBER.  I.E. STAGE COACH PASS SUB-BASIN 14 IS DESIGNATED AS SCP-14.
  32          ID
  33          ID   PROJECT CONCENTRATION POINTS DESIGNATED AS C FOLLOWED BY SUB-BASIN NAME AND
  34          ID   CONCENTRATION POINT NUMBER.  CONCENTRATION POINT NUMBER IS CHOOSEN BY THE SUB
  35          ID   BASIN THE CONCENTRATION POINT IS LOCATED IN.  I.E.  CONCENTRATION POINT IN
  36          ID   SUB-BASIN 06 OF UPPER BOULDERS WASH IS DESIGNATED AS CUB06.
  37          ID
  38          ID   PROJECT ROUTES ARE DESIGNATED AS R FOLLOWED BY SUB-BASIN NAME AND ROUTE
  39          ID   NUMBER. ROUTE NUMBER IS CHOOSEN BY THE SUB-BASIN IN WHICH THE ROUTE BEGINS.
  40          ID   IE A ROUTE FROM SUB-BASIN 4 IN FAN 6C IS DESIGNATED AS RF6C4.
  41          ID
  42          ID
  43          ID
  44          ID
  45          IT       1                    2000
  46          IO       5       2
  47          IN      15
  48          JD    3.50    0.01
  49          PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
  50          PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
  51          PC   0.962   0.972   0.983   0.991   1.000
  52          JD   3.477    0.50
  53          JD   3.412    2.80
  54          PC   0.000   0.009   0.016   0.025   0.034   0.042   0.051   0.059   0.067   0.076
  55          PC   0.087   0.100   0.120   0.163   0.252   0.451   0.694   0.837   0.900   0.938
```

Placid Place

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  2091819990         .         .         .         .         .         .         .         .         .         .         .         .
  2091920000---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
1
1                                                                 STATION   SSCP4B

                         (O) OUTFLOW
             0.        40.       80.       120.      160.      200.      240.      280.      320.      360.        0.        0.        0.
 DAHRMN PER
  10000   10---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
  10001   20         .         .         .         .         .         .         .         .         .         .         .         .
  10002   30         .         .         .         .         .         .         .         .         .         .         .         .
  10003   40         .         .         .         .         .         .         .         .         .         .         .         .
  10004   50         .         .         .         .         .         .         .         .         .         .         .         .
  10005   60         .         .         .         .         .         .         .         .         .         .         .         .
  10006   70         .         .         .         .         .         .         .         .         .         .         .         .
  10007   80         .         .         .         .         .         .         .         .         .         .         .         .
  10008   90         .         .         .         .         .         .         .         .         .         .         .         .
  10009  100         .         .         .         .         .         .         .         .         .         .         .         .
  10010  110 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10011  120         .         .         .         .         .         .         .         .         .         .         .         .
  10012  130         .         .         .         .         .         .         .         .         .         .         .         .
  10013  140         .         .         .         .         .         .         .         .         .         .         .         .
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  10015  16.O        .         .         .         .         .         .         .         .         .         .         .         .
  10016  17.O        .         .         .         .         .         .         .         .         .         .         .         .
  10017  18.O        .         .         .         .         .         .         .         .         .         .         .         .
  10018  19.O        .         .         .         .         .         .         .         .         .         .         .         .
  10019  20.O        .         .         .         .         .         .         .         .         .         .         .         .
  10020  21.O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10021  22.O        .         .         .         .         .         .         .         .         .         .         .         .
  10022  23.O        .         .         .         .         .         .         .         .         .         .         .         .
  10023  24.O        .         .         .         .         .         .         .         .         .         .         .         .
  10024  25.O        .         .         .         .         .         .         .         .         .         .         .         .
  10025  26.O        .         .         .         .         .         .         .         .         .         .         .         .
  10026  27.O        .         .         .         .         .         .         .         .         .         .         .         .
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  10032  33.O        .         .         .         .         .         .         .         .         .         .         .         .
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  10042  43.O        .         .         .         .         .         .         .         .         .         .         .         .
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  10057  58.O        .         .         .         .         .         .         .         .         .         .         .         .
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  10059  60.O        .         .         .         .         .         .         .         .         .         .         .         .
  10100  61.O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10101  62.O        .         .         .         .         .         .         .         .         .         .         .         .
  10102  63.O        .         .         .         .         .         .         .         .         .         .         .         .
  10103  64.O        .         .         .         .         .         .         .         .         .         .         .         .
  10104  65.O        .         .         .         .         .         .         .         .         .         .         .         .
  10105  66.O        .         .         .         .         .         .         .         .         .         .         .         .
  10106  67.O        .         .         .         .         .         .         .         .         .         .         .         .
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  10110  71.O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
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  10122  83.O        .         .         .         .         .         .         .         .         .         .         .         .
  10123  84.O        .         .         .         .         .         .         .         .         .         .         .         .
  10124  85.O        .         .         .         .         .         .         .         .         .         .         .         .
  10125  86.O        .         .         .         .         .         .         .         .         .         .         .         .
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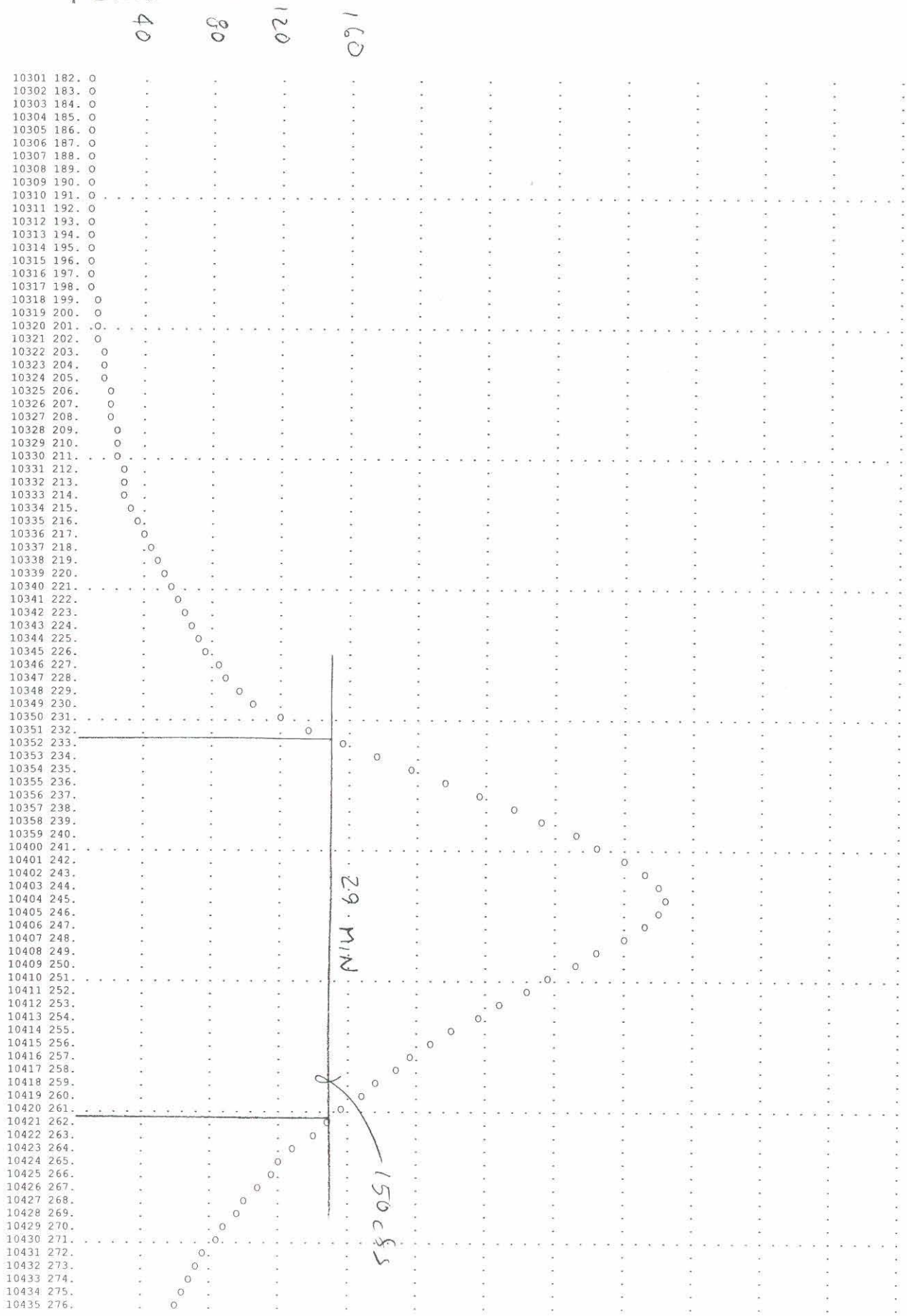
PLACID PLACE



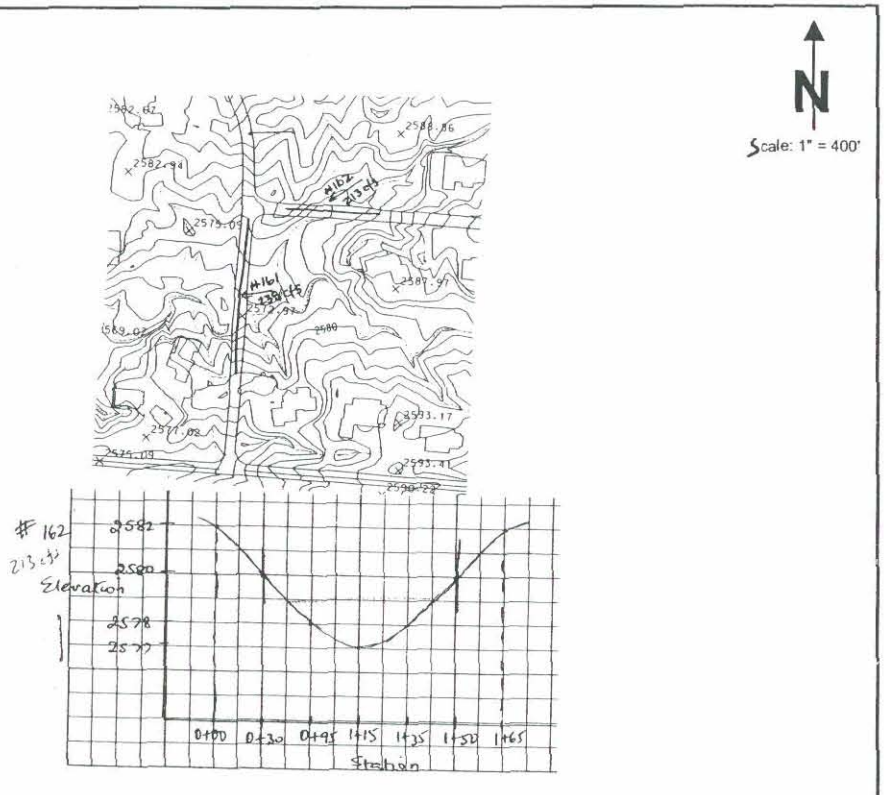
Venus Drive (#162)

Carefree Drainage Master Plan
Dip Crossing Notes

ID Number: 162

Source of Data: TOPO

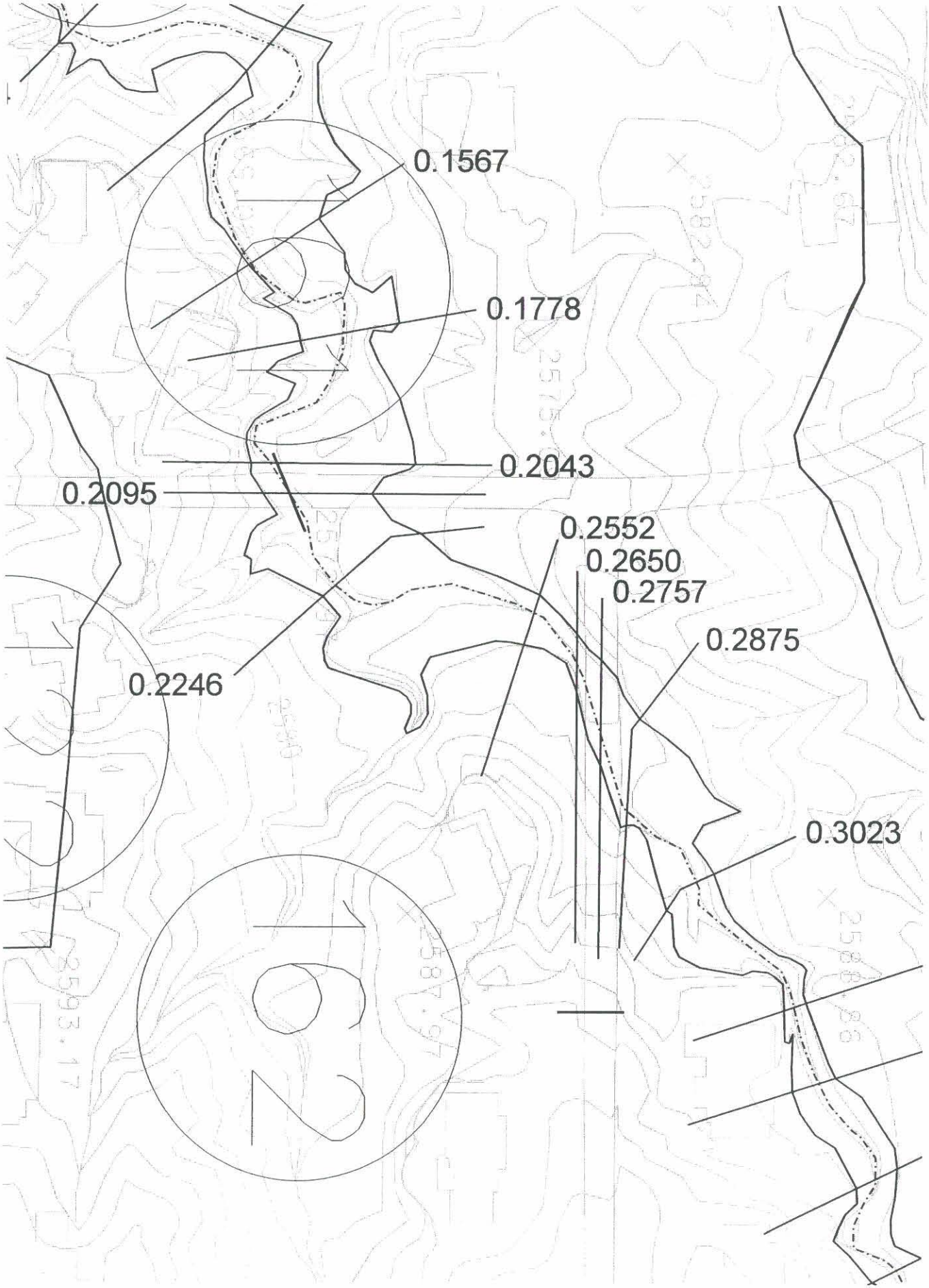
Location: Venus Drive



Material: Dip Crossing

Protection:

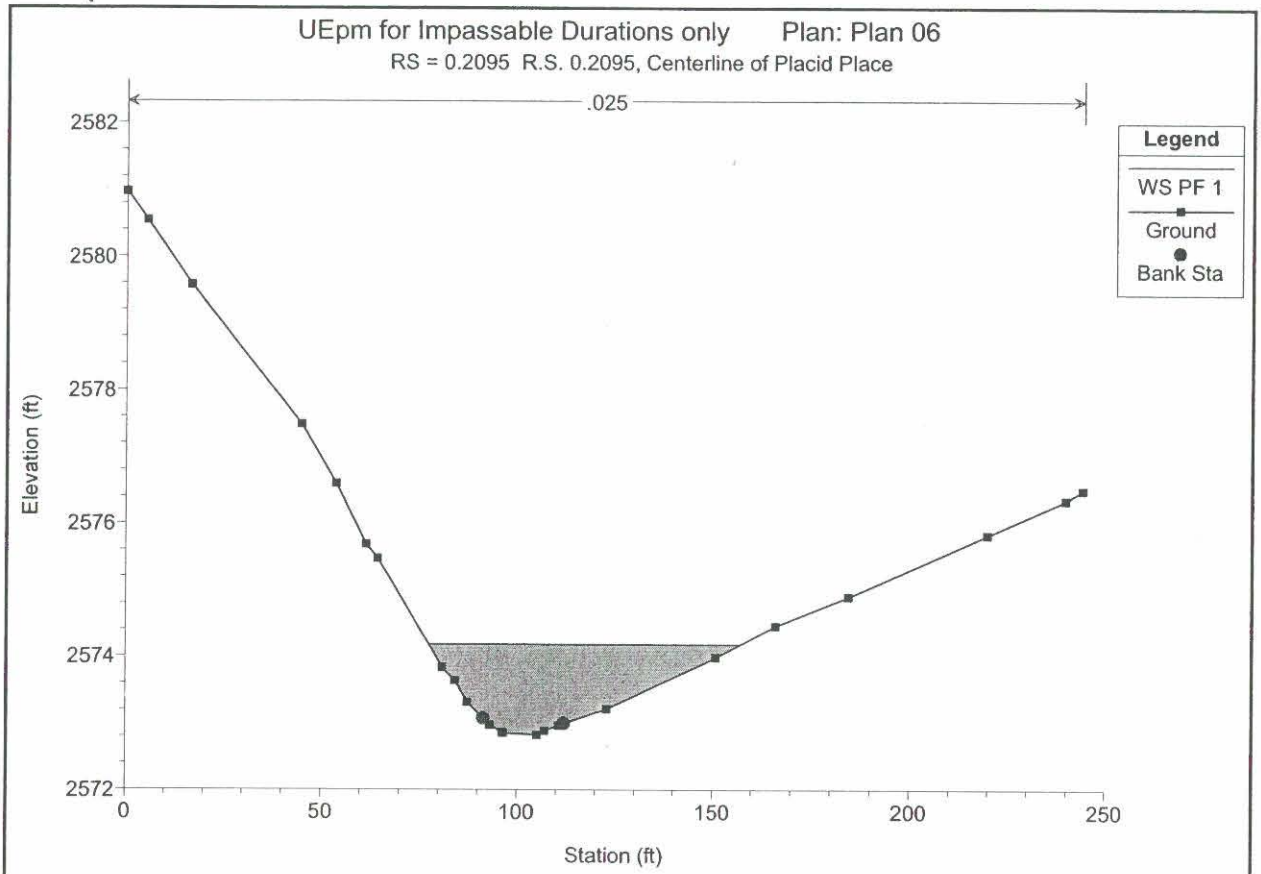
Notes: Part of floodplain Delineation Study - Eastern Pima Wash

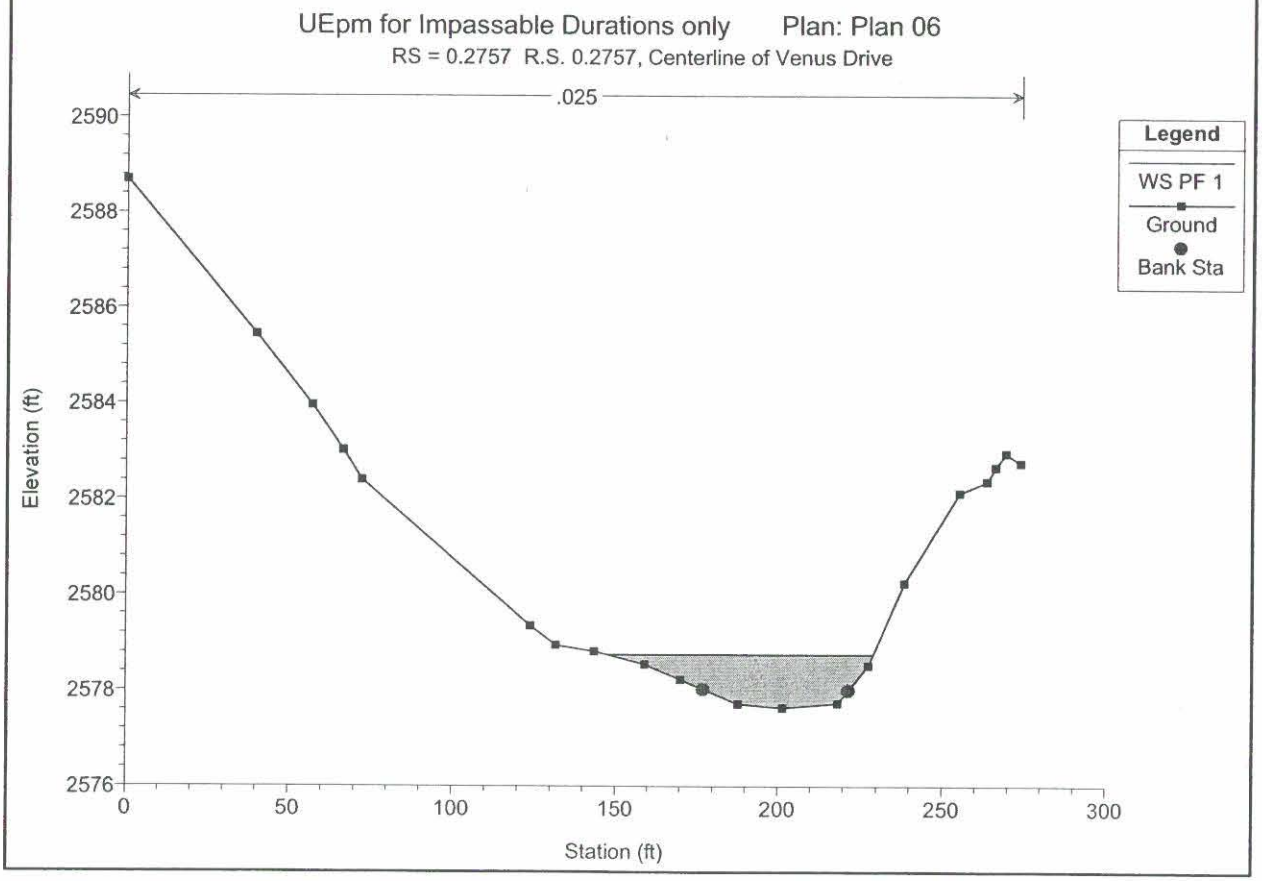


— N →

VENUS DRIVE SCALE 1" = 100'

VENUS DRIVE


UEpm for Impassable Durations only Plan: Plan 06
RS = 0.2095 R.S. 0.2095, Centerline of Placid Place
.025
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
2582
2580
2578
2576
2574
2572
0
50
100
150
200
250
Station (ft)


UEpm for Impassable Durations only Plan: Plan 06
RS = 0.2757 R.S. 0.2757, Centerline of Venus Drive
.025
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
2590
2588
2586
2584
2582
2580
2578
2576
0
50
100
150
200
250
300
Station (ft)

VENUS DRIVE

Plan: Plan 01 Unnamed Eastern Pima RS: 0.2757 Profile: PF 1

E.G. Elev (ft)	2578.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.	0.025	0.025	0.025
W.S. Elev (ft)	2578.76	Reach Len. (ft)	56.52	56.52	56.52
Crit W.S. (ft)		Flow Area (sq ft)	9.71	45.34	3.19
E.G. Slope (ft/ft)	0.001861	Area (sq ft)	9.71	45.34	3.19
Q Total (cfs)	134.00	Flow (cfs)	11.70	117.69	4.60
Top Width (ft)	82.15	Top Width (ft)	30.12	44.50	7.54
Vel Total (ft/s)	2.30	Avg. Vel. (ft/s)	1.21	2.60	1.44
Max Chl Dpth (ft)	1.12	Hydr. Depth (ft)	0.32	1.02	0.42
Conv. Total (cfs)	3106.1	Conv. (cfs)	271.3	2728.1	106.7
Length Wtd. (ft)	56.52	Wetted Per. (ft)	30.13	44.52	7.58
Min Ch El (ft)	2577.64	Shear (lb/sq ft)	0.04	0.12	0.05
Alpha	1.16	Stream Power (lb/ft s)	0.05	0.31	0.07
Frctn Loss (ft)	0.15	Cum Volume (acre-ft)	0.53	0.80	0.79
C & E Loss (ft)	0.01	Cum SA (acres)	0.66	0.41	1.02

VENUS DRIVE

Plan: Plan 01 Unnamed Eastern Pima RS: 0.2757 Profile: PF 2

E.G. Elev (ft)	2578.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.	0.025	0.025	0.025
W.S. Elev (ft)	2578.61	Reach Len. (ft)	56.52	56.52	56.52
Crit W.S. (ft)		Flow Area (sq ft)	5.89	38.78	2.15
E.G. Slope (ft/ft)	0.002268	Area (sq ft)	5.89	38.78	2.15
Q Total (cfs)	110.00	Flow (cfs)	7.01	100.11	2.88
Top Width (ft)	72.72	Top Width (ft)	21.62	44.50	6.60
Vel Total (ft/s)	2.35	Avg. Vel. (ft/s)	1.19	2.58	1.34
Max Chl Dpth (ft)	0.97	Hydr. Depth (ft)	0.27	0.87	0.33
Conv. Total (cfs)	2310.0	Conv. (cfs)	147.2	2102.3	60.4
Length Wtd. (ft)	56.52	Wetted Per. (ft)	21.63	44.52	6.63
Min Ch El (ft)	2577.64	Shear (lb/sq ft)	0.04	0.12	0.05
Alpha	1.12	Stream Power (lb/ft s)	0.05	0.32	0.06
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)	0.20	0.61	0.56
C & E Loss (ft)	0.01	Cum SA (acres)	0.45	0.41	0.89

Curve
Plotted Curves for Irregular Channel

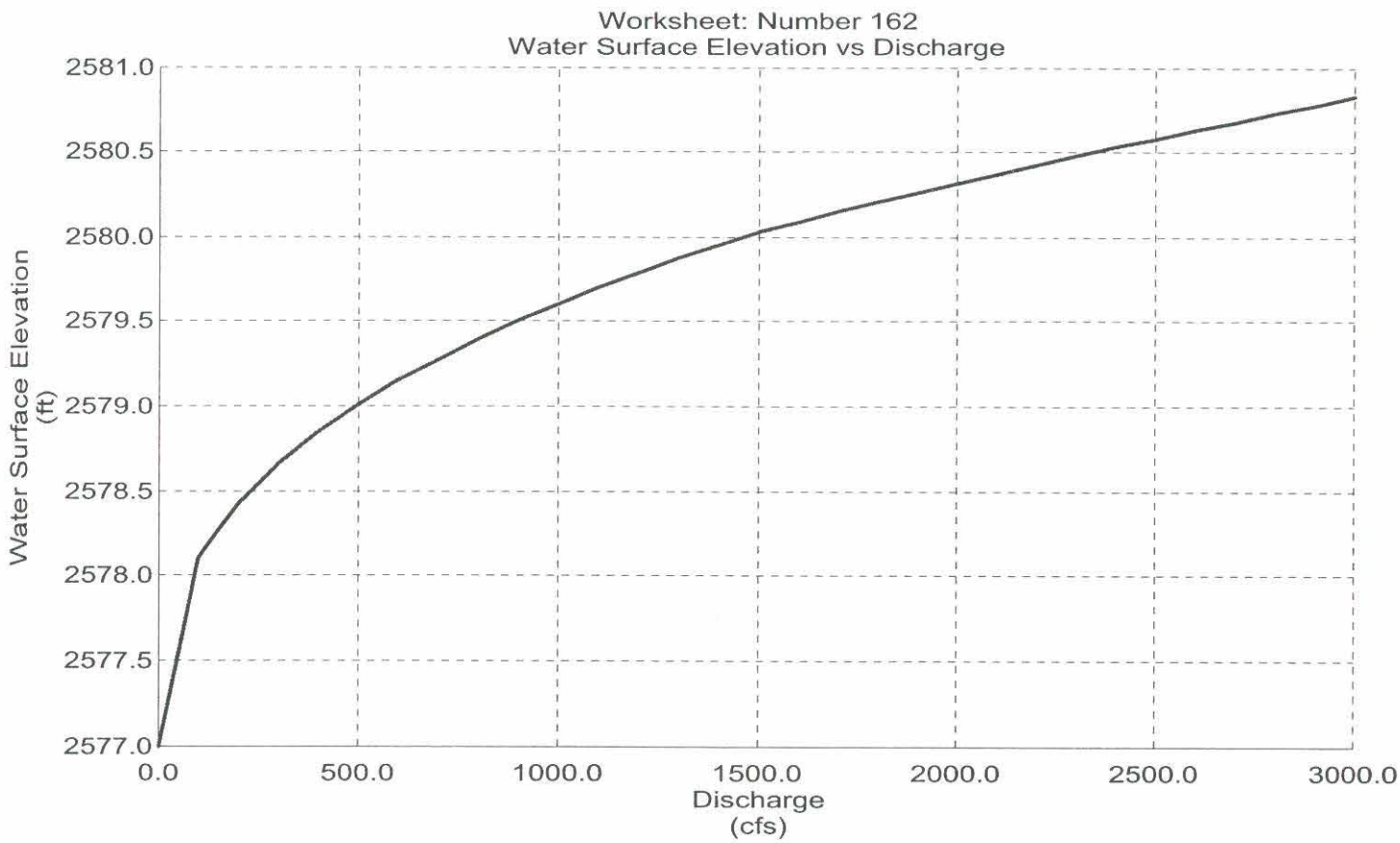
VENUS DRIVE

Project Description	
Worksheet	Number 162
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data	
Slope	010000 ft/ft

Options	
Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	3,000.00	100.00



Curve
Plotted Curves for Irregular Channel

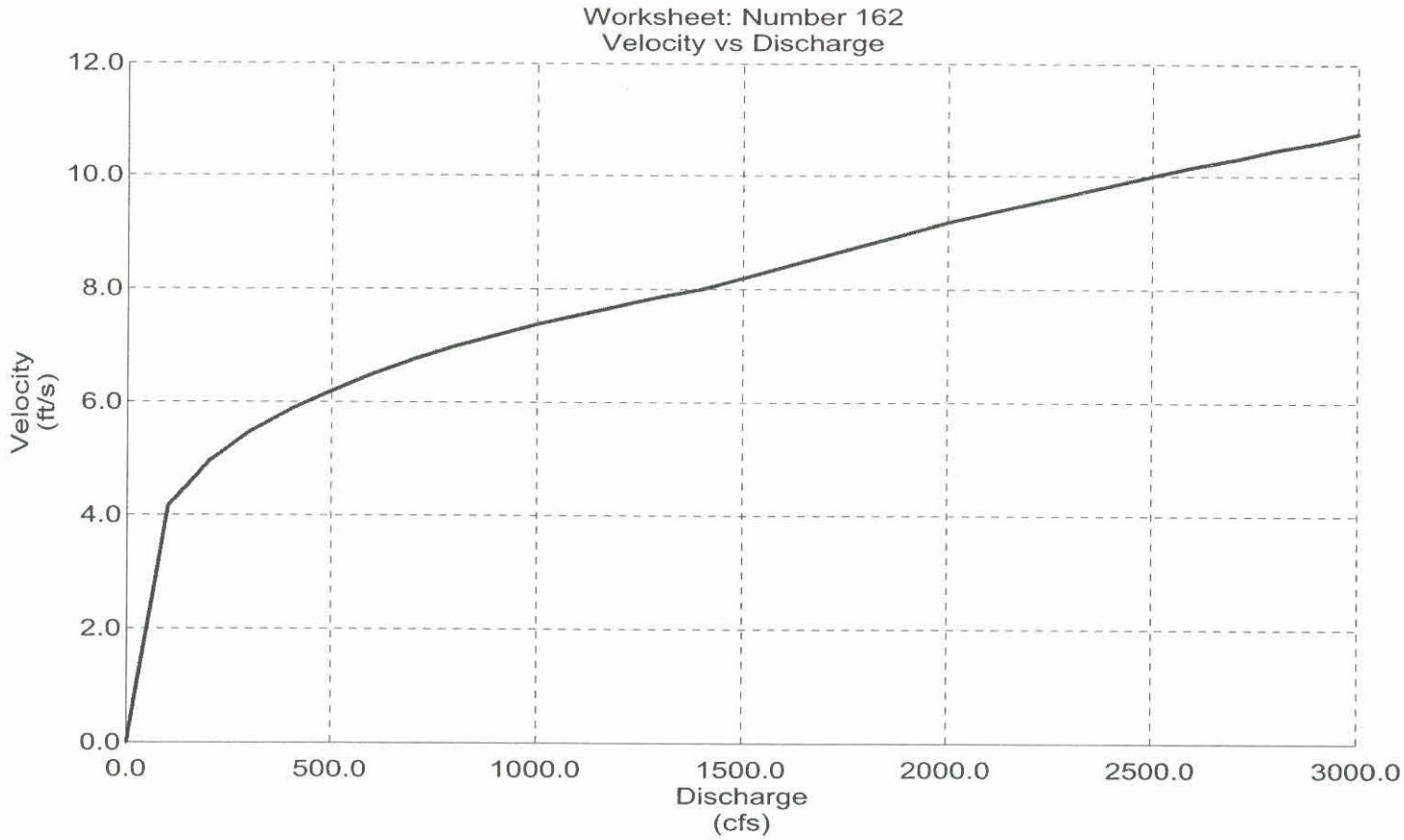
VENUS DRIVE

Project Description	
Worksheet	Number 162
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data	
Slope	010000 ft/ft

Options	
Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	3,000.00	100.00



Worksheet
Worksheet for Irregular Channel

VENUS DRIVE

Project Description	
Worksheet	Number 162
Flow Element	Irregular Chan
Method	Manning's Forr
Solve For	Channel Depth

Input Data		
Slope	010000	ft/ft
Discharg	213.00	cfs

Options	
Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Results		
Mannings Coefficie	0.024	
Water Surface Elev	2,578.46	ft
Elevation Range	77.00 to 2,580.00	
Flow Area	42.5	ft²
Wetted Perimeter	58.41	ft
Top Width	58.32	ft
Actual Depth	1.46	ft
Critical Elevation	2,578.48	ft
Critical Slope	0.009303	ft/ft
Velocity	5.01	ft/s
Velocity Head	0.39	ft
Specific Energy	2,578.85	ft
Froude Number	1.03	
Flow Type	Supercritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+30	1+50	0.024

Natural Channel Points

Station (ft)	Elevation (ft)
0+30	2,580.00
0+95	2,578.00
1+15	2,577.00
1+35	2,578.00
1+50	2,580.00

NS 100 YR, 6 HR
FUTURE

VENUS DRIVE

```
1*************************************
 *                                   *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
 *             JUN   1998            *
 *           VERSION 4.1             *
 *                                   *
 *  RUN DATE   27NOV02  TIME  08:52:05  *
 *                                   *
 *************************************
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```
*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*           (916) 756-1104          *
*                                   *
*************************************
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X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX         XXX
```

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

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


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

   1          ID   Project ID: 01131.12 - Major Basin: NS - Return Period: 100 Years
   2          ID
   3          ID   NORTH SCOTTSDALE 100-YR FLOODPLAIN DELINEATION STUDY
   4          ID   MAY 2002
   5          ID
   6          ID   FILE NAME:  NS.DAT
   7          ID   THIS MODEL REPRESENTS THE FUTURE LAND USE CONDITIONS OF THE WATERSHEDS.
   8          ID   THE TOTAL DRAINAGE AREA FOR THE ENTIRE STUDY IS 11.2 SQUARE MILES.
   9          ID
  10          ID   100-YEAR, 6-HOUR FREQUENCY
  11          ID
  12          ID   METHODOLOGY:
  13          ID   THE US CORPS OF ENGINEERS FLOOD HYROLOGY MODEL HEC-1, DATED JUNE 1998,
  14          ID   VERSION 4.1
  15          ID   MULTIPLE STORMS
  16          ID   CLARK UNIT HYDROGRAPH
  17          ID   GREEN AMPT LOSS METHOD
  18          ID   NORMAL DEPTH BASIN AND REACH ROUTING METHOD
  19          ID
  20          ID   LAND USES PER CITY OF SCOTTSDALE PROVIDED GIS
  21          ID
  22          ID   PROJECT WASHES INCLUDE: STAGE COACH PASS (SCP)
  23          ID                           UPPER BOULDERS WASH (UB)
  24          ID                           FAN 6C (F6C)
  25          ID                           FAN 6A NORTH (F6AN)
  26          ID                           FAN 6A SOULTH (F6AS)
  27          ID                           FAN 6A (F6A)
  28          ID                           UPPER FAN 5 (UF5)
  29          ID
  30          ID   PROJECT SUB-BASINS DESIGNATED AS SUB-BASIN NAME ABREVIATION FOLLOWED BY BASIN
  31          ID   NUMBER.  I.E. STAGE COACH PASS SUB-BASIN 14 IS DESIGNATED AS SCP-14.
  32          ID
  33          ID   PROJECT CONCENTRATION POINTS DESIGNATED AS C FOLLOWED BY SUB-BASIN NAME AND
  34          ID   CONCENTRATION POINT NUMBER.  CONCENTRATION POINT NUMBER IS CHOOSEN BY THE SUB
  35          ID   BASIN THE CONCENTRATION POINT IS LOCATED IN.  I.E.  CONCENTRATION POINT IN
  36          ID   SUB-BASIN 06 OF UPPER BOULDERS WASH IS DESIGNATED AS CUB06.
  37          ID
  38          ID   PROJECT ROUTES ARE DESIGNATED AS R FOLLOWED BY SUB-BASIN NAME AND ROUTE
  39          ID   NUMBER. ROUTE NUMBER IS CHOOSEN BY THE SUB-BASIN IN WHICH THE ROUTE BEGINS.
  40          ID   IE A ROUTE FROM SUB-BASIN 4 IN FAN 6C IS DESIGNATED AS RF6C4.
  41          ID
  42          ID
  43          ID
  44          ID
  45          IT       1                    2000
  46          IO       5       2
  47          IN      15
  48          JD    3.50    0.01
  49          PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
  50          PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
  51          PC   0.962   0.972   0.983   0.991   1.000
  52          JD   3.477    0.50
  53          JD   3.412    2.80
  54          PC   0.000   0.009   0.016   0.025   0.034   0.042   0.051   0.059   0.067   0.076
  55          PC   0.087   0.100   0.120   0.163   0.252   0.451   0.694   0.837   0.900   0.938
```

Venus Drive

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1                                                                   STATION    SSCP4B

                            (O) OUTFLOW
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  10006   70        .         .         .         .         .         .         .         .         .         .         .         .
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  10009  100        .         .         .         .         .         .         .         .         .         .         .         .
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  10012  130        .         .         .         .         .         .         .         .         .         .         .         .
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  10014  150        .         .         .         .         .         .         .         .         .         .         .         .
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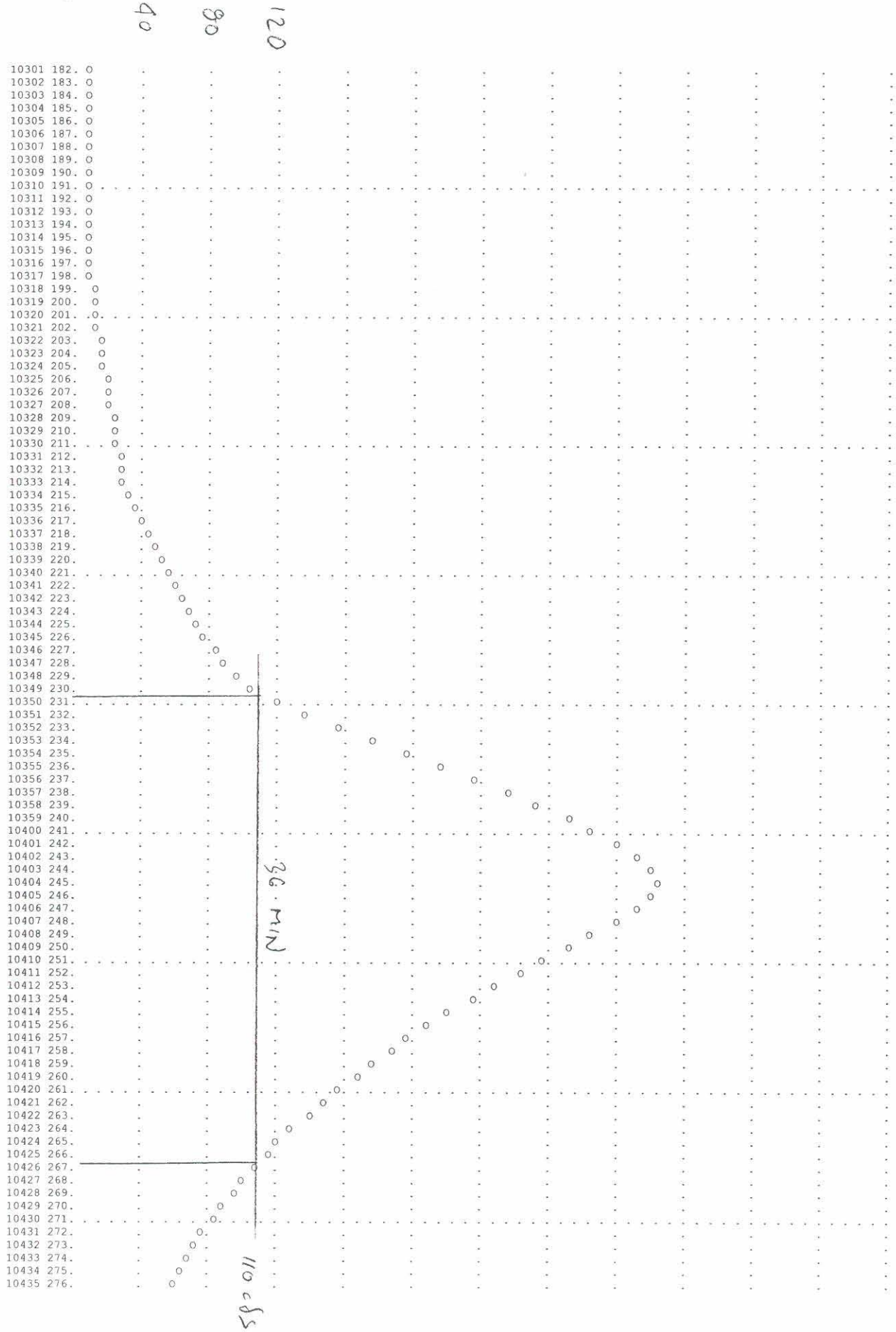
VENUS DRIVE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10428 269.
10429 270.
10430 271.
10431 272.
10432 273.
10433 274.
10434 275.
10435 276.
36 MIN
110 cfs

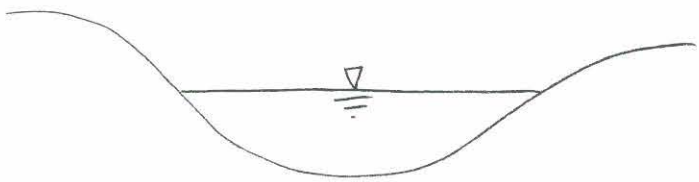
Double Eagle Drive West of Pima Road (#170)

Carefree Drainage Master Plan
Dip Crossing Notes

ID Number: 170

Source of Data:

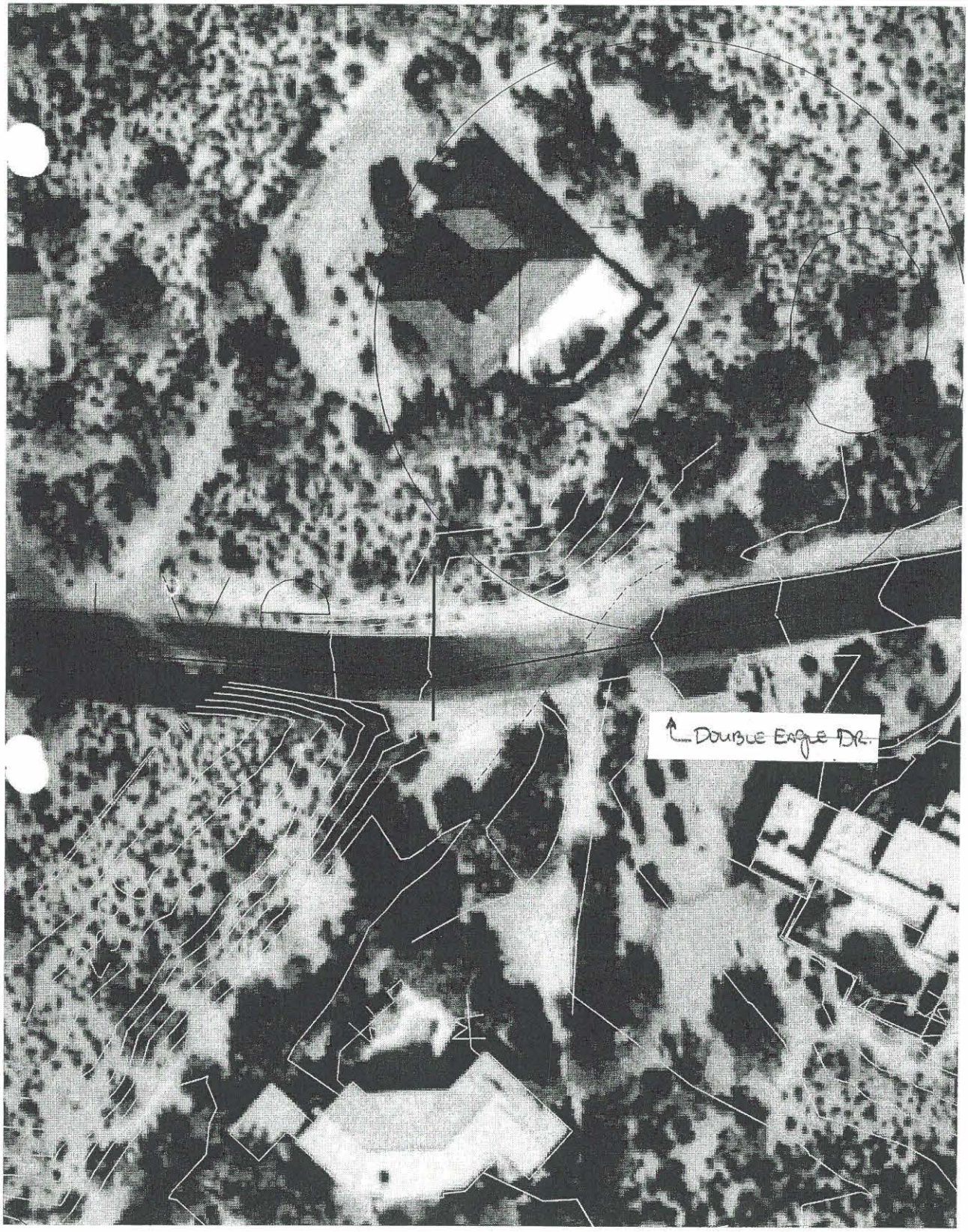
Location: DOUBLE EAGLE DRIVE WEST OF PIMA ROAD



Material: PAVED DIP CROSSING

Protection:

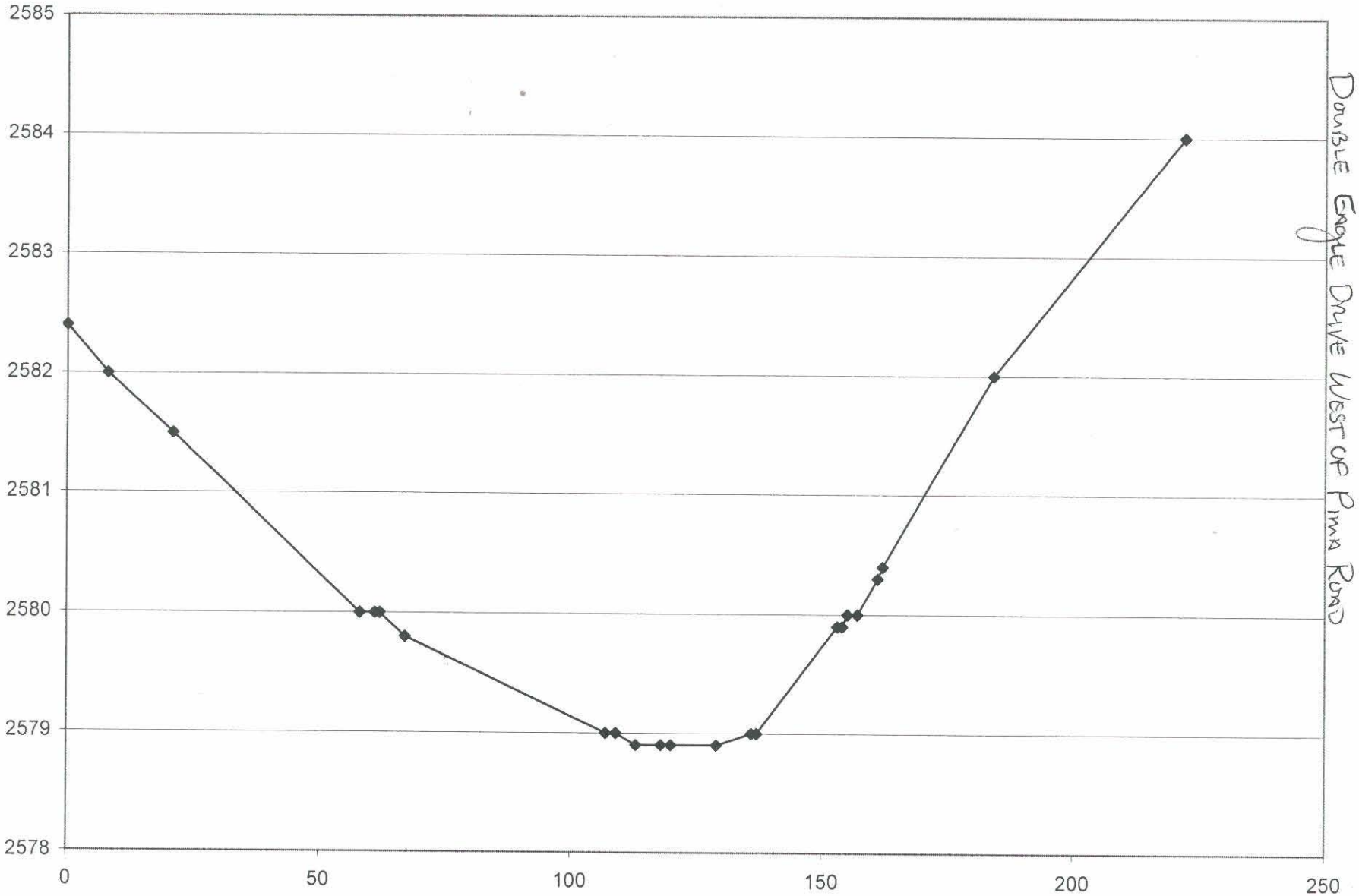
Notes:



DOUBLE EAGLE DRIVE WEST OF
PIMA ROAD

N

SCALE 1" = 60'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50
100
150
200
250
DOUBLE EAGLE DRIVE WEST OF PIMA ROAD

Worksheet
Worksheet for Irregular Channel

DOUBLE EAGLE DRIVE WEST OF PIMA ROAD

Project Description

Worksheet	170
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data

Slope	013800	ft/ft
Discharg	377.00	cfs

Options

Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Results

Mannings Coefficie	0.032	
Water Surface Elev	2,580.17	ft
Elevation Range	78.90 to 2,582.40	
Flow Area	80.6	ft²
Wetted Perimeter	101.42	ft
Top Width	101.37	ft
Actual Depth	1.27	ft
Critical Elevation	2,580.12	ft
Critical Slope	0.016335	ft/ft
Velocity	4.68	ft/s
Velocity Head	0.34	ft
Specific Energy	2,580.51	ft
Froude Number	0.93	
Flow Type	Subcritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00	1+84	0.032

Natural Channel Points

Station (ft)	Elevation (ft)
0+00	2,582.40
0+58	2,580.00
1+13	2,578.90
1+29	2,578.90
1+37	2,579.00
1+84	2,582.00

Table
Rating Table for Irregular Channel

DOUBLE EAGLE DRIVE WEST OF PIMA ROAD

Project Description

Worksheet	170
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data

Slope	013800	ft/ft

Options

Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

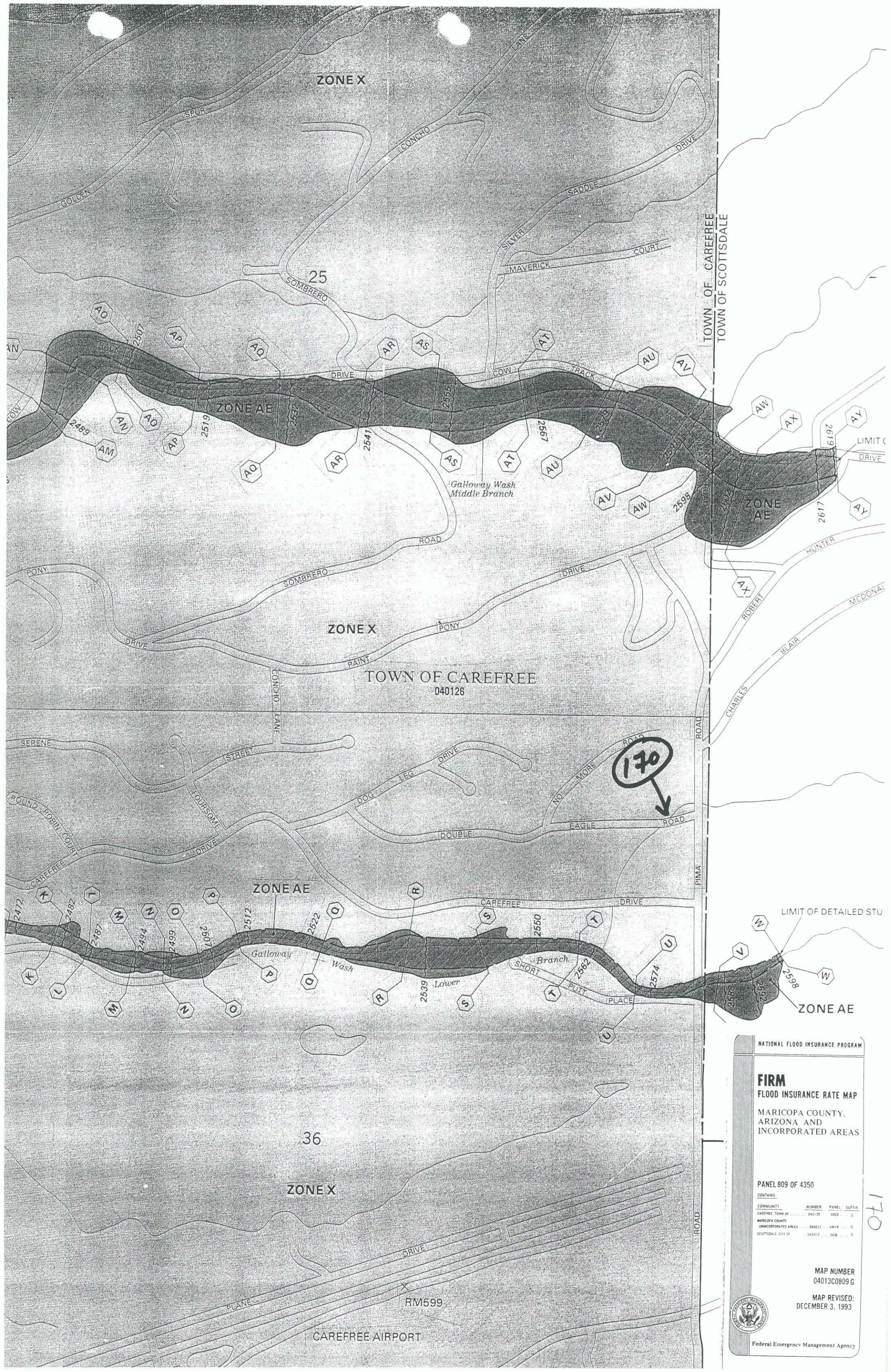
Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	400.00	5.00

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00	2,578.90	0.00	0.0	0.00	0.00
5.00	2,579.05	1.31	3.8	32.35	32.35
10.00	2,579.12	1.65	6.1	36.66	36.65
15.00	2,579.17	1.87	8.0	40.00	39.99
20.00	2,579.21	2.04	9.8	42.82	42.81
25.00	2,579.25	2.18	11.5	45.29	45.28
30.00	2,579.28	2.30	13.0	47.52	47.51
35.00	2,579.31	2.41	14.5	49.56	49.54
40.00	2,579.34	2.50	16.0	51.44	51.43
45.00	2,579.37	2.59	17.4	53.21	53.19
50.00	2,579.39	2.67	18.8	54.86	54.85
55.00	2,579.42	2.74	20.1	56.43	56.42
60.00	2,579.44	2.81	21.4	57.93	57.91
65.00	2,579.46	2.87	22.6	59.35	59.33
70.00	2,579.48	2.93	23.9	60.72	60.69
75.00	2,579.50	2.99	25.1	62.03	62.00
80.00	2,579.52	3.04	26.3	63.29	63.26
85.00	2,579.54	3.09	27.5	64.51	64.48
90.00	2,579.56	3.14	28.7	65.68	65.66
95.00	2,579.58	3.19	29.8	66.83	66.80
100.00	2,579.59	3.23	31.0	67.93	67.91
105.00	2,579.61	3.27	32.1	69.01	68.98
110.00	2,579.62	3.31	33.2	70.05	70.03
115.00	2,579.64	3.35	34.3	71.07	71.05
120.00	2,579.66	3.39	35.4	72.07	72.04
125.00	2,579.67	3.43	36.4	73.04	73.01
130.00	2,579.68	3.47	37.5	73.99	73.96
135.00	2,579.70	3.50	38.5	74.91	74.88
140.00	2,579.71	3.54	39.6	75.82	75.79
145.00	2,579.73	3.57	40.6	76.71	76.68
150.00	2,579.74	3.60	41.6	77.58	77.55
155.00	2,579.75	3.63	42.7	78.44	78.40
160.00	2,579.77	3.66	43.7	79.27	79.24
165.00	2,579.78	3.70	44.7	80.10	80.06

Table
Rating Table for Irregular Channel

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
170.00	2,579.79	3.72	45.6	80.91	80.87
175.00	2,579.80	3.75	46.6	81.70	81.67
180.00	2,579.81	3.78	47.6	82.48	82.45
185.00	2,579.83	3.81	48.6	83.25	83.21
190.00	2,579.84	3.84	49.5	84.01	83.97
195.00	2,579.85	3.86	50.5	84.75	84.71
200.00	2,579.86	3.89	51.4	85.49	85.45
205.00	2,579.87	3.91	52.4	86.21	86.17
210.00	2,579.88	3.94	53.3	86.92	86.88
215.00	2,579.89	3.96	54.3	87.62	87.58
220.00	2,579.90	3.99	55.2	88.32	88.28
225.00	2,579.91	4.01	56.1	89.00	88.96
230.00	2,579.92	4.03	57.0	89.67	89.63
235.00	2,579.93	4.06	57.9	90.34	90.30
240.00	2,579.94	4.08	58.8	91.00	90.96
245.00	2,579.95	4.10	59.7	91.65	91.61
250.00	2,579.96	4.12	60.6	92.29	92.25
255.00	2,579.97	4.14	61.5	92.92	92.88
260.00	2,579.98	4.17	62.4	93.55	93.51
265.00	2,579.99	4.19	63.3	94.17	94.13
270.00	2,580.00	4.21	64.2	94.75	94.71
275.00	2,580.01	4.23	65.0	95.09	95.04
280.00	2,580.02	4.26	65.8	95.42	95.38
285.00	2,580.03	4.28	66.6	95.75	95.71
290.00	2,580.03	4.31	67.4	96.08	96.04
295.00	2,580.04	4.33	68.2	96.41	96.36
300.00	2,580.05	4.35	68.9	96.73	96.69
305.00	2,580.06	4.38	69.7	97.05	97.01
310.00	2,580.07	4.40	70.5	97.37	97.32
315.00	2,580.07	4.42	71.3	97.69	97.64
320.00	2,580.08	4.44	72.0	98.00	97.95
325.00	2,580.09	4.46	72.8	98.31	98.26
330.00	2,580.10	4.49	73.6	98.62	98.57
335.00	2,580.11	4.51	74.3	98.93	98.88
340.00	2,580.11	4.53	75.1	99.23	99.18
345.00	2,580.12	4.55	75.8	99.53	99.48
350.00	2,580.13	4.57	76.6	99.83	99.78
355.00	2,580.14	4.59	77.3	100.13	100.08
360.00	2,580.14	4.61	78.1	100.43	100.38
365.00	2,580.15	4.63	78.8	100.72	100.67
370.00	2,580.16	4.65	79.5	101.01	100.96
375.00	2,580.17	4.67	80.3	101.30	101.25
380.00	2,580.17	4.69	81.0	101.59	101.54
385.00	2,580.18	4.71	81.7	101.88	101.83
390.00	2,580.19	4.73	82.5	102.16	102.11
395.00	2,580.19	4.75	83.2	102.45	102.39
400.00	2,580.20	4.77	83.9	102.73	102.67

IMPASSABLE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SPUR
CONCHO
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GOLDEN
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COURT
MAVERICK
25
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TOWN OF CAREFREE
TOWN OF SCOTTSDALE
TRACK
DRIVE
COW
TRACK
ZONE AE
Galloway Wash
Middle Branch
ROAD
LIMIT OF
DRIVE
HUNTER
ROBERT
MCDONAL
BLAIR
CHARLES
PONY
SOMBRERO
DRIVE
PONY
DRIVE
PAINT
ZONE X
TOWN OF CAREFREE
040126
CONCHO
LANE
SERENE
STREET
FOURSOME
DOG
LEG
DRIVE
NO
MORE
ROAD
170
ROUND ROBIN COURT
DOUBLE
EAGLE
ROAD
CAREFREE
DRIVE
PIMA
ZONE AE
CAREFREE
DRIVE
LIMIT OF DETAILED STU
Galloway Wash
Lower Branch
SHORT
PUTT
PLACE
ZONE AE
36
ZONE X
ROAD
DRIVE
PLANE
RM599
CAREFREE AIRPORT
NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
MARICOPA COUNTY, ARIZONA AND INCORPORATED AREAS
PANEL 809 OF 4350
CONTAINS
COMMUNITY NUMBER PANEL SUFFIX
CAREFREE TOWN OF 040126 0809 G
MARICOPA COUNTY
UNINCORPORATED AREAS 040037 0809 G
SCOTTSDALE CITY OF 045012 0809 G
MAP NUMBER
04013C0809 G
MAP REVISED:
DECEMBER 3, 1993
Federal Emergency Management Agency
170

GW 100 YR, 24 HR FUTURE

DOUBLE EAGLE DRIVE WEST OF PIMA ROAD


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 *              JUN  1998                *
 *            VERSION 4.1                *
 *                                       *
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*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*           (916) 756-1104          *
*                                   *
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

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

```
1                                    HEC-1 INPUT                                                    PAGE  1

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

    1           ID     FUTURE CONDITIONS HYDROLOGY FOR CAREFREE AREA DRAINAGE MASTER PLAN
    2           ID       BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC., DEC. 2001
    3           ID
    4           ID     FUTURE CONDITIONS LAND USE BASED ON CAVE CREEK WATERCOURSE MASTER PLAN
    5           ID     HYDROLOGY BY TETRA TECH, 2000.
    6           ID
    7           ID     BASE MODEL BASED ON:
    8           ID
    9           ID           FLOODPLAIN DELINEATION STUDY OF ANDORA HILLS & GALLOWAY WASHES
   10           ID           FCD 99-14
   11           ID           BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC.
   12           ID           FOR THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
   13           ID           REVISED MARCH 2002     FILENAME: GWM224R.DAT
   14           ID      ****************************************************************
   15           ID           100 YEAR ANALYSIS 24-HOUR STORM USING JD RECORDS
   16           ID           MCUHP2 USED FOR UNIT HYDROGRAPHS
   17           ID     ****************************************************************
   18           ID
   19           ID     DDM MCUHP2 GALLOWAY WASH FLOODPLAIN DELINEATION STUDY, FCD NO. 99-14
   20           ID
   21           ID    March 2002 revisions to original Dec. 1999 model include:
   22           ID
   23           ID    HC BLOCK ADDED FOR GRAPEVINE WASH (CP 295A)
   24           ID
   25           ID    SUBBASIN GWW1_3 FURTHER SUBDIVIDED ALONG GALLOWAY WASH PER FEMA COMMENTS
   26           ID    IN LETTER DATED FEB. 8, 2002
   27           ID
   28           ID    *** ADDITIONAL COMBINATION ADDED 10-17-02 TO PROVIDE TOTAL FLOW IN
   29           ID        NORTH GALLOWAY WASH BY TWL FOR CH2M HILL FOR CAREFREE DMP ***
   30           ID
   31           ID   DDM MCUHP2 Carefree Area Drainage Master Plan, Galloway Wash Future Condition
                *DIAGRAM
   32           IT       5 01DEC99    0005     400
   33           IO       5       2
   34           IN      15
   35           JD    4.80    0.01
   36           PC    .000    .002    .005    .008    .011    .014    .017    .020    .023    .026
   37           PC    .029    .032    .035    .038    .041    .044    .048    .052    .056    .060
   38           PC    .064    .068    .072    .076    .080    .085    .090    .095    .100    .105
   39           PC    .110    .115    .120    .126    .133    .140    .147    .155    .163    .172
   40           PC    .181    .191    .203    .218    .236    .257    .283    .387    .663    .707
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   43           PC    .913    .918    .922    .926    .930    .934    .938    .942    .946    .950
   44           PC    .953    .956    .959    .962    .965    .968    .971    .974    .977    .980
   45           PC    .983    .986    .989    .992    .995    .998   1.000
   46           JD    4.78    1.00
   47           JD    4.51   10.00
   48           JD    4.37   20.00
   49           JD    4.11   70.00
                *
                * DDM   ***** Updated *****
1                                    HEC-1 INPUT                                                    PAGE  2

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DOUBLE EAGLE DRIVE WEST OF PIMA ROAD

1

STATION GWW132

(O) OUTFLOW

DAHRMN	PER	0.	100.	200.	300.	400.	500.	600.	700.	0.	0.	0.	0.	0.
10005	10													
10010	20													
10015	30													
10020	40													
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10030	60													
10035	70													
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10045	90													
10050	100													
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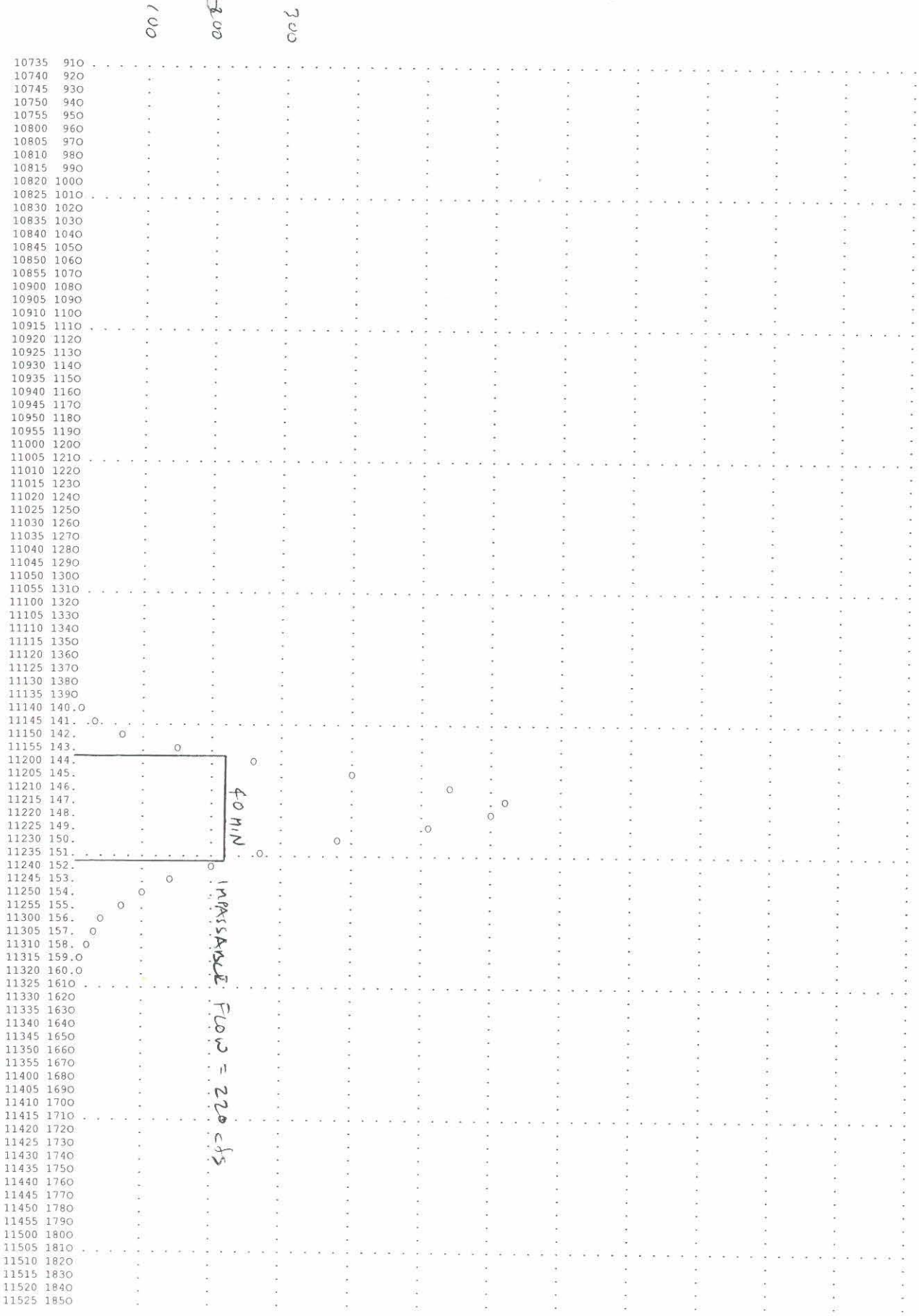
DOUBLE EAGLE DRIVE WEST OF PIMA ROAD



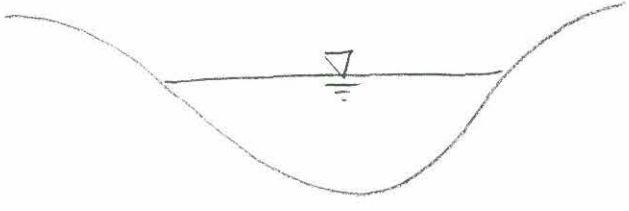
Carefree Drive East of Foursome Way (#171)

Carefree Drainage Master Plan
Dip Crossing Notes

ID Number: 171

Source of Data:

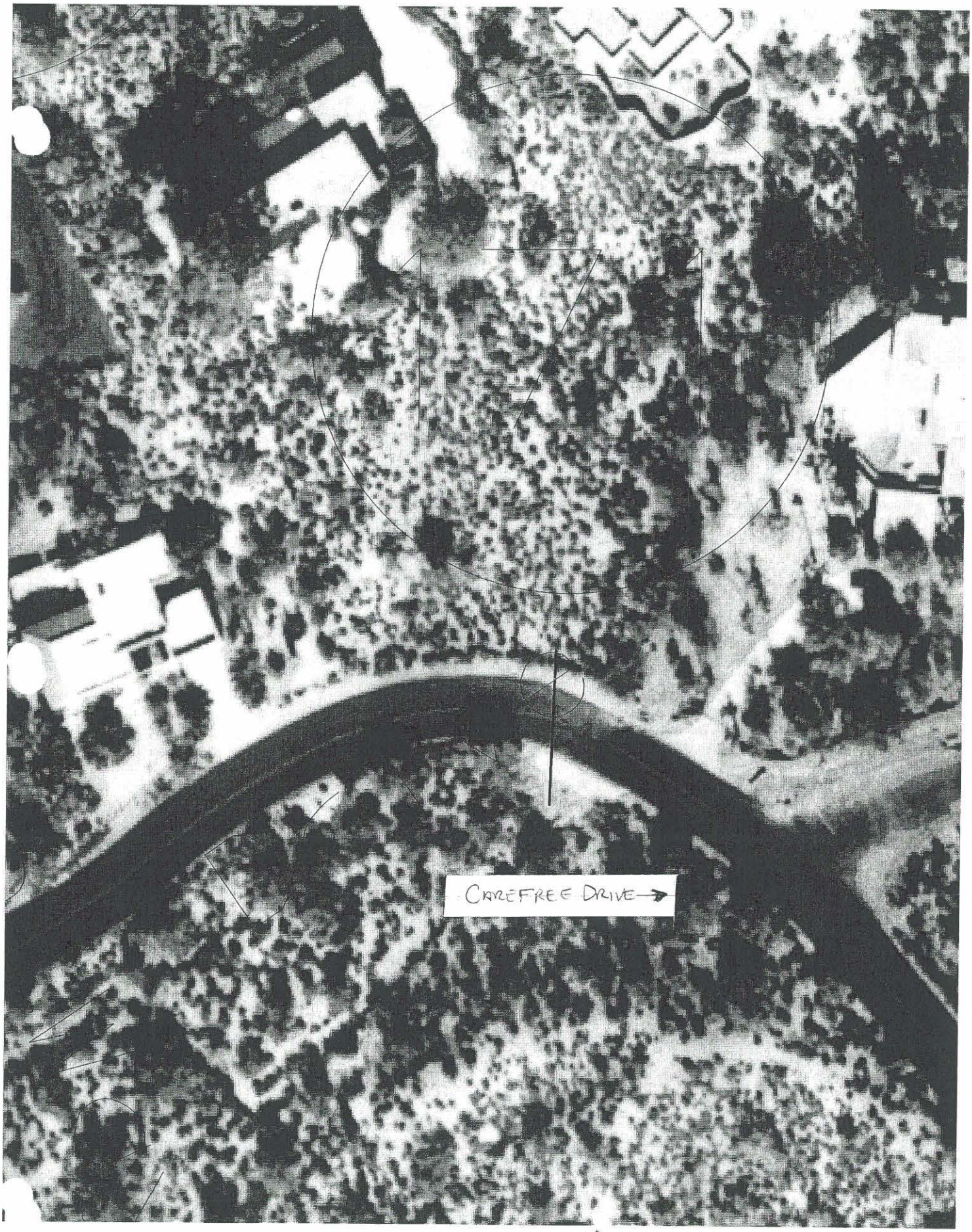
Location: CAREFREE DRIVE EAST OF FOURSOME WAY



Material: PAVED DIP CROSSING

Protection:

Notes:



CAREFREE DRIVE EAST OF
FE[illegible] WAY

N

SCALE 1" - 60'

Worksheet
Worksheet for Irregular Channel

CARLEFREE DRIVE EAST OF FOURSOME WAY

Project Description	
Worksheet	Generic 200 foot v
Flow Element	Irregular Channel
Method	Manning's Formul
Solve For	Channel Depth

Input Data		
Slope	010000	ft/ft
Discharg	276.00	cfs

Options	
Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Results		
Mannings Coefficie	0.032	
Water Surface Elev	1.17	ft
Elevation Range	.00 to 3.00	
Flow Area	80.4	ft²
Wetted Perimeter	126.66	ft
Top Width	126.63	ft
Actual Depth	1.17	ft
Critical Elevation	1.05	ft
Critical Slope	0.018308	ft/ft
Velocity	3.43	ft/s
Velocity Head	0.18	ft
Specific Energy	1.35	ft
Froude Number	0.76	
Flow Type	Subcritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00	2+00	0.032

Natural Channel Points

Station (ft)	Elevation (ft)
0+00	3.00
0+20	2.00
0+40	1.00
1+00	0.00
1+60	1.00
1+80	2.00
2+00	3.00

Table
Rating Table for Irregular Channel

CAREFREE DRIVE EAST OF FOURSOME WAY

Project Description	
Worksheet	Generic 200 foot v
Flow Element	Irregular Channel
Method	Manning's Formul
Solve For	Channel Depth

Input Data	
Slope	010000 ft/ft

Options	
Current Roughness Metho	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	300.00	5.00

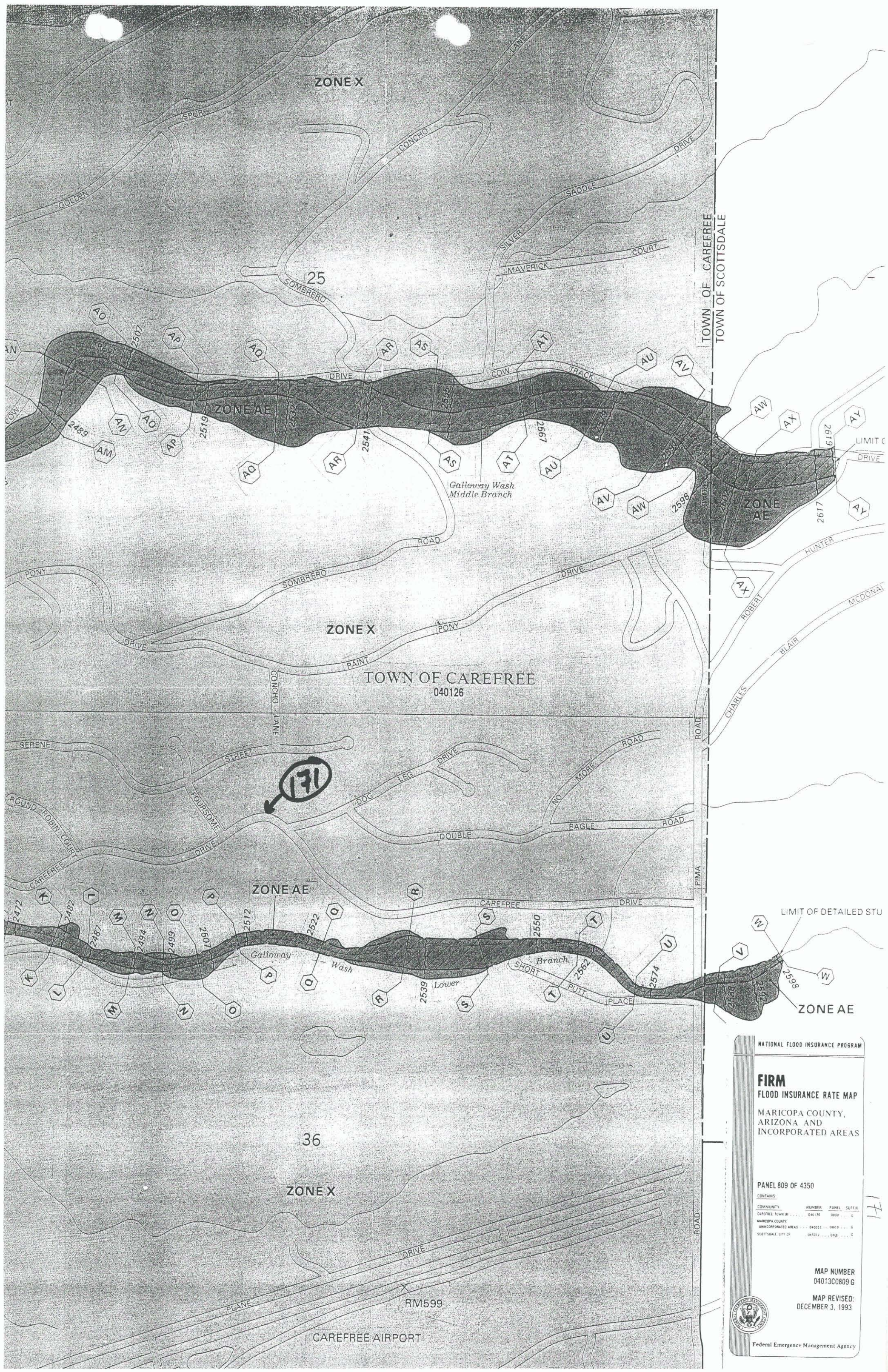
Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00	0.00	0.00	0.0	0.00	0.00
5.00	0.26	1.20	4.2	31.60	31.60
10.00	0.34	1.43	7.0	40.99	40.98
15.00	0.40	1.58	9.5	47.72	47.71
20.00	0.44	1.70	11.8	53.15	53.15
25.00	0.48	1.80	13.9	57.79	57.78
30.00	0.52	1.88	16.0	61.88	61.87
35.00	0.55	1.95	17.9	65.56	65.55
40.00	0.57	2.02	19.8	68.93	68.92
45.00	0.60	2.08	21.6	72.04	72.03
50.00	0.62	2.14	23.4	74.95	74.94
55.00	0.65	2.19	25.1	77.67	77.66
60.00	0.67	2.24	26.8	80.25	80.24
65.00	0.69	2.28	28.5	82.70	82.68
70.00	0.71	2.32	30.1	85.03	85.01
75.00	0.73	2.36	31.7	87.25	87.24
80.00	0.74	2.40	33.3	89.39	89.38
85.00	0.76	2.44	34.8	91.45	91.43
90.00	0.78	2.48	36.4	93.43	93.42
95.00	0.79	2.51	37.9	95.34	95.33
100.00	0.81	2.54	39.4	97.19	97.18
105.00	0.82	2.57	40.8	98.99	98.97
110.00	0.84	2.60	42.3	100.73	100.72
115.00	0.85	2.63	43.7	102.42	102.41
120.00	0.87	2.66	45.1	104.07	104.06
125.00	0.88	2.69	46.5	105.68	105.66
130.00	0.89	2.71	47.9	107.24	107.23
135.00	0.91	2.74	49.3	108.77	108.76
140.00	0.92	2.76	50.6	110.27	110.25
145.00	0.93	2.79	52.0	111.73	111.71
150.00	0.94	2.81	53.3	113.16	113.14
155.00	0.95	2.84	54.7	114.56	114.54
160.00	0.97	2.86	56.0	115.93	115.91
165.00	0.98	2.88	57.3	117.27	117.26

Table
Rating Table for Irregular Channel

CAREFREE DRIVE EAST OF FOURSOME WAY

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft^2)	Wetted Perimeter (ft)	Top Width (ft)
170.00	0.99	2.90	58.6	118.59	118.58
175.00	1.00	2.92	59.9	119.89	119.87
180.00	1.01	2.95	61.0	120.35	120.33
185.00	1.02	2.98	62.1	120.71	120.69
190.00	1.03	3.01	63.1	121.06	121.04
195.00	1.03	3.04	64.2	121.41	121.40
200.00	1.04	3.06	65.3	121.76	121.74
205.00	1.05	3.09	66.3	122.11	122.09
210.00	1.06	3.12	67.4	122.45	122.43
215.00	1.07	3.14	68.4	122.79	122.77
220.00	1.08	3.17	69.4	123.12	123.10
225.00	1.09	3.19	70.4	123.45	123.43
230.00	1.09	3.22	71.4	123.78	123.76
235.00	1.10	3.24	72.5	124.10	124.08
240.00	1.11	3.27	73.4	124.42	124.40
245.00	1.12	3.29	74.4	124.74	124.72
250.00	1.13	3.31	75.4	125.06	125.04
255.00	1.13	3.34	76.4	125.37	125.35
260.00	1.14	3.36	77.4	125.68	125.66
265.00	1.15	3.38	78.3	125.99	125.96
270.00	1.16	3.40	79.3	126.29	126.27
275.00	1.16	3.43	80.3	126.60	126.57
280.00	1.17	3.45	81.2	126.90	126.87
285.00	1.18	3.47	82.1	127.19	127.17
290.00	1.19	3.49	83.1	127.49	127.46
295.00	1.19	3.51	84.0	127.78	127.76
300.00	1.20	3.53	84.9	128.07	128.05

IMPASSABLE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GOLDEN
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COURT
MAVERICK
25
SOMBRERO
TOWN OF CAREFREE
TOWN OF SCOTTSDALE
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PONY
PAINT
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040126
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SERENE
STREET
FOURSOME
ROUND ROBIN COURT
CAREFREE
DOG
LEG
NO
MORE
EAGLE
DOUBLE
PIMA
Galloway Wash
Lower Branch
SHORT
PUTT
PLACE
36
PLANE
RM599
CAREFREE AIRPORT
NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
MARICOPA COUNTY, ARIZONA AND INCORPORATED AREAS
PANEL 809 OF 4350
CONTAINS
COMMUNITY NUMBER PANEL SUFFIX
CAREFREE, TOWN OF 040126 0809 G
MARICOPA COUNTY
UNINCORPORATED AREAS 040037 0809 G
SCOTTSDALE, CITY OF 045012 0809 G
MAP NUMBER
04013C0809 G
MAP REVISED:
DECEMBER 3, 1993
Federal Emergency Management Agency

171

GW 100 YR, 24 HR
FUTURE

171

CAREFREE DRIVE EAST OF FOUNSUME WAY

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*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*             JUN  1998             *
*           VERSION 4.1             *
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*  RUN DATE   27NOV02  TIME  08:45:45  *
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*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*           (916) 756-1104          *
*                                   *
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

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

1 HEC-1 INPUT PAGE 1

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

  1           ID     FUTURE CONDITIONS HYDROLOGY FOR CAREFREE AREA DRAINAGE MASTER PLAN
  2           ID       BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC., DEC. 2001
  3           ID
  4           ID     FUTURE CONDITIONS LAND USE BASED ON CAVE CREEK WATERCOURSE MASTER PLAN
  5           ID     HYDROLOGY BY TETRA TECH, 2000.
  6           ID
  7           ID     BASE MODEL BASED ON:
  8           ID
  9           ID          FLOODPLAIN DELINEATION STUDY OF ANDORA HILLS & GALLOWAY WASHES
 10           ID          FCD 99-14
 11           ID          BY JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC.
 12           ID          FOR THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
 13           ID          REVISED MARCH 2002     FILENAME: GWM224R.DAT
 14           ID      ****************************************************************
 15           ID          100 YEAR ANALYSIS 24-HOUR STORM USING JD RECORDS
 16           ID          MCUHP2 USED FOR UNIT HYDROGRAPHS
 17           ID     ****************************************************************
 18           ID
 19           ID     DDM MCUHP2 GALLOWAY WASH FLOODPLAIN DELINEATION STUDY, FCD NO. 99-14
 20           ID
 21           ID    March 2002 revisions to original Dec. 1999 model include:
 22           ID
 23           ID    HC BLOCK ADDED FOR GRAPEVINE WASH (CP 295A)
 24           ID
 25           ID    SUBBASIN GWW1_3 FURTHER SUBDIVIDED ALONG GALLOWAY WASH PER FEMA COMMENTS
 26           ID    IN LETTER DATED FEB. 8, 2002
 27           ID
 28           ID    *** ADDITIONAL COMBINATION ADDED 10-17-02 TO PROVIDE TOTAL FLOW IN
 29           ID        NORTH GALLOWAY WASH BY TWL FOR CH2M HILL FOR CAREFREE DMP ***
 30           ID
 31           ID   DDM MCUHP2 Carefree Area Drainage Master Plan, Galloway Wash Future Condition
              *DIAGRAM
 32           IT       5 01DEC99    0005     400
 33           IO       5       2
 34           IN      15
 35           JD    4.80    0.01
 36           PC    .000    .002    .005    .008    .011    .014    .017    .020    .023    .026
 37           PC    .029    .032    .035    .038    .041    .044    .048    .052    .056    .060
 38           PC    .064    .068    .072    .076    .080    .085    .090    .095    .100    .105
 39           PC    .110    .115    .120    .126    .133    .140    .147    .155    .163    .172
 40           PC    .181    .191    .203    .218    .236    .257    .283    .387    .663    .707
 41           PC    .735    .758    .776    .791    .804    .815    .825    .834    .842    .849
 42           PC    .856    .863    .869    .875    .881    .887    .893    .898    .903    .908
 43           PC    .913    .918    .922    .926    .930    .934    .938    .942    .946    .950
 44           PC    .953    .956    .959    .962    .965    .968    .971    .974    .977    .980
 45           PC    .983    .986    .989    .992    .995    .998   1.000
 46           JD    4.78    1.00
 47           JD    4.51   10.00
 48           JD    4.37   20.00
 49           JD    4.11   70.00
              *
              * DDM   ***** Updated *****
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1 HEC-1 INPUT PAGE 2

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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
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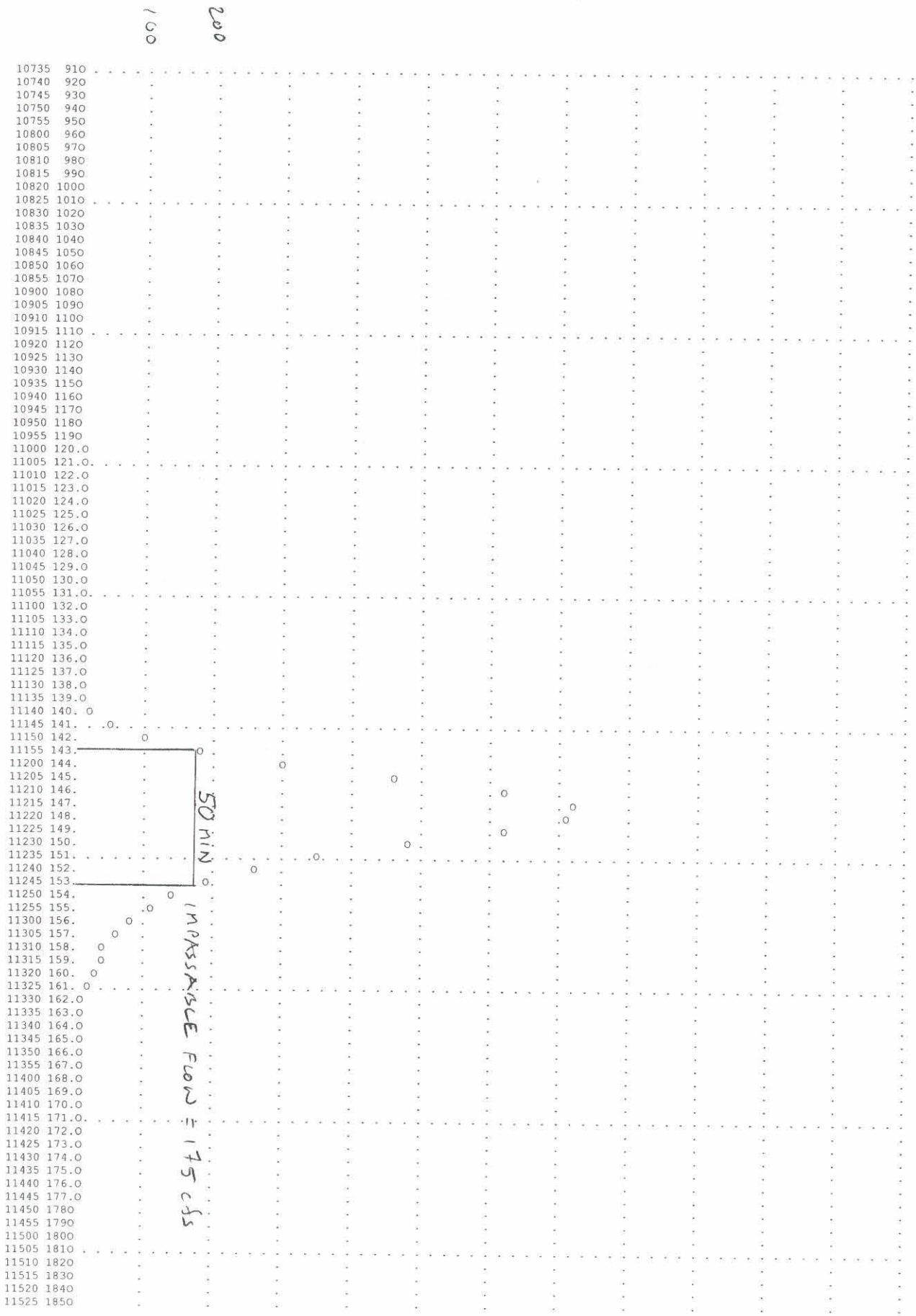
CAREFREE DRIVE EAST OF FOURSOME WAY

1 STATION GWW133

(O) OUTFLOW

DAHRMN	PER	0.	100.	200.	300.	400.	500.	600.	700.	800.	0.	0.	0.	0.
10005	10													
10010	20													
10015	30													
10020	40													
10025	50													
10030	60													
10035	70													
10040	80													
10045	90													
10050	100													
10055	110													
10100	120													
10105	130													
10110	140													
10115	150													
10120	160													
10125	170													
10130	180													
10135	190													
10140	200													
10145	210													
10150	220													
10155	230													
10200	240													
10205	250													
10210	260													
10215	270													
10220	280													
10225	290													
10230	300													
10235	310													
10240	320													
10245	330													
10250	340													
10255	350													
10300	360													
10305	370													
10310	380													
10315	390													
10320	400													
10325	410													
10330	420													
10335	430													
10340	440													
10345	450													
10350	460													
10355	470													
10400	480													
10405	490													
10410	500													
10415	510													
10420	520													
10425	530													
10430	540													
10435	550													
10440	560													
10445	570													
10450	580													
10455	590													
10500	600													
10505	610													
10510	620													
10515	630													
10520	640													
10525	650													
10530	660													
10535	670													
10540	680													
10545	690													
10550	700													
10555	710													
10600	720													
10605	730													
10610	740													
10615	750													
10620	760													
10625	770													
10630	780													
10635	790													
10640	800													
10645	810													
10650	820													
10655	830													
10700	840													
10705	850													
10710	860													
10715	870													
10720	880													
10725	890													
10730	900													

CAREFREE DRIVE EAST OF FAIRSOME WAY



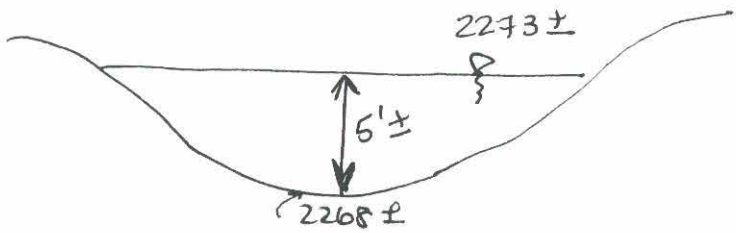
Piedra Grande Drive at Andora Hills Wash (#210)

Carefree Drainage Master Plan
Dip Crossing Notes

ID Number: #210

Source of Data: Floodplain Delineation Study of Andora Hills & Galloway Washes, June 2001, preliminary (attached)

Location: Piedra Grande Drive at Andora Hills Wash



Profile view

Material: Paved Dip Crossing

Protection:

Notes: Impassable during 100-yr.

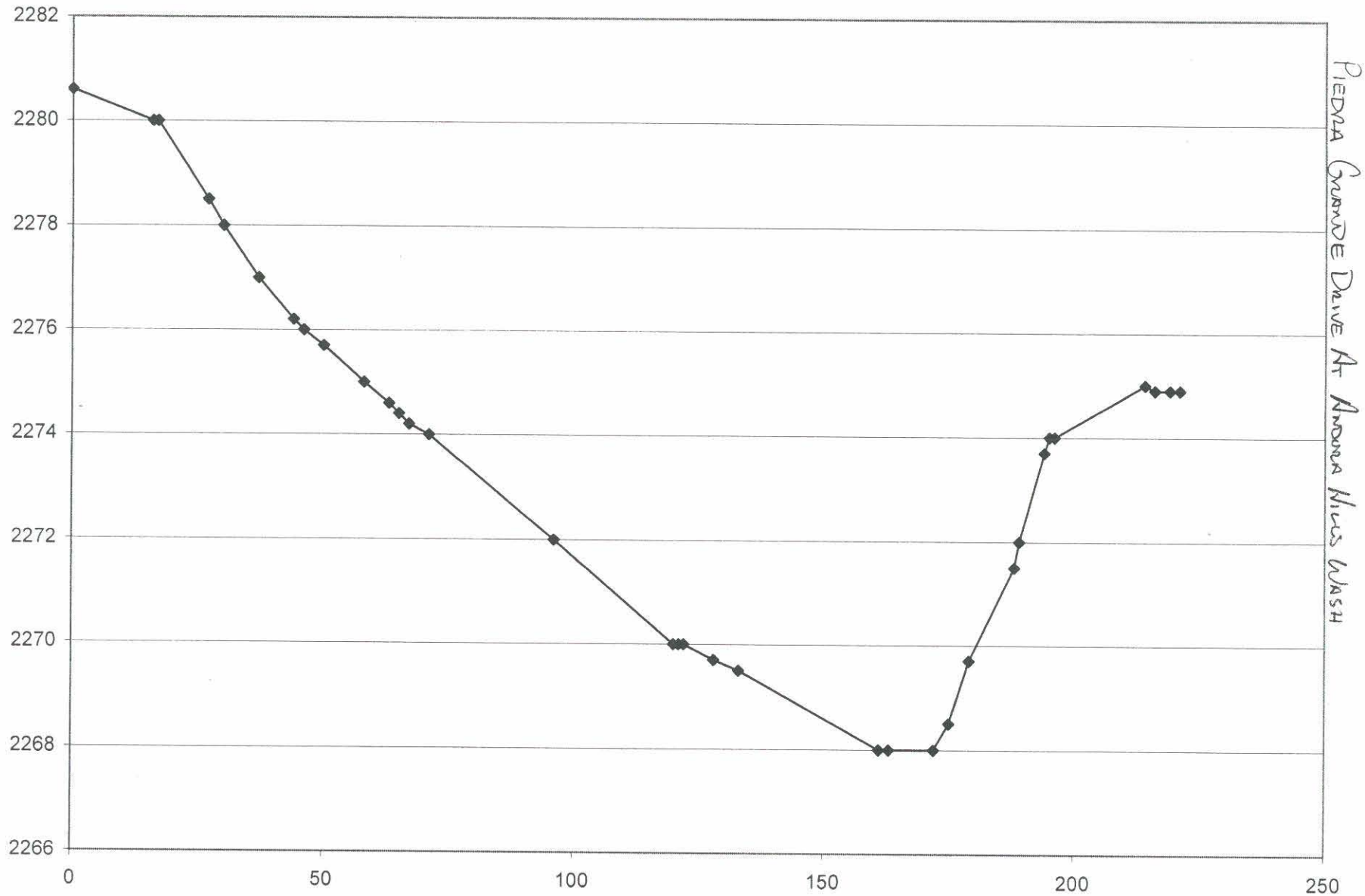
PIEDRA GRANDE DRIVE AT
ANDALA HILLS WASH

← N —

SCALE 1" = 60'

N

1" = 60'


2282
2280
2278
2276
2274
2272
2270
2268
2266
0
50
100
150
200
250
PIEDRA GRANDE DRIVE AT ANDORA NICS WASH

Worksheet
Worksheet for Irregular Channel

PIEDRA GRANDE DRIVE AT ANDORA HILLS WASH

Project Description	
Worksheet	210
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data		
Slope	018750	ft/ft
Discharg	,293.00	cfs

Options	
Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Results		
Mannings Coefficie	0.033	
Water Surface Elev	2,271.91	ft
Elevation Range	37.80 to 2,275.00	
Flow Area	212.2	ft²
Wetted Perimeter	91.23	ft
Top Width	90.59	ft
Actual Depth	4.11	ft
Critical Elevation	2,272.32	ft
Critical Slope	0.011709	ft/ft
Velocity	10.81	ft/s
Velocity Head	1.82	ft
Specific Energy	2,273.72	ft
Froude Number	1.25	
Flow Type	Supercritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+58	1+33	0.040
1+33	1+72	0.032
1+72	2+14	0.040

Natural Channel Points

Station (ft)	Elevation (ft)
0+58	2,275.00
1+20	2,270.00
1+33	2,269.50
1+61	2,268.00
1+66	2,267.80
1+72	2,268.00
1+95	2,274.00
2+14	2,275.00

Table
Rating Table for Irregular Channel

PIEDRA GRANDE DRIVE AT ANDORA HILLS WASH

Project Description

Worksheet	210
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data

Slope	018750	ft/ft

Options

Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	2,400.00	10.00

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00	2,267.80	0.00	0.0	0.00	0.00
10.00	2,268.22	2.50	4.0	15.90	15.86
20.00	2,268.36	3.05	6.6	19.22	19.15
30.00	2,268.47	3.41	8.8	21.71	21.63
40.00	2,268.56	3.68	10.9	23.77	23.67
50.00	2,268.64	3.91	12.8	25.55	25.44
60.00	2,268.70	4.18	14.4	26.90	26.79
70.00	2,268.76	4.35	16.1	28.33	28.20
80.00	2,268.82	4.50	17.8	29.64	29.51
90.00	2,268.88	4.64	19.4	30.86	30.72
100.00	2,268.93	4.77	21.0	32.00	31.85
110.00	2,268.97	4.89	22.5	33.08	32.92
120.00	2,269.02	5.00	24.0	34.10	33.93
130.00	2,269.06	5.10	25.5	35.07	34.90
140.00	2,269.10	5.20	26.9	36.00	35.82
150.00	2,269.14	5.29	28.3	36.88	36.70
160.00	2,269.18	5.38	29.7	37.74	37.55
170.00	2,269.22	5.46	31.1	38.56	38.36
180.00	2,269.25	5.54	32.5	39.35	39.15
190.00	2,269.29	5.62	33.8	40.12	39.91
200.00	2,269.32	5.69	35.1	40.86	40.65
210.00	2,269.35	5.76	36.4	41.59	41.37
220.00	2,269.38	5.83	37.7	42.29	42.06
230.00	2,269.41	5.90	39.0	42.97	42.74
240.00	2,269.44	5.96	40.3	43.63	43.40
250.00	2,269.47	6.02	41.5	44.28	44.04
260.00	2,269.50	6.08	42.8	44.91	44.67
270.00	2,269.52	6.16	43.8	45.58	45.34
280.00	2,269.56	6.15	45.5	46.69	46.44
290.00	2,269.58	6.23	46.5	47.36	47.11
300.00	2,269.64	6.06	49.5	49.22	48.96
310.00	2,269.67	6.08	51.0	50.10	49.84
320.00	2,269.70	6.11	52.4	50.96	50.69
330.00	2,269.73	6.13	53.8	51.79	51.52

IMPASSABLE

Table
Rating Table for Irregular Channel

PIEDRA GRANDE DRIVE AT ANDORA HILLS WASH

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
340.00	2,269.75	6.16	55.2	52.60	52.32
350.00	2,269.78	6.18	56.6	53.40	53.12
360.00	2,269.81	6.20	58.0	54.17	53.89
370.00	2,269.83	6.23	59.4	54.93	54.64
380.00	2,269.86	6.25	60.8	55.68	55.39
390.00	2,269.88	6.28	62.1	56.41	56.11
400.00	2,269.90	6.30	63.5	57.12	56.82
410.00	2,269.93	6.33	64.8	57.82	57.52
420.00	2,269.95	6.35	66.1	58.51	58.21
430.00	2,269.97	6.37	67.5	59.19	58.88
440.00	2,270.00	6.40	68.8	59.86	59.54
450.00	2,270.00	6.52	69.0	59.98	59.67
460.00	2,270.00	6.67	69.0	59.98	59.67
470.00	2,270.00	6.81	69.0	59.98	59.67
480.00	2,270.00	6.95	69.0	59.98	59.67
490.00	2,270.00	7.10	69.0	59.98	59.67
500.00	2,270.00	7.24	69.0	59.98	59.67
510.00	2,270.00	7.37	69.2	60.04	59.73
520.00	2,270.02	7.40	70.2	60.32	60.00
530.00	2,270.04	7.44	71.2	60.59	60.27
540.00	2,270.05	7.48	72.2	60.85	60.53
550.00	2,270.07	7.51	73.2	61.12	60.79
560.00	2,270.21	6.85	81.7	63.38	63.03
570.00	2,270.22	6.89	82.8	63.65	63.30
580.00	2,270.24	6.92	83.8	63.92	63.56
590.00	2,270.26	6.95	84.8	64.18	63.83
600.00	2,270.27	6.99	85.9	64.45	64.09
610.00	2,270.29	7.02	86.9	64.71	64.35
620.00	2,270.30	7.05	87.9	64.97	64.61
630.00	2,270.32	7.08	88.9	65.23	64.86
640.00	2,270.34	7.11	90.0	65.48	65.11
650.00	2,270.35	7.15	91.0	65.74	65.37
660.00	2,270.37	7.18	92.0	65.99	65.61
670.00	2,270.38	7.21	93.0	66.24	65.86
680.00	2,270.40	7.24	94.0	66.49	66.11
690.00	2,270.41	7.27	95.0	66.73	66.35
700.00	2,270.43	7.29	96.0	66.98	66.59
710.00	2,270.44	7.32	96.9	67.22	66.83
720.00	2,270.46	7.35	97.9	67.46	67.07
730.00	2,270.47	7.38	98.9	67.70	67.31
740.00	2,270.49	7.41	99.9	67.94	67.55
750.00	2,270.50	7.44	100.9	68.18	67.78
760.00	2,270.51	7.46	101.8	68.41	68.01
770.00	2,270.53	7.49	102.8	68.65	68.24
780.00	2,270.54	7.52	103.8	68.88	68.47
790.00	2,270.56	7.54	104.7	69.11	68.70
800.00	2,270.57	7.57	105.7	69.34	68.93
810.00	2,270.58	7.59	106.7	69.56	69.15
820.00	2,270.60	7.62	107.6	69.79	69.38
830.00	2,270.61	7.65	108.6	70.01	69.60
840.00	2,270.63	7.67	109.5	70.24	69.82
850.00	2,270.64	7.70	110.4	70.46	70.04
860.00	2,270.65	7.72	111.4	70.68	70.26
870.00	2,270.67	7.74	112.3	70.90	70.47

Table
Rating Table for Irregular Channel

PIEDRA GRANDE DRIVE AT ANTONA HILLS WASH

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
880.00	2,270.68	7.77	113.3	71.12	70.69
890.00	2,270.69	7.79	114.2	71.33	70.90
900.00	2,270.71	7.82	115.1	71.55	71.12
910.00	2,270.72	7.84	116.1	71.76	71.33
920.00	2,270.73	7.86	117.0	71.98	71.54
930.00	2,270.74	7.89	117.9	72.19	71.75
940.00	2,270.76	7.91	118.8	72.40	71.96
950.00	2,270.77	7.93	119.8	72.61	72.16
960.00	2,270.78	7.95	120.7	72.82	72.37
970.00	2,270.80	7.98	121.6	73.02	72.58
980.00	2,270.81	8.00	122.5	73.23	72.78
990.00	2,270.82	8.02	123.4	73.43	72.98
1,000.00	2,270.83	8.04	124.3	73.64	73.18
1,010.00	2,270.85	8.06	125.2	73.84	73.39
1,020.00	2,270.86	8.09	126.1	74.04	73.59
1,030.00	2,270.87	8.11	127.0	74.24	73.78
1,040.00	2,270.88	8.13	127.9	74.44	73.98
1,050.00	2,270.89	8.15	128.8	74.64	74.18
1,060.00	2,270.91	8.17	129.7	74.84	74.37
1,070.00	2,270.92	8.19	130.6	75.04	74.57
1,080.00	2,270.93	8.21	131.5	75.23	74.76
1,090.00	2,270.94	8.23	132.4	75.43	74.96
1,100.00	2,270.95	8.29	132.7	75.50	75.02
1,110.00	2,270.95	8.36	132.7	75.50	75.02
1,120.00	2,270.95	8.44	132.7	75.50	75.02
1,130.00	2,270.95	8.51	132.7	75.50	75.02
1,140.00	2,270.95	8.59	132.7	75.50	75.02
1,150.00	2,270.95	8.66	132.7	75.50	75.02
1,160.00	2,270.95	8.74	132.7	75.50	75.02
1,170.00	2,270.95	8.81	132.7	75.50	75.02
1,180.00	2,270.95	8.89	132.7	75.50	75.02
1,190.00	2,270.95	8.97	132.7	75.50	75.02
1,200.00	2,270.95	9.04	132.7	75.50	75.02
1,210.00	2,270.95	9.12	132.7	75.50	75.02
1,220.00	2,270.95	9.19	132.7	75.50	75.02
1,230.00	2,270.95	9.26	132.8	75.51	75.04
1,240.00	2,270.96	9.28	133.6	75.68	75.21
1,250.00	2,270.97	9.30	134.4	75.86	75.38
1,260.00	2,270.98	9.32	135.2	76.03	75.56
1,270.00	2,270.99	9.34	136.0	76.21	75.73
1,280.00	2,271.00	9.36	136.8	76.38	75.90
1,290.00	2,271.01	9.38	137.6	76.55	76.07
1,300.00	2,271.02	9.39	138.4	76.72	76.24
1,310.00	2,271.03	9.41	139.2	76.90	76.41
1,320.00	2,271.04	9.43	140.0	77.07	76.58
1,330.00	2,271.05	9.45	140.8	77.23	76.74
1,340.00	2,271.06	9.47	141.6	77.40	76.91
1,350.00	2,271.07	9.48	142.3	77.57	77.08
1,360.00	2,271.08	9.50	143.1	77.74	77.24
1,370.00	2,271.09	9.52	143.9	77.91	77.41
1,380.00	2,271.10	9.54	144.7	78.07	77.57
1,390.00	2,271.11	9.55	145.5	78.24	77.74
1,400.00	2,271.12	9.57	146.3	78.40	77.90
1,410.00	2,271.13	9.59	147.1	78.57	78.06

Table
Rating Table for Irregular Channel

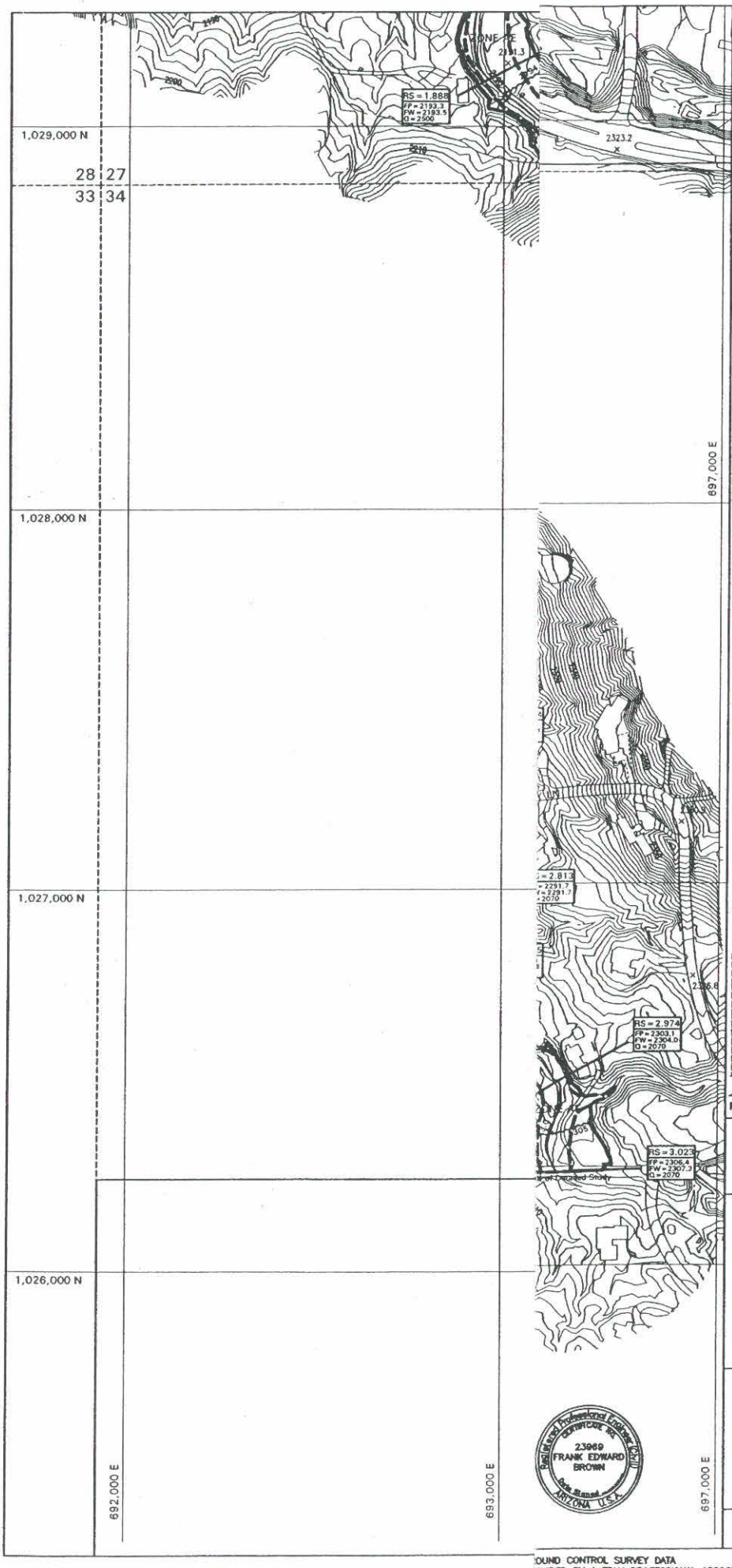
PIEDRA GRANDE DRIVE AT ANDORA HILLS WASH

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
1,420.00	2,271.14	9.61	147.8	78.73	78.22
1,430.00	2,271.15	9.62	148.6	78.89	78.39
1,440.00	2,271.16	9.64	149.4	79.06	78.55
1,450.00	2,271.17	9.66	150.2	79.22	78.71
1,460.00	2,271.18	9.67	150.9	79.38	78.87
1,470.00	2,271.19	9.69	151.7	79.54	79.03
1,480.00	2,271.20	9.71	152.5	79.70	79.19
1,490.00	2,271.21	9.72	153.3	79.86	79.34
1,500.00	2,271.22	9.74	154.0	80.02	79.50
1,510.00	2,271.23	9.75	154.8	80.18	79.66
1,520.00	2,271.24	9.77	155.6	80.34	79.81
1,530.00	2,271.25	9.79	156.3	80.49	79.97
1,540.00	2,271.26	9.80	157.1	80.65	80.13
1,550.00	2,271.27	9.82	157.9	80.81	80.28
1,560.00	2,271.28	9.83	158.6	80.96	80.44
1,570.00	2,271.29	9.85	159.4	81.12	80.59
1,580.00	2,271.30	9.86	160.2	81.27	80.74
1,590.00	2,271.31	9.88	160.9	81.43	80.90
1,600.00	2,271.32	9.90	161.7	81.58	81.05
1,610.00	2,271.33	9.91	162.4	81.74	81.20
1,620.00	2,271.34	9.93	163.2	81.89	81.35
1,630.00	2,271.35	9.94	164.0	82.04	81.50
1,640.00	2,271.35	9.96	164.7	82.19	81.65
1,650.00	2,271.36	9.97	165.5	82.35	81.80
1,660.00	2,271.37	9.99	166.2	82.50	81.95
1,670.00	2,271.38	10.00	167.0	82.65	82.10
1,680.00	2,271.39	10.02	167.7	82.80	82.25
1,690.00	2,271.40	10.03	168.5	82.95	82.40
1,700.00	2,271.41	10.05	169.2	83.10	82.54
1,710.00	2,271.42	10.06	170.0	83.24	82.69
1,720.00	2,271.43	10.07	170.7	83.39	82.84
1,730.00	2,271.44	10.09	171.5	83.54	82.98
1,740.00	2,271.45	10.10	172.2	83.69	83.13
1,750.00	2,271.45	10.12	173.0	83.83	83.28
1,760.00	2,271.46	10.13	173.7	83.98	83.42
1,770.00	2,271.47	10.15	174.4	84.13	83.56
1,780.00	2,271.48	10.16	175.2	84.27	83.71
1,790.00	2,271.49	10.17	175.9	84.42	83.85
1,800.00	2,271.50	10.19	176.7	84.56	84.00
1,810.00	2,271.51	10.20	177.4	84.71	84.14
1,820.00	2,271.52	10.22	178.1	84.85	84.28
1,830.00	2,271.53	10.23	178.9	84.99	84.42
1,840.00	2,271.53	10.24	179.6	85.14	84.56
1,850.00	2,271.54	10.26	180.4	85.28	84.71
1,860.00	2,271.55	10.27	181.1	85.42	84.85
1,870.00	2,271.56	10.28	181.8	85.56	84.99
1,880.00	2,271.57	10.30	182.6	85.70	85.13
1,890.00	2,271.58	10.31	183.3	85.85	85.27
1,900.00	2,271.59	10.32	184.0	85.99	85.40
1,910.00	2,271.59	10.34	184.8	86.13	85.54
1,920.00	2,271.60	10.35	185.5	86.27	85.68
1,930.00	2,271.61	10.36	186.2	86.41	85.82
1,940.00	2,271.62	10.38	186.9	86.54	85.96
1,950.00	2,271.63	10.39	187.7	86.68	86.09

Table
Rating Table for Irregular Channel

PIEDRA GRANDE DRIVE AT ANDORA HILLS WASH

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
1,960.00	2,271.64	10.40	188.4	86.82	86.23
1,970.00	2,271.64	10.42	189.1	86.96	86.37
1,980.00	2,271.65	10.43	189.8	87.10	86.50
1,990.00	2,271.66	10.44	190.6	87.23	86.64
2,000.00	2,271.67	10.46	191.3	87.37	86.78
2,010.00	2,271.68	10.47	192.0	87.51	86.91
2,020.00	2,271.69	10.48	192.7	87.64	87.05
2,030.00	2,271.69	10.49	193.5	87.78	87.18
2,040.00	2,271.70	10.51	194.2	87.91	87.31
2,050.00	2,271.71	10.52	194.9	88.05	87.45
2,060.00	2,271.72	10.53	195.6	88.18	87.58
2,070.00	2,271.73	10.54	196.3	88.32	87.71
2,080.00	2,271.74	10.56	197.1	88.45	87.85
2,090.00	2,271.74	10.57	197.8	88.59	87.98
2,100.00	2,271.75	10.58	198.5	88.72	88.11
2,110.00	2,271.76	10.59	199.2	88.85	88.24
2,120.00	2,271.77	10.60	199.9	88.98	88.37
2,130.00	2,271.78	10.62	200.6	89.12	88.50
2,140.00	2,271.78	10.63	201.3	89.25	88.63
2,150.00	2,271.79	10.64	202.0	89.38	88.77
2,160.00	2,271.80	10.65	202.8	89.51	88.90
2,170.00	2,271.81	10.66	203.5	89.64	89.02
2,180.00	2,271.82	10.68	204.2	89.77	89.15
2,190.00	2,271.82	10.69	204.9	89.90	89.28
2,200.00	2,271.83	10.70	205.6	90.03	89.41
2,210.00	2,271.84	10.71	206.3	90.16	89.54
2,220.00	2,271.85	10.72	207.0	90.29	89.67
2,230.00	2,271.86	10.74	207.7	90.42	89.80
2,240.00	2,271.86	10.75	208.4	90.55	89.92
2,250.00	2,271.87	10.76	209.1	90.68	90.05
2,260.00	2,271.88	10.77	209.8	90.81	90.18
2,270.00	2,271.89	10.78	210.5	90.94	90.30
2,280.00	2,271.90	10.79	211.2	91.06	90.43
2,290.00	2,271.90	10.80	211.9	91.19	90.56
2,300.00	2,271.91	10.82	212.6	91.32	90.68
2,310.00	2,271.92	10.83	213.3	91.44	90.81
2,320.00	2,271.93	10.84	214.0	91.57	90.93
2,330.00	2,271.93	10.85	214.7	91.70	91.06
2,340.00	2,271.94	10.86	215.4	91.82	91.18
2,350.00	2,271.95	10.87	216.1	91.95	91.31
2,360.00	2,271.96	10.88	216.8	92.07	91.43
2,370.00	2,271.96	10.89	217.5	92.20	91.55
2,380.00	2,271.97	10.91	218.2	92.32	91.68
2,390.00	2,271.98	10.92	218.9	92.45	91.80
2,400.00	2,271.99	10.93	219.6	92.57	91.92



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOODPLAIN DELINEATION STUDY OF ANDORA HILLS & GALLOWAY WASHES FCD 99-14

JUNE, 2001

LEGEND

100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	1.2 — 1.3
CROSS SECTION	RS = 0.300, FP = 2061.0, FW = 2061.5, Q = 13,700
ELEVATION REFERENCE MARK	ERM 4
BASE FLOOD ELEVATIONS	2060
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	TOWN OF CAVECREEK
SECTION LINE	

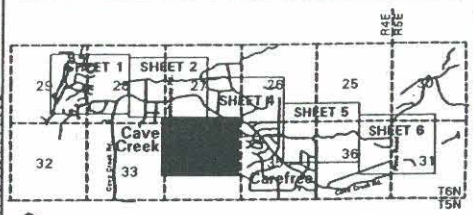
ELEVATION REFERENCE MARKS

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
ERM 4	2290.43	BC IN C/L OF TERRACE ESTATES CIRCLE, APPROXIMATELY 1000 FEET NORTH OF INTERSECTION OF BURRO ROAD AND HOLIDAY LANE, S34, T6N, R4E (N1028038.50, E695882.82)

NOTES

1. THE HYDRAULIC BASE LINE IS CROSS SECTION STATION 10,000 UNLESS NOTED OTHERWISE.
2. HORIZONTAL PROJECTION IS ARIZONA STATEPLANE, CENTRAL ZONE, NORTH AMERICAN DATUM OF 1983.
3. ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929. CONVERSION FACTOR: 1988 NGVD = 2.05 + 1929 NGVD

INDEX MAP



NORTH

200 0' 200 400

SCALE: 1" = 200 FEET

CONTOUR INTERVAL = 2 FEET

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
24530
DAVID A. RHINE
Date Signed
ARIZONA, U.S.A.

JE FULLER
HYDROLOGY & GEOMORPHOLOGY, INC.

in association with

DIBBLE & ASSOCIATES
CONSULTING ENGINEERS

SHEET 3 OF 8

OUND CONTROL SURVEY DATA
OVIDED BY A TEAM PROFESSIONAL ASSOCIATES, INC.

AW 100 YR, 6 HR
FUTURE

PIEDRA GRANDE DRIVE AT ANDORA HILLS WASH

```
1**************************************
*                                    *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)*
*              JUN  1998             *
*            VERSION 4.1             *
*                                    *
*  RUN DATE   27NOV02  TIME  08:23:52*
*                                    *
**************************************
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```
*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*           (916) 756-1104          *
*                                   *
*************************************
```

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

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

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

```
1                                   HEC-1 INPUT                                          PAGE  1

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

    1           ID   ANDORA HILLS WASH FUTURE CONDITIONS
    2           ID
    3           ID    100-YEAR 6-HOUR MODEL  FILENAME: AW1006F.DAT
    4           ID      MODIFIED BY JEF, INC. FOR CAREFREE AREA DRAINAGE MASTER PLAN
    5           ID      MODIFICATIONS INCLUDE:
    6           ID      1)  CHANGES TO WATERSHED DELINATION BETWEEN S320 AND S340L
    7           ID          EXAMINATION OF AERIAL PHOTOGRAPHS REVEALED AREA WITHIN
    8           ID          S320 THAT ACTUALLY FLOWS THROUGH S340L NEAR THE SW CORNER
    9           ID          OF S340L OFF THE BLACK MOUNTAIN HILLS.
   10           ID      2)  ADDITION OF NEW COMBINATION BLOCKS TO SEPARATE COMBINATIONS WITH
   11           ID          MORE THAN TWO HYDROGRAPHS IN THE ORIGINAL MODEL.
   12           ID      3)  FUTURE CONDITIONS LAND USE INTERPRETED FROM FUTURE LAND USE IN
   13           ID          CAVE CREEK WATERCOURSE MASTER PLAN BY TETRA TECH, 2001
   14           ID
   15           ID    BASED ON:
   16           ID
   17           ID        Cave Creek Above Carefree Highway FPD Study       File: AW100-6.IH1
   18           ID           by  GVSCE for Maricopa County FCD 95-28    Original: 06-17-96     mcg
   19           ID           Project:            84                       Revised:
   20           ID
   21           ID         Andora Hills Wash sub-watershed model
   22           ID           100-year, 6-hr rainfall with FCDMC Design Manual distribution
   23           ID           Green & Ampt Loss Rate Method
   24           ID           NMIN = 2
   25           ID           Clark Unit Hydrograph
   26           ID           Modified Puls, normal depth channel routing
                *
                *
                *
   27           IT       2                     900
   28           IO       5       2
   29           IN      15
                *
                *DIAGRAM
                *
                *  Depth-Area reduction factors taken from Table 2.2 of FCDMC Design Manual
                *
                *  6-hr rainfall distributions per Table 2.4 and Figure 2.17 of Design Manual
                *
   30           JD    3.40    0.01
   31           PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
   32           PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
   33           PC   0.962   0.972   0.983   0.991   1.000
   34           JD    3.38    0.50
   35           JD    3.30    2.80
   36           PC   0.000   0.009   0.016   0.025   0.034   0.042   0.051   0.059   0.067   0.076
   37           PC   0.087   0.100   0.120   0.163   0.252   0.451   0.694   0.837   0.900   0.938
   38           PC   0.950   0.963   0.975   0.988   1.000
                *
                *
1                                   HEC-1 INPUT                                          PAGE  2

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

   39           KK    S320
   40           KM   SUB-BASIN AHW1
```

PIEDRA GRANDE DRIVE AT ANDORA HILLS WASH

```
  20548 8950
  20550 8960
  20552 8970
  20554 8980
  20556 8990
  20558 9000---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
1
1                                                   STATION     C350

                    (O) OUTFLOW
          0.      400.      800.     1200.     1600.     2000.     2400.       0.       0.       0.       0.       0.       0.
DAHRMN PER
 10000   10---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
 10002   20
 10004   30
 10006   40
 10008   50
 10010   60
 10012   70
 10014   80
 10016   90
 10018  100
 10020  110
 10022  120
 10024  130
 10026  140
 10028  150
 10030  160
 10032  170
 10034  180
 10036  190
 10038  200
 10040  210
 10042  220
 10044  230
 10046  240
 10048  250
 10050  260
 10052  270
 10054  280
 10056  290
 10058  300
 10100  310
 10102  320
 10104  33.0
 10106  34.0
 10108  35.0
 10110  36.0
 10112  37.0
 10114  38.0
 10116  39.0
 10118  40.0
 10120  41.0
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 10152  57.0
 10154  58.0
 10156  59.0
 10158  60.0
 10200  61.0
 10202  62.0
 10204  63.0
 10206  64.0
 10208  65.0
 10210  66.0
 10212  67.0
 10214  68.0
 10216  69.0
 10218  70.0
 10220  71.0
 10222  72.0
 10224  73.0
 10226  74.0
 10228  75.0
 10230  76.0
 10232  77.0
 10234  78.0
 10236  79.0
 10238  80.0
 10240  81.0
 10242  82.0
 10244  83.0
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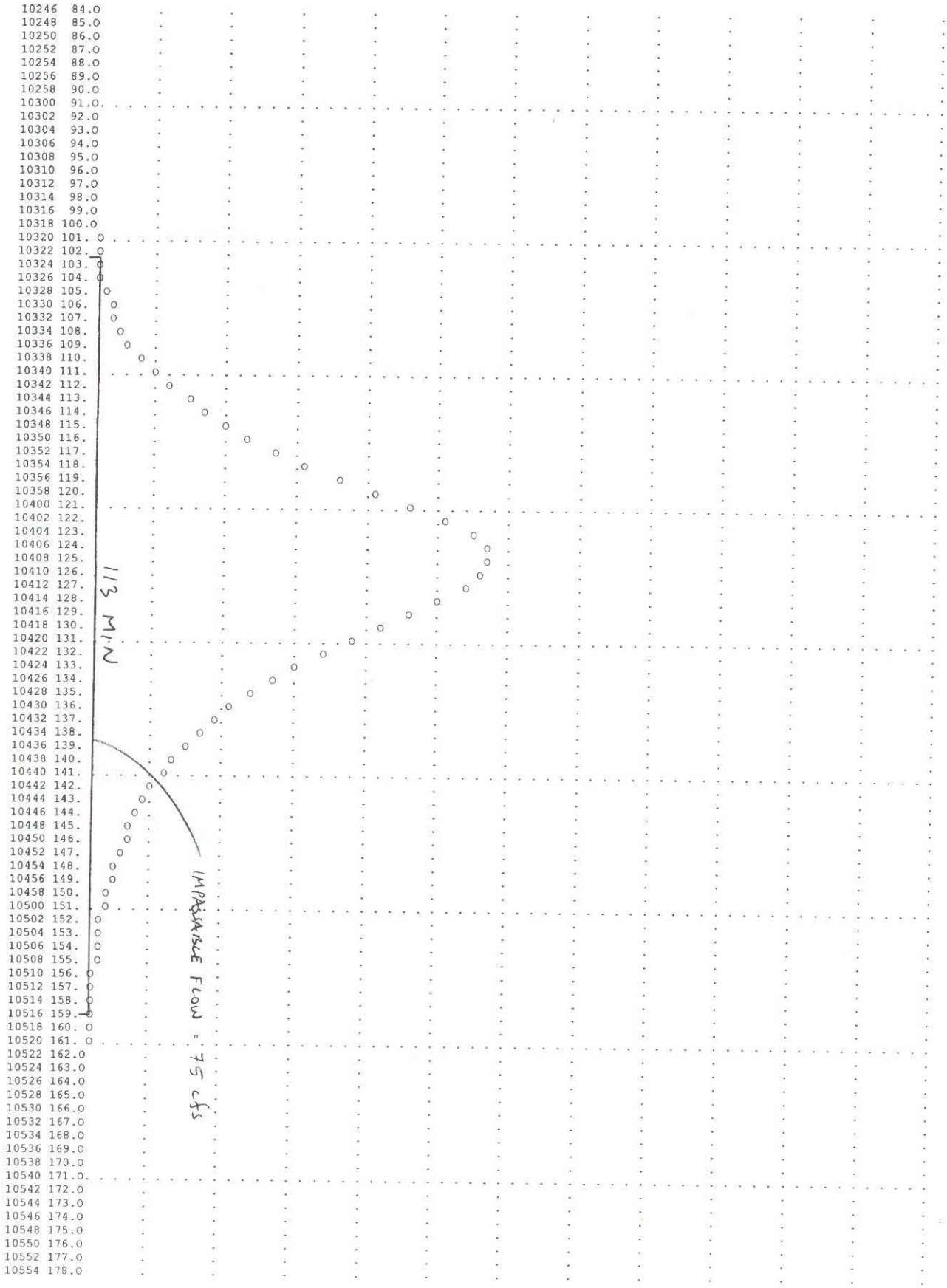
PIEDRA GRANDE DRIVE AT ANDORA HILLS WASH

400



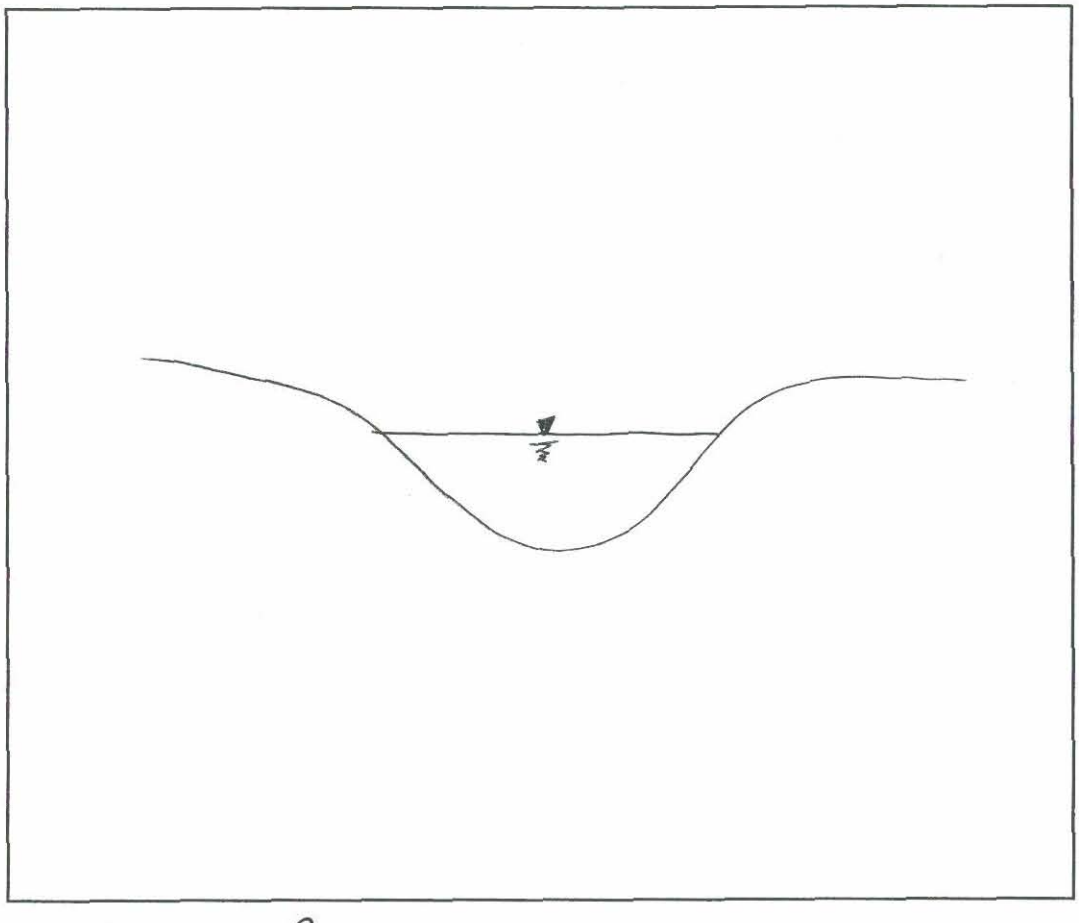
Carefree Highway West of Carefree Mountain Drive (#236)

Carefree Drainage Master Plan
Dip Crossing Notes

ID Number: #236

Source of Data:

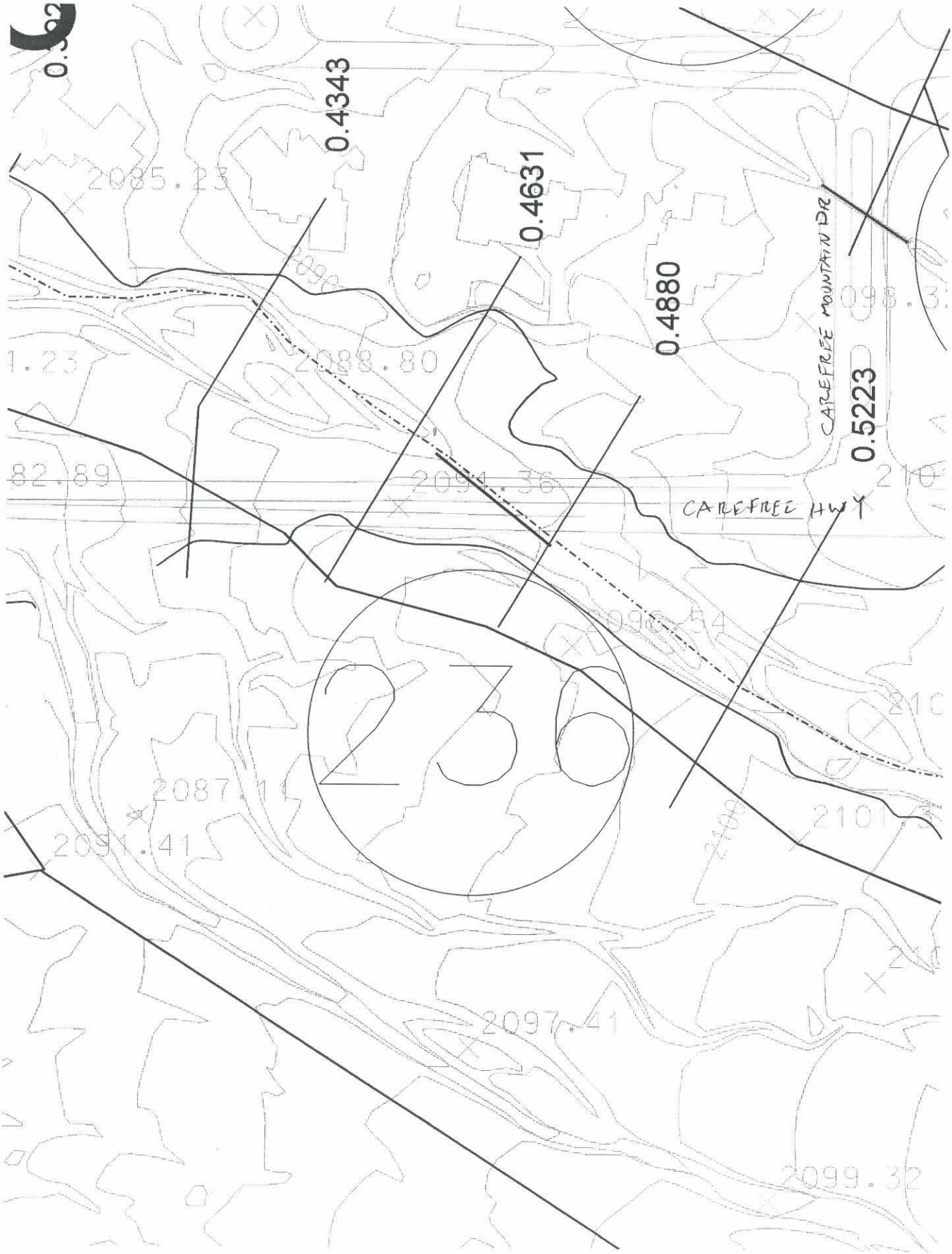
Location: CAREFREE HIGHWAY WEST OF CAREFREE MOUNTAIN DRIVE



Material: PAVED DIP CROSSING

Protection:

Notes:

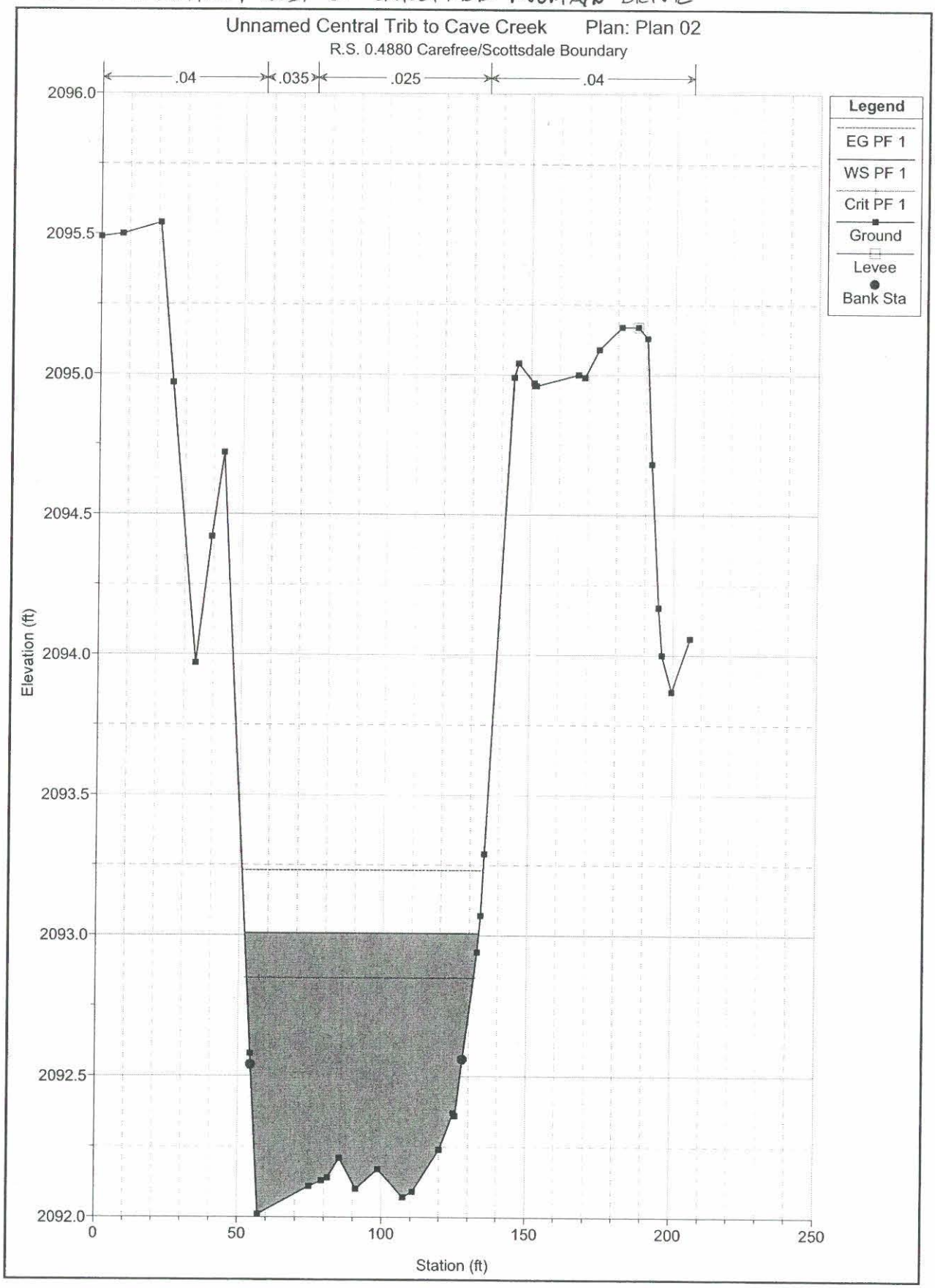


CAREFREE Highway WEST OF
CAREFREE MOUNTAIN DRIVE

N

SCALE 1" = 100'

CAREFREE HIGHWAY WEST OF CAREFREE MOUNTAIN DRIVE



CAREFREE HIGHWAY WEST OF CAREFREE MTN DRIVE

Plan: Plan 02 Unnamed Central South RS: 0.4880 Profile: PF 1

E.G. Elev (ft)	2093.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.23	Wt. n-Val.	0.040	0.028	0.025
W.S. Elev (ft)	2092.96	Reach Len. (ft)	131.84	131.84	131.84
Crit W.S. (ft)	2092.83	Flow Area (sq ft)	0.44	59.60	1.03
E.G. Slope (ft/ft)	0.006782	Area (sq ft)	0.44	59.60	1.03
Q Total (cfs)	233.00	Flow (cfs)	0.46	230.81	1.73
Top Width (ft)	80.65	Top Width (ft)	2.09	73.50	5.06
Vel Total (ft/s)	3.82	Avg. Vel. (ft/s)	1.06	3.87	1.69
Max Chl Dpth (ft)	0.95	Hydr. Depth (ft)	0.21	0.81	0.20
Conv. Total (cfs)	2829.2	Conv. (cfs)	5.6	2802.6	21.0
Length Wtd. (ft)	131.84	Wetted Per. (ft)	2.13	73.56	5.08
Min Ch El (ft)	2092.01	Shear (lb/sq ft)	0.09	0.34	0.09
Alpha	1.02	Stream Power (lb/ft s)	0.09	1.33	0.14
Frctn Loss (ft)	0.91	Cum Volume (acre-ft)	4.14	2.05	3.18
C & E Loss (ft)	0.02	Cum SA (acres)	5.10	1.12	4.21

UC 100 YR, 24 HR
FUTURE
CAREFREE HIGHWAY WEST OF CAREFREE MOUNTAIN DRIVE

```
1*************************************
*                                   *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN  1998            *
*            VERSION 4.1            *
*                                   *
*  RUN DATE   27NOV02  TIME  08:53:50  *
*                                   *
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*************************************
*                                   *
*   U.S. ARMY CORPS OF ENGINEERS    *
*   HYDROLOGIC ENGINEERING CENTER   *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*          (916) 756-1104           *
*                                   *
*************************************
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X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX        XXX
```

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

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DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM


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

  1           ID         UC MODEL - UNNAMED WASH, CENTRAL
  2           ID         100-YEAR 24-HOUR MODEL  FILENAME: UC10024F.DAT
  3           ID         FUTURE CONDITIONS
  4           ID         CAREFREE DRAINAGE MASTER PLAN
  5           ID         FCD 2000C037
  6           ID         BY CH2M HILL
  7           ID         FOR THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
  8           ID         JANUARY 2002
  9           ID    ***************************************************************
 10           ID         100 YEAR ANALYSIS 24-HOUR STORM
 11           ID         SCS TYPE II DISTRIBUTION
 12           ID         GREEN AND AMPT LOSS RATE METHOD, NMIN=2
 13           ID         CLARK UNIT HYDROGRAPH, NORMAL DEPTH CHANNEL ROUTING
 14           ID   ***************************************************************
 15           ID     DEPTH-AREA REDUCT FACTORS BASED ON TABLE 2.1a OF FCDMC MANUAL
 16           ID     PC RECORDS ARE 24-HOUR SCS TYPE II RAINFALL DISTRIBUTION
 17           ID     PRELIMINARY
              *DIAGRAM
 18           IT       2                    500
 19           IO       5       2
 20           IN      15
 21           JD    4.60    0.01
 22           PC   0.000   0.002   0.005   0.008   0.011   0.013   0.016   0.019   0.022   0.025
 23           PC   0.028   0.032   0.035   0.038   0.041   0.044   0.048   0.053   0.056   0.060
 24           PC   0.063   0.067   0.071   0.075   0.080   0.084   0.089   0.093   0.098   0.103
 25           PC   0.109   0.114   0.120   0.127   0.133   0.140   0.147   0.155   0.163   0.172
 26           PC   0.181   0.192   0.204   0.220   0.235   0.259   0.283   0.473   0.663   0.699
 27           PC   0.735   0.754   0.772   0.785   0.799   0.810   0.820   0.829   0.838   0.846
 28           PC   0.854   0.861   0.868   0.874   0.880   0.885   0.891   0.900   0.902   0.910
 29           PC   0.912   0.920   0.921   0.926   0.929   0.930   0.937   0.941   0.945   0.950
 30           PC   0.952   0.957   0.959   0.962   0.965   0.970   0.972   0.973   0.978   0.981
 31           PC   0.984   0.987   0.989   0.992   0.995   0.998   1.000
 32           JD    4.57    1.00
 33           JD    4.46    5.00
              *

 34           KK     UC8
 35           KM   SUB-BASIN 8, UNNAMED WASH CENTRAL
 36           KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 37           KM    L= 1.04   Kb= 0.031   S=138.0
 38           BA    .054
 39           LG     .30     .36     4.9     .26    36.0
 40           UC    .225    .384
 41           UA       0       5      16      30      65      77      84      90      94      97
 42           UA     100
              *

 43           KK     UC9
 44           KM    SUBBASIN 9, UNNAMED WASH CENTRAL
 45           KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 46           KM    L= 0.91   Kb= 0.031   S=145.0
 47           BA    .047
 48           LG     .30     .36     5.0     .23    36.0
 49           UC    .208    .316
 50           UA       0       5      16      30      65      77      84      90      94      97
```

Carefree Highway West of Carefree Mountain Drive

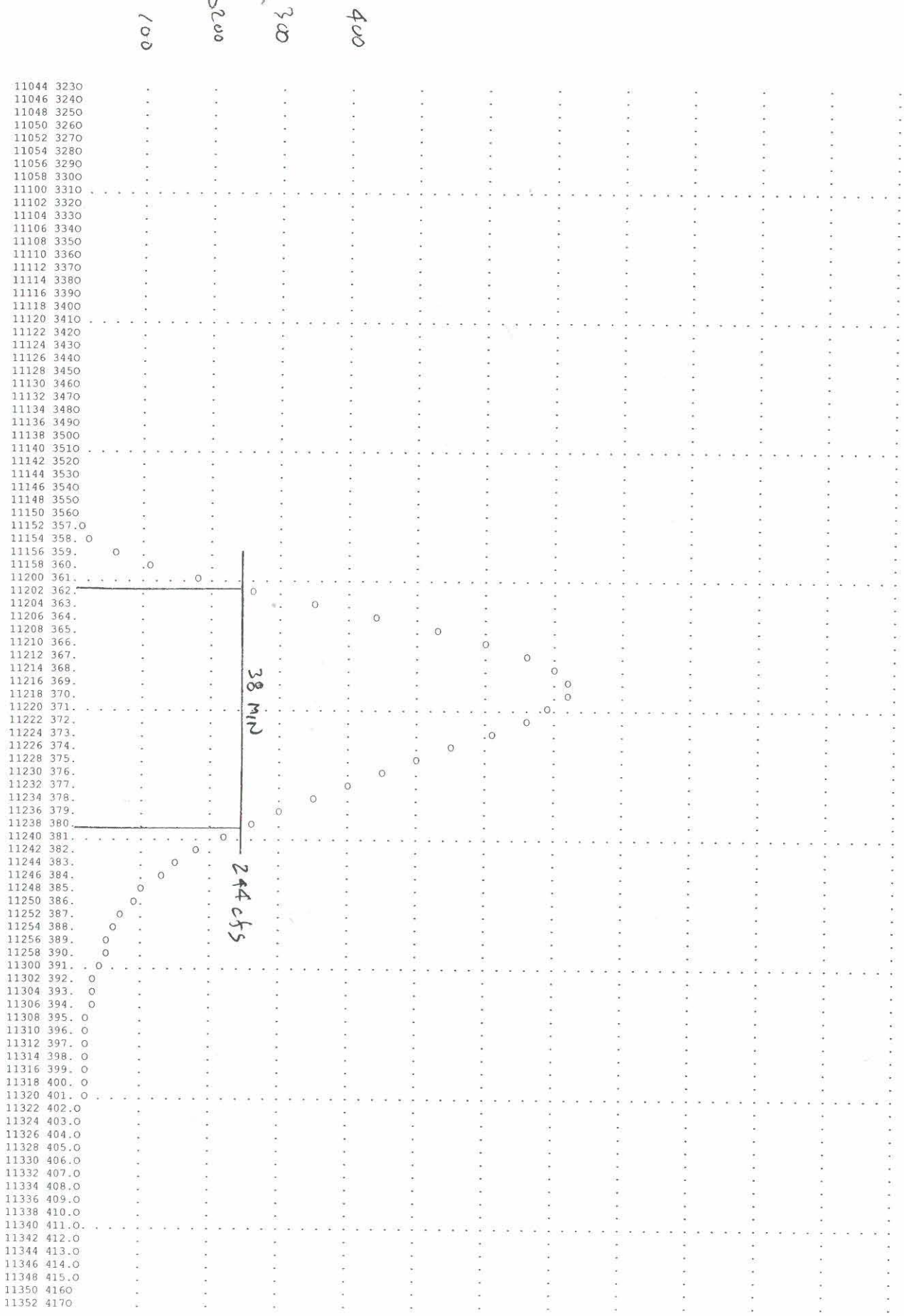
```
11456 4490
11458 4500
11500 4510
11502 4520
11504 4530
11506 4540
11508 4550
11510 4560
11512 4570
11514 4580
11516 4590
11518 4600
11520 4610
11522 4620
11524 4630
11526 4640
11528 4650
11530 4660
11532 4670
11534 4680
11536 4690
11538 4700
11540 4710
11542 4720
11544 4730
11546 4740
11548 4750
11550 4760
11552 4770
11554 4780
11556 4790
11558 4800
11600 4810
11602 4820
11604 4830
11606 4840
11608 4850
11610 4860
11612 4870
11614 4880
11616 4890
11618 4900
11620 4910
11622 4920
11624 4930
11626 4940
11628 4950
11630 4960
11632 4970
11634 4980
11636 4990
11638 5000
1
1
```

STATION RD84IN

(O) OUTFLOW

DAHRMN	PER	0.	100.	200.	300.	400.	500.	600.	700.	800.	0.	0.	0.	0.
10000	10													
10002	20													
10004	30													
10006	40													
10008	50													
10010	60													
10012	70													
10014	80													
10016	90													
10018	100													
10020	110													
10022	120													
10024	130													
10026	140													
10028	150													
10030	160													
10032	170													
10034	180													
10036	190													
10038	200													
10040	210													
10042	220													
10044	230													
10046	240													
10048	250													
10050	260													
10052	270													
10054	280													
10056	290													
10058	300													
10100	310													
10102	320													
10104	330													
10106	340													
10108	350													
10110	360													
10112	370													

CAREFREE HIGHWAY WEST OF CAREFREE MOUNTAIN DRIVE



Terravita Way (#239)

Carefree Drainage Master Plan
Field Survey Notes

Culvert Number: 239

Date of Survey: As-built Plans (attached)

Location: Terravita Way

See attached
Split Flow Calculations

Material: Dip crossing + 4 - 10'x4' Boxes

Headwall:

Notes:

Terravita Way Boundary Conditions and Flow Split Determination

TO: File

COPIES: File

FROM: Tony Bokich

DATE: April 30, 2003 (Revised (3/19/04)

A hydraulic analysis was performed on Terravita Way to determine the downstream boundary condition for the Unnamed Central Tributary to Cave Creek and to determine the direction flow would travel. Flow could travel north through 4-10'x4' RCBC's, or north, south or west over Terravita Way.

The Haestad CulvertMaster program was used to determine the maximum water surface elevation at Terravita Way of 2141.45 and used as the boundary condition. This information was used to determine the maximum flow through the box culverts and overtopping flows at 4 low points along the roadway profile. Culvert and channel analyses generated a flow-rating table of box culvert and overtopping flows at four low points on the roadway profile. The analysis determined that 1,578 cfs flows through the box culvert while 142 cfs, 562 cfs, and 514 cfs will flow to the south, west, and north, respectively, of Terravita Way.

The total flow used in the analysis is 2,849 cfs. This figure omits the small side channel flow that enters the north side of the main stream about 70 feet upstream of the culvert. This wash (UC84 in the HEC-1 output) was combined at this location after the initial flow split of 2092 to the north and 704 to the south. It increased the north peak to 2116 cfs. The difference in peak flows between the overtopping analysis and the HEC-RAS flows at Terravita Way is a total of 24 cfs or 1.1% of the total flow.

The results of the flow split analysis produced rating curves that determine the flow split quantitatively. These rating curves were incorporated into the HEC-1 model. The peak flow entering the Unnamed Central Tributary to Cave Creek - North Branch is taken from concentration point CP84. The peak flow entering the South Branch is taken from RD84S and then D84IIN. Refer to the Summary of HEC-RAS Model Flow Changes table in the TDN.

Terravita Way Flow Split Estimation
03/19/2004
Carefree DMP
162944.DP.15.03

A total flow of cfs arrives at Terravita Way. The 2849 cfs flow will split at Terravita Way and will go:

1. Through the culvert to the North
2. Over the Road to the North
3. Over the Road to the West and
4. Over the Road and to the South.

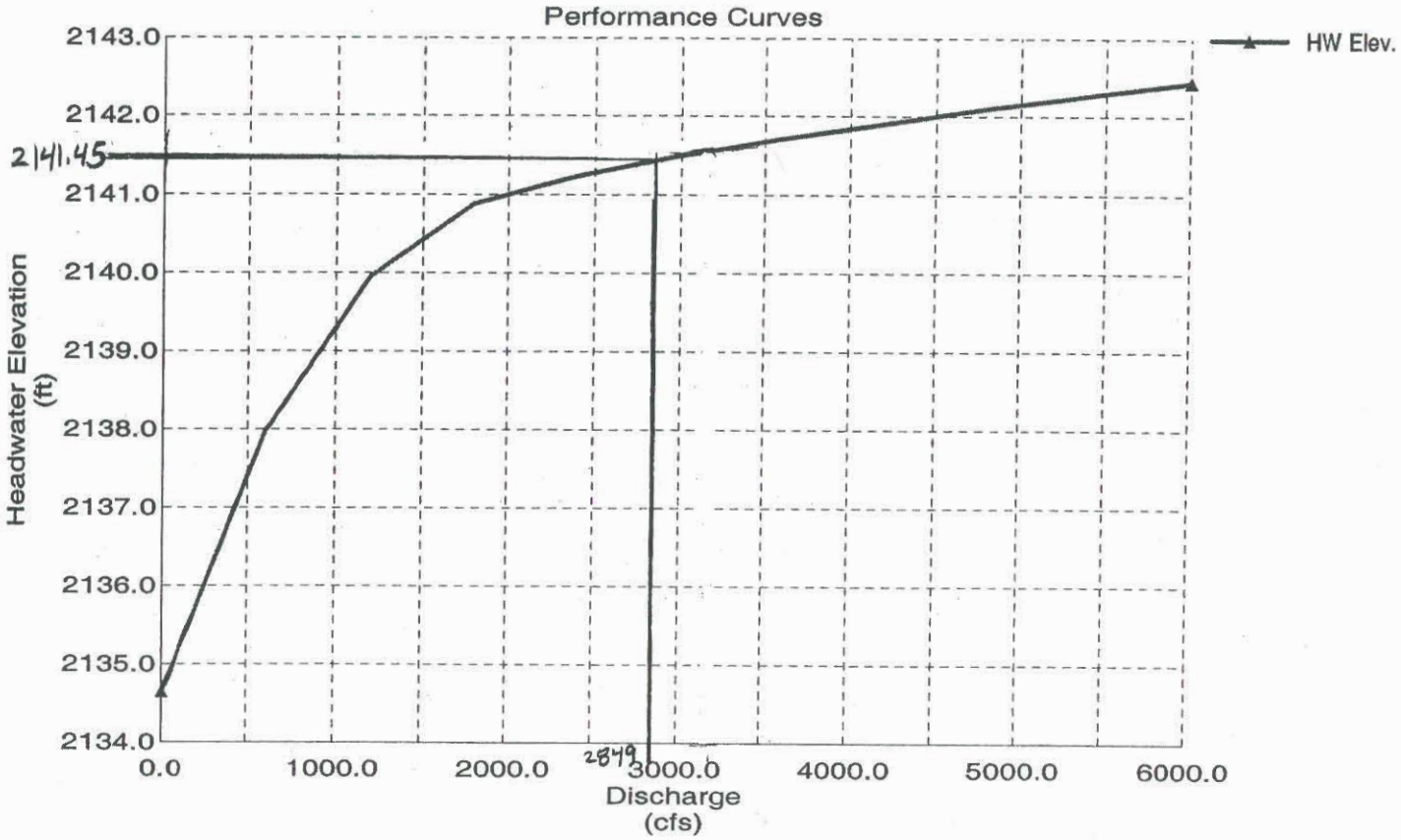
Culvert capacity was analyzed using both Culvert Master and HY-8 and the results were identical. A rating curve was developed that takes into account the headwater depths. Rating curves were developed for the total flow, culvert and overtopping and just for the culvert. The flow split was further analyzed with the Culvertmaster program at the centerline of overtopping (see attached map). This is the line at which overtopping will occur, it is not the centerline of the roadway. Using the 5 existing low points on the centerline profile, the centerline was divided into individual sections to determine the amount of flow that will go North, South, or West. A rating table was determined for each section to yield total flow for each section.

The resulting Rating Table is as follows:

WSE	Total Flow	Road	Culvert	North (Road & Culvert)	South	West
2134.64	0	0	0	0	0	0
2135.5	79.7	0	79.7	79.7	0	0
2136.55	255	0	255	255	0	0
2137.59	490	0	490	490	0	0
2138.98	880	0	880	880	0	0
2140.08	1250	50	1200	1250	0	0
2140.67	1550	175	1375	1550	0	0
2141	1964	514	1450	1839	0	125
2141.28	2475	950	1525	2090	10	375
2141.45	2849	1271	1578	2116	142	562
2141.52	3043	1443	1600	2270	150	663

Performance Curves Report
terravita way

Range Data:			
	Minimum	Maximum	Increment
Discharge	0.00	6,000.00	600.00 cfs



Culvert Analysis Report
Terravita Way

nponent:Culvert-1

Culvert Summary			
Computed Headwater Elevation	2,141.45 ft	Discharge	1,577.80 cfs
Inlet Control HW Elev	2,141.45 ft	Tailwater Elevation	2,133.70 ft
Outlet Control HW Elev	2,140.83 ft	Control Type	Inlet Control
Headwater Depth/ Height	1.70		

Grades			
Upstream Invert	2,134.64 ft	Downstream Invert	2,133.70 ft
Length	90.00 ft	Constructed Slope	0.010444 ft/ft

Hydraulic Profile			
Profile	S2	Depth, Downstream	2.79 ft
Slope Type	Steep	Normal Depth	2.43 ft
Flow Regime	Supercritical	Critical Depth	3.64 ft
Velocity Downstream	14.12 ft/s	Critical Slope	0.003320 ft/ft

Section			
Section Shape	Box	Mannings Coefficient	0.013
Section Material	Concrete	Span	10.00 ft
Section Size	10 x 4 ft	Rise	4.00 ft
Number Sections	4		

;let Control Properties			
Outlet Control HW Elev	2,140.83 ft	Upstream Velocity Head	1.82 ft
Ke	0.40	Entrance Loss	0.73 ft

Inlet Control Properties			
Inlet Control HW Elev	2,141.45 ft	Flow Control	Submerged
Inlet Type 3/4" chamfers; 45 ° skewed headwall		Area Full	160.0 ft²
K	0.52200	HDS 5 Chart	11
M	0.66700	HDS 5 Scale	1
C	0.04020	Equation Form	2
Y	0.73000		

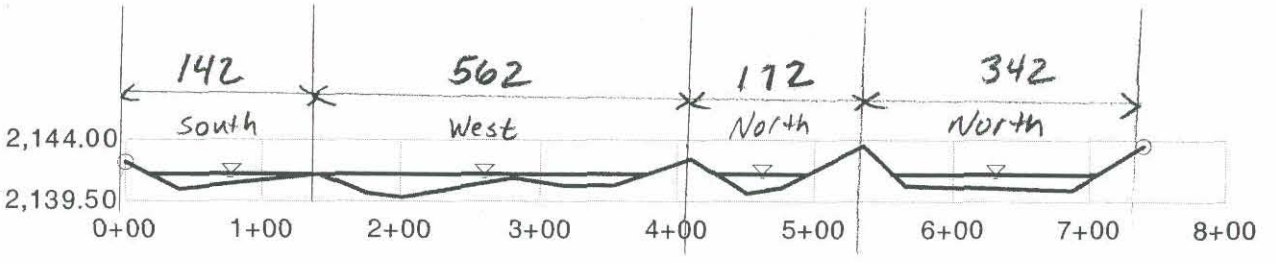
Cross Section
Cross Section for Irregular Channel

TERRAVITA WAY FLOW SPLIT ESTIMATION

Project Description	
Worksheet	Overall Roadway Section
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Section Data	
Mannings Coefficient	0.035
Slope	0.005919 ft/ft
Water Surface Elevation	2,141.45 ft
Elevation Range	2,139.80 to 2,143.56
Discharge	1,271.07 cfs

Total Flow = 2849 cfs
Culvert = 1578 cfs
Road = 1271 cfs
WSE = 2141.45 ft



Roadway Profile

V:10.0
H:1
NTS

Worksheet
Worksheet for Irregular Channel

Project Description	
Worksheet	Overall Roadway Section
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Input Data	
Slope	0.005919 ft/ft
Water Surface Elevation	2,141.45 ft

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Method	Improved Lotter's Method
Closed Channel Weighting Method	Horton's Method

Results	
Mannings Coefficient	0.035
Elevation Range	2,139.80 to 2,143.56
Discharge	1,271.07 cfs
Flow Area	453.2 ft²
Wetted Perimeter	569.63 ft
Top Width	569.39 ft
Actual Depth	1.65 ft
Critical Elevation	2,141.15 ft
Critical Slope	0.021377 ft/ft
Velocity	2.80 ft/s
Velocity Head	0.12 ft
Specific Energy	2,141.57 ft
Froude Number	0.55
Flow Type	Subcritical

Calculation Messages:
Flow is divided.

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00	7+40	0.035

Natural Channel Points

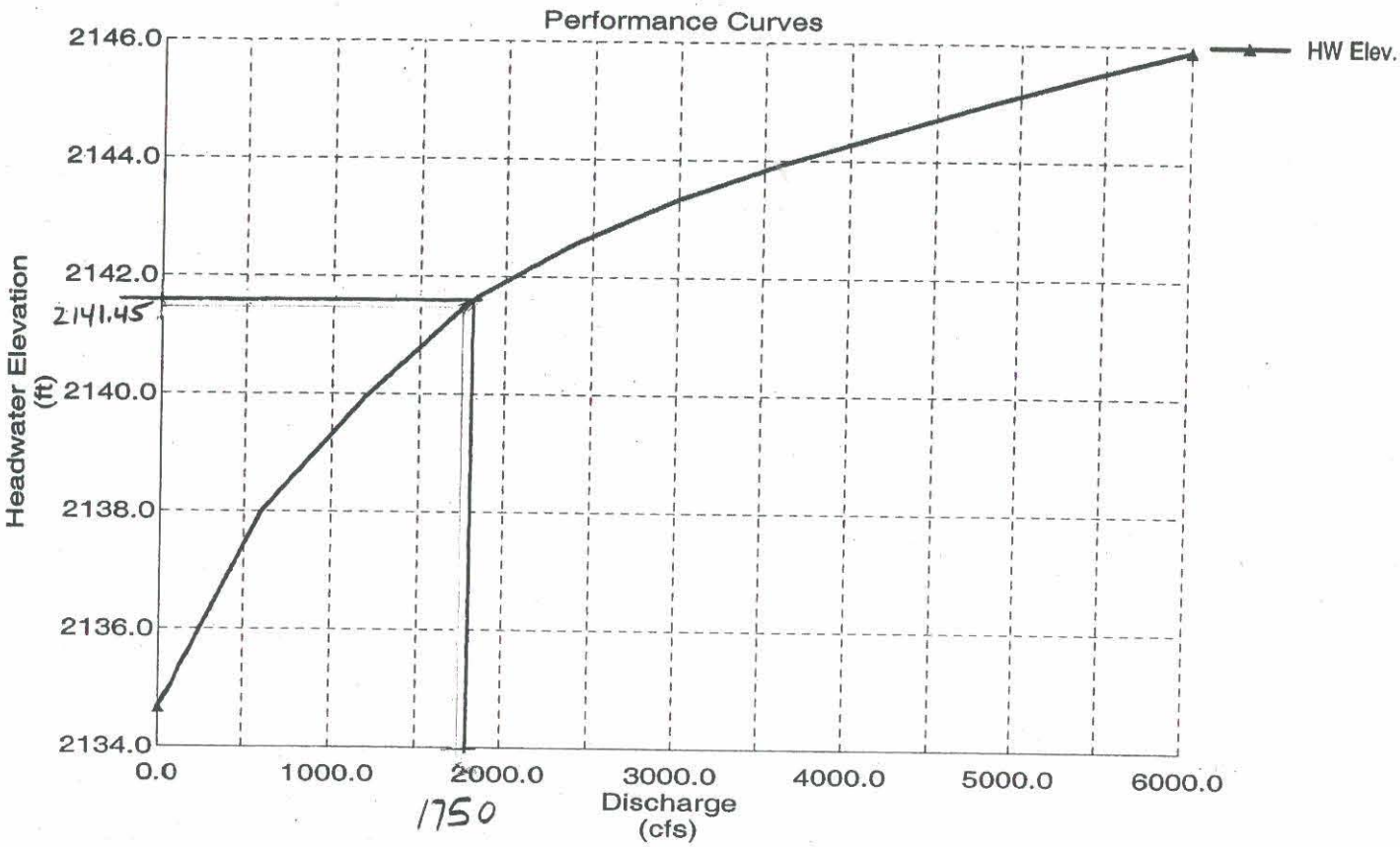
Station (ft)	Elevation (ft)
0+00	2,142.30
0+40	2,140.35
1+40	2,141.50
1+75	2,140.05
2+01	2,139.80
2+81	2,141.14
3+17	2,140.62
3+54	2,140.62
4+10	2,142.62
4+51	2,140.08
4+76	2,140.49

Worksheet
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
5+35	2,143.56
5+65	2,140.58
6+88	2,140.38
7+40	2,143.50

Performance Curves Report
terravita way <north 1>

Range Data:				
	Minimum	Maximum	Increment	
Discharge	0.00	6,000.00	600.00	cfs



1750 - 1578 = 172 CFS

CULVERT FLOW

OVERTOPPING

Performance Curves Report
terravita way <north 2>

Range Data:				
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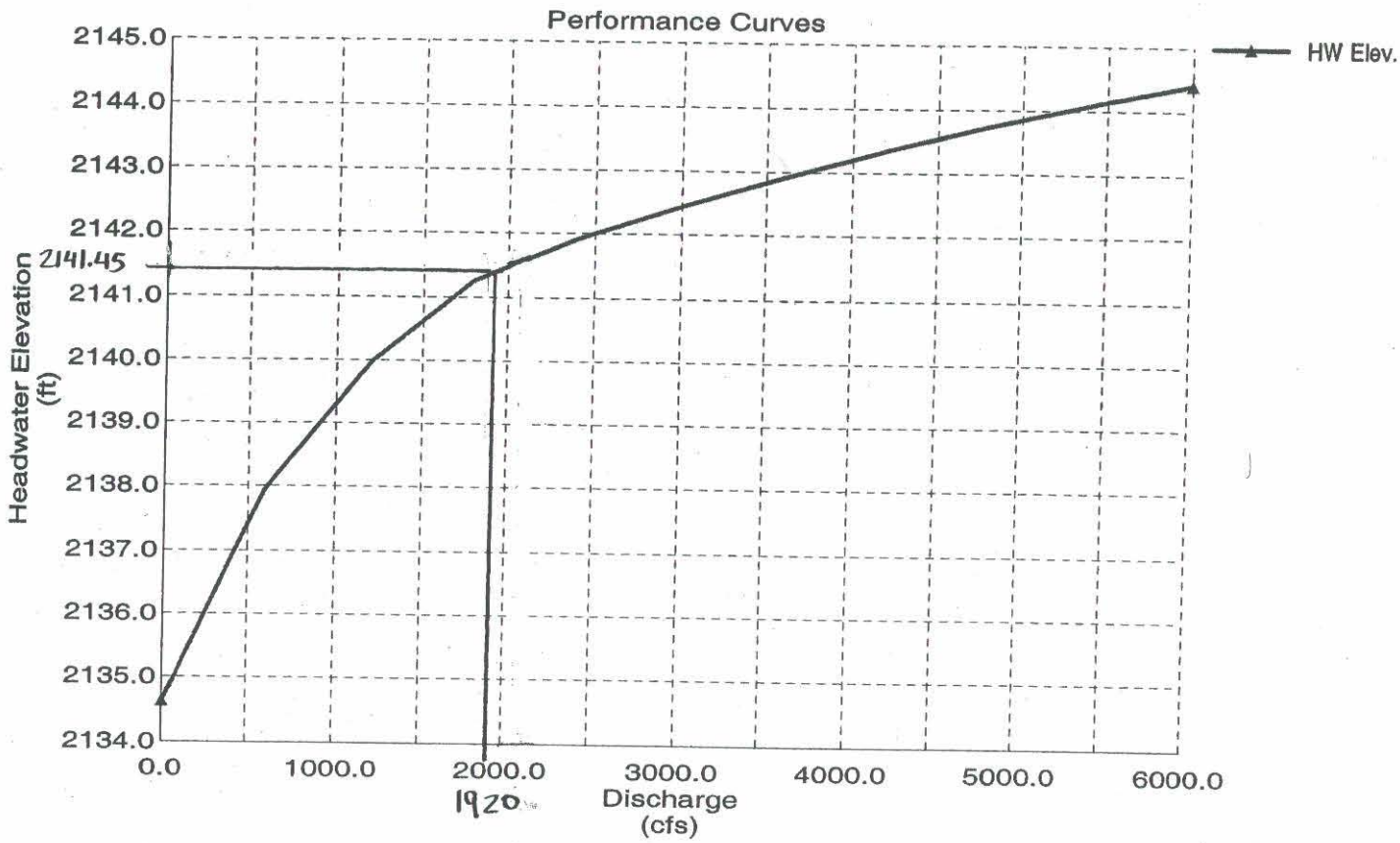
Discharge	0.00	6,000.00	600.00	cfs



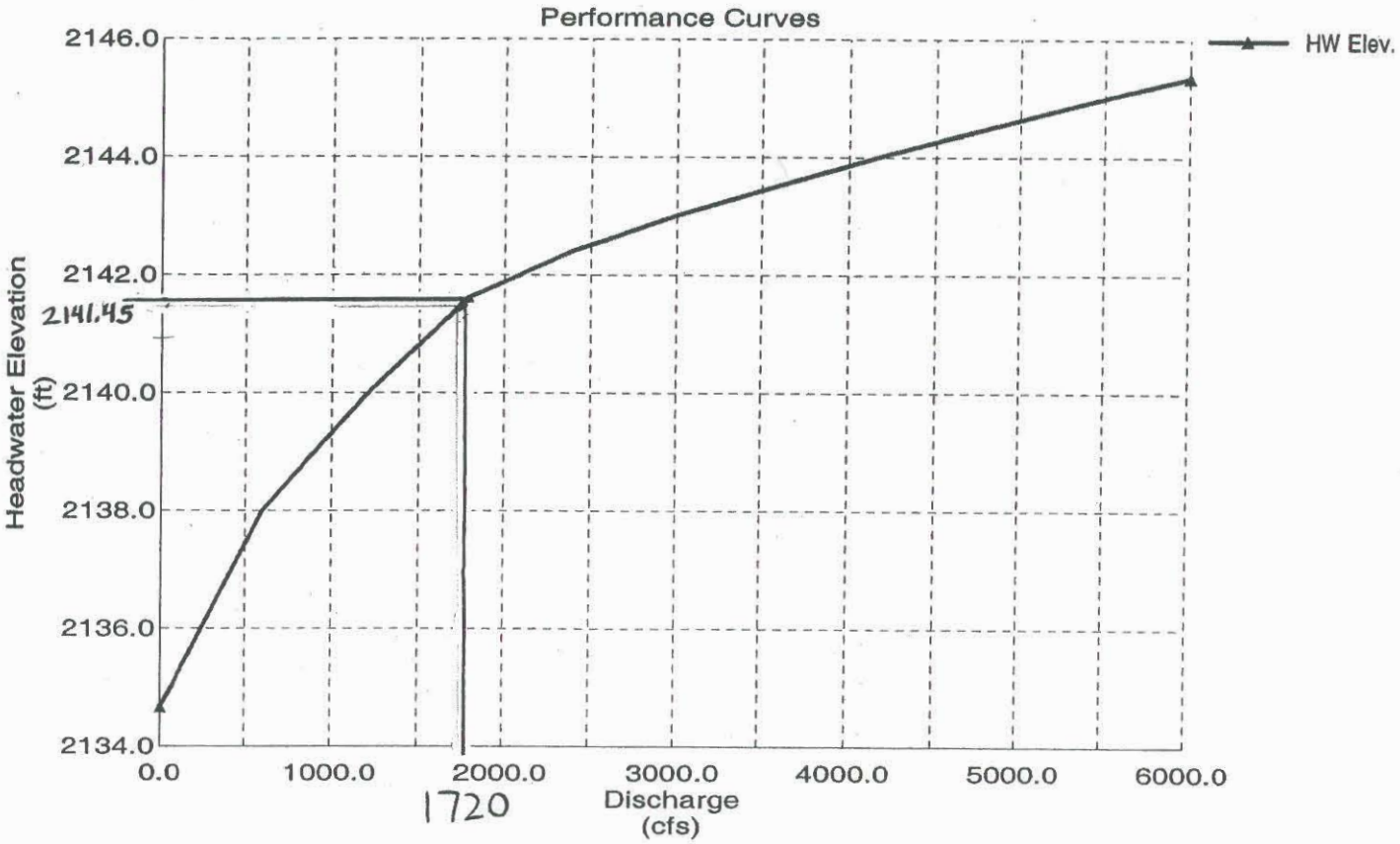
1920 - 1578 = 342 cfs

↑ CULVERT FLOW

↑ OVERTOPPING

Performance Curves Report
terravita way <south>

Range Data:			
	Minimum	Maximum	Increment
Discharge	0.00	6,000.00	600.00 cfs



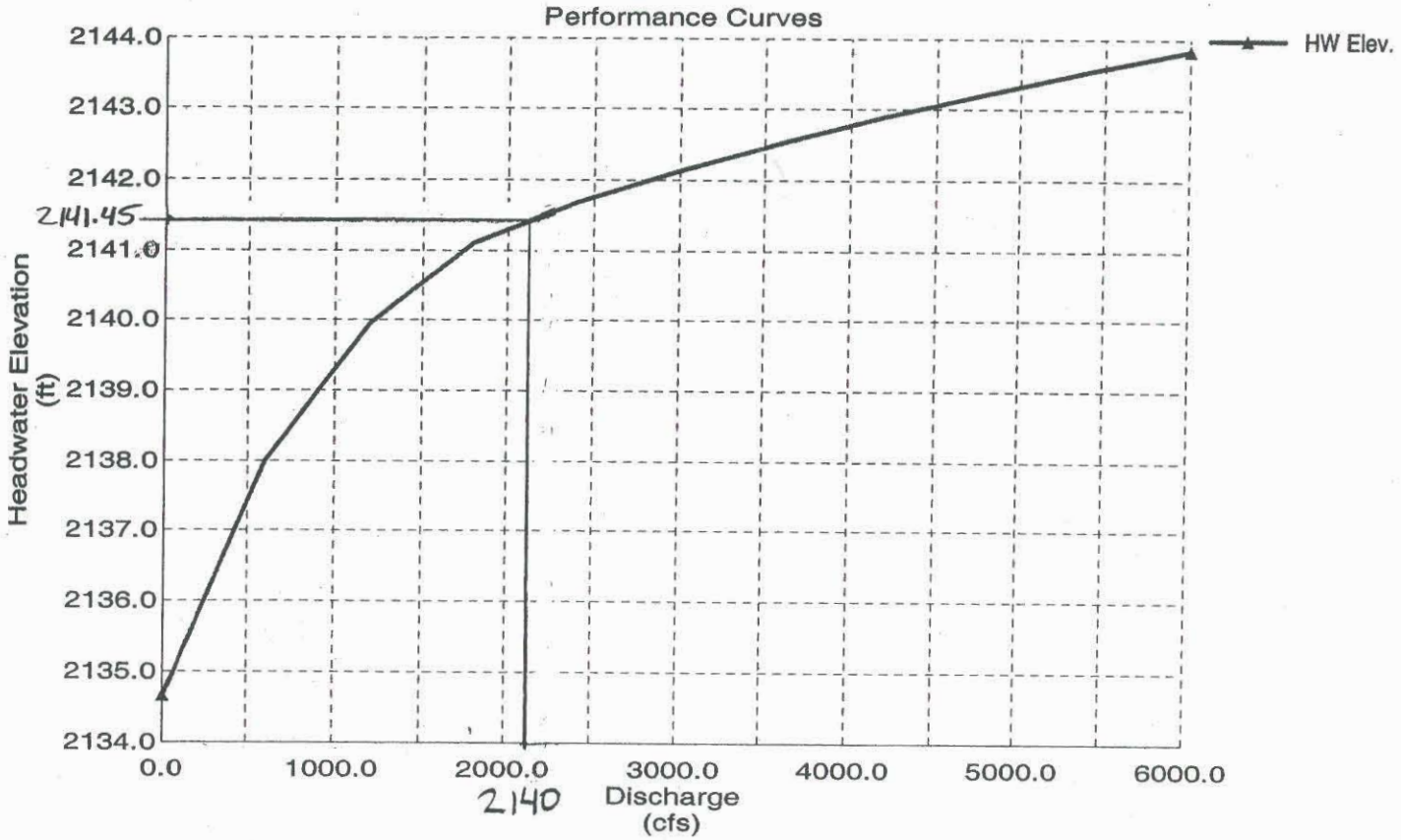
1720 - 1578 = 142 cfs

culvert flow

overtopping

Performance Curves Report
terravita way <west>

Range Data:				
	Minimum	Maximum	Increment	
Discharge	0.00	6,000.00	600.00	cfs



2140 − 1578 = 562 cfs

culvert flow

overtopping