Project File

SALT RIVER PIMA-MARICOPA INDIAN COMMUNITY

MASTER DRAINAGE PLAN

NORTHWEST AREA

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

GREAT SEAL
SALT RIVER PIMA-MARICOPA INDIAN COMMUNITY

PREPARED BY:

EVANS, KUHN & ASSOCIATES, INC.
727 EAST BETHANY HOME ROAD, SUITE D-225
PHOENIX, ARIZONA 85014

Registered Professional Engineer (Civil)
CERTIFICATE NO.
13483
BRUCE J.
FRIEDHOFF
3/9/92
Date Signed
ARIZONA, U.S.A.

MARCH 9, 1992

EKA #3182

EVANS, KUHN & ASSOCIATES, INC.

EVANS, KUHN & ASSOCIATES, INC.

GEORGE L. EVANS, P.E.
JOHN D. KUHN, JR., P.E.

CONSULTING ENGINEERS
727 East Bethany Home Road, Suite D-225
Phoenix, Arizona 85014
(602) 241-0782
FAX NUMBER (602) 248-9158

March 9, 1992

Ms. Nona Baheshone
Salt River Pima-Maricopa Indian Community
10005 East Osborn Road
Scottsdale, Arizona 85256

Re: Master Drainage Plan - Northwest Area
Final Report
EKA #3182.1

Dear Ms. Baheshone:

Transmitted herewith for your review and comment are five (5) copies of the Master Drainage Plan.

The guidelines contained in this document will enable the Community to implement and control drainage improvements in the Northwest Area. This document is intended to be a "living document" and should be updated as improvements take place.

It has been a pleasure preparing this document for use by the Community. If you have any questions regarding the results of this study, please do not hesitate to call.

Very truly yours,

EVANS, KUHN & ASSOCIATES, INC.

Bruce J. Friedhoff

Bruce J. Friedhoff, P.E.
Project Manager

31821PC1.203/ADMIN2/kyd

VOLUME 1
TABLE OF CONTENTS

Letter of Transmittal i
Project Location Map ii

I. Introduction 1

II. Existing Drainage Basin Characteristics 3
- A. Area/Location 3
- B. Existing Drainage Pattern/Facilities 3
- C. Land Use and Ground Cover 3
- D. Soil Data 3

III. Hydrology 4
- A. Hydrologic Model (HEC-1) 4
- B. Base Model 4
- C. Rainfall 4
- D. Kinematic Wave Routing 5
- E. Sub-Basin Delineation 5
- F. Master Drainage Plan 6
- G. Comparison of Flows 6

IV. Proposed Improvements 7
- A. General 7
- B. 96th Street Storm Drain From the Arizona Canal to the North Boundary 7
- C. Arizona Canal Outfall Channel From Pima Road to 96th Street 8
- D. Mockingbird Lane Diversion Channel From 108th Street to Stapley Drive 9
- E. Natural Drainage Ways 9
- F. Detention/Retention 10
- G. National Pollutant Discharge Elimination System (NPDES) Permit 10
- H. Right-of-Way 11
- I. Finished Floor Elevations 11
- J. Erosion 12

V. Construction Costs 12

VI. Phasing 13
- A. General 13
- B. 96th Street Storm Drain 13
- C. Arizona Canal Outfall Channel From Pima Road to the Pima Freeway 13
- D. Arizona Canal Outfall Channel From Pima Freeway to 96th Street 14
- E. Mockingbird Lane Diversion Channel 14

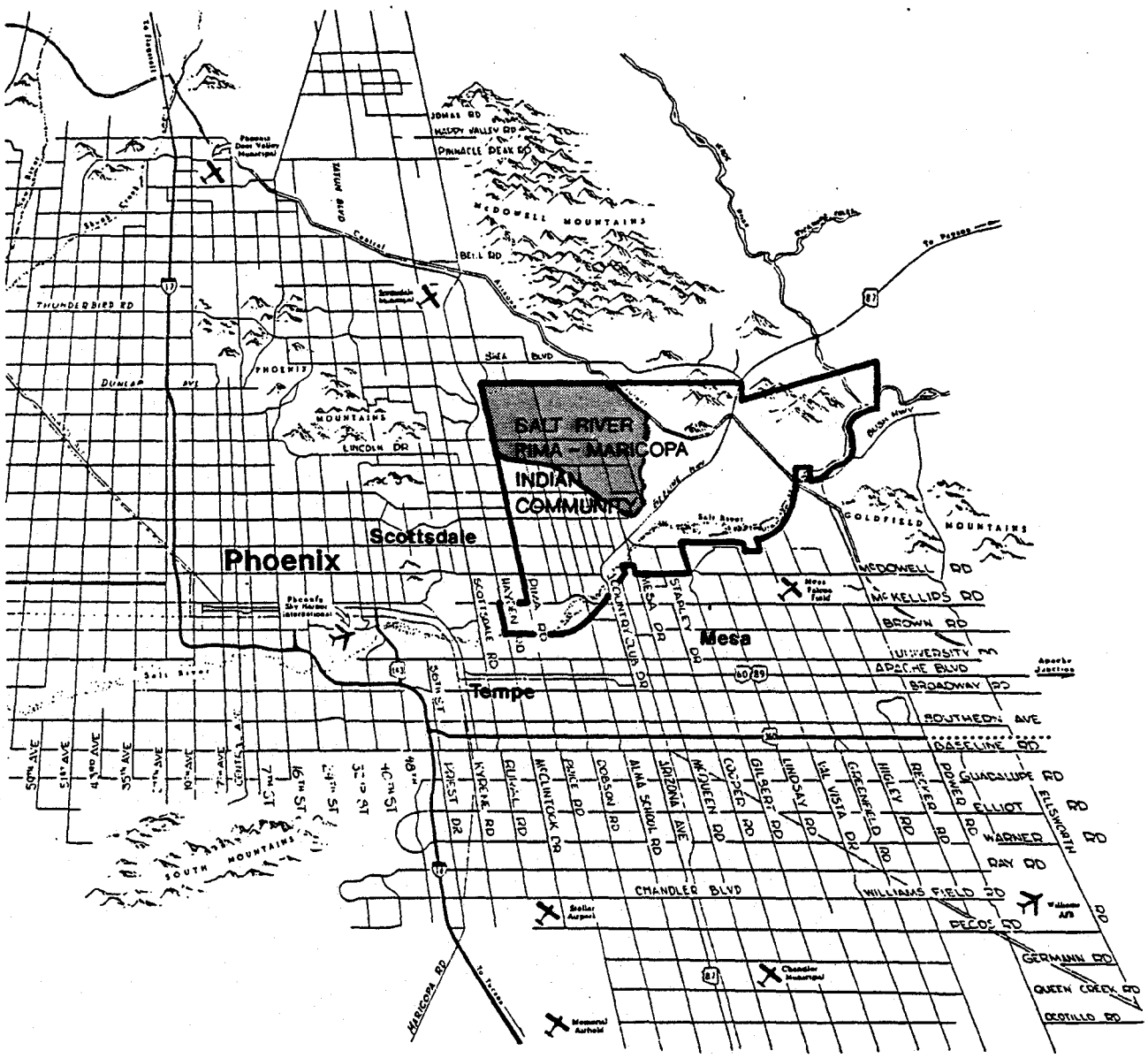
VII. Alternatives 14

VIII. Conclusion 15

References

Appendix

Registered Professional Engineer (Civil)
CERTIFICATE NO.
13483
BRUCE J.
FRIEDHOFF
Date Signed 3/9/92
ARIZONA, U.S.A.



SALT RIVER PIMA–MARICOPA
INDIAN COMMUNITY, ARIZONA

LOCATION MAP

N

Map Source: Maricopa Association of Governments

EVANS, KUHN & ASSOCIATES, INC.
CONSULTING ENGINEERS
727 East Bethany Home Road, Suite 225
Phoenix, Arizona 85014
(602) 241-0782

I. INTRODUCTION

The Salt River Pima-Maricopa Indian Community is located in the eastern part of Maricopa County, Arizona, in a rural community setting. The Community is bounded by the City of Scottsdale on the west and the City of Scottsdale, Fountain Hills, and the Fort McDowell Indian Reservation on the north. The Cities of Tempe and Mesa bound the south side of the Community.

The Master Drainage Plan discussed herein is located on 11,800 acres in the northwest corner of the Community north of the Arizona Canal, east of Pima Road, south of the north boundary, and west of Gilbert Road. The current land use in the master plan area consists of approximately 3,600 acres of farming, 8,040 acres of natural desert, and 160 acres of commercial development.

Proposed development in the Master Plan Area will be changing the current land use and drainage patterns in the northwest area during the next 5 to 10 years. Proposed development includes:

- *Construction of the Pima Freeway east of Pima Road.*
- *Construction of 4,000 acres of new farms and irrigation systems authorized by the Water Rights Settlement Act of 1988.*
- *Commercial development of the remaining areas along the west and north boundaries of the Master Plan area.*

This Master Drainage Plan has been prepared following the Community's General Development Plan in providing efficient and orderly development guidelines for the northwest area with respect to drainage.

The purpose of this plan is to establish the basic drainage considerations, guidelines, and requirements to be followed during development in the northwest area. This plan was prepared with the following goals in mind:

- *Preserve natural and existing drainage patterns.*
- *Reduce flooding risk.*
- *Decrease the amount of storm water runoff leaving the Community.*
- *Provide for erosion protection.*
- *Minimize maintenance costs for drainage facilities.*

- *Maximize the use of land.*

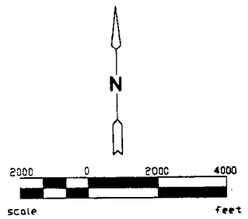
- *Minimize aesthetic impacts to existing landscape and future development.*

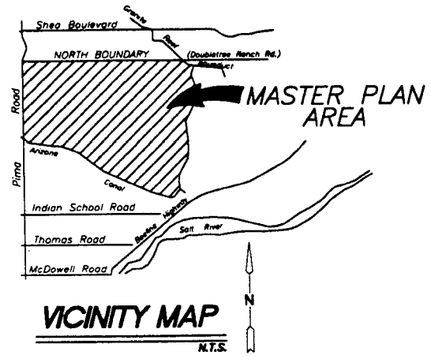
- *Land owners have the right to protect their property from flooding provided that the physical improvements such as diversion, detention, or channelization facilities do not injure others or deny other land owners of the same right.*

- *Protect and improve the quality of storm water leaving the Community in accordance with Section 402 of the Clean Water Act.*

- *Provide for dedicated drainage easement right-of-way to prevent the blockage, obstruction, or diversion of storm water runoffs.*

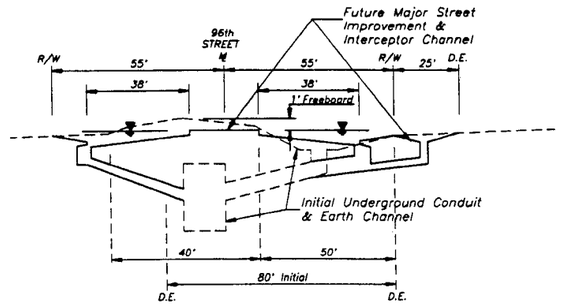
The Master Drainage Plan consists of this report and a Master Drainage Plan Map, located at the end of this section, which incorporates the results of a detailed hydrologic analysis and alternative plan evaluation for major drainage ways for the 100-year storm event. Specific facility improvements are described with construction cost estimates, right-of-way and phasing requirements. This plan addresses major improvements only. Minor improvements required for storm events other than the 100-year storm, such as street drainage, storm drains, property line swales and culvert crossings of roadways, are beyond the scope of this plan.





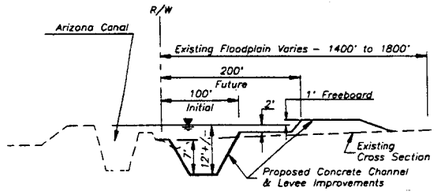
VICINITY MAP

N.T.S.



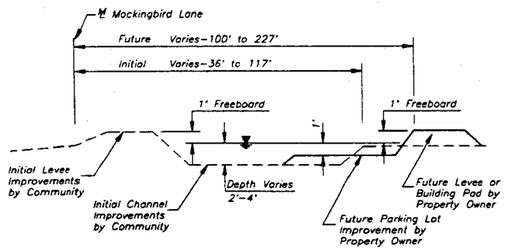
SECTION A-A

N.T.S.



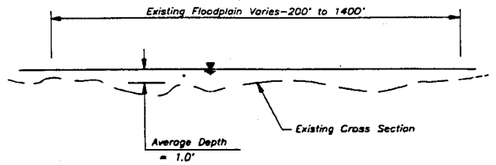
SECTION B-B

N.T.S.



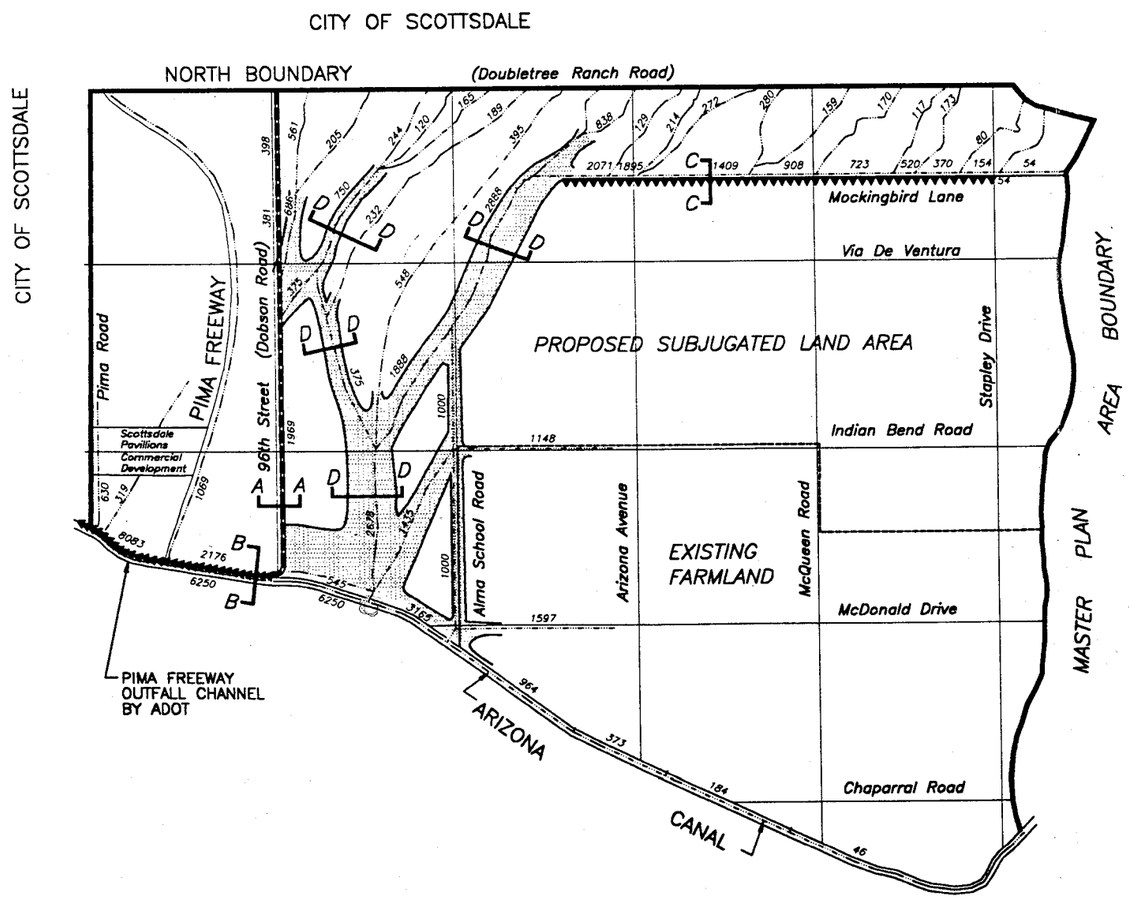
SECTION C-C

N.T.S.



SECTION D-D

N.T.S.



LEGEND

- PROPOSED DIVERSION CHANNEL & LEVEE IMPROVEMENT
- NATURAL DRAINAGE WAY AND APPROXIMATE LIMITS OF SHALLOW SHEET FLOW. DRAINAGE WAY LIMITS AND DEDICATED EASEMENTS MUST BE DETERMINED AT TIME OF DEVELOPMENT
- PROPOSED UNDERGROUND STORM DRAIN IMPROVEMENT
- PROPOSED OUTFALL CHANNEL IMPROVEMENTS
- 350 — 100-YEAR STORM WATER RUNOFF (Cubic Feet per Second)
- NATURAL DRAINAGE WAY. EASEMENTS MAY BE REQUIRED

GENERAL NOTES

1. ALL SUB-AREAS LOCATED WITHIN THIS MASTER DRAINAGE PLAN ARE SUBJECT TO ON-SITE RETENTION REQUIREMENTS FOR THE 100 YEAR-12 HOUR STORM(3.86 inches) TO BE DRAINED WITHIN 36 HOURS.
2. ALL ARTERIAL STREETS WILL BE DRAINED TO PROVIDE ONE 12' DRY LANE IN BOTH DIRECTIONS FOR THE 2-YEAR STORM EVENT.
3. THE MAXIMUM DEPTH OF RUNOFF FROM THE 100 YEAR STORM WITHIN STREET R.O.W. WILL BE 12 INCHES.
4. RUNOFF FROM THE 100-YEAR STORM EVENT WILL BE CONTAINED WITHIN STREET R.O.W. OR DEDICATED DRAINAGE WAY EASEMENTS.
5. DEVELOPMENT IN AREAS CONTAINING NATURAL DRAINAGE WAYS WILL PROVIDE DRAINAGE EASEMENTS FOR THE FLOWS SHOWN ON THIS MAP AT THE TIME OF DEVELOPMENT.
6. THE PROPOSED WATER SURFACE ELEVATION SHOULD BE AT OR BELOW EXISTING GROUND FOR SECTIONS A-A AND C-C.
7. THE PROPOSED WATER SURFACE ELEVATION SHOULD BE AT OR BELOW THE EXISTING WATER SURFACE ELEVATION FOR SECTION B-B.
8. THE PROPOSED WATER SURFACE ELEVATION FOR NATURAL DRAINAGE WAYS MAY BE RAISED NO MORE THAN ONE FOOT(1') ABOVE THE EXISTING WATER SURFACE ELEVATION PROVIDED THAT UPSTREAM AND DOWNSTREAM PROPERTIES ARE NOT ADVERSELY IMPACTED.

Salt River Pima-Maricopa Indian Community

MASTER DRAINAGE PLAN NORTHWEST AREA

EVANS, KUHN & ASSOCIATES, INC.
CONSULTING ENGINEERS

JOB # 3182.2 March 11, 1992

the watershed. Curve numbers are used to model infiltration/runoff characteristics of particular soil types. Soils with higher curve numbers have a higher runoff potential. The table below shows the types of soils found in the drainage basin and their corresponding curve numbers. A map showing the delineation of these soil groups is located in the appendix of this report.

SOIL CONSERVATION SERVICE CURVE NUMBERS

Hydrologic Soil Group	B	C
Desert	77	85
Agricultural	80	87

III. HYDROLOGY

A. HYDROLOGIC MODEL (HEC-1)

The U.S. Army Corp of Engineers Flood Hydrograph Package (HEC-1) was used to develop a computerized distributed flow simulation of rainfall and runoff within the study area. The basin is modeled by inputting numerical parameters describing the physical features of the watershed. Once a basic model describing the existing conditions is completed, it can be altered to simulate the effect of alternative drainage improvements.

B. BASE MODEL

The HEC-1 model from the Final Hydrology Report Outer Loop Highway Camelback Walk Channel to the Arizona Canal (Pima Freeway) was used as a base model for this study. This model was used to simulate the existing conditions in the watershed and was then modified to determine the design flows specified in the Master Drainage Plan and alternatives.

C. RAINFALL

Wrong Statement

The model prepared for the Pima Freeway by the Arizona Department of Transportation (ADOT) was generated using precipitation values for the 100-year 12-hour storm. These are the expected values for a storm with a duration of 12 hours which has the probability of occurring once every 100 years. These same rainfall depths, shown in the table below, were used in the Master Drainage Plan modifications to the original model. Using the 12-hour storm gives results which are consistent with other hydrologic studies done in the same area by the U.S. Army Corps of Engineers and the Flood Control District of Maricopa County.

Rainfall Distribution

Precipitation Values (inches) for 100-Year 12-Hour Storm

5-min	15-min	1-hr	2-hr	3-hr	6-hr	12-hr
0.72	1.42	2.50	2.77	2.95	3.29	3.68

D. KINEMATIC WAVE ROUTING

All of the alternative models were developed using the Kinematic Wave distributed flow method of stream routing. This method allows direct runoff to be routed either as overland sheet flow or as stream flow. This method is particularly applicable to the study area because large portions of the basin are relatively wide and flat, with few well defined stream channels. The input data required for Kinematic Wave routing includes overland flow lengths, slopes and roughness coefficients, as well as channel lengths, slopes and roughness coefficients. Channel shapes and dimensions are also included as input data. Lengths and slopes were determined using 7.5 minute quadrangle maps and aerial photographs. Roughness coefficients were chosen in conformance with those used in the base model. All natural and proposed channels in the watershed were modeled as being trapezoidally shaped. Dimensioning of the natural channels was based on the ADOT model and then field verified. Preliminary sizing of proposed channels was based on maintaining a constant depth throughout the channel and varying the bottom width. A side slope of 4 foot horizontal to 1 foot vertical was used for proposed channels. Pipe diameters and channel sizes specified in these preliminary models were used to simulate the flow condition only and are not intended as final design sizes. Input data summaries and HEC-1 input/output data is located in the appendix of this report.

E. SUB-BASIN DELINEATION

It was necessary to divide the drainage basin into homogeneous sub-basins in order to simulate the runoff response to rainfall. All sub-basins from the developed portion of the watershed within the City of Scottsdale, from between 96th Street and the proposed alignment of the Pima Freeway, and from the agricultural portion of the Community were taken, without modification, from the Pima Freeway model. The remainder of the watershed was subdivided into smaller areas on the basis of similar hydrologic properties. Area-weighted average values for overland slopes and roughnesses, channel slopes and roughnesses, and curve numbers were then assigned to each of these sub-basins.

F. MASTER DRAINAGE PLAN

The Master Drainage Plan shown in Section 1 of this report shows the proposed flow pattern. There are two major components to this plan. The first component is the construction of an east-west drainage channel along Mockingbird Lane approximately 2,600 feet south of the north boundary. This channel would intercept storm runoff and divert it around the existing and proposed agricultural areas of the Community. It would extend from the eastern boundary of the drainage basin to a point approximately 2,600 feet east of Alma School Road (108th Street) where it would discharge into an existing wide and shallow sheet flow area. The area between 96th Street and Alma School Road would remain in its natural state, exhibiting shallow, undefined sheet flow.

The other major component of this plan is the installation of a storm drain in 96th Street. This storm drain would intercept all remaining runoff from east of 96th Street, thereby protecting the Pima Freeway and the land area between. This runoff would be conveyed south to a point just north of the Arizona Canal where it would enter a channel parallel to the canal to be conveyed off-site to the Indian Bend Wash floodway. HEC-1 hydrologic calculations and maps used to develop the Master Plan are located in the appendix. Design flows for the 100-year 12-hour storm generated by the HEC-1 model are shown on the Master Plan in Section 1 of this report.

G. COMPARISON OF FLOWS

The flow results for the Master Drainage Plan were found to compare favorably with those of previous studies. A similar study of the area conducted by the U.S. Army Corp of Engineers (C.O.E.) in 1980 utilized a different methodology and estimated a peak discharge of 8,000 cubic feet per second (cfs) at the intersection of Pima Road and the Arizona Canal. ADOT has adopted this 8,000 cfs design flow and applied it to the design of the Pima Freeway outfall channel between Pima Road and the freeway. A study by Simons, Li & Associates (SLA) in 1989 estimated a peak discharge of 9,326 cfs for the 100-year 24-hour storm and was used in the original Concept Study prepared by DeLeuw, Cather & Company (DCCO) for ADOT in September, 1989. After coordination with affected agencies and the Community, an updated study was prepared for DCCO to incorporate the proposed drainage improvements along 96th Street and comments received by reviewing agencies. This updated study estimated a peak discharge of 8,000 cfs for a 100-year 12-hour storm. The Master Drainage Plan uses a peak flow of 8,083 cfs.

IV. PROPOSED IMPROVEMENTS

A. GENERAL

A variety of Master Plan alternatives was developed to meet the needs of the Community and are summarized in Section VII of this report. Analysis and evaluation of these alternatives by Community representatives resulted in the selection of the following phased improvements to be constructed at appropriate times in the future:

- *96th Street Storm Drain from the Arizona Canal to the North Boundary.*
- *Arizona Canal Outfall Channel from Pima Road to 96th Street.*
- *Mockingbird Lane Diversion Channel from 108th Street to Stapley Drive.*
- *Natural Drainage Ways.*
- *On-Site Detention/Retention Facilities.*

B. 96TH STREET STORM DRAIN FROM THE ARIZONA CANAL TO THE NORTH BOUNDARY

The 96th Street Storm Drain will be constructed to meet both the initial needs of the Pima Freeway and the future needs for major street improvements of 96th Street. The 96th Street Storm Drain will intercept flow that would normally flow to the Pima Freeway thereby allowing a smaller channel to be used along the freeway. In the future, when the area is developed and 96th Street is improved to a major arterial roadway the storm drain will provide street drainage and flood protection to adjoining parcels.

In the initial phase, an earth channel will intercept and convey a flow of 398 cfs from the North Boundary to Via de Ventura. The diversion channel will be 40 feet wide with an average depth of 3.5 feet and a bottom width of 10 feet. An earth diversion channel and underground conduit will convey a flow of 1969 cfs from Via de Ventura to the Arizona Canal Outfall Channel. The diversion channel will be 50 feet wide with an average depth of 4.5 feet and a bottom width of 10 feet. The underground conduit is an average 12-foot square box culvert. The diversion channel will be located on the east side of 96th Street near the right-of-way line. The box conduit would be located near the center of 96th Street. Flows will then drain into the Arizona Canal Outfall Channel located north of the Arizona Canal right-of-way and to Indian Bend Wash Floodway. A 40 foot unpaved road will be located on the west side of 96th Street approximately 1 foot above existing ground and design water surface elevation. See Section A-A on the Master Drainage Plan Map for a typical section.

In a future phase, major street improvements to 96th Street would consist of replacing the diversion channel with a smaller 25 foot channel on the east side of 96th Street and drainage inlets in the street curb. Connector pipes will be extended and the existing inlets relocated to the new diversion channel location. A smaller storm drain would be extended to the North Boundary to intercept street drainage to provide for one 12 foot dry lane in both directions for the 2-year storm runoff. See Section A-A on the Master Drainage Plan map for a typical section.

C. ARIZONA CANAL OUTFALL CHANNEL FROM PIMA ROAD TO 96TH STREET

Improvements along the north side of the Arizona Canal will be completed in two segments for the purpose of reclaiming the existing floodplain for land development. Improvements will be designed to function with the Arizona Canal to convey stormwater runoff under Pima Road to the Indian Bend Wash floodway channel. Finished improvements must not raise the existing water surface elevation in the canal during flood stage. The outfall channel between Pima Road and the Pima Freeway will be constructed by the Arizona Department of Transportation as a major outfall for the freeway's drainage facilities and for runoff upstream of the Arizona Canal. The channel will be concrete lined with a top width of 150 feet, a bottom width of 100 feet, and an average depth of 10 feet. Finished improvements will reclaim approximately 50 acres of existing floodplain. Improvements will require a 220 foot drainage easement which has already been acquired as part of the Pima Freeway Right-of-Way.

The second segment of the Arizona Canal Outfall Channel between the Pima Freeway and 96th Street will be constructed by the Salt River Pima-Maricopa Indian Community as a major drainage outfall for the 96th Street Storm Drain. The initial channel will be concrete lined with a top width of 100 feet, a bottom width of 30 feet, an average depth of 7 feet, and a 28 foot service road. Future improvements will provide for development of approximately 56 acres of existing floodplain. The configuration and location of future improvements will be determined by the owner and the Community at the time of development. Options could include parking lots, green belt channels, floodwalls, levees, and earth fill. It is estimated that a minimum 200 foot drainage easement would be required for a permanent floodway in this reach. See Section B-B on the Master Drainage Plan Map for a typical section.

The segment between 96th Street and Alma School Road would be constructed some time in the future by landowners. The location and type of improvement would be determined by the owner and the Community at the time of development for the design flow shown on the Master Drainage Plan. Options would be similar to those considered for the segment between the Pima Freeway and 96th Street and may require a minimum 200 foot drainage easement.

D. **MOCKINGBIRD LANE DIVERSION CHANNEL FROM 108TH STREET TO STAPLEY DRIVE**

Proposed improvements to Mockingbird Lane consist of an earth channel and levee which will divert and convey the design flows shown on the Master Drainage Plan west to an existing wash near 108th Street and then to Alma School Road. This will provide flood protection for the new subjugated land area south of Mockingbird Lane. Improvements would be constructed by the Salt River Pima-Maricopa Indian Community as part of the subjugated land area development for new farms and irrigation facilities. The channel would vary in width with a maximum initial width of 117 feet and would be earth lined. See Section C-C on the Master Drainage Plan Map.

It is anticipated that future commercial development will occur in the corridor along the north boundary of the Community and that flows from the north will be conveyed through those developments in dedicated drainage easements to the Mockingbird Lane Diversion Channel. Roadway crossings of these drainage ways will require bridge or culvert crossings to convey the design flows shown on the Master Drainage Plan under the roadway.

E. **NATURAL DRAINAGE WAYS**

Natural drainage ways exhibiting wide shallow sheet flow characteristics have been shown on the Master Drainage Plan with the required design flows. Future development in these areas will require drainage improvements in dedicated drainage easements to permit the flow of runoff through the development to the Arizona Canal Outfall Channel. The type of drainage improvement and configuration would be determined at the time of development and should be designed and constructed in a way which will not adversely impact surrounding land owners. Proposed water surface elevations could be raised no more than one (1) foot above the existing water surface elevation providing that there are no adverse impacts. Also, improvements within this area should not result in increased flows to either the 96th Street Storm Drain or the Alma School Road Diversion Channel. See Section D-D on the Master Drainage Plan Map.

F. DETENTION/RETENTION

Flows from areas not within existing or proposed rights-of-way can be eliminated or reduced by construction of on-site retention facilities. Benefits to the Community are:

- *Reduced stormwater runoff*
- *Reduced flooding*
- *Reduced storm drain sizes*
- *Reduced impacts to adjoining landowners*
- *Reduced maintenance costs for drainage facilities*
- *Containment and treatment of point source pollutants(NPDES)*
- *Groundwater recharge*

On-site retention basins should be required for all non-residential developments to retain runoff from the 100-year 12-hour storm (3.86 inches). The retention volume should be drained within 36 hours by controlled bleed-off to a storm drain system or by underground injection by approved dry wells. Dry wells should be installed in conformance with "Construction and Location Criteria," and Article 8, Drywells, Sections 49-331 to 49-336, Arizona Revised Statutes.

G. NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT

The Salt River Pima-Maricopa Indian Community is subject to the Clean Water Act, Section 402(p) which establishes water quality standards for stormwater runoff. The Clean Water Act prohibits the discharge of any pollutant to waters of the United States from a point source unless the discharge was authorized by a National Pollutant Discharge Elimination System (NPDES) permit. NPDES permits specify monitoring, reporting and control requirements, including allowable levels of pollutants in discharges.

It is recognized that rainfall picks up a multitude of pollutants from falling on and draining off streets and parking lots, construction and industrial sites, mining, logging and agricultural areas. The pollutants are dissolved into and are carried off by the rainfall as it drains from these surfaces and areas. The runoff eventually ends up in surface water bodies such as creeks, rivers, estuaries, bays, and oceans. Runoff can also end up in groundwater supplies.

NPDES permits are required for stormwater discharges associated with industrial activity including gas stations, feed lots, and construction activity. Additionally, permits will also be required for containment and treatment of stormwater runoff associated with industrial activity prior to injection below ground.

H. RIGHT-OF-WAY

The Community is in the process of acquiring 110 feet of right-of-way for 96th Street. At this time there is no existing right-of-way for the Arizona Canal Outfall Channel or the Mockingbird Lane Diversion Channel. It will be necessary for the Community to acquire drainage easements prior to constructing facilities in these areas. The following is a summary of the right-of-way necessary for initial and future facility improvements.

SALT RIVER PIMA-MARICOPA INDIAN COMMUNITY
MASTER DRAINAGE PLAN
Right-Of-Way Calculations

		Initial	Future
Arizona Canal Outfall Channel			
Length	ft	3,258	3,258
Width	ft	100	200
Area	sq ft	325,800	651,600
Area	acres	7.48	14.96
96th Street Storm Drain			
Length	ft	9,004	9,004
Width	ft	80	20
Area	sq ft	720,320	180,080
Area	acres	16.54	4.13
Mockingbird Lane Diversion Channel			
Length	ft	20,011	20,011
Width	ft	54	111
Area	sq ft	1,089,000	2,221,560
Area	acres	25.00	51.00
Total Right-Of-Way	acres	49.02	70.09

Drainage easements will also be required for natural drainage ways delineated on the Master Drainage Plan. The alignment and width of these easements should be determined at the time of development.

I. FINISHED FLOOR ELEVATIONS

Building structure improvements in the Master Plan area are required to have the lowest finished floor elevation a minimum of one (1) foot above the adjacent water surface elevation caused by the 100-year storm. This includes both channels and retention basins. The lowest finished floor elevation may be below the 100-year water surface where approved flood-proofing is provided.

J. EROSION

Earth channels are particularly susceptible to erosion and may require a substantial amount of maintenance and repair if not properly sized. The USDOT Training Design Manual, "Highways in the River Environment", 1975, explains the causes of erosion and ways of predicting erosion. Stream power is a means by which the erosion potential of an earth channel can be estimated as a function of the water velocity, density, depth, and channel slope and is given by the following equation:

$$Stream\ Power = \tau V = \gamma RSV\ (ft\text{-}lb/sec/ft^2)$$

Where,

τ = *Boundary Shear Stress* = γRS(*psf*)
γ = *Density of Water* = 62.4 lbs/ft^3
R = *Hydraulic Radius* (*ft*)
S = *Energy Slope* (*ft/ft*)
V = *Velocity of Flow*(*fps*)

The potential for erosion increases with increasing stream power. A review of USDOT's criteria indicated that earth channel erosion could be minimized by setting an upper limit for stream power of 10 foot-pounds per second per square foot. Stabilized channels should be used above this value. Where earth channels are used they should be sized shallow and wide so that the computed stream power is less than 10.

V. CONSTRUCTION COSTS

This section summarizes the probable construction cost for the major drainage facilities shown on the Master Drainage Plan. Calculations are located in the appendix of this report. Costs for the development of major drainage ways and for on-site retention are dependent on the type of development and can only be determined at the time of development. Typical unit costs have been included here for planning information only.

Unit costs of construction were developed by consulting various agencies, suppliers and contractors. Agencies consulted include the Salt River Pima-Maricopa Indian Community, Arizona Department of Transportation, Maricopa County Flood Control District and the City of Phoenix. Suppliers included Ameron, Hydro Conduit, Contech, Salt River Sand and Rock, Gifford-Hill and KIP Inc. Contractors included Pulice Construction, Wheeler Construction, Phoenix Gunite and JWJ Contractors. Material costs were provided on an in-place basis and a wide variety of costs for the same cost item were often encountered. Where possible, costs for similar construction quantities were used as the preferred unit cost. When this was not possible, costs were compared and a most reasonable average value was utilized. Unit costs are always subject to current material and labor availabilities and may vary substantially, up or down, from the unit costs used in this study.

	Construction Cost
96th Street Initial Storm Drain	$4,630,000
Arizona Canal Initial Outfall Channel From Pima Road to Pima Freeway	ADOT
Arizona Canal Initial Outfall Channel From Pima Freeway to 96th Street	$ 700,000
Mockingbird Lane Initial Diversion Channel	$ 260,000
Natural Drainage Ways (Per Acre)	$ 4,000
On-Site Detention/Retention (Per Acre)	$ 1,000

VI. PHASING

A. GENERAL

This section on phasing describes the relationship between the major elements of the Master Drainage Plan and the considerations concerning the appropriate timing of construction. The objective of phasing is to provide for the desired operational characteristics of the drainage system and distinguish between facilities to be constructed initially from those that can be constructed in the future. Both the Pima Freeway construction and the new subjugated land area development play a dominant role in the phasing of the Master Drainage Plan improvements. Freeway construction will be completed between 1995 and 2000. The subjugated land development will be completed between 1993 and 1995. Development of natural drainage ways and on-site retention will be done at the time of development.

B. 96TH STREET STORM DRAIN

The 96th Street Storm Drain could be completed in two phases. The initial phase would construct the storm drain and an earth diversion channel and should be completed before grading and paving of the Pima Freeway north of the Arizona Canal. A future phase would occur when 96th Street Road improvements would replace the earth diversion channel with a paved street.

C. ARIZONA CANAL OUTFALL CHANNEL FROM PIMA ROAD TO THE PIMA FREEWAY

The outfall channel from Pima Road and the Pima Freeway will be constructed by ADOT with the construction of the grading improvements for the freeway north of the Arizona Canal. It would be possible and desirable, but not necessary, to construct this facility prior to freeway construction and with the construction of the 96th Street Storm Drain.

D. **ARIZONA CANAL OUTFALL CHANNEL FROM PIMA FREEWAY TO 96TH STREET**

The outfall channel from the Pima Freeway to 96th Street can be constructed in two phases. The initial phase would consist of a low flow channel which would be constructed at the same time or after construction of the outfall channel by ADOT from Pima Road to the Pima Freeway. It would also be possible, but not desirable, to construct the channel before the freeway channel. Constructing the channel before the ADOT channel would result in additional maintenance costs to remove sediment trapped in the depressed channel (temporary retention basin). A future phase would construct a levee and overflow channel north of the low flow channel to permit reclamation of the existing floodplain. The future phase could be completed at the same time the low flow channel is constructed or after, but not before.

E. **MOCKINGBIRD LANE DIVERSION CHANNEL**

The initial Mockingbird Lane Diversion Channel should be constructed at the same time that the new subjugated land area is developed. Improvements could be made before, but are not necessary, and would have little benefit. Future improvements should be done at the time of property development.

VII. ALTERNATIVES

A. **GENERAL**

The Community was presented with three drainage Plan Alternatives A, B and C on March 12, 1991. Modifications were made and a gross array of alternatives developed for conveying stormwater flows through the Master Plan Area to the Arizona Canal. Plan A, which is essentially the same plan that was developed for use in the Pima Freeway right-of-way negotiation process, was selected as the preferred alternative in meeting Master Plan goals and is documented in Volumes 1 and 2, Preliminary Study, April 25, 1991. The conveyance mechanisms investigated included reinforced concrete pipes (RCP), concrete cast-in-place pipes (CIPP), corrugated metal pipes (CMP), reinforced concrete box culverts (RCBC), concrete lined channels, earth lined channels, soil cement lined channels, asphalt concrete parking lots and reclaimed farmlands. Drainage schemes included a combination of low flow channels, overflow channels, and below ground conduits.

A review of the gross array of alternatives with the Community indicated that a number of elements were common to more than one plan. For example, with all plans a storm drain system in 96th Street will extend

from the Arizona Canal to the north boundary. Maximum flows to be conveyed in the 96th Street storm drain system varied, depending on the overall drainage scheme. Therefore, the 96th Street storm drain system was analyzed to convey a variety of flows using Plans A, B and C. Other basic drainage elements included the Arizona Canal, Alma School Road, Mockingbird Lane, Doubletree Road (north boundary) and Via De Ventura. See Exhibits 4, 5 and 6 Volume 1 Preliminary Study, April 25, 1991 for the basic elements used in Plans A, B, and C.

Each basic drainage element was sized for the design flow considering the effects of erosion and channel friction losses. Unit construction costs and right-of-way costs were developed and used to compute the probable project cost of each element. Drainage element computations are contained in Volume 2, Preliminary Study, April 25, 1991. Construction costs, right-of-way costs and total project costs for each plan element are summarized in Tables 7.2, 7.3 and 7.4 of Volume 1.

Alternatives B and C were not selected for the reason that the Community does not have the financial resources necessary to fund these alternative plans. Alternative A is within the Community's funding capability.

VIII. CONCLUSION

Proposed development during the next 5 to 10 years will be changing the current land use and drainage patterns in the northwest area. Following the requirements and implementing the improvements described in this plan will provide for the orderly and efficient development of drainage protection for all properties in the northwest area for the 100-year storm. The Master Drainage Plan is intended to be a working document and should be updated as new data becomes available and improvements are made in the master plan and drainage areas.

REFERENCES

1. Final Hydrology Report Outer Loop Highway Camelback Walk Wash Channel to the Arizona Canal, Simons, Li & Associates, Inc., May, 1989.

2. Supplement to Concept Study for the Pima Freeway Crossing the Arizona Canal, DeLeuw, Cather & Company, September, 1990.

3. Amendment #1 Supplement to Concept study for the Pima Freeway Crossing the Arizona Canal, DeLeuw, Cather & Company, October, 1990.

4. Amendment #2 Supplement to Concept Study for the Pima Freeway Crossing the Arizona Canal, DeLeuw, Cather & Company, December, 1990.

5. Soil Survey of Aguila - Carefree Area, Parts of Maricopa and Pinal Counties, Arizona, U.S. Department of Agriculture Soil Conservation Service, April, 1986.

6. Aerial Photographs L19, L20 from Landis Aerial Surveys, November 18, 1987.

7. United States Government Services 7.5 Minute Series, Sawik Mountain Quadrangle Map (1982).

8. HEC-1 Flood Hydrograph Package User's Manual, U.S. Army Corp of Engineers, Hydrologic Engineering Center, September, 1990.

9. Urban Highways Section: Design Procedures Manual, Arizona Department of Transportation, 1990.

10. Design Procedures and Criteria: Section 3, Design of Facilities to Manage Stormwater Runoff, City of Scottsdale, Arizona, October 3, 1984.

11. Hydraulic Design of Highway Culverts; Hydraulic Design Series No. 5, U.S. Department of Transportation, September, 1985.

12. Highways in the River Environment; Hydraulic and Environmental Design Considerations; Training and Design Manual, U.S. Department of Transportation, Federal Highway Administration, May, 1975.

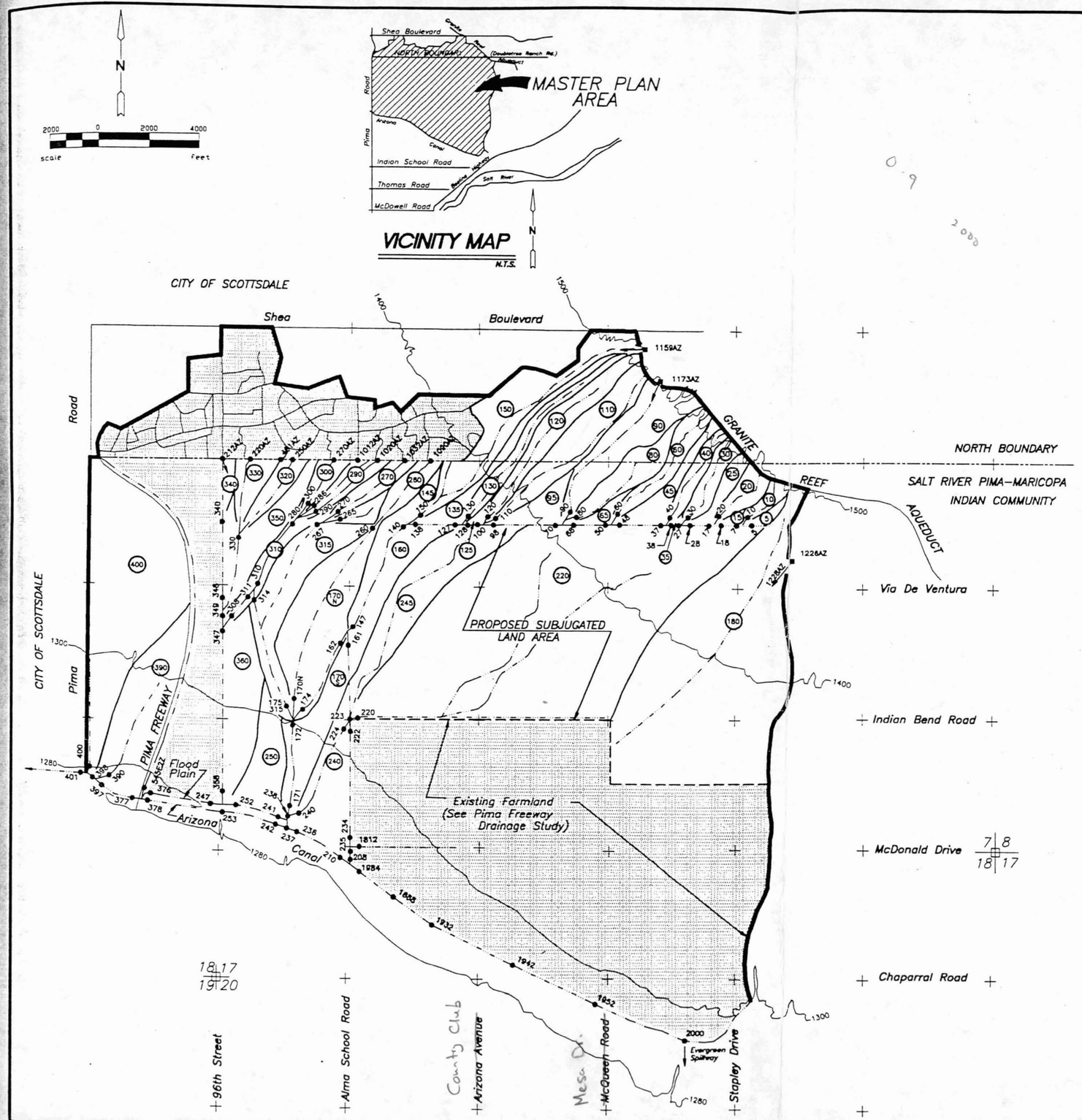
13. "Gila River Basins, Arizona, Indian Bend Wash, Design Memorandum No. 4, Future Design for Diversion," Los Angeles District U.S. Army Corps of Engineers, January, 1980.

14. Guidance Manual for the Preparation of NPDES Permit Applications for Storm Water Discharges Associated With Industrial Activity, United States Environmental Protection Agency, April, 1991.

15. Salt River Pima-Maricopa Indian Community, Master Drainage Plan, North of the Arizona Canal, Preliminary Study, Evans, Kuhn & Associates, Inc., April 25, 1991, Volumes 1 & 2.

Appendix
Table of Contents

		Page
1.	Hydrologic Analysis	
	1.1 Sub-basins and Concentration Point Map	1
	1.2 Hydrologic Soil Group Map	2
	1.3 Summary Tables	3
	1.4 HEC-1 Input/Output Data	10
2.	Hydraulic Analysis	
	2.1 Arizona Canal Outfall Channel	135
	2.2 96th Street Storm Drain	142
	2.3 Mockingbird Lane Diversion Channel	146
	2.4 Natural Drainage Ways	150
3.	Cost Estimates	152
4.	Right-Of-Way Areas	155



GREAT SEAL
SALT RIVER PIMA-MARICOPA INDIAN COMMUNITY

LEGEND

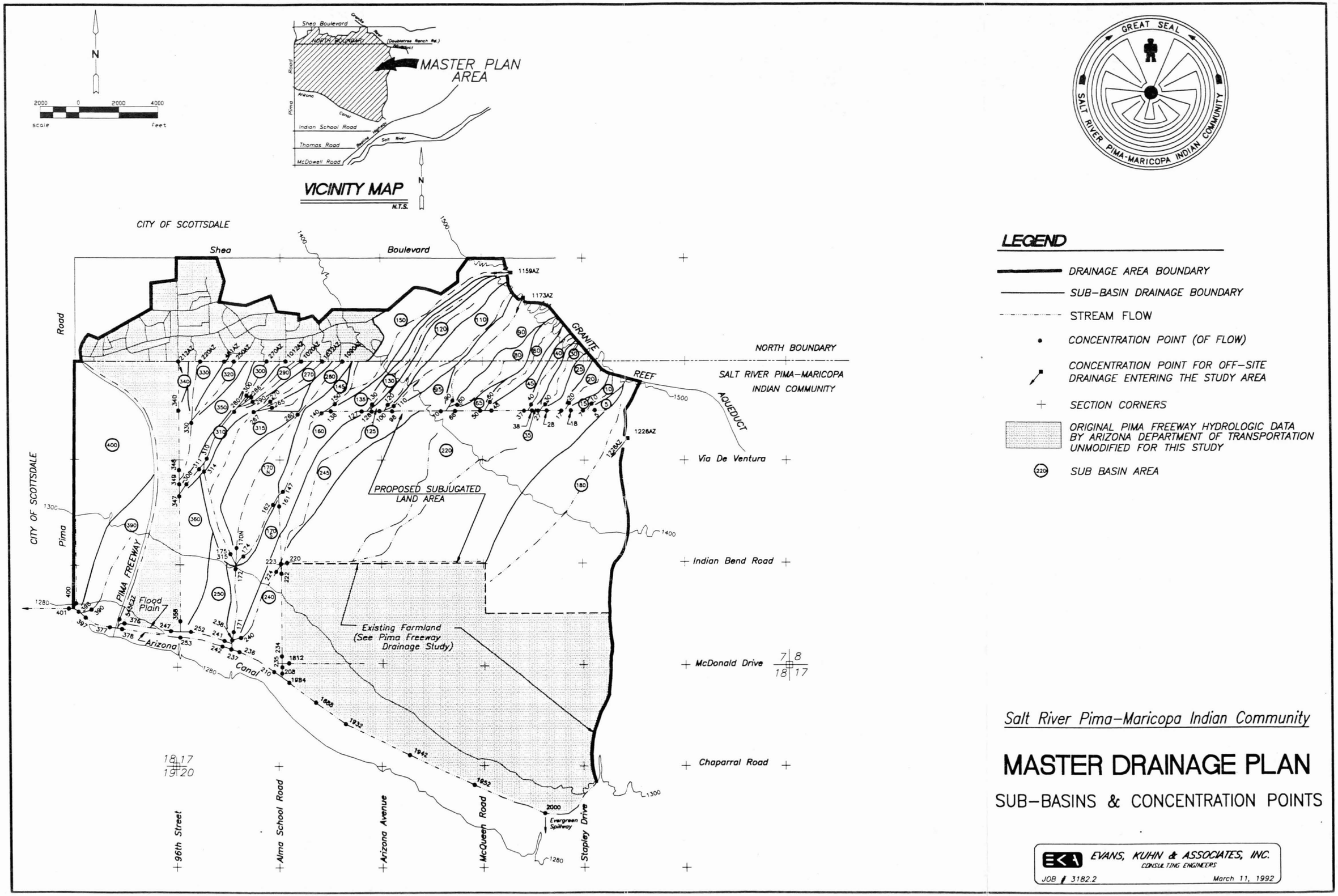
- DRAINAGE AREA BOUNDARY
- SUB-BASIN DRAINAGE BOUNDARY
- STREAM FLOW
- CONCENTRATION POINT (OF FLOW)
- CONCENTRATION POINT FOR OFF-SITE DRAINAGE ENTERING THE STUDY AREA
- SECTION CORNERS
- ORIGINAL PIMA FREEWAY HYDROLOGIC DATA BY ARIZONA DEPARTMENT OF TRANSPORTATION UNMODIFIED FOR THIS STUDY
- (220) SUB BASIN AREA

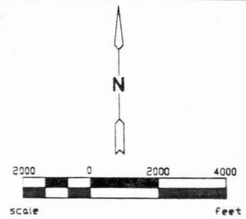
Salt River Pima–Maricopa Indian Community

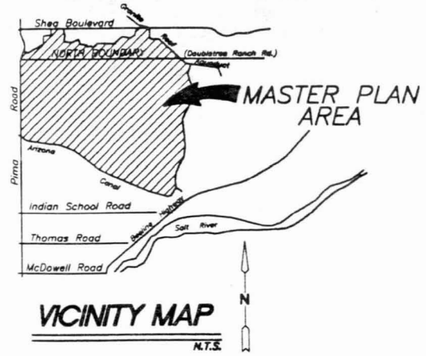
MASTER DRAINAGE PLAN

SUB–BASINS & CONCENTRATION POINTS

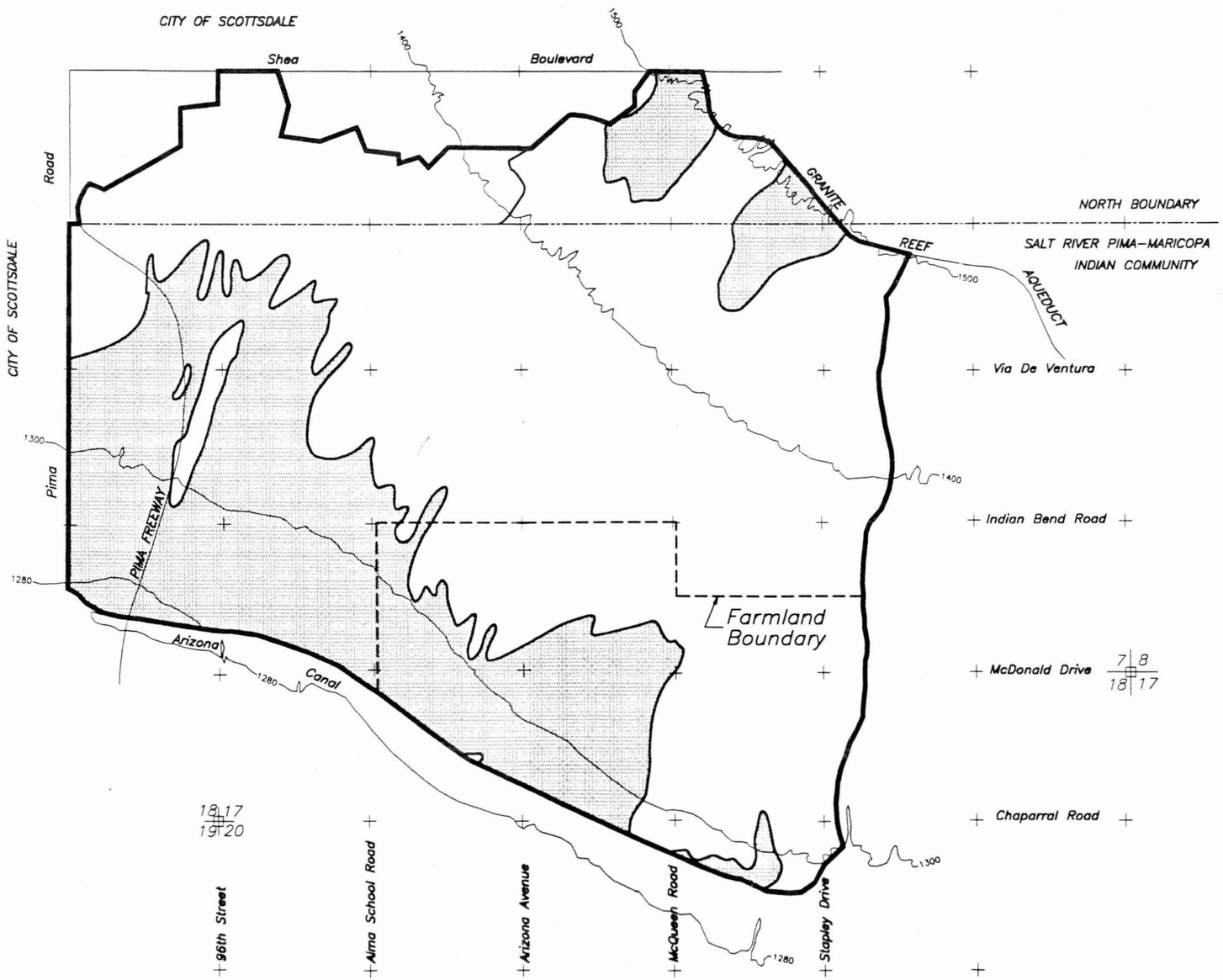
EVANS, KUHN & ASSOCIATES, INC.
CONSULTING ENGINEERS
3182.2
March 11, 1992

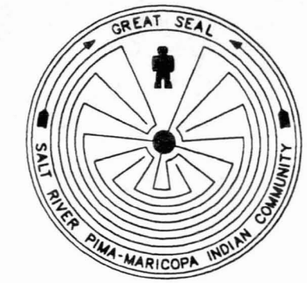

N
2000 0 2000 4000
scale feet
Shea Boulevard
NORTH BOUNDARY
MASTER PLAN AREA
Pima Road
Arizona Canal
Indian School Road
Thomas Road
McDowell Road
Salt River
VICINITY MAP
N.T.S.
GREAT SEAL
SALT RIVER PIMA-MARICOPA INDIAN COMMUNITY
CITY OF SCOTTSDALE
Shea Boulevard
GRANITE REEF AQUEDUCT
NORTH BOUNDARY
SALT RIVER PIMA-MARICOPA INDIAN COMMUNITY
Via De Ventura
Indian Bend Road
McDonald Drive
Chaparral Road
PROPOSED SUBJUGATED LAND AREA
Existing Farmland (See Pima Freeway Drainage Study)
PIMA FREEWAY
Flood Plain
Arizona Canal
Evergreen Spillway
96th Street
Alma School Road
Arizona Avenue
McQueen Road
Stapley Drive
LEGEND
DRAINAGE AREA BOUNDARY
SUB-BASIN DRAINAGE BOUNDARY
STREAM FLOW
CONCENTRATION POINT (OF FLOW)
CONCENTRATION POINT FOR OFF-SITE DRAINAGE ENTERING THE STUDY AREA
SECTION CORNERS
ORIGINAL PIMA FREEWAY HYDROLOGIC DATA BY ARIZONA DEPARTMENT OF TRANSPORTATION UNMODIFIED FOR THIS STUDY
SUB BASIN AREA
Salt River Pima-Maricopa Indian Community
MASTER DRAINAGE PLAN
SUB-BASINS & CONCENTRATION POINTS
EVANS, KUHN & ASSOCIATES, INC.
CONSULTING ENGINEERS
JOB # 3182.2
March 11, 1992





VICINITY MAP
N.T.S.





LEGEND

- HYDROLOGIC SOIL GROUP "B"
- HYDROLOGIC SOIL GROUP "C"
- STUDY BOUNDARY

Salt River Pima–Maricopa Indian Community

MASTER DRAINAGE PLAN

HYDROLOGIC SOIL GROUP MAP

EVANS, KUHN & ASSOCIATES, INC.
CONSULTING ENGINEERS

JOB # 3182.2 March 11, 1992

TABLE 1. BASIN AREA DATA USED FOR INPUT TO HEC-1 HYDROLOGY MODEL (BA,LS)

NO	BY	BASIN AREA (SQ MI)	CN	% IMPERV.
5		0.0265	77	
10		0.0517	77	
15		0.0166	77	
20		0.076	79	
25		0.0732	81	
30		0.1004	83	
35		0.0115	80	
40		0.0875	78	
45		0.132	81	
60		0.148	80	
65		0.0387	77	
80		0.181	77	
90		0.3329	78	
95		0.1019	77	
110		0.311	80	
120		0.221	80	
125		0.023	77	
130		0.148	79	
135		0.1535	78	
145		0.0488	77	
150		0.449	79	
160		0.3343	77	
180		2.0022	77	
220		2.8854	77	
240		0.3121	85	
245		0.4577	77	
250		0.2497	85	
260		0.092	77	
265		0.0488	77	
270		0.093	77	
275		0.093	77	
290		0.1	77	
300		0.072	77	
310		0.122	85	
315		0.3616	83	
320		0.098	80	
330		0.118	79	
340		0.04	80	
350		0.2568	82	
360		0.3615	85	
390		0.47	84	
400		1.08	82	
1240		0.0315	80	
1250		0.0303	80	
1260		0.032	80	
1270		0.0308	80	
1280		0.0308	80	
1290		0.032	80	
1300		0.0303	80	
1310		0.0315	80	
1320		0.0306	81	
1330		0.0303	80	
1340		0.032	80	
1350		0.0308	80	
1360		0.0308	80	
1370		0.032	80	
1380		0.0303	80	
1390		0.0239	80	
1400		0.008	84	
1410		0.0315	80	
1420		0.0303	80	
1430		0.032	80	
1440		0.0308	80	
1450		0.0308	80	
1460		0.032	80	
1470		0.0303	80	
1480		0.0315	80	
1490		0.0315	80	
1500		0.0303	80	
1510		0.032	80	
1520		0.0308	80	
1530		0.0308	80	
1540		0.032	80	
1550		0.0303	80	
1560		0.0315	80	
1570		0.063	80	
1580		0.0606	80	
1590		0.0639	80	
1600		0.0616	80	
1610		0.2505	80	
1620		0.2542	82	
1630		0.1107	84	
1640		0.0245	87	
1645		0.0921	84	
1650		0.0903	80	
1660		0.0903	80	
1670		0.0759	80	
1680		0.0759	80	
1690		0.0922	80	
1700		0.0922	80	
1710		0.094	83	
1720		0.093	85	
1730		0.0913	80	
1740		0.0913	80	
1750		0.0787	80	
1760		0.0493	80	
1770		0.0359	80	
1780		0.0903	83	
1790		0.0903	82	
1800		0.0921	87	
1810		0.1156	87	
1820		0.1134	84	
1830		0.1134	87	
1840		0.0315	86	
1850		0.1392	86	
1860		0.117	87	
1870		0.1847	87	
1880		0.0546	87	
1885		0.0657	87	
1890		0.0975	87	
1900		0.1214	87	
1910		0.1445	85	
1920		0.1959	86	
1925		0.0655	87	
1930		0.0717	86	
1940		0.1143	87	
1945		0.0822	82	
1950		0.0407	80	
170N		0.5043	82	
170S		0.3279	85	
70	AZ	0.0108	77	
75	AZ	0.0025	77	85
80	AZ	0.0066	77	85
85	AZ	0.0027	77	85
90	AZ	0.0151	77	60
95	AZ	0.0124	77	95
100	AZ	0.0032	77	85
110	AZ	0.0158	77	85
120	AZ	0.0149	77	85
130	AZ	0.0317	77	85
135	AZ	0.0253	77	85
140	AZ	0.0263	77	85
150	AZ	0.0427	77	85
155	AZ	0.0256	77	85
160	AZ	0.0234	77	85
165	AZ	0.0133	77	85
180	AZ	0.0659	77	
185	AZ	0.0241	77	85
190	AZ	0.0321	77	
195	AZ	0.0393	77	85
200	AZ	0.0416	77	13
210	AZ	0.0224	77	45
220	AZ	0.081	77	45
230	AZ	0.0419	77	60
235	AZ	0.0136	77	36
240	AZ	0.0739	77	33
245	AZ	0.0235	77	36
250	AZ	0.0488	77	36
255	AZ	0.029	77	36
260	AZ	0.0448	77	36
270	AZ	0.0576	77	45
280	AZ	0.0599	77	85
290	AZ	0.0154	77	92
300	AZ	0.0319	77	31
304	AZ	0.0001		
310	AZ	0.0286	77	41
320	AZ	0.0166	77	92
330	AZ	0.0179	77	92
360	AZ	0.0278	77	
400	AZ	0.0994	81	
405	AZ	0.0133	77	
410	AZ	0.0337	77	
415	AZ	0.0072	77	
420	AZ	0.0787	77	
425	AZ	0.0108	77	
545	AZ	0.0321	85	
1000	AZ	0.0166	77	60
1010	AZ	0.0387	77	45
1020	AZ	0.0345	77	45
1030	AZ	0.0308	77	45
1040	AZ	0.0381	77	60
1050	AZ	0.0009	77	60
1060	AZ	0.0399	77	60
1070	AZ	0.0393	77	45
1080	AZ	0.0824	77	38
1090	AZ	0.0528	77	38
1159	AZ	0.0001		
1173	AZ	1E-05		
1226	AZ	1E-05		
430A	AZ	0.0759	84	
430C	AZ	0.0952	83	
440A	AZ	0.0696	83	
495A	AZ	0.026	83	
500A	AZ	0.0332	80	
500B	AZ	0.017	83	
503A	AZ	1E-05		
540A	AZ	0.068	85	
545A	AZ	0.0086	85	
545B	AZ	0.01	85	
545C	AZ	0.0113	85	
545D	AZ	0.0285	85	
550A	AZ	0.1578	83	
560A	AZ	0.0194	81	
560B	AZ	0.0224	79	
560C	AZ	0.0421	77	

TABLE 2. CHANNEL KINEMATIC WAVE INPUT DATA FOR HEC-1 HYDROLOGY MODEL(RK)

NO	BY	CHANNEL LENGTH (FEET)	CHANNEL SLOPE (FT/FT)	CHANNEL ROUGHNESS	CHANNEL SHAPE	DIAMETER OR BOTTOM WIDTH (FEET)	SIDE SLOPE (Z:1)
5		2,000	0.0175	0.045	TRAP	15	5.00
10		2,500	0.0175	0.045	TRAP	15	5.00
15		1,000	0.0124	0.045	TRAP	15	5.00
16		1,200	0.0067	0.035	TRAP	10	4.00
20		2,750	0.013	0.045	TRAP	15	5.00
25		3,300	0.018	0.045	TRAP	10	10.00
26		1,300	0.0154	0.035	TRAP	20	4.00
30		4,000	0.018	0.045	TRAP	10	10.00
35		500	0.02	0.045	TRAP	10	10.00
36		700	0.0014	0.035	TRAP	65	4.00
40		4,500	0.016	0.045	TRAP	10	5.00
45		5,500	0.015	0.045	TRAP	10	5.00
46		2,300	0.0065	0.035	TRAP	40	4.00
60		6,000	0.014	0.045	TRAP	10	5.00
65		2,000	0.013	0.045	TRAP	10	5.00
66		2,000	0.008	0.035	TRAP	50	4.00
80		6,750	0.015	0.045	TRAP	10	5.00
90		8,000	0.012	0.045	TRAP	10	5.00
95		3,500	0.01	0.045	TRAP	10	5.00
96		3,200	0.0078	0.035	TRAP	85	4.00
110		9,000	0.013	0.045	TRAP	10	5.00
120		9,250	0.013	0.045	TRAP	10	5.00
125		1,000	0.013	0.045	TRAP	12	5.00
126		800	0.0038	0.035	TRAP	140	4.00
130		9,500	0.013	0.045	TRAP	12	5.00
135		10,000	0.013	0.045	TRAP	12	5.00
136		2,000	0.0065	0.035	TRAP	115	4.00
145		3,000	0.008	0.045	TRAP	5	10.00
146		5,000	0.0077	0.045	TRAP	310	4.00
150		12,250	0.011	0.045	TRAP	12	5.00
160		5,000	0.0077	0.045	TRAP	310	4.00
165		3,200	0.0057	0.025	TRAP	45	0.50
171		4,500	0.0033	0.045	TRAP	1300	0.01
174		4,000	0.0057	0.045	TRAP	10	20.00
175		5,000	0.003	0.065	TRAP	5	10.00
180		12,500	0.0099	0.045	TRAP	10	20.00
208		700	0.0029	0.030	TRAP	45	1.00
220		18,000	0.0087	0.045	TRAP	10	20.00
234		5,300	0.003	0.025	TRAP	45	0.50
236		3,000	0.0007	0.018	TRAP	70	1.00
240		5,000	0.0038	0.045	TRAP	15	25.00
245		9,000	0.0078	0.045	TRAP	10	20.00
250		5,500	0.0045	0.065	TRAP	10	20.00
251		2,700	0.0007	0.035	TRAP	60	4.00
253		2,700	0.0007	0.018	TRAP	70	1.00
260		3,500	0.009	0.045	TRAP	5	10.00
265		2,500	0.008	0.045	TRAP	5	10.00
270		4,500	0.007	0.045	TRAP	5	10.00
275		1,000	0.005	0.045	TRAP	10	10.00
290		4,000	0.007	0.045	TRAP	5	5.00
1781		980	0.0029	0.045	TRAP	10	100.00
1790		2,570	0.0028	0.045	TRAP	10	100.00
1791		980	0.0029	0.045	TRAP	10	100.00
1800		2,620	0.0028	0.045	TRAP	10	100.00
1801		980	0.0029	0.030	TRAP	20	10.00
1810		2,620	0.0028	0.024	TRAP	5	1.00
1811		1,230	0.0029	0.030	TRAP	20	10.00
1820		2,570	0.0028	0.024	TRAP	5	1.00
1822		1,230	0.0029	0.045	TRAP	10	100.00
1830		2,570	0.0028	0.024	TRAP	5	1.00
1831		1,230	0.0029	0.045	TRAP	10	100.00
1840		2,550	0.0028	0.024	TRAP	5	1.00
1841		1,600	0.0029	0.045	TRAP	10	100.00
1850		2,940	0.0028	0.045	TRAP	10	100.00
1860		2,470	0.0028	0.045	TRAP	10	100.00
1870		3,900	0.0028	0.045	TRAP	10	100.00
1880		1,700	0.0028	0.045	TRAP	10	100.00
1885		2,400	0.0028	0.045	TRAP	10	100.00
1886		300	0.0029	0.045	TRAP	10	100.00
1890		1,980	0.0028	0.045	TRAP	10	100.00
1900		2,470	0.0028	0.045	TRAP	10	100.00
1910		2,940	0.0028	0.045	TRAP	10	100.00
1920		4,200	0.0028	0.045	TRAP	10	100.00
1925		1,250	0.0028	0.045	TRAP	10	100.00
1930		2,200	0.0028	0.045	TRAP	10	100.00
1931		530	0.0029	0.045	TRAP	10	100.00
1940		2,770	0.0028	0.045	TRAP	10	100.00
1941		650	0.0029	0.045	TRAP	10	100.00
1945		1,710	0.0028	0.045	TRAP	10	100.00
1950		1,900	0.0028	0.045	TRAP	10	100.00
1951		500	0.0029	0.045	TRAP	10	100.00
170N		8,500	0.0052	0.045	TRAP	5	10
170S		7,000	0.0038	0.045	TRAP	15	25
70	AZ	760	0.004	0.024	TRAP	10	50.00
75	AZ	200	0.004	0.024	TRAP	10	50.00
80	AZ	240	0.004	0.024	TRAP	0	25.00
85	AZ	285	0.004	0.024	TRAP	10	25.00
87	AZ	240	0.004	0.024	TRAP	10	50.00
90	AZ	1,000	0.004	0.035	TRAP	30	3.00
91	AZ	520	0.004	0.024	TRAP	10	25.00
95	AZ	1,020	0.004	0.035	TRAP	6	3.60
96	AZ	600	0.004	0.024	TRAP	10	25.00
100	AZ	640	0.004	0.024	TRAP	10	25.00
101	AZ	680	0.004	0.024	TRAP	10	25.00
103	AZ	250	0.004	0.018	TRAP	10	1.00
110	AZ	1,280	0.004	0.024	TRAP	10	25.00
120	AZ	800	0.004	0.024	TRAP	0	25.00
121	AZ	720	0.004	0.024	TRAP	10	25.00
122	AZ	520	0.004	0.024	TRAP	10	25.00
130	AZ	200	0.004	0.025	TRAP	5	2.00

Table Continued

TABLE 2. CHANNEL KINEMATIC WAVE INPUT DATA FOR HEC-1 HYDROLOGY MODEL (RK)

300	2,650	0.006	0.045	TRAP	5	5.00
308	2,000	0.0048	0.055	TRAP	10	20.00
310	3,000	0.0048	0.035	TRAP	10	20.00
312	5,000	0.005	0.045	TRAP	15	5.00
315	9,000	0.0044	0.065	TRAP	10	10.00
320	4,000	0.005	0.035	TRAP	5	7.00
328	4,000	0.005	0.045	TRAP	5	5.00
330	3,250	0.005	0.045	TRAP	5	5.00
340	2,500	0.0052	0.018	TRAP	10	1.50
348	4,500	0.0044	0.018	TRAP	10	1.50
350	7,000	0.006	0.045	TRAP	5	10.00
356	7,500	0.0044	0.012	DEEP	11	
360	8,500	0.0051	0.065	TRAP	10	20.00
376	3,400	0.0007	0.035	TRAP	100	4.00
378	3,400	0.0007	0.018	TRAP	70	1.00
390	7,000	0.006	0.045	TRAP	10	100.00
397	2,300	0.0007	0.035	TRAP	100	4.00
400	11,750	0.006	0.045	TRAP	10	5.00
1240	660	0.0029	0.024	TRAP	5	10.00
1250	660	0.0029	0.045	TRAP	10	100.00
1260	660	0.0029	0.045	TRAP	10	100.00
1270	660	0.0029	0.045	TRAP	10	100.00
1280	660	0.0029	0.045	TRAP	10	100.00
1290	660	0.0029	0.045	TRAP	10	100.00
1300	660	0.0029	0.045	TRAP	10	100.00
1310	660	0.0029	0.024	TRAP	5	10.00
1320	660	0.0029	0.024	TRAP	5	10.00
1330	660	0.0029	0.045	TRAP	10	100.00
1340	660	0.0029	0.045	TRAP	10	100.00
1350	660	0.0029	0.045	TRAP	10	100.00
1360	660	0.0029	0.045	TRAP	10	100.00
1370	660	0.0029	0.045	TRAP	10	100.00
1380	660	0.0029	0.045	TRAP	10	100.00
1390	660	0.0029	0.045	TRAP	10	100.00
1391	300	0.0028	0.045	TRAP	10	100.00
1400	700	0.0029	0.024	TRAP	5	10.00
1410	660	0.0029	0.024	TRAP	5	10.00
1420	660	0.0029	0.045	TRAP	10	100.00
1430	660	0.0029	0.045	TRAP	10	100.00
1440	660	0.0029	0.045	TRAP	10	100.00
1450	660	0.0029	0.045	TRAP	10	100.00
1460	660	0.0029	0.045	TRAP	10	100.00
1470	660	0.0029	0.045	TRAP	10	100.00
1480	660	0.0029	0.024	TRAP	5	10.00
1490	660	0.0029	0.024	TRAP	5	10.00
1500	660	0.0029	0.045	TRAP	10	100.00
1510	660	0.0029	0.045	TRAP	10	100.00
1520	660	0.0029	0.045	TRAP	10	100.00
1530	660	0.0029	0.045	TRAP	10	100.00
1540	660	0.0029	0.045	TRAP	10	100.00
1550	660	0.0029	0.045	TRAP	10	100.00
1560	660	0.0029	0.024	TRAP	5	10.00
1570	1,320	0.0029	0.024	TRAP	5	10.00
1571	1,330	0.0028	0.045	TRAP	10	100.00
1580	660	0.0029	0.045	TRAP	10	100.00
135 AZ	1,160	0.004	0.024	TRAP	10	50.00
140 AZ	2,000	0.004	0.024	TRAP	10	50.00
150 AZ	1,200	0.004	0.024	TRAP	10	25.00
151 AZ	1,140	0.004	0.024	TRAP	10	25.00
155 AZ	1,120	0.004	0.024	TRAP	10	25.00
156 AZ	840	0.004	0.024	TRAP	10	25.00
160 AZ	880	0.004	0.024	TRAP	10	25.00
161 AZ	740	0.004	0.025	TRAP	50	2.00
165 AZ	320	0.004	0.024	TRAP	10	25.00
180 AZ	1,600	0.004	0.035	TRAP	5	2.00
181 AZ	1,160	0.004	0.024	TRAP	10	25.00
185 AZ	1,040	0.004	0.024	TRAP	10	25.00
186 AZ	1,040	0.004	0.024	TRAP	10	25.00
188 AZ	680	0.004	0.024	TRAP	10	50.00
190 AZ	600	0.004	0.035	TRAP	10	100.00
191 AZ	1,320	0.004	0.024	TRAP	4	2.60
195 AZ	1,000	0.004	0.024	TRAP	10	25.00
200 AZ	1,640	0.004	0.024	TRAP	10	50.00
210 AZ	1,200	0.004	0.024	TRAP	10	25.00
211 AZ	1,320	0.004	0.035	TRAP	10	2.00
220 AZ	600	0.004	0.024	TRAP	10	25.00
220 AZ	1,440	0.0044	0.035	TRAP	25	4.00
230 AZ	1,840	0.004	0.035	TRAP	12	2.00
231 AZ	480	0.004	0.035	TRAP	12	2.00
233 AZ	380	0.004	0.035	TRAP	12	2.00
235 AZ	800	0.004	0.024	TRAP	10	25.00
236 AZ	680	0.004	0.024	TRAP	10	50.00
240 AZ	1,720	0.004	0.024	TRAP	10	25.00
245 AZ	1,320	0.004	0.024	TRAP	10	25.00
246 AZ	960	0.0077	0.035	TRAP	4	2.60
248 AZ	580	0.004	0.035	TRAP	4	2.60
250 AZ	1,840	0.004	0.024	TRAP	10	50.00
255 AZ	800	0.004	0.024	TRAP	10	50.00
255 AZ	780	0.004	0.024	TRAP	10	25.00
260 AZ	1,000	0.004	0.024	TRAP	10	25.00
260 AZ	800	0.004	0.035	TRAP	8	2.00
270 AZ	1,440	0.004	0.024	TRAP	10	25.00
280 AZ	1,600	0.004	0.024	TRAP	10	50.00
290 AZ	640	0.004	0.035	TRAP	12	2.00
291 AZ	650	0.004	0.035	TRAP	12	2.00
300 AZ	1,360	0.0059	0.035	TRAP	20	2.00
310 AZ	680	0.004	0.024	TRAP	0	75.00
312 AZ	720	0.004	0.024	TRAP	10	25.00
320 AZ	960	0.004	0.024	TRAP	10	25.00
330 AZ	680	0.004	0.035	TRAP	12	2.00
360 AZ	1,110	0.002	0.018	TRAP	20	0.10
400 AZ	2,300	0.0046	0.045	TRAP	5	10.00
405 AZ	1,200	0.005	0.045	TRAP	5	10.00
410 AZ	900	0.0067	0.045	TRAP	5	5.00
415 AZ	600	0.01	0.045	TRAP	5	1.00
420 AZ	1,600	0.0058	0.045	TRAP	5	5.00
425 AZ	600	0.0083	0.045	TRAP	5	1.00
451 AZ	760	0.004	0.035	TRAP	8	2.00
545 AZ	800	0.003	0.030	TRAP	10	2.00
1000 AZ	700	0.004	0.024	TRAP	10	50.00

Table Continued

TABLE 2. CHANNEL KINEMATIC WAVE INPUT DATA FOR HEC-1 HYDROLOGY MODEL (RK)

1581	1,280	0.0028	0.045	TRAP	10	100.00	1010 AZ	1,250	0.004	0.024	TRAP	5	25.00
1590	1,320	0.0029	0.045	TRAP	10	100.00	1010 AZ	680	0.004	0.024	TRAP	5	25.00
1591	1,360	0.0028	0.045	TRAP	10	100.00	1011 AZ	1,280	0.004	0.024	TRAP	10	50.00
1600	1,320	0.0029	0.045	TRAP	10	100.00	1012 AZ	4,000	0.007	0.045	TRAP	5	5.00
1610	5,250	0.0028	0.045	TRAP	10	100.00	1020 AZ	1,300	0.0054	0.024	TRAP	5	1.00
1611	1,330	0.0029	0.024	TRAP	5	10.00	1030 AZ	500	0.0041	0.025	TRAP	0	50.00
1620	5,250	0.0028	0.045	TRAP	10	100.00	1030 AZ	1,800	0.003	0.035	TRAP	12	4.00
1621	1,350	0.0029	0.024	TRAP	5	10.00	1031 AZ	400	0.0035	0.035	TRAP	5	10.00
1630	2,900	0.0028	0.045	TRAP	10	100.00	1040 AZ	2,200	0.004	0.025	TRAP	0	50.00
1640	2,100	0.0028	0.045	TRAP	10	100.00	1041 AZ	1,820	0.004	0.024	TRAP	10	50.00
1645	2,620	0.0035	0.045	TRAP	10	100.00	1042 AZ	320	0.004	0.024	TRAP	10	50.00
1650	2,570	0.0028	0.045	TRAP	10	100.00	1050 AZ	450	0.004	0.024	TRAP	5	25.00
1660	2,570	0.0028	0.045	TRAP	10	100.00	1050 AZ	200	0.004	0.040	TRAP	5	10.00
1670	2,550	0.0028	0.045	TRAP	10	100.00	1051 AZ	800	0.004	0.024	TRAP	10	50.00
1680	2,550	0.0028	0.045	TRAP	10	100.00	1060 AZ	2,400	0.0001	0.024	TRAP	5	25.00
1681	830	0.0029	0.045	TRAP	10	100.00	1070 AZ	1,900	0.004	0.035	TRAP	5	10.00
1690	2,570	0.0028	0.045	TRAP	10	100.00	1070 AZ	300	0.004	0.024	TRAP	0	50.00
1691	980	0.0029	0.045	TRAP	10	100.00	1080 AZ	2,100	0.0057	0.024	TRAP	5	25.00
1700	2,570	0.0028	0.045	TRAP	10	100.00	1090 AZ	1,500	0.004	0.024	TRAP	5	25.00
1701	980	0.0029	0.045	TRAP	10	100.00	430A AZ	3,400	0.0053	0.045	TRAP	5	7
1710	2,620	0.0028	0.045	TRAP	10	100.00	430C AZ	2,750	0.0053	0.045	TRAP	5	7
1711	980	0.0029	0.030	TRAP	20	10.00	440A AZ	1,600	0.0055	0.045	TRAP	5	5
1720	2,620	0.0028	0.045	TRAP	10	100.00	495A AZ	1,200	0.0043	0.045	TRAP	5	15
1721	980	0.0029	0.030	TRAP	20	10.00	500A AZ	1,200	0.005	0.030	TRAP	10	2
1730	2,570	0.0028	0.045	TRAP	10	100.00	500B AZ	765	0.0015	0.025	TRAP	27	3.5
1731	980	0.0029	0.045	TRAP	10	100.00	503B AZ	7,000	0.0032	0.012	CIRC	5	
1740	2,570	0.0028	0.045	TRAP	10	100.00	540A AZ	1,900	0.005	0.030	TRAP	10	2.00
1741	980	0.0029	0.045	TRAP	10	100.00	545A AZ	475	0.0023	0.030	TRAP	33	3.50
1750	2,550	0.0028	0.045	TRAP	10	100.00	545B AZ	495	0.0015	0.030	TRAP	27	3.50
1751	860	0.0029	0.024	TRAP	10	100.00	545C AZ	500	0.0015	0.030	TRAP	62	3.50
1760	2,550	0.0028	0.045	TRAP	10	100.00	545D AZ	1,080	0.0015	0.030	TRAP	55	3.50
1761	550	0.0029	0.024	TRAP	10	100.00	550A AZ	3,000	0.0049	0.045	TRAP	10	20.00
1770	2,550	0.0028	0.045	TRAP	10	100.00	560A AZ	900	0.0047	0.045	TRAP	5	15.00
1771	400	0.0029	0.045	TRAP	10	100.00	560B AZ	1,500	0.0047	0.045	TRAP	5	15.00
1780	2,570	0.0028	0.045	TRAP	10	100.00	560C AZ	1,700	0.0047	0.045	TRAP	5	15.00

TABLE 3. OVERLAND FLOW KINEMATIC WAVE INPUT DATA FOR HEC-1 HYDROLOGY MODEL(UK)

NO	BY	OVERLAND FLOW LENGTH (FEET)	OVERLAND SLOPE (FT/FT)	OVERLAND ROUGHNESS	PERCENT SUBBASIN AREA
5		185	0.0213	0.10	100.00
10		290	0.0213	0.10	100.00
15		230	0.0213	0.10	100.00
20		385	0.0213	0.10	100.00
25		310	0.0213	0.10	100.00
30		350	0.0213	0.10	100.00
35		320	0.0213	0.10	100.00
40		270	0.0213	0.10	100.00
45		335	0.0213	0.10	100.00
60		345	0.0213	0.10	100.00
65		270	0.0213	0.10	100.00
80		375	0.0213	0.10	100.00
90		580	0.0213	0.10	100.00
95		405	0.0213	0.10	100.00
110		480	0.0213	0.10	100.00
120		333	0.0213	0.10	100.00
125		320	0.0213	0.10	100.00
130		220	0.0213	0.10	100.00
135		215	0.0213	0.10	100.00
145		225	0.0080	0.10	100.00
150		510	0.0213	0.10	100.00
160		650	0.0080	0.10	100.00
180		1,000	0.0080	0.10	100.00
220		1,150	0.0080	0.10	100.00
240		1,300	0.0057	0.10	100.00
245		650	0.0080	0.10	100.00
250		600	0.0057	0.10	100.00
260		365	0.0080	0.10	100.00
265		270	0.0080	0.10	100.00
270		290	0.0080	0.10	100.00
275		260	0.0057	0.10	100.00
290		350	0.0057	0.10	100.00
300		380	0.0057	0.10	100.00
310		340	0.0057	0.10	100.00
315		500	0.0057	0.10	100.00
320		340	0.0057	0.10	100.00
330		505	0.0057	0.10	100.00
340		225	0.0057	0.10	100.00
350		510	0.0057	0.10	100.00
360		600	0.0057	0.10	100.00
390		935	0.0057	0.10	100.00
400		1,280	0.0057	0.10	100.00
1240		1,330	0.0028	0.15	100.00
1250		1,280	0.0028	0.15	100.00
1260		1,350	0.0028	0.15	100.00
1270		1,300	0.0028	0.15	100.00
1280		1,300	0.0028	0.15	100.00
1290		1,350	0.0028	0.15	100.00
1300		1,280	0.0028	0.15	100.00
1310		1,330	0.0028	0.15	100.00
1320		1,330	0.0028	0.15	100.00
1330		1,280	0.0028	0.15	100.00
1340		1,350	0.0028	0.15	100.00
1350		1,300	0.0028	0.15	100.00
1360		1,300	0.0028	0.15	100.00
1370		1,350	0.0028	0.15	100.00
1380		1,280	0.0028	0.15	100.00
1390		1,020	0.0028	0.15	100.00
1400		300	0.0028	0.15	100.00
1410		1,330	0.0028	0.15	100.00
1420		1,280	0.0028	0.15	100.00
1430		1,350	0.0028	0.15	100.00
1440		1,300	0.0028	0.15	100.00
1450		1,300	0.0028	0.15	100.00
1460		1,350	0.0028	0.15	100.00
1470		1,280	0.0028	0.15	100.00
1480		1,330	0.0028	0.15	100.00
1490		1,330	0.0028	0.15	100.00
1500		1,280	0.0028	0.15	100.00
1510		1,350	0.0028	0.15	100.00
1520		1,300	0.0028	0.15	100.00
1530		1,300	0.0028	0.15	100.00
1540		1,350	0.0028	0.15	100.00
1550		1,280	0.0028	0.15	100.00
1560		1,330	0.0028	0.15	100.00
1570		1,330	0.0028	0.15	100.00
1580		1,280	0.0028	0.15	100.00
1590		1,350	0.0028	0.15	100.00
1600		1,300	0.0028	0.15	100.00
1610		1,330	0.0029	0.15	100.00
1620		1,350	0.0029	0.15	100.00
1630		1,000	0.0029	0.15	100.00
1640		470	0.0029	0.15	100.00
1645		980	0.0054	0.15	100.00
1650		980	0.0029	0.15	100.00
1660		980	0.0029	0.15	100.00
1670		830	0.0029	0.15	100.00
1680		830	0.0029	0.15	100.00
1690		980	0.0029	0.15	100.00
1700		980	0.0029	0.15	100.00
1710		980	0.0029	0.15	100.00
1720		980	0.0029	0.15	100.00
1730		990	0.0029	0.15	100.00
1740		980	0.0029	0.15	100.00
1750		860	0.0029	0.15	100.00
1760		550	0.0029	0.15	100.00
1770		400	0.0029	0.15	100.00
1780		980	0.0029	0.15	100.00
1790		980	0.0029	0.15	100.00
1800		980	0.0029	0.15	100.00
1810		1,230	0.0029	0.15	100.00
1820		1,230	0.0029	0.15	100.00
1830		1,230	0.0029	0.15	100.00
1840		1,630	0.0029	0.15	100.00
1850		1,320	0.0029	0.15	100.00
1860		1,320	0.0029	0.15	100.00
1870		1,320	0.0029	0.15	100.00
1880		1,200	0.0029	0.15	100.00
1885		1,100	0.0029	0.15	100.00
1890		1,370	0.0029	0.15	100.00
1900		1,370	0.0029	0.15	100.00
1910		1,370	0.0029	0.15	100.00
1920		1,300	0.0029	0.15	100.00
1925		1,730	0.0029	0.15	100.00
1930		1,090	0.0029	0.15	100.00
1940		1,200	0.0029	0.15	100.00
1945		1,340	0.0029	0.15	100.00
1950		960	0.0029	0.15	100.00
170N		770	0.0057	0.10	100.00
170S		650	0.0057	0.10	100.00

Table continued

TABLE 3. OVERLAND FLOW KINEMATIC WAVE INPUT DATA FOR HEC-1 HYDROLOGY MODEL(UK) Continued

NO	BY	OVERLAND FLOW LENGTH (FEET)	OVERLAND SLOPE (FT/FT)	OVERLAND ROUGHNESS	PERCENT SUBBASIN AREA
70	AZ	270	0.0063	0.10	100.00
75	AZ	100	0.0050	0.09	100.00
80	AZ	105	0.0050	0.09	100.00
85	AZ	70	0.0050	0.09	100.00
90	AZ	150	0.0050	0.09	100.00
95	AZ	315	0.0050	0.09	100.00
100	AZ	200	0.0050	0.09	100.00
110	AZ	120	0.0050	0.09	100.00
120	AZ	270	0.0050	0.09	100.00
130	AZ	510	0.0050	0.09	100.00
135	AZ	390	0.0050	0.09	100.00
140	AZ	230	0.0050	0.09	100.00
150	AZ	230	0.0050	0.09	100.00
155	AZ	230	0.0050	0.09	100.00
160	AZ	230	0.0050	0.09	100.00
165	AZ	230	0.0050	0.09	100.00
180	AZ	400	0.0082	0.10	100.00
185	AZ	80	0.0082	0.09	100.00
190	AZ	1,230	0.0063	0.10	100.00
195	AZ	80	0.0082	0.09	100.00
200	AZ	260	0.0050	0.10	100.00
210	AZ	153	0.0040	0.09	100.00
220	AZ	135	0.0040	0.09	100.00
230	AZ	110	0.0040	0.09	100.00
235	AZ	140	0.0040	0.09	100.00
240	AZ	140	0.0040	0.09	100.00
245	AZ	130	0.0040	0.09	100.00
250	AZ	150	0.0040	0.09	100.00
300	AZ	270	0.0033	0.10	100.00
310	AZ	680	0.0040	0.10	100.00
320	AZ	80	0.0040	0.09	100.00
330	AZ	100	0.0040	0.09	100.00
360	AZ	1,000	0.0057	0.10	100.00
400	AZ	1,000	0.0057	0.10	100.00
405	AZ	200	0.0057	0.10	100.00
410	AZ	400	0.0057	0.10	100.00
415	AZ	200	0.0057	0.10	100.00
420	AZ	1,200	0.0057	0.10	100.00
425	AZ	200	0.0057	0.10	100.00
545	AZ	900	0.0057	0.10	100.00
1000	AZ	725	0.0063	0.10	100.00
1010	AZ	130	0.0040	0.09	100.00
1020	AZ	110	0.0063	0.10	100.00
1030	AZ	160	0.0040	0.10	100.00
1040	AZ	100	0.0040	0.09	100.00
1050	AZ	100	0.0040	0.09	100.00
1060	AZ	210	0.0014	0.09	100.00
1070	AZ	130	0.0040	0.10	100.00
1080	AZ	110	0.0040	0.10	100.00
1090	AZ	105	0.0040	0.10	100.00
430A	AZ	500	0.0057	0.10	100.00
430C	AZ	700	0.0057	0.10	100.00
440A	AZ	1,200	0.0057	0.10	100.00
495A	AZ	600	0.0057	0.10	100.00
500A	AZ	700	0.0057	0.10	100.00
500B	AZ	600	0.0057	0.10	100.00
540A	AZ	1,000	0.0057	0.10	100.00
545A	AZ	200	0.0057	0.10	100.00
545B	AZ	400	0.0057	0.10	100.00
545C	AZ	500	0.0057	0.10	100.00
545D	AZ	600	0.0057	0.10	100.00
550A	AZ	1,200	0.0057	0.10	100.00
560A	AZ	300	0.0057	0.10	100.00
560B	AZ	300	0.0057	0.10	100.00
560C	AZ	400	0.0057	0.10	100.00

TABLE 4. SUMMARY OF PEAK FLOWS FOR THE 100 YEAR 12 HOUR STORM

NO	PEAK FLOW (CFS)	NO	PEAK FLOW (CFS)	NO	PEAK FLOW (CFS)	NO	PEAK FLOW (CFS)	NO	PEAK FLOW (CFS)	NO	PEAK FLOW (CFS)	NO	PEAK FLOW (CFS)	NO	PEAK FLOW (CFS)	NO	PEAK FLOW (CFS)	NO	PEAK FLOW (CFS)	NO	PEAK FLOW (CFS)
5	54	135	121	252	316	1250	10	1590	96	1760	27	1930	226	130AZ	152	260AZ	119	DAM95	55	503BAZ	121
7	133	136	1,962	253	6,250	1260	10	1591	95	1761	952	1931	147	140AZ	80	270AZ	168	1000AZ	29	503CAZ	1,007
10	80	138	2,071	260	395	1270	10	1592	190	1762	977	1932	373	150AZ	160	280AZ	222	1010AZ	107	540A1Z	1,058
15	34	140	2,743	265	49	1280	20	1600	95	1770	21	1940	93	151AZ	264	290AZ	64	1011AZ	113	540AAZ	73
16	130	145	47	267	232	1290	20	1610	75	1771	973	1941	90	152AZ	438	291AZ	336	1012AZ	141	545A1Z	1,060
17	275	146	22	270	189	1300	20	1611	371	1772	992	1942	184	155AZ	96	292AZ	337	1020AZ	104	545A2Z	1,062
18	154	147	2,888	275	132	1310	20	1612	445	1780	44	1945	30	156AZ	71	300AZ	337	1030AZ	75	545AAZ	22
20	121	150	838	280	595	1320	31	1620	86	1781	106	1950	17	157AZ	284	304AZ	336	1031AZ	94	545B1Z	1,062
25	136	160	2,888	286	120	1330	30	1621	445	1782	146	1951	30	160AZ	88	310AZ	38	1032AZ	170	545B2Z	1,065
26	246	161	1,000	290	165	1340	31	1622	578	1790	41	1952	46	161AZ	106	312AZ	0	103AAZ	494	545BAZ	18
27	542	162	1,888	300	244	1350	30	1630	56	1791	106	1984	961	165AZ	51	320AZ	66	103BAZ	0	545C1Z	1,061
28	370	165	1,000	308	354	1360	40	1640	59	1792	144	70AZ	15	180AZ	77	322AZ	66	1040AZ	101	545C2Z	1,065
30	173	170N	548	310	750	1370	41	1645	60	1800	58	75AZ	395	181AZ	87	330AZ	71	1041AZ	39	545CAZ	18
35	24	170S	262	311	375	1380	40	1650	36	1801	155	80AZ	28	182AZ	373	331AZ	337	1042AZ	29	545D2Z	1,065
36	508	171	2,657	312	912	1390	10	1660	36	1802	212	85AZ	380	185AZ	96	332AZ	347	1043AZ	127	545DAZ	39
37	615	172	2,678	313	1,124	1391	10	1670	33	1810	1,404	87AZ	25	186AZ	145	360AZ	17	1050AZ	3	545E1Z	1,055
38	520	173	1,888	314	375	1392	42	1680	33	1811	211	88AZ	396	187AZ	227	361AZ	478	1051AZ	39	545E2Z	1,069
40	117	174	1,553	315	291	1400	33	1681	33	1812	1,597	90AZ	48	188AZ	205	362AZ	491	1052AZ	39	545EAZ	36
45	180	175	352	316	375	1410	52	1682	66	1820	1,225	91AZ	385	189AZ	544	400AZ	229	1060AZ	39	550AAZ	143
46	588	180	905	320	205	1420	50	1690	37	1822	143	92AZ	415	190AZ	17	402AZ	839	1070AZ	100	560A1Z	1,014
48	723	208	2,596	326	955	1430	50	1691	36	1823	1,360	95AZ	41	191AZ	348	405AZ	17	1080AZ	229	560A2Z	1,024
50	880	210	3,165	328	116	1440	50	1692	71	1830	1,053	96AZ	360	192AZ	397	410AZ	34	1090AZ	294	560AAZ	33
60	170	220	1,148	330	686	1450	59	1700	37	1831	145	97AZ	389	195AZ	160	411AZ	488	1159AZ	834	560B1Z	1,015
65	75	222	1,000	340	381	1460	60	1701	36	1832	1,182	DAM1	383	210AZ	65	415AZ	66	1173AZ	37	560B2Z	1,028
66	877	223	2,352	347	1,792	1470	59	1702	71	1840	13	DAM2	69	211AZ	382	420AZ	176	1226AZ	437	560BAZ	27
68	908	224	1,352	348	363	1480	62	1710	46	1841	989	DAM3	62	212AZ	398	423AZ	673	1227AZ	66	560C1Z	976
70	1,339	234	1,000	349	1,438	1490	73	1711	59	1842	1,002	DAM4	0	220AZ	561	425AZ	83	1228AZ	371	560C2Z	997
80	159	235	2,597	350	217	1500	68	1712	104	1850	66	DAM5	67	231AZ	337	431AZ	772	230AZ0	135	560CAZ	37
90	280	236	3,164	356	1,754	1510	69	1720	52	1860	115	DAM6	36	232AZ	415	432AZ	863	400AAZ	229	DAM100	119
95	111	237	6,795	358	1,969	1520	69	1721	104	1870	169	DAM7	337	233AZ	409	433AZ	854	410BAZ	484	DAM110	64
96	1,319	238	4,259	360	241	1530	77	1722	156	1880	31	DAM8	98	235AZ	37	441AZ	985	410CAZ	518	DAM120	57
98	1,409	239	1,352	376	2,131	1540	78	1730	36	1885	382	100AZ	119	236AZ	69	451AZ	116	430AAZ	90	DAM135	84
100	1,895	240	1,435	377	8,083	1550	77	1731	71	1886	169	101AZ	60	237AZ	92	501AZ	980	430CAZ	101	DAM150	174
110	272	241	545	378	6,250	1560	83	1732	106	1887	459	102AZ	496	240AZ	197	545D1	1,054	440AAZ	57	DAM155	106
120	214	242	6,250	390	319	1570	103	1740	36	1888	964	103AZ	494	245AZ	64	551AZ	899	495AAZ	31	DAM160	92
125	39	243	1,247	397	8,077	1571	281	1741	71	1890	148	110AZ	58	246AZ	170	552AZ	1,020	500AAZ	32	DAM165	50
126	1,865	245	247	398	8,292	1572	371	1742	106	1900	112	120AZ	49	247AZ	235	DAM75	394	500B1Z	998	DAM200	60
127	2,002	247	2,176	400	630	1580	95	1750	899	1910	62	121AZ	359	248AZ	219	DAM80	25	500B2Z	1,010		
128	1,879	250	208	401	8,732	1581	190	1751	65	1920	90	122AZ	14	250AZ	118	DAM85	379	500BAZ	22		
130	129	251	228	1240	10	1582	282	1752	954	1925	210	123AZ	401	255AZ	75	DAM90	70	503AAZ	121		

1 ****

FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985

U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616

****

THIS HEC-1 VERSION CONTAINS ALL OPTIONS EXCEPT ECONOMICS, AND THE NUMBER OF PLANS ARE REDUCED TO 3

1 HEC-1 INPUT PAGE 1

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

  1           ID      ***************************************************************
  2           ID      *          SALT RIVER PIMA - MARICOPA INDIAN COMMUNITY        *
  3           ID      *                   DRAINAGE STUDY                            *
  4           ID      *                                                             *
  5           ID      *                   PLAN   A                                  *
  6           ID      *                                                             *
  7           ID      *             MODIFICATIONS TO ADOT MODEL:                    *
  8           ID      *                                                             *
  9           ID      *                   ROBERT L. WARD, P.E.                      *
 10           ID      *                   CONSULTING ENGINEER                       *
 11           ID      *                                                             *
 12           ID      *                   OUTER LOOP FREEWAY                        *
 13           ID      *              (NORTH OF THE ARIZONA CANAL)                   *
 14           ID      *                        PHASE 2                              *
 15           ID      *                                                             *
 16           ID      *         HYDROLOGY ANALYSIS FOR OFFSITE DRAINAGE             *
 17           ID      *                    100 YEAR EVENT                           *
 18           ID      *         12 HOUR HYPOTHETICAL STORM DISTRIBUTION             *
 19           ID      *                                                             *
 20           ID      *      USES % IMPERVIOUS COVER TO SIMULATE DEVELOPMENT        *
 21           ID      *         INCLUDES RETENTION/DETENTION BASINS FOR             *
 22           ID      *             RESIDENTIAL & COMMERCIAL AREAS                  *
 23           ID      *                                                             *
 24           ID      *                                                             *
 25           ID      *         THIS MODEL INCLUDES THE ADDITIONAL AREA             *
 26           ID      *       PREVIOUSLY MODELED BY THE CORP OF ENGINEERS           *
 27           ID      *                                                             *
 28           ID      *     ALL CURVE NUMBERS ARE FOR 12-HOUR STORM DURATION        *
 29           ID      *     NORMAL DEPTH STORAGE ROUTING ALONG ARIZONA CANAL        *
 30           ID      *       INCLUDES CAP CROSS-DRAINAGE AT EAST BOUNDARY          *
 31           ID      * BASE MODEL USES APRIL 1989 HYDROLOGIC REVISIONS BY R. WARD *
 32           ID      * MARCH 1989 HIGHWAY ALIGNMENT HAS BEEN REVISED TO MID 1989  *
 33           ID      *                   HIGHWAY ALIGNMENT.                        *
 34           ID      *                                                             *
 35           ID      *                     MODEL EK15.24I                          *
 36           ID      *      THIS MODEL SIMULATES THE IMPACT TO THE OUTER LOOP      *
 37           ID      *      OF A NORTH/SOUTH CHANNEL ALONG AN EXTENSION OF         *
 38           ID      *      96th STREET FROM THE NORTH BOUNDARY OF THE SRPMIC      *
 39           ID      *      TO THE ARIZONA CANAL                                   *
```

-10-

```
40      ID      *                                                        *
41      ID      *  13 DETENTION BASINS HAVE BEEN REMOVED THAT WERE ADJACENT  *
42      ID      *  TO THE OUTER LOOP.  MODIFIED PULS CHANNEL ROUTING        *
43      ID      *  OPERATIONS ARE USED IN-PLACE OF THE BASINS.              *
44      ID      *  CHANNEL GEOMETRY IS BASED ON AVERAGED, APPROXIMATE XSEC  *
45      ID      *  GEOMETRY.                                                *
46      ID      *                                                           *
47      ID      *                CP 103 IS ROUTED TO SUB 360.               *
48      ID      * ALL SUB-BASIN DATA & ROUTING OPERATIONS HAVE BEEN REVISED  *
49      ID      * TO REFLECT THE HIGHWAY ALIGNMENT CHANGE MADE BY DCCO IN   *
50      ID      * MID-1989.  ADDITIONAL OFFSITE DRAINAGE HAS BEEN ROUTED    *
51      ID      *THROUGH 7000 LF OF PIPE AND INSERTED IN THE MODEL AT CP 503B *
52      ID      *    WHICH IS AT THE NORTH SIDE OF VIA DE VENTURA           *
53      ID      *                                                           *
54      ID      * CHANNEL ROUTING OPERATIONS ARE REFERENCED TO OUTER LOOP    *
55      ID      *  HIGHWAY STATIONING FROM THE HIGHWAY GENERAL PLAN          *
```



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

56          ID      ************************************************************
            *DIAGRAM
57          IT      5 09JAN91       0     289
58          IO      5
            *      ******************************************************************
            *      BEGIN DRAINAGE AREA CONTRIBUTING DIRECTLY TO HIGHWAY DRAINAGE CHANNEL
            *      ******************************************************************

59          KK  1000AZ     SUB
60          KM       RUNOFF FROM SUB 1000AZ
61          BA   .0166
62          PH            .1     .72    1.42    2.50    2.77    2.95    3.29    3.68
63          LS            77      60
64          UK    725   .0063    .10     100
65          RK    700   .0040   .024           TRAP      10      50

66          KK  1042AZ      CP
67          KM       ROUTE SUB 1000AZ TO CP 1042AZ
68          RK    320   0.004   .024           TRAP      10      50

69          KK  1060AZ     SUB
70          KM       RUNOFF FROM SUB 1060AZ
71          BA   .0399
72          LS            77      60
73          UK    210   .0014    .09     100
74          RK   2400   .0001   .024           TRAP       5      25

75          KK  1051AZ      CP
76          KM       ROUTE SUB 1060AZ TO CP 1051AZ
77          RK    800   .0040   .024           TRAP      10      50

78          KK  1050AZ     SUB
79          KM       RUNOFF FROM SUB 1050AZ
80          BA   .0009
81          LS            77      60
82          UK    100   .0040    .09     100
83          RK    450   .0040   .024   .0006   TRAP       5      25
84          RK    200   .0040   .040           TRAP       5      10
```

Where is CP103 & Sub 360 on the Sub-basin Concentration Points map.

-11-

```
 85          KK  1052AZ      CP
 86          KM        COMBINE SUB 1050AZ & CP 1051AZ
 87          HC       2

 88          KK  1041AZ      CP
 89          KM        ROUTE CP 1052AZ TO CP 1041AZ
 90          RK    1820   .0040    .024           TRAP      10      50

 91          KK  1040AZ     SUB
 92          KM        RUNOFF FROM SUB 1040AZ
 93          BA   .0381
 94          LS              77      60
 95          UK     100   .0040     .09     100
 96          RK    2200   .0040    .025           TRAP       0      50
1                                   HEC-1 INPUT                                                    PAGE  3

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


 97          KK  1043AZ      CP
 98          KM        COMBINE SUB 1040AZ WITH CP 1041AZ AND CP 1442AZ
 99          HC       3

100          KK    DAMB
101          KM        ROUTE CP 1043AZ THROUGH RETENTION BASIN 8
102          RS       1    STOR
103          SV       0   1.895    3.79
104          SE     100     101     102
105          SS  101.99     200     2.9     1.5
106          ST     102     200     2.9     1.5

107          KK  1011AZ      CP
108          KM        ROUTE OUTFLOW FROM DAM 8 TO CP 1011AZ
109          RK    1280  0.0040    .024           TRAP      10      50

110          KK  1010AZ     SUB
111          KM        RUNOFF FROM SUB 1010AZ
112          BA   .0387
113          LS              77      45
114          UK     130   .0040     .09     100
115          RK     680   .0040    .024   .0057   TRAP       5      25
116          RK    1250   .0040    .024           TRAP       5      25

117          KK  1012AZ      CP
118          KM        COMBINE SUB 1010AZ WITH CP 1011AZ
119          HC       2

120          KK     286          CP
121          KM            ROUTE ADOT 1012 TO CP286
122          RK    4000    .007    .045           TRAP       5       5     YES

123          KK  1020AZ     SUB
124          KM        RUNOFF FROM SUB 1020AZ
125          BA   .0345
126          LS              77      45
127          UK     110   .0063     .10     100
128          RK    1300   .0054    .024           TRAP       5       1
```

-12-

```
129        KK    290        SUB
130        KM          RUNOFF FROM SUB 290 AND ROUTE 1020AZ
131        BA   .100
132        LS            77
133        UK    350  .0057    .10    100
134        RK   4000   .007   .045          TRAP     5     5    YES

135        KK  270AZ    SUB
136        KM       RUNOFF FROM SUB 270AZ
137        BA  .0576
138        LS            77     45
139        UK    130   .004    .09    100
140        RK   1440   .004   .024          TRAP    10    25
```



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

141        KK    300        SUB
142        KM          RUNOFF FROM 300 AND ROUTE ADOT 270
143        BA   .072
144        LS            77
145        UK    380  .0057    .10    100
146        RK   2650   .006   .045          TRAP     5     5    YES

147        KK    275        SUB
148        KM          RUNOFF FROM SUB 275
149        BA   .093
150        LS            77
151        UK    260  .0057    .10    100
152        RK   1000   .005   .045          TRAP    10    10

153        KK    280        CP
154        KM          COMBINE SUB 275, SUB 290, SUB 300, CP286,
155        HC      4

156        KK    310        SUB
157        KM          RUNOFF FROM SUB 310 AND ROUTE CP280
158        BA  .1220
159        LS            85
160        UK    340  .0057    .10    100
161        RK   3000  .0048   .035          TRAP    10    20    YES

162        KK    311        DIV
163        KM          DIVERT 50% OF FLOW FROM 310 INTO 315
164        DT    314
165        DI      0    100    500   1000  10000
166        DQ      0     50    250    500   5000

167        KK    308       CP
168        KM          ROUTE REMAINING 310 TO CP308
169        RK   2000  .0048   .055          TRAP    10    20

170        KK  280AZ    SUB
171        KM       RUNOFF FROM SUB 280AZ
172        BA  .0599
173        LS            77     85
```

```
174          UK     165    .004     .09     100
175          RK    1600    .004    .024           TRAP      10      50

176          KK    DAM5
177          KM        ROUTE SUB 280AZ THROUGH RETENTION BASIN 5
178          RS       1    STOR
179          SV       0     2.9     5.8
180          SE     100     101     102
181          SS  101.99     200     2.9     1.5
182          ST     102     200     2.9     1.5
1                                        HEC-1 INPUT                                                    PAGE  5

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


183          KK   250AZ     SUB
184          KM        RUNOFF FROM SUB 250AZ AND ROUTE OUTFLOW FROM DAM 5
185          BA   .0488
186          LS              77      36
187          UK     150    .004     .09     100
188          RK    1840    .004    .024           TRAP      10      50     YES

189          KK     320          SUB
190          KM            RUNOFF FROM 320 AND ROUTE ADOT 250
191          BA    .098
192          LS              80
193          UK     340   .0057     .10     100
194          RK    4000    .005    .035           TRAP       5       7     YES

195          KK   304AZ      CP
             *  ************************************************************************
             *                  DISCHARGE IN CFS RELEASED FROM THE LAKES
             *  ************************************************************************
196          KM        FLOW RELEASED FROM THE LAKES
197          IN      10 09JAN91       0
198          BA   .0001
199          QI     200     200     200     200     200     200     200     200     200     200
200          QI     200     200     200     200     200     200     200     200     200     200
201          QI     200     200     200     200     200     200     200     200     200     200
202          QI     200     200     200     200     200     200     200     200     200     200
203          QI     200     200     200     200     200     200     200     200     200     200
204          QI     200     200     200     200     200     200     200     200     200     200
205          QI     200     200     200     200     200     200     200     207     230     260
206          QI     288     305     317     324     330     333     336     336     335     334
207          QI     333     332     330     328     327     326     324     322     319     317
208          QI     313     311     308     306     303     301     298     295     291     287
209          QI     282     278     272     268     263     258     250     244     240     234
210          QI     227     219     211     203     194     186     179     170     161     152
211          QI     140     132     124     116     109     102      96      88      79      72
212          QI      67      62      58      54      49      44      39      35      31      28
213          QI      24      20      18      15      12
             *  ************************************************************************

214          KK   300AZ     SUB
215          KM        RUNOFF FROM SUB 300AZ & ROUTE CP 304AZ
216          BA   .0319
217          LS              77      31
218          UK     270   .0033     .10     100
```

```
219          RK    1360   .0059    .035           TRAP      20       2     YES

220          KK    DAM7
221          KM        ROUTE SUB 300AZ THROUGH RETENTION BASIN 7
222          RS       1    STOR
223          SV       0    .325     .65
224          SE     100     101     102
225          SS  101.99     200     2.9     1.5
226          ST     102     200     2.9     1.5
1                                          HEC-1 INPUT                                                    PAGE  6

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


227          KK   291AZ      CP
228          KM        ROUTE OUTFLOW FROM DAM 7 TO CP 291AZ
229          RK     650    .004    .035           TRAP      12       2

230          KK   290AZ     SUB
231          KM        RUNOFF FROM SUB 290AZ
232          BA   .0154
233          LS              77      92
234          UK     100    .004     .09     100
235          RK     640    .004    .035           TRAP      12       2

236          KK    DAM6
237          KM        ROUTE SUB 290AZ THROUGH RETENTION BASIN 6
238          RS       1    STOR
239          SV       0      .8     1.6
240          SE     100     101     102
241          SS  101.99     200     2.9     1.5
242          ST     102     200     2.9     1.5

243          KK   292AZ      CP
244          KM        COMBINE OUTFLOW FROM DAM 6 WITH CP 291AZ
245          HC       2

246          KK   331AZ      CP
247          KM        ROUTE CP 292AZ TO CP 331AZ
248          RK     680    .004    .035           TRAP      12       2

249          KK   330AZ     SUB
250          KM        RUNOFF FROM SUB 330AZ
251          BA   .0179
252          LS              77      92
253          UK     100    .004     .09     100
254          RK    1080    .004    .035           TRAP      12       2

255          KK    DAM2
256          KM        ROUTE SUB 330AZ THROUGH RETENTION BASIN 2
257          RS       1    STOR
258          SV       0      .8     1.6
259          SE     100     101     102
260          SS  101.99     200     2.9     1.5
261          ST     102     200     2.9     1.5

262          KK   332AZ      CP
263          KM        COMBINE OUTFLOW FROM DAM 2 WITH CP 331AZ
```

```
 264          HC      2

 265          KK   231AZ      CP
 266          KM        ROUTE CP 332AZ TO CP 231AZ
 267          RK     480    .004    .035           TRAP      12       2
1                                          HEC-1 INPUT                                                    PAGE  7

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


 268          KK  230AZ0     SUB
 269          KM        RUNOFF FROM SUB 230AZ
 270          BA   .0419
 271          LS              77      60
 272          UK     110    .004     .09     100
 273          RK    1840    .004    .035           TRAP      12       2

 274          KK   232AZ      CP
 275          KM        COMBINE SUB 230AZ WITH CP 231AZ
 276          HC       2

 277          KK   233AZ      CP
 278          KM        ROUTE CP 232AZ TO CP 233AZ
 279          RK     380    .004    .035           TRAP      12       2

 280          KK   220AZ     SUB
 281          KM        RUNOFF FROM SUB 220AZ AND ROUTE CP 233AZ
 282          BA   .0810
 283          LS              77      45
 284          UK     135    .004     .09     100
 285          RK     600    .004    .024   .0091   TRAP      10      25
 286          RK    1440   .0044    .035           TRAP      25       4     YES

 287          KK     330          SUB
 288          KM            RUNOFF FROM 330 AND ROUTE ADOT 220
 289          BA    .118
 290          LS              79
 291          UK     505   .0057     .10     100
 292          RK    3250    .005    .045           TRAP       5       5     YES

 293          KK   310AZ     SUB
 294          KM        RUNOFF FROM SUB 310AZ
 295          BA   .0286
 296          LS              77      41
 297          UK     680    .004     .10     100
 298          RK     680    .004    .024           TRAP       0      75

 299          KK    DAM4
 300          KM        ROUTE SUB 310AZ THROUGH RETENTION BASIN 4
 301          RS       1    STOR
 302          SV       0     1.8     3.6
 303          SE     100     101     102
 304          SS  101.99     200     2.9     1.5
 305          ST     102     200     2.9     1.5

 306          KK   312AZ      CP
 307          KM        ROUTE OUTFLOW FROM DAM 4 TO CP 312AZ
 308          RK     720    .004    .024           TRAP      10      25
```

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

 309          KK   320AZ     SUB
 310          KM        RUNOFF FROM SUB 320AZ
 311          BA   .0166
 312          LS             77      92
 313          UK     80    .004     .09     100
 314          RK    960    .004    .024    .009    TRAP      10      25

 315          KK   322AZ      CP
 316          KM        COMBINE SUB 320AZ WITH CP 312AZ
 317          HC       2

 318          KK    DAM3
 319          KM        ROUTE CP 322AZ THROUGH RETENTION BASIN 3
 320          RS       1    STOR
 321          SV       0      .8     1.6
 322          SE     100     101     102
 323          SS  101.99     200     2.9     1.5
 324          ST     102     200     2.9     1.5

 325          KK   260AZ     SUB
 326          KM        RUNOFF FROM SUB 260AZ AND ROUTE OUTFLOW FROM DAM 3
 327          BA   .0448
 328          LS             77      36
 329          UK    120    .004     .09     100
 330          RK   1000    .004    .024   .0256    TRAP      10      25
 331          RK    800    .004    .035            TRAP       8       2     YES

 332          KK   451AZ      CP
 333          KM        ROUTE SUB 260AZ TO CP 451AZ
 334          RK    760    .004    .035            TRAP       8       2

 335          KK    328          CP
 336          KM            ROUTE 451AZ TO CP 328
 337          RK   4000    .005    .045            TRAP       5       5     YES

 338          KK    326          CP
 339          KM            COMBINE CP328, SUB 320 AND SUB 330
 340          HC       3

 341          KK    312          CP
 342          KM            ROUTE CP326 TO CP312
 343          RK   5000    .005    .045            TRAP      15       5     YES

 344          KK    350          SUB
 345          KM            RUNOFF FROM SUB 350
 346          BA   .2568
 347          LS             82
 348          UK    510   .0057     .10     100
 349          RK   7000    .006    .045            TRAP       5      10
```



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


-17-

```
350          KK     313     CP
351          KM            COMBINE CP312 AND SUB 350
352          HC       2

353          KK   240AZ     SUB
354          KM        RUNOFF FROM SUB 240AZ
355          BA   .0739
356          LS              77      33
357          UK     140    .004     .09     100
358          RK    1720    .004    .024    .034    TRAP      10      25

359          KK   246AZ      CP
360          KM        ROUTE SUB 240AZ TO CP 246AZ
361          RK     960   .0077    .035            TRAP     3.5     2.6

362          KK   245AZ     SUB
363          KM        RUNOFF FROM SUB 245AZ
364          BA   .0235
365          LS              77      36
366          UK     130    .004     .09     100
367          RK    1320    .004    .024            TRAP      10      25

368          KK   247AZ      CP
369          KM        COMBINE CP 246AZ WITH SUB 245AZ
370          HC       2

371          KK   248AZ      CP
372          KM        ROUTE CP 247AZ TO CP 248AZ
373          RK     580    .004    .035            TRAP     3.5     2.6

374          KK   180AZ     SUB
375          KM        RUNOFF FROM SUB 180AZ
376          BA   .0659
377          LS              77
378          UK     400   .0082      .1     100
379          RK    1600    .004    .035            TRAP       5       2

380          KK   255AZ     SUB
381          KM        RUNOFF FROM SUB 255AZ
382          BA   .0290
383          LS              77      36
384          UK     135    .004     .09     100
385          RK     780    .004    .024   .0079    TRAP      10      25
386          RK     800    .004    .024            TRAP      10      50

387          KK   236AZ      CP
388          KM        ROUTE SUB 255AZ TO CP 236AZ
389          RK     680    .004    .024            TRAP      10      50
```



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

390          KK   235AZ     SUB
391          KM        RUNOFF FROM SUB 235AZ
392          BA   .0136
393          LS              77      36
```

```
394          UK     140    .004     .09     100
395          RK     800    .004    .024           TRAP      10      25

396          KK   237AZ      CP
397          KM        COMBINE CP 236AZ WITH SUB 235AZ
398          HC       2

399          KK   181AZ      CP
400          KM        ROUTE CP 237AZ TO CP 181AZ
401          RK    1160    .004    .024           TRAP      10      25

402          KK   182AZ      CP
403          KM        COMBINE CP 248AZ WITH CP 181AZ AND SUB 180AZ
404          HC       3

405          KK   191AZ      CP
406          KM        ROUTE CP 182AZ TO CP 191AZ
407          RK    1320    .004    .024           TRAP       4     2.6

408          KK   195AZ     SUB
409          KM        RUNOFF FROM SUB 195AZ
410          BA   .0393
411          LS              77      85
412          UK      80   .0082     .09     100
413          RK    1000    .004    .024           TRAP      10      25

414          KK   186AZ      CP
415          KM        ROUTE SUB 195AZ TO CP 186AZ
416          RK    1040    .004    .024           TRAP      10      25

417          KK   185AZ     SUB
418          KM        RUNOFF FROM SUB 185AZ
419          BA   .0241
420          LS              77      85
421          UK      80   .0082     .09     100
422          RK    1040    .004    .024           TRAP      10      25

423          KK   187AZ      CP
424          KM        COMBINE SUB 185AZ WITH CP 186AZ
425          HC       2

426          KK   188AZ      CP
427          KM        ROUTE CP 187AZ TO CP 188AZ
428          RK     680    .004    .024           TRAP      10      50
```



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

429          KK   189AZ      CP
430          KM        COMBINE CP 188AZ & CP 191AZ
431          HC       2

432          KK    DAM1
433          KM        ROUTE CP 189AZ THROUGH RETENTION BASIN 1
434          RS       1    STOR
435          SV       0     5.6    11.2
436          SE     100     101     102
```

```
437          SS  101.99     200     2.9     1.5
438          ST     102     200     2.9     1.5

439          KK   190AZ     SUB
440          KM        RUNOFF FROM SUB 190AZ
441          BA   .0321
442          LS             77
443          UK    1230  .00625      .1     100
444          RK     600    .004    .035           TRAP      10     100

445          KK   192AZ      CP
446          KM        COMBINE OUTFLOW FROM DAM 1 WITH SUB 190AZ
447          HC       2

448          KK   211AZ      CP
449          KM        ROUTE CP 192AZ TO CP 211AZ
450          RK    1320    .004    .035           TRAP      10       2

451          KK   210AZ     SUB
452          KM        RUNOFF FROM SUB 210AZ
453          BA   .0224
454          LS             77      45
455          UK     153    .004     .09     100
456          RK    1200    .004    .024           TRAP      10      25

457          KK   212AZ      CP
458          KM        COMBINE SUB 210AZ WITH CP 211AZ
459          HC       2

460          KK     340          SUB
461          KM            RUNOFF FROM SUB 340 AND ROUTE 212AZ
462          BA    .040
463          LS             80
464          UK     225   .0057     .10     100
465          RK    2500   .0052    .018           TRAP      10     1.5     YES

466          KK     348          CP
467          KM            ROUTE SUB 340 TO CP348
468          RK    4500   .0044    .018           TRAP      10     1.5     YES
```



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


469          KK     349          CP
470          KM            COMBINE CP313 AND CP348
471          HC       2

472          KK     347          CP
473          KM            COMBINE CP308 AND CP349
474          HC       2

475          KK     356          CP
476          KM            ROUTE CP347 TO CP 356
477          RK    7500   .0044    .012           DEEP      11             YES

478          KK     360          SUB
479          KM            RUNOFF FROM SUB 360
```

```
480          BA   .3615
481          LS            85
482          UK    600   .0057    .10     100
483          RK   8500   .0051    .065           TRAP      10      20

484          KK    358         CP
485          KM           COMBINE CP356 AND SUB 360
486          KD      2       2
487          HC      2

488          KK   1270     SUB
489          KM       RUNOFF FROM SUB 1270
490          BA   .0308
491          LS            80
492          UK   1300   .0028    .15     100
493          RK    660   .0029    .045           TRAP      10     100

494          KK   1280     SUB
495          KM       RUNOFF FROM SUB 1280 AND ROUTE SUB 1270
496          BA   .0308
497          LS            80
498          UK   1300   .0028    .15     100
499          RK    660   .0029    .045           TRAP      10     100     YES

500          KK   1350     SUB
501          KM       RUNOFF FROM SUB 1350 AND ROUTE SUB 1280
502          BA   .0308
503          LS            80
504          UK   1300   .0028    .15     100
505          RK    660   .0029    .045           TRAP      10     100     YES

506          KK   1360     SUB
507          KM       RUNOFF FROM SUB 1360 AND ROUTE SUB 1350
508          BA   .0308
509          LS            80
510          UK   1300   .0028    .15     100
511          RK    660   .0029    .045           TRAP      10     100     YES
```



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

512          KK   1440     SUB
513          KM       RUNOFF FROM SUB 1440 AND ROUTE SUB 1360
514          BA   .0308
515          LS            80
516          UK   1300   .0028    .15     100
517          RK    660   .0029    .045           TRAP      10     100     YES

518          KK   1450     SUB
519          KM       RUNOFF FROM SUB 1450 AND ROUTE SUB 1440
520          BA   .0308
521          LS            80
522          UK   1300   .0028    .15     100
523          RK    660   .0029    .045           TRAP      10     100     YES

524          KK   1520     SUB
525          KM       RUNOFF FROM SUB 1520 AND ROUTE SUB 1440
```

```
526          BA   .0308
527          LS             80
528          UK   1300   .0028     .15     100
529          RK    660   .0029    .045           TRAP      10     100     YES

530          KK   1530     SUB
531          KM       RUNOFF FROM SUB 1530 AND ROUTE SUB 1520
532          BA   .0308
533          LS             80
534          UK   1300   .0028     .15     100
535          RK    660   .0029    .045           TRAP      10     100     YES

536          KK   1600     SUB
537          KM       RUNOFF FROM SUB 1600 AND ROUTE SUB 1530
538          BA   .0616
539          LS             80
540          UK   1300   .0028     .15     100
541          RK   1320   .0029    .045           TRAP      10     100     YES

542          KK   1591      CP
543          KM       ROUTE SUB 1600 TO CP 1591
544          RK   1360   .0028    .045           TRAP      10     100

545          KK   1260     SUB
546          KM       RUNOFF FROM SUB 1260
547          BA   .0320
548          LS             80
549          UK   1350   .0028     .15     100
550          RK    660   .0029    .045           TRAP      10     100

551          KK   1290     SUB
552          KM       RUNOFF FROM SUB 1290 AND ROUTE SUB 1260
553          BA   .0320
554          LS             80
555          UK   1350   .0028     .15     100
556          RK    660   .0029    .045           TRAP      10     100     YES
```



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

557          KK   1340     SUB
558          KM       RUNOFF FROM SUB 1340 AND ROUTE SUB 1290
559          BA   .0320
560          LS             80
561          UK   1350   .0028     .15     100
562          RK    660   .0029    .045           TRAP      10     100     YES

563          KK   1370     SUB
564          KM       RUNOFF FROM SUB 1370 AND ROUTE SUB 1340
565          BA   .0320
566          LS             80
567          UK   1350   .0028     .15     100
568          RK    660   .0029    .045           TRAP      10     100     YES

569          KK   1430     SUB
570          KM       RUNOFF FROM SUB 1430 AND ROUTE SUB 1370
571          BA   .0320
```

```
572          LS              80
573          UK    1350   .0028     .15     100
574          RK     660   .0029    .045           TRAP      10     100     YES

575          KK    1460     SUB
576          KM        RUNOFF FROM SUB 1460 AND ROUTE SUB 1430
577          BA   .0320
578          LS              80
579          UK    1350   .0028     .15     100
580          RK     660   .0029    .045           TRAP      10     100     YES

581          KK    1510     SUB
582          KM        RUNOFF FROM SUB 1510 AND ROUTE SUB 1460
583          BA   .0320
584          LS              80
585          UK    1350   .0028     .15     100
586          RK     660   .0029    .045           TRAP      10     100     YES

587          KK    1540     SUB
588          KM        RUNOFF FROM SUB 1540 AND ROUTE SUB 1510
589          BA   .0320
590          LS              80
591          UK    1350   .0028     .15     100
592          RK     660   .0029    .045           TRAP      10     100     YES

593          KK    1590     SUB
594          KM        RUNOFF FROM SUB 1590 AND ROUTE SUB 1540
595          BA   .0639
596          LS              80
597          UK    1350   .0028     .15     100
598          RK    1320   .0029    .045           TRAP      10     100     YES
```



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

599          KK    1592      CP
600          KM        COMBINE SUB 1590 WITH CP 1591
601          HC       2

602          KK    1581      CP
603          KM        ROUTE CP 1592 TO CP 1581
604          RK    1280  0.0028    .045           TRAP      10     100

605          KK    1250     SUB
606          KM        RUNOFF FROM SUB 1250
607          BA   .0303
608          LS              80
609          UK    1280   .0028     .15     100
610          RK     660   .0029    .045           TRAP      10     100

611          KK    1300     SUB
612          KM        RUNOFF FROM SUB 1300 AND ROUTE SUB 1250
613          BA   .0303
614          LS              80
615          UK    1280   .0028     .15     100
616          RK     660   .0029    .045           TRAP      10     100     YES
```

```
617          KK   1330     SUB
618          KM       RUNOFF FROM SUB 1330 AND ROUTE SUB 1300
619          BA  .0303
620          LS             80
621          UK   1280   .0028     .15     100
622          RK    660   .0029    .045           TRAP      10     100     YES

623          KK   1380     SUB
624          KM       RUNOFF FROM SUB 1380 AND ROUTE SUB 1330
625          BA  .0303
626          LS             80
627          UK   1280   .0028     .15     100
628          RK    660   .0029    .045           TRAP      10     100     YES

629          KK   1420     SUB
630          KM       RUNOFF FROM SUB 1420 AND ROUTE SUB 1380
631          BA  .0303
632          LS             80
633          UK   1280   .0028     .15     100
634          RK    660   .0029    .045           TRAP      10     100     YES

635          KK   1470     SUB
636          KM       RUNOFF FROM SUB 1470 AND ROUTE SUB 1420
637          BA  .0303
638          LS             80
639          UK   1280   .0028     .15     100
640          RK    660   .0029    .045           TRAP      10     100     YES
```



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

641          KK   1500     SUB
642          KM       RUNOFF FROM SUB 1500 AND ROUTE SUB 1470
643          BA  .0303
644          LS             80
645          UK   1280   .0028     .15     100
646          RK    660   .0029    .045           TRAP      10     100     YES

647          KK   1550     SUB
648          KM       RUNOFF FROM SUB 1550 AND ROUTE SUB 1500
649          BA  .0303
650          LS             80
651          UK   1280   .0028     .15     100
652          RK    660   .0029    .045           TRAP      10     100     YES

653          KK   1580     SUB
654          KM       RUNOFF FROM SUB 1580 AND ROUTE SUB 1550
655          BA  .0606
656          LS             80
657          UK   1280   .0028     .15     100
658          RK    660   .0029    .045           TRAP      10     100     YES

659          KK   1582      CP
660          KM       COMBINE SUB 1580 WITH CP 1581
661          HC      2

662          KK   1571      CP
```

```
663          KM       ROUTE CP 1582 TO CP 1571
664          RK   1330  0.0028    .045           TRAP      10     100

665          KK   1240     SUB
666          KM       RUNOFF FROM SUB 1240
667          BA  .0315
668          LS            80
669          UK   1330   .0028     .15     100
670          RK    660   .0029    .024           TRAP       5      10

671          KK   1310     SUB
672          KM       RUNOFF FROM SUB 1310 AND ROUTE SUB 1240
673          BA  .0315
674          LS            80
675          UK   1330   .0028     .15     100
676          RK    660   .0029    .024           TRAP       5      10     YES

677          KK   1320     SUB
678          KM       RUNOFF FROM SUB 1320 AND ROUTE SUB 1310
679          BA  .0306
680          LS            81
681          UK   1330   .0028     .15     100
682          RK    660   .0029    .024           TRAP       5      10     YES
```



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


683          KK   1400     SUB
684          KM       RUNOFF FROM SUB 1400 AND ROUTE SUB 1320
685          BA  .0080
686          LS            84
687          UK    300   .0028     .15     100
688          RK    700   .0029    .024           TRAP       5      10     YES

689          KK   1390     SUB
690          KM       RUNOFF FROM SUB 1390
691          BA  .0239
692          LS            80
693          UK   1020   .0028     .15     100
694          RK    660   .0029    .045           TRAP      10     100

695          KK   1391      CP
696          KM       ROUTE SUB 1390 TO CP 1391
697          RK    300  0.0028    .045           TRAP      10     100

698          KK   1392      CP
699          KM       COMBINE SUB 1400 AND CP 1391
700          HC      2

701          KK   1410     SUB
702          KM       RUNOFF FROM SUB 1410 AND ROUTE CP 1392
703          BA  .0315
704          LS            80
705          UK   1330   .0028     .15     100
706          RK    660   .0029    .024           TRAP       5      10     YES

707          KK   1480     SUB
```

```
708          KM       RUNOFF FROM SUB 1480 AND ROUTE SUB 1410
709          BA   .0315
710          LS            80
711          UK   1330   .0028     .15     100
712          RK    660   .0029    .024           TRAP      5      10     YES

713          KK   1490     SUB
714          KM       RUNOFF FROM SUB 1490 AND ROUTE SUB 1480
715          BA   .0315
716          LS            80
717          UK   1330   .0028     .15     100
718          RK    660   .0029    .024           TRAP      5      10     YES

719          KK   1560     SUB
720          KM       RUNOFF FROM SUB 1560 AND ROUTE SUB 1490
721          BA   .0315
722          LS            80
723          UK   1330   .0028     .15     100
724          RK    660   .0029    .024           TRAP      5      10     YES
```



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


725          KK   1570     SUB
726          KM       RUNOFF FROM SUB 1570 AND ROUTE SUB 1560
727          BA   .0630
728          LS            80
729          UK   1330   .0028     .15     100
730          RK   1320   .0029    .024           TRAP      5      10     YES

731          KK   1572      CP
732          KM       COMBINE CP 1572 WITH CP 1571
733          HC      2

734          KK   1611      CP
735          KM       ROUTE CP 1572 TO CP 1611
736          RK   1330  0.0029    .024           TRAP      5      10

737          KK   1610     SUB
738          KM       RUNOFF FROM SUB 1610
739          BA   .2505
740          LS            80
741          UK   1330   .0029     .15     100
742          RK   5250   .0028    .045           TRAP     10     100

743          KK   1612      CP
744          KM       COMBINE SUB 1610 AND CP 1611
745          HC      2

746          KK   1621      CP
747          KM       ROUTE CP 1612 TO CP 1621
748          RK   1350  0.0029    .024           TRAP      5      10

749          KK   1620     SUB
750          KM       RUNOFF FROM SUB 1620
751          BA   .2542
752          LS            82
```

```
753          UK    1350   .0029     .15     100
754          RK    5250   .0028    .045           TRAP      10     100

755          KK    1630     SUB
756          KM       RUNOFF FROM SUB 1630
757          BA   .1107
758          LS             84
759          UK    1000   .0029     .15     100
760          RK    2900   .0028    .045           TRAP      10     100

761          KK    1640     SUB
762          KM       RUNOFF FROM SUB 1640 AND ROUTE SUB 1630
763          BA   .0245
764          LS             87
765          UK     470   .0029     .15     100
766          RK    2100   .0028    .045           TRAP      10     100     YES
```



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

767          KK    1622      CP
768          KM       COMBINE SUB 1640, CP 1621 AND SUB 1620
769          HC       3

770          KK    1887      CP
771          KM       ROUTE CP 1622 TO CP 1887
772          RS       1    FLOW      -1
773          RC    .050    .024    .080   10500   .0007
774          RX       0      50     100     115     180   190.5     194     544
775          RY     400     400     400     385     385   395.5     392   395.5

776          KK    1950     SUB
777          KM       RUNOFF FROM SUB 1950
778          BA   .0407
779          LS             80
780          UK     960   .0029     .15     100
781          RK    1900   .0028    .045           TRAP      10     100

782          KK    1945     SUB
783          KM       RUNOFF FROM SUB 1945
784          BA   .0822
785          LS             82
786          UK    1340   .0029     .15     100
787          RK    1710   .0028    .045           TRAP      10     100

788          KK    1951      CP
789          KM       ROUTE SUB 1945 TO CP 1951
790          RK     500  0.0029    .045           TRAP      10     100

791          KK    1952      CP
792          KM       COMBINE CP 1951 AND SUB 1950
793          HC       2

794          KK    1940     SUB
795          KM       RUNOFF FROM SUB 1940 AND ROUTE CP 1952
796          BA   .1143
797          LS             87
```

```
798          UK    1200   .0029     .15     100
799          RK    2770   .0028    .045           TRAP      10     100     YES

800          KK    1920     SUB
801          KM       RUNOFF FROM SUB 1920
802          BA   .1959
803          LS             B6
804          UK    1300   .0029     .15     100
805          RK    4200   .0028    .045           TRAP      10     100

806          KK    1941      CP
807          KM       ROUTE SUB 1920 TO CP 1941
808          RK     650  0.0029    .045           TRAP      10     100
```



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


809          KK    1942      CP
810          KM       COMBINE SUB 1940 WITH CP 1941
811          HC       2

812          KK    1925     SUB
813          KM       RUNOFF FROM SUB 1925 AND ROUTE CP 1942
814          BA   .0655
815          LS             B7
816          UK    1730   .0029     .15     100
817          RK    1250   .0028    .045           TRAP      10     100     YES

818          KK    1930     SUB
819          KM       RUNOFF FROM SUB 1930 AND ROUTE SUB 1925
820          BA   .0717
821          LS             B6
822          UK    1090   .0029     .15     100
823          RK    2200   .0028    .045           TRAP      10     100     YES

824          KK    1910     SUB
825          KM       RUNOFF FROM SUB 1910
826          BA   .1445
827          LS             B5
828          UK    1370   .0029     .15     100
829          RK    2940   .0028    .045           TRAP      10     100

830          KK    1900     SUB
831          KM       RUNOFF FROM SUB 1900 AND ROUTE SUB 1910
832          BA   .1214
833          LS             B7
834          UK    1370   .0029     .15     100
835          RK    2470   .0028    .045           TRAP      10     100     YES

836          KK    1890     SUB
837          KM       RUNOFF FROM SUB 1890 AND ROUTE SUB 1900
838          BA   .0975
839          LS             B7
840          UK    1370   .0029     .15     100
841          RK    1980   .0028    .045           TRAP      10     100     YES

842          KK    1931      CP
```

```
843          KM        ROUTE SUB 1890 TO CP 1931
844          RK     530  0.0029    .045           TRAP      10     100

845          KK    1932      CP
846          KM        COMBINE SUB 1930 WITH CP 1931
847          HC       2

848          KK    1885     SUB
849          KM        RUNOFF FROM SUB 1885 AND ROUTE CP 1932
850          BA   .0657
851          LS             87
852          UK    1100   .0029     .15     100
853          RK    2400   .0028    .045           TRAP      10     100     YES
```



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

854          KK    1850     SUB
855          KM        RUNOFF FROM SUB 1850
856          BA   .1392
857          LS             86
858          UK    1320   .0029     .15     100
859          RK    2940   .0028    .045           TRAP      10     100

860          KK    1860     SUB
861          KM        RUNOFF FROM SUB 1860 AND ROUTE SUB 1850
862          BA   .1170
863          LS             87
864          UK    1320   .0029     .15     100
865          RK    2470   .0028    .045           TRAP      10     100     YES

866          KK    1870     SUB
867          KM        RUNOFF FROM SUB 1870 AND ROUTE SUB 1860
868          BA   .1847
869          LS             87
870          UK    1320   .0029     .15     100
871          RK    3900   .0028    .045           TRAP      10     100     YES

872          KK    1886      CP
873          KM        ROUTE SUB 1870 TO CP 1886
874          RK     300  0.0029    .045           TRAP      10     100

875          KK    1880     SUB
876          KM        RUNOFF FROM SUB 1880
877          BA   .0546
878          LS             87
879          UK    1200   .0029     .15     100
880          RK    1700   .0028    .045           TRAP      10     100

881          KK    1888      CP
882          KM        COMBINE CP 1886, SUB 1880, AND SUB 1885 AND CP 1887
883          HC       4

884          KK    1984      CP
885          KM        ROUTE CP 1888 TO CP 1984
886          RS       1    FLOW      -1
887          RC    .050    .024    .080    1850   .0007
```

```
888          RX      0      50     100     115     180   190.5     194     544
889          RY    400     400     400     385     385   395.5     392   395.5

890          KK   1840     SUB
891          KM        RUNOFF FROM SUB 1840
892          BA  .0315
893          LS             86
894          UK   1630   .0029     .15     100
895          RK   2550   .0028    .024            TRAP       5       1
1                                          HEC-1 INPUT                                                    PAGE 22

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


896          KK   1670     SUB
897          KM        RUNOFF FROM SUB 1670
898          BA  .0759
899          LS             80
900          UK    830   .0029     .15     100
901          RK   2550   .0028    .045            TRAP      10     100

902          KK   1681      CP
903          KM        ROUTE SUB 1670 TO CP 1681
904          RK    830  0.0029    .045            TRAP      10     100

905          KK   1680     SUB
906          KM        RUNOFF FROM SUB 1680
907          BA  .0759
908          LS             80
909          UK    830   .0029     .15     100
910          RK   2550   .0028    .045            TRAP      10     100

911          KK   1682      CP
912          KM        COMBINE SUB 1680 AND CP 1681
913          HC      2

914          KK   1751      CP
915          KM        ROUTE CP 1682 TO 1751
916          RK    860  0.0029    .024            TRAP      10     100

917          KK  1226AZ     CP
918          KM        DISCHARGE FROM 2-66" CMP OVER THE CAP AT STA 332+75
919          IN     60 09JAN91
920          BA  .00001
921          QI      0       0       0       0       0       0       0       0      40     100
922          QI    200     300     437     437     437     300     250     200     150     100
923          QI     70      40      27      13       0

924          KK  1227AZ    DIV
925          KM        DIVERT CROSS-DRAINAGE FROM CP 1226AZ OUT OF OUTER LOOP MODEL
926          DT  1228AZ
927          DI      0     100    1000
928          DQ      0      85     850

929          KK    180          SUB
930          KM            RUNOFF FROM SUB 180 AND ROUTE 1226AZ
931          BA  2.0022
932          LS             77
```

```
933          UK    1000   .0080     .10     100
934          RK   12500   .0099    .045           TRAP      10      20     YES

935          KK    1750     SUB
936          KM       RUNOFF FROM SUB 1750 AND ROUTE SUB 180
937          BA   .0787
938          LS             80
939          UK     860   .0029     .15     100
940          RK    2550   .0028    .045           TRAP      10     100     YES
```



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


941          KK    1752      CP
942          KM       COMBINE SUB 1750 AND CP 1751
943          HC       2

944          KK    1761      CP
945          KM       ROUTE CP 1752 TO CP 1761
946          RK     550  0.0029    .024           TRAP      10     100

947          KK    1760     SUB
948          KM       RUNOFF FROM SUB 1760
949          BA   .0493
950          LS             80
951          UK     550   .0029     .15     100
952          RK    2550   .0028    .045           TRAP      10     100

953          KK    1762      CP
954          KM       COMBINE SUB 1760 AND CP 1761
955          HC       2

956          KK    1771      CP
957          KM       ROUTE CP 1762 TO CP 1771
958          RK     400  0.0029    .045           TRAP      10     100

959          KK    1770     SUB
960          KM       RUNOFF FROM SUB 1770
961          BA   .0359
962          LS             80
963          UK     400   .0029     .15     100
964          RK    2550   .0028    .045           TRAP      10     100

965          KK    1772      CP
966          KM       COMBINE SUB 1770 AND CP 1771
967          HC       2

968          KK    1841      CP
969          KM       ROUTE CP 1772 TO CP 1841
970          RK    1600  0.0029    .045           TRAP      10     100

971          KK    1842      CP
972          KM       COMBINE CP 1841 AND SUB 1840
973          HC       2

974          KK    1830     SUB
975          KM       RUNOFF FROM SUB 1830 AND ROUTE CP 1842
```

```
 976          BA   .1134
 977          LS             87
 978          UK    1230   .0029     .15     100
 979          RK    2570   .0028    .024           TRAP      5      1     YES
1                                          HEC-1 INPUT                                                    PAGE 24

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


 980          KK    1660     SUB
 981          KM       RUNOFF FROM SUB 1660
 982          BA   .0903
 983          LS             80
 984          UK     980   .0029     .15     100
 985          RK    2570   .0028    .045           TRAP     10    100

 986          KK    1691      CP
 987          KM       ROUTE SUB 1660 TO CP 1691
 988          RK     980  0.0029    .045           TRAP     10    100

 989          KK    1690     SUB
 990          KM       RUNOFF FROM SUB 1690
 991          BA   .0922
 992          LS             80
 993          UK     980   .0029     .15     100
 994          RK    2570   .0028    .045           TRAP     10    100

 995          KK    1692      CP
 996          KM       COMBINE SUB 1690 AND CP 1691
 997          HC       2

 998          KK    1741      CP
 999          KM       ROUTE CP 1692 TO CP 1741
1000          RK     980  0.0029    .045           TRAP     10    100

1001          KK    1740     SUB
1002          KM       RUNOFF FROM SUB 1740
1003          BA   .0913
1004          LS             80
1005          UK     980   .0029     .15     100
1006          RK    2570   .0028    .045           TRAP     10    100

1007          KK    1742      CP
1008          KM       COMBINE SUB 1740 AND CP 1741
1009          HC       2

1010          KK    1781      CP
1011          KM       ROUTE CP 1742 TO CP 1781
1012          RK     980  0.0029    .045           TRAP     10    100

1013          KK    1780     SUB
1014          KM       RUNOFF FROM SUB 1780
1015          BA   .0903
1016          LS             83
1017          UK     980   .0029     .15     100
1018          RK    2570   .0028    .045           TRAP     10    100

1019          KK    1782      CP
```

```
1020          KM       COMBINE SUB 1780 AND CP 1781
1021          HC      2
1                                        HEC-1 INPUT                                                    PAGE 25

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


1022          KK   1831      CP
1023          KM       ROUTE CP 1782 TO CP 1831
1024          RK   1230  0.0029    .045           TRAP      10     100

1025          KK   1832      CP
1026          KM       COMBINE CP 1831 AND SUB 1830
1027          HC      2

1028          KK   1820     SUB
1029          KM       RUNOFF FROM SUB 1820 AND ROUTE CP 1832
1030          BA  .1134
1031          LS            84
1032          UK   1230   .0029     .15     100
1033          RK   2570   .0028    .024           TRAP       5       1     YES

1034          KK   1650     SUB
1035          KM       RUNOFF FROM SUB 1650
1036          BA  .0903
1037          LS            80
1038          UK    980   .0029     .15     100
1039          RK   2570   .0028    .045           TRAP      10     100

1040          KK   1701      CP
1041          KM       ROUTE SUB 1650 TO CP 1701
1042          RK    980  0.0029    .045           TRAP      10     100

1043          KK   1700     SUB
1044          KM       RUNOFF FROM SUB 1700
1045          BA  .0922
1046          LS            80
1047          UK    980   .0029     .15     100
1048          RK   2570   .0028    .045           TRAP      10     100

1049          KK   1702      CP
1050          KM       COMBINE SUB 1700 AND CP 1701
1051          HC      2

1052          KK   1731      CP
1053          KM       ROUTE CP 1702 TO CP 1731
1054          RK    980  0.0029    .045           TRAP      10     100

1055          KK   1730     SUB
1056          KM       RUNOFF FROM SUB 1730
1057          BA  .0913
1058          LS            80
1059          UK    990   .0029     .15     100
1060          RK   2570   .0028    .045           TRAP      10     100

1061          KK   1732      CP
1062          KM       COMBINE SUB 1730 AND CP 1731
1063          HC      2
```

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

1064          KK   1791      CP
1065          KM       ROUTE CP 1732 TO CP 1791
1066          RK    980  0.0029    .045           TRAP      10     100

1067          KK   1790     SUB
1068          KM       RUNOFF FROM SUB 1790
1069          BA  .0903
1070          LS             82
1071          UK    980   .0029     .15     100
1072          RK   2570   .0028    .045           TRAP      10     100

1073          KK   1792      CP
1074          KM       COMBINE SUB 1790 AND CP 1791
1075          HC      2

1076          KK   1822      CP
1077          KM       ROUTE CP 1792 TO CP 1822
1078          RK   1230  0.0029    .045           TRAP      10     100

1079          KK   1823      CP
1080          KM       COMBINE SUB 1820 AND CP 1822
1081          HC      2

1082          KK   1810     SUB
1083          KM       RUNOFF FROM SUB 1810 AND ROUTE CP 1823
1084          BA  .1156
1085          LS             87
1086          UK   1230   .0029     .15     100
1087          RK   2620   .0028    .024           TRAP       5       1     YES

1088          KK   1645     SUB
1089          KM       RUNOFF FROM SUB 1645
1090          BA  .0921
1091          LS             84
1092          UK    980   .0054     .15     100
1093          RK   2620   .0035    .045           TRAP      10     100

1094          KK   1711      CP
1095          KM       ROUTE SUB 1645 TO CP 1711
1096          RK    980   .0029    .030           TRAP      20      10

1097          KK   1710     SUB
1098          KM       RUNOFF FROM SUB 1710
1099          BA  .0940
1100          LS             83
1101          UK    980   .0029     .15     100
1102          RK   2620   .0028    .045           TRAP      10     100

1103          KK   1712      CP
1104          KM       COMBINE SUB 1710 AND CP 1711
1105          HC      2
```

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

1106          KK    1721      CP
1107          KM        ROUTE CP 1712 TO CP 1721
1108          RK     980   .0029    .030           TRAP      20      10

1109          KK    1720     SUB
1110          KM        RUNOFF FROM SUB 1720
1111          BA   .0930
1112          LS              85
1113          UK     980   .0029     .15     100
1114          RK    2620   .0028    .045           TRAP      10     100

1115          KK    1722      CP
1116          KM        COMBINE SUB 1720 AND CP 1721
1117          HC       2

1118          KK    1801      CP
1119          KM        ROUTE CP 1722 TO CP 1801
1120          RK     980   .0029    .030           TRAP      20      10

1121          KK    1800     SUB
1122          KM        RUNOFF FROM SUB 1800
1123          BA   .0921
1124          LS              87
1125          UK     980   .0029     .15     100
1126          RK    2620   .0028    .045           TRAP      10     100

1127          KK    1802      CP
1128          KM        COMBINE SUB 1800 AND CP 1801
1129          HC       2

1130          KK    1811      CP
1131          KM        ROUTE CP 1802 TO CP 1811
1132          RK    1230   .0029    .030           TRAP      20      10

1133          KK    1812      CP
1134          KM        COMBINE CP 1811 AND SUB 1810
1135          HC       2

1136          KK       5     SUB
1137          KM        RUNOFF FROM SUB 5
1138          BA   .0265
1139          LS              77
1140          UK     185   .0213     .10     100
1141          RK    2000   .0175    .045           TRAP      15       5

1142          KK      10     SUB
1143          KM           RUNOFF FROM SUB 10
1144          BA   .0517
1145          LS              77
1146          UK     290   .0213     .10     100
1147          RK    2500   .0175    .045           TRAP      15       5
```


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

```
1148        KK      7     CP
1149        KM            COMBINE SUB 5 AND SUB 10
1150        HC      2

1151        KK     16     CP
1152        KM            ROUTE CP 7 TO CP 16
1153        RK   1200  .0067    .035          TRAP     10      4

1154        KK     15    SUB
1155        KM            RUNOFF FROM SUB 15
1156        BA  .0166
1157        LS            77
1158        UK    230  .0213     .10    100
1159        RK   1000  .0124    .045          TRAP     15      5

1160        KK     18     CP
1161        KM            COMBINE CP16 AND SUB 15
1162        HC      2

1163        KK     20    SUB
1164        KM            RUNOFF FROM SUB 20
1165        BA  .0760
1166        LS            79
1167        UK    385  .0213     .10    100
1168        RK   2750   .013    .045          TRAP     15      5

1169        KK     17         CP
1170        KM            COMBINE CP18 AND SUB 20
1171        HC      2

1172        KK     26         CP
1173        KM            ROUTE CP17 TO CP 26
1174        RK   1300  .0154    .035          TRAP     20      4

1175        KK     25         SUB
1176        KM            RUNOFF FROM SUB 25
1177        BA  .0732
1178        LS            81
1179        UK    310  .0213     .10    100
1180        RK   3300   .018    .045          TRAP     10     10

1181        KK     28          CP
1182        KM            COMBINE CP26 AND SUB 25
1183        HC      2

1184        KK     30         SUB
1185        KM            RUNOFF FROM SUB 30
1186        BA  .1004
1187        LS            83
1188        UK    350  .0213     .10    100
1189        RK   4000   .018    .045          TRAP     10     10
```



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

1190        KK     27         CP
```

```
1191        KM          COMBINE CP28 AND SUB 30
1192        HC      2

1193        KK     36        CP
1194        KM          ROUTE CP27 TO CP36
1195        RK    700  .0014   .035          TRAP     65      4

1196        KK     35        SUB
1197        KM          RUNOFF FROM SUB 35
1198        BA  .0115
1199        LS            80
1200        UK    320  .0213    .10    100
1201        RK    500   .020   .045          TRAP     10     10

1202        KK     38        CP
1203        KM          COMBINE CP36 AND SUB 35
1204        HC      2

1205        KK     40        SUB
1206        KM          RUNOFF FROM SUB 40
1207        BA  .0875
1208        LS            78
1209        UK    270  .0213    .10    100
1210        RK   4500   .016   .045          TRAP     10      5

1211        KK     37        CP
1212        KM          COMBINE CP38 AND SUB 40
1213        HC      2

1214        KK     46        CP
1215        KM          ROUTE CP37 TO CP46
1216        RK   2300  .0065   .035          TRAP     40      4

1217        KK     45        SUB
1218        KM          RUNOFF FROM SUB 45
1219        BA  .1320
1220        LS            81
1221        UK    335  .0213    .10    100
1222        RK   5500   .015   .045          TRAP     10      5

1223        KK     48        CP
1224        KM          COMBINE CP46 AND SUB 45
1225        HC      2

1226        KK     60        SUB
1227        KM          RUNOFF FROM SUB 60
1228        BA  .1480
1229        LS            80
1230        UK    345  .0213    .10    100
1231        RK   6000   .014   .045          TRAP     10      5
```



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

1232        KK     50        CP
1233        KM          COMBINE CP48 AND SUB 60
1234        HC      2
```

```
1235        KK     66         CP
1236        KM          ROUTE CP 50 TO CP66
1237        RK   2000    .008    .035          TRAP     50      4

1238        KK     65         SUB
1239        KM           RUNOFF FROM SUB 65
1240        BA   .0387
1241        LS            77
1242        UK    270   .0213     .10     100
1243        RK   2000    .013    .045          TRAP     10      5

1244        KK     68      CP
1245        KM          COMBINE CP66 AND SUB 65
1246        HC      2

1247        KK  1173AZ      CP
1248        KM       DISCHARGE FROM 36" RCP OVER CAP AT STA 243+00
1249        IN     60 09JAN91
1250        BA  .00001
1251        QI      0       0       0       0       0       0       0       0       0       0
1252        QI     15      37      37      25      20      15      10       5       0       0
1253        QI      0       0       0       0       0

1254        KK     90         SUB
1255        KM           RUNOFF FROM SUB 90 AND ROUTE 1173AZ
1256        BA   .3329
1257        LS            78
1258        UK    580   .0213     .10     100
1259        RK   8000    .012    .045          TRAP     10      5    YES

1260        KK     80         SUB
1261        KM           RUNOFF FROM SUB 80
1262        BA   .1810
1263        LS            77
1264        UK    375   .0213     .10     100
1265        RK   6750    .015    .045          TRAP     10      5

1266        KK     70         CP
1267        KM           COMBINE CP68, SUB 80 AND SUB 90
1268        HC      3

1269        KK     96         CP
1270        KM           ROUTE CP70 TO CP96
1271        RK   3200   .0078    .035          TRAP     85      4
```



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

1272        KK     95         SUB
1273        KM           RUNOFF FROM SUB 95
1274        BA   .1019
1275        LS            77
1276        UK    405   .0213     .10     100
1277        RK   3500    .010    .045          TRAP     10      5

1278        KK     98         CP
```

```
1279        KM          COMBINE CP96 AND SUB 95
1280        HC      2

1281        KK    110         SUB
1282        KM          RUNOFF FROM SUB 110
1283        BA   .3110
1284        LS            80
1285        UK    480  .0213    .10     100
1286        RK   9000   .013   .045           TRAP     10       5

1287        KK    120         SUB
1288        KM          RUNOFF FROM SUB 120
1289        BA   .2210
1290        LS            80
1291        UK    333  .0213    .10     100
1292        RK   9250   .013   .045           TRAP     10       5

1293        KK    100         CP
1294        KM          COMBINE CP98, SUB 110 AND SUB 120
1295        HC      3

1296        KK    126         CP
1297        KM          ROUTE CP100 TO CP126
1298        RK    800  .0038   .035           TRAP    140       4

1299        KK    125         SUB
1300        KM          RUNOFF FROM SUB 125
1301        BA   .0230
1302        LS            77
1303        UK    320  .0213    .10     100
1304        RK   1000   .013   .045           TRAP     12       5

1305        KK    128         CP
1306        KM          COMBINE CP126 AND SUB 125
1307        HC      2

1308        KK    130         SUB
1309        KM          RUNOFF FROM SUB 130
1310        BA   .1480
1311        LS            79
1312        UK    220  .0213    .10     100
1313        RK   9500   .013   .045           TRAP     12       5
```



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

1314        KK    127         CP
1315        KM          COMBINE CP128 AND SUB 130
1316        HC      2

1317        KK    136         CP
1318        KM          ROUTE CP 127 TO CP 136
1319        RK   2000  .0065   .035           TRAP    115       4

1320        KK    135         SUB
1321        KM          RUNOFF FROM SUB 135
1322        BA   .1535
```

```
1323        LS            78
1324        UK    215   .0213    .10     100
1325        RK  10000   .013    .045           TRAP     12       5

1326        KK    138     CP
1327        KM          COMBINE CP136 AND SUB 135
1328        HC      2

1329        KK  1159AZ     CP
            *  ************************************************************************
            *      DISCHARGE IN CFS RELEASED FROM 3-72" CMP ACROSS CAP AT STA 234+10
            *  ************************************************************************
1330        KM       OUTFLOW FROM PIPES
1331        IN     10 09JAN91       0
1332        BA   .0001
1333        QI      0       2       5       7      10      14      17      21      25      29
1334        QI     33      37      41      46      51      57      63      69      75      82
1335        QI     89      96     104     112     120     130     140     150     162     173
1336        QI    185     198     212     225     239     252     266     283     300     317
1337        QI    333     350     366     384     402     420     440     460     480     500
1338        QI    520     540     557     573     590     607     623     640     655     670
1339        QI    695     712     728     745     757     770     782     790     798     806
1340        QI    811     817     822     825     827     830     831     833     834     834
1341        QI    833     832     832     831     830     828     825     823     822     820
1342        QI    819     817     814     812     810     809     807     804     802     799
1343        QI    796     793     790     787     783     780     776     773     770     765
1344        QI    763     760     756     752     748     743     738     733     728     724
1345        QI    719     713     706     700     694     687     681     674     667     660
1346        QI    653     645     638     628     618     608     597     589     580     570
1347        QI    559     549     539     528     518
            *  ************************************************************************

1348        KK    150         SUB
1349        KM          RUNOFF FROM SUB 150 AND ROUTE 1159AZ
1350        BA   .4490
1351        LS            79
1352        UK    510   .0213    .10     100
1353        RK  12250   .011    .045           TRAP     12       5     YES
```



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

1354        KK    140         CP
1355        KM          COMBINE CP138 AND SUB 150
1356        HC      2

1357        KK    160         SUB
1358        KM          RUNOFF FROM SUB 160 AND ROUTE CP140
1359        BA   .3343
1360        LS            77
1361        UK    650   .0080    .10     100
1362        RK   5000   .0077   .045           TRAP    310       4     YES

1363        KK    145         SUB
1364        KM          RUNOFF FROM SUB 145
1365        BA   .0488
1366        LS            77
```

```
1367        UK    225  .0080    .10     100
1368        RK   3000   .008   .045           TRAP      5      10

1369        KK    146         CP
1370        KM          ROUTE RUNOFF FROM SUB 145 THRUOGH SUB 160
1371        RK   5000  .0077   .045           TRAP    310       4     YES

1372        KK    147         CP
1373        KM          COMBINE CP146 AND SUB 160
1374        HC      2

1375        KK    161      DIVERSION
1376        KM          DIVERT FLOW GREATER THAN 1000 CFS TO SUB 170
1377        DT    162
1378        DI      0    500    1000    1500    2000    5000   10000
1379        DQ      0      0       0     500    1000    4000    9000

1380        KK    165         CP
1381        KM          ROUTE REMAINING FLOW FROM SUB 160 TO CP165
1382        RK   3200  .0057   .025           TRAP     45      .5     YES

1383        KK    245         SUB
1384        KM          RUNOFF FROM SUB 245
1385        BA  .4577
1386        LS            77
1387        UK    650  .0080    .10     100
1388        RK   9000  .0078   .045           TRAP     10      20

1389        KK    243         CP
1390        KM          COMBINE CP 165 AND SUB 245
1391        HC      2

1392        KK    220         SUB
1393        KM          RUNOFF FROM SUB 220
1394        BA 2.8854
1395        LS            77
1396        UK   1150  .0080    .10     100
1397        RK  18000  .0087   .045           TRAP     10      20
```



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


1398        KK    223         CP
1399        KM          COMBINE CP 243 AND SUB 220
1400        HC      2

1401        KK    222
1402        KM          DIVERT FLOW IN EXCESS OF 1000 CFS TO SUB 240
1403        DT    224
1404        DI      0    500    1000    2000    5000   10000
1405        DQ      0      0       0    1000    4000    9000
```

234

```
1406        KK   ~~236~~      CP
1407        KM          ROUTE UNDIVERTED CP223 TO CP236
1408        RK   5300   .003   .025           TRAP     45      .5
```

235

```
1409        KK   ~~237~~      CP
```


-41-

```
1410        KM          COMBINE CP236 AND ADOT 1812
1411        HC      2

1412        KK    208         CP
1413        KM          ROUTE CP237 TO CP208
1414        RK    700   .0029    .030          TRAP     45      1

1415        KK    210         CP
1416        KM          COMBINE CP208 AND CP1984
1417        HC      2

1418        KK    236
1419        KM          ROUTE CP210 TO CP236 IN ARIZONA CANAL
1420        RK   3000   .0007    .018          TRAP     70      1

1421        KK  1070AZ     SUB
1422        KM       RUNOFF FROM SUB 1070AZ
1423        BA   .0393
1424        LS             77      45
1425        UK    130   .0040     .10     100
1426        RK    300   .0040    .024   .0057   TRAP      0     50
1427        RK   1900    .004    .035          TRAP      5     10

1428        KK  1031AZ     CP
1429        KM       ROUTE SUB 1070AZ TO CP 1031AZ
1430        RK    400  0.0035    .035          TRAP      5     10     YES

1431        KK  1030AZ     SUB
1432        KM       RUNOFF FROM SUB 1030AZ
1433        BA   .0305
1434        LS             77      45
1435        UK    160   .0040     .10     100
1436        RK    500   .0041    .025   .0045   TRAP      0     50
1437        RK   1800    .003    .035          TRAP     12      4
```



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

1438        KK  1032AZ     CP
1439        KM       COMBINE SUB 1030AZ WITH CP 1031AZ
1440        HC      2

1441        KK    270         SUB
1442        KM          RUNOFF FROM SUB 270 AND ROUTE 1032AZ
1443        BA   .093
1444        LS             77
1445        UK    290   .0080     .10     100
1446        RK   4500    .007    .045          TRAP      5     10     YES

1447        KK    265         SUB
1448        KM          RUNOFF FROM SUB 265
1449        BA   .0488
1450        LS             77
1451        UK    270   .0080     .10     100
1452        RK   2500    .008    .045          TRAP      5     10

1453        KK    267     CP
```

```
1454        KM          COMBINE SUB 265 AND SUB 270
1455        HC      2

1456        KK    315        SUB
1457        KM          RUNOFF FROM SUB 315 AND ROUTE CP 267
1458        BA   .3616
1459        LS            83
1460        UK    500   .0057    .10     100
1461        RK   9000   .0044   .065           TRAP      10      10     YES

1462        KK  1080AZ    SUB
1463        KM       RUNOFF FROM SUB 1080AZ
1464        BA   .0824
1465        LS            77      38
1466        UK    110   .0040    .10     100
1467        RK   2100   .0057   .024           TRAP       5      25

1468        KK  1090AZ    SUB
1469        KM       RUNOFF FROM SUB 1090AZ  AND ROUTE SUB 1080AZ
1470        BA   .0528
1471        LS            77      38
1472        UK    105   .0040    .10     100
1473        RK   1500   .0040   .024           TRAP       5      25     YES

1474        KK    260        SUB
1475        KM          RUNOFF FROM SUB 260 AND ROUTE 1090AZ
1476        BA   .092
1477        LS            77
1478        UK    365   .0080    .10     100
1479        RK   3500    .009   .045           TRAP       5      10     YES
```



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


1480        KK   170N    SUB
1481        KM        RUNOFF FROM SUB 170N AND ROUTE SUB 260
1482        BA   .5043
1483        LS            82
1484        UK    770   .0057    .10     100
1485        RK   8500   .0052   .045           TRAP       5      10     YES

1486        KK    173    RET
1487        KM        RETRIEVE FLOW DIVERTED FROM SUB 160
1488        DR    162

1489        KK    174     CP
1490        KM        ROUTE RETRIEVED FLOW TO CP174
1491        RK   4000   .0057   .045           TRAP      10      20

1492        KK    316        RET
1493        KM          RETRIEVE FLOW DIVERTED FROM SUB 310
1494        DR    314

1495        KK    175        CP
1496        KM          ROUTE RETURN FLOW FROM SUB 310 TO CP175
1497        RK   5000    .003   .065           TRAP       5      10
```

```
1498        KK    172      CP
1499        KM         COMBINE SUB315, CP 174, CP175 AND SUB 170N
1500        HC      4

1501        KK    171      CP
1502        KM         ROUTE CP172 TO CP171
1503        RK   4500   .0033    .045          TRAP    1300     .01     YES

1504        KK   170S        SUB
1505        KM         RUNOFF FROM SUB 170S
1506        BA  .3279
1507        LS            85
1508        UK    650   .0057     .10     100
1509        RK   7000   .0038    .045          TRAP      15      25

1510        KK    239
1511        KM           RETREIVE FLOW DIVERTED FROM CP165
1512        DR    224

1513        KK    240         SUB
1514        KM           RUNOFF FROM SUB 240 AND ROUTE DIVERTED FLOW
1515        BA  .3121
1516        LS            85
1517        UK   1300   .0057     .10     100
1518        RK   5000   .0038    .045          TRAP      15      25     YES
```



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


1519        KK    238         CP
1520        KM       COMBINE CP171, SUB 170S AND SUB 240
1521        HC      3

1522        KK    237         CP
1523        KM             COMBINE CP236 AND CP238
1524        HC      2

1525        KK    241         CP
1526        KM             DIVERSION - 6250 CFS IN ARIZONA CANAL, REMAINDER IN
1527        KM             PARALLEL CHANNEL
1528        DT    242
1529        DI      0    500    1000    5000    6000    6250    7000   10000   12000
1530        DQ      0    500    1000    5000    6000    6250    6250    6250    6250

1531        KK    251         CP
1532        KM           ROUTE UNDIVERTED FLOW IN TRAPEZOIDAL CHANNEL (EARTH) PARALLEL
1533        KM             TO ARIZONA CANAL (CP172 TO CP251) TO 96TH STREET
1534        RK   2700   .0007    .035          TRAP      60       4

1535        KK    250         SUB
1536        KM           RUNOFF FROM SUB 250
1537        BA  .2497
1538        LS            85
1539        UK    600   .0057     .10     100
1540        RK   5500   .0045    .065          TRAP      10      20

1541        KK    252    CP
```

```
1542        KM          COMBINE CP251 AND SUB 250
1543        HC      2

1544        KK    247         CP
1545        KM          COMBINE CP358 AND CP252
1546        HC      2

1547        KK    376         CP
1548        KM          ROUTE CP 247 TO CP 376
1549        RK   3400  .0007   .035          TRAP    100      4

1550        KK           RET
1551        KM          RETREIVE FLOW DIVERTED INTO ARIZONA CANAL
1552        DR    242

1553        KK    253         CP
1554        KM          ROUTE FLOW THROUGH ARIZONA CANAL TO 96TH STREET
1555        RK   2700  .0007   .018          TRAP     70      1

1556        KK    378         CP
1557        KM          ROUTE FLOW THROUGH ARIZONA CANAL FROM 96TH STREET TO PIMA FREEWAY
1558        RK   3400  .0007   .018          TRAP     70      1
```



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

1559        KK  165AZ     SUB
1560        KM       RUNOFF FROM SUB 165AZ
1561        BA  .0133
1562        PH            .1     .72    1.42    2.50    2.77    2.95    3.29    3.68
1563        LS            77     85
1564        UK    230    .005    .09     100
1565        RK    320    .004   .024          TRAP     10      25

1566        KK  DAM165
1567        KM       ROUTE SUB 165AZ THROUGH RETENTION BASIN
1568        RS      1    STOR
1569        SV      0    .265    .53
1570        SE    100     101    102
1571        SS  101.99    200    2.9     1.5
1572        ST    102     200    2.9     1.5

1573        KK  156AZ      CP
1574        KM       ROUTE DAM 165AZ TO CP 156AZ
1575        RK    840    .004   .024          TRAP     10      25

1576        KK  160AZ     SUB
1577        KM       RUNOFF FROM SUB 160AZ
1578        BA  .0234
1579        LS            77     85
1580        UK    230    .005    .09     100
1581        RK    880    .004   .024          TRAP     10      25

1582        KK  DAM160
1583        KM       ROUTE SUB 160AZ THROUGH RETENTION BASIN
1584        RS      1    STOR
1585        SV      0    .465    .93
```

```
1586          SE     100     101     102
1587          SS  101.99     200     2.9     1.5
1588          ST     102     200     2.9     1.5

1589          KK   161AZ      CP
1590          KM        ROUTE DAM 160AZ TO CP 161AZ
1591          RK     740    .004    .025           TRAP      50       2

1592          KK   155AZ     SUB
1593          KM        RUNOFF FROM SUB 155AZ
1594          BA   .0256
1595          LS              77      85
1596          UK     230    .005     .09     100
1597          RK    1120    .004    .024           TRAP      10      25

1598          KK  DAM155
1599          KM        ROUTE SUB 155AZ THROUGH RETENTION BASIN
1600          RS       1    STOR
1601          SV       0     .51    1.02
1602          SE     100     101     102
1603          SS  101.99     200     2.9     1.5
1604          ST     102     200     2.9     1.5
```



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


1605          KK   157AZ      CP
1606          KM        COMBINE DAM 155AZ WITH CP 156AZ AND CP 161AZ
1607          HC       3

1608          KK   151AZ      CP
1609          KM        ROUTE CP 157AZ TO CP 151AZ
1610          RK     1140    .004    .024           TRAP      10      25

1611          KK   150AZ     SUB
1612          KM        RUNOFF FROM SUB 150AZ
1613          BA   .0427
1614          LS              77      85
1615          UK     230    .005     .09     100
1616          RK    1200    .004    .024           TRAP      10      25

1617          KK  DAM150
1618          KM        ROUTE SUB 150AZ THROUGH RETENTION BASIN
1619          RS       1    STOR
1620          SV       0     .85    1.70
1621          SE     100     101     102
1622          SS  101.99     200     2.9     1.5
1623          ST     102     200     2.9     1.5

1624          KK   152AZ      CP
1625          KM        COMBINE DAM 150AZ WITH CP 151AZ
1626          HC       2

1627          KK   121AZ      CP
1628          KM        ROUTE CP 152AZ TO CP 121AZ
1629          RK     720    .004    .024           TRAP      10      25
```

```
1630        KK   70AZ     SUB
1631        KM        RUNOFF FROM SUB 70AZ
1632        BA   .0108
1633        LS             77
1634        UK    270  .00625     .1     100
1635        RK    760   .004    .024           TRAP      10      50

1636        KK   122AZ      CP
1637        KM        ROUTE CP SUB 70AZ TO CP 122AZ
1638        RK    520   .004    .024           TRAP      10      25

1639        KK   120AZ     SUB
1640        KM        RUNOFF FROM SUB 120AZ
1641        BA   .0149
1642        LS             77      85
1643        UK    270   .005    .09     100
1644        RK    800   .004    .024           TRAP       0      25
```



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


1645        KK  DAM120
1646        KM        ROUTE SUB 120AZ THROUGH RETENTION BASIN
1647        RS      1    STOR
1648        SV      0    .295    .59
1649        SE    100     101     102
1650        SS  101.99    200     2.9     1.5
1651        ST    102     200     2.9     1.5

1652        KK   123AZ      CP
1653        KM        COMBINE DAM 120AZ WITH CP 121AZ AND CP 122AZ
1654        HC      3

1655        KK    75AZ     SUB
1656        KM        RUNOFF FROM SUB 75AZ AND ROUTE CP 123AZ
1657        BA   .0025
1658        LS             77      85
1659        UK    100   .005    .09     100
1660        RK    200   .004    .024           TRAP      10      50     YES

1661        KK   DAM75
1662        KM        ROUTE SUB 75AZ THROUGH RETENTION BASIN
1663        RS      1    STOR
1664        SV      0     .05    .10
1665        SE    100     101     102
1666        SS  101.99    200     2.9     1.5
1667        ST    102     200     2.9     1.5

1668        KK    85AZ     SUB
1669        KM        RUNOFF FROM SUB 85AZ AND ROUTE DAM 75AZ
1670        BA   .0027
1671        LS             77      85
1672        UK     70   .005    .09     100
1673        RK    285   .004    .024           TRAP      10      25     YES

1674        KK   DAM85
1675        KM        ROUTE SUB 85AZ THROUGH RETENTION BASIN
```

```
1676        RS      1    STOR
1677        SV      0    .055     .11
1678        SE    100     101     102
1679        SS  101.99    200     2.9     1.5
1680        ST    102     200     2.9     1.5

1681        KK   80AZ     SUB
1682        KM       RUNOFF FROM SUB 80AZ
1683        BA   .0066
1684        LS             77      85
1685        UK    105    .005     .09     100
1686        RK    240    .004    .024           TRAP      0      25
1                                        HEC-1 INPUT                                        PAGE 41

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


1687        KK   DAM80
1688        KM       ROUTE SUB 80AZ THROUGH RETENTION BASIN
1689        RS      1    STOR
1690        SV      0     .13     .26
1691        SE    100     101     102
1692        SS  101.99    200     2.9     1.5
1693        ST    102     200     2.9     1.5

1694        KK   87AZ      CP
1695        KM       ROUTE DAM 80AZ TO CP 87AZ
1696        RK    240    .004    .024           TRAP     10      50

1697        KK   88AZ      CP
1698        KM       COMBINE CP 87AZ AND DAM 85AZ
1699        HC      2

1700        KK   96AZ      CP
1701        KM       ROUTE CP 88AZ TO CP 96AZ
1702        RK    600    .004    .024           TRAP     10      25

1703        KK   95AZ     SUB
1704        KM       RUNOFF FROM SUB 95AZ
1705        BA   .0124
1706        LS             77      95
1707        UK    315    .005     .09     100
1708        RK   1020    .004    .035           TRAP      6     3.6

1709        KK   DAM95
1710        KM       ROUTE SUB 95AZ THROUGH RETENTION BASIN
1711        RS      1    STOR
1712        SV      0    .275     .55
1713        SE    100     101     102
1714        SS  101.99    200     2.9     1.5
1715        ST    102     200     2.9     1.5

1716        KK   97AZ      CP
1717        KM       COMBINE DAM 95AZ WITH CP 96AZ
1718        HC      2

1719        KK   91AZ      CP
1720        KM       ROUTE CP 97AZ TO CP 91AZ
```

```
1721          RK     520    .004    .024           TRAP      10       25

1722          KK    90AZ     SUB
1723          KM        RUNOFF FROM SUB 90AZ
1724          BA   .0151
1725          LS              77      60
1726          UK     150    .005     .09     100
1727          RK    1000    .004    .035           TRAP      30        3
```



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


1728          KK   DAM90
1729          KM        ROUTE SUB 90AZ THROUGH RETENTION BASIN
1730          RS       1    STOR
1731          SV       0     .26     .52
1732          SE     100     101     102
1733          SS  101.99     200     2.9     1.5
1734          ST     102     200     2.9     1.5

1735          KK    92AZ      CP
1736          KM        COMBINE DAM 90AZ WITH CP 91AZ
1737          HC       2

1738          KK   110AZ     SUB
1739          KM        RUNOFF FROM SUB 110AZ
1740          BA   .0158
1741          LS              77      85
1742          UK     120    .005     .09     100
1743          RK    1280    .004    .024           TRAP      10       25

1744          KK  DAM110
1745          KM        ROUTE SUB 110AZ THROUGH RETENTION BASIN
1746          RS       1    STOR
1747          SV       0    .315     .63
1748          SE     100     101     102
1749          SS  101.99     200     2.9     1.5
1750          ST     102     200     2.9     1.5

1751          KK   101AZ      CP
1752          KM        ROUTE DAM 110AZ TO CP 101AZ
1753          RK     680    .004    .024           TRAP      10       25

1754          KK   100AZ     SUB
1755          KM        RUNOFF FROM SUB 100AZ
1756          BA   .0032
1757          LS              77      85
1758          UK     200    .005     .09     100
1759          RK     640    .004    .024           TRAP      10       25

1760          KK  DAM100
1761          KM        ROUTE SUB 100AZ THROUGH RETENTION BASIN
1762          RS       1    STOR
1763          SV       0     .11     .22
1764          SE     100     101     102
1765          SS  101.99     200     2.9     1.5
1766          ST     102     200     2.9     1.5
```

```
1904          RK    1160    .004    .024           TRAP      10      50
```



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

1905          KK  DAM135
1906          KM        ROUTE SUB 135AZ THROUGH RETENTION BASIN
1907          RS       1    STOR
1908          SV       0    .505    1.01
1909          SE     100     101     102
1910          SS  101.99     200     2.9     1.5
1911          ST     102     200     2.9     1.5

1912          KK   425AZ     SUB
1913          KM        RUNOFF FROM SUB 425AZ AND ROUTE DAM 135AZ
1914          BA   .0108
1915          LS              77
1916          UK     200   .0057     .10     100
1917          RK     600   .0083    .045           TRAP       5       1     YES

1918          KK   426AZ      CP
1919          KM        COMBINE SUB 405AZ, SUB 415AZ AND SUB 425AZ
1920          HC       3

1921          KK   400AZ     SUB
1922          KM        RUNOFF FROM SUB 400AZ AND ROUTE CP 426AZ
1923          BA   .0994
1924          LS              81
1925          UK    1000   .0057     .10     100
1926          RK    2300   .0046    .045           TRAP       5      10     YES

1927          KK  400AAZ      CP
1928          KM        ROUTE SUB 400AZ TO OLH STA 2414+30
1929          RS       1    FLOW      -1
1930          RC    .045    .030    .045     390   .0015
1931          RX       0       1       2      89     129     245     246     247
1932          RY      30      29      29       0       0      29      29      30

1933          KK   402AZ      CP
1934          KM        COMBINE CP 400AAZ & CP 401AZ
1935          HC       2

1936          KK   431AZ      CP
1937          KM        ROUTE CP 402AZ TO OLH STA 2429+50
1938          RS       1    FLOW      -1
1939          RC    .045    .030    .045    1520   .0015
1940          RX       0       1       2      89     129     245     246     247
1941          RY      30      29      29       0       0      29      29      30

1942          KK  430CAZ     SUB
1943          KM        RUNOFF FROM SUB 430CAZ
1944          BA   .0952
1945          LS              83
1946          UK     700   .0057     .10     100
1947          RK    2750   .0053    .045           TRAP       5       7
```

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

1948          KK   432AZ      CP
1949          KM        COMBINE SUB 430CAZ & CP 431AZ
1950          HC       2

1951          KK   433AZ      CP
1952          KM        ROUTE CP 432AZ TO OLH STA 2439+00
1953          RS       1    FLOW      -1
1954          RC    .045    .018    .045     950   .0015
1955          RX       0       1       2      60      80     138     139     140
1956          RY      30      29      29       0       0      29      29      30

1957          KK  430AAZ     SUB
1958          KM        RUNOFF FROM SUB 430AAZ
1959          BA   .0759
1960          LS             84
1961          UK     500   .0057     .10     100
1962          RK    3400   .0053    .045           TRAP       5       7

1963          KK  440AAZ     SUB
1964          KM        RUNOFF FROM SUB 440AAZ
1965          BA   .0696
1966          LS             83
1967          UK    1200   .0057     .10     100
1968          RK    1600   .0055    .045           TRAP       5       5

1969          KK   441AZ      CP
1970          KM        COMBINE SUB 430AAZ, SUB 440AAZ, & CP 433AZ
1971          HC       3

1972          KK   501AZ      CP
1973          KM        ROUTE CP 441AZ TO VIA DE VENTURA (OLH STA 2442+00)
1974          RS       1    FLOW      -1
1975          RC    .045    .018    .045     300   .0015
1976          RX       0       1       2      60      80     138     139     140
1977          RY      30      29      29       0       0      29      29      30

1978          KK  500AAZ     SUB
1979          KM        RUNOFF FROM SUB 500AAZ
1980          BA   .0332
1981          LS             80
1982          UK     700   .0057     .10     100
1983          RK    1200   .0050    .030           TRAP      10       2

1984          KK  503AAZ      CP
1985          KM        OFFSITE DRAINAGE HYDROGRAPH FROM NORTHWEST EDGE OF SRPMIC BOUNDARY
1986          IN      10 09JAN91    1038
1987          BA  .00001
1988          QI       0       2       3     4.5     5.5     6.5     7.8    10.6    15.0    30.0
1989          QI   120.6   120.6    38.0    22.8    15.8    12.5    10.0     8.6     7.2     6.5
1990          QI     5.8     5.3     5.0     4.5     4.0     4.0
```


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

```
1991        KK  503BAZ      CP
1992        KM        ROUTE HYDROGRAPH FROM CP 503AAZ THROUGH 7000 LF OF 4.5 FT DIAMETER PIPE
1993        KM        TO CP 503BAZ
1994        RK    7000   .0032    .012            CIRC     4.5

1995        KK  503CAZ      CP
1996        KM        COMBINE SUB 500AAZ, CP 501AZ, & CP 503BAZ
1997        HC       3

1998        KK  500B1Z      CP
1999        KM        ROUTE CP 503CAZ TO OLH STA 2449+65
2000        RS       1    FLOW      -1
2001        RC    .045    .025    .045     765   .0015
2002        RX       0       1       2      89     116     232     233     234
2003        RY      30      29      29       0       0      29      29      30

2004        KK  500BAZ     SUB
2005        KM        RUNOFF FROM SUB 500BAZ
2006        BA   .0170
2007        LS             83
2008        UK     600   .0057     .10     100
2009        RK     765   .0015    .025            TRAP      27     3.5

2010        KK  500B2Z      CP
2011        KM        CP 500B1Z & SUB 500BAZ
2012        HC       2

2013        KK  560A1Z      CP
2014        KM        ROUTE SUB 500B2Z TO OLH STA 2454+40
2015        RS       1    FLOW      -1
2016        RC    .045    .030    .045     475   .0015
2017        RX       0       1       2      89     122     238     239     240
2018        RY      30      29      29       0       0      29      29      30

2019        KK  560AAZ     SUB
2020        KM        RUNOFF FROM SUB 560AAZ
2021        BA   .0194
2022        LS             81
2023        UK     300   .0057     .10     100
2024        RK     900   .0047    .045            TRAP       5      15

2025        KK  560A2Z      CP
2026        KM        COMBINE SUB 560AAZ & CP 560A1AZ
2027        HC       2

2028        KK  560B1Z      CP
2029        KM        ROUTE CP 560A2AZ TO OLH STA 2459+30
2030        RS       1    FLOW      -1
2031        RC    .045    .030    .045     490   .0015
2032        RX       0       1       2      89     127     243     244     245
2033        RY      30      29      29       0       0      29      29      30
```



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

2034        KK  560BAZ     SUB
2035        KM        RUNOFF FROM SUB 560BAZ
```

```
2036        BA   .0224
2037        LS            79
2038        UK    300   .0057    .10     100
2039        RK   1500   .0047    .045           TRAP      5      15

2040        KK  560B2Z      CP
2041        KM       COMBINE SUB 560BAZ & CP 560B1AZ
2042        HC      2

2043        KK  560C1Z      CP
2044        KM       ROUTE CP 560B2AZ TO OLH STA 2474+35
2045        RS      1    FLOW      -1
2046        RC   .045    .030    .045    1505   .0015
2047        RX      0       1       2      89     133     249     250     251
2048        RY     30      29      29       0       0      29      29      30

2049        KK  560CAZ     SUB
2050        KM       RUNOFF FROM SUB 560CAZ
2051        BA   .0421
2052        LS            77
2053        UK    400   .0057    .10     100
2054        RK   1700   .0047    .045           TRAP      5      15

2055        KK  560C2Z      CP
2056        KM       COMBINE SUB 560CAZ & CP 560C1AZ
2057        HC      2

2058        KK   551AZ      CP
2059        KM       ROUTE CP 560C2AZ TO OLH STA 2498+00 (INDIAN BEND ROAD)
2060        RS      1    FLOW      -1
2061        RC   .045    .030    .045    2365   .0015
2062        RX      0       1       2      89     122     238     239     240
2063        RY     30      29      29       0       0      29      29      30

2064        KK  495AAZ     SUB
2065        KM       RUNOFF FROM SUB 495AAZ
2066        BA   .0260
2067        LS            83
2068        UK    600   .0057    .10     100
2069        RK   1200   .0043    .045           TRAP      5      15

2070        KK  550AAZ     SUB
2071        KM       RUNOFF FROM SUB 550AAZ & ROUTE SUB 495AAZ
2072        BA   .1578
2073        LS            83
2074        UK   1200   .0057    .10     100
2075        RK   3000   .0049    .045           TRAP     10      20     YES
```



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

2076        KK   552AZ      CP
2077        KM       COMBINE SUB 550AAZ & CP 551AZ
2078        HC      2

2079        KK  540AAZ     SUB
2080        KM       RUNOFF FROM SUB 540AAZ & ROUTE ALONG INDIAN BEND ROAD TO OLH
```

```
2081        BA   .0680
2082        LS            85
2083        UK    1000   .0057     .10     100
2084        RK    1900   .0050    .030           TRAP      10       2

2085        KK  540A1Z      CP
2086        KM        COMBINE SUB 540AAZ & CP 552AZ
2087        HC       2

2088        KK  545A1Z      CP
2089        KM        ROUTE CP 540A1AZ UNDER INDIAN BEND ROAD TO OLH STA 2504+55
2090        RS       1    FLOW      -1
2091        RC    .045    .018    .045     655   .0023
2092        RX       0       1       2      60      80     138     139     140
2093        RY      30      29      29       0       0      29      29      30

2094        KK  545AAZ     SUB
2095        KM        RUNOFF FROM SUB 545AAZ
2096        BA   .0086
2097        LS            85
2098        UK     200   .0057     .10     100
2099        RK     475   .0023    .030           TRAP      33     3.5

2100        KK  545A2Z      CP
2101        KM        COMBINE CP 545A1AZ & SUB 545AAZ
2102        HC       2

2103        KK  545B1Z      CP
2104        KM      ROUTE CP 545A2AZ TO CP 545B1AZ (OLH STA 2509+50)
2105        RS       1    FLOW      -1
2106        RC    .045    .030    .045     495   .0015
2107        RX       0       1       2      89     116     232     233     234
2108        RY      30      29      29       0       0      29      29      30

2109        KK  545BAZ     SUB
2110        KM        RUNOFF FROM SUB 545BAZ
2111        BA   .0100
2112        LS            85
2113        UK     400   .0057     .10     100
2114        RK     495   .0015    .030           TRAP      27     3.5

2115        KK  545B2Z      CP
2116        KM        COMBINE SUB 545AZ & CP 545B1AZ
2117        HC       2
```



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

2118        KK  545C1Z      CP
2119        KM        ROUTE CP 545B2AZ TO OLH STA 2514+50
2120        RS       1    FLOW      -1
2121        RC    .045    .030    .045     500   .0015
2122        RX       0       1       2      89     151     267     268     269
2123        RY      30      29      29       0       0      29      29      30

2124        KK  545CAZ     SUB
2125        KM        RUNOFF FROM SUB 545CAZ
```

```
2126        BA   .0113
2127        LS            85
2128        UK    500   .0057    .10    100
2129        RK    500   .0015   .030           TRAP     62     3.5

2130        KK  545C2Z      CP
2131        KM        COMBINE CP 545C1AZ & SUB 545CAZ
2132        HC       2

2133        KK   545D1      CP
2134        KM        ROUTE CP 545C2AZ TO OLH STA 2525+30
2135        RS       1    FLOW      -1
2136        RC    .045    .030    .045    1080   .0015
2137        RX       0       1       2      89     144     260     261     262
2138        RY      30      29      29       0       0      29      29      30

2139        KK  545DAZ     SUB
2140        KM        RUNOFF FROM SUB 545DAZ
2141        BA   .0285
2142        LS            85
2143        UK    600   .0057    .10     100
2144        RK   1080   .0015   .030           TRAP     55     3.5

2145        KK  545D2Z      CP
2146        KM        COMBINE CP 545D1AZ & SUB 545DAZ
2147        HC       2

2148        KK  545E1Z      CP
2149        KM        ROUTE CP 545D2AZ TO CP 545E1AZ
2150        RS       1    FLOW      -1
2151        RC    .045    .030    .045     800   .0030
2152        RX       0       1       2      89      99     215     216     217
2153        RY      30      29      29       0       0      29      29      30

2154        KK  545EAZ     SUB
2155        KM        RUNOFF FROM SUB 545EAZ
2156        BA   .0321
2157        LS            85
2158        UK    900   .0057    .10     100
2159        RK    800   .0030   .030           TRAP     10      2
```



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


2160        KK  545E2Z      CP
2161        KM        COMBINE CP 545E1AZ & SUB 545EAZ
2162        KM        THIS IS THE TOTAL DISCHARGE TO THE NORTH SIDE OF THE ARIZONA CANAL
2163        KM        FROM THE OUTER LOOP HIGHWAY OFFSITE DRAINAGE CHANNEL
2164        HC       2
            *       ******************************************************
            *       THIS CONCLUDES THE AREA CONTRIBUTING TO THE NORTH/SOUTH
            *       HIGHWAY DRAINAGE CHANNEL
            *       ******************************************************

2165        KK     377          CP
2166        KM            COMBINE CP545E2AZ AND CP376 AND CP378
2167        HC       3
```

```
2168          KK     397          CP
2169          KM            ROUTE CP377 TO CP397
2170          RK    2300   .0007    .035           TRAP     100       4

2171          KK     390    SUB
2172          KM            RUNOFF FROM SUB 390
2173          BA    .470
2174          LS              84
2175          UK     935   .0057     .10     100
2176          RK    7000    .006    .045           TRAP      10     100

2177          KK     398     CP
2178          KM            COMBINE CP397 AND SUB 390
2179          HC       2

2180          KK     400    SUB
2181          KM            RUNOFF FROM SUB 400
2182          BA   1.080
2183          LS              82
2184          UK    1280   .0057     .10     100
2185          RK   11750    .006    .045           TRAP      10       5

2186          KK     401     CP
2187          KM            COMBINE CP398 AND SUB 400
2188          HC       2
2189          ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

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

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

   59     1000AZ
               V
               V
   66     1042AZ
               .
               .
   69          .      1060AZ
               .          V
               .          V
   75          .      1051AZ
               .          .
               .          .
   78          .          .      1050AZ
               .          .          .
               .          .          .
   85          .      1052AZ............
               .          V
               .          V
   88          .      1041AZ
               .          .
               .          .
   91          .          .      1040AZ
               .          .          .
               .          .          .
```

```
 97     1043AZ.......................
            V
            V
100       DAM8
            V
            V
107     1011AZ
            .
            .
110         .      1010AZ
            .          .
            .          .
117     1012AZ............
            V
            V
120       286
            .
            .
123         .      1020AZ
            .          V
            .          V
129         .        290 ***
            .          .
            .          .
135         .          .      270AZ
            .          .         V
            .          .         V
141         .          .       300 ***
            .          .         .
            .          .         .
147         .          .         .        275
            .          .         .          .
            .          .         .          .
153       280..................................
            V
            V
156       310 ***
            .
            .
164         .-------->    314
162       311
            V
            V
167       308
            .
            .
170         .      280AZ
            .          V
            .          V
175         .       DAM5
            .          V
            .          V
183         .      250AZ ***
            .          V
            .          V
189         .        320 ***
            .          .
            .          .
```


-60-

```
195     .       .     304AZ
        .       .       V
        .       .       V
214     .       .     300AZ ***
        .       .       V
        .       .       V
220     .       .      DAM7
        .       .       V
        .       .       V
227     .       .     291AZ
        .       .       .
        .       .       .
230     .       .       .       290AZ
        .       .       .         V
        .       .       .         V
236     .       .       .        DAM6
        .       .       .         .
        .       .       .         .
243     .       .     292AZ............
        .       .       V
        .       .       V
245     .       .     331AZ
        .       .       .
        .       .       .
249     .       .       .       330AZ
        .       .       .         V
        .       .       .         V
255     .       .       .        DAM2
        .       .       .         .
        .       .       .         .
262     .       .     332AZ............
        .       .       V
        .       .       V
265     .       .     231AZ
        .       .       .
        .       .       .
268     .       .       .      230AZ0
        .       .       .         .
        .       .       .         .
274     .       .     232AZ............
        .       .       V
        .       .       V
277     .       .     233AZ
        .       .       V
        .       .       V
280     .       .     220AZ ***
        .       .       V
        .       .       V
287     .       .       330 ***
        .       .       .
        .       .       .
293     .       .       .       310AZ
        .       .       .         V
        .       .       .         V
299     .       .       .        DAM4
        .       .       .         V
        .       .       .         V
306     .       .       .       312AZ
```

```
                .         .         .         .
                .         .         .         .
309             .         .         .         .      320AZ
                .         .         .         .         .
                .         .         .         .         .
315             .         .         .      322AZ.........
                .         .         .         V
                .         .         .         V
318             .         .         .       DAM3
                .         .         .         V
                .         .         .         V
325             .         .         .      260AZ ***
                .         .         .         V
                .         .         .         V
332             .         .         .      451AZ
                .         .         .         V
                .         .         .         V
335             .         .         .       328
                .         .         .         .
                .         .         .         .
338             .       326......................
                .         V
                .         V
341             .       312
                .         .
                .         .
344             .         .       350
                .         .         .
                .         .         .
350             .       313...........
                .         .
                .         .
352             .         .     240AZ
                .         .         V
                .         .         V
359             .         .     245AZ
                .         .         .
                .         .         .
362             .         .         .      245AZ
                .         .         .         .
                .         .         .         .
365             .         .     247AZ...........
                .         .         V
                .         .         V
371             .         .     248AZ
                .         .         .
                .         .         .
374             .         .         .      180AZ
                .         .         .         .
                .         .         .         .
380             .         .         .         .      255AZ
                .         .         .         .         V
                .         .         .         .         V
387             .         .         .         .      236AZ
                .         .         .         .         .
                .         .         .         .         .
390             .         .         .         .         .      235AZ
                .         .         .         .         .         .
```

-62-

```
396                                   237AZ............
                                        V
                                        V
399                                   181AZ
                                        .
                                        .
402                   182AZ......................
                        V
                        V
405                   191AZ
                        .
                        .
408                         195AZ
                              V
                              V
414                         186AZ
                              .
                              .
417                                   185AZ
                                        .
                                        .
423                         187AZ............
                              V
                              V
426                         188AZ
                              .
                              .
429                   189AZ............
                        V
                        V
432                    DAM1
                        .
                        .
439                         190AZ
                              .
                              .
445                   192AZ............
                        V
                        V
448                   211AZ
                        .
                        .
451                         210AZ
                              .
                              .
457                   212AZ............
                        V
                        V
460                    340 ***
                        V
                        V
466                    348
                        .
                        .
469                349............
                        .
                        .
```


-63-

```
472        347............
             V
             V
475        356
             .
             .
478          .        360
             .          .
             .          .
484        358............
             .
             .
488          .       1270
             .          V
             .          V
494          .       1280 ***
             .          V
             .          V
500          .       1350 ***
             .          V
             .          V
506          .       1360 ***
             .          V
             .          V
512          .       1440 ***
             .          V
             .          V
518          .       1450 ***
             .          V
             .          V
524          .       1520 ***
             .          V
             .          V
530          .       1530 ***
             .          V
             .          V
536          .       1600 ***
             .          V
             .          V
542          .       1591
             .          .
             .          .
545          .          .       1260
             .          .          V
             .          .          V
551          .          .       1290 ***
             .          .          V
             .          .          V
557          .          .       1340 ***
             .          .          V
             .          .          V
563          .          .       1370 ***
             .          .          V
             .          .          V
569          .          .       1430 ***
             .          .          V
             .          .          V
575          .          .       1460 ***
```

-64-

```
                .          .          V
                .          .          V
581             .          .       1510 ***
                .          .          V
                .          .          V
587             .          .       1540 ***
                .          .          V
                .          .          V
593             .          .       1590 ***
                .          .          .
                .          .          .
599             .       1592............
                .          V
                .          V
602             .       1581
                .          .
                .          .
605             .          .       1250
                .          .          V
                .          .          V
611             .          .       1300 ***
                .          .          V
                .          .          V
617             .          .       1330 ***
                .          .          V
                .          .          V
623             .          .       1380 ***
                .          .          V
                .          .          V
629             .          .       1420 ***
                .          .          V
                .          .          V
635             .          .       1470 ***
                .          .          V
                .          .          V
641             .          .       1500 ***
                .          .          V
                .          .          V
647             .          .       1550 ***
                .          .          V
                .          .          V
653             .          .       1580 ***
                .          .          .
                .          .          .
659             .       1582............
                .          V
                .          V
662             .       1571
                .          .
                .          .
665             .          .       1240
                .          .          V
                .          .          V
671             .          .       1310 ***
                .          .          V
                .          .          V
677             .          .       1320 ***
                .          .          V
```

```
                .         .         V
683             .         .      1400 ***
                .         .         .
                .         .         .
689             .         .         .       1390
                .         .         .          V
                .         .         .          V
695             .         .         .       1391
                .         .         .          .
                .         .         .          .
698             .         .      1392............
                .         .         V
                .         .         V
701             .         .      1410 ***
                .         .         V
                .         .         V
707             .         .      1480 ***
                .         .         V
                .         .         V
713             .         .      1490 ***
                .         .         V
                .         .         V
719             .         .      1560 ***
                .         .         V
                .         .         V
725             .         .      1570 ***
                .         .         .
                .         .         .
731             .      1572............
                .         V
                .         V
734             .      1611
                .         .
                .         .
737             .         .      1610
                .         .         .
                .         .         .
743             .      1612............
                .         V
                .         V
746             .      1621
                .         .
                .         .
749             .         .      1620
                .         .         .
                .         .         .
755             .         .         .       1630
                .         .         .          V
                .         .         .          V
761             .         .         .       1640 ***
                .         .         .          .
                .         .         .          .
767             .      1622........................
                .         V
                .         V
770             .      1887
                .         .
                .         .
```

-66-

```
776     .       .       1950
        .       .         .
        .       .         .
782     .       .         .       1945
        .       .         .         V
        .       .         .         V
788     .       .         .       1951
        .       .         .         .
        .       .         .         .
791     .       .       1952............
        .       .         V
        .       .         V
794     .       .       1940 ***
        .       .         .
        .       .         .
800     .       .         .       1920
        .       .         .         V
        .       .         .         V
805     .       .         .       1941
        .       .         .         .
        .       .         .         .
809     .       .       1942............
        .       .         V
        .       .         V
812     .       .       1925 ***
        .       .         V
        .       .         V
818     .       .       1930 ***
        .       .         .
        .       .         .
824     .       .         .       1910
        .       .         .         V
        .       .         .         V
830     .       .         .       1900 ***
        .       .         .         V
        .       .         .         V
836     .       .         .       1890 ***
        .       .         .         V
        .       .         .         V
842     .       .         .       1931
        .       .         .         .
        .       .         .         .
845     .       .       1932............
        .       .         V
        .       .         V
848     .       .       1885 ***
        .       .         .
        .       .         .
854     .       .         .       1850
        .       .         .         V
        .       .         .         V
860     .       .         .       1860 ***
        .       .         .         V
        .       .         .         V
866     .       .         .       1870 ***
        .       .         .         V
        .       .         .         V
872     .       .         .       1886
```

-67-

```
875                                  1880
                                       .
                                       .
881                1888.................
                     V
                     V
884                1984
                     .
                     .
890                     1840
                        .
                        .
896                        .      1670
                           :        V
                           :        V
902                        .      1681
                           .        .
                           .        .
905                        .        .      1680
                           .        .        .
                           .        .        .
911                        .      1682............
                           .        V
                           .        V
914                        .      1751
                           .        .
                           .        .
917                        .        .     1226AZ
                           .        .        .
                           .        .        .
926                        .        .        .-------> 1228AZ
924                        .        .     1227AZ
                           .        .        V
                           .        .        V
929                        .        .       180 ***
                           .        .        V
                           .        .        V
935                        .        .      1750 ***
                           .        .        .
                           .        .        .
941                        .      1752............
                           .        V
                           .        V
944                        .      1761
                           .        .
                           .        .
947                        .        .      1760
                           .        .        .
                           .        .        .
953                        .      1762............
                           .        V
                           .        V
956                        .      1771
                           .        .
                           .        .
959                        .        .      1770
```

```
                .         .         .         .         .
                .         .         .         .         .
965             .         .         .      1772.........
                .         .         .         V
                .         .         .         V
968             .         .         .      1841
                .         .         .         .
                .         .         .         .
971             .         .      1842.........
                .         .         V
                .         .         V
974             .         .      1830 ***
                .         .         .
                .         .         .
980             .         .         .      1660
                .         .         .         V
                .         .         .         V
986             .         .         .      1691
                .         .         .         .
                .         .         .         .
989             .         .         .         .      1690
                .         .         .         .         .
                .         .         .         .         .
995             .         .         .      1692.........
                .         .         .         V
                .         .         .         V
998             .         .         .      1741
                .         .         .         .
                .         .         .         .
1001            .         .         .         .      1740
                .         .         .         .         .
                .         .         .         .         .
1007            .         .         .      1742.........
                .         .         .         V
                .         .         .         V
1010            .         .         .      1781
                .         .         .         .
                .         .         .         .
1013            .         .         .         .      1780
                .         .         .         .         .
                .         .         .         .         .
1019            .         .         .      1782.........
                .         .         .         V
                .         .         .         V
1022            .         .         .      1831
                .         .         .         .
                .         .         .         .
1025            .         .      1832.........
                .         .         V
                .         .         V
1028            .         .      1820 ***
                .         .         .
                .         .         .
1034            .         .         .      1650
                .         .         .         V
                .         .         .         V
1040            .         .         .      1701
                .         .         .         .
```

```
1043   .      .      .      .
       .      .      .      .      1700
       .      .      .      .        .
       .      .      .      .        .
1049   .      .      .    1702.......
       .      .      .      V
       .      .      .      V
1052   .      .      .    1731
       .      .      .      .
       .      .      .      .
1055   .      .      .      .      1730
       .      .      .      .        .
       .      .      .      .        .
1061   .      .      .    1732.......
       .      .      .      V
       .      .      .      V
1064   .      .      .    1791
       .      .      .      .
       .      .      .      .
1067   .      .      .      .      1790
       .      .      .      .        .
       .      .      .      .        .
1073   .      .      .    1792.......
       .      .      .      V
       .      .      .      V
1076   .      .      .    1822
       .      .      .      .
       .      .      .      .
1079   .      .    1823.......
       .      .      V
       .      .      V
1082   .      .    1810 ***
       .      .      .
       .      .      .
1088   .      .      .    1645
       .      .      .      V
       .      .      .      V
1094   .      .      .    1711
       .      .      .      .
       .      .      .      .
1097   .      .      .      .      1710
       .      .      .      .        .
       .      .      .      .        .
1103   .      .      .    1712.......
       .      .      .      V
       .      .      .      V
1106   .      .      .    1721
       .      .      .      .
       .      .      .      .
1109   .      .      .      .      1720
       .      .      .      .        .
       .      .      .      .        .
1115   .      .      .    1722.......
       .      .      .      V
       .      .      .      V
1118   .      .      .    1801
       .      .      .      .
       .      .      .      .
```

```
1121   .      .      .      .      1800
       .      .      .      .        .
       .      .      .      .        .
1127   .      .      .    1802.........
       .      .      .      V
       .      .      .      V
1130   .      .      .    1811
       .      .      .      .
       .      .      .      .
1133   .      .    1812.........
       .      .      .
       .      .      .
1136   .      .      .      5
       .      .      .      .
       .      .      .      .
1142   .      .      .      .        10
       .      .      .      .        .
       .      .      .      .        .
1148   .      .      .      7.........
       .      .      .      V
       .      .      .      V
1151   .      .      .     16
       .      .      .      .
       .      .      .      .
1154   .      .      .      .        15
       .      .      .      .        .
       .      .      .      .        .
1160   .      .      .     18.........
       .      .      .      .
       .      .      .      .
1163   .      .      .      .        20
       .      .      .      .        .
       .      .      .      .        .
1169   .      .      .     17.........
       .      .      .      V
       .      .      .      V
1172   .      .      .     26
       .      .      .      .
       .      .      .      .
1175   .      .      .      .        25
       .      .      .      .        .
       .      .      .      .        .
1181   .      .      .     28.........
       .      .      .      .
       .      .      .      .
1184   .      .      .      .        30
       .      .      .      .        .
       .      .      .      .        .
1190   .      .      .     27.........
       .      .      .      V
       .      .      .      V
1193   .      .      .     36
       .      .      .      .
       .      .      .      .
1196   .      .      .      .        35
       .      .      .      .        .
       .      .      .      .        .
1202   .      .      .     38.........
```

```
                 .         .         .         .
                 .         .         .         .
1205             .         .         .         .        40
                 .         .         .         .         .
                 .         .         .         .         .
1211             .         .         .        37............
                 .         .         .         V
                 .         .         .         V
1214             .         .         .        46
                 .         .         .         .
                 .         .         .         .
1217             .         .         .         .        45
                 .         .         .         .         .
                 .         .         .         .         .
1223             .         .         .        48............
                 .         .         .         .
                 .         .         .         .
1226             .         .         .         .        60
                 .         .         .         .         .
                 .         .         .         .         .
1232             .         .         .        50............
                 .         .         .         V
                 .         .         .         V
1235             .         .         .        66
                 .         .         .         .
                 .         .         .         .
1238             .         .         .         .        65
                 .         .         .         .         .
                 .         .         .         .         .
1244             .         .         .        68............
                 .         .         .         .
                 .         .         .         .
1247             .         .         .         .     1173AZ
                 .         .         .         .         V
                 .         .         .         .         V
1254             .         .         .         .        90 ***
                 .         .         .         .         .
                 .         .         .         .         .
1260             .         .         .         .         .        80
                 .         .         .         .         .         .
                 .         .         .         .         .         .
1266             .         .         .        70.......................
                 .         .         .         V
                 .         .         .         V
1269             .         .         .        96
                 .         .         .         .
                 .         .         .         .
1272             .         .         .         .        95
                 .         .         .         .         .
                 .         .         .         .         .
1278             .         .         .        98............
                 .         .         .         .
                 .         .         .         .
1281             .         .         .         .       110
                 .         .         .         .         .
                 .         .         .         .         .
1287             .         .         .         .         .       120
                 .         .         .         .         .         .
```

```
                .         .         .         .         .         .
1293            .         .         .       100.......................
                .         .         .         V
                .         .         .         V
1296            .         .         .       126
                .         .         .         .
                .         .         .         .
1299            .         .         .         .         125
                .         .         .         .           .
                .         .         .         .           .
1305            .         .         .       128............
                .         .         .         .
                .         .         .         .
1308            .         .         .         .         130
                .         .         .         .           .
                .         .         .         .           .
1314            .         .         .       127............
                .         .         .         V
                .         .         .         V
1317            .         .         .       136
                .         .         .         .
                .         .         .         .
1320            .         .         .         .         135
                .         .         .         .           .
                .         .         .         .           .
1326            .         .         .       138............
                .         .         .         .
                .         .         .         .
1329            .         .         .         .       1159AZ
                .         .         .         .           V
                .         .         .         .           V
1348            .         .         .         .         150 ***
                .         .         .         .           .
                .         .         .         .           .
1354            .         .         .       140............
                .         .         .         V
                .         .         .         V
1357            .         .         .       160 ***
                .         .         .         .
                .         .         .         .
1363            .         .         .         .         145
                .         .         .         .           V
                .         .         .         .           V
1369            .         .         .         .         146
                .         .         .         .           .
                .         .         .         .           .
1372            .         .         .       147............
                .         .         .         .
                .         .         .         .
1377            .         .         .         .-------->     162
1375            .         .         .       161
                .         .         .         V
                .         .         .         V
1380            .         .         .       165
                .         .         .         .
                .         .         .         .
1383            .         .         .         .         245
                .         .         .         .           .
```

```
                .         .         .         .         .
1389            .         .         .       243.........
                .         .         .         .
                .         .         .         .
1392            .         .         .         .       220
                .         .         .         .         .
                .         .         .         .         .
1398            .         .         .       223.........
                .         .         .         .
                .         .         .         .
1403            .         .         .         .------>     224
1401            .         .         .       222
                .         .         .         V
                .         .         .         V
1406            .         .         .       ~~236~~ 234
                .         .         .         .
                .         .         .         .
                                      235
1409            .         .      ~~237~~.........
                .         .         V
                .         .         V
1412            .         .       208
                .         .         .
                .         .         .
1415            .       210.........
                .         V
                .         V
1418            .       236
                .         .
                .         .
1421            .         .    1070AZ
                .         .         V
                .         .         V
1428            .         .    1031AZ
                .         .         .
                .         .         .
1431            .         .         .     1030AZ
                .         .         .         .
                .         .         .         .
1438            .         .    1032AZ.........
                .         .         V
                .         .         V
1441            .         .       270 ***
                .         .         .
                .         .         .
1447            .         .         .       265
                .         .         .         .
                .         .         .         .
1453            .         .       267.........
                .         .         V
                .         .         V
1456            .         .       315 ***
                .         .         .
                .         .         .
1462            .         .         .     1080AZ
                .         .         .         V
                .         .         .         V
1466            .         .         .     1090AZ ***
                .         .         .         V
```

```
                .         .         .         V
1474            .         .         .       260 ***
                .         .         .         V
                .         .         .         V
1480            .         .         .      170N ***
                .         .         .         .
                .         .         .         .
1488            .         .         .         .         .<-------     162
1486            .         .         .         .       173
                .         .         .         .         V
                .         .         .         .         V
1489            .         .         .         .       174
                .         .         .         .         .
                .         .         .         .         .
1494            .         .         .         .         .         .<-------     314
1492            .         .         .         .         .       316
                .         .         .         .         .         V
                .         .         .         .         .         V
1495            .         .         .         .         .       175
                .         .         .         .         .         .
                .         .         .         .         .         .
1498            .         .       172.................................
                .         .         V
                .         .         V
1501            .         .       171
                .         .         .
                .         .         .
1504            .         .         .      170S
                .         .         .         .
                .         .         .         .
1512            .         .         .         .         .<-------     224
1510            .         .         .         .       239
                .         .         .         .         V
                .         .         .         .         V
1513            .         .         .         .       240 ***
                .         .         .         .         .
                .         .         .         .         .
1519            .         .       238......................
                .         .         .
                .         .         .
1522            .       237............
                .         .
                .         .
1528            .         .-------> 242
1525            .       241
                .         V
                .         V
1531            .       251
                .         .
                .         .
1535            .         .       250
                .         .         .
                .         .         .
1541            .       252............
                .         .
                .         .
1544          247............
                V
```

```
                V
1547          376
                .
                .
1552            .          .<-------     242
1550            .
                .          V
                .          V
1553            .        253
                .          V
                .          V
1556            .        378
                .          .
                .          .
1559            .          .      165AZ
                .          .         V
                .          .         V
1566            .          .     DAM165
                .          .         V
                .          .         V
1573            .          .      156AZ
                .          .          .
                .          .          .
1576            .          .          .      160AZ
                .          .          .         V
                .          .          .         V
1582            .          .          .     DAM160
                .          .          .         V
                .          .          .         V
1589            .          .          .      161AZ
                .          .          .          .
                .          .          .          .
1592            .          .          .          .      155AZ
                .          .          .          .         V
                .          .          .          .         V
1598            .          .          .          .     DAM155
                .          .          .          .          .
                .          .          .          .          .
1605            .          .      157AZ.......................
                .          .         V
                .          .         V
1608            .          .      151AZ
                .          .          .
                .          .          .
1611            .          .          .      150AZ
                .          .          .         V
                .          .          .         V
1617            .          .          .     DAM150
                .          .          .          .
                .          .          .          .
1624            .          .      152AZ............
                .          .         V
                .          .         V
1627            .          .      121AZ
                .          .          .
                .          .          .
1630            .          .          .       70AZ
                .          .          .          V
```

```
                .         .         .         V
1636            .         .         .      122AZ
                .         .         .         .
                .         .         .         .
1639            .         .         .         .      120AZ
                .         .         .         .         V
                .         .         .         .         V
1645            .         .         .         .     DAM120
                .         .         .         .         .
                .         .         .         .         .
1652            .         .      123AZ.......................
                .         .         V
                .         .         V
1655            .         .       75AZ ***
                .         .         V
                .         .         V
1661            .         .      DAM75
                .         .         V
                .         .         V
1668            .         .       85AZ ***
                .         .         V
                .         .         V
1674            .         .      DAM85
                .         .         .
                .         .         .
1681            .         .         .       80AZ
                .         .         .         V
                .         .         .         V
1687            .         .         .      DAM80
                .         .         .         V
                .         .         .         V
1694            .         .         .       87AZ
                .         .         .         .
                .         .         .         .
1697            .         .       88AZ............
                .         .         V
                .         .         V
1700            .         .       96AZ
                .         .         .
                .         .         .
1703            .         .         .       95AZ
                .         .         .         V
                .         .         .         V
1709            .         .         .      DAM95
                .         .         .         .
                .         .         .         .
1716            .         .       97AZ............
                .         .         V
                .         .         V
1719            .         .       91AZ
                .         .         .
                .         .         .
1722            .         .         .       90AZ
                .         .         .         V
                .         .         .         V
1728            .         .         .      DAM90
                .         .         .         .
                .         .         .         .
```

```
1735        .         .      92AZ............
            .         .        .
            .         .        .
1738        .         .        .      110AZ
            .         .        .         V
            .         .        .         V
1744        .         .        .     DAM110
            .         .        .         V
            .         .        .         V
1751        .         .        .      101AZ
            .         .        .         .
            .         .        .         .
1754        .         .        .         .      100AZ
            .         .        .         .         V
            .         .        .         .         V
1760        .         .        .         .     DAM100
            .         .        .         .         .
            .         .        .         .         .
1767        .         .     102AZ........................
            .         .        V
            .         .        V
1770        .         .     103AZ
            .         .        .
            .         .        .
1775        .         .        .-------> 103BAZ
1773        .         .    103AAZ
            .         .        V
            .         .        V
1778        .         .     361AZ
            .         .        .
            .         .        .
1785        .         .        .      360AZ
            .         .        .         .
            .         .        .         .
1791        .         .     362AZ............
            .         .        V
            .         .        V
1794        .         .     411AZ
            .         .        V
            .         .        V
1800        .         .    410BAZ
            .         .        .
            .         .        .
1806        .         .        .      410AZ
            .         .        .         V
            .         .        .         V
1812        .         .        .     410AAZ
            .         .        .         .
            .         .        .         .
1818        .         .    410CAZ............
            .         .        V
            .         .        V
1821        .         .     421AZ
            .         .        .
            .         .        .
1827        .         .        .      140AZ
            .         .        .         V
            .         .        .         V
```

```
1833          .         .         .     DAM140
              .         .         .         V
              .         .         .         V
1840          .         .         .      130AZ ***
              .         .         .         V
              .         .         .         V
1846          .         .         .     DAM130
              .         .         .         V
              .         .         .         V
1853          .         .         .      420AZ ***
              .         .         .         V
              .         .         .         V
1859          .         .         .     420AAZ
              .         .         .         .
              .         .         .         .
1865          .         .   423AZ...........
              .         .      V
              .         .      V
1868          .         .   401AZ
              .         .      .
              .         .      .
1874          .         .         .      405AZ
              .         .         .         .
              .         .         .         .
1880          .         .         .         .      200AZ
              .         .         .         .         V
              .         .         .         .         V
1886          .         .         .         .     DAM200
              .         .         .         .         V
              .         .         .         .         V
1893          .         .         .         .      415AZ ***
              .         .         .         .         .
              .         .         .         .         .
1899          .         .         .         .         .      135AZ
              .         .         .         .         .         V
              .         .         .         .         .         V
1905          .         .         .         .         .     DAM135
              .         .         .         .         .         V
              .         .         .         .         .         V
1912          .         .         .         .         .      425AZ ***
              .         .         .         .         .         .
              .         .         .         .         .         .
1918          .         .         .      426AZ.......................
              .         .         .         V
              .         .         .         V
1921          .         .         .      400AZ ***
              .         .         .         V
              .         .         .         V
1927          .         .         .     400AAZ
              .         .         .         .
              .         .         .         .
1933          .         .   402AZ...........
              .         .      V
              .         .      V
1936          .         .   431AZ
              .         .      .
              .         .      .
1942          .         .         .     430CAZ
```

```
                .         .         .         .
                .         .         .         .
1948            .         .     432AZ...........
                .         .         V
                .         .         V
1951            .         .     433AZ
                .         .         .
                .         .         .
1957            .         .         .     430AAZ
                .         .         .         .
                .         .         .         .
1963            .         .         .         .     440AAZ
                .         .         .         .         .
                .         .         .         .         .
1969            .         .     441AZ......................
                .         .         V
                .         .         V
1972            .         .     501AZ
                .         .         .
                .         .         .
1978            .         .         .     500AAZ
                .         .         .         .
                .         .         .         .
1984            .         .         .         .     503AAZ
                .         .         .         .         V
                .         .         .         .         V
1991            .         .         .         .     503BAZ
                .         .         .         .         .
                .         .         .         .         .
1995            .         .     503CAZ......................
                .         .         V
                .         .         V
1998            .         .     500B1Z
                .         .         .
                .         .         .
2004            .         .         .     500BAZ
                .         .         .         .
                .         .         .         .
2010            .         .     500B2Z...........
                .         .         V
                .         .         V
2013            .         .     560A1Z
                .         .         .
                .         .         .
2019            .         .         .     560AAZ
                .         .         .         .
                .         .         .         .
2025            .         .     560A2Z...........
                .         .         V
                .         .         V
2028            .         .     560B1Z
                .         .         .
                .         .         .
2034            .         .         .     560BAZ
                .         .         .         .
                .         .         .         .
2040            .         .     560B2Z...........
                .         .         V
```

```
                .         .         V
2043            .         .    560C1Z
                .         .         .
                .         .         .
2049            .         .         .      560CAZ
                .         .         .          .
                .         .         .          .
2055            .         .    560C2Z............
                .         .         V
                .         .         V
2058            .         .     551AZ
                .         .         .
                .         .         .
2064            .         .         .      495AAZ
                .         .         .          V
                .         .         .          V
2070            .         .         .      550AAZ ***
                .         .         .          .
                .         .         .          .
2076            .         .     552AZ............
                .         .         .
                .         .         .
2079            .         .         .      540AAZ
                .         .         .          .
                .         .         .          .
2085            .         .    540A1Z............
                .         .         V
                .         .         V
2088            .         .    545A1Z
                .         .         .
                .         .         .
2094            .         .         .      545AAZ
                .         .         .          .
                .         .         .          .
2100            .         .    545A2Z............
                .         .         V
                .         .         V
2103            .         .    545B1Z
                .         .         .
                .         .         .
2109            .         .         .      545BAZ
                .         .         .          .
                .         .         .          .
2115            .         .    545B2Z............
                .         .         V
                .         .         V
2118            .         .    545C1Z
                .         .         .
                .         .         .
2124            .         .         .      545CAZ
                .         .         .          .
                .         .         .          .
2130            .         .    545C2Z............
                .         .         V
                .         .         V
2133            .         .     545D1
                .         .         .
                .         .         .
```

```
2139          .          .          .      545DAZ
              .          .          .          .
              .          .          .          .
2145          .          .     545D2Z............
              .          .          V
              .          .          V
2148          .          .     545E1Z
              .          .          .
              .          .          .
2154          .          .          .      545EAZ
              .          .          .          .
              .          .          .          .
2160          .          .     545E2Z............
              .          .          .
              .          .          .
2165        377........................
              V
              V
2168        397
              .
              .
2171          .        390
              .          .
              .          .
2177        398............
              .
              .
2180          .        400
              .          .
              .          .
2186        401............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1                                                  ****
                    FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985
          U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616
                                                  ****


                    ************************************************************
                    *          SALT RIVER PIMA - MARICOPA INDIAN COMMUNITY     *
                    *                   DRAINAGE STUDY                         *
                    *                                                          *
                    *                     PLAN   A                             *
                    *                                                          *
                    *              MODIFICATIONS TO ADOT MODEL:                *
                    *                                                          *
                    *                   ROBERT L. WARD, P.E.                   *
                    *                   CONSULTING ENGINEER                    *
                    *                                                          *
                    *                   OUTER LOOP FREEWAY                     *
                    *               (NORTH OF THE ARIZONA CANAL)               *
                    *                        PHASE 2                           *
                    *                                                          *
                    *         HYDROLOGY ANALYSIS FOR OFFSITE DRAINAGE          *
                    *                   100 YEAR EVENT                         *
```

```
*          12 HOUR HYPOTHETICAL STORM DISTRIBUTION          *
*                                                           *
*      USES % IMPERVIOUS COVER TO SIMULATE DEVELOPMENT      *
*          INCLUDES RETENTION/DETENTION BASINS FOR          *
*              RESIDENTIAL & COMMERCIAL AREAS               *
*                                                           *
*                                                           *
*          THIS MODEL INCLUDES THE ADDITIONAL AREA          *
*        PREVIOUSLY MODELED BY THE CORP OF ENGINEERS        *
*                                                           *
*     ALL CURVE NUMBERS ARE FOR 12-HOUR STORM DURATION      *
*     NORMAL DEPTH STORAGE ROUTING ALONG ARIZONA CANAL      *
*       INCLUDES CAP CROSS-DRAINAGE AT EAST BOUNDARY        *
* BASE MODEL USES APRIL 1989 HYDROLOGIC REVISIONS BY R. WARD *
* MARCH 1989 HIGHWAY ALIGNMENT HAS BEEN REVISED TO MID 1989 *
*                  HIGHWAY ALIGNMENT.                       *
*                                                           *
*                     MODEL EK15.24I                        *
*      THIS MODEL SIMULATES THE IMPACT TO THE OUTER LOOP    *
*      OF A NORTH/SOUTH CHANNEL ALONG AN EXTENSION OF       *
*      96th STREET FROM THE NORTH BOUNDARY OF THE SRPMIC    *
*      TO THE ARIZONA CANAL                                 *
*                                                           *
*   13 DETENTION BASINS HAVE BEEN REMOVED THAT WERE ADJACENT *
*   TO THE OUTER LOOP.  MODIFIED PULS CHANNEL ROUTING       *
*   OPERATIONS ARE USED IN-PLACE OF THE BASINS.             *
*   CHANNEL GEOMETRY IS BASED ON AVERAGED, APPROXIMATE XSEC *
*   GEOMETRY.                                               *
*                                                           *
*              CP 103 IS ROUTED TO SUB 360.                 *
* ALL SUB-BASIN DATA & ROUTING OPERATIONS HAVE BEEN REVISED *
* TO REFLECT THE HIGHWAY ALIGNMENT CHANGE MADE BY DCCD IN   *
* MID-1989.   ADDITIONAL OFFSITE DRAINAGE HAS BEEN ROUTED   *
*THROUGH 7000 LF OF PIPE AND INSERTED IN THE MODEL AT CP 503B *
*     WHICH IS AT THE NORTH SIDE OF VIA DE VENTURA          *
*                                                           *
* CHANNEL ROUTING OPERATIONS ARE REFERENCED TO OUTER LOOP   *
*   HIGHWAY STATIONING FROM THE HIGHWAY GENERAL PLAN         *
*************************************************************

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

   IT        HYDROGRAPH TIME DATA
                   NMIN          5  MINUTES IN COMPUTATION INTERVAL
                  IDATE     9JAN91  STARTING DATE
                  ITIME       0000  STARTING TIME
                     NQ        289  NUMBER OF HYDROGRAPH ORDINATES
                 NDDATE    10JAN91  ENDING DATE
                 NDTIME       0000  ENDING TIME

             COMPUTATION INTERVAL     .08 HOURS
                  TOTAL TIME BASE   24.00 HOURS

        ENGLISH UNITS
1  NO UPSTREAM INFLOW TO ROUTE - ERROR EXIT FROM ***   FDKSRM  ****
```

*** ***
***

```
          **************
          *            *
 484 KK   *      358   *              CP
          *            *
          **************

 486 KO         OUTPUT CONTROL VARIABLES
                     IPRNT          2  PRINT CONTROL
                     IPLOT          2  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE

 487 HC         HYDROGRAPH COMBINATION
                     ICOMP          2  NUMBER OF HYDROGRAPHS TO COMBINE
```

***

****
***

HYDROGRAPH AT STATION 358
SUM OF 2 HYDROGRAPHS

****
***

DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW
9 JAN 0000	1	0.	9 JAN 0605	74	225.	9 JAN 1210	147	332.	9 JAN 1815	220	258.
9 JAN 0005	2	0.	9 JAN 0610	75	251.	9 JAN 1215	148	343.	9 JAN 1820	221	255.
9 JAN 0010	3	0.	9 JAN 0615	76	316.	9 JAN 1220	149	353.	9 JAN 1825	222	252.
9 JAN 0015	4	0.	9 JAN 0620	77	475.	9 JAN 1225	150	362.	9 JAN 1830	223	249.
9 JAN 0020	5	0.	9 JAN 0625	78	808.	9 JAN 1230	151	368.	9 JAN 1835	224	247.
9 JAN 0025	6	0.	9 JAN 0630	79	1276.	9 JAN 1235	152	373.	9 JAN 1840	225	244.
9 JAN 0030	7	0.	9 JAN 0635	80	1693.	9 JAN 1240	153	377.	9 JAN 1845	226	241.
9 JAN 0035	8	3.	9 JAN 0640	81	1917.	9 JAN 1245	154	379.	9 JAN 1850	227	238.
9 JAN 0040	9	16.	9 JAN 0645	82	1969.	9 JAN 1250	155	381.	9 JAN 1855	228	234.
9 JAN 0045	10	49.	9 JAN 0650	83	1839.	9 JAN 1255	156	382.	9 JAN 1900	229	231.
9 JAN 0050	11	93.	9 JAN 0655	84	1651.	9 JAN 1300	157	382.	9 JAN 1905	230	

-84-

227.

9 JAN 0055	12	133.	*	9 JAN 0700	85	1480.	*	9 JAN 1305	158	382.	*	9 JAN 1910	231

224.

9 JAN 0100	13	161.	*	9 JAN 0705	86	1321.	*	9 JAN 1310	159	381.	*	9 JAN 1915	232

220.

9 JAN 0105	14	179.	*	9 JAN 0710	87	1183.	*	9 JAN 1315	160	380.	*	9 JAN 1920	233

216.

9 JAN 0110	15	189.	*	9 JAN 0715	88	1065.	*	9 JAN 1320	161	379.	*	9 JAN 1925	234

212.

9 JAN 0115	16	194.	*	9 JAN 0720	89	964.	*	9 JAN 1325	162	377.	*	9 JAN 1930	235

208.

9 JAN 0120	17	197.	*	9 JAN 0725	90	879.	*	9 JAN 1330	163	375.	*	9 JAN 1935	236

204.

9 JAN 0125	18	199.	*	9 JAN 0730	91	808.	*	9 JAN 1335	164	373.	*	9 JAN 1940	237

200.

9 JAN 0130	19	200.	*	9 JAN 0735	92	746.	*	9 JAN 1340	165	371.	*	9 JAN 1945	238

196.

9 JAN 0135	20	200.	*	9 JAN 0740	93	694.	*	9 JAN 1345	166	369.	*	9 JAN 1950	239

192.

9 JAN 0140	21	200.	*	9 JAN 0745	94	649.	*	9 JAN 1350	167	367.	*	9 JAN 1955	240

189.

9 JAN 0145	22	201.	*	9 JAN 0750	95	611.	*	9 JAN 1355	168	365.	*	9 JAN 2000	241

185.

9 JAN 0150	23	201.	*	9 JAN 0755	96	578.	*	9 JAN 1400	169	363.	*	9 JAN 2005	242

181.

9 JAN 0155	24	201.	*	9 JAN 0800	97	549.	*	9 JAN 1405	170	361.	*	9 JAN 2010	243

177.

9 JAN 0200	25	201.	*	9 JAN 0805	98	523.	*	9 JAN 1410	171	359.	*	9 JAN 2015	244

173.

9 JAN 0205	26	201.	*	9 JAN 0810	99	501.	*	9 JAN 1415	172	356.	*	9 JAN 2020	245

168.

9 JAN 0210	27	201.	*	9 JAN 0815	100	481.	*	9 JAN 1420	173	355.	*	9 JAN 2025	246

164.

9 JAN 0215	28	202.	*	9 JAN 0820	101	463.	*	9 JAN 1425	174	353.	*	9 JAN 2030	247

160.

9 JAN 0220	29	202.	*	9 JAN 0825	102	448.	*	9 JAN 1430	175	351.	*	9 JAN 2035	248

155.

9 JAN 0225	30	202.	*	9 JAN 0830	103	434.	*	9 JAN 1435	176	349.	*	9 JAN 2040	249

151.

9 JAN 0230	31	202.	*	9 JAN 0835	104	421.	*	9 JAN 1440	177	348.	*	9 JAN 2045	250

146.

9 JAN 0235	32	202.	*	9 JAN 0840	105	409.	*	9 JAN 1445	178	346.	*	9 JAN 2050	251

142.

9 JAN 0240	33	202.	*	9 JAN 0845	106	399.	*	9 JAN 1450	179	344.	*	9 JAN 2055	252

138.

9 JAN 0245	34	202.	*	9 JAN 0850	107	390.	*	9 JAN 1455	180	343.	*	9 JAN 2100	253

134.

9 JAN 0250	35	202.	*	9 JAN 0855	108	381.	*	9 JAN 1500	181	341.	*	9 JAN 2105	254

130.

9 JAN 0255	36	203.	*	9 JAN 0900	109	373.	*	9 JAN 1505	182	339.	*	9 JAN 2110	255

127.

9 JAN 0300	37	203.	*	9 JAN 0905	110	365.	*	9 JAN 1510	183	337.	*	9 JAN 2115	256

123.

9 JAN 0305	38	203.	*	9 JAN 0910	111	359.	*	9 JAN 1515	184	335.	*	9 JAN 2120	257

120.

9 JAN 0310	39	203.	*	9 JAN 0915	112	352.	*	9 JAN 1520	185	333.	*	9 JAN 2125	258

116.

9 JAN 0315	40	203.	*	9 JAN 0920	113	347.	*	9 JAN 1525	186	331.	*	9 JAN 2130	259

113.																	
	9 JAN 0320	41	203.	*	9 JAN 0925	114	341.	*	9 JAN 1530	187	329.	*	9 JAN 2135	260
110.																	
	9 JAN 0325	42	203.	*	9 JAN 0930	115	336.	*	9 JAN 1535	188	327.	*	9 JAN 2140	261
107.																	
	9 JAN 0330	43	204.	*	9 JAN 0935	116	332.	*	9 JAN 1540	189	326.	*	9 JAN 2145	262
103.																	
	9 JAN 0335	44	204.	*	9 JAN 0940	117	328.	*	9 JAN 1545	190	324.	*	9 JAN 2150	263
100.																	
	9 JAN 0340	45	204.	*	9 JAN 0945	118	324.	*	9 JAN 1550	191	322.	*	9 JAN 2155	264
97.																	
	9 JAN 0345	46	204.	*	9 JAN 0950	119	320.	*	9 JAN 1555	192	320.	*	9 JAN 2200	265
94.																	
	9 JAN 0350	47	204.	*	9 JAN 0955	120	317.	*	9 JAN 1600	193	319.	*	9 JAN 2205	266
90.																	
	9 JAN 0355	48	205.	*	9 JAN 1000	121	313.	*	9 JAN 1605	194	317.	*	9 JAN 2210	267
87.																	
	9 JAN 0400	49	205.	*	9 JAN 1005	122	310.	*	9 JAN 1610	195	315.	*	9 JAN 2215	268
84.																	
	9 JAN 0405	50	205.	*	9 JAN 1010	123	307.	*	9 JAN 1615	196	314.	*	9 JAN 2220	269
81.																	
	9 JAN 0410	51	205.	*	9 JAN 1015	124	305.	*	9 JAN 1620	197	312.	*	9 JAN 2225	270
78.																	
	9 JAN 0415	52	206.	*	9 JAN 1020	125	302.	*	9 JAN 1625	198	311.	*	9 JAN 2230	271
75.																	
	9 JAN 0420	53	206.	*	9 JAN 1025	126	300.	*	9 JAN 1630	199	309.	*	9 JAN 2235	272
73.																	
	9 JAN 0425	54	206.	*	9 JAN 1030	127	297.	*	9 JAN 1635	200	307.	*	9 JAN 2240	273
70.																	
	9 JAN 0430	55	206.	*	9 JAN 1035	128	295.	*	9 JAN 1640	201	305.	*	9 JAN 2245	274
68.																	
	9 JAN 0435	56	207.	*	9 JAN 1040	129	293.	*	9 JAN 1645	202	304.	*	9 JAN 2250	275
66.																	
	9 JAN 0440	57	207.	*	9 JAN 1045	130	291.	*	9 JAN 1650	203	302.	*	9 JAN 2255	276
64.																	
	9 JAN 0445	58	207.	*	9 JAN 1050	131	289.	*	9 JAN 1655	204	299.	*	9 JAN 2300	277
62.																	
	9 JAN 0450	59	207.	*	9 JAN 1055	132	287.	*	9 JAN 1700	205	297.	*	9 JAN 2305	278
60.																	
	9 JAN 0455	60	208.	*	9 JAN 1100	133	286.	*	9 JAN 1705	206	295.	*	9 JAN 2310	279
58.																	
	9 JAN 0500	61	208.	*	9 JAN 1105	134	284.	*	9 JAN 1710	207	293.	*	9 JAN 2315	280
56.																	
	9 JAN 0505	62	208.	*	9 JAN 1110	135	282.	*	9 JAN 1715	208	290.	*	9 JAN 2320	281
54.																	
	9 JAN 0510	63	209.	*	9 JAN 1115	136	281.	*	9 JAN 1720	209	288.	*	9 JAN 2325	282
52.																	
	9 JAN 0515	64	209.	*	9 JAN 1120	137	279.	*	9 JAN 1725	210	285.	*	9 JAN 2330	283
50.																	
	9 JAN 0520	65	209.	*	9 JAN 1125	138	278.	*	9 JAN 1730	211	283.	*	9 JAN 2335	284
48.																	
	9 JAN 0525	66	210.	*	9 JAN 1130	139	277.	*	9 JAN 1735	212	280.	*	9 JAN 2340	285
46.																	
	9 JAN 0530	67	210.	*	9 JAN 1135	140	277.	*	9 JAN 1740	213	278.	*	9 JAN 2345	286
44.																	
	9 JAN 0535	68	211.	*	9 JAN 1140	141	278.	*	9 JAN 1745	214	275.	*	9 JAN 2350	287
42.																	
	9 JAN 0540	69	211.	*	9 JAN 1145	142	282.	*	9 JAN 1750	215	273.	*	9 JAN 2355	288

-86-

```
41.
     9 JAN 0545   70      212.   *    9 JAN 1150  143      287.   *    9 JAN 1755  216      270.   *   10 JAN 0000  289
39.
     9 JAN 0550   71      213.   *    9 JAN 1155  144      296.   *    9 JAN 1800  217      267.   *
     9 JAN 0555   72      214.   *    9 JAN 1200  145      307.   *    9 JAN 1805  218      264.   *
     9 JAN 0600   73      217.   *    9 JAN 1205  146      319.   *    9 JAN 1810  219      261.   *
                                 *                                *                                *

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

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR        72-HR     24.00-HR
+   (CFS)       (HR)
                           (CFS)
+    1969.      6.75                 561.         302.         302.         302.
                         (INCHES)   2.371        5.114        5.114        5.114
                          (AC-FT)    278.         600.         600.         600.

                         CUMULATIVE AREA =    2.20 SQ MI

1                                                  STATION      358

                           (O) OUTFLOW
          0.       200.      400.      600.      800.      1000.     1200.     1400.     1600.     1800.     2000.       0.
  0.
  DAHRMN PER
   90000
 10---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
   90005   20          .         .         .         .         .         .         .         .         .         .         .
   .
   90010   30          .         .         .         .         .         .         .         .         .         .         .
  .
   90015   40          .         .         .         .         .         .         .         .         .         .         .
   .
   90020   50          .         .         .         .         .         .         .         .         .         .         .
   .
   90025   60          .         .         .         .         .         .         .         .         .         .         .
   .
   90030   70          .         .         .         .         .         .         .         .         .         .         .
  .
   90035   80          .         .         .         .         .         .         .         .         .         .         .
   .
   90040   9.0         .         .         .         .         .         .         .         .         .         .         .
   .
   90045   10. O       .         .         .         .         .         .         .         .         .         .         .
   .
   90050   11. . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  .
   90055   12.      O  .         .         .         .         .         .         .         .         .         .         .
   .
   90100   13.       O .         .         .         .         .         .         .         .         .         .         .
   .
   90105   14.        O.         .         .         .         .         .         .         .         .         .         .
   .
   90110   15.        O.         .         .         .         .         .         .         .         .         .         .
   .
   90115   16.         O         .         .         .         .         .         .         .         .         .         .
```

-87-

90120	17.	0
90125	18.	0
90130	19.	0
90135	20.	0
90140	21.	0
90145	22.	0
90150	23.	0
90155	24.	0
90200	25.	0
90205	26.	0
90210	27.	0
90215	28.	0
90220	29.	0
90225	30.	0
90230	31.	0
90235	32.	0
90240	33.	0
90245	34.	0
90250	35.	0
90255	36.	0
90300	37.	0
90305	38.	0
90310	39.	0
90315	40.	0
90320	41.	0
90325	42.	0
90330	43.	0
90335	44.	0
90340	45.	0

90345	46.	0
90350	47.	0
90355	48.	0
90400	49.	0
90405	50.	0
90410	51.	0
90415	52.	0
90420	53.	0
90425	54.	0
90430	55.	0
90435	56.	0
90440	57.	0
90445	58.	0
90450	59.	0
90455	60.	0
90500	61.	0
90505	62.	0
90510	63.	0
90515	64.	0
90520	65.	0
90525	66.	0
90530	67.	.0
90535	68.	.0
90540	69.	.0
90545	70.	.0
90550	71.	.0.
90555	72.	.0
90600	73.	.0
90605	74.	.0

```
90610  75.          . 0       .         .         .         .         .         .         .         .         .         .
90615  76.          .     0   .         .         .         .         .         .         .         .         .         .
90620  77.          .         .   0     .         .         .         .         .         .         .         .         .
90625  78.          .         .         .         0         .         .         .         .         .         .         .
90630  79.          .         .         .         .         .         .   0     .         .         .         .         .
90635  80.          .         .         .         .         .         .         .         .    0    .         .         .
90640  81. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 0 . . . . . . . . . .
90645  82.          .         .         .         .         .         .         .         .         .       0 .         .
90650  83.          .         .         .         .         .         .         .         .         . 0       .         .
90655  84.          .         .         .         .         .         .         .         .  0      .         .         .
90700  85.          .         .         .         .         .         .         .   0     .         .         .         .
90705  86.          .         .         .         .         .         .     0   .         .         .         .         .
90710  87.          .         .         .         .         .         0.        .         .         .         .         .
90715  88.          .         .         .         .         .   0     .         .         .         .         .         .
90720  89.          .         .         .         .        0.         .         .         .         .         .         .
90725  90.          .         .         .         .    0    .         .         .         .         .         .         .
90730  91. . . . . . . . . . . . . . . . . . . . . 0 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
90735  92.          .         .         .      0  .         .         .         .         .         .         .         .
90740  93.          .         .         .    0    .         .         .         .         .         .         .         .
90745  94.          .         .         . 0       .         .         .         .         .         .         .         .
90750  95.          .         .         .0        .         .         .         .         .         .         .         .
90755  96.          .         .         0.        .         .         .         .         .         .         .         .
90800  97.          .         .       0 .         .         .         .         .         .         .         .         .
90805  98.          .         .      0  .         .         .         .         .         .         .         .         .
90810  99.          .         .     0   .         .         .         .         .         .         .         .         .
90815 100.          .         .    0    .         .         .         .         .         .         .         .         .
90820 101. . . . . . . . . . . . .0. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
90825 102.          .         . 0       .         .         .         .         .         .         .         .         .
90830 103.          .         . 0       .         .         .         .         .         .         .         .         .
```

-90-

90835 104. .0

90840 105. 0

90845 106. 0

90850 107. 0.

90855 108. 0.

90900 109. 0.

90905 110. 0

90910 111. 0

90915 112. 0

90920 113. 0

90925 114. 0

90930 115. 0

90935 116. 0

90940 117. 0

90945 118. 0

90950 119. 0

90955 120. 0

91000 121. 0

91005 122. 0

91010 123. 0

91015 124. 0

91020 125. 0

91025 126. 0

91030 127. 0

91035 128. 0

91040 129. 0

91045 130. 0

91050 131. 0

91055 132. 0

91100 133. . 0 . . . . . .
91105 134. . 0 . . . . . .
91110 135. . 0 . . . . . .
91115 136. . 0 . . . . . .
91120 137. . 0 . . . . . .
91125 138. . 0 . . . . . .
91130 139. . 0 . . . . . .
91135 140. . 0 . . . . . .
91140 141. . . . . 0 . . . . . .
91145 142. . 0 . . . . . .
91150 143. . 0 . . . . . .
91155 144. . 0 . . . . . .
91200 145. . 0 . . . . . .
91205 146. . 0 . . . . . .
91210 147. . 0 . . . . . .
91215 148. . 0 . . . . . .
91220 149. . 0 . . . . . .
91225 150. . 0 . . . . . .
91230 151. . . . . 0 . . . . . .
91235 152. . 0. . . . . .
91240 153. . 0. . . . . .
91245 154. . 0. . . . . .
91250 155. . 0. . . . . .
91255 156. . 0. . . . . .
91300 157. . 0. . . . . .
91305 158. . 0. . . . . .
91310 159. . 0. . . . . .
91315 160. . 0. . . . . .
91320 161. . . . . .0. . . . . .

91325 162. . 0. . . . . .

91330 163. . 0. . . . . .

91335 164. . 0. . . . . .

91340 165. . 0. . . . . .

91345 166. . 0 . . . . . .

91350 167. . 0 . . . . . .

91355 168. . 0 . . . . . .

91400 169. . 0 . . . . . .

91405 170. . 0 . . . . . .

91410 171. . . . . 0 . . . . . .

91415 172. . 0 . . . . . .

91420 173. . 0 . . . . . .

91425 174. . 0 . . . . . .

91430 175. . 0 . . . . . .

91435 176. . 0 . . . . . .

91440 177. . 0 . . . . . .

91445 178. . 0 . . . . . .

91450 179. . 0 . . . . . .

91455 180. . 0 . . . . . .

91500 181. . . . . .0. . . . . .

91505 182. . 0 . . . . . .

91510 183. . 0 . . . . . .

91515 184. . 0 . . . . . .

91520 185. . 0 . . . . . .

91525 186. . 0 . . . . . .

91530 187. . 0 . . . . . .

91535 188. . 0 . . . . . .

91540 189. . 0 . . . . . .

91545 190. . 0 . . . . . .

-93-

91550 191. . . . . 0 . . . . . .

91555 192. . 0 . . . . . .

91600 193. . 0 . . . . . .

91605 194. . 0 . . . . . .

91610 195. . 0 . . . . . .

91615 196. . 0 . . . . . .

91620 197. . 0 . . . . . .

91625 198. . 0 . . . . . .

91630 199. . 0 . . . . . .

91635 200. . 0 . . . . . .

91640 201. . . . . .0. . . . . .

91645 202. . 0 . . . . . .

91650 203. . 0 . . . . . .

91655 204. . 0 . . . . . .

91700 205. . 0 . . . . . .

91705 206. . 0 . . . . . .

91710 207. . 0 . . . . . .

91715 208. . 0 . . . . . .

91720 209. . 0 . . . . . .

91725 210. . 0 . . . . . .

91730 211. . . . . 0 . . . . . .

91735 212. . 0 . . . . . .

91740 213. . 0 . . . . . .

91745 214. . 0 . . . . . .

91750 215. . 0 . . . . . .

91755 216. . 0 . . . . . .

91800 217. . 0 . . . . . .

91805 218. . 0 . . . . . .

91810 219. . 0 . . . . . .

91815 220. . 0

91820 221. . . . . .0.

91825 222. . 0

91830 223. . 0

91835 224. . 0

91840 225. . 0

91845 226. . 0

91850 227. . 0

91855 228. . 0

91900 229. . 0

91905 230. .0

91910 231. . . . . .0.

91915 232. .0

91920 233. .0

91925 234. .0

91930 235. 0

91935 236. 0

91940 237. 0

91945 238. 0

91950 239. 0

91955 240. 0.

92000 241. . . . .0.

92005 242. 0.

92010 243. 0.

92015 244. 0.

92020 245. 0 .

92025 246. 0 .

92030 247. 0 .

92035 248. 0 .

92040 249. 0

92045 250. 0

92050 251. 0

92055 252. 0

92100 253. 0

92105 254. 0

92110 255. 0

92115 256. 0

92120 257. 0

92125 258. 0

92130 259. 0

92135 260. 0

92140 261. 0

92145 262. 0

92150 263. 0

92155 264. 0

92200 265. 0

92205 266. 0

92210 267. 0

92215 268. 0

92220 269. 0

92225 270. 0

92230 271. 0

92235 272. 0

92240 273. 0

92245 274. 0

92250 275. 0

92255 276. 0

92300 277. 0

```
.
92305 278.  O    .    .    .    .    .    .    .    .    .    .    .
.
92310 279.  O    .    .    .    .    .    .    .    .    .    .    .
.
92315 280.  O    .    .    .    .    .    .    .    .    .    .    .
.
92320 281. .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
. .
92325 282.  O    .    .    .    .    .    .    .    .    .    .    .
.
92330 283. O     .    .    .    .    .    .    .    .    .    .    .
.
92335 284. O     .    .    .    .    .    .    .    .    .    .    .
.
92340 285. O     .    .    .    .    .    .    .    .    .    .    .
.
92345 286. O     .    .    .    .    .    .    .    .    .    .    .
.
92350 287. O     .    .    .    .    .    .    .    .    .    .    .
.
92355 288. O     .    .    .    .    .    .    .    .    .    .    .
.
100000
289.-O-------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
1
```

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 419. TO 8659.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 0. TO 8659.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 0. TO 8659.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 0. TO 8659.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 745. TO 46625.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 95. TO 46625.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 2075. TO 55924.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 173. TO 55924.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

```
*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN     6247. TO    55924.
               THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
               THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN      143. TO    48858.
               THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
               THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN        0. TO    48858.
               THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
               THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN      144. TO    59444.
               THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
               THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN      144. TO    52473.
               THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
               THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN      165. TO    54935.
               THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
               THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN     6639. TO    57908.
               THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
               THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN    39705. TO    52473.
               THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
               THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN        0. TO    60500.
               THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
               THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN      120. TO    49537.
               THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
               THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN      263. TO    66930.
               THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
               THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN     1585. TO    63404.
               THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
               THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN      288. TO    58478.
               THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
               THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)
```

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

	PEAK	TIME OF	AVERAGE FLOW FOR MAXIMUM PERIOD	BASIN	MAXIMUM	TIME OF

-98-

	OPERATION	STATION	FLOW	PEAK	6-HOUR	24-HOUR	72-HOUR	AREA	STAGE	MAX STAGE
+										
	HYDROGRAPH AT									
+		1000AZ	29.	6.33	4.	1.	1.	.02		
	ROUTED TO									
+		1042AZ	29.	6.42	4.	1.	1.	.02		
	HYDROGRAPH AT									
+		1060AZ	39.	6.83	11.	3.	3.	.04		
	ROUTED TO									
+		1051AZ	39.	6.92	11.	3.	3.	.04		
	HYDROGRAPH AT									
+		1050AZ	3.	6.25	0.	0.	0.	.00		
	2 COMBINED AT									
+		1052AZ	39.	6.92	11.	3.	3.	.04		
	ROUTED TO									
+		1041AZ	39.	7.08	11.	3.	3.	.04		
	HYDROGRAPH AT									
+		1040AZ	101.	6.25	10.	3.	3.	.04		
	3 COMBINED AT									
+		1043AZ	127.	6.25	25.	7.	7.	.10		
	ROUTED TO									
+		DAM6	98.	6.50	19.	5.	5.	.10		
+									102.19	6.50
	ROUTED TO									
+		1011AZ	113.	6.58	20.	5.	5.	.10		
	HYDROGRAPH AT									
+		1010AZ	107.	6.25	9.	3.	3.	.04		
	2 COMBINED AT									
+		1012AZ	141.	6.58	29.	8.	8.	.13		
	ROUTED TO									
+		286	120.	6.75	29.	8.	8.	.13		
	HYDROGRAPH AT									
+		1020AZ	104.	6.17	8.	2.	2.	.03		
	HYDROGRAPH AT									
+		290	165.	6.42	24.	6.	6.	.13		
	HYDROGRAPH AT									
+		270AZ	168.	6.25	14.	4.	4.	.06		
	HYDROGRAPH AT									
+		300	244.	6.33	27.	7.	7.	.13		

	HYDROGRAPH AT								
+		275	132.	6.33	15.	4.	4.	.09	
	4 COMBINED AT								
+		280	595.	6.42	94.	25.	25.	.49	
	HYDROGRAPH AT								
+		310	750.	6.42	123.	33.	33.	.61	
	DIVERSION TO								
+		314	375.	6.42	61.	17.	17.	.61	
	HYDROGRAPH AT								
+		311	375.	6.42	61.	17.	17.	.61	
	ROUTED TO								
+		308	354.	6.67	61.	17.	17.	.61	
	HYDROGRAPH AT								
+		280AZ	222.	6.25	19.	5.	5.	.06	
	ROUTED TO								
+		DAM5	67.	6.50	9.	2.	2.	.06	
+									102.15 6.50
	HYDROGRAPH AT								
+		250AZ	118.	6.25	19.	5.	5.	.11	
	HYDROGRAPH AT								
+		320	205.	6.42	37.	10.	10.	.21	
	HYDROGRAPH AT								
+		304AZ	336.	12.67	309.	206.	206.	.00	
	HYDROGRAPH AT								
+		300AZ	337.	12.83	309.	208.	208.	.03	
	ROUTED TO								
+		DAM7	337.	12.83	309.	208.	208.	.03	
+									102.43 12.83
	ROUTED TO								
+		291AZ	336.	12.83	309.	208.	208.	.03	
	HYDROGRAPH AT								
+		290AZ	64.	6.17	5.	1.	1.	.02	
	ROUTED TO								
+		DAM6	36.	6.33	3.	1.	1.	.02	
+									102.09 6.33
	2 COMBINED AT								
+		292AZ	337.	12.83	310.	209.	209.	.05	
	ROUTED TO								
+		331AZ	337.	12.92	310.	209.	209.	.05	
	HYDROGRAPH AT								

+		330AZ	71.	6.17	6.	2.	2.	.02	
	ROUTED TO								
+		DAM2	69.	6.33	3.	1.	1.	.02	
+									102.15 6.33
	2 COMBINED AT								
+		332AZ	347.	6.33	310.	210.	210.	.07	
	ROUTED TO								
+		231AZ	337.	12.92	310.	210.	210.	.07	
	HYDROGRAPH AT								
+		230AZO	135.	6.25	11.	3.	3.	.04	
	2 COMBINED AT								
+		232AZ	415.	6.33	310.	213.	213.	.11	
	ROUTED TO								
+		233AZ	409.	6.33	310.	213.	213.	.11	
	HYDROGRAPH AT								
+		220AZ	561.	6.25	311.	219.	219.	.19	
	HYDROGRAPH AT								
+		330	686.	6.42	312.	224.	224.	.31	
	HYDROGRAPH AT								
+		310AZ	38.	6.42	7.	2.	2.	.03	
	ROUTED TO								
+		DAM4	0.	.08	0.	0.	0.	.03	
+									101.92 24.00
	ROUTED TO								
+		312AZ	0.	.08	0.	0.	0.	.03	
	HYDROGRAPH AT								
+		320AZ	66.	6.17	6.	2.	2.	.02	
	2 COMBINED AT								
+		322AZ	66.	6.17	6.	2.	2.	.05	
	ROUTED TO								
+		DAM3	62.	6.33	3.	1.	1.	.05	
+									102.14 6.33
	HYDROGRAPH AT								
+		260AZ	119.	6.25	13.	3.	3.	.09	
	ROUTED TO								
+		451AZ	116.	6.33	13.	3.	3.	.09	
	ROUTED TO								
+		328	116.	6.58	14.	4.	4.	.09	
	3 COMBINED AT								
+		326	955.	6.50	320.	238.	238.	.60	

+	ROUTED TO 312	912.	6.58	320.	237.	237.	.60
+	HYDROGRAPH AT 350	217.	6.67	48.	13.	13.	.26
+	2 COMBINED AT 313	1124.	6.58	367.	250.	250.	.86
+	HYDROGRAPH AT 240AZ	197.	6.25	16.	4.	4.	.07
+	ROUTED TO 246AZ	170.	6.25	16.	4.	4.	.07
+	HYDROGRAPH AT 245AZ	64.	6.25	5.	1.	1.	.02
+	2 COMBINED AT 247AZ	235.	6.25	21.	6.	6.	.10
+	ROUTED TO 248AZ	219.	6.33	21.	6.	6.	.10
+	HYDROGRAPH AT 180AZ	77.	6.33	10.	3.	3.	.07
+	HYDROGRAPH AT 255AZ	75.	6.25	6.	2.	2.	.03
+	ROUTED TO 236AZ	69.	6.33	6.	2.	2.	.03
+	HYDROGRAPH AT 235AZ	37.	6.25	3.	1.	1.	.01
+	2 COMBINED AT 237AZ	92.	6.33	9.	3.	3.	.04
+	ROUTED TO 181AZ	87.	6.42	10.	3.	3.	.04
+	3 COMBINED AT 182AZ	373.	6.33	41.	11.	11.	.21
+	ROUTED TO 191AZ	348.	6.42	41.	11.	11.	.21
+	HYDROGRAPH AT 195AZ	160.	6.17	13.	3.	3.	.04
+	ROUTED TO 186AZ	145.	6.25	13.	4.	4.	.04
+	HYDROGRAPH AT 185AZ	96.	6.17	8.	2.	2.	.02

	2 COMBINED AT								
+		187AZ	227.	6.25	20.	6.	6.	.06	
	ROUTED TO								
+		188AZ	205.	6.33	20.	6.	6.	.06	
	2 COMBINED AT								
+		189AZ	544.	6.33	61.	17.	17.	.27	
	ROUTED TO								
+		DAM1	383.	6.50	43.	11.	11.	.27	
+									102.47 6.50
	HYDROGRAPH AT								
+		190AZ	17.	6.75	5.	1.	1.	.03	
	2 COMBINED AT								
+		192AZ	397.	6.50	47.	13.	13.	.30	
	ROUTED TO								
+		211AZ	382.	6.58	47.	13.	13.	.30	
	HYDROGRAPH AT								
+		210AZ	65.	6.25	5.	1.	1.	.02	
	2 COMBINED AT								
+		212AZ	398.	6.58	52.	14.	14.	.32	
	HYDROGRAPH AT								
+		340	381.	6.67	59.	16.	16.	.36	
	ROUTED TO								
+		348	363.	6.75	59.	16.	16.	.36	
	2 COMBINED AT								
+		349	1438.	6.67	426.	266.	266.	1.22	
	2 COMBINED AT								
+		347	1792.	6.67	487.	282.	282.	1.84	
	ROUTED TO								
+		356	1754.	6.75	486.	282.	282.	1.84	
	HYDROGRAPH AT								
+		350	241.	7.00	75.	21.	21.	.36	
	2 COMBINED AT								
+		358	1969.	6.75	561.	302.	302.	2.20	
	HYDROGRAPH AT								
+		1270	10.	7.42	5.	1.	1.	.03	
	HYDROGRAPH AT								
+		1280	20.	7.50	10.	3.	3.	.06	
	HYDROGRAPH AT								
+		1350	30.	7.50	15.	4.	4.	.09	

+	HYDROGRAPH AT	1360	40.	7.58	19.	6.	6.	.12
+	HYDROGRAPH AT	1440	50.	7.67	24.	7.	7.	.15
+	HYDROGRAPH AT	1450	59.	7.75	29.	9.	9.	.18
+	HYDROGRAPH AT	1520	69.	7.75	34.	10.	10.	.22
+	HYDROGRAPH AT	1530	77.	7.83	39.	11.	11.	.25
+	HYDROGRAPH AT	1600	95.	7.92	48.	14.	14.	.31
+	ROUTED TO	1591	95.	8.08	48.	14.	14.	.31
+	HYDROGRAPH AT	1260	10.	7.50	5.	1.	1.	.03
+	HYDROGRAPH AT	1290	20.	7.50	10.	3.	3.	.06
+	HYDROGRAPH AT	1340	31.	7.58	15.	4.	4.	.10
+	HYDROGRAPH AT	1370	41.	7.67	20.	6.	6.	.13
+	HYDROGRAPH AT	1430	50.	7.67	25.	7.	7.	.16
+	HYDROGRAPH AT	1460	60.	7.75	30.	9.	9.	.19
+	HYDROGRAPH AT	1510	69.	7.83	35.	10.	10.	.22
+	HYDROGRAPH AT	1540	78.	7.83	40.	12.	12.	.26
+	HYDROGRAPH AT	1590	96.	7.92	49.	15.	15.	.32
+	2 COMBINED AT	1592	190.	8.00	97.	29.	29.	.63
+	ROUTED TO	1581	190.	8.17	96.	29.	29.	.63
+	HYDROGRAPH AT	1250	10.	7.42	5.	1.	1.	.03
	HYDROGRAPH AT							

+		1300	20.	7.50	10.	3.	3.	.06
	HYDROGRAPH AT							
+		1330	30.	7.50	14.	4.	4.	.09
	HYDROGRAPH AT							
+		1380	40.	7.58	19.	6.	6.	.12
	HYDROGRAPH AT							
+		1420	50.	7.67	24.	7.	7.	.15
	HYDROGRAPH AT							
+		1470	59.	7.67	29.	8.	8.	.18
	HYDROGRAPH AT							
+		1500	68.	7.75	33.	10.	10.	.21
	HYDROGRAPH AT							
+		1550	77.	7.83	38.	11.	11.	.24
	HYDROGRAPH AT							
+		1580	95.	7.75	47.	14.	14.	.30
	2 COMBINED AT							
+		1582	282.	8.08	142.	43.	43.	.93
	ROUTED TO							
+		1571	281.	8.17	142.	43.	43.	.93
	HYDROGRAPH AT							
+		1240	10.	7.42	5.	1.	1.	.03
	HYDROGRAPH AT							
+		1310	20.	7.42	10.	3.	3.	.06
	HYDROGRAPH AT							
+		1320	31.	7.42	15.	4.	4.	.09
	HYDROGRAPH AT							
+		1400	33.	7.42	17.	5.	5.	.10
	HYDROGRAPH AT							
+		1390	10.	7.17	4.	1.	1.	.02
	ROUTED TO							
+		1391	10.	7.25	4.	1.	1.	.02
	2 COMBINED AT							
+		1392	42.	7.33	21.	6.	6.	.13
	HYDROGRAPH AT							
+		1410	52.	7.42	26.	7.	7.	.16
	HYDROGRAPH AT							
+		1480	62.	7.42	31.	9.	9.	.19
	HYDROGRAPH AT							
+		1490	73.	7.50	36.	10.	10.	.22

+	HYDROGRAPH AT	1560	83.	7.50	41.	12.	12.	.25	
+	HYDROGRAPH AT	1570	103.	7.50	51.	15.	15.	.31	
+	2 COMBINED AT	1572	371.	8.00	190.	58.	58.	1.25	
+	ROUTED TO	1611	371.	8.08	190.	58.	58.	1.25	
+	HYDROGRAPH AT	1610	75.	8.00	38.	12.	12.	.25	
+	2 COMBINED AT	1612	445.	8.08	228.	69.	69.	1.50	
+	ROUTED TO	1621	445.	8.17	228.	69.	69.	1.50	
+	HYDROGRAPH AT	1620	86.	7.92	42.	13.	13.	.25	
+	HYDROGRAPH AT	1630	56.	7.25	21.	6.	6.	.11	
+	HYDROGRAPH AT	1640	59.	7.58	26.	8.	8.	.14	
+	3 COMBINED AT	1622	578.	8.08	296.	89.	89.	1.89	
+	ROUTED TO	1887	459.	8.92	273.	88.	88.	1.89	
+									387.40 8.92
+	HYDROGRAPH AT	1950	17.	7.33	7.	2.	2.	.04	
+	HYDROGRAPH AT	1945	30.	7.50	14.	4.	4.	.08	
+	ROUTED TO	1951	30.	7.58	14.	4.	4.	.08	
+	2 COMBINED AT	1952	46.	7.42	21.	6.	6.	.12	
+	HYDROGRAPH AT	1940	93.	7.58	44.	13.	13.	.24	
+	HYDROGRAPH AT	1920	90.	7.58	39.	11.	11.	.20	
+	ROUTED TO	1941	90.	7.67	39.	11.	11.	.20	

	2 COMBINED AT								
+		1942	184.	7.67	84.	24.	24.	.43	
	HYDROGRAPH AT								
+		1925	210.	7.75	96.	28.	28.	.50	
	HYDROGRAPH AT								
+		1930	226.	8.00	109.	33.	33.	.57	
	HYDROGRAPH AT								
+		1910	62.	7.50	28.	8.	8.	.14	
	HYDROGRAPH AT								
+		1900	112.	7.67	53.	16.	16.	.27	
	HYDROGRAPH AT								
+		1890	148.	7.83	72.	21.	21.	.36	
	ROUTED TO								
+		1931	147.	7.83	72.	21.	21.	.36	
	2 COMBINED AT								
+		1932	373.	7.92	181.	54.	54.	.93	
	HYDROGRAPH AT								
+		1885	382.	8.17	191.	58.	58.	1.00	
	HYDROGRAPH AT								
+		1850	66.	7.42	28.	8.	8.	.14	
	HYDROGRAPH AT								
+		1860	115.	7.67	52.	15.	15.	.26	
	HYDROGRAPH AT								
+		1870	169.	8.00	88.	26.	26.	.44	
	ROUTED TO								
+		1886	169.	8.08	88.	26.	26.	.44	
	HYDROGRAPH AT								
+		1880	31.	7.17	12.	3.	3.	.05	
	4 COMBINED AT								
+		1888	964.	8.50	555.	176.	176.	3.38	
	ROUTED TO								
+		1984	961.	8.58	554.	176.	176.	3.38	
+									388.74 8.58
	HYDROGRAPH AT								
+		1840	13.	7.42	6.	2.	2.	.03	
	HYDROGRAPH AT								
+		1670	33.	7.25	12.	4.	4.	.08	
	ROUTED TO								
+		1681	33.	7.50	12.	4.	4.	.08	

	HYDROGRAPH AT						
+	1680	33.	7.25	12.	4.	4.	.08
	2 COMBINED AT						
+	1682	66.	7.42	25.	7.	7.	.15
	ROUTED TO						
+	1751	65.	7.50	25.	7.	7.	.15
	HYDROGRAPH AT						
+	1226AZ	437.	12.00	357.	129.	129.	.00
	DIVERSION TO						
+	1228AZ	371.	12.00	304.	110.	110.	.00
	HYDROGRAPH AT						
+	1227AZ	66.	12.00	54.	19.	19.	.00
	HYDROGRAPH AT						
+	180	905.	6.92	306.	100.	100.	2.00
	HYDROGRAPH AT						
+	1750	899.	7.17	314.	104.	104.	2.08
	2 COMBINED AT						
+	1752	954.	7.17	339.	111.	111.	2.23
	ROUTED TO						
+	1761	952.	7.25	339.	111.	111.	2.23
	HYDROGRAPH AT						
+	1760	27.	7.08	8.	2.	2.	.05
	2 COMBINED AT						
+	1762	977.	7.25	347.	113.	113.	2.28
	ROUTED TO						
+	1771	973.	7.25	347.	113.	113.	2.28
	HYDROGRAPH AT						
+	1770	21.	7.00	6.	2.	2.	.04
	2 COMBINED AT						
+	1772	992.	7.25	352.	115.	115.	2.32
	ROUTED TO						
+	1841	989.	7.33	351.	115.	115.	2.32
	2 COMBINED AT						
+	1842	1002.	7.33	356.	116.	116.	2.35
	HYDROGRAPH AT						
+	1830	1053.	7.42	375.	123.	123.	2.46
	HYDROGRAPH AT						
+	1660	36.	7.33	15.	4.	4.	.09

	ROUTED TO							
+		1691	36.	7.58	15.	4.	4.	.09
	HYDROGRAPH AT							
+		1690	37.	7.33	15.	4.	4.	.09
	2 COMBINED AT							
+		1692	71.	7.50	29.	8.	8.	.18
	ROUTED TO							
+		1741	71.	7.58	29.	8.	8.	.18
	HYDROGRAPH AT							
+		1740	36.	7.33	15.	4.	4.	.09
	2 COMBINED AT							
+		1742	106.	7.50	43.	13.	13.	.27
	ROUTED TO							
+		1781	106.	7.58	43.	13.	13.	.27
	HYDROGRAPH AT							
+		1780	44.	7.25	17.	5.	5.	.09
	2 COMBINED AT							
+		1782	146.	7.50	59.	17.	17.	.36
	ROUTED TO							
+		1831	145.	7.67	59.	17.	17.	.36
	2 COMBINED AT							
+		1832	1182.	7.42	434.	141.	141.	2.83
	HYDROGRAPH AT							
+		1820	1225.	7.50	451.	147.	147.	2.94
	HYDROGRAPH AT							
+		1650	36.	7.33	15.	4.	4.	.09
	ROUTED TO							
+		1701	36.	7.58	15.	4.	4.	.09
	HYDROGRAPH AT							
+		1700	37.	7.33	15.	4.	4.	.09
	2 COMBINED AT							
+		1702	71.	7.50	29.	8.	8.	.18
	ROUTED TO							
+		1731	71.	7.58	29.	8.	8.	.18
	HYDROGRAPH AT							
+		1730	36.	7.33	15.	4.	4.	.09
	2 COMBINED AT							
+		1732	106.	7.50	43.	13.	13.	.27
	ROUTED TO							

+		1791	106.	7.67	43.	13.	13.	.27
	HYDROGRAPH AT							
+		1790	41.	7.33	16.	5.	5.	.09
	2 COMBINED AT							
+		1792	144.	7.50	59.	17.	17.	.36
	ROUTED TO							
+		1822	143.	7.67	59.	17.	17.	.36
	2 COMBINED AT							
+		1823	1360.	7.50	510.	164.	164.	3.30
	HYDROGRAPH AT							
+		1810	1404.	7.58	529.	171.	171.	3.42
	HYDROGRAPH AT							
+		1645	60.	7.00	18.	5.	5.	.09
	ROUTED TO							
+		1711	59.	7.08	18.	5.	5.	.09
	HYDROGRAPH AT							
+		1710	46.	7.25	17.	5.	5.	.09
	2 COMBINED AT							
+		1712	104.	7.17	35.	10.	10.	.19
	ROUTED TO							
+		1721	104.	7.25	35.	10.	10.	.19
	HYDROGRAPH AT							
+		1720	52.	7.17	19.	5.	5.	.09
	2 COMBINED AT							
+		1722	156.	7.25	54.	15.	15.	.28
	ROUTED TO							
+		1801	155.	7.33	54.	15.	15.	.28
	HYDROGRAPH AT							
+		1800	58.	7.17	20.	6.	6.	.09
	2 COMBINED AT							
+		1802	212.	7.25	74.	21.	21.	.37
	ROUTED TO							
+		1811	211.	7.33	74.	21.	21.	.37
	2 COMBINED AT							
+		1812	1597.	7.58	602.	192.	192.	3.79
	HYDROGRAPH AT							
+		5	54.	6.25	4.	1.	1.	.03
	HYDROGRAPH AT							
+		10	80.	6.25	8.	2.	2.	.05

	2 COMBINED AT							
+		7	133.	6.25	12.	3.	3.	.08
	ROUTED TO							
+		16	130.	6.33	12.	3.	3.	.08
	HYDROGRAPH AT							
+		15	34.	6.25	3.	1.	1.	.02
	2 COMBINED AT							
+		18	154.	6.33	15.	4.	4.	.09
	HYDROGRAPH AT							
+		20	121.	6.33	13.	3.	3.	.08
	2 COMBINED AT							
+		17	275.	6.33	28.	7.	7.	.17
	ROUTED TO							
+		26	246.	6.42	28.	7.	7.	.17
	HYDROGRAPH AT							
+		25	136.	6.25	13.	3.	3.	.07
	2 COMBINED AT							
+		28	370.	6.33	41.	11.	11.	.24
	HYDROGRAPH AT							
+		30	173.	6.33	20.	5.	5.	.10
	2 COMBINED AT							
+		27	542.	6.33	61.	16.	16.	.34
	ROUTED TO							
+		36	508.	6.42	61.	16.	16.	.34
	HYDROGRAPH AT							
+		35	24.	6.25	2.	1.	1.	.01
	2 COMBINED AT							
+		38	520.	6.42	63.	16.	16.	.36
	HYDROGRAPH AT							
+		40	117.	6.33	14.	4.	4.	.09
	2 COMBINED AT							
+		37	615.	6.42	77.	20.	20.	.44
	ROUTED TO							
+		46	588.	6.50	80.	21.	21.	.44
	HYDROGRAPH AT							
+		45	180.	6.33	24.	6.	6.	.13
	2 COMBINED AT							
+		48	723.	6.50	103.	27.	27.	.58

-111-

	HYDROGRAPH AT							
+		60	170.	6.33	25.	7.	7.	.15
	2 COMBINED AT							
+		50	880.	6.42	128.	34.	34.	.72
	ROUTED TO							
+		66	877.	6.50	131.	35.	35.	.72
	HYDROGRAPH AT							
+		65	75.	6.25	6.	2.	2.	.04
	2 COMBINED AT							
+		68	906.	6.42	137.	36.	36.	.76
	HYDROGRAPH AT							
+		1173AZ	37.	11.00	25.	7.	7.	.00
	HYDROGRAPH AT							
+		90	280.	6.50	61.	21.	21.	.33
	HYDROGRAPH AT							
+		80	159.	6.42	27.	7.	7.	.18
	3 COMBINED AT							
+		70	1339.	6.50	225.	64.	64.	1.28
	ROUTED TO							
+		96	1319.	6.50	222.	64.	64.	1.28
	HYDROGRAPH AT							
+		95	111.	6.33	15.	4.	4.	.10
	2 COMBINED AT							
+		98	1409.	6.50	237.	68.	68.	1.38
	HYDROGRAPH AT							
+		110	272.	6.50	53.	14.	14.	.31
	HYDROGRAPH AT							
+		120	214.	6.50	38.	10.	10.	.22
	3 COMBINED AT							
+		100	1895.	6.50	327.	92.	92.	1.91
	ROUTED TO							
+		126	1865.	6.58	328.	93.	93.	1.91
	HYDROGRAPH AT							
+		125	39.	6.25	4.	1.	1.	.02
	2 COMBINED AT							
+		128	1879.	6.58	331.	94.	94.	1.93
	HYDROGRAPH AT							
+		130	129.	6.50	25.	7.	7.	.15
	2 COMBINED AT							

+	127	2002.	6.58	356.	100.	100.	2.08
ROUTED TO +	136	1962.	6.67	358.	101.	101.	2.08
HYDROGRAPH AT +	135	121.	6.50	25.	7.	7.	.15
2 COMBINED AT +	138	2071.	6.67	361.	108.	108.	2.23
HYDROGRAPH AT +	1159AZ	834.	13.00	817.	538.	538.	.00
HYDROGRAPH AT +	150	838.	13.25	821.	546.	546.	.45
2 COMBINED AT +	140	2743.	6.58	1023.	654.	654.	2.68
HYDROGRAPH AT +	160	2888.	6.75	1057.	656.	656.	3.02
HYDROGRAPH AT +	145	47.	6.42	7.	2.	2.	.05
ROUTED TO +	146	22.	7.92	6.	2.	2.	.05
2 COMBINED AT +	147	2888.	6.75	1063.	658.	658.	3.07
DIVERSION TO +	162	1883.	6.50	182.	46.	46.	3.07
HYDROGRAPH AT +	161	1000.	6.50	894.	613.	613.	3.07
ROUTED TO +	165	1000.	6.58	894.	610.	610.	3.07
HYDROGRAPH AT +	245	247.	6.83	68.	19.	19.	.46
2 COMBINED AT +	243	1247.	6.83	946.	629.	629.	3.52
HYDROGRAPH AT +	220	1148.	7.17	415.	117.	117.	2.89
2 COMBINED AT +	223	2352.	7.08	1357.	746.	746.	6.41
DIVERSION TO +	224	1352.	6.50	357.	91.	91.	6.41
HYDROGRAPH AT +	222	1000.	6.50	1000.	655.	655.	6.41

-113-

	ROUTED TO						
+		234 ~~236~~	1000.	7.25	1000.	650.	650.	6.41
	2 COMBINED AT						
+		235 ~~237~~	2597.	7.58	1602.	841.	841.	10.20
	ROUTED TO						
+		208	2596.	7.58	1602.	840.	840.	10.20
	2 COMBINED AT						
+		210	3165.	7.83	2149.	1016.	1016.	13.58
	ROUTED TO						
+		236	3164.	7.92	2151.	1011.	1011.	13.58
	HYDROGRAPH AT						
+		1070AZ	100.	6.25	9.	3.	3.	.04
	ROUTED TO						
+		1031AZ	94.	6.33	9.	3.	3.	.04
	HYDROGRAPH AT						
+		1030AZ	75.	6.33	7.	2.	2.	.03
	2 COMBINED AT						
+		1032AZ	170.	6.33	16.	4.	4.	.07
	HYDROGRAPH AT						
+		270	189.	6.50	31.	8.	8.	.16
	HYDROGRAPH AT						
+		265	49.	6.42	7.	2.	2.	.05
	2 COMBINED AT						
+		267	232.	6.50	38.	10.	10.	.21
	HYDROGRAPH AT						
+		315	291.	7.00	105.	29.	29.	.57
	HYDROGRAPH AT						
+		1080AZ	229.	6.25	19.	5.	5.	.08
	HYDROGRAPH AT						
+		1090AZ	294.	6.33	31.	8.	8.	.14
	HYDROGRAPH AT						
+		260	395.	6.42	45.	12.	12.	.23
	HYDROGRAPH AT						
+		170N	548.	6.83	138.	38.	38.	.73
	HYDROGRAPH AT						
+		173	1888.	6.75	182.	46.	46.	.00
	ROUTED TO						
+		174	1553.	6.92	182.	46.	46.	.00

HYDROGRAPH AT							
+	316	375.	6.42	61.	17.	17.	.00
ROUTED TO							
+	175	352.	7.00	61.	17.	17.	.00
4 COMBINED AT							
+	172	2678.	7.00	486.	129.	129.	1.31
ROUTED TO							
+	171	2657.	7.33	472.	130.	130.	1.31
HYDROGRAPH AT							
+	1705	262.	6.83	68.	19.	19.	.33
HYDROGRAPH AT							
+	239	1352.	7.08	357.	91.	91.	.00
HYDROGRAPH AT							
+	240	1435.	7.33	414.	109.	109.	.31
3 COMBINED AT							
+	238	4259.	7.33	943.	257.	257.	1.95
2 COMBINED AT							
+	237	6795.	7.33	3077.	1269.	1269.	15.53
DIVERSION TO							
+	242	6250.	7.33	3056.	1263.	1263.	15.53
HYDROGRAPH AT							
+	241	545.	7.33	21.	5.	5.	15.53
ROUTED TO							
+	251	228.	7.58	21.	5.	5.	15.53
HYDROGRAPH AT							
+	250	208.	6.83	52.	14.	14.	.25
2 COMBINED AT							
+	252	316.	7.58	74.	20.	20.	15.78
2 COMBINED AT							
+	247	2176.	6.75	634.	322.	322.	17.97
ROUTED TO							
+	376	2131.	6.83	632.	320.	320.	17.97
HYDROGRAPH AT							
+		6250.	7.33	3056.	1263.	1263.	.00
ROUTED TO							
+	253	6250.	7.42	3057.	1259.	1259.	.00
ROUTED TO							
+	378	6250.	7.50	3062.	1255.	1255.	.00
HYDROGRAPH AT							

+		165AZ	51.	6.25	4.	1.	1.	.01		
	ROUTED TO									
+		DAM165	50.	6.17	4.	1.	1.	.01		
+									102.12	6.17
	ROUTED TO									
+		156AZ	71.	6.25	4.	1.	1.	.01		
	HYDROGRAPH AT									
+		160AZ	88.	6.25	7.	2.	2.	.02		
	ROUTED TO									
+		DAM160	92.	6.25	6.	2.	2.	.02		
+									102.18	6.25
	ROUTED TO									
+		161AZ	106.	6.25	7.	2.	2.	.02		
	HYDROGRAPH AT									
+		155AZ	96.	6.25	8.	2.	2.	.03		
	ROUTED TO									
+		DAM155	106.	6.25	7.	2.	2.	.03		
+									102.20	6.25
	3 COMBINED AT									
+		157AZ	284.	6.25	18.	5.	5.	.06		
	ROUTED TO									
+		151AZ	264.	6.25	18.	5.	5.	.06		
	HYDROGRAPH AT									
+		150AZ	160.	6.25	13.	4.	4.	.04		
	ROUTED TO									
+		DAM150	174.	6.25	11.	3.	3.	.04		
+									102.28	6.25
	2 COMBINED AT									
+		152AZ	438.	6.25	29.	8.	8.	.10		
	ROUTED TO									
+		121AZ	359.	6.33	29.	8.	8.	.10		
	HYDROGRAPH AT									
+		70AZ	15.	6.33	2.	0.	0.	.01		
	ROUTED TO									
+		122AZ	14.	6.42	2.	0.	0.	.01		
	HYDROGRAPH AT									
+		120AZ	49.	6.25	5.	1.	1.	.01		
	ROUTED TO									
+		DAM120	57.	6.25	4.	1.	1.	.01		
+									102.13	6.25

-116-

+	3 COMBINED AT 123AZ	401.	6.33	35.	9.	9.	.13		
+	HYDROGRAPH AT 75AZ	395.	6.33	36.	9.	9.	.13		
+	ROUTED TO DAM75	394.	6.33	36.	9.	9.	.13	102.48	6.33
+	HYDROGRAPH AT 85AZ	380.	6.33	36.	10.	10.	.14		
+	ROUTED TO DAM85	379.	6.33	37.	10.	10.	.14	102.47	6.33
+	HYDROGRAPH AT 80AZ	28.	6.17	2.	1.	1.	.01		
+	ROUTED TO DAM80	25.	6.17	2.	0.	0.	.01	102.07	6.17
+	ROUTED TO 87AZ	25.	6.25	2.	0.	0.	.01		
+	2 COMBINED AT 88AZ	396.	6.33	39.	10.	10.	.14		
+	ROUTED TO 96AZ	360.	6.42	39.	10.	10.	.14		
+	HYDROGRAPH AT 95AZ	41.	6.25	4.	1.	1.	.01		
+	ROUTED TO DAM95	55.	6.25	3.	1.	1.	.01	102.13	6.25
+	2 COMBINED AT 97AZ	389.	6.42	42.	11.	11.	.15		
+	ROUTED TO 91AZ	385.	6.42	42.	11.	11.	.15		
+	HYDROGRAPH AT 90AZ	48.	6.25	4.	1.	1.	.02		
+	ROUTED TO DAM90	70.	6.25	3.	1.	1.	.02	102.15	6.25
+	2 COMBINED AT 92AZ	415.	6.42	46.	12.	12.	.17		
+	HYDROGRAPH AT 110AZ	58.	6.25	5.	1.	1.	.02		

-117-

+	ROUTED TO	DAM110	64.	6.17	4.	1.	1.	.02	
+									102.14 6.17
+	ROUTED TO	101AZ	60.	6.25	5.	1.	1.	.02	
+	HYDROGRAPH AT	100AZ	119.	6.25	10.	3.	3.	.00	
+	ROUTED TO	DAM100	119.	6.25	10.	3.	3.	.00	
+									102.21 6.25
+	3 COMBINED AT	102AZ	496.	6.42	60.	16.	16.	.19	
+	ROUTED TO	103AZ	494.	6.42	60.	16.	16.	.19	
+	DIVERSION TO	103BAZ	0.	6.42	0.	0.	0.	.19	
+	HYDROGRAPH AT	103AAZ	494.	6.42	60.	16.	16.	.19	
+	ROUTED TO	361AZ	478.	6.42	60.	16.	16.	.19	
+									3.43 6.42
+	HYDROGRAPH AT	360AZ	17.	6.67	4.	1.	1.	.03	
+	2 COMBINED AT	362AZ	491.	6.42	64.	17.	17.	.22	
+	ROUTED TO	411AZ	488.	6.42	64.	17.	17.	.22	
+									3.47 6.42
+	ROUTED TO	410BAZ	484.	6.42	64.	17.	17.	.22	
+									3.45 6.42
+	HYDROGRAPH AT	410AZ	34.	6.42	5.	1.	1.	.03	
+	ROUTED TO	410AAZ	34.	6.42	5.	1.	1.	.03	
+									.38 6.42
+	2 COMBINED AT	410CAZ	518.	6.42	69.	18.	18.	.25	
+	ROUTED TO	421AZ	504.	6.50	69.	18.	18.	.25	
+									3.80 6.50

-118-

	HYDROGRAPH AT								
+		140AZ	80.	6.25	8.	2.	2.	.03	
	ROUTED TO								
+		DAM140	79.	6.25	7.	2.	2.	.03	
+								102.16	6.25
	HYDROGRAPH AT								
+		130AZ	152.	6.25	17.	5.	5.	.06	
	ROUTED TO								
+		DAM130	155.	6.33	16.	4.	4.	.06	
+								102.26	6.33
	HYDROGRAPH AT								
+		420AZ	176.	6.42	28.	8.	8.	.14	
	ROUTED TO								
+		420AAZ	169.	6.50	28.	8.	8.	.14	
+								2.05	6.50
	2 COMBINED AT								
+		423AZ	673.	6.50	97.	26.	26.	.39	
	ROUTED TO								
+		401AZ	631.	6.58	97.	26.	26.	.39	
+								3.28	6.58
	HYDROGRAPH AT								
+		405AZ	17.	6.33	2.	1.	1.	.01	
	HYDROGRAPH AT								
+		200AZ	65.	6.33	7.	2.	2.	.04	
	ROUTED TO								
+		DAM200	60.	6.42	7.	2.	2.	.04	
+								102.13	6.42
	HYDROGRAPH AT								
+		415AZ	66.	6.42	8.	2.	2.	.05	
	HYDROGRAPH AT								
+		135AZ	77.	6.33	8.	2.	2.	.03	
	ROUTED TO								
+		DAM135	84.	6.25	7.	2.	2.	.03	
+								102.17	6.25
	HYDROGRAPH AT								
+		425AZ	83.	6.33	8.	2.	2.	.04	
	3 COMBINED AT								
+		426AZ	164.	6.33	19.	5.	5.	.10	
	HYDROGRAPH AT								
+		400AZ	229.	6.50	36.	10.	10.	.20	

	ROUTED TO								
+		400AAZ	229.	6.50	36.	10.	10.	.20	
+									1.80 6.50
	2 COMBINED AT								
+		402AZ	839.	6.58	134.	36.	36.	.58	
	ROUTED TO								
+		431AZ	772.	6.67	133.	36.	36.	.58	
+									3.64 6.67
	HYDROGRAPH AT								
+		430CAZ	101.	6.58	18.	5.	5.	.10	
	2 COMBINED AT								
+		432AZ	863.	6.67	151.	41.	41.	.68	
	ROUTED TO								
+		433AZ	854.	6.67	151.	41.	41.	.68	
+									4.27 6.67
	HYDROGRAPH AT								
+		430AAZ	90.	6.50	15.	4.	4.	.08	
	HYDROGRAPH AT								
+		440AAZ	57.	6.67	13.	4.	4.	.07	
	3 COMBINED AT								
+		441AZ	985.	6.67	180.	48.	48.	.83	
	ROUTED TO								
+		501AZ	980.	6.67	180.	48.	48.	.83	
+									4.65 6.67
	HYDROGRAPH AT								
+		500AAZ	32.	6.50	6.	2.	2.	.03	
	HYDROGRAPH AT								
+		503AAZ	121.	12.33	15.	5.	5.	.00	
	ROUTED TO								
+		503BAZ	121.	12.50	15.	5.	5.	.00	
	3 COMBINED AT								
+		503CAZ	1007.	6.67	187.	55.	55.	.86	
	ROUTED TO								
+		500B1Z	998.	6.75	187.	55.	55.	.86	
+									4.54 6.75
	HYDROGRAPH AT								
+		500BAZ	22.	6.42	3.	1.	1.	.02	
	2 COMBINED AT								
+		500B2Z	1010.	6.75	190.	56.	56.	.88	
	ROUTED TO								
+		560A1Z	1014.	6.75	190.	56.	56.	.88	

+								4.67	6.75
	HYDROGRAPH AT								
+		560AAZ	33.	6.33	4.	1.	1.	.02	
	2 COMBINED AT								
+		560A2Z	1024.	6.75	193.	57.	57.	.90	
	ROUTED TO								
+		560B1Z	1015.	6.75	193.	57.	57.	.90	
+								4.36	6.75
	HYDROGRAPH AT								
+		560BAZ	27.	6.42	4.	1.	1.	.02	
	2 COMBINED AT								
+		560B2Z	1028.	6.75	197.	58.	58.	.92	
	ROUTED TO								
+		560C1Z	976.	6.83	196.	58.	58.	.92	
+								3.96	6.83
	HYDROGRAPH AT								
+		560CAZ	37.	6.50	6.	2.	2.	.04	
	2 COMBINED AT								
+		560C2Z	997.	6.83	202.	59.	59.	.96	
	ROUTED TO								
+		551AZ	899.	7.00	201.	59.	59.	.96	
+								4.34	7.00
	HYDROGRAPH AT								
+		495AAZ	31.	6.42	5.	1.	1.	.03	
	HYDROGRAPH AT								
+		550AAZ	143.	6.75	35.	10.	10.	.18	
	2 COMBINED AT								
+		552AZ	1020.	7.00	236.	69.	69.	1.14	
	HYDROGRAPH AT								
+		540AAZ	73.	6.58	14.	4.	4.	.07	
	2 COMBINED AT								
+		540A1Z	1058.	7.00	250.	73.	73.	1.21	
	ROUTED TO								
+		545A1Z	1060.	7.00	250.	73.	73.	1.21	
+								4.28	7.00
	HYDROGRAPH AT								
+		545AAZ	22.	6.25	2.	0.	0.	.01	
	2 COMBINED AT								
+		545A2Z	1062.	7.00	251.	73.	73.	1.22	
	ROUTED TO								

+	545B1Z	1062.	7.00	251.	73.	73.	1.22		
+								5.14	7.00
HYDROGRAPH AT									
+	545BAZ	18.	6.33	2.	1.	1.	.01		
2 COMBINED AT									
+	545B2Z	1065.	7.00	253.	74.	74.	1.23		
ROUTED TO									
+	545C1Z	1061.	7.00	253.	74.	74.	1.23		
+								3.51	7.00
HYDROGRAPH AT									
+	545CAZ	18.	6.42	2.	1.	1.	.01		
2 COMBINED AT									
+	545C2Z	1065.	7.00	255.	74.	74.	1.24		
ROUTED TO									
+	545D1	1054.	7.08	255.	74.	74.	1.24		
+								3.70	7.08
HYDROGRAPH AT									
+	545DAZ	39.	6.42	6.	2.	2.	.03		
2 COMBINED AT									
+	545D2Z	1065.	7.08	260.	76.	76.	1.27		
ROUTED TO									
+	545E1Z	1055.	7.08	260.	76.	76.	1.27		
+								5.69	7.08
HYDROGRAPH AT									
+	545EAZ	36.	6.50	7.	2.	2.	.03		
2 COMBINED AT									
+	545E2Z	1069.	7.08	266.	78.	78.	1.30		
3 COMBINED AT									
+	377	8083.	7.50	3922.	1653.	1653.	19.28		
ROUTED TO									
+	397	8077.	7.58	3920.	1646.	1646.	19.28		
HYDROGRAPH AT									
+	390	319.	7.00	93.	26.	26.	.47		
2 COMBINED AT									
+	398	8292.	7.50	4003.	1671.	1671.	19.75		
HYDROGRAPH AT									
+	400	630.	7.00	194.	54.	54.	1.08		
2 COMBINED AT									
+	401	8732.	7.50	4182.	1725.	1725.	20.83		

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION DAM8

-122-

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	100.00	101.99	102.00
STORAGE	0.	4.	4.
OUTFLOW	0.	0.	1.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	102.19	.19	4.	98.	10.25	6.50	.00

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION DAM5

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	100.00	101.99	102.00
STORAGE	0.	6.	6.
OUTFLOW	0.	0.	1.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	102.15	.15	6.	67.	7.67	6.50	.00

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION DAM7

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	100.00	101.99	102.00
STORAGE	0.	1.	1.
OUTFLOW	0.	0.	1.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	102.43	.43	1.	337.	24.00	12.83	.00

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION DAM6

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	100.00	101.99	102.00
STORAGE	0.	2.	2.
OUTFLOW	0.	0.	1.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	102.09	.09	2.	36.	5.25	6.33	.00

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION DAM2

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	100.00	101.99	102.00
STORAGE	0.	2.	2.
OUTFLOW	0.	0.	1.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	102.15	.15	2.	69.	6.08	6.33	.00

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION DAM4

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	100.00	101.99	102.00
STORAGE	0.	4.	4.
OUTFLOW	0.	0.	1.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	101.92	.00	3.	0.	.00	.00	.00

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION DAM3

PLAN 1 ..... INITIAL VALUE SPILLWAY CREST TOP OF DAM

ELEVATION	100.00	101.99	102.00
STORAGE	0.	2.	2.
OUTFLOW	0.	0.	1.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	102.14	.14	2.	62.	5.75	6.33	.00

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION DAM1

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	100.00	101.99	102.00
STORAGE	0.	11.	11.
OUTFLOW	0.	0.	1.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	102.47	.47	14.	383.	10.33	6.50	.00

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION DAM165

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	100.00	101.99	102.00

STORAGE	0.	1.	1.
OUTFLOW	0.	0.	1.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	102.12	.12	1.	50.	4.83	6.17	.00

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION DAM160

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	100.00	101.99	102.00
STORAGE	0.	1.	1.
OUTFLOW	0.	0.	1.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	102.18	.18	1.	92.	6.58	6.25	.00

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION DAM155

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	100.00	101.99	102.00
STORAGE	0.	1.	1.

OUTFLOW	0.	0.	1.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	102.20	.20	1.	106.	6.75	6.25	.00

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION DAM150

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	100.00	101.99	102.00
STORAGE	0.	2.	2.
OUTFLOW	0.	0.	1.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	102.28	.28	2.	174.	7.33	6.25	.00

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION DAM120

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	100.00	101.99	102.00
STORAGE	0.	1.	1.
OUTFLOW	0.	0.	1.

-128-

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	102.13	.13	1.	57.	5.42	6.25	.00

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION DAM75

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	100.00	101.99	102.00
STORAGE	0.	0.	0.
OUTFLOW	0.	0.	1.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	102.48	.48	0.	394.	10.00	6.33	.00

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION DAM85

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	100.00	101.99	102.00
STORAGE	0.	0.	0.
OUTFLOW	0.	0.	1.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	102.47	.47	0.	379.	10.42	6.33	.00

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION DAMBO

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	100.00	101.99	102.00
STORAGE	0.	0.	0.
OUTFLOW	0.	0.	1.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	102.07	.07	0.	25.	2.33	6.17	.00

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION DAM95

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	100.00	101.99	102.00
STORAGE	0.	1.	1.
OUTFLOW	0.	0.	1.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	102.13	.13	1.	55.	4.75	6.25	.00

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION DAM30

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	100.00	101.99	102.00
STORAGE	0.	1.	1.
OUTFLOW	0.	0.	1.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	102.15	.15	1.	70.	5.08	6.25	.00

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION DAM110

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	100.00	101.99	102.00
STORAGE	0.	1.	1.
OUTFLOW	0.	0.	1.

RATIO	MAXIMUM	MAXIMUM	MAXIMUM	MAXIMUM	DURATION	TIME OF	TIME OF

-131-

OF PMF	RESERVOIR W.S.ELEV	DEPTH OVER DAM	STORAGE AC-FT	OUTFLOW CFS	OVER TOP HOURS	MAX OUTFLOW HOURS	FAILURE HOURS
1.00	102.14	.14	1.	64.	5.58	6.17	.00

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION DAM100

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	100.00	101.99	102.00
STORAGE	0.	0.	0.
OUTFLOW	0.	0.	1.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	102.21	.21	0.	118.	9.08	6.25	.00

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION DAM140

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	100.00	101.99	102.00
STORAGE	0.	1.	1.
OUTFLOW	0.	0.	1.

RATIO OF	MAXIMUM RESERVOIR	MAXIMUM DEPTH	MAXIMUM STORAGE	MAXIMUM OUTFLOW	DURATION OVER TOP	TIME OF MAX OUTFLOW	TIME OF FAILURE

PMF	W.S.ELEV	OVER DAM	AC-FT	CFS	HOURS	HOURS	HOURS
1.00	102.16	.16	1.	79.	6.92	6.25	.00

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION DAM130

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	100.00	101.99	102.00
STORAGE	0.	1.	1.
OUTFLOW	0.	0.	1.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	102.26	.26	1.	155.	8.42	6.33	.00

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION DAM200

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	100.00	101.99	102.00
STORAGE	0.	0.	0.
OUTFLOW	0.	0.	1.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS

1.00	102.13	.13	0.	60.	7.25	6.42	.00

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION DAM135

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	100.00	101.99	102.00
STORAGE	0.	1.	1.
OUTFLOW	0.	0.	1.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	102.17	.17	1.	84.	6.83	6.25	.00

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

-134-

O P E N C H A N N E L F L O W - V E R S I O N 1.1 02/28/92

PROJECT NAME: SALT RIVER PIMA - MARICOPA INDIAN COMMUNITY
JOB NUMBER: 3182
BY: FRIEDHOFF
DATE: 02/28/92

ARIZONA CANAL OUTFALL CHANNEL

FLOW RATING CURVE FOR SECTION NO. 1 EXISTING COMBINED

ENERGY GRADIENT = .000262

STATION	ELEVATION	N-VALUE
0.00	1287.20	0.018
11.50	1275.70	0.018
81.50	1275.70	0.018
90.00	1284.50	0.018
110.00	1284.35	0.018
112.00	1284.00	0.045
120.00	1283.00	0.045
121.00	1282.00	0.045
122.00	1281.00	0.045
140.00	1281.00	0.045
162.00	1282.00	0.045
328.00	1283.00	0.045
635.00	1284.00	0.045
910.00	1285.00	0.045
1200.00	1286.00	0.045
1500.00	1287.00	0.045
1780.00	1286.00	0.045

ELEVATION (FEET)	AREA (SQ.FT.)	P (FEET)	R (FEET)	VELOCITY (FPS)	DISCHARGE (CFS)
1277	103.26	97.14	1.06	1.45	150
1278	199.42	118.02	1.69	2.00	398
1279	310.08	138.90	2.23	2.40	745
1280	435.27	159.78	2.72	2.72	1,186
1281	466.45	265.71	1.76	3.50	1,634
1282	652.19	296.28	2.20	3.42	2,229
1283	1209.60	1159.79	1.04	2.51	3,038
1284	1848.76	1868.28	0.99	2.18	4,044
1285	2341.55	1741.34	1.34	2.24	5,254
1286	3272.35	1787.76	1.83	2.19	7,180
1287	4481.65	1809.17	2.48	2.19	9,829

FLOW RATING CURVE FOR SECTION NO. 2 IMPROVED COMBINED

ENERGY GRADIENT = .000186

STATION	ELEVATION	N-VALUE
0.00	1287.20	0.018
11.50	1275.70	0.018
81.50	1275.70	0.018
90.00	1284.50	0.018
110.00	1284.35	0.018

112.00	1284.00	0.045
120.00	1283.00	0.045
121.00	1282.00	0.045
122.00	1281.00	0.045
140.00	1281.00	0.045
147.00	1281.40	0.045
161.00	1274.44	0.018
191.00	1274.44	0.018
205.00	1281.40	0.018
217.00	1284.39	0.025
317.00	1284.40	0.025
328.20	1287.20	0.025
428.00	1287.20	0.025

ELEVATION (FEET)	AREA (SQ.FT.)	P (FEET)	R (FEET)	VELOCITY (FPS)	DISCHARGE (CFS)
1276	82.85	124.79	0.66	1.11	92
1277	214.73	150.80	1.42	1.52	326
1278	367.37	176.82	2.08	1.92	705
1279	540.81	202.83	2.67	2.26	1,220
1280	735.04	228.85	3.21	2.55	1,871
1281	922.94	276.12	3.34	2.86	2,641
1282	924.73	220.33	4.20	3.40	3,148
1283	1110.79	236.50	4.70	3.66	4,071
1284	1308.17	256.54	5.10	3.91	5,114
1285	1467.89	331.90	4.42	4.18	6,137
1286	1791.99	341.56	5.25	4.22	7,562
1287	2125.09	351.23	6.05	4.33	9,202

FLOW RATING CURVE FOR SECTION NO. 3 EXISTING ARIZONA CANAL ONLY

ENERGY GRADIENT = .000262

STATION	ELEVATION	N-VALUE
0.00	1287.20	0.018
11.50	1275.70	0.018
81.50	1275.70	0.018
90.00	1284.50	0.018
110.00	1284.35	0.018

ELEVATION (FEET)	AREA (SQ.FT.)	P (FEET)	R (FEET)	VELOCITY (FPS)	DISCHARGE (CFS)
1277	93.48	75.45	1.24	1.57	147
1278	168.76	79.65	2.12	2.27	384
1279	246.97	83.84	2.95	2.87	708
1280	328.11	88.04	3.73	3.39	1,111
1281	412.18	92.23	4.47	3.86	1,590
1282	499.19	96.43	5.18	4.29	2,142
1283	589.12	100.62	5.85	4.69	2,765
1284	681.99	104.82	6.51	5.07	3,457
1285	747.40	115.39	6.48	5.50	4,111

1286	855.70	116.80	7.33	5.79	4,957
1287	965.00	118.22	8.16	6.10	5,890

FLOW RATING CURVE FOR SECTION NO. 5 EXISTING FLOODPLAIN ONLY

ENERGY GRADIENT = .000262

STATION	ELEVATION	N-VALUE
112	1284	0.045
120	1283	0.045
121	1282	0.045
122	1281	0.045
140	1281	0.045
162	1282	0.045
328	1283	0.045
635	1284	0.045
910	1285	0.045
1200	1286	0.045
1500	1287	0.045
1780	1288	0.045

ELEVATION (FEET)	AREA (SQ.FT.)	P (FEET)	R (FEET)	VELOCITY (FPS)	DISCHARGE (CFS)
1282	95.50	173.57	0.55	0.37	36
1283	569.00	1038.87	0.55	0.39	222
1284	1133.50	1751.92	0.65	0.49	551
1285	1592.50	1623.93	0.98	0.70	1,122
1286	2413.00	1668.93	1.45	0.92	2,220
1287	3511.00	1688.93	2.09	1.12	3,934

EXISTING FLOW CONDITION RATING CURVE

ELEVATION (FEET)	FLOODPLAIN FLOW (CFS)	CANAL FLOW (CFS)	COMBINED FLOW (CFS)
1277			
1278			
1279			
1280			
1281	0		0
1282	36		36
1283	222		222
1284	551		551
1284	551	3,457	4,008
1285	1,122	4,111	5,233
1286	2,220	4,957	7,177
1287	3,934	5,890	9,823

FLOW RATING CURVE FOR SECTION NO. 4 IMPROVED ARIZONA CANAL ONLY

ENERGY GRADIENT = .000186

STATION	ELEVATION	N-VALUE

0.00	1287.20	0.018
11.50	1275.70	0.018
81.50	1275.70	0.018
90.00	1284.50	0.018
110.00	1284.35	0.018

ELEVATION (FEET)	AREA (SQ.FT.)	P (FEET)	R (FEET)	VELOCITY (FPS)	DISCHARGE (CFS)
1277	93.48	75.45	1.24	1.32	124
1278	168.76	79.65	2.12	1.92	323
1279	246.97	83.84	2.95	2.41	596
1280	328.11	88.04	3.73	2.85	936
1281	412.18	92.23	4.47	3.25	1,340
1282	499.19	96.43	5.18	3.62	1,805
1283	589.12	100.62	5.85	3.95	2,329
1284	681.99	104.82	6.51	4.27	2,913
1285	747.40	115.39	6.48	4.64	3,464
1286	855.70	116.80	7.33	4.88	4,177
1287	965.00	118.22	8.16	5.14	4,962

FLOW RATING CURVE FOR SECTION NO. 6 IMPROVED CHANNEL ONLY

ENERGY GRADIENT = .000186

STATION	ELEVATION	N-VALUE
112.00	1284.00	0.045
120.00	1283.00	0.045
121.00	1282.00	0.045
122.00	1281.00	0.045
123.00	1281.00	0.045
147.00	1281.40	0.045
161.00	1274.44	0.018
191.00	1274.44	0.018
215.00	1281.40	0.018
217.00	1284.39	0.025
317.00	1284.40	0.025
328.00	1287.20	0.025
423.00	1287.20	0.025

ELEVATION (FEET)	AREA (SQ.FT.)	P (FEET)	R (FEET)	VELOCITY (FPS)	DISCHARGE (CFS)
1276	61.49	51.03	1.21	1.32	81
1277	116.35	64.50	1.80	1.73	201
1278	183.28	77.98	2.35	2.05	376
1279	262.28	91.46	2.87	2.32	608
1280	353.35	104.94	3.37	2.56	903
1281	456.49	154.42	2.96	2.77	1,264
1282	368.03	97.62	3.77	3.53	1,300
1283	470.19	115.58	4.07	3.61	1,699
1284	592.90	140.19	4.23	3.66	2,171
1285	718.82	214.40	3.35	3.72	2,672

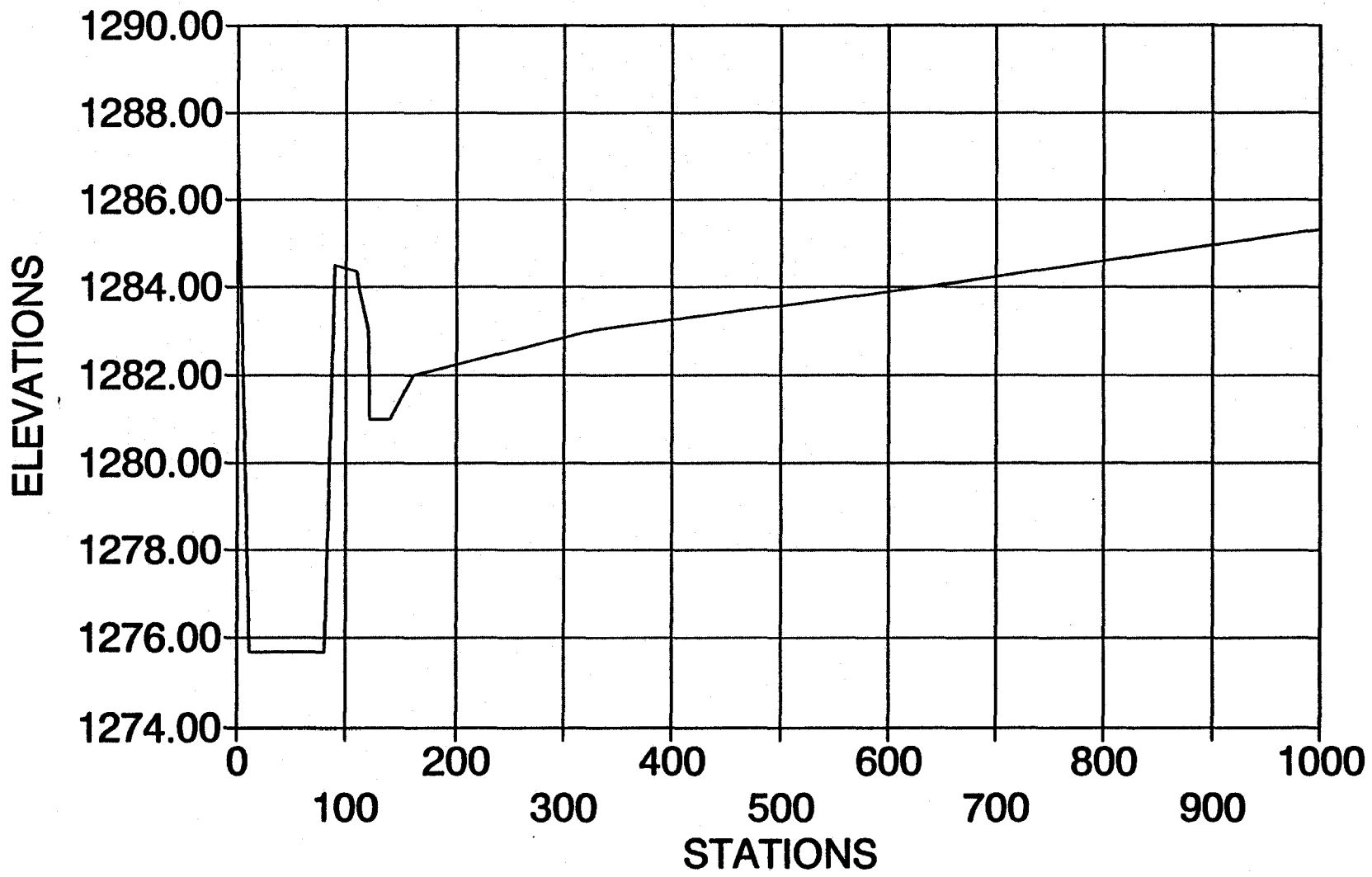
1286	932.46	222.51	4.19	3.63	3,383
1287	1153.96	230.62	5.00	3.67	4,234

IMPROVED FLOW CONDITION RATING CURVE

ELEVATION (FEET)	CHANNEL FLOW (CFS)	CANAL FLOW (CFS)	COMBINED FLOW (CFS)
1275	0		0
1276	81		81
1277	201		201
1278	376		376
1279	608		608
1280	903		903
1281	1,264		1,264
1282	1,300		1,300
1283	1,699		1,699
1284	2,171		2,171
1284	2,171	2,913	5,084
1285	2,672	3,464	6,137
1286	3,383	4,177	7,560
1287	4,234	4,962	9,196

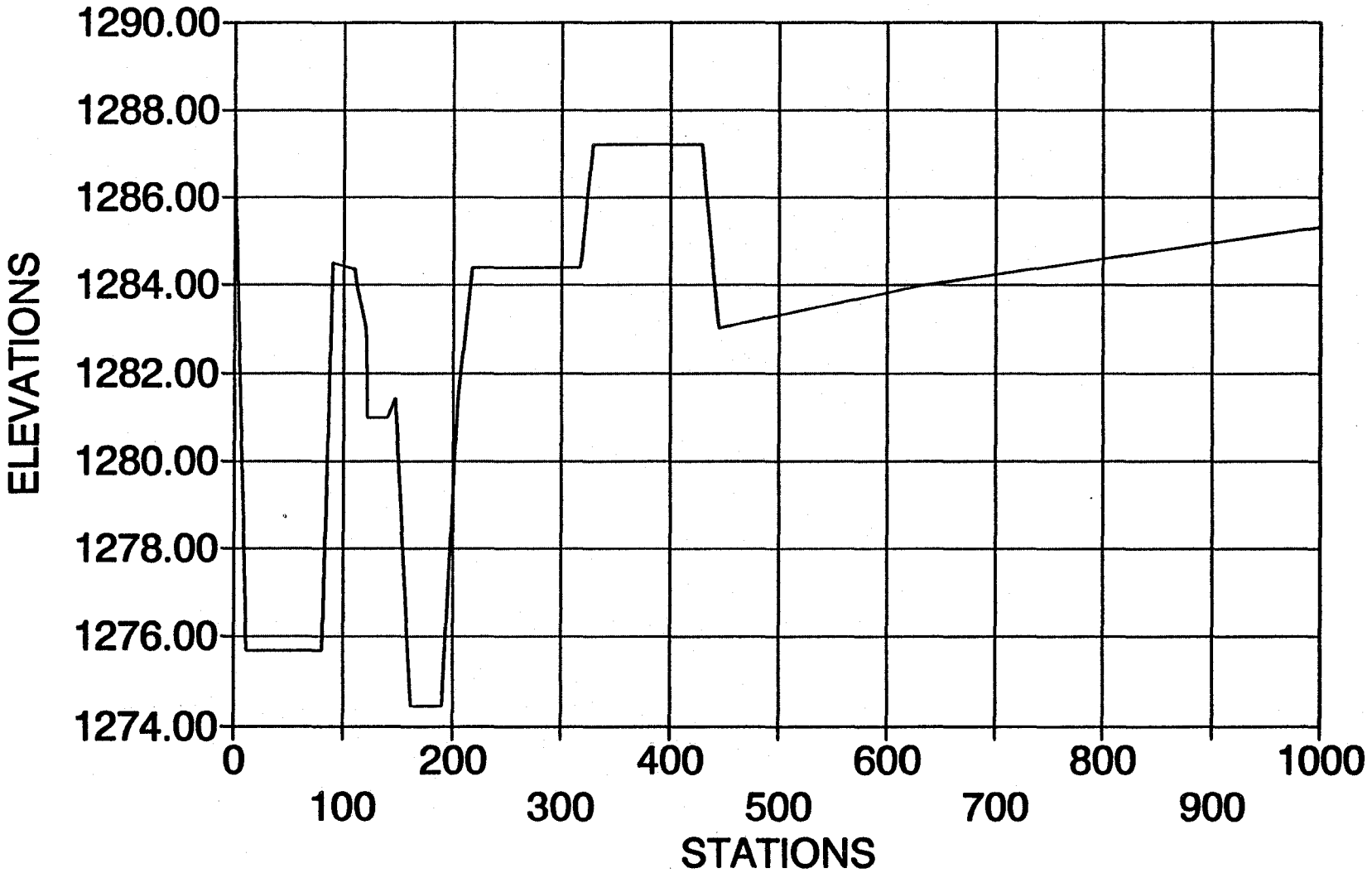
ARIZONA CANAL OUTFALL CHANNEL

EXISTING CHANNEL SECTION 35+00



ARIZONA CANAL OUTFALL CHANNEL

IMPROVED CHANNEL SECTION 35+00



O P E N C H A N N E L F L O W - VERSION 1.0 3/2/92

PROJECT NAME: 96th Street Storm Drain
JOB NUMBER: 3182
BY: bjf

96th Street Storm Drain

FLOW RATING CURVE FOR SECTION NO. 1 Future street section south of Via De Ventura

ENERGY GRADIENT = 0.00328

STATION	ELEVATION	N-VALUE
0	1.24	.025
9	1.24	.025
9	.74	.015
47	1.5	.015
47	2	.015
63	2	.015
63	1.5	.015
101	.74	.015
101	1.24	.015
110	1.24	.025
115	0	.025
127	0	.025
135	2	.025

DEPTH (FT.)	AREA (SF.)	P (FEET)	R (FEET)	VELOCITY (FPS)	DISCHARGE (C.F.S.)
0.20	2.56	13.66	0.19	1.14	3
0.40	5.44	15.31	0.35	1.76	10
0.60	8.65	16.97	0.51	2.27	20
0.80	12.62	33.81	0.37	2.62	33
1.00	24.47	86.07	0.28	2.52	62
1.20	46.63	138.34	0.34	2.69	125
1.40	81.95	206.96	0.4	2.97	243
1.60	72.18	119.06	0.61	3.58	258
1.80	95.74	120.49	0.79	4.19	401
2.00	119.46	137.41	0.87	4.79	572

Flow capacity for underground conduit.

span =	=	10.5	ft
rise =	=	10.5	ft
a = span * rise	=	110.25	sq ft
p = 2*(span + rise)	=	42	ft
r = a/p	=	2.625	ft
n =	=	0.012	
s =	=	0.00328	ft/ft
v = 1.49*r^0.667*s^0.5/n	=	13.54	fps
Qp = v*a	=	1,492	cfs

Combined flow capacity for 96th Street.

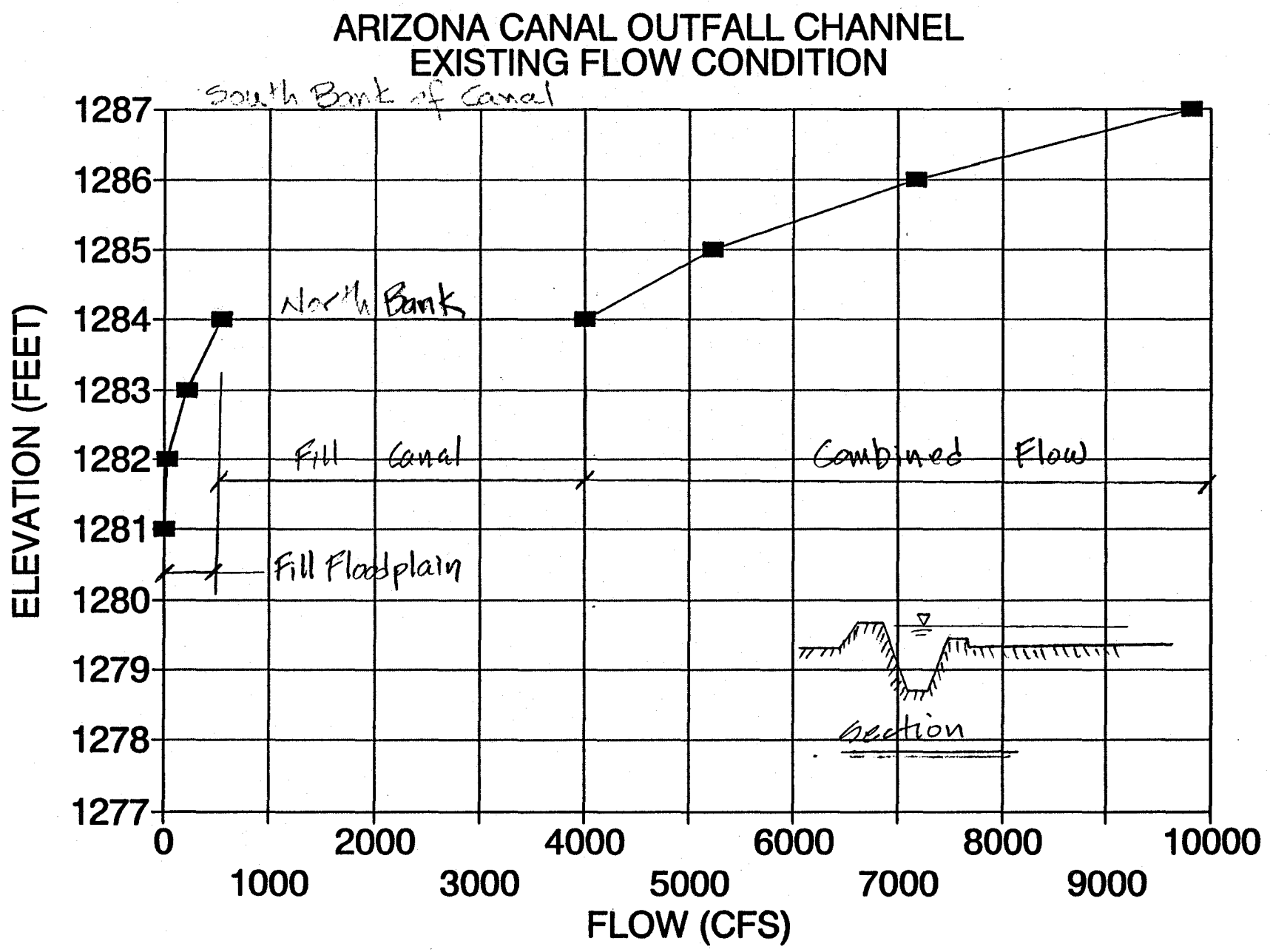
DEPTH (FT.)	CONDUIT (CFS)	STREET (CFS)	COMBINED (CFS)
0.20	1.492	3	1.495
0.40	1.492	10	1.502
0.60	1.492	20	1.512
0.80	1.492	33	1.525
1.00	1.492	62	1.554
1.20	1.492	125	1.618
1.40	1.492	243	1.736
1.60	1.492	258	1.751
1.80	1.492	401	1.893
2.00	1.492	572	2.065 >> 2000 Design ∴ OK

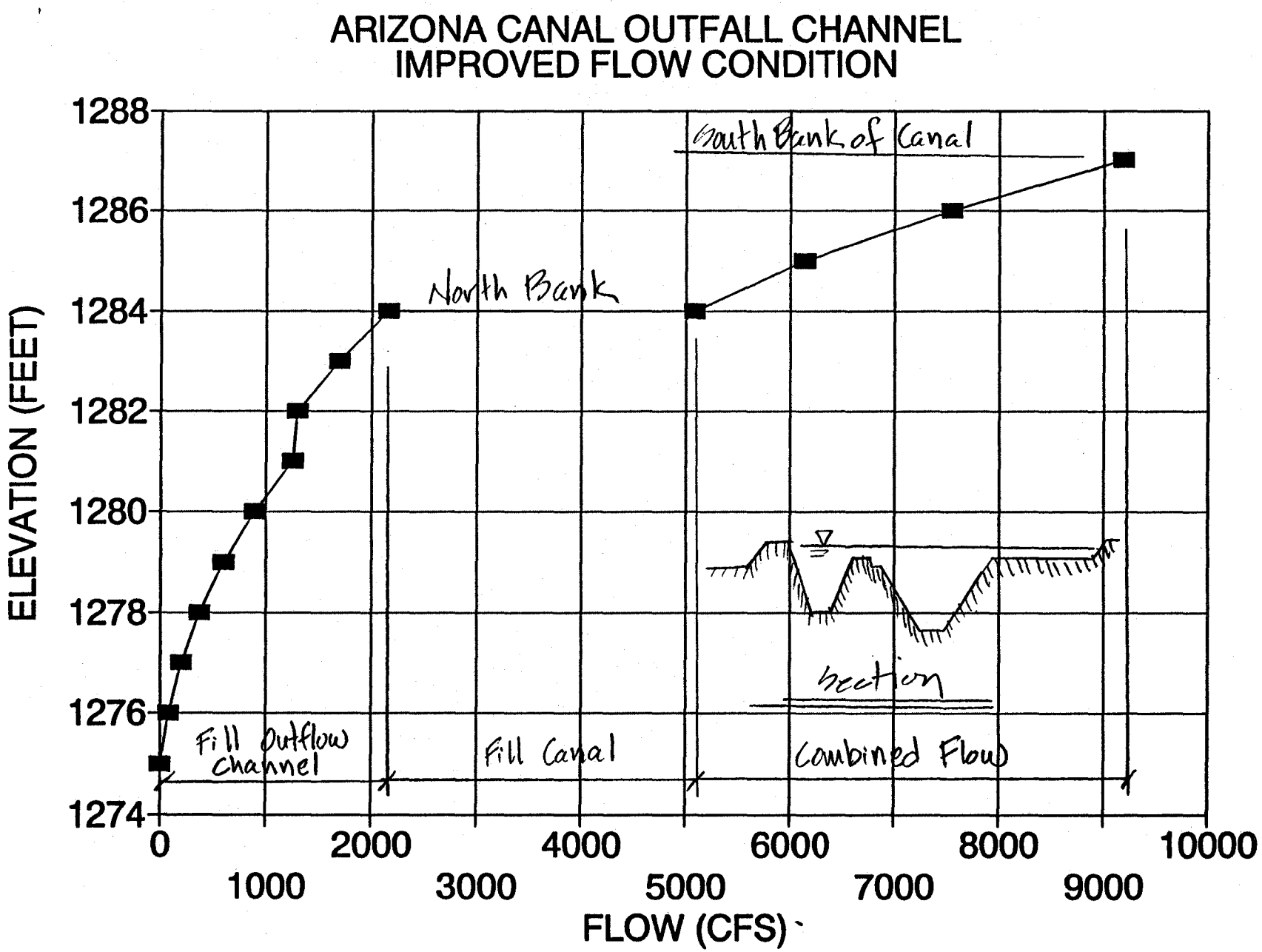
FLOW RATING CURVE FOR SECTION NO. 2 Future street section north of Via De Ventura.

ENERGY GRADIENT = 0.0044

STATION	ELEVATION	N-VALUE
0	1.24	.025
9	1.24	.025
9	.74	.015
47	1.5	.015
47	2	.015
63	2	.015
63	1.5	.015
101	.74	.015
101	1.24	.015
110	1.24	.025

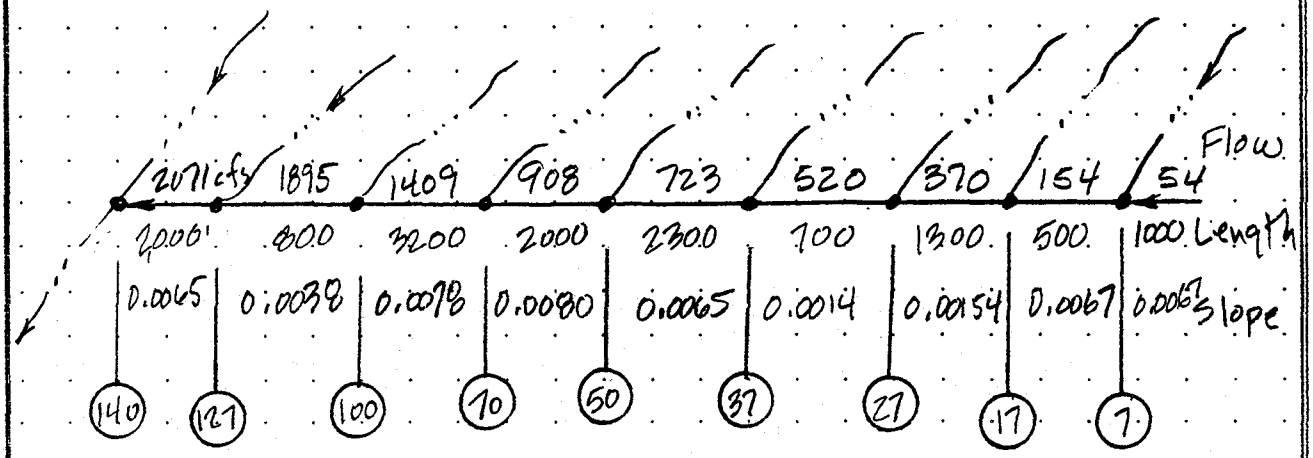
DEPTH (FT.)	AREA (SF.)	P (FEET)	R (FEET)	VELOCITY (FPS)	DISCHARGE (C.F.S.)
0.57	1.98	31.88	0.06	0.9	2
0.99	7.94	63.77	0.12	1.43	13
1.12	17.86	95.65	0.19	1.87	39
1.24	31.62	145.03	0.22	2.26	83
1.37	51.95	176.53	0.29	2.55	153
1.50	76.05	208.04	0.37	2.87	253
1.62	45.03	95.38	0.47	3.31	173
1.75	56.87	95.76	0.59	3.84	253
1.87	69.72	96.14	0.71	4.34	345
2.00	80.56	112.02	0.72	4.81	448 >> 398 ∴ ok


ARIZONA CANAL OUTFALL CHANNEL
EXISTING FLOW CONDITION
South Bank of Canal
North Bank
Fill Canal
Combined Flow
Fill Floodplain
Section
ELEVATION (FEET)
1287
1286
1285
1284
1283
1282
1281
1280
1279
1278
1277
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
FLOW (CFS)


ARIZONA CANAL OUTFALL CHANNEL
IMPROVED FLOW CONDITION
ELEVATION (FEET)
1288
1286
1284
1282
1280
1278
1276
1274
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
FLOW (CFS)
South Bank of Canal
North Bank
Section
Fill Outflow Channel
Fill Canal
Combined Flow

EVANS KUHN AND ASSOCIATES, INC.

TITLE: Salt River Pima - Maricopa Indian Comm. JOB NO.: 3182
SUBJECT: Master Drainage Plan DATE: 3/4/92
TASK: Mockingbird Lane Diversion Channel BY: BJF



N

Line Diagram

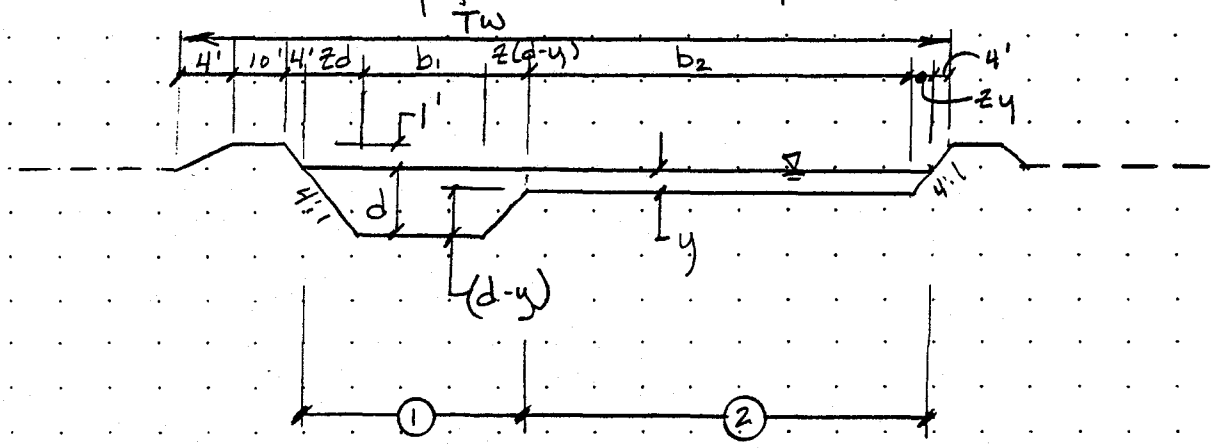
Nts

Checked By : _____ Page ____ of ____

EVANS KUHN AND ASSOCIATES, INC.

TITLE: Salt River Pima - Maricopa Indian Comm. JOB NO.: 3182
SUBJECT: Master Drainage Plan DATE: 3/4/82
TASK: Mockingbird Lane Diversion Channel BY: BJF

Channel Geometry for Low Flow & Overflow Channel



① Low Flow Channel

$$a_1 = zd^2 - y^2 z + db_1$$

$$P_1 = (2d-y)\sqrt{z^2+1} + b_1$$

$$Tw_1 = (2d-y)z + b_1 + 14$$

② Overflow Channel

$$a_2 = \frac{zy^2}{2} + b_2 y$$

$$P_2 = b_2 + y\sqrt{z^2+1}$$

$$Tw_2 = b_2 + zy$$

Checked By : _____ Page ____ of ____

Salt River Pima-Maricopa Indian Community
Mockingbird Lane Diversion Channel

3182\MOCK.WQ1
BJF 03/04/92

Summary of Channel Flow Geometry

	Units	1	2	3	4	5	6	7	8	9	Average	Max	Min
Initial Improvements													
Flow	cfs	2,071	1,895	1,409	908	723	520	370	154	54	900	2,071	54
Velocity	fps	7	6	8	7	6	3	3	4	3	5	8	3
Depth	ft	4	4	4	4	4	4	4	2	2	4	4	2
Bottom Width	ft	53	65	30	16	13	25	14	10	(0)	25	65	(0)
Top Width	ft	105	117	82	68	65	77	66	46	36	73	117	36
Future Improvements													
Low Flow Channel													
Flow	cfs	1,453	1,423	732	564	412	376	222	54	54	588	1,453	54
Velocity	fps	7	6	7	7	6	3	3	4	4	5	7	3
Depth	ft	4	4	4	4	4	4	4	2	2	4	4	2
Bottom Width	ft	35	47	11	6	3	15	4	0	0	13	47	0
Top Width	ft	83	95	59	54	51	63	52	34	34	58	95	34
Overflow Channel													
Flow	cfs	618	472	677	344	311	144	151	105	99	325	677	99
Velocity	fps	5	4	5	5	5	2	2	3	3	4	5	2
Depth	ft	1	1	1	1	1	1	1	1	1	1	1	1
Bottom Width	ft	128	128	128	64	64	64	64	68	64	86	128	64
Top Width	ft	132	132	132	68	68	68	68	70	66	89	132	66
Combined													
Flow	cfs	2,071	1,895	1,409	908	723	520	373	159	152	912	2,130	152
Bottom Width	ft	163	175	139	70	67	79	68	68	64	99	175	64
Top Width	ft	215	227	191	122	119	131	120	104	100	147	227	100

Channel and Levee Design

Reach =		Unit	1	2	3	4	5	6	7	8	9	Average	Max	Min
Qc =	Channel flow =	cfs	2,071	1,895	1,409	908	723	520	370	154	54	900	2,071	54
l =	Reach length =	ft	2,000	800	3,200	2,000	2,300	700	1,300	1,200	1,000	1,611	3,200	700
s =	Land slope = Energy slope =	ft/ft	0.00850	0.00380	0.00780	0.00800	0.00850	0.00140	0.00154	0.00670	0.00670	0.00544	0.00800	0.00140
z =	Side slope =	ft/ft	4	4	4	4	4	4	4	4	4	4	4	4
d =	Depth of flow =	ft	4.00	4.00	4.00	4.00	4.00	4.00	4.00	2.00	2.00	3.56	4.00	2.00
n =	Friction value =		0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
b =	Bottom width =	ft	53	65	30	16	13	25	14	10	-0	25	65	-0
a =	Cross sectional area = b*d+d^2*z =	sq ft	277.15	325.20	183.48	126.13	114.13	163.36	118.82	36.02	15.86	151.13	325.20	15.86
p =	Wetted perimeter = b+2*d*sqrt(1+z^2) =	ft	86.27	98.29	62.85	48.52	45.52	57.82	46.69	28.50	16.42	54.32	98.29	16.42
r =	Hydraulic radius = a/p =	ft	3.21	3.31	2.92	2.60	2.51	2.83	2.54	1.36	0.97	2.47	3.31	0.97
tw =	Top width = b + 2*d*z +20	ft	105	117	82	68	65	77	66	46	36	73	117	36
v =	Velocity = 1.49*r^(2/3)*sqrt(s)/n =	fps	7.47	5.83	7.68	7.20	6.33	3.18	3.11	4.28	3.40	5.39	7.68	3.11
sp =	Stream power = v*r*s*62.4 =	ft lb/sec	9.74	4.57	10.91	9.34	6.44	0.79	0.76	2.43	1.37	5.15	10.91	0.76
Q' =	Estimated flow trial and error = v*a =	cfs	2,071	1,895	1,409	908	723	520	370	154	54	900	2,071	54
err =	Error of estimate = Q' - Qc >= 0	cfs	(0)	(0)	0	(0)	(0)	(0)	(0)	0	(0)	0	0	(0)
												Totals		
Ve =	Volume Excavation = a*l/27 =	cu yd	20,529	9,636	21,745	9,343	9,722	4,235	5,721	1,601	587	83,120	cu yd	
Al =	Area of lining = l * p /9 =	sq yd	19,171	8,737	22,348	10,782	11,632	4,497	6,744	3,534	1,825	89,270	sq yd	
ROW =	Right-of-Way Area = tw * l/43560 =	ac	5	2	6	3	3	1	2	1	1	25	ac	

Overflow channel and levee design

Reach =		Unit	1	2	3	4	5	6	7	8	9	Average	Max	Min
Qc =	Channel flow =	cfs	2,071	1,895	1,409	908	723	520	370	154	54	900	2,071	54
l =	Reach length =	ft	2,000	800	3,200	2,000	2,300	700	1,300	1,200	1,000	1,611	3,200	700
s =	Land slope = Energy slope =	ft/ft	0.00850	0.00380	0.00780	0.00800	0.00850	0.00140	0.00154	0.00670	0.00670	0.00544	0.00800	0.00140
z =	Side slope =	ft/ft	4	4	4	4	4	4	4	4	4	4	4	4
d =	Depth of flow =	ft	4.00	4.00	4.00	4.00	4.00	4.00	4.00	2.00	2.00	3.56	4.00	2.00
y =	Depth of overflow channel =	ft	1	1	1	1	1	1	1	0.5	0.5	0.89	1.00	0.50

Low Flow Channel

n =	Friction value =		0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
b =	Bottom width =	ft	35	47	11	6	3	15	4	0	0	13	47	0
a =	Cross sectional area = z*d^2+d*b-z*y^2=	sq ft	196.06	246.30	102.98	82.89	70.28	120.53	76.00	15.00	15.00	102.98	246.30	15.00
p =	Wetted perimeter = (2*d-y)*sqrt(z^2+1)+b =	ft	63.36	75.44	39.61	34.53	31.43	43.99	32.86	14.43	14.43	36.90	75.44	14.43
r =	Hydraulic radius = a/p =	ft	3.13	3.26	2.60	2.39	2.24	2.74	2.31	1.04	1.04	2.31	3.26	1.04
tw =	Top width = (2*d-y)*z+b+20 =	ft	83	95	59	54	51	63	52	34	34	56	95	34
v =	Velocity = 1.49*r^(2/3)*sqrt(s)/n =	fps	7.34	5.78	7.11	6.81	5.87	3.12	2.92	3.56	3.56	5.12	7.34	2.92
sp =	Stream power = v*r*s*62.4 =	ft lb/sec	9.30	4.47	9.00	8.15	5.32	0.75	0.65	1.55	1.55	4.53	9.30	0.65
Ql =	Flow in low flow channel =	cfs	1,453	1,423	732	564	412	376	222	54	54	566	1,453	54
												Totals		
Ve =	Volume Excavation = a*l/27 =	cu yd	14,671	7,296	12,204	6,125	5,967	3,125	3,859	667	556	54,292	cu yd	
Al =	Area of lining = l * p /9 =	sq yd	14,084	6,705	14,082	7,674	6,033	3,422	4,747	1,924	1,603	62,274	sq yd	
ROW =	Right-of-Way Area = tw * l/43560 =	ac	4	2	4	2	3	1	2	1	1	19	ac	

Overflow Channel

n =	Friction value =		0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025
b =	Bottom width =	ft	128	128	128	64	64	64	64	68	64	86	128	64
a =	Cross sectional area = z/2*y^2+b*y =	sq ft	130.00	130.00	130.00	66.00	66.00	66.00	66.00	34.50	32.50	80.11	130.00	32.50
p =	Wetted perimeter = b+y*sqrt(z^2+1) =	ft	132.12	132.12	132.12	66.12	66.12	66.12	66.12	70.06	66.06	89.44	132.12	66.06
r =	Hydraulic radius = a/p =	ft	0.98	0.98	0.98	0.97	0.97	0.97	0.97	0.49	0.49	0.87	0.98	0.49
tw =	Top width = b + z y	ft	132	132	132	68	68	68	68	70	66	89	132	66
v =	Velocity = 1.49*r^(2/3)*sqrt(s)/n =	fps	4.75	3.63	5.21	5.22	4.70	2.16	2.29	3.04	3.04	3.79	5.22	2.16
sp =	Stream power = v*r*s*62.4 =	ft lb/sec	1.90	0.85	2.49	2.52	1.85	0.18	0.21	0.63	0.63	1.25	2.52	0.18
Qo =	Flow in overflow channel =	cfs	618	472	677	344	311	144	151	105	99	325	677	99
												Totals		
Ve =	Volume Excavation = a*l/27 =	cu yd	9,630	3,852	15,407	4,889	5,622	1,711	3,178	1,533	1,204	47,026	cu yd	
Al =	Area of lining = l * p /9 =	sq yd	29,361	11,744	46,977	15,138	17,409	5,298	9,840	9,342	7,340	152,450	sq yd	
ROW =	Right-of-Way Area = tw * l/43560 =	ac	6	2	10	3	4	1	2	2	2	31	ac	

Combined Low Flow and Overflow Channel

a =	Combined Cross Section Area =	sq ft	326.06	376.30	232.98	148.89	136.28	186.53	142.00	49.50	47.50	183.09	376.30	47.50
p =	Combined Perimeter =	ft	195.50	207.56	171.73	102.66	99.56	112.12	100.98	84.49	80.49	128.34	207.56	80.49
tw =	Combined top width	ft	214.51	226.57	190.74	121.67	118.57	131.13	120.00	104.00	100.00	147.47	226.57	100.00
Ql =	Flow in low flow channel =	cfs	1,453	1,423	732	564	412	376	222	54	54	566	1,453	54
Qo =	Flow in overflow channel =	cfs	618	472	677	344	311	144	151	105	99	325	677	99
Q =	Combined flow = Ql + Qo =	cfs	2,071	1,895	1,409	908	723	520	373	159	152	912	2,071	152
err =	Error of estimate = Q - Qc >= 0	cfs	0	0	0	(0)	0	0	3	5	98	12	98	(0)
												Totals		
Ve =	Combined Excavation Volume =	cu yd	24,301	11,150	27,612	11,014	11,609	4,836	6,837	2,200	1,759	101,318	cu yd	
Al =	Combined Lining Area =	sq yd	43,444	18,450	61,059	22,813	25,442	8,720	14,587	11,266	8,944	214,724	sq yd	
ROW =	Combined Right-of-Way Area =	ac	10	4	14	6	6	2	4	3	2	51	ac	

SALT RIVER PIMA - MARICOPA INDIAN COMMUNITY
MASTER DRAINAGE PLAN
NATURAL WASH DELINEATION

3182H6BF.WQ1
03/02/92
BJF

Solve for depth

Wash No.	1	2	3	4	5	6	7	8	9
From Point	172	224	162	314	311	280	140	1159az	210
To Point	171	240	174	175	308	310	147	150	236
Flow	2,678	1435	1888	375	375	750	2888	838	3165
b	1,300	15	10	5	10	10	310	12	45
z	0.01	25	20	10	20	20	4	5	0.5
n	0.045	0.045	0.045	0.065	0.055	0.035	0.045	0.045	0.025
s	0.0033	0.0038	0.0057	0.003	0.0048	0.0048	0.0077	0.011	0.003
d	1.05	3.87	4.40	4.01	2.59	2.85	2.00	4.08	6.58
a=d*b+z*d^2	1,365	432	431	181	159	191	637	132	318
p=b+2*d*sqrt(1+z^2)	1,302	209	186	86	113	124	327	54	60
r=a/p	1.05	2.07	2.32	2.11	1.40	1.54	1.95	2.47	5.32
tw=b+2*z*d	1300	208	186	85	113	124	326	53	52
v=1.49*r^.667*sqrt(s)/n	1.96	3.32	4.38	2.07	2.35	3.93	4.54	6.34	9.96
q=v*a	2,678	1,435	1,888	375	375	750	2,888	838	3,165
delta Q	-0	-0	-0	-0	-0	-0	-0	-0	-0

Solve for width for d = 1 foot

Wash No.	1	2	3	4	5	6	7	8	9
From Point	172	224	162	314	311	280	140	1159az	210
To Point	171	240	174	175	308	310	147	150	236
Flow	2,678	1435	1888	375	375	750	2888	838	3165
b	1409	704	757	300	201	256	995	242	971
z	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
n	0.045	0.045	0.045	0.065	0.055	0.035	0.045	0.045	0.025
s	0.0033	0.0038	0.0057	0.003	0.0048	0.0048	0.0077	0.011	0.003
d	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
a=d*b+z*d^2	1,409	704	757	300	201	256	995	243	971
p=b+2*d*sqrt(1+z^2)	1,411	706	759	302	203	258	997	245	973
r=a/p	1.00	1.00	1.00	0.99	0.99	0.99	1.00	0.99	1.00
tw=b+2*z*d	1409	704	757	300	201	256	995	243	971
v=1.49*r^.667*sqrt(s)/n	1.90	2.04	2.50	1.25	1.86	2.93	2.90	3.45	3.26
q=v*a	2,678	1,435	1,888	375	375	750	2,888	838	3,165
delta Q	-0	-0	-0	-0	-0	-0	0	-0	0

Solve for width for d = 2 foot

Wash No.	1	2	3	4	5	6	7	8	9
From Point	172	224	162	314	311	280	140	1159az	210
To Point	171	240	174	175	308	310	147	150	236
Flow	2,678	1435	1888	375	375	750	2888	838	3165
b	446	224	240	97	65	83	316	79	308
z	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
n	0.045	0.045	0.045	0.065	0.055	0.035	0.045	0.045	0.025
s	0.0033	0.0038	0.0057	0.003	0.0048	0.0048	0.0077	0.011	0.003
d	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
a=d*b+z*d^2	892	448	481	193	131	165	631	157	616

p=b+2*d*sqrt(1+z^2)	450	228	244	101	69	87	320	83	312
r=a/p	1.98	1.97	1.97	1.92	1.89	1.91	1.96	1.90	1.97
tw=b+2*z*d	446	224	240	97	65	83	316	79	308
v=1.49*r^.667*sqrt(s)/n	3.00	3.20	3.93	1.94	2.87	4.54	4.57	5.34	5.14
q=v*a	2,678	1,435	1,888	375	375	750	2,888	838	3,165
delta Q	-0	-0	-0	-0	-0	-0	-0	-0	0

Wash No.		1	2	3	4	5	6	7	8	9
From Point		172	224	162	314	311	280	140	1159az	210
To Point		171	240	174	175	308	310	147	150	236
Flow		2,678	1435	1888	375	375	750	2888	838	3165
Floodplain Width	Feet	1,409	704	757	300	201	256	995	243	971
Floodway Width	Feet	446	224	240	97	65	83	316	79	308

SALT RIVER PIMA - MARICOPA INDIAN COMMUNITY
MASTER DRAINAGE PLAN
96th Street Street Storm Drain
Construction Cost Estimate

EKA#3182.2
3182C1BF.WQ1
03/04/92

ITEM DESCRIPTION	TOTAL QUANTITY	UNIT	UNIT COST	TOTAL COST
Roadway Fill	18,192	C.Y.	$0.50	$9,096
13' x 13' Concrete Box Culvert	3,040	L.F.	$519.00	$1,577,760
11' x 11' Concrete Box Culvert	4,090	L.F.	$444.00	$1,815,960
9' x 9' Concrete Box Culvert	830	L.F.	$370.00	$307,100
8' x 8' Concrete Box Culvert	370	L.F.	$333.00	$123,210
7' x 6' Concrete Box Culvert	410	L.F.	$278.00	$113,980
8' x 4' Concrete Box Culvert Connector	264	L.F.	$259.00	$68,376
12" Dia. Storm Drain Pipe	33	L.F.	$15.00	$495
Storm drain transition/junction structure	4	EACH	$12,500.99	$50,004
Headwall w/wingwalls for 16'x14' outlet , ADOT B-03.10 (Mod.)	1	EACH	$5,000.00	$5,000
Trash rack for outlet structure, MAG 502-1, Modified	1	EACH	$3,400.00	$3,400
Conduit access structure (Manhole)	10	EACH	$2,000.00	$20,000
Concrete Apron, 4" P.C.C. w/6"x6" w.w.f. (10 ga.)	12,960	S.F.	$4.00	$51,840
Trash rack for inlet structure, MAG 502-1, Modified	6	EACH	$3,400.00	$20,400
Geotextile fabric for subdrain	232	S.F.	$0.50	$116
Aggregate for subdrain fill	60	TON	$12.00	$720
Asphalt Concrete Surface Course (2", A 1-1/2)	87	TON	$24.00	$2,088
Select Fill or Aggregate Base for roadways (4")	95	TON	$20.00	$1,890
Cutoff wall, MAG 552	1,384	L.F.	$15.00	$20,760
Remove tree	73	EACH	$1.00	$73
Remove/relocate power pole & down guy, by SRP	1	EACH	$10,000.99	$10,001
Drywell w/connector & catch basin	2	EACH	$4,000.00	$8,000
	Sub-total, Construction			$4,210,269
	10% Contingencies			$421,027
	Total Construction			$4,631,296

SALT RIVER PIMA - MARICOPA INDIAN COMMUNITY
MASTER DRAINAGE PLAN
Arizona Canal Outfall Channel
Construction Cost Estimate

EKA#3182.2
3182C1BF.WQ1
03/04/92

ITEM DESCRIPTION	TOTAL QUANTITY	UNIT	UNIT COST	TOTAL COST
Channel Excavation	91,482	C.Y.	$2.50	$228,705
4" Gunite Lining	12,345	S.Y.	$18.00	$222,210
Maintenance Ramp, 6" P.C.C. w/6"x6" w.w.f. (10 ga.)	5,198	S.F.	$3.20	$16,634
Barbed Wire Fence	6,875	L.F.	$20.99	$144,306
Grade and Compact 12' Maintenance Road	4,344	S.Y.	$3.00	$13,032
Grade 1' deep roadside drainage ditch	3,258	L.F.	$2.00	$6,516
Survey marker, MAG 120-1, Type B	6	EACH	$1,000.00	$6,000
Maintenance ramp access gate	1	EACH	$2,600.00	$2,600
	Sub-total, Construction			$640,003
	10% Contingencies			$64,000
	Total Construction			$704,003

SALT RIVER PIMA - MARICOPA INDIAN COMMUNITY
MASTER DRAINAGE PLAN
Mockingbird Lane Diversion Channel
Construction Cost Estimate

EKA#3182.2
3182C1BF.WQ1
03/04/92

ITEM DESCRIPTION	TOTAL QUANTITY	UNIT	UNIT COST	TOTAL COST
Channel Excavation	83,120	C.Y.	$2.50	$207,800
	Sub-total, Construction			$207,800
	25% Contingencies			$51,950
	Total Construction			$259,750

SALT RIVER PIMA - MARICOPA INDIAN COMMUNITY
MASTER DRAINAGE PLAN
Right-of-Way Calculations

3182\ROW1.WKS
BJF 03/04/92

	Units	Initial	Future
Arizona Canal Outfall Channel			
Length	ft	3,258	3,258
Width	ft	100	200
Area	sq ft	325,800	651,600
Area	acres	7.48	14.96
96th Street Storm Drain			
Length	ft	9,004	9,004
Width	ft	80	20
Area	sq ft	720,320	180,080
Area	acres	16.54	4.13
Mockingbird Lane Interceptor Channel			
Length	ft	20,011	20,011
Width	ft	54	111
Area	sq ft	1,089,000	2,221,560
Area	acres	25.00	51.00
Total Right-of-Way	acres	49.02	70.09

II. EXISTING DRAINAGE BASIN CHARACTERISTICS

A. AREA/LOCATION

The drainage basin consists of approximately 20 square miles located primarily within the Salt River Pima-Maricopa Indian Community. The drainage area is bounded on the northeast by the Granite Reef Aquifer, on the south by the Arizona Canal, and on the west by Pima Road. The perimeter and location of this drainage area can be seen on the sub-basin and concentration point map located in the appendix of this report.

B. EXISTING DRAINAGE PATTERN/FACILITIES

Currently, the Master Plan area exhibits a northeast to southwest drainage pattern. No major drainage improvements have been made on Community lands outside of the existing farm area and the Pavillions commercial development. All drainage outside the existing farmland is provided by natural channels having slopes ranging between .002 ft/ft and .018 ft/ft Existing overland slopes range from .0028 ft/ft in agricultural areas to .0213 ft/ft in the northeast section of the basin area. All runoff is intercepted on the southern boundary of the drainage area by the Arizona Canal. A portion of this runoff is allowed to enter the canal at various inlet locations while the remainder ponds against the northern embankment and is conveyed westward to Indian Bend Wash and then to the Salt River.

C. LAND USE AND GROUND COVER

The majority of the study area located within the Salt River Pima-Maricopa Indian Community is undeveloped desert land with sparse desert vegetation. The remainder of the land within the Community consists of irrigated agricultural fields. The portion of the drainage basin outside the Community is primarily urban developed land within the City of Scottsdale. This area includes Scottsdale Ranch and other developments having significant drainage improvements which alter the natural runoff characteristics of the drainage basin. These improvements include on-site detention, channelization and lakes.

D. SOIL DATA

Based on a review of the Soil Survey of the Aguila-Carefree Area, Parts of Maricopa and Pinal Counties, Arizona, U.S. Department of Agriculture, April, 1986, it was determined that the basin area was comprised of two major hydrologic soil groups, Groups B and C. These groups were further subdivided into desert and agricultural areas. These classifications were used to select Soil Conservation Service (SCS) curve numbers for