FCD Chronology of Significant Events

ACDC

ADOT

Adobe Dam

Agua Fria

Buckhorn Mesa

Casandro Wash Dam

Cave Buttes Dam

Cliff Dam

Colter Channel

Dreamy Draw, Cave Buttes, Adobe & New River

East Maricopa Floodway

Harquahala Valley Water Shed

Idian Bend Wash

McMicken Dam/Trilby Wash

Miscellaneous

Miscellaneous FCD Pamphlets

New River Dam

New Waddell Dam

Old Cross Cut Canal

PVSP

Salt-Gila Rivers

Signal Butte

Spillway Capacities/Discharges

Spook Hill

USGS Fact Sheet

Board of Supervisors

Apache Junction

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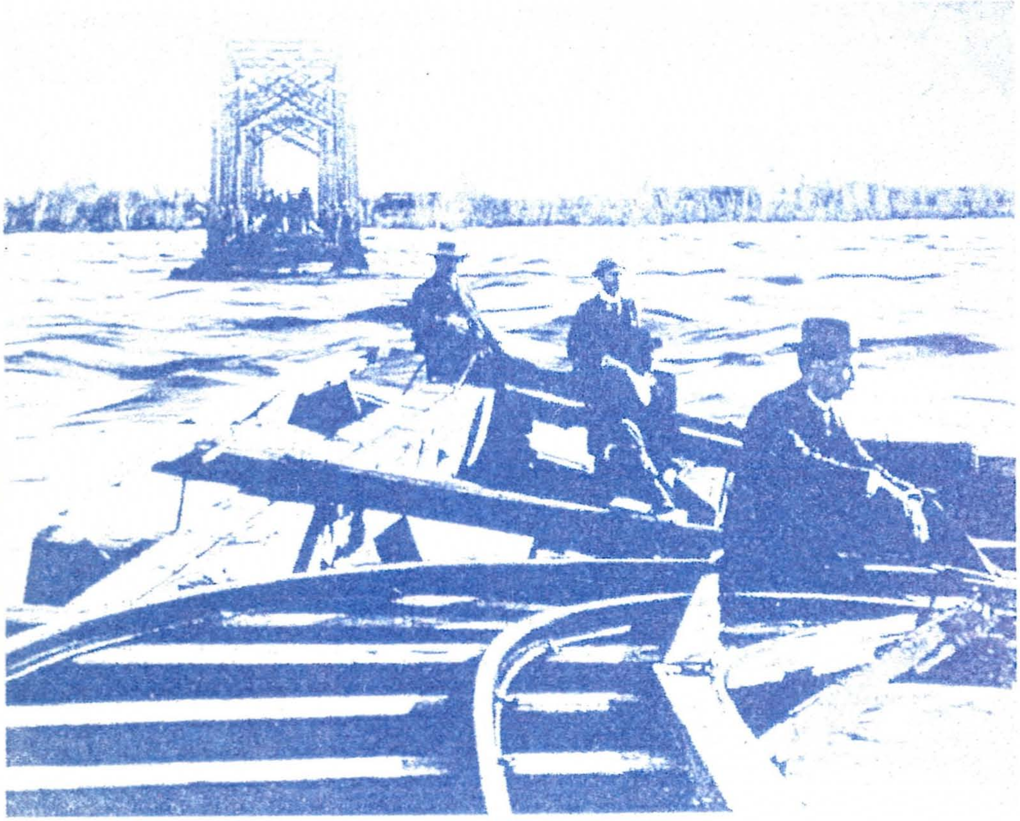
Flood Control District
of Maricopa County

Chronology of Significant Events

Flood Control District
of Maricopa County



Chronology of Significant Events

The Flood Control District of Maricopa County wishes to thank the sponsors of the 40th Anniversary Celebration for their generous support.

Please join us in acknowledging their contributions.

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The Flood Control District helps provide the safe environment responsible for the growth and economic prosperity of Maricopa County.

Before the district's inception 40 years ago, severe flooding occurred throughout much of Maricopa County during winter rains and the monsoon season. The Gila, Salt and Verde rivers often overflowed. Water rose above shorelines, spilling into neighborhoods and destroying property and homes. Today, that kind of massive flooding is less common. Through effective engineering, dam and channel construction and public education, the Flood Control District of Maricopa County has harnessed nature's waterways so they become assets, not hazards. Residents can easily determine the probability of whether the area they intend to build on will flood by contacting this agency.

The Flood Control District of Maricopa County manages floodplains for an area that covers more than 9,000 square miles. The agency now employs more than 200 people and maintains about 70 flood control structures and 151,137 acres of water channels. The district is also responsible for 16 weather stations, 527 miles of access roads, nearly two million linear feet of fencing and 200 rain gages.

Chronology of Significant Events

The following pages highlight Flood Control District and flood-related events as recorded by various federal state, county and Flood Control District sources.

1891 **The maximum flood on record sweeps through Maricopa County February 16-23. The Agua Fria, Verde, Salt and Gila Rivers massively overflowed.**

1911 The Roosevelt Dam is completed.

1916 There is severe flooding along the Agua Fria River in January.

1921 Significant flooding along Cave Creek inundates the State Capitol with two feet of water.

1923 The Cave Creek Dam is constructed north of downtown Phoenix to protect the metropolitan area.

1923 Severe flooding of the Verde and Salt Rivers occurs in December.

1924 The Arizona State Legislature passes a law enabling the establishment of general flood control districts. These bodies lack the ability to allocate funding and prove to be ineffective.

1925 Severe flooding of the Verde and Salt Rivers occurs.

1927 The Waddell Dam on the Agua Fria River is completed.

1932 Heavy flooding occurs along the Verde River.

1933 Storms flood downtown Gilbert in September.

1936 United States Congress passes the Flood Control Act.

1938 U.S. Army Corps of Engineers develops plans for flood control along the Salt and Gila Rivers.

1943 Flooding occurs along New River and in the Phoenix area in August.

1951 **Significant flooding overtakes the West Valley. Luke Air Force Base, downtown Goodyear, Avondale and the Harquahala Valley suffer.**

1954 Severe flooding in Queen Creek causes people to establish local Standard Project Floods.

The Soil Conservation District completes White Tanks Flood Retarding Structures 3 and 4.

The Maricopa County Board of Supervisors, Phoenix City Council and Salt River Project Board of Directors formally recognize the need for a comprehensive approach to solving flood issues.

1956 **The U.S. Army Corps of Engineers completes McMicken Dam and Outlet Structure to protect Luke Air Force Base.**

The Federal Flood Insurance Act of 1956 becomes law.

1957 The Flood Protection Improvement Committee is formed.

1958 The Flood Protection Improvement Committee publishes its report.

1959 US Army Corps of Engineers completes the original Dysart Dam and Painted Rock Dam.

The 24th Arizona State Legislature passes legislation in March that authorizes the establishment of flood control districts by counties.

Gov. Paul Fannin signs legislation authorizing Arizona counties to establish flood control district.

Maricopa County Flood Control District forms on Aug. 13 and hires three employees.

1963 The Maricopa County Board of Supervisors adopts the Comprehensive Flood Control Program. This 20-year plan becomes the mechanism by which flood control devices are developed and built.

1966 The first Flood Control District bond election fails.

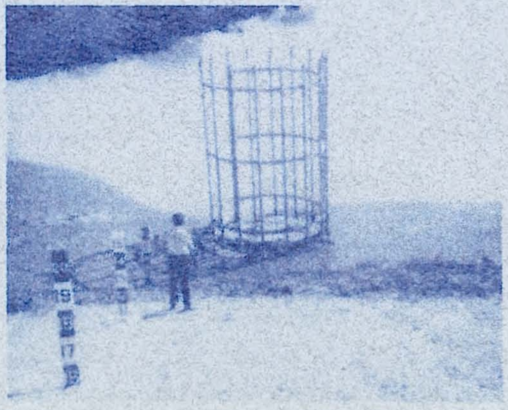
1967 Widespread flooding hits central Phoenix in December.

The Powerline Dam is completed.

1968 The Powerline Floodway and Vineyard Dam are completed.

Congress passes the National Flood Insurance Act.

1969 Rittenhouse Dam and the Alma School Drain are completed.



1970 State legislature receives proposed floodplain regulations that will cover all of Arizona.

Initial National Flood Insurance Program regulations containing the first set of floodplain management criteria are published in the Federal Register.

Maricopa County is granted permission to participate in the preliminary phase of the National Flood Insurance Program by the Housing and Urban Development Department on Dec. 31.

1971 An area-wide storm causes flooding from Queen Creek to the Harquahala Valley.

1972 Flooding causes extensive damage in downtown Phoenix and Scottsdale.

1973 Dreamy Draw Dam is completed.

State House Bill 2010 allows towns, cities and counties to adopt floodplain regulations.

Congress passes the Flood Disaster Protection Act Comprehensive Revisions to the National Flood Insurance Program which includes the requirement that communities enroll in the plan so citizens may have flood insurance at subsidized rates. The revisions also require municipalities to have their floodplain regulations approved by the national program.

1974 The Board of Supervisors adopts flood control amendments to zoning ordinances and subdivision regulations.

Maricopa County adopts first floodplain regulations for unincorporated areas on February 25. These include a 5-year and 100-year floodplain.

Mandatory flood insurance purchase requirements of the Flood Disaster Protection Act become effective.

1975 Buckeye Flood Retarding Structures 1,2,3, Old Cross Cut Canal and Guadalupe Dam are completed.

Floodplain regulations are adopted and become effective.

1976 Sunset and Sunny Cove Dams are completed.

1977 Sossaman Channel and Basin and Indian Bend Wash Outlet are completed.

President Jimmy Carter and Arizona Governor Raul Castro require floodplain management for all projects using state or federal funds.

1978 In March, the heaviest flooding since 1891 nearly destroys the community of Allenville and causes heavy damage to homes in Holly Acres, Hound Dog Acres and Rose Garden Lane.

Significant flooding occurs again in December along the Agua Fria, Salt and Gila Rivers.

1979 Maricopa County Board of Supervisors approve variances for residents who need extensive repair to their homes because of the March floods.

National Flood Insurance Program transferred from HUD to newly established Federal Emergency Management Agency in April.

Spook Hill Dam and Indian Bend Wash Inlet are completed.

Maricopa County adopts Flood Insurance Rate Maps.

1980 **Cave Buttes Dam and Spook Hill Floodway are completed.**

Executive Order 11990, Protection of Wetlands, goes into effect.

A major flood in early February causes the loss of a number of homes and bridge crossings. Holly Acres floods again. Maricopa County Board of Supervisors approves temporary living quarters for those in need.

1981 The first telemetered rain gauge is installed and begins the Flood Monitoring System for the Flood Control District of Maricopa County.

1982 The Saddleback Dam and Diversion Channel are completed, as are the Harquahala Dam and Floodway Channel. State Route 85 Bridge Channel is finished, and repairs to White Tanks Dams 3 and 4 are completed.

1983 **Skunk Creek Channels and Levee at Interstate 17 are completed.**

Massive storms in the south bring flood-waters north along the Santa Cruz and Gila Rivers into Maricopa County.

1984 Adobe Dam, Perryville Bank Stabilization, the Signal Butte Floodway Channel and McMicken Dam Restoration are completed.

A summer storm causes scattered flooding in east Mesa near the Central Arizona Project Canal while it is under construction.

Revised State Flood Control Statutes become law. Each county's Flood Control District is now responsible for floodplain management throughout the county unless cities publicly resolve to assume the duty.

1985 **The Holly Acres Levee and Bank Stabilization, New River Dam and Indian Bend Wash are completed. The Salt-Gila Clearing Project begins.**

The Board of Directors approves an Area Drainage Master Study Program on April 17.

1986 Centennial Levee and Indian School Road Drain are completed.

1987 The Flood Monitoring System changes from a mainframe system to a PC-based system.

The Signal Butte Dam and Pass Mountain Diversion Channel are completed. 1988 District receives new Flood Insurance Rate Maps. These are the first since the original maps of 1979. The Board of Directors approves these, as well as floodplain regulation changes.

1988 Drainage regulations for Maricopa County are adopted in September.

1989 **East Maricopa Floodway Channel and Guadalupe Channel are completed.**

1990 Maricopa County Flood Control District publishes Drainage Design Manual of Maricopa County, Vol. 1 -- Hydrologic.

District applies for participation in the Community Rating System Program. Class 9 rating received Oct. 1, 1991.

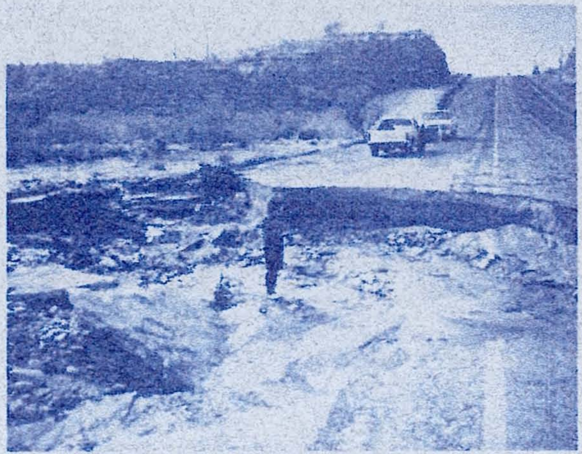
1991 Revised Flood Insurance Rate Maps that show the Alluvial Fan delineation go into effect.

Maricopa County Flood Control District publishes Drainage Design Manual for Maricopa County Vol. II - Hydraulic.

1992 Maricopa County dedicates new Flood Control District facilities.

State amends law to require written authorization from the county flood control district for any construction within a delineated floodplain.

1993 **Major flooding on the Verde River, the Hassayampa River and Gila River creates a federal disaster. District staff participates in county emergency operations.**



New Flood Insurance Rate Maps show the alluvial fan special flood hazard area. These are the first major revisions since 1988.

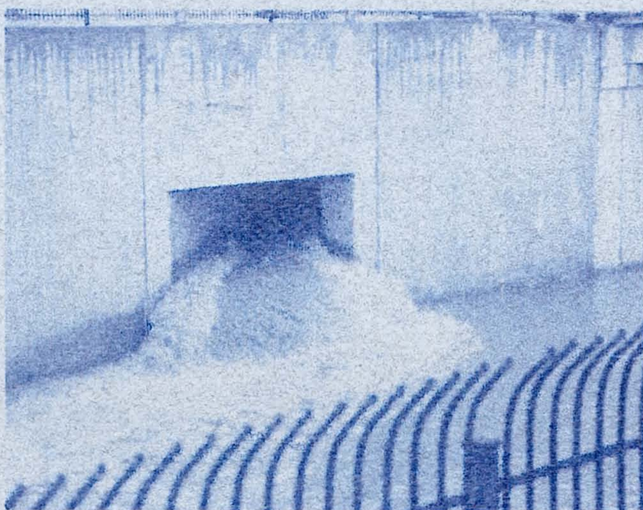
Board of Directors approve amendments to the 1991 Floodplain Regulations in December.

The procedure for indentifying and prioritizing potential 5-year Capital Improvement Projects is adopted.

The New River Channelization and University Drive Basin are completed.

1994 The first of the local flood response systems is developed for the Town of Wickenburg.

A 20 percent flood insurance premium credit through the Community Rating System Program becomes effective.



The Arizona Canal Diversion Channel and Colter Channel are completed.

A heavy storm on Feb. 14 activates the County Emergency Operation Center. The Salt River flows and some minor flood erosion occurs along the Hassayampa River near Wickenburg.

1995 The Scatter Wash Channel from 47th to 35th Avenues, Beardsley Road Regional Drainage System, New River Channel Improvements from Thunderbird Road to the Skunk Creek confluence and Salt River Channel are completed.

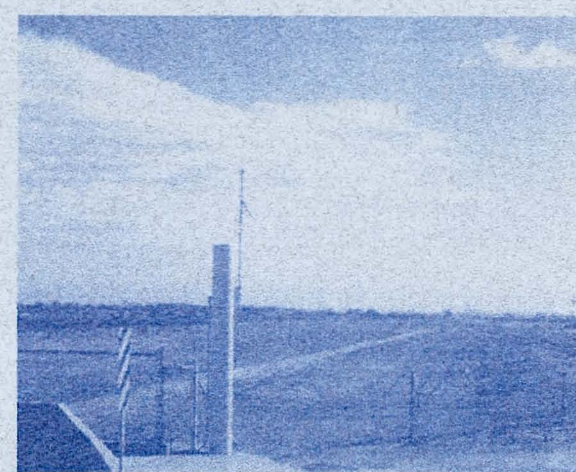
The district begins using meteorological services in June

1996 The Dysart Drain Improvements, the Upper East Fork Cave Creek, and the Casandro Wash Dam and Outlet are completed.

1997 Tropical Depression Nora causes flooding in western Maricopa County, particularly in the Aguila and Wickenburg areas.

The Salt River Channel from Dobson Road to Country Club Road, the Price Drain, the Maryvale Stadium Basin and the Tenth Street Wash Basins are completed.

1999 **The statewide flood warning system goes into effect in February.**



Reconstruction of the Old Cross Cut Canal is completed.

2000 and beyond:

Our Mission: To reduce the risk of flood loss; minimize the impacts of floods on human safety, health and welfare; And restore and preserve the natural and beneficial values served by floodplains. Our Vision: To be recognized throughout North America as an agency that is unsurpassed in its dedication to accomplishing its mission, and being responsive to its clients in an efficient , effective and fiscally responsible manner. We will be known as stewards of the public trust, and our concerns about the effect of our actions for not only the current, but future generations.

Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, Arizona 85009
(602)506-1501

Arizona Canal Diversion Channel
Fact Sheet

Arizona Canal Diversion Channel

16.5-mile flood control channel, originating near 40th Street and Stanford Drive on the grounds of the Phoenix Country Day School, and terminating at 75th Avenue and Greenway Road where the storm drainage flows into Skunk Creek. The Channel protects large portions of Phoenix, and areas of Glendale and Peoria from 100-year flood damage. A 100-year flood has a 1% chance of happening in any year.

The Diversion Channel is part of the Phoenix and Vicinity (including New River) Flood Control Project proposed by a citizens' committee in 1963, and funded by Congress in 1965. The project also includes four dams: Dreamy Draw, completed 1974; Cave Buttes, on Cave Creek Wash, completed 1979; Adobe Dam, on Skunk Creek, completed in 1982; and New River Dam, completed 1985. Related improvements include channelization of Cave Creek Wash from the confluence with the ACDC upstream to Sweetwater Avenue; channelization of Skunk Creek downstream of its confluence with the ACDC; and channelization of the New River downstream of confluence with Skunk Creek; and channelization of the Agua Fria River near the Gila River.

Designed and Built by: U.S. Army Corps of Engineers, with the Flood Control District of Maricopa County as local sponsor.

ACDC Cost:

$254 million total; $152 million for construction, paid 97.7% by Corps of Engineers and 2.3% by local sponsor, Flood Control District; $102 million for property acquisition, relocation of people, roads, bridges, utilities, paid by the Flood Control District.

Total cost for the Phoenix and Vicinity (including New River) Flood Control Project, including the dams, is $422 million ($254 million federal; $168 million local).

Contractors:	Reach 1, Skunk Creek - 53rd Avenue:	Kiewit Western
	Reach 2a, 53rd Avenue - 47th Avenue:	C.S. Construction
	Reach 2b, 47th Avenue - 27th Avenue:	Kasler Corp.
	Reach 2c, 27th Avenue - 21st Avenue (+ 2.5 miles of Cave Creek channelization):	Pulice Construction
	Reach 3, 21st Avenue - 12th Street:	Pulice Construction
	Reach 4, 12th Street - 40th Street:	SundtCorp

Design capacity: Peak discharge into Skunk Creek is 29,000 cubic feet per second.

Channel dimensions:	Upstream end near 40th Street/Stanford Drive:	36 ft. wide x 21 ft. deep
	At confluence with Cave Creek Wash:	110 ft. wide x 20 ft. deep
	Downstream confluence with Skunk Creek:	500 ft. wide x 20 ft. deep

Construction specifications:

Concrete lined channel; covered box at Sunnyslope High School and from upstream end near 40th St. to just west of 24th St. (including the covered channel portion at the Arizona Biltmore Hotel) ; fenced to prevent entry; earthen channel starting at 55th Ave. to Skunk Creek.

(over)

Maintenance:

Flood Control District performs full maintenance of the channel, with a work station established in Sunnyslope; crews work 5 days a week. Phoenix maintains pedestrian underpasses at 35th Avenue, I-17, Central Avenue, Dunlap Avenue, Northern Avenue, Peoria Avenue, Cactus Street, 7th Street, 12th Street, 16th Street; Glendale maintains the recreational facilities at Thunderbird Paseo Park, in the channel between 56th and 71st Avenues. The Flood Control District has established a link between its electronic rain gauge system and Glendale's Fire Department to provide timely flood alert and evacuation of the park.

Recreational features:

As the responsible party, the Flood Control District will maintain a part of the channel bank as a 16.5 mile long segment of the Sun Circle Trail. While state law prohibits the District from funding recreational facilities, the Corps funded these features in conjunction with the listed cities on a 50% cost sharing basis:

--Paths for biking, walking, jogging
--Glendale Thunderbird Paseo Park, with ball fields, gardens, and amenities
--Phoenix pedestrian underpasses
--Phoenix recreation facilities along Cave Creek Channel north of Cactus Road

Landscaping:

As a result of citizen input, enhanced landscaping includes 5,378 trees and over 90,000 shrubs and groundcover plants maintained by the Flood Control District.

Aesthetic features and citizen input:

Starting in the mid 1980s, citizen groups provided input that was adopted by the Corps of Engineers to make the Channel more acceptable aesthetically to residents immediately adjacent to the project. Such suggestions included:

--tinted concrete (tan instead of gray/white)
--wrought-iron-look fencing (instead of chainlink fencing)
--enhanced landscaping
--staggered masonry walls to screen the channel from view

Environmental regulations:

Since first approved by Congress in 1965, plans for and construction of the Arizona Canal Diversion Channel have met the continually changing and progressively more strict federal environmental criteria and regulations.

Construction challenges:

--Completion of excavation, concrete work and covering of the channel at the Arizona Biltmore in 100 days...completed 2 days ahead of schedule, with kudos from the Hotel management.

--Maintaining schedule after Congress approved additional funding at the request of Paradise Valley to cover an additional 4,360 feet of channel, after construction of that portion of the channel was already underway. Flood Control District engineering staff redesigned the channel to support the cover and associated landscaping features, and drainage inlets to direct storm runoff into the covered channel.

--Keeping 6 lanes and frontage roads open on I-17 while constructing a bridge over the channel.

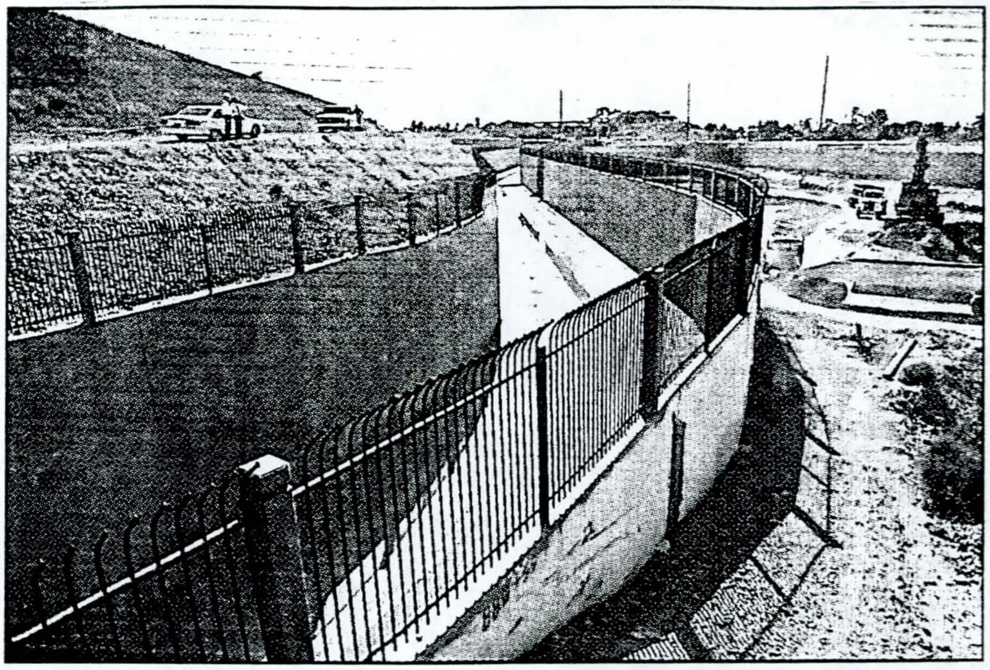
Safety Record:

During the seven years of construction of the channel, 2.5 million manhours were dedicated to the completion of this project. Due to the diligence of the construction contractors and the work crews, no lives were lost, no one suffers from a permanent disability, and only 6 accidents occurred where any days were lost by a member of the work force.

Channel nearing completion

Designed to prevent flooding across Valley

By Ryan Konig
Staff writer



James Garcia / Staff photographer

This finished portion of the Arizona Canal Diversion Channel is near 24th Street and Camelback Road.

The meandering Arizona Canal Diversion Channel, intended to spare thousands of homes from the wrath of floods, is just a mile away from completion.

About 16 miles of the channel has been completed, from 30th Street near Stanford Drive to about 75th Avenue near Bell Road.

The channel diverts floodwater runoff from storm drains and the occasionally overpowering washes along the way, including the Cudia City, Dreamy Draw and Cave Creek washes, and releases the water into the West Valley's Skunk Creek.

Sundt Corp., the company building the easternmost segment, has completed most of the 4.6-mile section that it contracted to build, said Tom Drysdale, Sundt excavation superintendent.

Drysdale said the channel will be completed to 39th Street in about 10 months.

Phoenix needs the channel, according to the Maricopa County Flood Control District.

The Valley is a natural drain for about half of Arizona's floodwaters.

The channel's effectiveness most recently was tested July 24, when a summer storm dropped more than 4 inches of rain on the neighborhoods sandwiched between the Phoenix Mountains and the channel.

Bill Hamann, a special assistant to the Phoenix city engineer, said he got calls from residents who were pleased with the channel's performance.

Some callers were from the 24th Street and Camelback Road area that was hit with floodwaters 4 to 6 feet high in 1972. That storm flooded the Cudia City Wash and damaged an estimated 2,000 houses.

"The channel takes on a beauty of its own when you get calls of relief from property owners in areas that are threatened by floods," Hamann said.

Hamann acts as the city's liaison with

See DIVERSION, Page 3

the U.S. Army Corps of Engineers, the county Flood Control District, the companies contracted to build the channel and the residents near the channel banks.

The channel at its widest point in the west has the capacity to handle about 200,000 gallons of water per second, which would add up to more water in one week than all of Phoenix's 1 million residents collectively use in one year.

According to recent estimates from the companies involved in the channel's construction, about 400,000 cubic yards of concrete have been poured.

Workers have removed at least 6 million cubic yards of earth in digging the channel, more than enough to bury a square-mile section of town under 6 feet of dirt.

And as many as 2 million man-hours of work have gone into the channel's construction.

The project will cost an estimated $269 million, according to Susan Fitzgerald of the Flood Control District. The county will pay about $102 million and the federal government will kick in $167 million.

Most of the channel is uncovered and its edges are bordered by wrought-iron fencing, shielded from view by rows of trees, shrubs, bushes and block walls.

Providing one had a pass key to the security gates of the channel, one could drive on the channel's floor from 75th Avenue to about 30th Street, passing under the football field at Sunnyslope High School and under a few tennis courts and parking areas of the Arizona Biltmore.

With no obstructions, providing the channel is dry, a driver could traverse the channel from Peoria to east Phoenix in a commuter-friendly 20 minutes.

The Corps of Engineers designed the channel to handle a "100-year-event," a phrase describing the fury of a storm by the frequency it is likely to occur — once every century.

The channel ranges from 24 to 40 feet in depth and from 32 to 110 feet in width. The walls and floor of the channel generally are 2 to 3 feet thick.

The channel runs parallel to the Arizona Canal, which partly created the need for the channel. The canal inadvertently has acted as a dam, forcing floodwaters to collect along its northern side.

"The channel takes on a beauty of its own when you get calls of relief from property owners in areas that are threatened by floods."

Bill Hamann
Special assistant to the Phoenix city engineer

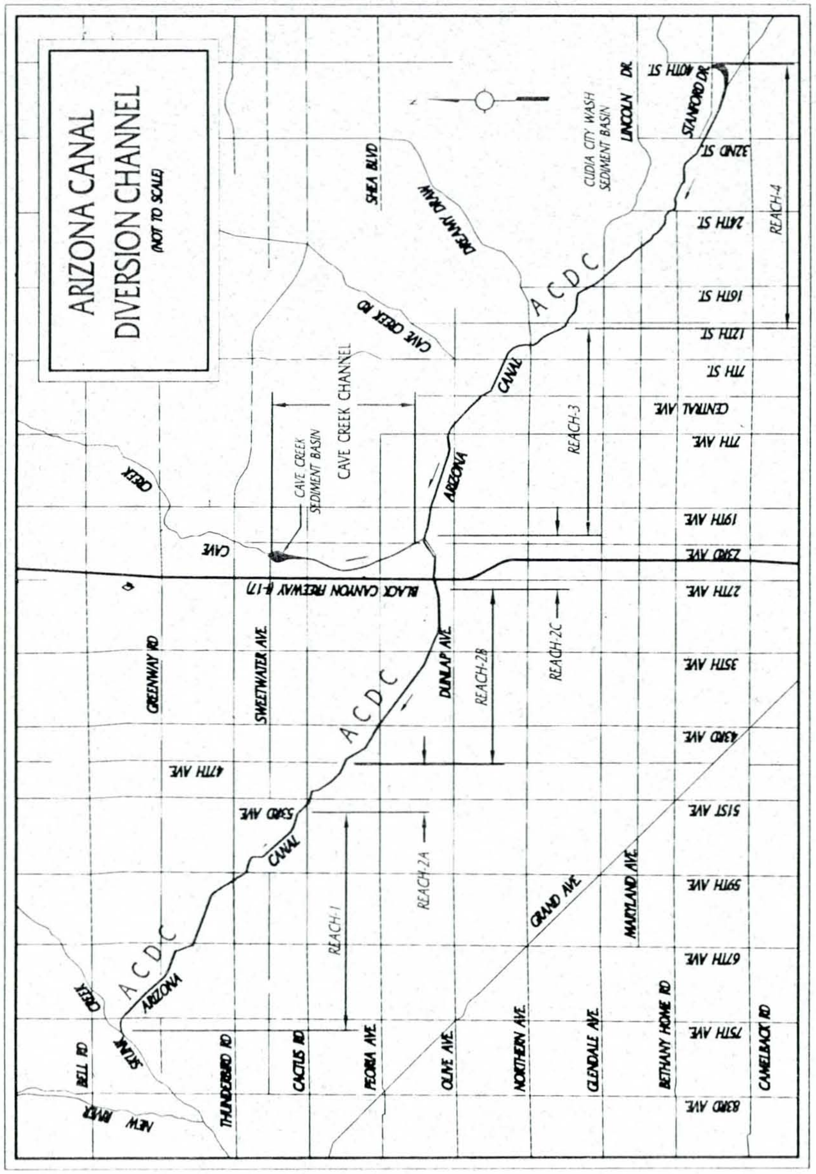

SIPHONS
SADDLE DIKE
NEW RIVER DAM
DIKE
SKUNK CREEK CHANNEL & LEVEES
DIKE NO 3
EXISTING CAVE CREEK DAM
DIKE NO 2
DIKE NO.1
CAVE BUTTES DAM UNDER CONSTRUCTION
DIP CROSSING
ADOBE DAM
CENTRAL ARIZON
GRANITE REEF
DIP CROSSINGS
SUN CITY
PEORIA
GLENDALE
MARYVALE
ALHAMBRA
SUNNYSLOPE
PARADISE V
PHOENIX
TOLLESON
VONDALE
TEMPE
ARIZONA CANAL DIVERSION CHANNEL
EXISTING DREAMY DRAW DAM
SKY HARBOR MUNICIPAL AIRPORT
SALT RIVER
GILA RIVER
Agua Fria River
New River
Skunk Creek
Cave Creek
Deadman Wash
Indian Bend Wash
Cudia City Wash
NOTE

Dedication

Arizona Canal Diversion Channel

9 a.m. Friday
October 8, 1993

23rd Avenue and Mountainview
Phoenix, Arizona



THANK YOU

It required the efforts of many people to successfully complete a project as large as the Arizona Canal Diversion Channel. To all those who contributed to the project, we extend our thanks and appreciation for a job well done. While it is impossible to list all those involved, some of the many are listed here.

Flood Control District

Shelby Brown, Administrative Coordinator
Roberta Combs, Administrative Coordinator
Francis Crosby, Engineering Drafting Spec
Leanna Cumberland, Eng Contract Spec
Mike Cuneo, Controller
Betty Dickens, Revegetation Ecologist
Paul DiPierro, Construction Inspector
Neil S. Erwin, P.E., Chf Eng/Gen Mgr
Chris Franklin, Land Management Specialist
Fred Fuller, Chf of Construction Inspection
Ken Green, Real Property Engineering Assoc
Hedy Hall, Land Management Specialist
Kumar Hanamaiah, P.E., Civil Engineer
Jonathan Hughes, Construction Inspector
David Johnson, Hydrology Manager
Diane C. Johnson, Land Management Aide
Ken Johnson, Property Mgt Specialist
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Bill Knight, Revegetation Ecologist
Lisa LaMarche, Administrative Coordinator
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Stanley L. Smith, P.E., Dpty Chf Engineer
Laurence Spanulescu, Const Inspector
Jan Staedicke, Civil Engineering Tech
John Svechovsky, P.E., Water Res Planner
Charles Wainwright, P.E., Civil Engineer
Ray Warriner, Prop Acquisition Coord
Larry Wong, Engineering Drafting Spec
Connie Yanez, Administrative Assistant
Linda Young, Administrative Coord
and ACDC Maintenance Crews...thanks!

General Counsel

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Julie Lemmon, Attorney

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Sue Mutschler, Public Involvement Coord
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U.S. Army Corps of Engineers

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George Beams, District Construction Ops Div
Blaine Brillhart, Construction Representative
Tom Brock, Real Estate
Satsuki Carrington, Civil Engineering Tech
Vance Carson, Project Design Team
Anna Cross, Real Estate
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Girish J. Desai, Project Design Manager
Joe Dixon, Chief Planning Section
Gregory Ellion, Construction Representative
Carl Enson, Chief, Construction Ops Div
Michael Evasovic, Project Environmentalist
William Fisk, Area Office
Larry Flatua, Construction Representative
Cliff Ford, Chief Design Section
Bernice Fuduka, District Construction Ops Div
Daniel Gee, District Construction Ops Div
Carl Gregory, Construction Surveillance
Ted Gula, Project Manager
Richard Gutschow, Materials Investigation
William Halczak, Materials Engineer
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Theodore Ingersoll, Project Geotech Engineer
Arthur Jung, Construction Manager
John Karakawa, Design Team
Patricia Kelly, Area Office
Thomas Kirkpatrick, Contracting
Robert Koplin, Chief Engineering Division
Marlys Koralewski, Construction & Ops Div
Christopher Kronick, Construction Manager
Robert Kuboshige, Construction Manager

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Glenn Mashburn, Project Hydraulic Engineer
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Barbara Moore, Area Office
Daniel Moore, Project Engineer
Joe Pickens, Area Engineer
Dave Reichardt, Real Estate
Joseph Robertucci, Construction Inspector
Kelly Ryan, P.E., Project & Office Engineer
Leo Snyder, P.E., Project Engineer
Ruth Tegeler, Chief of Lab
Stephen Temmel, Chief Counsel
Robert Thurman, Project Geologist
Ruth Villalobos, Chief Environ Resources
David Watanabe, District Constr Ops Div
Ronald Weiss , Chief Estimator
Brayton Willis, Office and Proj Engineer

Former Corps of Engineers Employees

Brad Caron, Engineering Technician
Neil Erwin, P.E., Resident Engineer
Jerry Hand, Construction Representative
John Hand, Construction Representative
Michele Jackson, Office and Proj Engineer
Joe Salinaz, Construction Representative
Andy Worthington, Engineering Tech

PROGRAM

MASTER OF CEREMONIES — ***The Honorable Jim Bruner***
Chairman, Flood Control District Board of Directors

POSTING OF THE COLORS — ***County Sheriff's Honor Guard***

PLEDGE OF ALLEGIANCE — ***William LoPiano***
Chair, Flood Control District Citizens Advisory Board

INVOCATION — ***The Rev. Ed Delph***
Pastor, Hosanna Christian Fellowship

INTRODUCTION OF DISTINGUISHED GUESTS — ***Supervisor Bruner***

REMARKS

The Honorable James McAllister
Vice Mayor, City of Glendale

The Honorable Ken Forgia
Mayor, City of Peoria

The Honorable Paul Johnson
Mayor, City of Phoenix

The Honorable Mary Rose Wilcox
Board of Directors/Supervisors, District 5

The Honorable Ed King
Board of Directors/Supervisors, District 4

The Honorable Betsey Bayless
Board of Directors/Supervisors, District 3

Col. R. L. VanAntwerp
District Engineer
Los Angeles District, U.S. Army Corps of Engineers

The Honorable Jim Bruner
Chairman, Board of Directors/Supervisors

UNVEILING OF MONUMENT
CHRISTENING OF CHANNEL
REFRESHMENTS

Flood Control District Board of Directors

Jim Bruner, Chairman, District 2
Tom Rawles, District 1
Betsey Bayless, District 3
Ed King, District 4
Mary Rose Wilcox, District 5

Flood Control District Citizens Advisory Board

William J. LoPiano, Chairman
John E. Miller Jr., Vice Chairman
Samuel K. Wu, Secretary
Marcella Peters, Member
Ron Wheat, Member
James Matteson, Ex Officio Member, City of Phoenix
Paul Cherrington, Ex Officio Member, Salt River Project

recycled paper

ACDC

Arizona Canal Diversion Channel

Flood Control for the Phoenix Metropolitan Area

May 1990

Construction Questions

Where is Reach 4?

Reach 4 of the ACDC runs parallel to and on the north side of the Arizona Canal between 12th Street and Cudia City Wash (40th Street). See map, inside.

Who will be doing the construction?

The U.S. Army Corps of Engineers is expected to award a construction contract in October 1990. The work will be monitored and inspected by staff from the Corps of Engineers.

In what sequence will construction occur?

The construction contractor is expected to do the work generally in the following order:

1. Clearing and demolition of buildings
2. Excavation
3. Construction of channel walls
4. Backfilling
5. Landscaping

The construction contractor will work at many sites within Reach 4 simultaneously rather than working from one end to the other.

How will the construction affect me?

The Corps' contract work will take place within the channel right-of-way and under the bridges. Trucks removing dirt will not be on the streets during rush hour traffic. There will be some traffic disruption during the construction of the bridge at 24th Street by the Corps of Engineers. If you live next to the channel, you will experience additional noise during working hours.

What about bridges?

Bridges at Glendale Avenue and the new Squaw Peak Parkway have already been constructed. A bridge at 16th Street is currently under construction and bridges at 12th Street, Maryland Avenue, and 32nd Street will be under construction from May through November of 1990. Traffic detours will be provided at all these locations. During construction of the 32nd Street bridge, Stanford Drive will be closed.

A bridge at 24th Street will be built during the construction of Reach 4 and detours around the construction will be provided. The bridge at 24th Street has been limited to a 9 month time frame but the exact dates are not presently known.

Will there be any unusual construction activity?

Two areas of Reach 4 will be constructed as a covered channel. The area from just west of 24th Street to the east side of the golf links at the Biltmore Hotel (total length 4500 feet) will be a covered channel. Of that length, 1500 feet immediately in front of the Biltmore Hotel (the parking area) will be constructed under a compressed schedule in the summer months of 1991, when there are fewer people to disrupt. While covered channels are more expensive than open channels, the cost of obtaining replacement parking for the Hotel would be more than the cost of the covered channel.

The Corps will close Stanford Drive east of 32nd Street for 9 months while constructing a covered channel. Stanford Drive will then be restored on top of the covered channel. Rather than destroy the houses along Stanford Drive and relocate those residents, the Corps of Engineers opted for the less expensive option—in this instance—of covering the channel.

In Reach 3 of the ACDC, the Corps faced the similar concern of addressing the issue of covered versus open channels. The channel cut through the athletic facilities at Sunnyslope High School. Again, it was found to be less expensive to cover the channel and replace the facilities than to find an alternative location for them.

Can children get into the construction area?

Work areas will be fenced by the construction contractor until the permanent fences are placed on the channel walls.

Will the area be dusty?

The construction contractor for the Corps of Engineers must obtain earth moving permits from the Maricopa County Department of Health Services and follow its regulations as well as the Corps of Engineers' regulations. The contractor will have water trucks on the haul road. The Corps of Engineers' inspection force is alerted to dust control and monitors the contractor carefully. Call the Corps' office if dust becomes a problem.

Who do I call for more information?

Flood Control District, Public Involvement Coordinator 262-1501

Corps of Engineers 379-3022

When will the project be landscaped?

The landscaping will be done during the last 4 to 6 months of the construction contract. All the plants will be adapted to our hot, arid environment and will be low water users.

What hours will the contractor work?

The construction hours are 7:00 a.m. to 6:00 p.m., with the exception of the months of May through September, 1991, when double-shifting of construction crews will be necessary to construct the covered channel in the vicinity of the Biltmore Hotel.

Who do I call about a problem?

The ACDC is being designed and constructed by the U.S. Army Corps of Engineers. The local office is at 9601 North 21st Drive; telephone 261-3022.

Post-Construction Questions

What will the ACDC look like?

It will be a rectangular concrete channel. The concrete will be earth colored to blend in with the natural terrain. The banks will be landscaped and the permanent picket fences will look like wrought iron. Landscape nodes will be created at most major street intersections. Bridge railings will help prevent passing automobile passengers from seeing into the channel.

Screening walls, landscaping, and existing back yard fences will help conceal the channel from adjacent neighborhoods between major streets. The ACDC is screened from the south by the banks of the Arizona Canal.

Who will operate and maintain the ACDC?

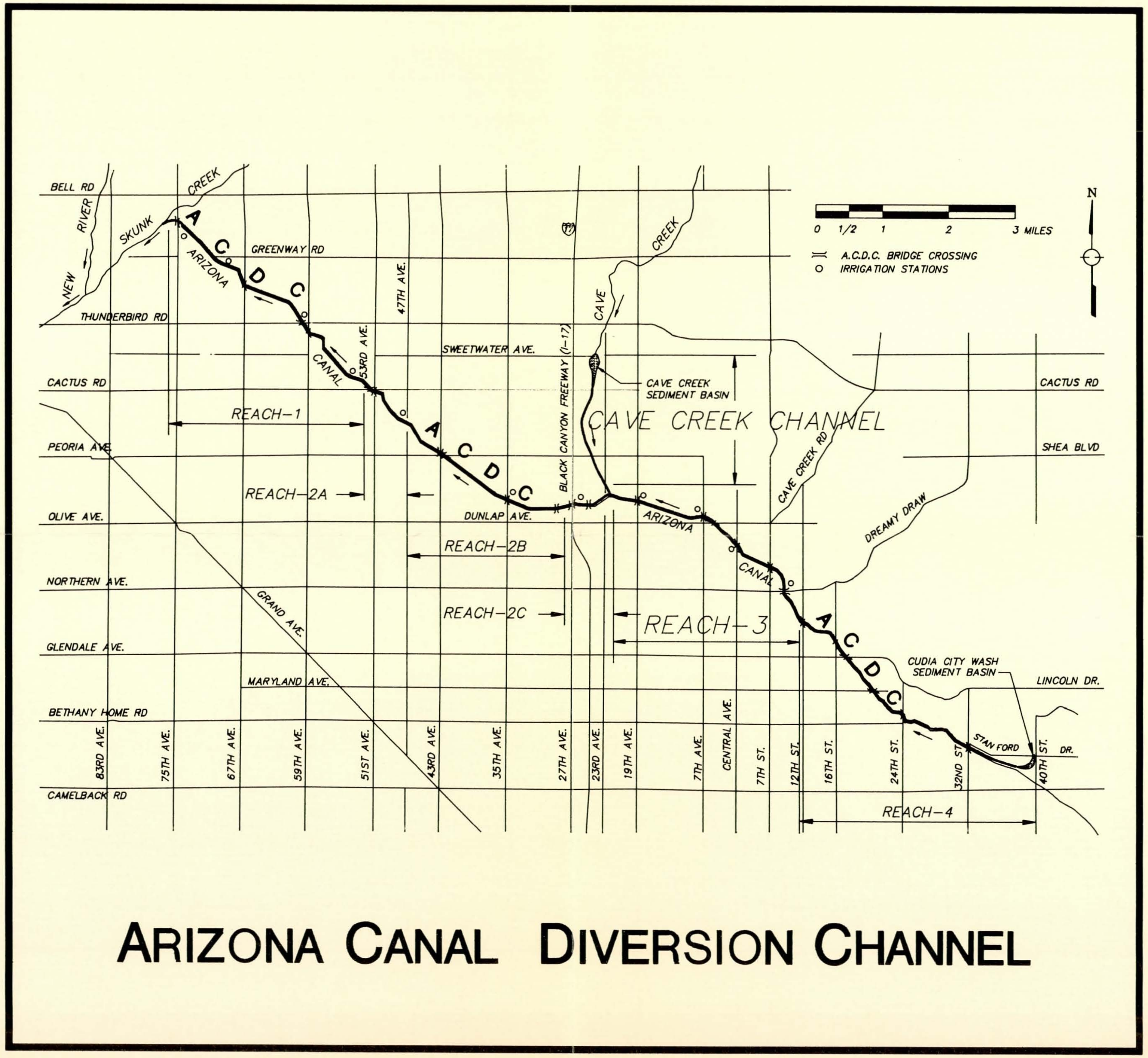
The Flood Control District will operate and maintain the channel and the landscaping after construction. The phone number is 262-1501.

Are there any recreation facilities?

The existing hiking, biking, and equestrian trails along the banks of the Arizona Canal will still be present. The maintenance road between the channel and the canal will also serve as a trail system for bicycle and equestrian purposes. In addition, in some areas, the maintenance road on the north side of the channel can be used as a bike path. Bicycle trail underpasses beneath 12th Street, 16th Street, and the Squaw Peak Parkway will complement those already in place at 24th Street and Glendale Avenue.

Can children get into the ACDC?

The Channel is being designed and constructed with the safety of children in mind. A 7-foot steel picket fence will be constructed on top of the channel wall.



How can someone get out of the channel?

Ladders are built into the walls at intervals so people can climb out, and equipment access ramps are located approximately every two miles. The emphasis on safety is to keep people out of the channel. By design, the channel is subject to *flash flooding* with stormwater moving at high velocities. If you witness trespassers in the channel, call the Operations and Maintenance Branch of the Flood Control District at 262-1501.

General Project Questions

What is the ACDC?

The Arizona Canal Diversion Channel is the core of an overall flood control project being designed and constructed by the U. S. Army Corps of Engineers and sponsored by the Flood Control District of Maricopa County.

Why is the ACDC being built?

Its purpose is to provide a high degree of flood protection to large parts of the metropolitan area. Floodwaters will be intercepted and diverted around the city. Water from streams, overland flows, and city storm drains will enter the ACDC and be carried to Skunk Creek and eventually to the Gila River.

How much flood protection will it provide?

The ACDC will intercept, and carry to Skunk Creek, flows up to a 100-year flood. This is the level of flooding expected to occur on an average of once per century.

How big will the ACDC be in Reach 4?

Reach 4 will be approximately 24 feet deep and between 36 and 40 feet wide.

What are the total costs of the ACDC?

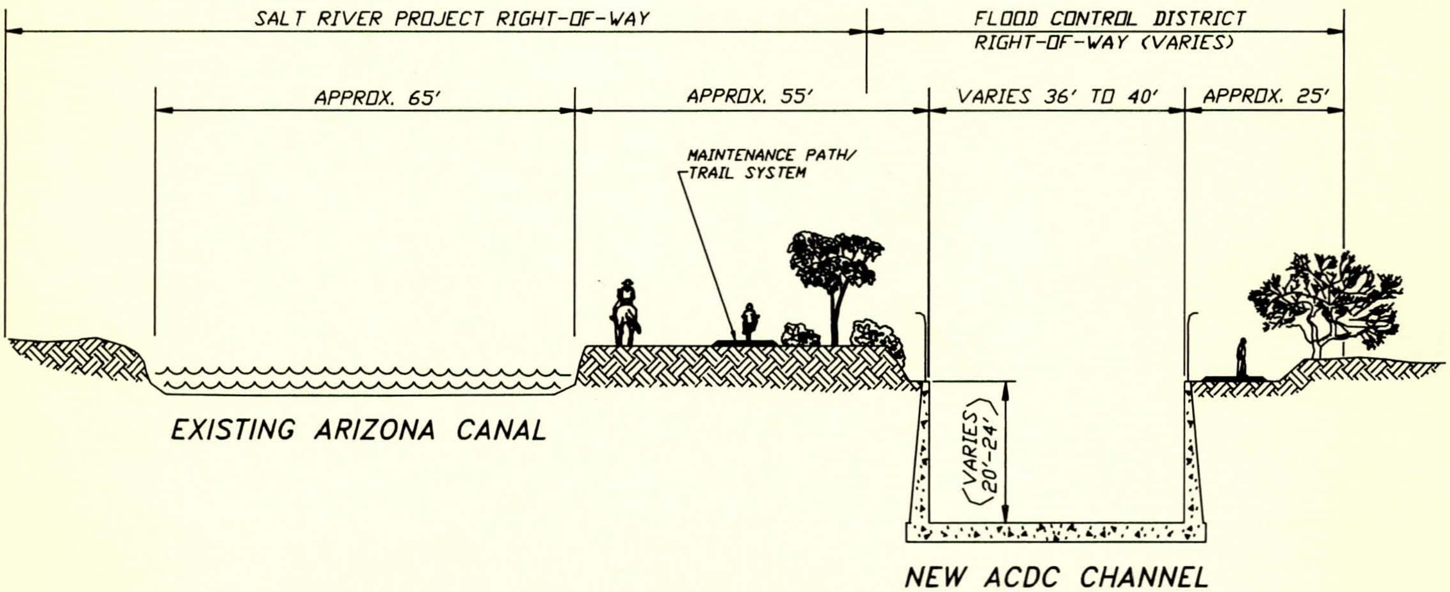
When completed the ACDC will be 16.5 miles in total length and will pass under 24 major streets. The most current estimates for federal and local costs for construction are approximately $154 million and $115 million, respectively. Local costs include the cost of purchasing rights-of-way and utility and street relocations.

What are the costs of Reach 4?

The Corps of Engineers' planning, design and construction costs will be about $54 million and the Flood Control District's costs will be about $29 million.

When will the entire ACDC be finished?

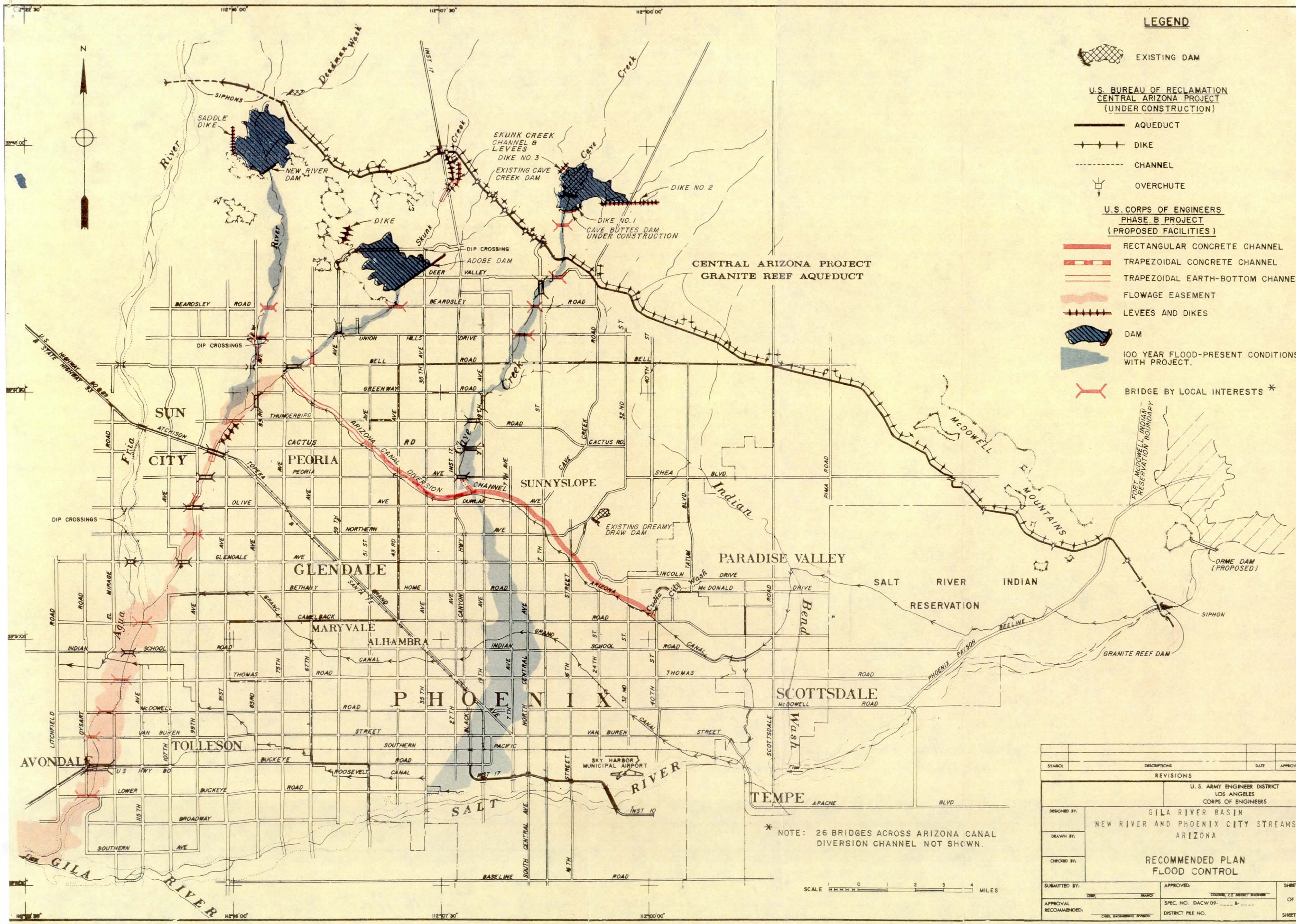
Reach 4, the final portion of the ACDC, is scheduled to be completed in the fall of 1992.



Typical Cross Section of Reach 4 of the ACDC—Shows the relative size of the features of the Arizona Canal and the ACDC.

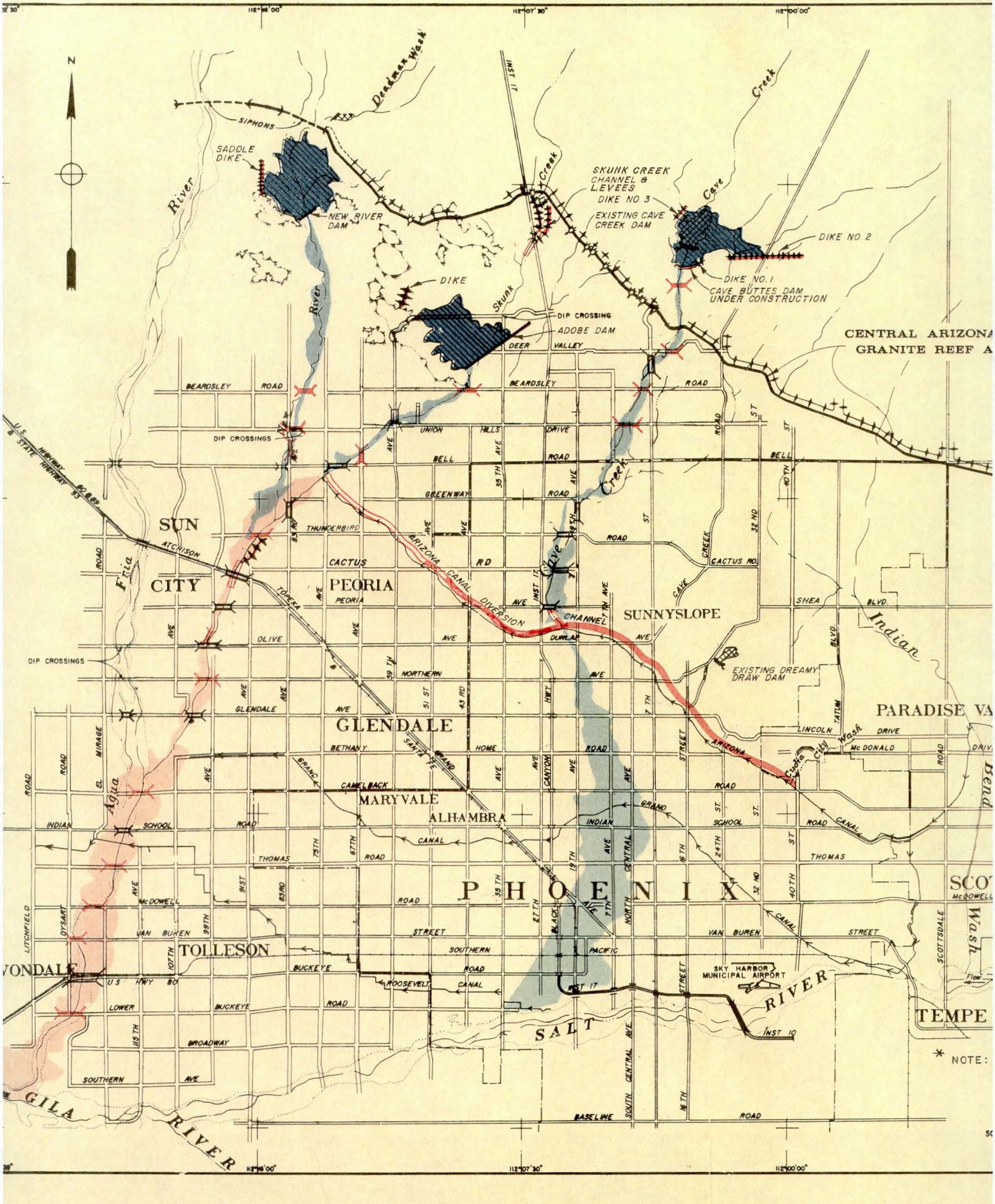
Flood Control District of Maricopa County
3335 West Durango Street
Phoenix, Arizona 85009

DATED MATERIAL ENCLOSED

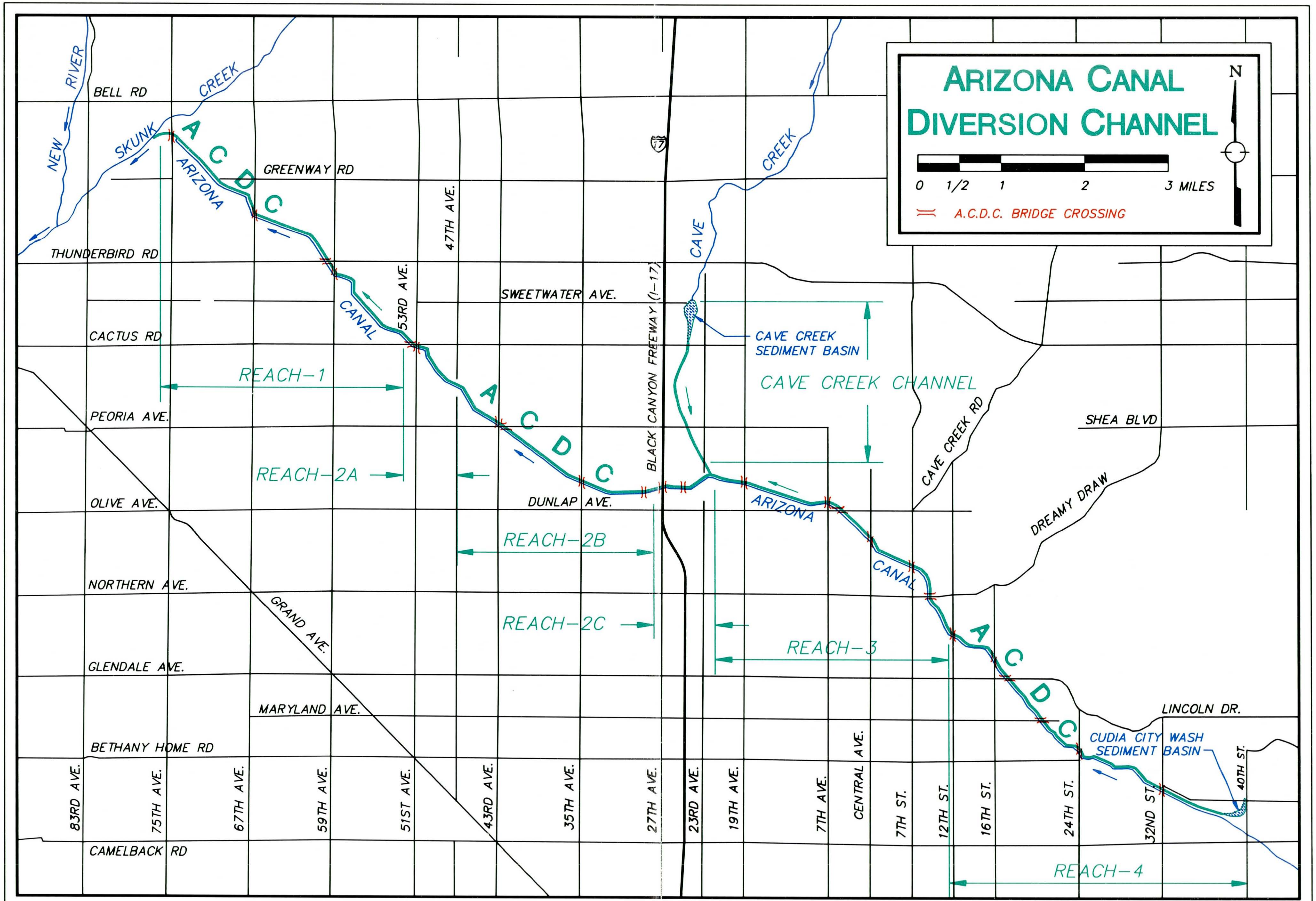


LEGEND
EXISTING DAM
U.S. BUREAU OF RECLAMATION
CENTRAL ARIZONA PROJECT
(UNDER CONSTRUCTION)
AQUEDUCT
DIKE
CHANNEL
OVERCHUTE
U.S. CORPS OF ENGINEERS
PHASE B PROJECT
(PROPOSED FACILITIES)
RECTANGULAR CONCRETE CHANNEL
TRAPEZOIDAL CONCRETE CHANNEL
TRAPEZOIDAL EARTH-BOTTOM CHANNEL
FLOWAGE EASEMENT
LEVEES AND DIKES
DAM
100 YEAR FLOOD-PRESENT CONDITIONS-WITH PROJECT.
BRIDGE BY LOCAL INTERESTS *
CENTRAL ARIZONA PROJECT
GRANITE REEF AQUEDUCT
SADDLE DIKE
NEW RIVER DAM
SIPHONS
DIKE
ADOBE DAM
DIP CROSSING
SKUNK CREEK CHANNEL & LEVEES
DIKE NO 3
EXISTING CAVE CREEK DAM
DIKE NO 2
DIKE NO. 1
CAVE BUTTES DAM UNDER CONSTRUCTION
DIP CROSSINGS
EXISTING DREAMY DRAW DAM
ARIZONA CANAL DIVERSION CHANNEL
ORME DAM (PROPOSED)
SIPHON
GRANITE REEF DAM
FORT McDOWELL INDIAN RESERVATION BOUNDARY
McDOWELL MOUNTAINS
SALT RIVER INDIAN RESERVATION
SUN CITY
PEORIA
GLENDALE
SUNNYSLOPE
PARADISE VALLEY
MARYVALE
ALHAMBRA
PHOENIX
SCOTTSDALE
TOLLESON
AVONDALE
TEMPE
SKY HARBOR MUNICIPAL AIRPORT
New River
Agua Fria
Skunk Creek
Cave Creek
Deadman Wash
Indian Bend Wash
SALT RIVER
GILA RIVER
* NOTE: 26 BRIDGES ACROSS ARIZONA CANAL DIVERSION CHANNEL NOT SHOWN.
SCALE 0 1 2 3 4 MILES
REVISIONS
U. S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS
GILA RIVER BASIN
NEW RIVER AND PHOENIX CITY STREAMS
ARIZONA
RECOMMENDED PLAN
FLOOD CONTROL

PLATE I



N
SIPHONS
Deadman Wash
SADDLE DIKE
NEW RIVER DAM
River
New River
DIKE
Skunk Creek
SKUNK CREEK CHANNEL & LEVEES
DIKE NO. 3
EXISTING CAVE CREEK DAM
Cave Creek
DIKE NO. 2
DIKE NO. 1
CAVE BUTTES DAM UNDER CONSTRUCTION
DIP CROSSING
ADOBE DAM
CENTRAL ARIZONA
GRANITE REEF A
DEER VALLEY
BEARDSLEY ROAD
DIP CROSSINGS
UNION HILLS DRIVE
BELL ROAD
GREENWAY ROAD
THUNDERBIRD
ARIZONA CANAL DIVERSION CHANNEL
SUN CITY
ATCHISON
TOPEKA
U.S. HIGHWAY 60 & 89
STATE HIGHWAY 93
CACTUS RD
CACTUS RD.
PEORIA
SUNNYSLOPE
SHEA BLVD.
Indian Bend
OLIVE AVE
DUNLAP AVE
NORTHERN AVE
EXISTING DREAMY DRAW DAM
GLENDALE AVE
GLENDALE
PARADISE VA
LINCOLN DRIVE
Cudia City Wash
McDONALD
BETHANY HOME ROAD
SANTA FE
GRAND
CAMELBACK ROAD
MARYVALE
ALHAMBRA
ARIZONA CANAL
INDIAN SCHOOL ROAD
GRAND CANAL
Agua Fria
THOMAS ROAD
PHOENIX
McDOWELL ROAD
VAN BUREN STREET
TOLLESON
SOUTHERN
BUCKEYE ROAD
PACIFIC
AVONDALE
US HWY 80
ROOSEVELT CANAL
INST 17
SKY HARBOR MUNICIPAL AIRPORT
SALT RIVER
INST 10
LOWER BUCKEYE ROAD
BROADWAY
SOUTHERN AVE
GILA RIVER
BASELINE ROAD
SCOTTSDALE
SCO
TEMPE
Wash
Flow
* NOTE:
LITCHFIELD ROAD
DYSART
EL MIRAGE ROAD
115 TH
107 TH
99TH
91ST
83RD
75TH
67TH
59 TH
51 ST
43 RD
35 TH AVE
27TH AVE
19TH AVE
7TH AVE
CENTRAL AVE
7 TH ST
16TH STREET
24TH ST.
32 ND ST
40TH ST
TATUM BLVD.
BLACK CANYON HWY
112°15'00"
112°07'30"
112°00'00"



ARIZONA CANAL DIVERSION CHANNEL
N
0 1/2 1 2 3 MILES
A.C.D.C. BRIDGE CROSSING
NEW RIVER
SKUNK CREEK
CAVE CREEK
ARIZONA CANAL
ACDC
BELL RD
GREENWAY RD
THUNDERBIRD RD
SWEETWATER AVE.
CACTUS RD
PEORIA AVE.
OLIVE AVE.
DUNLAP AVE.
NORTHERN AVE.
GLENDALE AVE.
MARYLAND AVE.
BETHANY HOME RD
CAMELBACK RD
LINCOLN DR.
SHEA BLVD
CAVE CREEK RD
DREAMY DRAW
GRAND AVE.
BLACK CANYON FREEWAY (I-17)
83RD AVE.
75TH AVE.
67TH AVE.
59TH AVE.
53RD AVE.
51ST AVE.
47TH AVE.
43RD AVE.
35TH AVE.
27TH AVE.
23RD AVE.
19TH AVE.
7TH AVE.
CENTRAL AVE.
7TH ST.
12TH ST.
16TH ST.
24TH ST.
32ND ST.
40TH ST.
REACH-1
REACH-2A
REACH-2B
REACH-2C
REACH-3
REACH-4
CAVE CREEK SEDIMENT BASIN
CAVE CREEK CHANNEL
CUDIA CITY WASH SEDIMENT BASIN

What are the elements of the ACDC?

Reach 1 is a 4.0 mile long earthen channel from Skunk Creek to Cactus Road. This reach is within the Cities of Peoria and Glendale. Glendale is building extensive recreation activities within the approximately 500 feet wide and 20 feet deep channel area.

Reach 2 extends 4.7 miles from Cactus Road to Cave Creek (23rd Avenue). From Cactus to 47th Avenue (0.75 miles) it is a concrete trapezoidal channel from 160 to 200 feet wide. Between 47th Avenue and Cave Creek Wash it is a concrete rectangular channel 110 feet wide. The walls through this Reach are approximately 21 feet deep.

Reach 3 extends 3.6 miles from Cave Creek to Dreamy Draw (12th Street) and will be 50 to 60 feet wide and 20.5 to 23.5 feet deep. It will be covered for a 2,565 foot stretch, so Sunnyslope High School can maintain the use of its athletic fields.

Reach 4 extends 4.2 miles from Dreamy Draw to Cudia City Wash near 40th Street. The rectangular concrete channel will be 36 to 40 feet wide and 20.5 to 24.5 feet deep. The channel will be covered from 24th Street to approximately 30th Street through the Arizona Biltmore Hotel area where costs of covering are less than additional right-of-way costs, and for 1,297 feet beneath Stanford Drive east of 32nd Street to avoid the cost of relocating Stanford Drive.

The Cave Creek Sediment Basin will be constructed just south of the Sweetwater Avenue alignment, and the area around the Basin will be used by the City of Phoenix for recreational acitivities.

The Cave Creek Channel will carry waters from the Sediment Basin to the ACDC. It will be a concrete channel within Phoenix's Cave Creek Park. The District is constructing undercrossings at Peoria and Cactus as well as six pedestrian bridges in connection with the Cave Creek Channel. The maintenance roads will be available for hiking, bicycling, equestrian and other nonvehicular recreation users.

The Cudia City Wash Sediment Basin will be on the grounds of the Phoenix Country Day School near 40th Street and Camelback. The basin is gradually sloping, unlined and relatively unobtrusive. The School's athletic fields, but no structures, will be located within it.

What will the ACDC look like?

The ACDC will mainly be a rectangular concrete channel (except for the earthen portion at the western end in Glendale and Peoria).

The Corps of Engineers, as part of its construction responsibilities, will provide landscaping and other aesthetic treatments.

For example, landscape nodes will be created at most major street intersections and the eye will be drawn to them rather than to the channel.

Bridge railings will help prevent passing automobile passengers from seeing into the channel.

Screening walls, landscaping, and existing back yard fences will conceal the channel from adjacent neighborhoods between major streets. Also, the channel is screened from the south by the banks of the Arizona Canal.

The type of landscaping differs in the various reaches in order to blend with existing neighborhoods; however, all the plants are adapted to the hot, arid environment in this area.

What causes the problem?

The natural paths of the streams and overland flows from the mountains and desert area are generally southwesterly across the metropolitan area and into the Salt and Gila Rivers.

These paths have, however, been obstructed by two different actions.

One was the building of the Arizona Canal in 1884.

This Canal, intended to distribute irrigation water, also acted as a dam to the natural flow of water.

As a result, water from small storms runs into the Arizona Canal or ponds along its northern bank. This ponding has resulted in flooding along that bank.

The second action was the obliteration through agriculture and urbanization of natural channels south of the Arizona Canal.

Significant rains drain into the Arizona Canal and quickly exceed the capacity of the Canal and pour over spillways to the south.

In major storms, the flows can and have caused breaks in the south bank of the Canal.

Because of the obliteration of the channels, these flows frequently race down streets, through yards and into homes and businesses.

How will the ACDC help?

The completion of the ACDC will allow the existing drainage to be modified.

Storm drains north of the Arizona Canal will empty into the ACDC and water will be carried to Skunk Creek. This will prevent ponding on the north side.

It will also intercept flows that would have gone into the Arizona Canal thereby preventing overflowing of the Canal caused by these inflows.

The ACDC will also allow the initiation of a new drainage concept south of the Canal.

Instead of having to cope with drainage from north of the Canal, new storm drains with a smaller initial capacity can be constructed to carry storm water to the Salt River.

Because the drain size can be decreased, the cities can save a large amount of money without decreasing protection.

Who is building the ACDC?

The overall Project and the ACDC are being designed and constructed by the U. S. Army Corps of Engineers with federal money.

The Flood Control District of Maricopa County is the local sponsor and is responsible for acquiring the land, building bridges, relocating utilities such as water lines, and then operating and maintaining the project in the future.

The money comes from the Flood Control Tax Levy on all real property within the County.

The cities along its path – Paradise Valley, Phoenix, Glendale, and Peoria – have studied and approved the project through their city limits.

ACDC COMPLETED RELOCATION PROJECTS

Project	Engineer	Contractor	Completion Date	Total Cost
75th Ave Bridge	Royden Engineering	C.S.Construction	11/85	$1,558,046
67th Ave Bridge	E.M. Plummer	R.G. Roth	8/85	2,736,297
T-Bird Road Bridge	Sverdrup & Parcel	C.S.Construction	1/84	1,363,909
59th Ave Bridge	Benson & Gerdin	Artcraft Constr.	6/84	1,707,873
51st & Cactus Br.	Hoffman-Miller	V.O. Conrtacting	8/86	1,960,198
43rd & Peoria Br.	Benson & Gerdin	Meadow Valley	11/87	2,872,705
35th Ave Bridge	Greiner Eng.	Kasler (Corps)	in-progress	1,693,578
29th Ave Bridge	DMJM	Ashton Co.	10/86	1,209,883
I-17 Bridge	RGA (ADOT)	JWJ (ADOT)	5/88	3,500,000
25th Ave Bridge	Sverdrup & Parcel	Tanner Companies	8/85	911,358
25th Ave Siphon	Erickson & Salmon	Nikko Constr.	2/88	498,895
19th Ave Siphon & 48" Waterline	Entranco/Mann/John	Lundell Constr.	2/88	821,742
Dunlap Ave Siphon	HNTB	Pierson Constr.	2/88	440,990
Northern Ave Siphon	RGA	Lloyd Bros. Constr.	2/88	354,048

*** ARIZONA CANAL DIVERSION CHANNEL PROJECT ***
**** WITHIN THE CITY OF PHOENIX ****

ARIZONA CANAL DIVERSION CHANNEL (ACDC)
Reaches 2A, 2B, 2C and Cave Creek Channel

General Schedule

<u>Reach 2A Channel - 51st Ave. to 47th Ave.</u>

Channel completed - August 1987

<u>Reach 2B Channel - 47th Ave. to 29th Ave. (Metro Center)</u>

Channel construction start date -	September 1987
Channel construction completion date -	January 1989
35th Avenue Bridge completion date -	July 1988

Reach 2C Channel - 29th Ave. to 22nd Ave.	Completion Date
12" Water Line (by Corps) Soonest start date Oct 88	June '90
12kV U/G electric	Sept. '88
I-17 Recreation/Maintenance Underpass	May '88
Begin Channel Construction *	Oct. '88
End Channel Construction *	June '90

* Note: Reach 2C Channel and Cave Creek Channel will be constructed at the same time.
Includes two pedestrian/maintenance road bridges.

Cave Creek Channel - ACDC Reach "2C" to Sweetwater Ave.	Completion Date
Utility Relocations at Peoria Ave.	Sept. '88
Utility Relocations at Cactus Rd.	Sept. '88
Utility Relocations (other)	Sept. '88
Recreation/Maintenance Underpass at Peoria Ave.	Oct. '88
Recreation/Maintenance Underpass at Cactus Rd.	Oct. '88
Begin Channel Construction **	Oct. '88
End Channel Construction **	June '88

** Note: Reach 2C Channel and Cave Creek Channel will be constructed at the same time.
Includes four pedestrian/maintenance road bridges.

April 13, 1988

ARIZONA CANAL DIVERSION CHANNEL (ACDC)
Reaches 3 & 4
General Schedule

	Begin Construction	End Construction
Reach Three -- 21st Drive to 12th Street		
FCD Construction:		
19th Avenue Bridge & Utilities	April 88	Nov 88
7th Avenue Bridge & Utilities	July 88	Dec 88
Central Ave to 7th St Utilities	July 88	Fall 88
7th Street Bridge & Utilities *	Summer 88	Spring 89
Northern Ave Bridge & Utilities *	June 88	Dec 88
Utilities Northern Ave to 12th St.	Summer 88	Fall 88
Corps of Engineers Construction:		
Channel Construction	April 89	Fall 90
Dunlap & Central Ave Bridges	Spring 89	Fall 90
Reach Four -- 12th Street to 40th Street		
FCD Construction:		
12th Street Bridge and Utilities	Spring 89	Fall 89
Glendale Avenue Bridge & Utilities	Spring 89	Fall 89
16th Street Bridge & Utilities *	Fall 89	Spring 90
Maryland Avenue Bridge & Utilities	Summer 89	Spring 90
Arizona Canal Relocation W. of 24th	Fall 89	Spring 90
Squaw Peak Water Treatment Plant reloc.	Fall 89	Spring 90
24th Street Sanitary Sewer Siphon	Fall 89	Spring 90
Biltmore Sewer Siphon	Fall 89	Spring 90
Arizona Canal Relocation at Biltmore	Fall 89	Spring 90
Utility Relocations 32nd to 40th Sts.	Fall 89	Spring 90
City of Phoenix Construction:		
Squaw Peak Parkway Bridge	Summer 88	Summer 89
Corps of Engineers Construction:		
Channel Construction	Spring 90	Fall 91
Relocation of Stanford Drive	90	91
Cudia City Wash Sediment Basin		
If Constructed by Corps	Spring 90	Fall 90
If Constructed by FCD	Spring 89	Fall 89

* Note: Pedestrian Underpass Locations

May 6, 1988

ACDC

Arizona Canal Diversion Channel

Flood Control for the Phoenix Metropolitan Area

January 1991

Construction Questions

Residents near the Arizona Cana[...]een 12th and 24th Streets are invited to a public meeting to be briefed on the construction:

7-9 p.m., Tuesday, January 8, 1991
Madison No. 1 Elementary School Cafeteria (follow the signs)
5601 North 16th Street

Representatives will be present from the:
--Flood Control District
--Army Corps of Engineers
--Construction Contractor (Sundt)
--City of Phoenix

Wh[...]

Rea[...] of tl[...] Was[...]

Wh[...]

The[...] cons[...] Not[...] 199[...] fron[...]

In w[...]

The[...] generally in the following order:

1. Clearing of rights-of-way
2. Excavation
3. Construction of channel walls
4. Backfilling
5. Landscaping

The contractor will not [...] Rather, work sites will b[...] to meet construction star[...] various property holders[...]

January 1991	24[...]
March	W[...]
May	Ar[...]
July	12[...]
October	Sq[...]
January 1992	Sta[...]
July	Ph[...]

Future newsletters will pr[...] on the schedule and activ[...]

owners of record who didn't live in the vicinity were requested to forward newsletter to property resident

How will the constructio[...]

The Corps' contract work will take place within the channel right-of-way and under the bridges. Trucks removing dirt will not be on the streets during rush hour traffic. There will be some traffic disruption during the construction of the bridge at 24th Street and the channel section along Stanford Drive. If you live next to the channel, you will experience additional noise during working hours.

[...]treet, [...]quaw [...] The [...]ction [...]ill be

[...]vered [...] east [...] 4500 [...] feet [...]king area) will be constructed under a compressed schedule in the summer months of 1991.

Stanford Drive east of 32nd Street will be closed for 10 months for construction of a covered channel. Stanford Drive then will be restored on top of the covered channel.

[...]ildren get into the construction area?

[...]reas will be fenced by the construction contractor [...] permanent fences are placed on the channel walls.

[...] area be dusty?

[...]struction contractor for the Corps of Engineers [...]tain earth-moving permits from the Maricopa [...] Department of Health Services and follow its [...]ons, as well as the Corps of Engineers' regulations. [...]tractor will have water trucks on the haul road. [...]ps of Engineers' inspection force is alerted to dust [...]and monitors the contractor carefully. Call the [...]ffice if dust becomes a problem.

[...]ill the project be landscaped?

[...]scaping will be done during the last 4 to 6 months [...]nstruction contract. All the plants will be adapted [...]t, arid environment and will be low water users.

Who do I call for more information?

Flood Control District, Public Involvement Coordinator	262-1501
Corps of Engineers	379-3022
Sundt Corp.	943-8668

ACDC

Arizona Canal Diversion Channel

Flood Control for the Phoenix Metropolitan Area

January 1991

Construction Questions

Where is Reach 4?

Reach 4 of the ACDC runs parallel to and on the north side of the Arizona Canal between 12th Street and Cudia City Wash (40th Street). See map, inside.

Who will be doing the construction?

The U.S. Army Corps of Engineers has awarded a construction contract to Sundt Corp. for $46 million. The Notice to Proceed was given to Sundt on November 8, 1990. The work will be monitored and inspected by staff from the Corps of Engineers.

In what sequence will construction occur?

The construction contractor is expected to do the work generally in the following order:

1. Clearing of rights-of-way
2. Excavation
3. Construction of channel walls
4. Backfilling
5. Landscaping

The contractor will not work from one end to the other. Rather, work sites will be scattered throughout the Reach to meet construction start and stop dates agreed upon with various property holders. The tentative schedule is:

January 1991	24th Street
March	Western Savings
May	Arizona Biltmore
July	12th Street and Orangewood
October	Squaw Peak Water Treatment Plant
January 1992	Stanford Drive
July	Phoenix Country Day School

Future newsletters will provide more detailed information on the schedule and activities.

How will the construction affect me?

The Corps' contract work will take place within the channel right-of-way and under the bridges. Trucks removing dirt will not be on the streets during rush hour traffic. There will be some traffic disruption during the construction of the bridge at 24th Street and the channel section along Stanford Drive. If you live next to the channel, you will experience additional noise during working hours.

What about bridges?

Bridges at Glendale Avenue, 16th Street, 12th Street, Maryland Avenue, and 32nd Street and the new Squaw Peak Parkway have already been constructed. The crossing at 24th Street will be built during the construction of Reach 4 and detours around the construction will be provided.

Will there be any unusual construction activity?

Two areas of Reach 4 will be constructed as a covered channel. The area from just west of 24th Street to the east side of the golf links at the Biltmore Hotel (total length 4500 feet) will be a covered channel. Of that length, 1500 feet immediately in front of the Biltmore Hotel (the parking area) will be constructed under a compressed schedule in the summer months of 1991.

Stanford Drive east of 32nd Street will be closed for 10 months for construction of a covered channel. Stanford Drive then will be restored on top of the covered channel.

Can children get into the construction area?

Work areas will be fenced by the construction contractor until the permanent fences are placed on the channel walls.

Will the area be dusty?

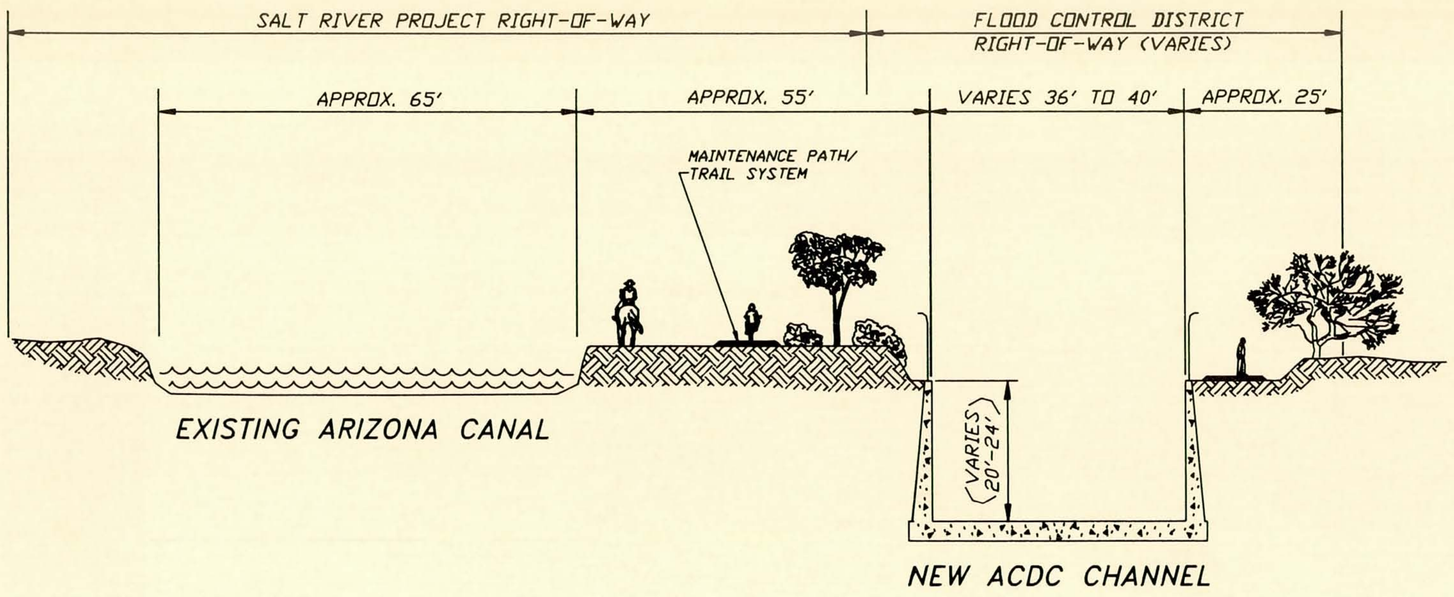
The construction contractor for the Corps of Engineers must obtain earth-moving permits from the Maricopa County Department of Health Services and follow its regulations, as well as the Corps of Engineers' regulations. The contractor will have water trucks on the haul road. The Corps of Engineers' inspection force is alerted to dust control and monitors the contractor carefully. Call the Corps' office if dust becomes a problem.

When will the project be landscaped?

The landscaping will be done during the last 4 to 6 months of the construction contract. All the plants will be adapted to our hot, arid environment and will be low water users.

Who do I call for more information?

Flood Control District, Public Involvement Coordinator	262-1501
Corps of Engineers	379-3022
Sundt Corp.	943-8668



Typical Cross Section of Reach 4 of the ACDC—Shows the relative size of the features of the Arizona Canal and the ACDC.

Flood Control District of Maricopa County
3335 West Durango Street
Phoenix, Arizona 85009

DATED MATERIAL ENCLOSED

Ed Raleigh

ACDC

Arizona Canal Diversion Channel

Flood Control for the Phoenix Metropolitan Area

January 1991

Construction Questions

Where is Reach 4?

Reach 4 of the ACDC runs parallel to and on the north side of the Arizona Canal between 12th Street and Cudia City Wash (40th Street). See map, inside.

Who will be doing the construction?

The U.S. Army Corps of Engineers has awarded a construction contract to Sundt Corp. for $46 million. The Notice to Proceed was given to Sundt on November 8, 1990. The work will be monitored and inspected by staff from the Corps of Engineers.

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Corps of Engineers 379-3022

Sundt Corp. 943-8668

What hours will the contractor work?

In addition to normal daytime hours, double-shifts will be used during times of intense construction activity, such as between May and September 1991 to start and finish work on the covered channel in front of the Biltmore Hotel. The contractor also plans to request extended hours for excavation hauling, to reduce inconvenience to, and enhance safety of, local traffic.

Who do I call about a problem?

The ACDC is being designed and constructed by the U.S. Army Corps of Engineers. The local office is at 9601 North 21st Drive; telephone 379-3022.

Post-Construction Questions

What will the ACDC look like?

It will be a rectangular concrete channel. The concrete will be earth colored to blend in with the natural terrain. The banks will be landscaped and the permanent picket fences will look like wrought iron. Landscape nodes will be created at most major street intersections. Bridge railings will help prevent passing automobile passengers from seeing into the channel.

Screening walls, landscaping, and existing back yard fences will help conceal the channel from adjacent neighborhoods between major streets. The ACDC is screened from the south by the banks of the Arizona Canal.

Who will operate and maintain the ACDC?

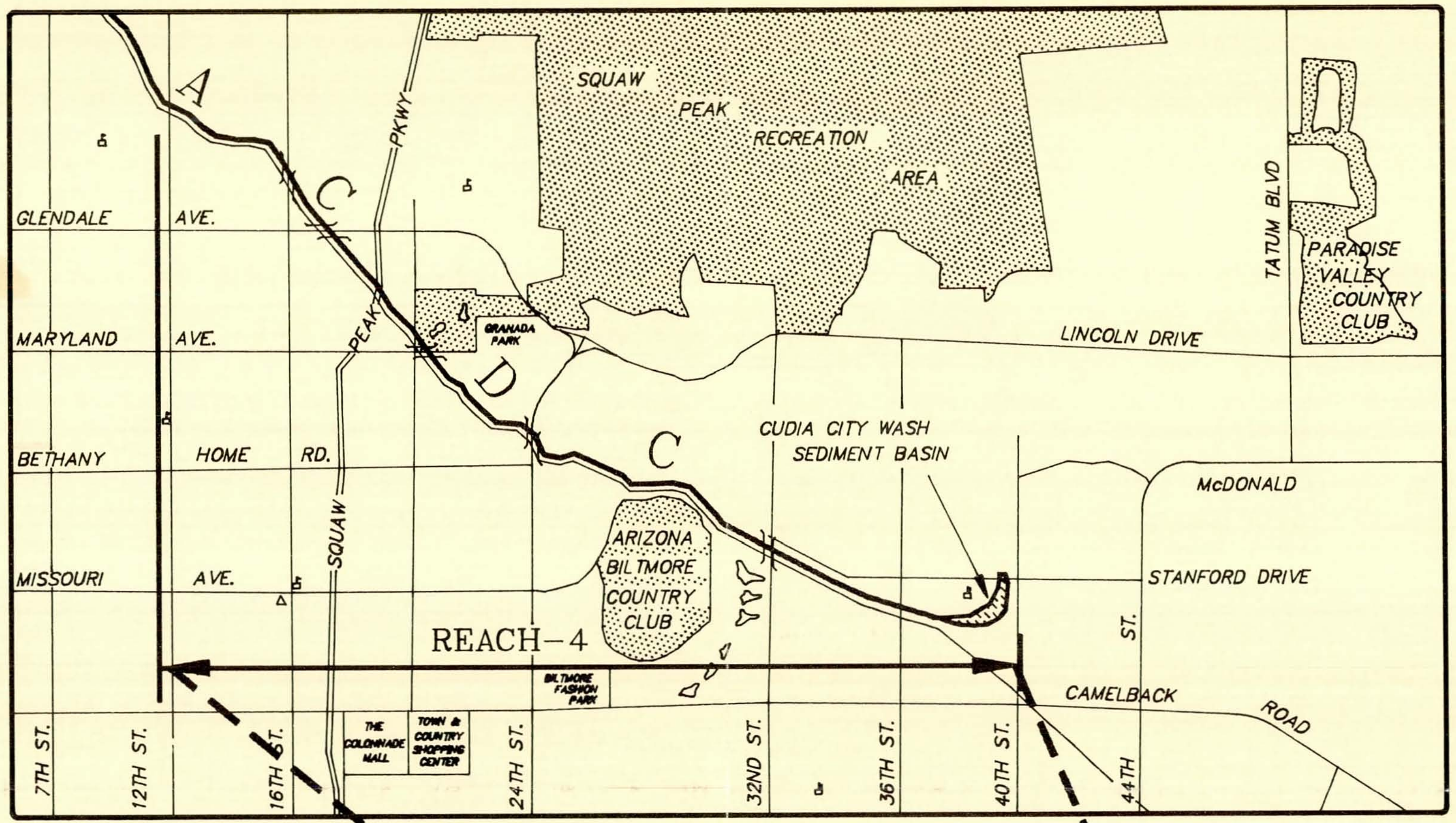
The Flood Control District will operate and maintain the channel and the landscaping after construction. The phone number is 262-1501.

Are there any recreation facilities?

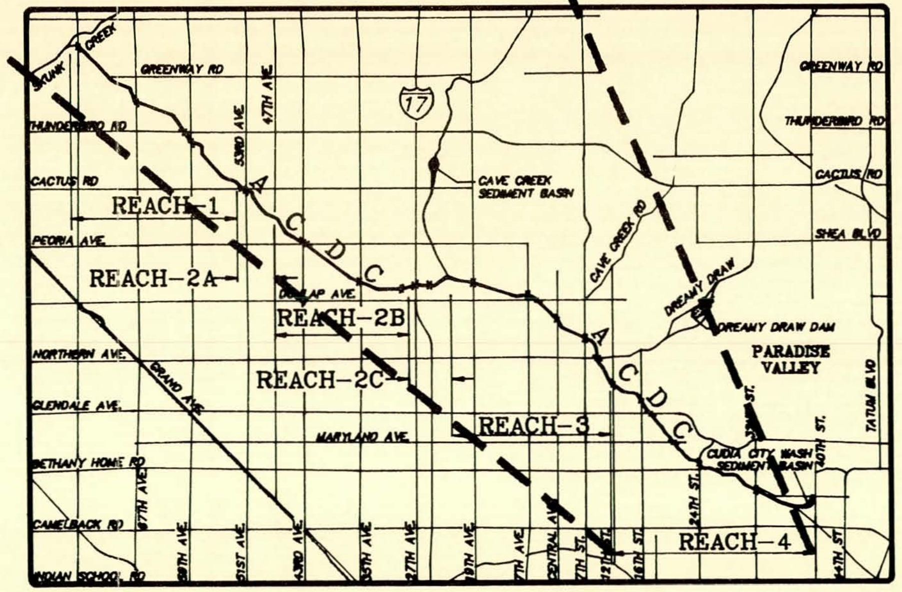
The existing hiking, biking, and equestrian trails along the banks of the Arizona Canal will still be present. The maintenance road between the channel and the canal will also serve as a trail system for bicycle and equestrian purposes. In addition, in some areas, the maintenance road on the north side of the channel can be used as a bike path. Bicycle trail underpasses beneath 12th Street, 16th Street, and the Squaw Peak Parkway will complement those already in place at 24th Street and Glendale Avenue.

Can children get into the ACDC?

The Channel is being designed and constructed with the safety of children in mind. A 7-foot steel picket fence will be constructed on top of the channel wall.



ARIZONA CANAL DIVERSION CHANNEL



How can someone get out of the channel?

Ladders are built into the walls at intervals so people can climb out, and equipment access ramps are located approximately every two miles. The emphasis on safety is to keep people out of the channel. By design, the channel is subject to *flash flooding* with stormwater moving at high velocities. If you witness trespassers in the channel, call the Operations and Maintenance Branch of the Flood Control District at 262-1501.

General Project Questions

What is the ACDC?

The Arizona Canal Diversion Channel is the core of an overall flood control project being designed and constructed by the U. S. Army Corps of Engineers and sponsored by the Flood Control District of Maricopa County.

Why is the ACDC being built?

Its purpose is to provide a high degree of flood protection to large parts of the metropolitan area. Floodwaters will be intercepted and diverted around the city. Water from streams, overland flows, and city storm drains will enter the ACDC and be carried to Skunk Creek and eventually to the Gila River.

How much flood protection will it provide?

The ACDC will intercept, and carry to Skunk Creek, flows up to a 100-year flood. This is the level of flooding expected to have a one percent chance of occurring in any year.

How big will the ACDC be in Reach 4?

Reach 4 will be approximately 24 feet deep and between 36 and 40 feet wide.

What are the total costs of the ACDC?

When completed the ACDC will be 16.5 miles in total length and will pass under 24 major streets. The most current estimates for federal and local costs for construction are approximately $154 million and $115 million, respectively. Local costs include the cost of purchasing rights-of-way and utility and street relocations.

What are the costs of Reach 4?

The Corps of Engineers' construction costs will be about $46 million and the Flood Control District's costs will be about $29 million.

When will the entire ACDC be finished?

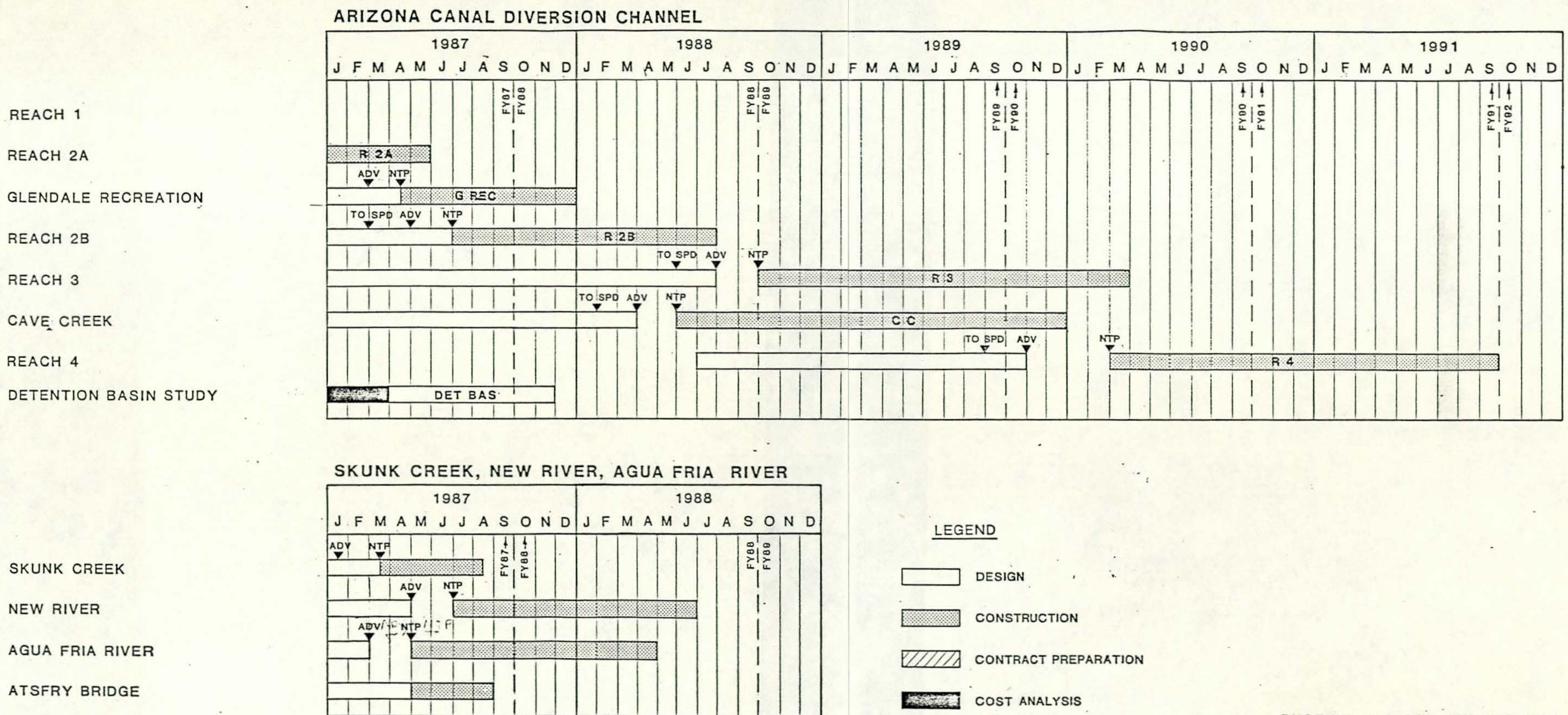
Reach 4, the final portion of the ACDC, is scheduled to be completed in the spring of 1993.

ARIZONA CANAL DIVERSION CHANNEL (ACDC)
Reaches 3 & 4
General Schedule

	Begin Construction	End Construction
Reach Three -- 21st Drive to 12th Street		
FCD Construction:		
19th Avenue Bridge & Utilities	April 88	Nov 88
7th Avenue Bridge & Utilities	August 88	Dec 88
Central Ave to 7th St Utilities	July 88	Fall 88
7th Street Bridge & Utilities *	August 88	March 89
Northern Ave Bridge & Utilities *	June 88	Dec 88
Utilities Northern Ave to 12th St.	October88	Jan 89
Corps of Engineers Construction:		
Channel Construction	April 89	Fall 90
Dunlap & Central Ave Bridges	Spring 89	Fall 90
Reach Four -- 12th Street to 40th Street		
FCD Construction:		
12th Street Bridge and Utilities	Spring 89	Fall 89
Glendale Avenue Bridge & Utilities	Spring 89	Fall 89
16th Street Bridge & Utilities *	Fall 89	Spring 90
Maryland Avenue Bridge & Utilities	Summer 89	Spring 90
Arizona Canal Relocation W. of 24th	Fall 89	Spring 90
Squaw Peak Water Treatment Plant reloc.	Fall 89	Spring 90
24th Street Sanitary Sewer Siphon	Fall 89	Spring 90
Biltmore Sewer Siphon	Fall 89	Spring 90
Arizona Canal Relocation at Biltmore	Fall 89	Spring 90
Utility Relocations 32nd to 40th Sts.	Fall 89	Spring 90
City of Phoenix Construction:		
Squaw Peak Parkway Bridge	Summer 88	Summer 89
Corps of Engineers Construction:		
Channel Construction	Spring 90	Fall 91
Relocation of Stanford Drive	90	91
Cudia City Wash Sediment Basin		
If Constructed by Corps	Spring 90	Fall 90
If Constructed by FCD	Spring 89	Fall 89

* Note: Pedestrian Underpass Locations

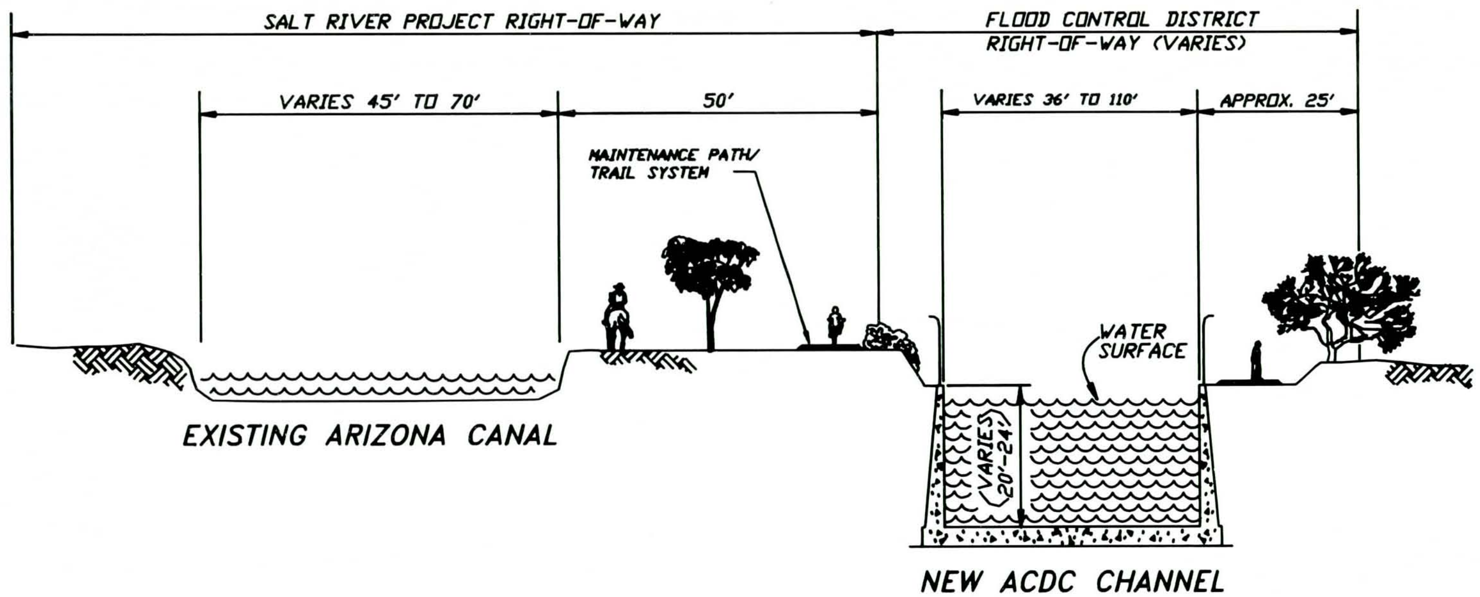
May 6, 1988



PHOENIX, ARIZONA AND VICINITY
PROJECT SCHEDULE
JANUARY 1987

ARIZONA CANAL DIVERSION CHANNEL (ACDC)
Reaches 3 & 4
General Schedule

Reach 3 (21st Drive to 12th Street)		
Construction by Corps	Fall 88	Spring 90
19th Avenue Bridge & Utilities	April 88	Oct 88
7th Avenue Bridge & Utilities	Aug 88	Jan 89
Sunnyslope High School Regrading	Spring 89	Fall 89
Central Ave to 7th St Utilities	July 88	Fall 88
7th Street Bridge & Utilities	Summer 88	Spring 89
Northern Ave Bridge & Utilities	Spring 88	Summer 88
Utilities Northern Ave to 12th St.	Summer 88	Fall 88
Dunlap & Central Ave Bridges (by Corps)	Winter 89	Spring 90
Reach 4 (12th Street to 40th Street)		
Construction by Corps	Spring 90	Fall 91
12th Street Sewer Siphon	Fall 88	Spring 89
12th Street Bridge and Utilities	Spring 89	Summer 89
Glendale Avene Sewer Siphon	Fall 88	Spring 89
Glendale Avenue Bridge & Utilities	Spring 89	Summer 89
16th Street Sewer Siphon	Fall 88	Spring 89
16th Street Bridge & Utilities	Summer 89	Winter 90
Squaw Peak Parkway Bridge (by Phx)	Summer 88	Summer 89
Maryland Avenue Sewer Siphon	Fall 89	Spring 90
Maryland Avenue Bridge & Utilies	Spring 90	Summer 90
Arizona Canal Relocation W. of 24th	Fall 88	Spring 89
Squaw Peak Water Treatment Plant reloc.	Summer 89	Fall 89
24th Street Sanitary Sewer Siphon	Fall 89	Spring 90
Biltmore Sewer Siphon	Fall 89	Spring 90
Arizona Canal Relocation at Biltmore	Fall 89	Spring 90
Utility Relocations 32nd to 40th Sts.	Fall 89	Spring 90
Relocation of Stanford Drive (By Corps) (same location, but on top of covered ACDC Channel)	91	
Cudia City Wash Sediment Basin	Fall 88	Spring 89



TYPICAL CROSS SECTION

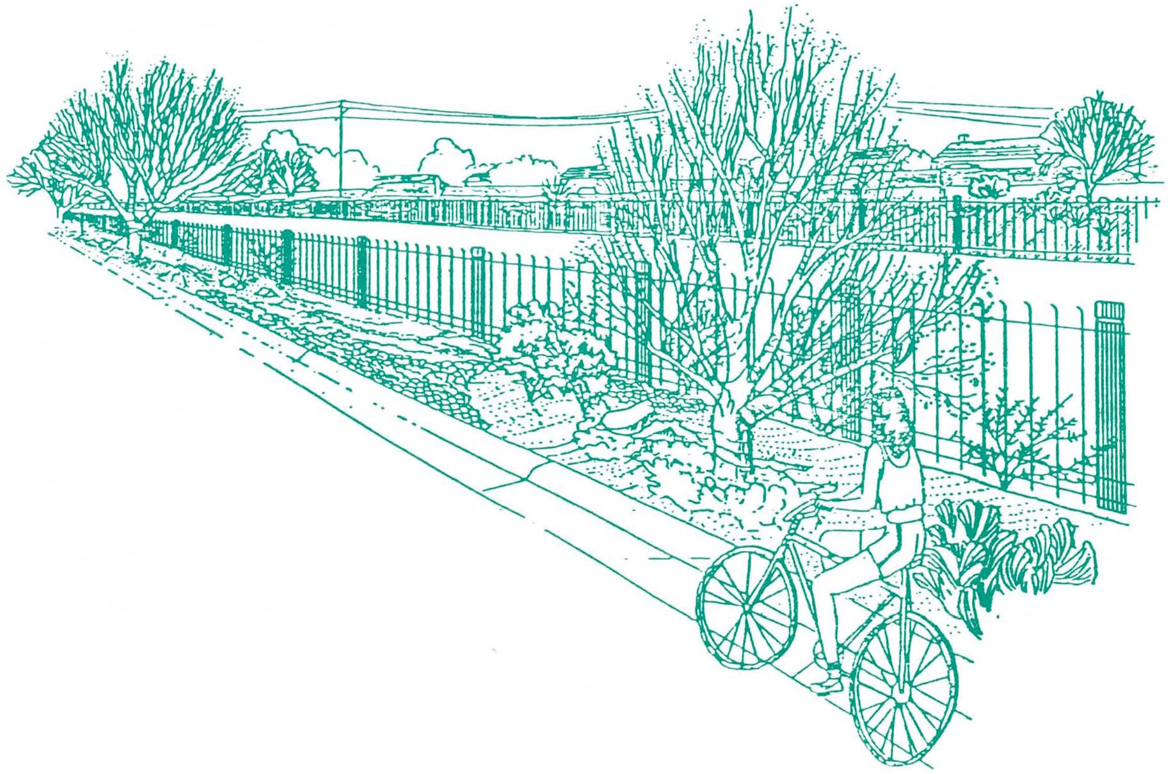
CONCRETE RECTANGULAR CHANNEL
47th AVENUE TO 40th STREET

For further information contact:

Public Involvement Coordinator
Flood Control District
of Maricopa County
3335 West Durango
Phoenix, Arizona 85009
262-1501

Flood Control District
of Maricopa County

ACDC



Arizona Canal Diversion Channel

What is the ACDC?

The Arizona Canal Diversion Channel (ACDC) is part of an overall project developed by the U.S. Army Corps of Engineers and sponsored by the Flood Control District of Maricopa County to provide a high measure of flood protection to a large part of the metropolitan area.

The overall project is known as the Phoenix, Arizona and Vicinity (Including New River) Flood Control Project.

This project includes Dreamy Draw Dam, Cave Buttes Dam, Adobe Dam, New River Dam, the ACDC, and flowage easements/bank stabilization on Skunk Creek, New River, and the Agua Fria River.

What is the purpose of the Phoenix, Arizona and Vicinity (Including New River) Flood Control Project?

This project will protect people from flood flows originating in the mountain and desert drainage area lying to the north of and including parts of Phoenix, Glendale, and Peoria.

Many streams including Cudia City Wash, Dreamy Draw, Cave Creek, Skunk Creek, New River, and the Agua Fria River drain flows from this mountain and desert area to the metropolitan area.

How does the Phoenix, Arizona and Vicinity (Including New River) Flood Control Project work?

Dreamy Draw Dam and Cave Buttes Dam, on Cave Creek, collect floodwaters and release the water slowly into the natural creek beds to the ACDC.

The ACDC collects this water as well as floodwaters from several minor tributaries, uncontrolled overland flow, and city storm drains and takes the water to Skunk Creek.

Adobe Dam, on Skunk Creek, and New River Dam collect floodwaters and release the water slowly down Skunk Creek and New River so that the peak flows, after the introduction of the ACDC water, will not be increased.

The acquisition of flowage easements and the construction of bank protection on Skunk Creek, New River, and the Agua Fria River complete the project.

The water from these projects flows into the Agua Fria River and then into the Gila River, which is its original and natural destination.

What is the purpose of the ACDC?

The ACDC is the core of the overall project. It is a 16.5 mile channel from approximately 40th Street and Camelback to 75th Avenue and Greenway in an alignment parallel to and on the northern side of the Arizona Canal.

It will intercept, and carry to Skunk Creek, flows up to a 100 year flood. This is the level of flooding expected to occur on an average of once per century.

For comparison, Phoenix city storm drains are generally planned for protection up to the two year flood.

The ACDC will eliminate flood damages to Phoenix, Glendale, and Peoria south of the Arizona Canal from flows originating north of the Canal up to the 100 year level and will substantially reduce damages from flows in excess of the 100 year level.

The plants are low water users.

A safety fence made of steel with a wrought iron appearance will prevent children and animals from getting into the channel.

The safety fencing will be only partially visible because there will be a slope from ground level down to the channel walls. The fence will be built at the top of the channel walls.

The south walls will, in most areas, nearly adjoin the north border of the Salt River Project right-of-way.

The Canal and the Channel will share a maintenance road which will also double as a bike path.

Adjacent to the maintenance road will be the existing equestrian path.

Stormwater will flow into the channel easily because the channel will be constructed below the ground surface.

Inlet structures will be built where the flows from major drains enter the channel and pipes will be used where local ponding occurs.

City storm drains constructed by Phoenix will also outlet into the Channel.

What about bridges?

A total of 24 vehicular bridges will be constructed at all present crossings of the Arizona Canal.

Several new pedestrian bridges will also be constructed.

These bridges are being built under the direction of the Flood Control District.

Who will operate and maintain the ACDC?

The Flood Control District will supply the manpower and costs of maintaining the ACDC.

This includes removal of debris and silt that may accumulate in the bottom of the channel as well as maintaining the landscaping on the banks.

Glendale and Phoenix will share in the maintenance responsibilities in areas where recreation features are planned.

What will the Phoenix and Vicinity (Including New River) Flood Control Project cost?

The total cost for the Phoenix and Vicinity (Including New River) Flood Control Project, which includes the ACDC, four dams, and other measures (flood control and recreational facilities, as well as wildlife mitigation and lands and archaeological mitigation) is estimated at $422 million, of which $254 million is a federal cost and $168 million is a local cost.

What will the ACDC cost?

The combined federal and local costs are estimated to be $254 million.

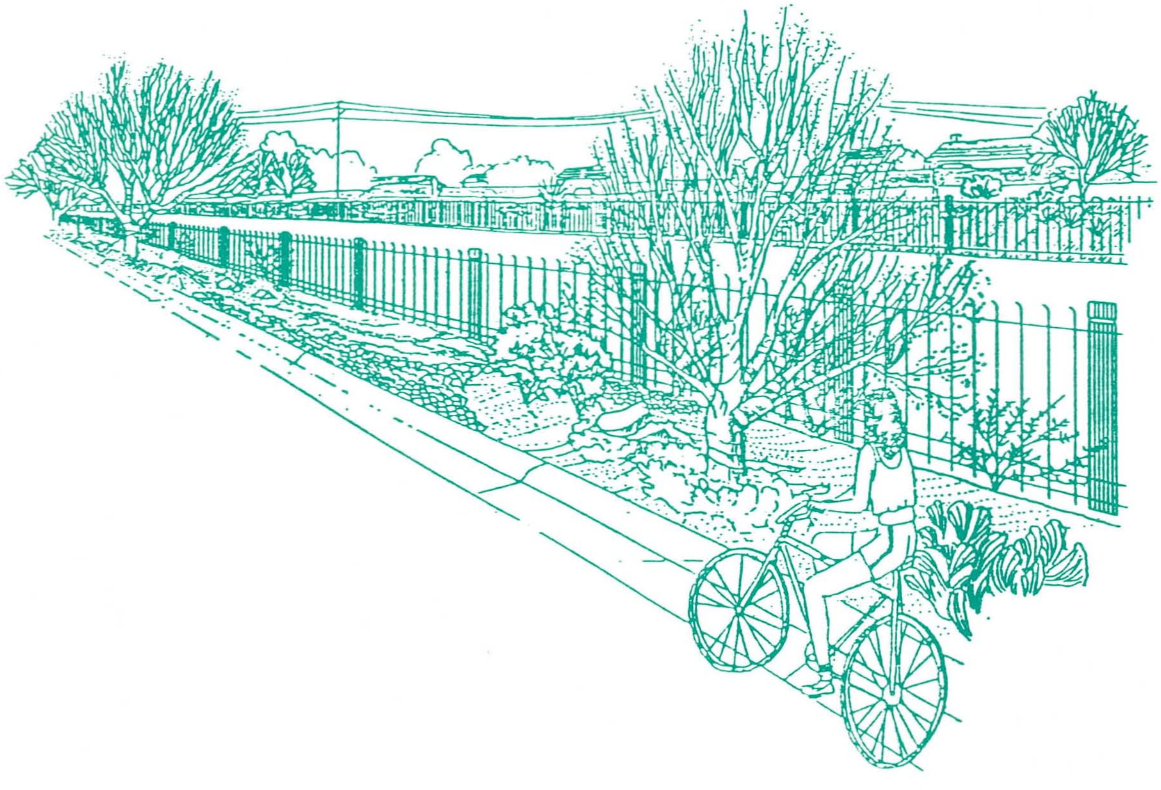
The costs includes $152 million in federal money and $102 million in local money for the ACDC, including recreation facilities.

ACDC File Numbers

		Engineer	Construct	C/E
General Correspondence	CI.1.1			
Corps of Engineers	CI.1.1.1			
Phoenix	CI.1.1.2			
Phoenix Utility Masterplan	CI.1.1.2.1	84-39		
Glendale	CI.1.1.3			
Glendale Utilities	CI.1.1.3.1			
Peoria	CI.1.1.4			
SRP	CI.1.1.5			
ADOT I-17	CI.1.1.8			
Public Meetings	CI.1.4			
59th Avenue Bridge	CI.5.3.1.1	82-18	83-20	
59th Ave. Canal Bridge			82-32	
Thunderbird Road Bridge	CI.5.3.1.2	82-20	83-19	
T'Bird Rd. Canal Bridge			82-33	
67th Avenue Bridge	CI.5.3.1.3	82-19	84-23	
51st Avenue & Cactus Road	CI.5.3.1.4	83-29	85-2	
Temp. Haul Bridge		83-30	83-25	
51st Canal Bridge Widen.			83-39	
Cactus Canal Bridge Widen.			83-40	
47th Ped. Bridge AZ Canal			84-18	
75th Avenue Bridge	CI.5.3.1.5	84-8	85-3	
43rd Ave. & Peoria	CI.5.3.1.6	84-9		
43rd Ave. Sewer & Siphon	"	"	85-44	
35th Ave. Bridge	CI.5.3.1.7	84-10		
29th Ave. Bridge	CI.5.3.1.8	84-11	85-40	85-46
25th Ave. Bridge	CI.5.3.1.9	84-12	85-1	
Fabricate Box Girders			84-37	
Hatcher Rd. 19th Ave.	CI.5.3.1.10	84-34	86-17	
25th Ave. Sewer Siphon	CI.5.3.1.11	85-27	87-25	
Dunlap Ave Sewer Siphon ~~19th Ave. Sewer Siphon~~	~~CI.5.3.1.12~~		87-26	
47th Ped. Bridge ACDC	CI.5.3.1.13	85-36	87-27	
Northern Ave Sewer Siphon Biltmore Tunnel Study		86-37	87-28	
19th Ave. Bridge & Util.	CI.5.3.1.14	87-7	87-46 Bridge @ 19th Ave 87-47	
7th Ave. Bridge & Util. 1/25/88	CI.5.3.1.15	87-1	~~87-49~~ 87-53 87-49	
7th St. Bridge & Util. FCD 87-58	CI.5.3.1.16	87-9		
Northern Ave. Bridge & Util.	CI.5.3.1.17	87-10	87-49	
Central Ave. & Sunnyslope Hi.	CI.5.3.1.18	87-12	88-13	
Cave Creek, Ped. Bridges & Box	CI.5.3.1.19	87-11		
83rd Ave. Bridge, Skunk Creek		87-8		
APS	CI.5.3.3.1			
Southwest/APS Gas	CI.5.3.7			
Mountain Bell	CI.5.3.6			
Box Girder Repair (Hoffman-Miller Engineers)		87-35		
Cudia City Wash Basin Plans (Mathews-Kessler)	CI.5.3.1.20	87-36		
CRS Sirrine		87-52		
16th St. } Glendale		88-36		
16th Street } Glendale	CI.5.3.1.21			

Flood Control District
of Maricopa County

ACDC



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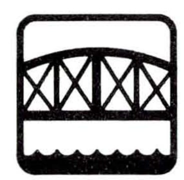

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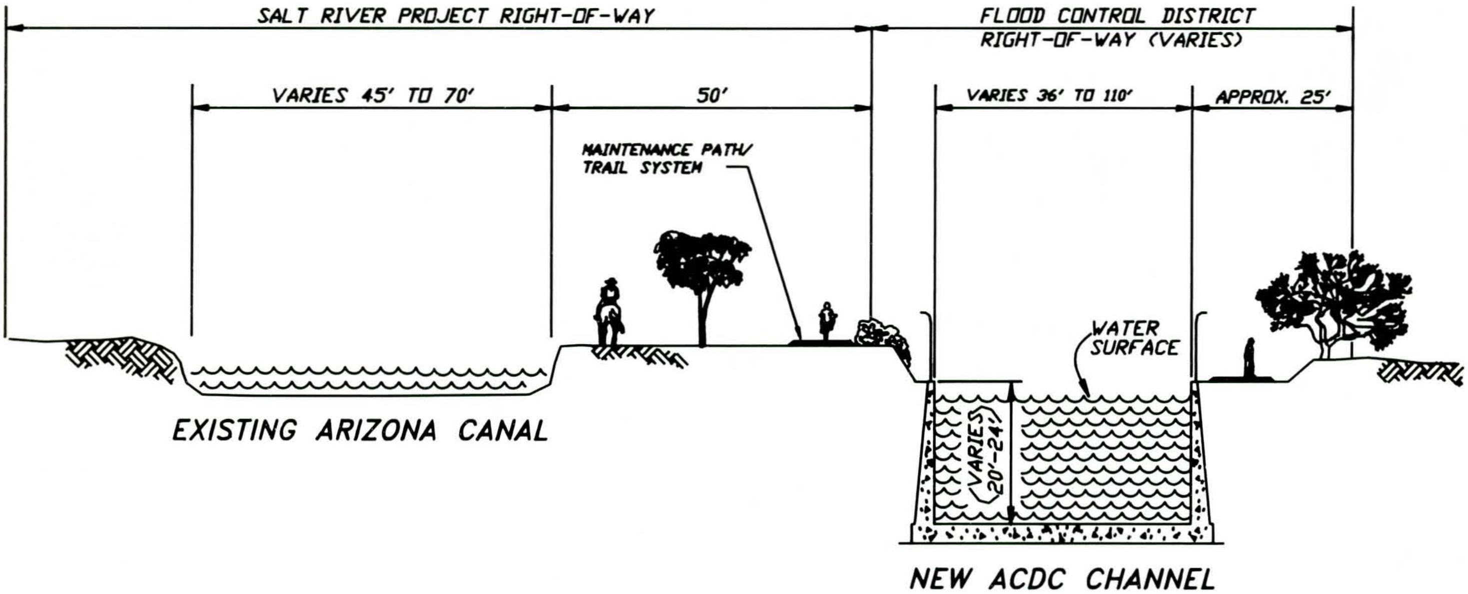


TYPICAL CROSS SECTION

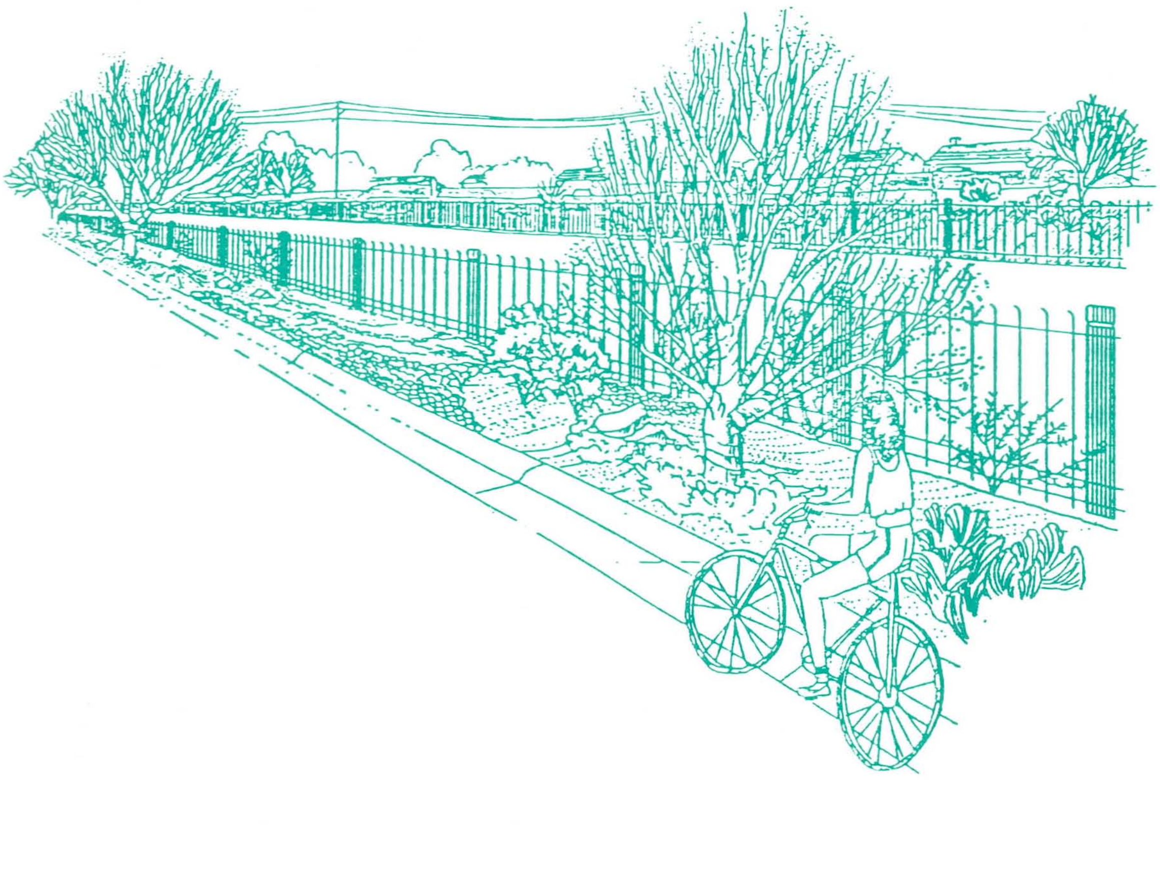
CONCRETE RECTANGULAR CHANNEL
47th AVENUE TO 40th STREET

For further information contact:

Public Involvement Coordinator
Flood Control District
of Maricopa County
3335 West Durango
Phoenix, Arizona 85009
262-1501

Flood Control District
of Maricopa County

ACDC



Arizona Canal Diversion Channel

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The Arizona Canal Diversion Channel (ACDC) is part of an overall project developed by the U.S. Army Corps of Engineers and sponsored by the Flood Control District of Maricopa County to provide a high measure of flood protection to a large part of the metropolitan area.

The overall project is known as the Phoenix, Arizona and Vicinity (Including New River) Flood Control Project.

This project includes Dreamy Draw Dam, Cave Buttes Dam, Adobe Dam, New River Dam, the ACDC, and flowage easements/bank stabilization on Skunk Creek, New River, and the Agua Fria River.

What is the purpose of the Phoenix, Arizona and Vicinity (Including New River) Flood Control Project?

This project will protect people from flood flows originating in the mountain and desert drainage area lying to the north of and including parts of Phoenix, Glendale, and Peoria.

Many streams including Cudia City Wash, Dreamy Draw, Cave Creek, Skunk Creek, New River, and the Agua Fria River drain flows from this mountain and desert area to the metropolitan area.

How does the Phoenix, Arizona and Vicinity (Including New River) Flood Control Project work?

Dreamy Draw Dam and Cave Buttes Dam, on Cave Creek, collect floodwaters and release the water slowly into the natural creek beds to the ACDC.

The ACDC collects this water as well as floodwaters from several minor tributaries, uncontrolled overland flow, and city storm drains and takes the water to Skunk Creek.

Adobe Dam, on Skunk Creek, and New River Dam collect floodwaters and release the water slowly down Skunk Creek and New River so that the peak flows, after the introduction of the ACDC water, will not be increased.

The acquisition of flowage easements and the construction of bank protection on Skunk Creek, New River, and the Agua Fria River complete the project.

The water from these projects flows into the Agua Fria River and then into the Gila River, which is its original and natural destination.

What is the purpose of the ACDC?

The ACDC is the core of the overall project. It is a 16.5 mile channel from approximately 40th Street and Camelback to 75th Avenue and Greenway in an alignment parallel to and on the northern side of the Arizona Canal.

It will intercept, and carry to Skunk Creek, flows up to a 100 year flood. This is the level of flooding expected to occur on an average of once per century.

For comparison, Phoenix city storm drains are generally planned for protection up to the two year flood.

The ACDC will eliminate flood damages to Phoenix, Glendale, and Peoria south of the Arizona Canal from flows originating north of the Canal up to the 100 year level and will substantially reduce damages from flows in excess of the 100 year level.

What causes the problem?

The natural paths of the streams and overland flows from the mountains and desert area are generally southwesterly across the metropolitan area and into the Salt and Gila Rivers.

These paths have, however, been obstructed by two different actions.

One was the building of the Arizona Canal in 1884.

This Canal, intended to distribute irrigation water, also acted as a dam to the natural flow of water.

As a result, water from small storms runs into the Arizona Canal or ponds along its northern bank. This ponding has resulted in flooding along that bank.

The second action was the obliteration through agriculture and urbanization of natural channels south of the Arizona Canal.

Significant rains drain into the Arizona Canal and quickly exceed the capacity of the Canal and pour over spillways to the south.

In major storms, the flows can and have caused breaks in the south bank of the Canal.

Because of the obliteration of the channels, these flows frequently race down streets, through yards and into homes and businesses.

How will the ACDC help?

The completion of the ACDC will allow the existing drainage to be modified.

Storm drains north of the Arizona Canal will empty into the ACDC and water will be carried to Skunk Creek. This will prevent ponding on the north side.

It will also intercept flows that would have gone into the Arizona Canal thereby preventing overflowing of the Canal caused by these inflows.

The ACDC will also allow the initiation of a new drainage concept south of the Canal.

Instead of having to cope with drainage from north of the Canal, new storm drains with a smaller initial capacity can be constructed to carry storm water to the Salt River.

Because the drain size can be decreased, the cities can save a large amount of money without decreasing protection.

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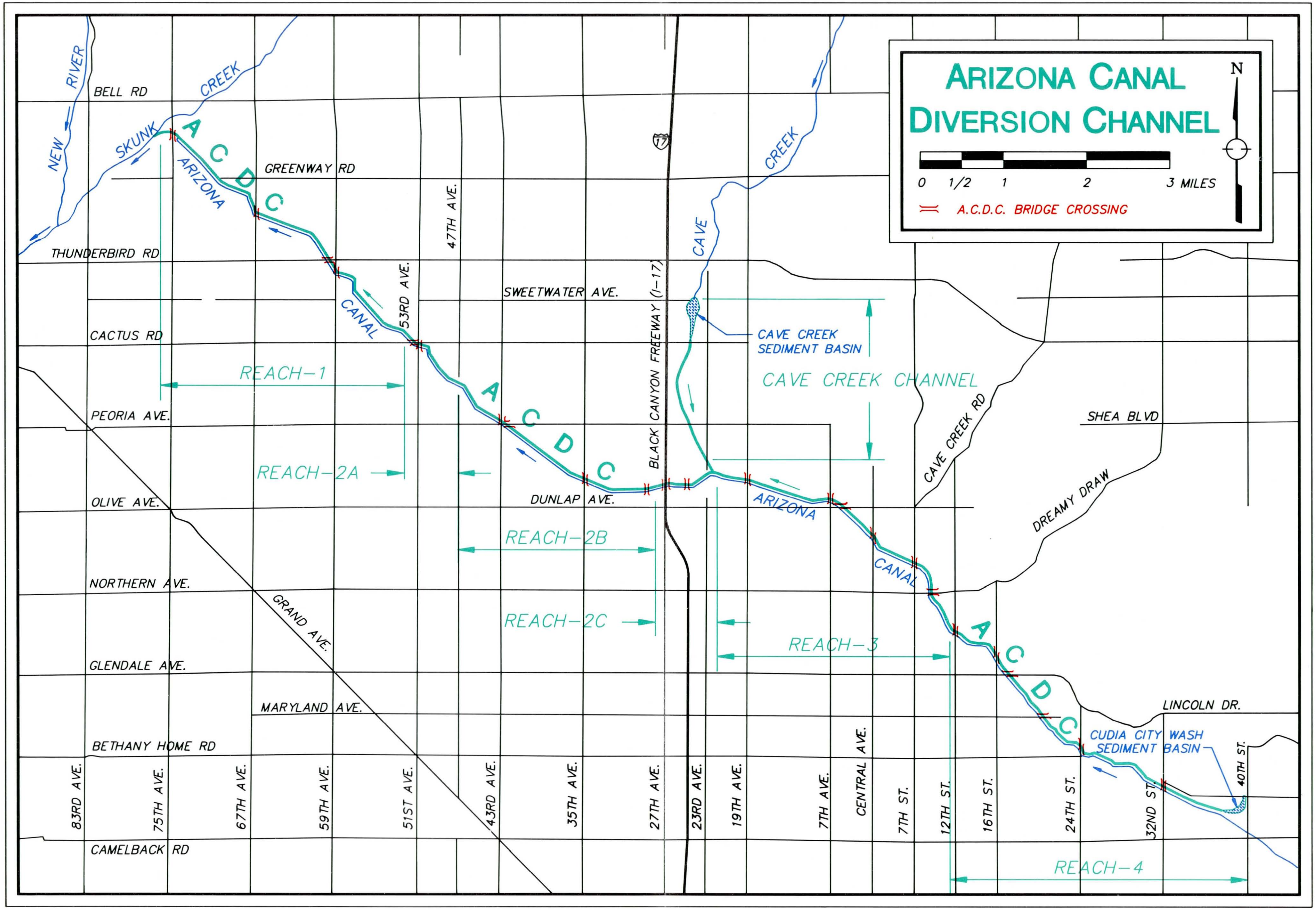
The cities along its path – Paradise Valley, Phoenix, Glendale, and Peoria – have studied and approved the project through their city limits.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What are the elements of the ACDC?

Reach 1 is a 4.0 mile long earthen channel from Skunk Creek to Cactus Road. This reach is within the Cities of Peoria and Glendale. Glendale is building extensive recreation activities within the approximately 500 feet wide and 20 feet deep channel area.

Reach 2 extends 4.7 miles from Cactus Road to Cave Creek (23rd Avenue). From Cactus to 47th Avenue (0.75 miles) it is a concrete trapezoidal channel from 160 to 200 feet wide. Between 47th Avenue and Cave Creek Wash it is a concrete rectangular channel 110 feet wide. The walls through this Reach are approximately 21 feet deep.

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Bridge railings will help prevent passing automobile passengers from seeing into the channel.

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The type of landscaping differs in the various reaches in order to blend with existing neighborhoods; however, all the plants are adapted to the hot, arid environment in this area.

The plants are low water users.

A safety fence made of steel with a wrought iron appearance will prevent children and animals from getting into the channel.

The safety fencing will be only partially visible because there will be a slope from ground level down to the channel walls. The fence will be built at the top of the channel walls.

The south walls will, in most areas, nearly adjoin the north border of the Salt River Project right-of-way.

The Canal and the Channel will share a maintenance road which will also double as a bike path.

Adjacent to the maintenance road will be the existing equestrian path.

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A total of 24 vehicular bridges will be constructed at all present crossings of the Arizona Canal.

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Who will operate and maintain the ACDC?

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Glendale and Phoenix will share in the maintenance responsibilities in areas where recreation features are planned.

What will the Phoenix and Vicinity (Including New River) Flood Control Project cost?

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The combined federal and local costs are estimated to be $254 million.

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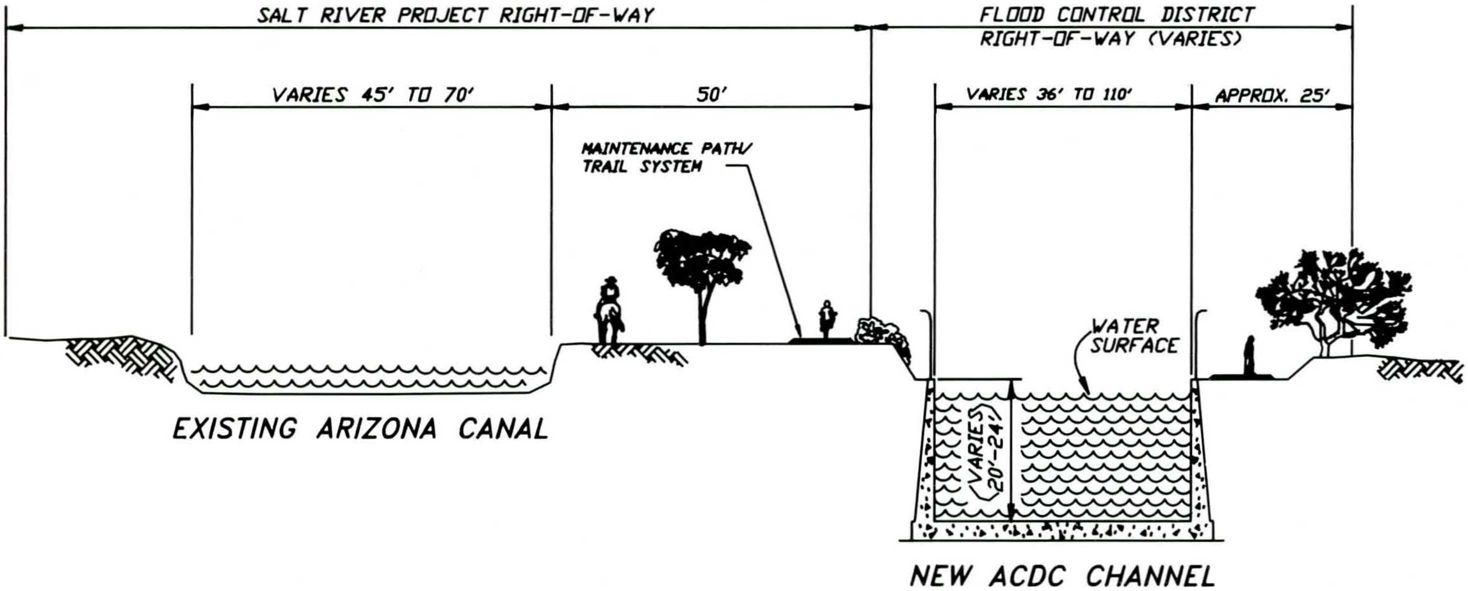

TYPICAL CROSS SECTION

CONCRETE RECTANGULAR CHANNEL
47th AVENUE TO 40th STREET

For further information contact:

Public Involvement Coordinator
Flood Control District
of Maricopa County
3335 West Durango
Phoenix, Arizona 85009
262-1501

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ACDC

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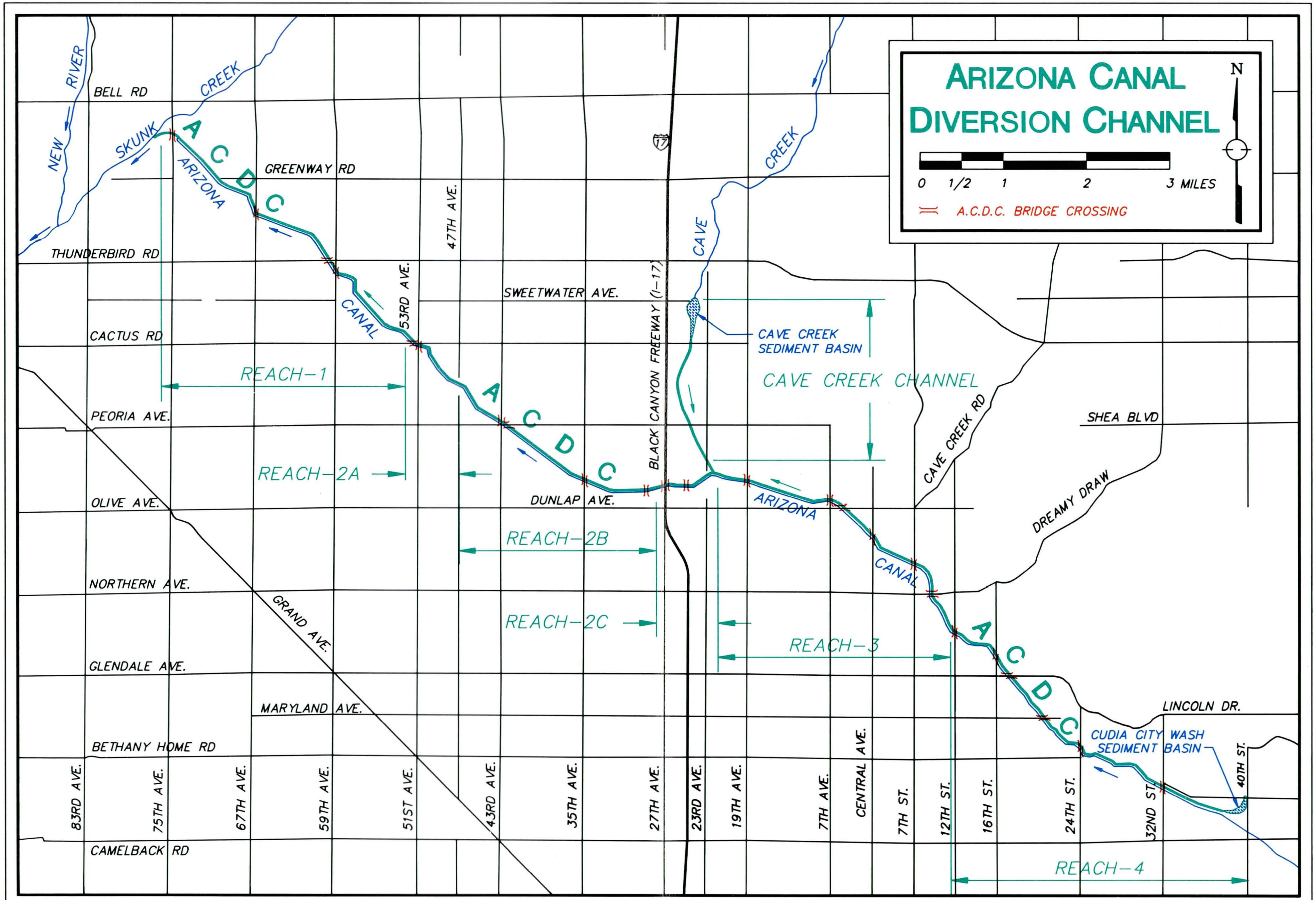

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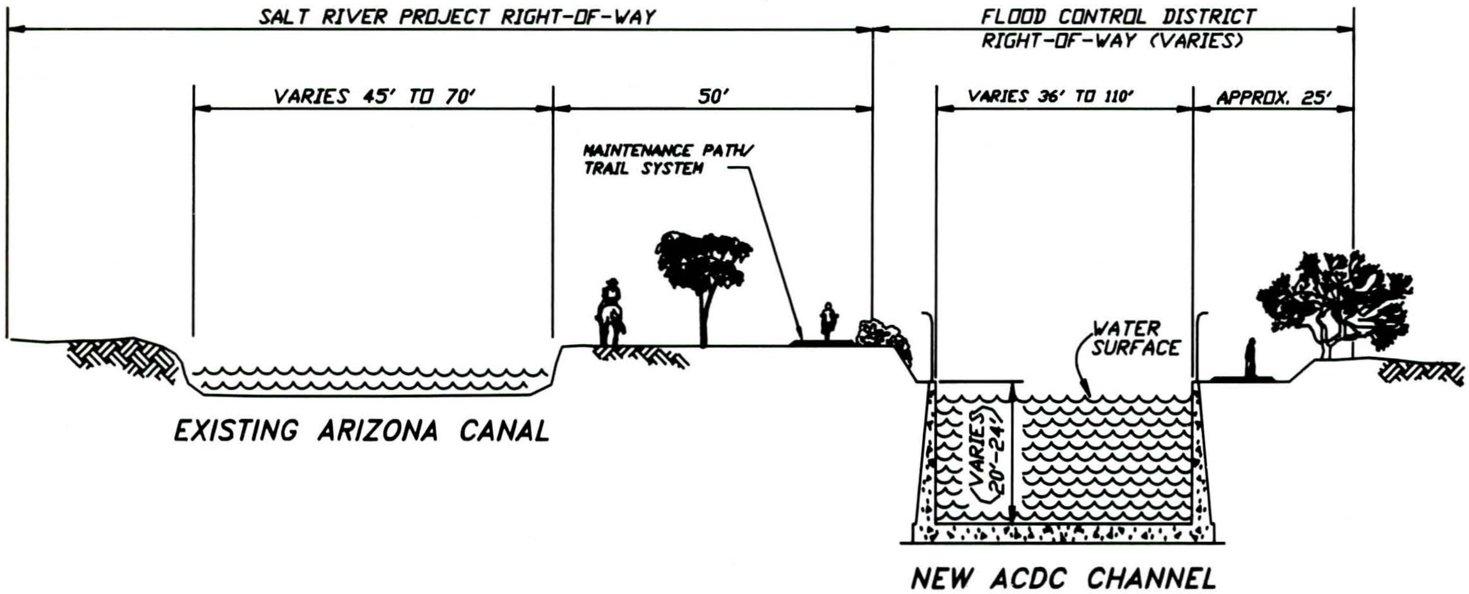

TYPICAL CROSS SECTION

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For further information contact:

Public Involvement Coordinator
Flood Control District
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3335 West Durango
Phoenix, Arizona 85009
262-1501

ARIZONA CANAL DIVERSION CHANNEL

Part of the Authorized Flood Control Project
of the U.S. Army Corps of Engineers
for Phoenix and Vicinity

Introduction

The Phoenix and Vicinity Flood Control Project is a comprehensive system of flood control measures designed to provide a high degree of flood protection for the people of the metropolitan Phoenix area. The Arizona Canal Diversion Channel is an essential part of this total system. (See plate 1.)

The Phoenix area below the Arizona Canal has experienced severe local storms in March 1938, August 1943, and June 1972. Several similar storms have occurred on adjacent watersheds. During many of these events, such as the flood of June 22, 1972, runoff has ponded at the Arizona Canal and eventually overtopped it.

Background

Phoenix citizens and local governments became extremely concerned about the flooding threat in the late 1950's (after four floods in the previous 10 years). Faced with the prospect that the threat would become greater and greater as urbanization increased, the Corps of Engineers was requested to develop a comprehensive flood control plan for Phoenix and surrounding areas. To begin its work, the Corps held a public meeting in late 1959 to give all local interests the opportunity to describe the flooding problem and comment on the extent of the improvements needed. At the time, the Flood Control Advisory Committee (the predecessor of the Flood Control District of Maricopa County) presented its first proposal for improvements in the area.

From 1959 to 1963, the Corps worked closely with the Flood Control District and its consultants to refine the proposal. As a result of the studies, the Corps - in cooperation with the Flood Control District of Maricopa County - developed a comprehensive five-phase flood control plan for the Phoenix metropolitan area. In 1963, the Corps presented the plan to the people of Phoenix. The plan cited the need for phased improvements in five areas:

Phase A - Indian Bend Wash from the Arizona Canal to the Salt River.

Phase B - Phoenix and Vicinity (including New River).

Phase C - Glendale-Maryvale and South Phoenix.

Phase D - Salt River downstream to the Gila River.

Phase E - Indian Bend Wash upstream from the Arizona Canal.

There was general agreement with the proposed plan, and it was formally approved by Maricopa County Flood Control District. In 1965, Congress authorized final planning of projects for the first two phases: Indian Bend Wash (completed) and Phoenix and Vicinity. Phases C through E were subsequently incorporated into the Corps' Phoenix Urban Study and the Central Arizona Water Control Study.

The Phoenix and Vicinity Authorized Project

The purpose of the flood control project, authorized by Congress for Phoenix and vicinity, is to protect people from floodflows originating in the 2,695-square-mile mountain and desert drainage area north of Phoenix. Many streams including Cudia City Wash, Dreamy Draw, Cave Creek, Skunk Creek, New River, and the Agua Fria River drain flows from this mountain and desert area to the Phoenix area. Currently, a major factor in Phoenix area flooding is the interaction between the Arizona Canal (an irrigation water delivery system flowing to the west) and the many streams which intersect the canal. Urban development has obliterated the historic courses of these streams below the canal. During flooding, flows from these streams have broken through and over the canal. The problem is worsened by overland drainage from the north. The raised canal bank traps the floodwaters until they overtop the canal. This problem is becoming more severe as urban development north of the canal increases and runoff becomes greater. (See photos #1 and #2).

Project Alternatives Considered

In every flood control project the Corps of Engineers must study and consider a full range of alternative solutions along a spectrum from no action to nonstructural measures to complete structural improvements. Structural improvements are those built by man to contain the flow of floodwaters. Nonstructural measures are actions taken by man to constrain future development in the floodplain (e.g., restrictive zoning), compensate people for economic loss due to flooding (e.g., acquiring flowage easements, providing flood insurance), or protect property against damage from inundation (e.g., floodproofing).

The Corps studied many alternatives. Six were considered in detail: One plan for no further action (after the construction of Dreamy Draw Dam which had been completed), three plans for complete structural improvements (dams only, channels only, and a combination of dams and channels), and two plans combining structural and nonstructural improvements. (See summary table). The main criteria for evaluating alternative plans are:

- Plan acceptability. Is the plan acceptable to the public?
- Plan completeness. Does the plan incorporate all necessary actions to ensure full attainment of the defined project purpose?
- Plan effectiveness. Will the plan, when implemented, achieve its objectives?
- Plan efficiency. Which plan will achieve national economic development, environmental quality, and other objectives in the least costly way?

Based on its evaluation, the Corps selected a modification of the originally authorized project: one of two plans combining structural and nonstructural improvements. Specifically, this plan was selected because:

- Of the four alternatives providing the largest degree of flood protection, the costs for flood control improvements are the least.
- It provides the second highest maximum flood control benefits (only 0.5-percent less than the alternative with the highest), but at 18-percent less cost for flood control improvements.
- Its benefit-to-cost ratio for flood control is the highest of the four alternatives, providing the greatest degree of flood protection. The benefit-to-cost ratio expresses the extent to which economic benefits from a project compare to project costs. In this case, benefits are measured mainly in terms of flood damages prevented.
- It has the least impact to the environment compared to the three other plans which provide comparable flood control benefits.
- It is the plan most supported by local governments and acceptable to the general public.
- It has the greatest recreational benefits among all the alternatives.

Project Support

As stated before, the Corps planned and designed the Phoenix and Vicinity Flood Control Project in close coordination with the Flood Control District of Maricopa County and the City of Phoenix. In studying the array of alternatives, the Corps sought public input in a series of public meetings and in informal sessions with citizen environmental and planning groups. The Corps closely coordinated its planning with other Federal, state, and local government agencies. The result of this effort of coordination and cooperation, over a 20-year period of extensive planning, is a project which has been broadly supported throughout the Phoenix area.

Arizona Canal Diversion Channel (ACDC): Purposes

The ACDC is intended to protect people in Phoenix, Glendale, and Peoria against 100-year floods (a flood which has a one-percent chance of occurring in any one year). If the ACDC were not built, floodflows would build up behind the Arizona Canal until they overtopped it, then breaking out in various places along the Canal. The residents of Phoenix, Glendale, and Peoria would continue to face the flood threat. (See plate 2).

ACDC: Features

The ACDC will be about 17 miles long, from Cudia City Wash near 40th Street on the east to Skunk Creek on the west. It will intercept floodwaters from the Phoenix Mountains and from Cudia City Wash, Dreamy Draw, Cave Creek, and several minor tributaries, as well as from uncontrolled overland flow and storm drains. Currently, these floodwaters frequently exceed the capacity of the Arizona Canal, causing breakouts and flooding to the south. The ACDC has three types of channel configuration:

- <u>From 40th Street to 47th Avenue (Length, 11.4 miles)</u>. A reinforced concrete channel with vertical walls to minimize the amount of land and associated development to be purchased. Another configuration (for example, a concrete channel with sloping side walls or an unlined channel) would have required the purchase of more property at much greater cost and the relocation of many more people. The Corps selected the channel with vertical walls because it significantly reduces the cost of property acquisition and minimizes social disruption due to relocations.

- <u>From 47th Avenue to Cactus Road (Length, 0.75 mile)</u>. A concrete channel with sloping side walls. While more land must be acquired than for a concrete vertical wall channel, it is the least costly configuration because there was less urban development in this portion of the project area at the time the rights-of-way were acquired.

- <u>From Cactus Road to Skunk Creek (Length, 4.4 miles)</u>. An unlined channel. This will permit recreational uses in the channel during no-flood situations: bicycling, jogging, and equestrian trails; picnic areas; and playing fields and courts. This type of construction is possible for this stretch of the channel because there is even less urban development than from 47th Avenue to Cactus Road. This type of construction is feasible for this stretch of channel. It was preferred by the city of Glendale.

The visual impact of the channel will be minimal. Since it will be entrenched along its entire length, people will see it only from bridge crossings (and where it is covered, not at all). Experience with other Corps projects similar in design has been that concrete channels, when viewed from relatively low altitudes or acute angles at a distance, do not dominate the esthetics of an urban area. In addition, the ACDC design calls for esthetic features. In the concrete-lined portions of the channel (from 40th Street to Cactus Road), the Corps will add esthetic features such as landscaping, pigmented concrete, and channel-wall designs to further soften the impact of the ACDC on the Arizona terrain. The Corps, the Flood Control District, and affected cities have met with residents to present and discuss optional esthetic features that are the most desired.

Eastern Portion of the ACDC (Reach 4):

Originally, the Corps planned for an ACDC only 12.4 miles long: from Dreamy Draw on the east to Skunk Creek on the west. In June 1972, residents affected by Cudia City Wash in the eastern part of the area sustained several million dollars in flood damages. This flood awakened Phoenix area governments to the prospect that more severe floods might cause much more severe damage. In 1974, the Phoenix City Council requested that the Corps consider, as part of the authorized project, providing flood control improvement from Dreamy Draw to Cudia City Wash in order to protect people threatened by flooding from this drainage area. Cudia City and many minor washes flow to the Arizona Canal between Dreamy Draw and 40th Street. The Corps agreed to consider this extension, given the severity of the 1972 problem and the potential threat. After a thorough technical and economic evaluation consistent with Federal law, the Corps found that incorporating this extra area into the project would be economically justified and that it therefore should be a part of the Congressionally authorized project.

The Corps examined in detail three alternatives: (1) extending the ACDC 4.6 miles east to 40th Street; (2) building a number of small detention basins in the Cudia City Wash drainage area within the town of Paradise Valley; and (3) building a collector channel along the Arizona Canal to intercept and convey flows from 36th Street to 40th Street and then under 40th Street in a box culvert to the Salt River.

The 4.6-mile extension to the ACDC will ensure the conveyance of 100-year floodflows in the ACDC. The detention basins would reduce the peak flow in Cudia City Wash at the Arizona Canal and therefore reduce the size of the ACDC between Cudia City Wash and Dreamy Draw. The collector channel along the Arizona Canal from 36th Street to 40th Street and the 40th Street culvert would avoid introduction of increased floodwaters into the ACDC altogether.

The Corps rejected the detention basins in Cudia City Wash drainage area. The Town of Paradise Valley strongly opposed the detention basins. Construction of the basins would undo residential development already underway or prevent development approved by Paradise Valley's Town Council. In 1974, the Town Council adopted a motion opposing both the ACDC through Paradise Valley and the detention basins.

The alternative of a collector channel along the Arizona Canal from 36th Street to 40th Street and a box culvert under 40th Street from the Arizona Canal to the Salt River was estimated to cost over $45 million.

The cost estimate for extending the ACDC 4.6 miles east to Cudia City Wash was $39 million. Because of the differences in costs and the fact that the ACDC extension would control floods originating in the Phoenix Mountains between the Cudia City Wash and Dreamy Draw drainage areas (while the collector channel would not), the Phoenix City Council opposed the collector channel. Given Phoenix's strong opposition, the Flood Control District of Maricopa County (the local project sponsor) gave its support to the alternative of extending the ACDC 4.6 miles to 40th Street. The Corps accepted the Flood Control District's position. The average annual cost for Reach 4 at the authorized project discount rate was $1,081,000. The average annual benefits were determined to be $1,403,000 for a benefit-to-cost ratio of 1.3 to 1.0. The ACDC extension was clearly the best alternative based on flood control benefit, cost, and local acceptability criteria. Additional development south of the Arizona Canal in recent years would strengthen the benefit-to-cost ratio.

The Level of Flood Protection

In trying to provide flood protection south of the Arizona Canal, the Corps analyzed three levels of flood protection: the Standard Project Flood, the 100-year flood, and the 50-year flood. Strictly from an economic standpoint, the Corps found that improvements to prevent each size flood would be economically justified. The Standard Project Flood (SPF) is the flood that would result from the most severe combination of meteorological and hydrologic conditions considered reasonably characteristic of the region. The 100-year flood is the flood that has a one percent chance of occurring in any one year. The 50-year flood is the flood that has a two percent chance of occurring in any one year. However, the Corps also found that improvements to protect against the 100-year flood were in the best overall public interest. There were two main reasons.

First, the Corps found that improvements to protect people south of the Arizona Canal against the 100-year flood would result in larger net economic benefits than improvements to protect people from a lesser (50-year) or greater (SPF) level of protection.

Second, the Corps concluded, based largely on local objections, that improvements to protect people from a Standard Project Flood would be too economically and socially disruptive to the Phoenix metropolitan area. Constructing the ACDC to provide SPF protection for residents south of the

Arizona Canal would require the Flood Control District to acquire substantially more land than for the authorized project: 62 percent more land, which would be permanently removed from the tax rolls; a 47-percent increase in home relocations; a 55-percent increase in apartment building relocations; a 63-percent increase in business relocations; and 630 additional acres of flowage easements along Skunk Creek and the New and Agua Fria Rivers to compensate for the additional waters that would be diverted. The Flood Control District has said that since it could not afford the increased costs, it could not continue to support the project if SPF design criteria were adopted for the ACDC. And, without this diversion channel, the floodflows from the Phoenix mountains would have no place to go but into the Arizona Canal or - inevitably - into the Phoenix area to the south.

Concern has been raised about whether the ACDC, designed to protect people from the 100-year flood, might cause more severe damage to them during a Standard Project Flood. It will not. In fact, the ACDC would carry away about half of the SPF, resulting in far less damage than under existing conditions. Several aspects of the ACDC support this conclusion:

> East of Cave Creek. Runoff from the Phoenix Mountains will generally be concentrated, following the same course, with or without the ACDC. Diverted flows already in the ACDC will not overtop the channel banks unless additional floodwaters downstream enter the channel at the same time. But the additional floodflows would have caused flooding downstream without the ACDC. With the ACDC, however, the flooding threat is much less frequent. Only flows exceeding 100-year protection will spill over the Arizona Canal - much greater protection than is provided at present.
>
> West of Cave Creek. Floodflows move overland, not following well-defined channels. Without the ACDC or due to channel overtopping from floods greater than the 100-year flood, downstream flooding can occur at any point because of breaks in the Arizona Canal. With the ACDC, there will be no canal breaks for any flood up to the 100-year flood. The floodflows will be totally confined within the ACDC.

Floodwaters from Cudia City Wash. If the floodflow from Cudia City Wash exceeds the 100-year flow, the ACDC will be designed to cause the excess to spill in the wash's own watershed. If necessary, structures will be built on the ACDC for this purpose.

Biltmore Estates retention basins. The Corps has considered these basins in the design of the ACDC. The watershed containing the basins contributes little to design peak discharges on the ACDC, with or without the basins. The ACDC will not affect these retention basins.

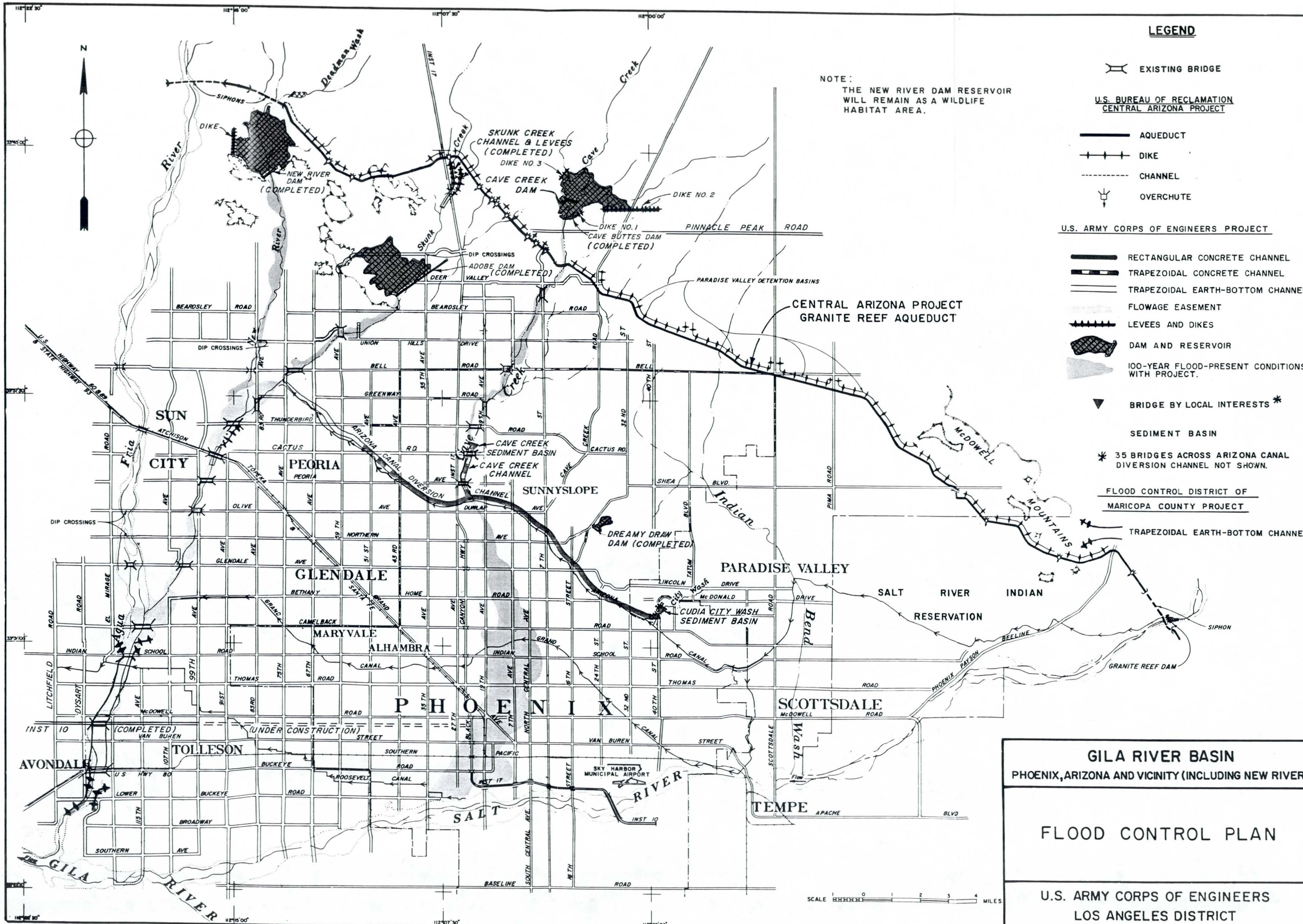
In summary, no one will be worse off all along the ACDC from any flood greater than the 100-year flood. But the ACDC will ensure that thousands of residents in Phoenix will have much greater flood protection than they now have.

Conclusion

The Phoenix and Vicinity flood control project is a comprehensive, integrated system of structural and nonstructural measures to provide a high degree of flood protection to the people of Metropolitan Phoenix. It is under construction. Failure to complete construction of all the elements would mean that the people of Metropolitan Phoenix would continue to be subjected to extensive flood damages.

The ACDC is an essential part of the total system. It completes the project. It provides a level of protection (100-year) which optimizes flood control benefits, it is the best economically and financially, and has had the greatest support. The ACDC will protect thousands of people not now protected - people who are increasingly vulnerable to flood damages as urban development continues. It will make flood conditions worse for no one.

The ACDC design is conservative, based on the standard Corps design criteria and the agency's long history as the main flood control builder in the country. These criteria have been reviewed and endorsed by the Corps technical review offices and the main Arizona agencies concerned with the project: the Arizona Department of Water Resources, the Flood Control District of Maricopa County, and the City of Phoenix.



LEGEND
EXISTING BRIDGE
U.S. BUREAU OF RECLAMATION CENTRAL ARIZONA PROJECT
AQUEDUCT
DIKE
CHANNEL
OVERCHUTE
U.S. ARMY CORPS OF ENGINEERS PROJECT
RECTANGULAR CONCRETE CHANNEL
TRAPEZOIDAL CONCRETE CHANNEL
TRAPEZOIDAL EARTH-BOTTOM CHANNEL
FLOWAGE EASEMENT
LEVEES AND DIKES
DAM AND RESERVOIR
100-YEAR FLOOD-PRESENT CONDITIONS-WITH PROJECT.
BRIDGE BY LOCAL INTERESTS *
SEDIMENT BASIN
* 35 BRIDGES ACROSS ARIZONA CANAL DIVERSION CHANNEL NOT SHOWN.
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY PROJECT
TRAPEZOIDAL EARTH-BOTTOM CHANNEL
NOTE: THE NEW RIVER DAM RESERVOIR WILL REMAIN AS A WILDLIFE HABITAT AREA.
N
NEW RIVER DAM (COMPLETED)
SKUNK CREEK CHANNEL & LEVEES (COMPLETED)
DIKE NO. 3
CAVE CREEK DAM
DIKE NO. 2
DIKE NO. 1
CAVE BUTTES DAM (COMPLETED)
ADOBE DAM (COMPLETED)
DIP CROSSINGS
PARADISE VALLEY DETENTION BASINS
CENTRAL ARIZONA PROJECT GRANITE REEF AQUEDUCT
CAVE CREEK SEDIMENT BASIN
CAVE CREEK CHANNEL
ARIZONA CANAL DIVERSION CHANNEL
DREAMY DRAW DAM (COMPLETED)
CUDIA CITY WASH SEDIMENT BASIN
SALT RIVER INDIAN RESERVATION
McDOWELL MOUNTAINS
GRANITE REEF DAM
SIPHON
SIPHONS
SUN CITY
PEORIA
GLENDALE
MARYVALE
ALHAMBRA
SUNNYSLOPE
PARADISE VALLEY
PHOENIX
SCOTTSDALE
TOLLESON
AVONDALE
TEMPE
SKY HARBOR MUNICIPAL AIRPORT
SALT RIVER
GILA RIVER
New River
Agua Fria River
Skunk Creek
Cave Creek
Deadman Wash
Indian Bend Wash
INST 10 (COMPLETED)
(UNDER CONSTRUCTION)
INST 17
PINNACLE PEAK ROAD
SCALE 1 0 1 2 3 4 MILES
GILA RIVER BASIN
PHOENIX, ARIZONA AND VICINITY (INCLUDING NEW RIVER)
FLOOD CONTROL PLAN
U.S. ARMY CORPS OF ENGINEERS
LOS ANGELES DISTRICT

PLATE I

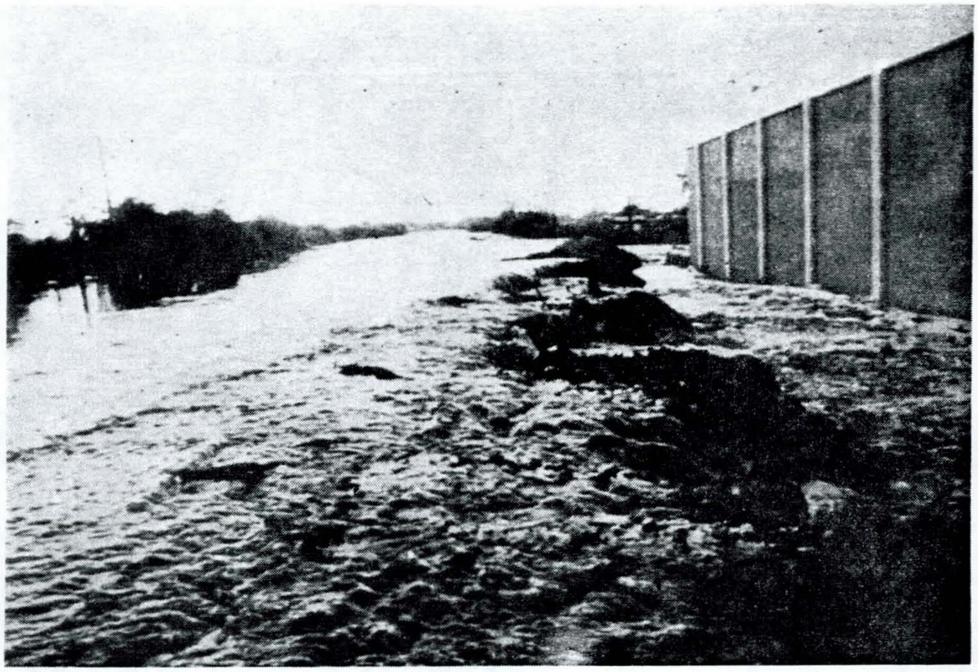


Photo #1. Floodwaters and debris flow over the top of the southern bank of the Arizona Canal east of 16th Street in Phoenix. June 22, 1972

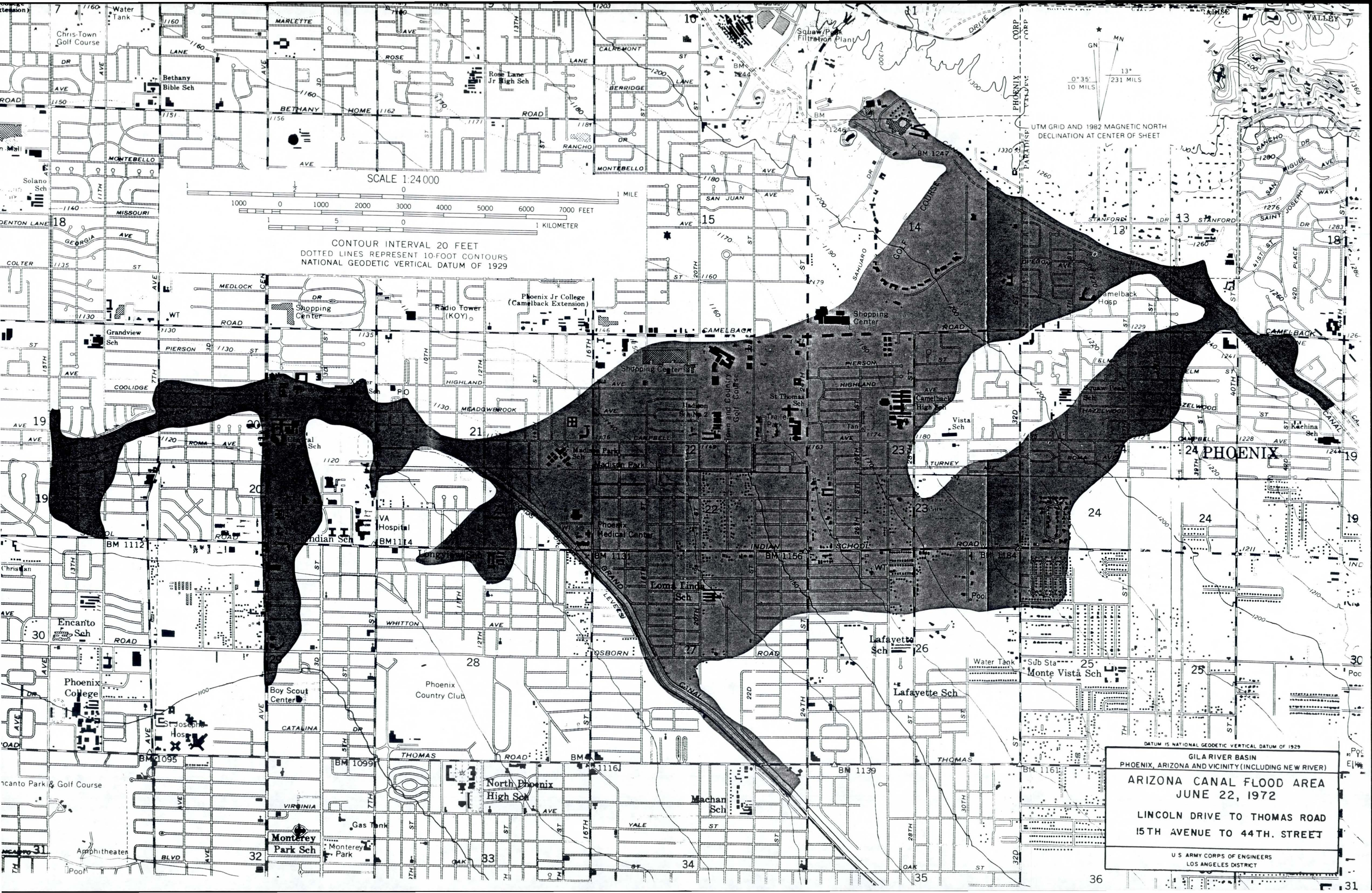
Photo #2. Homeowner on 38th Street and Camelback Road in Phoenix surveys damage from floodwaters. June 22, 1972

PHOENIX, ARIZONA AND VICINITY (INCLUDING NEW RIVER)

SUMMARY OF ALTERNATIVE PLANS

	ALTERNATIVE	COST (FLOOD CONTROL) (RECREATION)	PRICE LEVEL	B/C RATIO (FLOOD CONTROL) (RECREATION)	REASON FOR REJECTION	REFERENCE	REMARKS
	COMPREHENSIVE PLANS						
1	AUTHORIZED PLAN (1964 REVIEW REPORT)	70,800,000	1963	3.0	AUTHORIZED BY CONGRESS-MODIFIED IN LATER PLANNING STAGES	1964 REVIEW REPORT	MODIFIED BECAUSE OF CHANGED PHYSICAL CONDITIONS
2	COMBINED CENTRAL ARIZONA PROJECT AND FLOOD CONTROL PROJECT	260,000,000	1972		HIGH COST WITHOUT COMPENSATING BENEFITS	1976 GENERAL DESIGN MEMORANDUM - PHASE I	PLAN STUDIED AS PROPOSED BY ARIZONA WATER COMMISSION
3	NO FURTHER ACTION	NO NEW INVESTMENT	-	APPROX 1	DOES NOT RESOLVE FLOOD PROBLEM	1976 GENERAL DESIGN MEMORANDUM - PHASE I	DREAMY DRAW DAM CONSTRUCTED PREVIOUSLY AT COST OF $671,000
4	DAMS AND CHANNELS	257,000,000 10,030,000	1975	1.8 2.5	HIGHER COST THAN SELECTED PLAN WITHOUT COMPENSATING BENEFITS	1976 GENERAL DESIGN MEMORANDUM - PHASE I	CLOSEST OF PHASE I GDM ALTERNATIVES TO AUTHORIZED PLAN
5	DAMS ONLY	52,700,000 16,000,000	1975	2.6 1.6	WOULD PREVENT ONLY 27 PERCENT OF FLOOD DAMAGES-NOT SUFFICIENT PROTECTION.	1976 GENERAL DESIGN MEMORANDUM-PHASE I	INCLUDES ONLY DREAMY DRAW AND CAVE BUTTES DAMS
6	CHANNELS ONLY	289,000,000 5,900,000	1975	1.5 2.6	HIGHER COST THAN SELECTED PLAN WITHOUT COMPENSATING BENEFITS	1976 GENERAL DESIGN MEMORANDUM-PHASE I	DREAMY DRAW DAM INCLUDED-PREVIOUSLY CONSTRUCTED
7	STRUCTURAL AND NON-STRUCTURAL MEASURES (WITH CAVE CREEK DIVERSION CHANNEL	218,000,000 10,300,000	1975	2.2 1.6	SLIGHTLY HIGHER COST FOR SAME BENEFITS AS SELECTED	1976 GENERAL DESIGN MEMORANDUM-PHASE I	SAME AS SELECTED PLAN EXCEPT CAVE CREEK DIVERSION CHANNEL ADDED
8	STRUCTURAL AND NON-STRUCTURAL (WITHOUT CAVE CREEK DIVERSION CHANNEL)	210,000,000 23,400,000	1975	2.2 1.6	SELECTED PLAN	1976 GENERAL DESIGN MEMORANDUM-PHASE I	SELECTED PLAN
	ALTERNATIVES TO ACDC						
9	REPLACE ACDC WITH CULVERTS AT 7TH AVE, 16TH ST AND 40TH ST	EXCESS OF $650 MILLION	1975	N/A	HIGH COST WITHOUT COMPENSATING BENEFITS	1976 GENERAL DESIGN MEMORANDUM-PHASE I	SOME CHANNELIZATION REQUIRED NORTH OF ACDC. EIGHT SIPHONS REQUIRED
10	CAVE CREEK CHANNEL-OPEN CHANNEL ALONG 19TH AVE	EXCESS OF $210 MILLION	1975	N/A	HIGHER COST THAN SELECTED PLAN WITH LOWER BENEFITS	1976 GENERAL DESIGN MEMORANDUM-PHASE I	ELIMINATES ACDC FROM CAVE CREEK TO SKUNK CREEK
11	CAVE CREEK CHANNEL COVERED CONDUITS ALONG THE 7TH AVE AND 19TH AVE	EXCESS OF $330 MILLION	1975	N/A	HIGHER COST THAN SELECTED PLAN WITH LOWER BENEFITS	1976 GENERAL DESIGN MEMORANDUM-PHASE I	ELIMINATES ACDC FROM 19TH AVE TO SKUNK CREEK
12	COMBINE ACDC AND ARIZONA CANAL	N/A	-	N/A	NO PLAN COULD BE FORMULATED THAT SATISFIED SRP NEEDS	1976 GENERAL DESIGN MEMORANDUM-PHASE I	FOUR VARIATIONS CONSIDERED: (1) COMBINED CHANNEL WITH COLLAPSIBLE DAMS (2) PIPE CONDUIT FOR SRP UNDER ACDC BERM (3) PRESSURE PIPE FOR SRP (4) COMBINED CHANNEL WITH PUMPED WATER DELIVERY FOR SRP
13	PARADISE VALLEY DETENTION BASINS	NA	-	N/A	STRENUOUS OBJECTION BY CITY COUNCIL OF PARADISE VALLEY	1976 GENERAL DESIGN MEMORANDUM-PHASE I	PLAN NOT STUDIED BEYOND CONCEPTUAL STAGE BECAUSE OF LOCAL OBJECTIONS
	ALTERNATIVES TO 40TH STREET TO DREAMY DRAW REACH OF ACDC						
14	48TH ST DRAIN	N/A	-	N/A	NOT ECONOMICALLY JUSTIFIED	1964 REVEIW REPORT	INCLUDES COLLECTOR CHANNEL FROM 56TH ST TO 36TH STREET
15	40TH STREET DRAIN	$45,000,000	1975	ABOUT 1.1	HIGHER COST THAN SELECTED PLAN WITHOUT COMPENSATING BENEFITS	1976 GENERAL DESIGN MEMORANDUM-PHASE I	INCLUDES SHORT COLLECTOR CHANNEL NORTH OF ACDC AND OUTLET CHANNEL AT SALT RIVER. NEW COST ESTIMATE OCT 1982 SHOWED COST $69 MILLION

N/A - NOT AVAILABLE


SCALE 1:24 000
1 MILE
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CONTOUR INTERVAL 20 FEET
DOTTED LINES REPRESENT 10-FOOT CONTOURS
NATIONAL GEODETIC VERTICAL DATUM OF 1929
UTM GRID AND 1982 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET
PHOENIX
DATUM IS NATIONAL GEODETIC VERTICAL DATUM OF 1929
GILA RIVER BASIN
PHOENIX, ARIZONA AND VICINITY (INCLUDING NEW RIVER)
ARIZONA CANAL FLOOD AREA
JUNE 22, 1972
LINCOLN DRIVE TO THOMAS ROAD
15TH AVENUE TO 44TH. STREET
U S ARMY CORPS OF ENGINEERS
LOS ANGELES DISTRICT

Extra

North Phoenix

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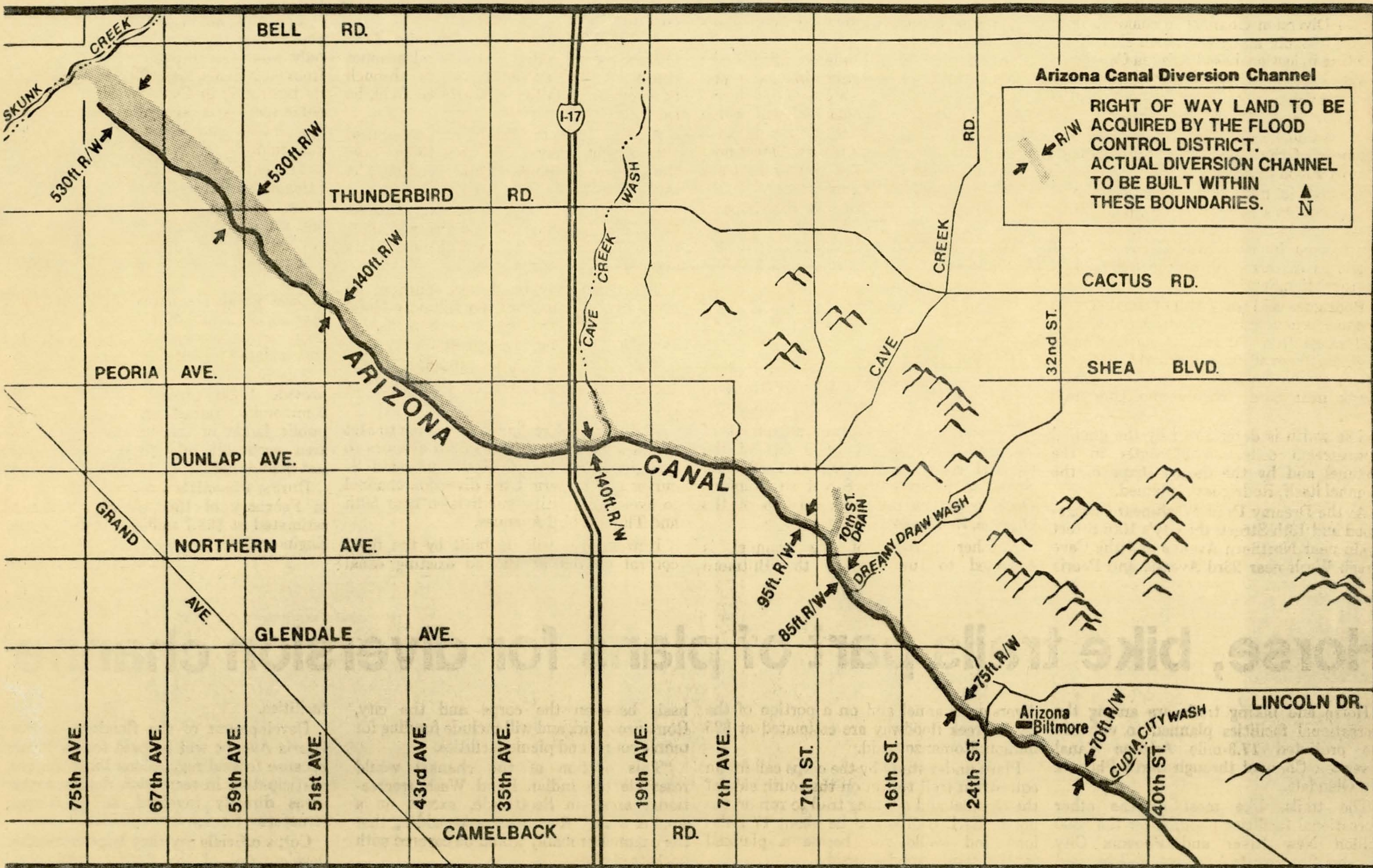

ARIZONA PUBLIC SERVICE COMPANY (APS)
Relocations for
ARIZONA CANAL DIVERSION CHANNEL (ACDC)

AGENCY	DESCRIPTION	ESTIMATED COST	AUTHORIZATION	ACTUAL COST	DATE PAID	REMARKS/ JUSTIF. FOR OVERAGE
ACDC REACH 1						
APS	75th Avenue N. of Greenway Road - 69kv Reloc.	$ 101,082	10/08/85	$ 112,793	11/05/87	Requested completion - 11/15/85
APS	75th Avenue, temporary reloc of 69kv line to provide overhead clearance to construct bridge.	$ 18,698	03/11/85	$ 19,633	11/08/85	
APS	70th Avenue & Greenway Electric facil. reloc & aband. $ 10,986 Gas facil. reloc & aband. $ 3,474 $ 14,460	$ 14,460	01/30/84	$ 7,610	04/11/85	
APS	69th Avenue utility relocations	$?	12/30/85			
APS	67th Avenue Bridge, gas line relocation Reloc. 810' of existing 2" ABS, upgrade to 4" STL	$ 20,527	05/14/84	$?		Actual cost less $5,206 (cost of upgrade to 4" steel)
APS	64th Avenue removal of transformer & related facilities	$ 775	03/04/86	$ 207 (1f)	06/29/89	
APS	59th Avenue - Relocate 3" gas line Reloc. line parallel to 59th Ave, below ACDC invert, FCD to pay actual cost less $620 for upgrade from 3" to 4" pipe.	$ 52,959	09/30/83	$ 47,232	11/15/84	$47,852 (actual) - 620 (betterment) $47,232 FCD Cost
ACDC REACH 2A						
APS	51st Ave & Cactus - Reloc. for Bridge construction	$ 17,343	06/19/85			
APS	51st Ave & Cactus - relocate 12kv	$		$ 38,539	11/05/87	
APS	51st Ave & Cactus, relocate street light	$	03/22/90	$ 3,466	08/30/90	
ACDC REACH 2B						
APS	46th Ave/ Yucca Ave - 44th Lane	$	10/08/85	$ 39,411	09/11/86	
APS	43rd Ave & Peoria - Relocate 12 kv	$ 68,151	06/05/86	$ 91,762	09/17/87	

APS	33rd-39th Ave, North of ACDC, electrical relocations	$ 118,456	02/20/87 12/10/87 rev	$ 98,779	06/15/89	Requested completion - 7/87
APS	33rd Ave to 39th Ave/Malapai-Carol, street lighting replacements.	$	06/21/90	$ 36,434	08/30/90	10/13/89 Request to revise plans
APS	Reach 2B (exact location unknown) relocate underground Duct bank WA 52-4766 Total cost 439,529 less 229,786 APS portion (52.28%) FCD cost 209,743	$	01/30/87?	$ 209,743	12/16/87	
APS	35th Ave Detour - remove street lights & stub pole, reinstall street lights upon project completion	$ 1,450***	12/10/87			
APS	35th - 33rd Ave - relocate poles and lines (UG) via: Cheryl Ave to Substation $225,263.70 * route used Carol Ave to Substation $202,165.34 Billing to be based on actual cost multiplied by ratio of Carol/Cheryl estimate, per APS letter of 7/15/87 WA 52-7562	$ 228,955 $	01/30/87 05/29/87 request to proceed, FCD to pay least cost alternative.	$ 160,547	11/10/88	Actual=178,384 x 90% = 160,547 Requested completion - 8/87
APS	33rd Avenue Canal Substation Prelim work only Addl work will be req'd immediately prior to ACDC Constr. Trade for new substation land rights handled separately. Land rights for new substation acquired 6/77	$ 81,833	09/13/77	$?		
APS	33rd Ave - Canal Substation - Reroute telephone cable w/in substation	$ 9,978 $ 5,978	12/10/87 rev 05/26/87 superceded	$ 9,875	02/25/88	Requested completion - 8/24/87
APS	33rd Ave & Carol - Canal Substation - replacement landscaping on property adjacent to ACDC. Landscaping destroyed in process of reloc for FCD. Only access through site was through landscaped area of Lincoln Properties Apts.			$ 3,250	8/87?	
APS	29th Ave Bridge - remove & reinstall street light system	$ 5,547	08/07/86	$ 5,866	12/16/87	
ACDC REACH 2C AND CAVE CREEK						
APS	25th Ave - 69 kv Reloc. total cost 117,155 less credits 11,353 See letter of 7/3/89 105,801	$ 93,099	09/08/87	$ 89,910 $ 15,891 $ 105,801	06/03/88 07/20/89	Work completed 9/88

APS	Cave Creek Wash at Peoria - reloc. power pole	$ 4,914	06/07/88			Requested to start work after 7/5/88. Coord w/ contractor.
	at Cactus - power pole bracing	$ 600	06/07/88			Requested completion - 7/1/88
	at Cactus - power pole bracing	$ 1,449	06/28/88			Requested Completion - 7/8/88
		$ 6,963		$ 9,142	06/01/89	Per APS letter of 5/9/89, add'l costs were req'd due to add'l engineering, overhead, & traffic congestion
APS	Cave Creek Wash at Cholla - power pole reloc. Actual cost = 15,905 x 45% = 7,157 (by agreement)	$ 12,411	06/14/88	$ 7,157	04/20/89	Requested Completion - 9/1/88
APS	Cave Creek Wash at Sweetwater - power pole reloc.	$ 3,384	07/08/88	$ 2,617	04/06/89	Requested completion - 9/15/88
ACDC REACH 3						
APS	Hatcher Road, reloc of power poles to accommodate Hatcher Road relocation.	$ 51,547	08/07/86	$ 80,298	01/03/91	See APS letter of 8-8-90. After estimate was made APS standards revised to require conductor installations encased in conduit. Extensive UG obstructions req'd hand digging. Rental equip. req'd to remove concrete obstructions from service station area.
APS	19th Avenue, reloc of electrical service to billboard	$ 3,381	12/12/88	$ 2,604 $ 224 $ 2,828	07/20/89 11/16/89	
APS	17th Avenue, remove service to storm water pump station	$ 2,582	08/07/89	$ 3,306	09/13/90	
APS	17th Avenue to 9th Avenue, misc. removal of overhead lines and poles to clear rights-of-way.	$ 15,516	12/15/88	$ 14,308	11/16/89	
APS	13th Avenue, relocation of power pole	$ 8,813****	06/06/91			
APS	7th Avenue, temporary relocation of power lines to provide overhead clearance to construct bridge.	$ 20,030	05/16/88	$ 17,233 $ 6,442 $ 23,676	06/08/89 06/22/89	
APS	9th Avenue to Dunlap Avenue, reloc of OH power lines	$ 54,703	10/14/87	$ 47,005	10/20/88	

APS	Dunlap Avenue, Installation of temporary lighting to illuminate detour, replacement of permanent lighting upon completion of covered channel, relocation of power supply to pump house of City Swimming Pool, and reloc of several power poles north of Dunlap Avenue.	$ 86,231***	07/31/89	$ 31,625**	03/08/90	$54,606 projected remaining cost
APS	Central Avenue, Installation of temporary lighting to illuminate the detour, and replacement of permanent lighting upon completion of covered channel.	$ 54,652****	06/15/89	$		
APS	7th Street to Central Avenue, reloc. of OH power lines	$ 33,384	04/04/89	$ 33,555	11/06/89	
APS	7th Street , relocate power poles and overhead lines	$ 79,957	07/11/88	$ 54,583	03/28/89	
				$ 5,571	06/29/89	
APS	7th Street to 10th Street, relocate power poles, overhead lines and street lights.	$ 24,269	08/25/88	$ 16,125	04/20/89	?
				$ 21,703	11/16/89	?
				$ 410	11/22/89	power to lift sta?
				$ 11,822	11/16/89	?
				$ 50,060		
APS	Northern Avenue Temporary rlocation of power lines to provide overhead clearance to construct bridge.	$ 22,370	06/20/88	$ 41,071	06/08/89	
APS	South of Northern Avenue, Relocate 230 kv lines below the ACDC invert.	$ 599,462	11/30/88	$ 215,654	04/13/89	Line hit by Pulice during exc. Caused by over exc. by Pulice & poor location of line by APS.
				$ 276,529	06/08/89	
				$ 72,039	07/20/89	
				$ 14,361	11/16/89	
				$ 578,583		
APS	South of Northern Avenue, reloc. of single power pole	$ 2,901	06/23/89	$ 2,631	11/08/89	
APS	West of 12th Street, Torre Blanca Housing Complex Relocation of underground electrical service.	$ 34,875	12/20/89	$ 34,931		
ACDC REACH 4						
APS	12th Street, Temporary relocation of 69kv & 12kv power lines to provide overhead clearance to construct bridge. Includes relocation of APS owned fiber-optic cables. Includes relocation of UG 12kv line in Orangewood alinement to an overhead powerline which spans channel.	$ 243,339	03/09/90	$ 121,670	06/21/90	Steel shoefly pole removed approx. 3-11-91.
				$ 104,178	06/xx/91	
				$ 225,848		
APS	12th Street - 14th Street, Removal of OH power lines which supply power to houses w/in the project R.O.W.. Includes relocation of OH lines in the 14th Street alinement after Sundt doesn't need the stormwater pump station.	$ 11,673****	04/05/90	$ 6,029**	08/23/90	$5,644 projected remaining cost

APS	16th Street, Temporary relocation of power lines to provide overhead clearance to construct bridge.	$ 96,208	09/26/89	$ 58,369 $ 53,505 $ 111,874	12/14/89 12/13/90	un-anticipated traffic congestion due to Squaw Pk Pkwy Construction. See APS letter of 12-10-90 and JMS message of 12-10-90.
APS	Glendale Avenue, temporary relocation of power lines to provide overhead clearance to construct bridge.	$ 15,314	07/17/89	$ 13,589	12/14/89	
APS	Maryland Avenue, Installation of steel power pole to replace a stub pole and downguys that conflict w/ bridge and channel.	$ 23,530	03/07/90	$ 42,876	12/13/90	See APS letter of 10/2/90. Difficult exc for steel pole foundation due to rock. Crane rental for placing pole not incl in est. Crane had to work around "hot" power lines.

IRRIGATION CONTROLLERS (hook-up electrical service)

APS	14962 N. 67th Avenue	$				1,365 (to be paid by Glendale)
APS	11402 N. 47th Avenue	$				Completed 9/87
APS	34th Lane & Vogel Avenue	$ 5,829	03/03/89	$ 5,829	06/01/89	
APS	9417 N. 25th Avenue dry Transformer	$ 176 $ 677	06/20/89 11/08/88	$ 176	05/11/89	582 less 2yrs x 203 = 176 no further payment required.
	TOTALS, ALL SHEETS	$2,347,490		$2,420,116 Paid to date $ 125,165 Projected remaining costs (total of items denoted *** and ****) $2,545,281 Projected total cost.		

* = plan & estimate requested
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SALT RIVER PROJECT (SRP)
Relocations for
ARIZONA CANAL DIVERSION CHANNEL (ACDC)

AGENCY	DESCRIPTION	ESTIMATED COST	AUTHORIZATION	ACTUAL COST	DATE PAID	REMARKS/ JUSTIF. FOR OVERAGE
SRP	Az Canal Reloc 49th - 51st and 57th - 64th Avenues Preliminary Design only, By International Engineering	$ 44,530	FCD Contract #?			Completion date 1976?
SRP	**Az Canal Reloc 57th - 63rd Avenue**					
	Water Relocations					
	Water only, design	$ 35,000	05/12/81	$ 58,600	7/31/83 (final payment)	
	Phase I (IGA of 7/6/82) Construction	$1,023,300	05/18/82			
	Well Retirement and Canal Tie-in, Construction	$ 83,129	04/11/83			Constructed Spring 1983
	Well retirement, 59th Ave $10,606					
	Canal tie-in $72,523					
	$83,129					
	Check Structure & laterals	$ 228,709	08/24/82			
	Radial Gate Fabrication	$ 18,900	07/16/82			
		$1,354,038		$1,274,200	10/83 (final payment)	
	59th & T-Bird Construction at tie-ins of reloc. canal & gate removal			$ 32,005	04/12/84	Work done during Nov 83 dry-up.
	W. of 59th, power or water?			$ 1,052	07/05/84	
	59th - 67th, S.of ACDC on Cholla, power or water?			$ 2,596	07/05/84	
	W. of 59th, retirement of wellsite		05/18/82	$ 706	03/21/85	
	Total, water relocation	**$1,389,038**		**$1,369,159**		
	12kv power relocation	$ 85,063	05/27/82			
	T-Bird Rd, reloc. of OH power lines to clr bridge			$ 18,535	08/11/83	
	59th Ave, reloc of OH power lines to clear bridge			$ 7,658	08/11/83	
	59th Ave, reloc & reset St light due to grade change			$ 1,076	12/08/83	
	Total, power relocation	**$ 85,063**		**$ 27,269**		
	TOTAL, WATER & POWER RELOCATION	**$1,474,101**		**$1,396,428**		

SRP	**Az Canal Relocation 51st - 47th Avenue**					
	Water (design)	$ 44,000	04/20/83	$ 43,996	02/28/84 (final payment)	
	Water (Construction)	$1,274,800	06/29/83	$1,044,892	08/31/84 (final payment) of this, $114,538 is for 47th Ave wellsite.	
	Relocate 6" Water line which enters GWTP	$?	08/18/83	6" Water line conflicts w/ reloc of irrigation facilities.		
	Total, water relocation	**$1,318,800**		**$1,088,888**		
	69kv power reloc.	$ 7,800	10/05/83	$ 19,272	11/15/84	Construction 11/83
	12kv feeder to Glendale Water Treatment Plant (GWTP)	$ 142,000	11/01/82			
	49th Dr. & Cholla, Pole replacement, Cook feeder reloc., and JM9,9000, JM9,9001,JM9,9002			$ 65,004	08/11/83	
	47th Ave, removal of pole & st light that conflict with canal relocation			$ 174	07/05/84	of irrigation facilities.
	47th Ave, removal of electrical service to well			$ 434	01/26/84	
	Total, power relocation	**$ 149,800**		**$ 84,884**		
	TOTAL, WATER & POWER RELOCATION	**$1,468,600**		**$1,173,772**		
SRP	51st Avenue Wellsite replacement		02/19/85?	$ 18,700	09/27/90	
	Replacement of overhead line to serve wellsite	$		$ 935	03/06/86	Work began & ended 8/23/85
SRP	51st Ave & Cactus to 25th Avenue 230 kv Transmission line, construct deep foundations on <u>new</u> pole line, ACDC causes SRP to use deep foundations, FCD to be billed cost differential between new poles w/o deep foundations and new poles w/ deep foundations. Approximate cost 10-15k per pole x 35poles = 350k to 525k.	$ 350,000	05/27/82	$ 350,750	09/15/83	Egr $38,953 Constr. $311,797
SRP	43rd Avenue & Peoria and 38th Ave & Purdue Relocate Stub poles which serve power line S. of canal XA2-2273 and JM3,90018	$ 18,508	07/14/87	$ 18,508 $ 1,265 <u>$ 1,736</u> $ 21,509	10/01/87 12/22/88 12/22/88	
SRP	16201 North 75th Avenue Electrical service to irrigation Controler, Hook-up only.	$ 1,203	12/05/90	$ 1,203	01/10/91	Requested Completion - 1/15/91

<u>ACDC REACH 2C AND CAVE CREEK</u>

SRP	I-17 Bridge and temporary detour bridge	$ 1,830	11/13/85	$ 3,587	10/29/87	Constr began 12/6/85 end 9/19/87

Relocation of turnout structure and related pipes. Replace non reinforced lateral w/ reinforced pipe. Design & Constr. Mgmt only, constructed under I-17 bridge contract. Construction by ADOT, reimbursed by FCD.

SRP	**23rd Avenue, Canal Relocation** Water (design) $ 35,000 Water (Construction) $429,392 $464,392	$ 464,392	08/19/87 02/07/86 superceded	$ 822,721	10/27/88(final payment)	work completed 12/87 See SRP letter of 4/5/88. Constr proceeded to correspond w/ canal dry-up, despite unresolved R.O.W. conflicts & power reloc. conflicts.
	Power reloc. 69kv & 12kv overhead, 12kv underground	$ 255,288	09/25/87	$ 269,547		Completion 11/87
	TOTAL, WATER & POWER RELOCATION	**$ 719,680**		**$1,092,268**		
ACDC REACH 3						
SRP	23rd Avenue to 15th Avenue, relocate 6 overhead 69kv guy poles.	$ 17,031	02/09/89	$ 13,509	12/14/89	
ACDC REACH 4						
SRP	Maryland Avenue, replacement of existing power pole and downguy w/ a larger pole that won't require downguy, and misc. relocation of street lights. (Downguy conflicted w/bridge and channel construction.)	$ 12,255	03/19/90	$ 10,503	11/08/90	
SRP	Maryland Avenue to 24th Street Relocate canal to accommodate ACDC, Design only, alinement later rejected	$ 44,130 $ +24,860 $ 68,990	04/10/89 06/07/89 Additional Costs due to numerous alinement changes.	$ 69,945	11/08/89	
SRP	Squaw Peak Power Substation SRP to provide inspector while contractor potholes for 36" water line w/in substation fence.	$ 2,000***	05/04/90	$		
	Northwest corner of substation, fence relocation for relocation of 36" water line.	$ 4,608	12/04/90	$ 0		Per Chuck Hughes of SRP, crews forgot to charge off to job #, so there will be no cost to FCD
	Northeast corner of substation, fence relocation for backslope of ACDC excavation. Add'l cost of $35/mo for temporary fence rental.	$ 4,262****	12/04/90	$		
SRP	32nd Street Bridge Temporary reloc of 12kv OH for bridge construction, 3 phases	$ 24,787	01/24/90	$ 31,649	06/14/91	See JMS memo of 6/24/91. Estimate didn't include reloc of service to canal gate structure. Estimate didn't account for effect of coord w/ bridge contractor & other utilities.

#**SRP RELOCATIONS FROM SQUAW PEAK PARKWAY TO PCDS** (All covered under SRP estimate of 8-1-90 and FCD authorization of 8-6-90, Amount $656,360)

POWER TRANSMISSION FACILITIES:

SRP	Station 895+50 West of 24th Street at Squaw Peak WTP Replace wood pole with a steel pole with distribution underbuild.						
SRP	Station 908+04 - Biltmore to Western Savings Replace wood pole with a deep foundation steel pole.						
SRP	Station 911+32 - Biltmore to Western Savings Replace wood pole with a deep foundation steel pole.						
SRP	Station 915+28 - Biltmore to Western Savings Replace wood pole with a deep foundation steel pole.						
SRP	Station 975+60 - Bend in Stanford Drive Relocate overhead guy pole with distribution underbuild.						
SRP	Station 1000+23 - 37th Street Alignment Relocate overhead guy pole with distribution underbuild.						
	SUBTOTAL TRANSMISSION	**$**	**366,533**	08/06/90	$	340,305	06/xx/91
SRP	Transmission pole foundation tie-backs for poles at stations 908+04, 911+32, and 915+28.	$	6,916	03/08/91	$	5,340	06/xx/91	Inadequate depth of pole foundations for ACDC exc. If had been installed correctly, cost would have been $11k. Pole 42 tieback inst. 3/10/91.
	POWER DISTRIBUTION FACILITIES:						
SRP	Station 858+70 - Between 19th St & 20th St Alignments Replace pole and overhead 12kV line crossing the ACDC. Remove pole in conflict with ACDC Channel. Place new pole 26' from edge of water.	$	8,019		$	11,723	06/xx/91
SRP	New Underground Line to be Placed Behind 20th St Sidewalk Install underground 12kV line from the new pole to the existing underground 12kV line that serves Granada Park. Also reroute street light conductor to existing light. Remove the 12kV underground line and abandon one 3-inch conduit in conflict with the ACDC Channel. This line crosses the ACDC at Station 862+62.	$	17,471		$	21,869	06/xx/91
SRP	Station 862+25 - North of Maryland Remove overhead guy pole to clear ACDC road and install down guy on pole on west side of the Arizona Canal.		861		$	1,339	06/xx/91
SRP	Station 877+60 to Maryland Avenue - Desert Crest Relocate six poles to clear ACDC excavation. This line is a double circuit 12kV feeder from Squaw Peak Substation to first pole south of Maryland Ave. Relocate poles to 26' from edge of water.	$	41,095		$	51,655	06/xx/91
SRP	Station 881+97 - Property Line between SPWTP & Desert Crest Relocate two 12kV underground circuits and remove one pole north of the Squaw Peak Substation.	$	26,054		$	28,575	06/xx/91

SRP RELOCATIONS (Continued)

SRP	Station 902+89 - West Side of 24th Street Remove and later install one Phoenix street light to clear detour road.	$ 383****		
SRP	Station 919+88 - Biltmore Conference Center Install temporary overhead 12kV line across the Arizona Canal to feed the underground at the Biltmore Conference Center and remove 12kV feeder in conflict with the ACDC.	$ 17,089	$ 26,821	06/xx/91
SRP	Remove temporary overhead 12kV line across the Arizona Canal and install underground 12kV feeder in proposed conduit in the top deck of the ACDC.	$ 10,520****		
SRP	Station 930+80 - East of East Biltmore Traffic Bridge. Install temporary overhead 12kV line across the Arizona Canal to feed underground at the Biltmore Hotel.	$ 6,080	$ 9,345	06/xx/91
SRP	Remove temporary overhead 12kV line across the Arizona Canal and install 12kV underground in proposed conduit in the top deck of the ACDC.	$ 13,108****		
SRP	Station 934+67 - At Biltmore Bath House Install temporary overhead 12kV line across the Arizona Canal to feed underground at Biltmore Bath House.	$ 7,250	$ 11,388	06/xx/91
SRP	Remove temporary overhead 12kV line across the Arizona Canal and install 665 feet of 12kV underground.	$ 25,696****		
SRP	Station 936+85 - Between Biltmore Tennis Courts Install temporary overhead 12kV line across the Arizona Canal to feed underground 12kV to Biltmore Gardens.	$ 7,664	$ 11,167	06/xx/91
SRP	Remove temporary overhead 12kV line across the Arizona Canal and splice underground to Biltmore Gardens.	$ 2,342****		
SRP	Station 973+00 - 34th Street Alignment Relocate pole from Stanford Drive to edge of canal during construction	No Charge		
SRP	Replace pole after construction.	$ 2,178****		
SRP	Station 989+86 - Service to House West of 36th Street Removal of overhead secondary and pole that served one house.	$ 510	$ 741	06/xx/91

SRP	Station 1003+06 - 37th Place Removal of overhead 12kV line.	$ 3,146		$ 3,484	06/xx/91
SRP	Station 1006+62 - Install underground 12kV to convert 12kV overhead line at Phoenix Country Day School southwest end of PCDS basin; service to wellsite.	$ 80,882***			
SRP	Remove overhead line after underground is installed	$ 8,897		$ 7,834	06/xx/91
SRP	Station 1022+40 - Relocate underground 12kV that serves PCDS at north end of PCDS sediment basin.	$ 10,582****			
	SUBTOTAL DISTRIBUTION	$ 289,827	08/06/90	$ 185,941 paid to date $ 145,691 projected remaining cost $ 331,632 projected total cost, Distribution	
	TOTALS, ALL SHEETS	$4,831,131		$4,716,344 Paid to date + 151,953 Projected remaining cost (total of items denoted *** and ****) **$4,868,297** PROJECTED TOTAL COST	
	projected total 0.8% over estimate				

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USWEST (USW) TELEPHONE
Relocations for
ARIZONA CANAL DIVERSION CHANNEL (ACDC)

AGENCY	DESCRIPTION	ESTIMATED COST	AUTHORIZATION	ACTUAL COST	DATE PAID	REMARKS/ JUSTIF. FOR OVERAGE
ACDC REACH 1						
USW	71st Ave & Greenway, Abandonment of telephone facilities	$ 370	04/13/84			
ACDC REACH 2B						
USW	35th Avenue & Vogel job # 3127	$ 15,000	12/21/89	$ 15,000		Invoice dated 11/15/88
USW	29th Avenue Bridge Suspend telephone cables during bridge construction & lower into new bridge sidewalk. An additional 50k was paid to the bridge contractor to work around the cables. See change order 1 to FCD 85-40.	$ 30,226***	04/02/86			
ACDC REACH 2C AND CAVE CREEK WASH						
USW	Cave Creek Wash at Mountain View Rd Temporary support of conduits accross cave creek wash	$ 30,000	08/29/88	$ 9,702	10/04/90	Invoice dated 9/19/90
USW	Cave Creek Wash at Mountain View Rd Permanent support structure across channel	$ 20,000	12/08/88	$ 21,273 (1f)	05/12/89	
USW	Cave Creek Wash at Cholla Ave, relocate UG Conduit	$ 8,786	08/05/88	$ 11,526 (1f)	05/12/89	
ACDC REACH 3						
USW	Hatcher Road USW reloc. to accommodate Hatcher Road Relocation	$ 2,292***	08/25/86			
USW	19th Avenue, reloc of telephone cables to clear bridge.	$ 36,630	07/18/88	$ 52,371 (1)	07/19/89	See JMW memo of 5-3-89. Job was competively bid. USWest thought bids came in high due to req'd coord w/ bridge contractor & short window to complete work.
USW	Dunlap Avenue, lowering of major underground telephone trunk lines below the invert of the ACDC.	$ 762,185	12/22/88	$ 238,781	05/24/90	Final billing. Job overestimated
USW	Central Avenue, suspend underground telephone trunk lines at grade while the ACDC is constructed below the cables. Lower cables onto completed covered ACDC and reconstruct Central.	$ 139,479****	09/17/90	$		May increase 12k due to double shifting. May increase 30k due add'l work req'd to achieve desired grade.

USW	Northern Avenue, Relocation of underground telephone cables to accommodate bridge construction.	$ 24,162***	07/18/88	$		
ACDC REACH 4						
USW	12th Street, tempoary relocation of aerial telephone cables to tempoary APS poles to clear construction site.	$ 6,996***	05/01/90	$		
USW	19th Street, re.ocation of aerial telephone cables to span the ACDC w/ a minimum clearance of 20 feet.	$ 544***	04/17/90	$		
USW	Maryland Avenue, relocation of underground telephone cables to a position between the proposed bridge caissons so that the caissons can be drilled w/o damaging the cables. Includes attachment of cables to the underside of the new bridge deck.	$ 20,000***	4/10/90	$		
USW	24th Street, Relocation of underground telephone conduits below the ACDC invert.	$ 362,499***	11/26/90	$		Includes double shifting.
USW	Biltmore Conference Center					
	Phase I, temporary overhead relocation	$ 9,421***	01/24/91	$		
	Phase II, permanant UG relocation over completed ACDC	$?*		$		
USW	32nd Street, temporary OH catenary support of conduits	$ 5,006****	11/19/90	$		
USW	32nd to 38th Street, Reloc of aerial telephone services	$ 8,278	11/14/89	$ 13,426	02/14/91	
USW	Stanford Drive, Joint trench, telephone and cable TV	$ 3,100****	03/01/90	$		
USW	Stanford Drive, Temporary OH Catenary support of UG telephone for 35th Street side drain. Job # AO-30AP	$ 5,006****	11/19/90	$		
USW	36th Street, Temporary OH support of UG conduits across ACDC and canal. Job # AO-3035	$ 35,014	04/20/90	$ 49,671		Invoice dated 4/9/91
	TOTALS, ALL SHEETS	$1,524,994		$ 411,750 Paid to date		

$ 411,750 Paid to date
$ 608,731 projected remaining cost (total of items denoted *** and ****)
$1,020,481 Projected total cost

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SOUTHWEST GAS (SWG)
Relocations for
ARIZONA CANAL DIVERSION CHANNEL (ACDC)

AGENCY	DESCRIPTION	ESTIMATED COST	AUTHORIZATION	ACTUAL COST	DATE PAID	REMARKS/ JUSTIF. FOR OVERAGE
ACDC REACH 1						
	Prior to 1985 gas system was operated by APS, see APS relocations.					
ACDC REACH 2B						
SWG	46th Avenue between Yucca Street & 44th Lane Abandonment & removal of gas line in lots along SW side of 46th Avenue					9/22/86 Request for estimate, License attached.
SWG	Malapai Drive and Vogel Avenue Relocate 2" PVC gas line	$ 33,325rev.	01/26/87			
SWG	3814 West Malapai Drive Relocation of service to this address	$ 556	12/19/86			
ACDC REAC 2C AND CAVE CREEK						
SWG	Cave Creek Wash at Peoria Avenue Lower gas line below channel invert.	$ 12,556	06/13/88	$ 14,071 $ 27,571 (1)	08/31/89 08/24/89	? ?
SWG	Cave Creek Wash at Cactus Avenue An additional $2,500 was anticipated due to non-standard pipe size on the existing main, necessitated add'l fittings. See SWG letter of 6/9/88. Job not re-authorized. See SWG invoice of 7/17/89	$ 18,193	04/20/88	$ 23,033	07/xx/89	
ACDC REACH 3						
SWG	19th Ave & Hatcher Reloc of 3 misc gas mains to accommodate Hatcher Road relocation (Carol E. of 19th, Hatcher @ 17th, Hatcher E. of 17th)	$ 12,000***	01/26/87			

SWG	19th Avenue Bridge					
	Phase I Temporary bypass	$ 39,387	11/17/87	$ 45,049	04/27/89	See JMW memo of 3-13-89. Short window to complete work to avoid conflict w/ bridge contractor, ended up working weekends, OT rates incurred.
	Phase II Attachment of permanent gas main to new Bridge deck.	$ 37,288	06/13/88	$ 38,911 $ 50,409 $ 89,320	01/18/90 07/19/90	See JMW memo of 3-13-89. Bridge contractor reportedly mis-alined sleeves thru bridge abutments for use by SWG. Extra fittings & crew time to make gasline fit. See SWG invoice of 11/13/89
	Phase III Relocation of vent pipe to clear excavation.	$ 1,013	11/29/89	$ 884	05/10/90	
SWG	7th Avenue, temporary relocation of 4" gas main to bypass bridge construction site, and attachment of permanent gas main to underside of new bridge deck.	$ 32,535	06/28/88	$ 44,542	01/25/90	
SWG	Central Avenue					
	Phase I Temporary gas line bypass under detour while channel is constructed through Central Ave.	$ 41,590	08/11/89	$ 35,678	06/21/90	
	Phase II Temporarily cap main	$ 11,980***	04/09/91			Contractor elected to use new detour plan which did not fit bypass, however a portion of the bypass did eliminate conflict w/ underpass & channel.
	Phase III Construct parmanent gas line over covered channel in Central Avenue	$ *				
SWG	7th Street Phase I, bypass bridge site	$ 13,510	12/03/87	$ 9,212	11/xx/88	
	Phase II	$ 20,730	03/21/88	$ 28,520	08/31/89	Conflict w/detour barricade caused add'l costs
	Phase III, attach gas line to new bridge	$ 11,039 $ 45,279	03/14/89	$ 34,091 $ 71,823	12/14/89	
SWG	Northern Avenue, gas line temporarily capped at both edges of bridge site. (At this location, all services could be fed separately from each end.) Upon completion of bridge construction, gas main attached to underside of new bridge deck.	$ 30,252***	05/--/88	$		
SWG	Misc. Reach 3 abandonments at 13th Ave, 9th Ave, Dunlap Ave, & 8th Street	$ 4,101	04/26/89	$ 5,018	12/21/89	Labor hours for abandonments underestimated.

ACDC REACH 4

SWG	12th Street, abandonment of portion of main which extends into excavation area, and relocation of service to property adjacent to the channel.	$ 1,636***	05/01/90	$	
SWG	14th Street, abandonment of portion of main which extends into excavation area.	$ 942***	06/05/90	$	
SWG	16th Street				
	Phase I temporary bypass around bridge site.	$ 59,348***	10/18/89	$	
	Phase II Attachment of gas line to new bridge.	$ 32,264***	04/??/90	$	
SWG	19th Street, abandonment of portion of main which extends into excavation area.	$ 1,496***	07/13/90	$	
SWG	19th Street, relocation of service to property adjacent to the channel.	$ 1,596***	07/13/90	$	
SWG	Maryland Avenue				
	Phase I temporary bypass and relocation of gas main which parallels ACDC between Maryland and 20th Street.	$ 15,812***	04/03/90	$	
	Phase II Installation of permanenet gas main through girder of new bridge.	$ 12,285***	01/18/91	$	Completed 2-7-91.
SWG	Biltmore Conference Center, Relocation of gas main below ACDC invert.	$ 11,158***	01/23/91	$	
		$ 8,058***	03/05/91	$	Addl cost due to water in exc.
SWG	Biltmore to Western Savings, new gas line on N. side of ACDC, paid by Western Savings because original gas line was installed after FCD had land rights.				
SWG	Biltmore Pool House, Relocation of gas main below ACDC.	$ 21,833***	03/05/91	$	
SWG	32nd Street Bridge, Phase I Relocate gas line to clear bridge site	$ 6,041***	02/07/90	$	
SWG	32nd Street, reloc. for bridge	$ 4,273***	?	$	estimate dated 7/3/90 SWG WR # 9007317060
SWG	32nd Street Bridge, Phase II Attach gas line to new bridge	$ 6,735***	08/27/90	$	

SWG	33rd Street & Stanford Relocate groundbed facilities	$ 15,636	07/06/90	$ 13,834	05/xx/91	Due to hard rock, groundbed was installed at lesser depth than anticipated, resulted in savings
SWG	36th Street Temporary relocation of gas services	$ 5,422****	11/19/90	$		
SWG	Phoenix Country Day School, relocation of service	$ *		$		
	TOTALS, ALL SHEETS	$ 524,590		$ 370,823 paid to date $ 243,131 projected remaining cost (total of items denoted *** and ****) $ 613,954 projected total cost		

Projected total cost 17% over estimated total cost.

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CABLE TELEVISION (CATV)
Relocations for
ARIZONA CANAL DIVERSION CHANNEL (ACDC)

AGENCY	DESCRIPTION	ESTIMATED COST	AUTHORIZATION	ACTUAL COST	DATE PAID	REMARKS/ JUSTIF. FOR OVERAGE
CATV	ACDC Reach 2 (exact location not specified) replace cable lines.	$		$ 20,161	10/87	Voucher # 813361 Warrant # 028172
CATV	43rd Avenue & Peoria	$		$ 1,675	11/87	
CATV	Carol Drive	$		$ 9,367	9/87	
CATV	Central Avenue, Temporary OH suspension of CATV. Reinstallation of UG CATV over covered ACDC.	$ 4,933****	06/08/89			
CATV	12th Street, Relocate UG CATV to temporary APS poles during bridge construction.	$		$ 1,063	06/14/90	Work done & billing sent w/o authorization. Cautionary letter sent 6/5/90.
CATV	24th Street, Temporary OH relocation of UG CATV	$ 4,591****	12/12/90			
CATV	Stanford Drive, E. of 32nd Street, relocate CATV in joint trench with telephone	$ 6,600***	2/90?			Requested completion 10/1/90
	TOTALS, ALL SHEETS	$ 16,124		$ 32,266 Paid to date $ 16,124 Projected remaining costs (total of items denoted *** and ****) $ 48,390 Projected total cost		

* = plan & estimate requested
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WESTERN UNION (WU)
Relocations for
ARIZONA CANAL DIVERSION CHANNEL (ACDC)

AGENCY	DESCRIPTION	ESTIMATED COST	AUTHORIZATION	ACTUAL COST	DATE PAID	REMARKS/ JUSTIF. FOR OVERAGE
WU	Maryland Ave, Temporary relocation of Western Union lines to clear the bridge site, replacement of lines in their original position upon completion of bridge construction.	$ 15,422***	05/17/90	$		

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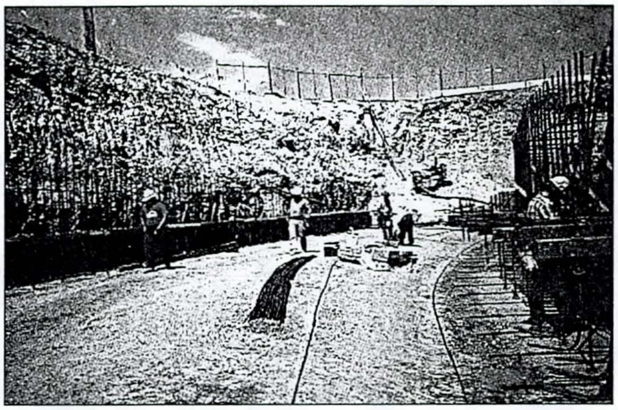
Revised June 27, 1991

called for running the 4.2-mile concrete channel through the parking lot of the Biltmore Hotel and through posh Paradise Valley. Officials went on the defensive, both at the Corps and at the Flood Control District of Maricopa County—the local sponsor paying $115 million of ACDC's cost.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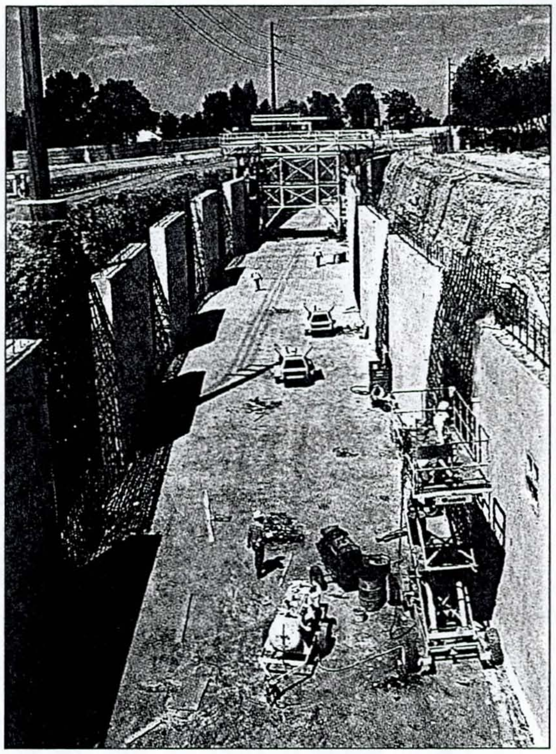
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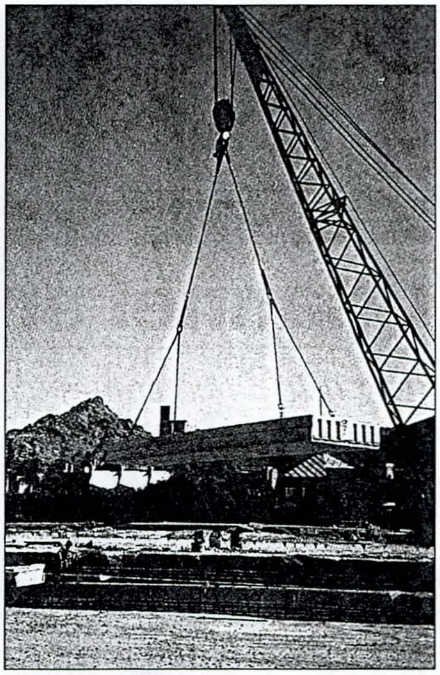
Concrete cover overcame aesthetic objections.

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By David B. Rosenbaum

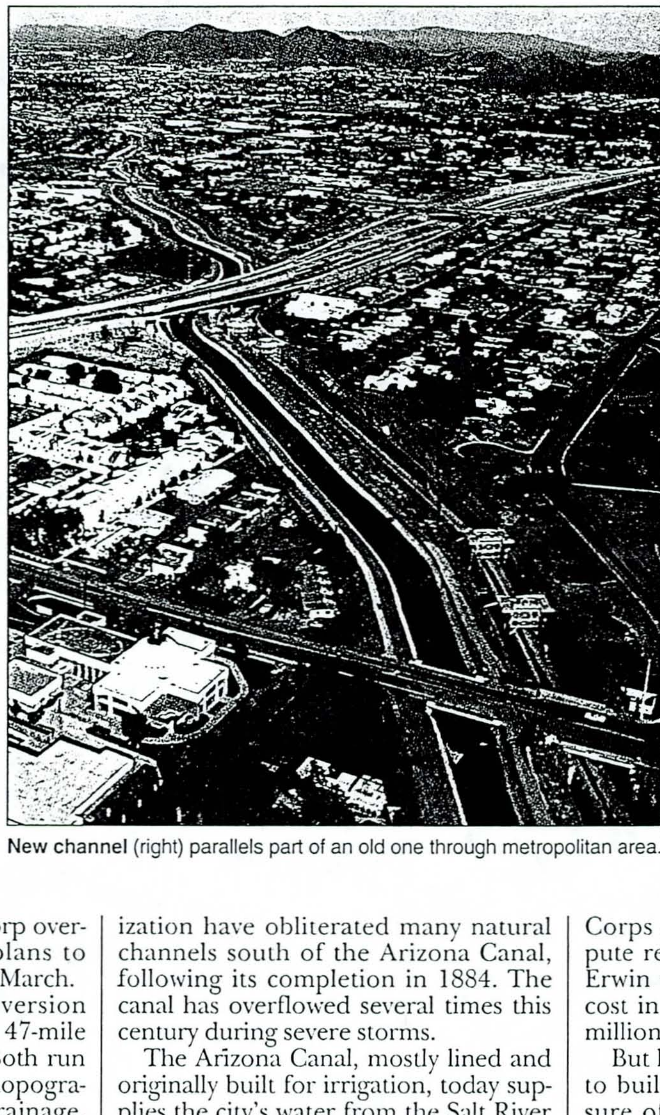
FLOOD CONTROL

Channel snakes through problems

'Big ditch' overcomes aesthetic objections and tough, wet material

Concrete-hard rock, perched groundwater and lack of access for heavy equipment made work tough for builders of a nearly completed drainage channel through metropolitan Phoenix. Toughest of all, perhaps, was keeping a low profile while slicing through a five-star resort and an adjacent neighborhood with million-dollar homes. "Being a good neighbor—critical public relations—was a big part of this job," says Neil S. Erwin, resident engineer for the Corps of Engineers in Phoenix.

As the agency responsible for building the $256-million flood-control channel, the Corps ran into staunch opposition from the Arizona Biltmore Hotel and the affluent community of Paradise Valley. To make matters worse, the contractor uncovered caliche as deep as 30 ft—much of it saturated—while building the last, most expensive and most controversial channel segment. Even so, Tucson-based SundtCorp overcame those challenges and plans to complete channel work by next March.



New channel (right) parallels part of an old one through metropolitan area.

The new Arizona Canal Diversion Channel parallels the existing 47-mile Arizona Canal for 16.5 miles. Both run roughly perpendicular to the topography's natural southwesterly drainage. ACDC, located just 55 ft north of the old canal and designed for 100-year floods, protects the canal from overflowing during storms.

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The Arizona Canal, mostly lined and originally built for irrigation, today supplies the city's water from the Salt River Project. The canal averages just 5 ft deep and 40 ft wide—widest in its upstream reaches. In contrast, the stormwater diversion channel becomes wider downstream, broadening from 40 to 500 ft and increasing in depth from 20 to 24 ft.

Controversial. ACDC proponents cite the channel's flood-control benefits, but critics call it an example of pork-barrel politics at work. The Corps estimates the total cost of the Phoenix and Vicinity Flood Control Project—including ACDC—at $450 million, with two-thirds of that sum spent for construction. The tab also includes $55 million for acquiring 600 parcels of land and relocating 260 persons.

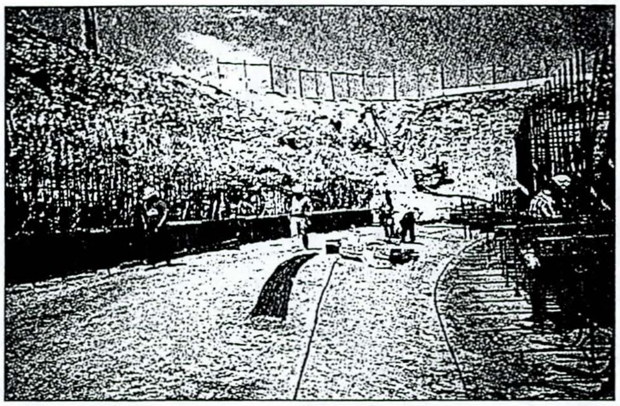
The Corps began laying plans for the project in 1959 and received congressional authorization six years later for initial work. From 1974 to '85 it built four earthfill detention dams around Phoenix for $54.7 million. Then work began on the first of four ACDC segments, plus 24 vehicular and several pedestrian bridges over the channel alignment.

Work on the first several segments, called "reaches," went relatively smoothly, by the Phoenix office of Kiewit Western Co.; C.S. Construction Co., Phoenix; Pulice Construction Inc., Phoenix; and Kasler Construction Co., San Bernardino, Calif. Although Kasler and the Corps might resort to alternative dispute resolution over a $1-million item, Erwin views that as a relatively minor cost in the context of the entire $256-million canal.

But hell broke out when it came time to build Reach 4. Looking for a measure of community acceptance on all the reaches, the Corps specified a buff color for concrete and selected stylish black 7-ft-high fences made from steel pickets, not chain link, to place on each side of the channel. None of that made ACDC seem any more attractive to some of the neighbors living along Reach 4. Despite the aesthetic features, even Erwin admits, "It's still a big ditch."

The controversial plans for Reach 4

called for running the 4.2-mile concrete channel through the parking lot of the Biltmore Hotel and through posh Paradise Valley. Officials went on the defensive, both at the Corps and at the Flood Control District of Maricopa County—the local sponsor paying $115 million of ACDC's cost.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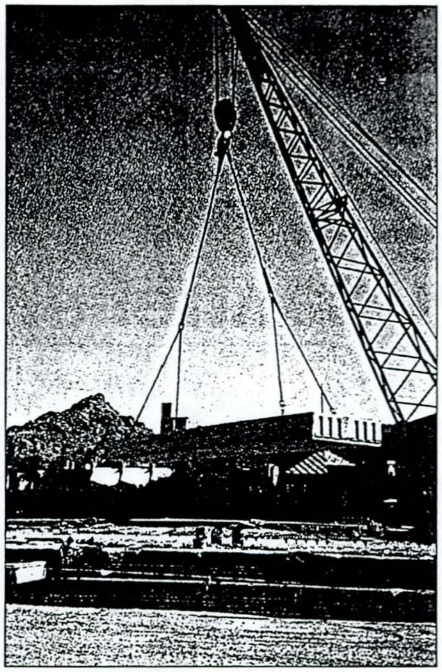
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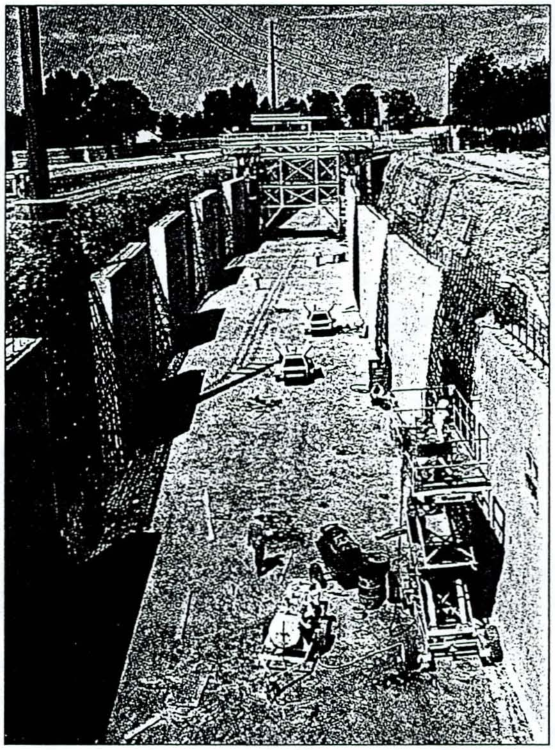
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By David B. Rosenbaum

CUDIA CITY WASH
FACT SHEET

	FCD	COE	
TOTAL AREA:	4.91[a]	4.91[e]	S.M
% AREA > 5% SLOPE	60%	---	
100-YEAR FLOW AT ACDC (EXISTING)	6500[a]	6800[d]	CFS
100-YEAR FLOW AT ACDC (175 AC-FT)	5600[b]	5200[e]	CFS
100-YEAR FLOW AT ACDC (96 AC-FT)	6100[b]	---	CFS
100-YEAR RUNOFF VOLUME AT ACDC (EXT)	700[a]	580[c]	AC-FT
PPT AMOUNT	4.04[b]	SPF[d]	IN
PPT DURATION	24[a]	7[d]	HR
TOTAL LENGTH OF WASHES IN BASIN	23.6[b]	---	MI
AERIAL MAP SCALE:	1"=200'[b]	---	

[a] Flood Control District of Maricopa County,"Review of W. S. Gookin and Associates Analysis of Cudia City Wash Hydrology," April 29,1987.

[b] Flood Control District of Maricop County, Analysis of the Alternatives to ACDC Reach 4, Bioengineering Approach, analysis by the Watershed Management Branch, Hydrology Division, 1990 (unpublished).

[c] U. S. Army Corps of Engineers, "Arizona Canal Diversion Channel, Detention Basin Study," Gila River Basin, Phoenix, Arizona and Vicinity (Including New River), Final, March 1987.

[d] U. S. Army Corps of Engineers, "Hydrology Part 2," Gila River Basin, Phoenix, Arizona and Vicinity (Including New River), DM No. 2, 1982.

[e] U. S. Army Corps of Engineers, Memorandum for Record, ACDC Reach 4 Bioengineering Alternative Design, January 9, 1991.

ACDC REACH 4 RELOCATION CONTRACTS
11-14-90

PROJECT NAME	CONTRACT #	ENGR. (OR CONTRACTOR)	COST	COMPL. DATE

12TH STREET BRIDGE, SEWAGE PUMP STATION, AND PEDESTRIAN UNDERPASS
Construction of a precast concrete box girder bridge, a pedestrian underpass, approach roadways, sanitary sewer pump station, and underground utilities modifications.

Design	FCD 88-38	Parsons Brinckerhoff	$ 156K	
Construction	FCD 89-61	Hunter Contracting	$ 595K	11/90*
Construction Management	FCD 89-73	Parsons Brinckerhoff	$ 103K	
			854K	

16TH STREET BRIDGE & SEWAGE LIFT STATION
Construction of a precast concrete box girder bridge, a sanitary sewer pump station, and relocation of a 12" sanitary sewer line.

Design	FCD 88-36	Entranco Engineers	$ 189K	
Construction	FCD 89-46	MGC Contractors	$1,441K	9/90
Construction Management	FCD 89-45	Entranco Engineers	$ 189K	
			1,819K	

GLENDALE AVENUE BRIDGE
Construction of a precast concrete box girder bridge, and sanitary sewer relocation.

Design	(included in 16th St Bridge Design Contract)			
Construction	FCD 89-44	MGC Contractors	$ 717K	4/90
Construction Management	FCD 89-43	Entranco Engineers	$ 152K	
			869K	

SQUAW PEAK PARKWAY BRIDGE OVER ACDC
Construction of a 4-span, post-tensioned concrete bridge over both the ACDC & the AZ Canal. Contracts administered by City of Phoenix. Per IGA FCD-87056, cost of bridge over ACDC is calculated as a percentage of the cost of the joint bridge over the ACDC and canal.

Design		HNTB	$ 93K	
Construction		Ralph L. Wadsworth Constr	$1,711K	3/90
Construction Management		HNTB	$ 171K	
			1,975K	

MARYLAND AVENUE BRIDGE, SEWAGE LIFT STATION, AND BUILDING DEMOLITION
Construction of a precast concrete box girder bridge, a sanitary sewage pump station, water and sewer line relocations, and building demolition.

Design	FCD 88-39	T.Y. Lyn International	$ 130K	
Construction	FCD 89-56	Hunter Contracting	$ 883K	12/90*
Construction Management	FCD 90-10	T.Y. Lyn International	$ 127K	
			1,140K	

SQUAW PEAK WATER TREATMENT PLANT UTILITY RELOCATIONS & BRIDGES
Relocation of 66" and 60" water mains, 66" and 48" raw water lines, two 36" plant wash water lines, electrical duct banks, and construction of 2 vehicular access bridges.

Design	FCD 88-40	John Carollo Engineers	$ 193K	
Construction	FCD 90-01	Mingus Construction	$1,102K	2/91*
Construction Management	FCD 90-11	John Carollo Engineers	$ 77K	
			1,372K	

SQUAW PEAK WATER TREATMENT PLANT BYPASS LINE
Construction of a 12' X 12' concrete box culvert bypass line around the existing presedimentation basin.

Design	Added by change order to FCD 88-40		$ 28K	
Construction	FCD 90-31	M.A.C.	$ 677K	4/91*
Construction Management	Added by change order to FCD 90-11		$ 60K	
			765K	

24TH STREET RELOCATIONS
Relocation of 12" epoxy lined ductile iron sewer line including a 42" jacked casing under the Arizona Canal. Preparation of plans for construction by Corps of 24th St detours and street reconstruction, and sanitary sewer relocation along the Arizona Canal.

Design Phase I	FCD 88-41	Boyle Engineering	$ 38K	
Phase II	FCD 89-78	Boyle Engineering	$ 112K	
Construction of Sewer Line	FCD 90-29	Mingus Construction	$ 449K	12/90*
Construction Management	Added by change order to FCD 89-78		$ 15K	
			614K	

32ND STREET BRIDGE
Construction of a precast concrete girder bridge, relocation of a 12" waterline & other utilites. Preparation of plans for construction by Corps of sanitary sewer relocation, reconstruction of Stanford Drive, and 35th St Side Drain.

Design Phase I	FCD 88-42	Creegan + D'Angelo	$ 63K	
Phase II	FCD 89-60	Creegan + D'Angelo	$ 188K	
Construction	FCD 89-76	R.G. Johnson	$ 651K	12/90*
Construction Management	FCD 89-77	Creegan + D'Angelo	$ 99K	
			1,001K	

PHOENIX COUNTRY DAY SCHOOL PEDESTRIAN BRIDGES & UTILITY RELOCATIONS AT CUDIA CITY WASH SEDIMENT BASIN
Construction of a 3-span concrete box girder pedestrian bridge, utility relocations, and preparation of plans for construction by Corps of 2 single span concrete box girder low flow channel bridges.

Design prelim grading plans	FCD 87-36	Mathews, Kessler, & Assoc	$ 5K	
***Design of pedestrian bridge & Util Relocs.		Letter of Auth. 3/7/90	50K **	
***Constr. of Utility Relocs.		Letter of Auth. 11/7/90	39K **	
Construction of Ped. bridge	FCD 90-21	R.G. Johnson	$ 168K	1/91*
Construction Mgmt of Ped Br.	FCD 90-16	Mathews, Kessler, & Assoc	$ 23K	
***Constr. Mgmt of Util. Relocs.		Letter of Auth 11/7/90	5K **	
			290K	

* = anticipated Completion
** = estimated cost
*** = paid as a relocation expense

ACDC REACH 3 RELOCATION CONTRACTS
4-24-89

PROJECT NAME	CONTRACT #	ENGR.(OR CONTRACTOR)	COST	COMP. DATE

19th AVENUE BRIDGE
Two phase construction of a prestressed concrete girder bridge, relocation of sewer and water lines, and structures demolition.

Design	FCD 87-7	Entranco Engineers	$ 113K	
Construction	FCD 87-46	Nesbitt Contracting	$ 706K	12-88
Construction Mgmt	FCD 87-54	Entranco Engineers	$ 126K	
			$ 945K	

19th AVENUE SEWER SIPHON & 48" WATERLINE
Construction of a 3-barrel sanitary sewer siphon, and relocation of a 48" water line.

Design	(included in bridge design contract)			
Construction	FCD 87-26	Lundell Construction	$ 621K	2-88
Construction Mgmt	FCD 87-47	Entranco Engineers	$ 62K	
			$ 683K	

7th AVENUE BRIDGE
Construction of a single span cast-in-place reinforced concrete box girder bridge, temporary detour, approach roadways, and miscellanous utility relocations.

Design	FCD 87-01	HNTB Engineers	$ 108K	
Construction	FCD 87-53	Meadow Valley Contrs.	$ 539K	4-89
Construction Mgmt	FCD 87-56	HNTB Engineers	$ 76K	
			$ 723K	

DUNLAP AVENUE SEWER SIPHON
Construction of a 3-barrel sanitary sewer siphon, and sanitary sewer and waterline relocations.

Design	(included in 7th Avenue bridge design contract)			
Construction	FCD 87-27	Pierson Construction	$ 621K	2-88
Construction Mgmt	FCD 87-48	HNTB Engineers	$ 40K	
			$ 661K	

7th STREET BRIDGE & SEWAGE LIFT STATION
Construction of a prestressed concrete girder bridge, temporary detours, approach roadways, sanitary sewer lift station, sanitary sewer and waterline relocations.

Design	FCD 87-09	John Carollo Engineers	$ 100K	
Construction	FCD 88-24	JWJ Contractors	$1389K*	6-89
Construction Mgmt	FCD 88-25	John Carollo Engineers	$ 94K*	
			$1583K*	

NORTHERN AVENUE BRIDGE
Construction of a voided slab prestressed girder bridge, temporary detours, approach roadways, a box culvert pedestrian underpass, street reconstruction, sanitary and storm sewer relocations.

Design	FCD 87-10	RGA Engineers	$ 124K	
Construction	FCD 87-58	JWJ Contracting	$ 672K	11-88
Construction Mgmt	FCD 87-55	RGA Engineers	$ 63K	
			$ 859K	

NORTHERN AVENUE SEWER SIPHON
Construction of a 2-barrel sanitary sewer siphon and miscellaneous utilities relocations.

Design	(included in bridge design contract)			
Construction	FCD 87-28	Lloyd Bros Construction	$ 177K	2-88
Construction Mgmt	FCD 87-49	RGA Engineers	$ 27K	
			$ 204K	

NORTHERN AVENUE SEWER RELOCATION
Construction of sanitary sewer and waterline relocations, and structures demolition.

Design	(included in bridge design contract)			
Construction	FCD 88-11	Tech Engineering	$ 130K*	6-89
Construction Mgmt	(FCD in-house)			

May 10, 1988

ACDC
MAJOR RELOCATION PROJECTS
COMPLETED TO DATE

Project	Engineer	Contractor	Completion Date	Total Cost
75th Ave Bridge	Royden Engineering	C.S.Construction	11/85	$1,558,046
67th Ave Bridge	E.M. Plummer	R.G. Roth	8/85	2,736,297
T-Bird Road Bridge	Sverdrup & Parcel	C.S.Construction	1/84	1,363,909
59th Ave Bridge	Benson & Gerdin	Artcraft Constr.	6/84	1,707,873
51st & Cactus Br.	Hoffman-Miller	V.O. Conrtacting	8/86	1,960,198
43rd & Peoria Br.	Benson & Gerdin	Meadow Valley	11/87	2,872,705
35th Ave Bridge	Greiner Eng.	Kasler (Corps)	in-progress	1,693,578
29th Ave Bridge	DMJM	Ashton Co.	10/86	1,209,883
I-17 Bridge	RGA (ADOT)	JWJ (ADOT)	5/88	3,500,000
25th Ave Bridge	Sverdrup & Parcel	Tanner Companies	8/85	911,358
25th Ave Siphon	Erickson & Salmon	Nikko Constr.	2/88	498,895

ACDC COMPLETED RELOCATION PROJECTS

CONTRACTS ADMINISTERED BY THE CITY OF GLENDALE

PROJECT	ENGINEER	CONTRACTOR	COMP. DATE
67th Ave Sewer & Lift Station	PRC/Glendale $53,450 (o)	? 595,000 (o)	3/86
Sewer Relocation 59th-67th Avenues	Evans,Kuhn & Assoc. $53,096 (o)	Metheun Construction/ $470,000 (o)	?
55th Ave Sewer & Lift Station	PRC/Glendale $33,800 (o)	Cadre Constr. ? + 50,000 for stby. Gen. - 10,000 for Liq. Dam.	4/86
Relocate Glendale Well # 30 (59th Ave)	?	Gilbert Pump $20,107 (o)	12/83
Relocate Glendale Well # 8	J.M. Montgomery Inc. $ 38,393 (o)	?	11/85
Reloc Sts & Util @ 71st Ave, Replatting Granada Estates	O'Neil-Morea-Hall $12,700 (o)	? ?	?
Reloc 30" Waterline at 51st & Cactus Aves	John Corollo Egrs $37,350 (o)	? ?	?

"o" = Original Contract amount
"e" = Estimated cost
"a" = actual cost

May 16, 1988

ACDC COMPLETED RELOCATION PROJECTS

RELOCATIONS COMPLETED BY SRP

PROJECT	ENGINEER	CONTRACTOR	COMP. DATE
Arizona Canal Reloc. 49th-67th Avenues	International Egr. $44,530 (o)	(prelim. plans only)	?
Az Canal Reloc 57th-63rd Ave			
Water	SRP/$35,000 (e)	SRP	?
Phase 1 (IGA of 7/6/82)		SRP/$1,023,300 (e)	
Well retirement & Canal Tie-in		SRP/$ 83,129 (e)	
Check Structure & Laterals		SRP/$ 228,709 (e)	
Radial Gate Fabrication		SRP/$ 18,900 (e)	
12 kv power relocation		SRP/$ 85,063 (e)	
Az Canal Reloc 51st-45th Ave			
Water	SRP/$44,000 (e)	SRP/$1,274,800 (e)	?
69 kv power reloc.	SRP	SRP/$ 7,800 (e)	
12 kv feeder to G-dale WTP		SRP/$ 142,000 (e)	
Az Canal Reloc @ 23rd Avenue			
Water	SRP/$35,000 (e)	SRP/$ 464,392 (e)	12/87
Power 69 & 12 kv	SRP	SRP/$ 255,288 (e)	11/87

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May 16, 1988

FLOOD CONTROL

Channel snakes … problems

'Big ditch' overcomes aesthetic objecti… …t material

Ed Raleigh

thanks! Sandy

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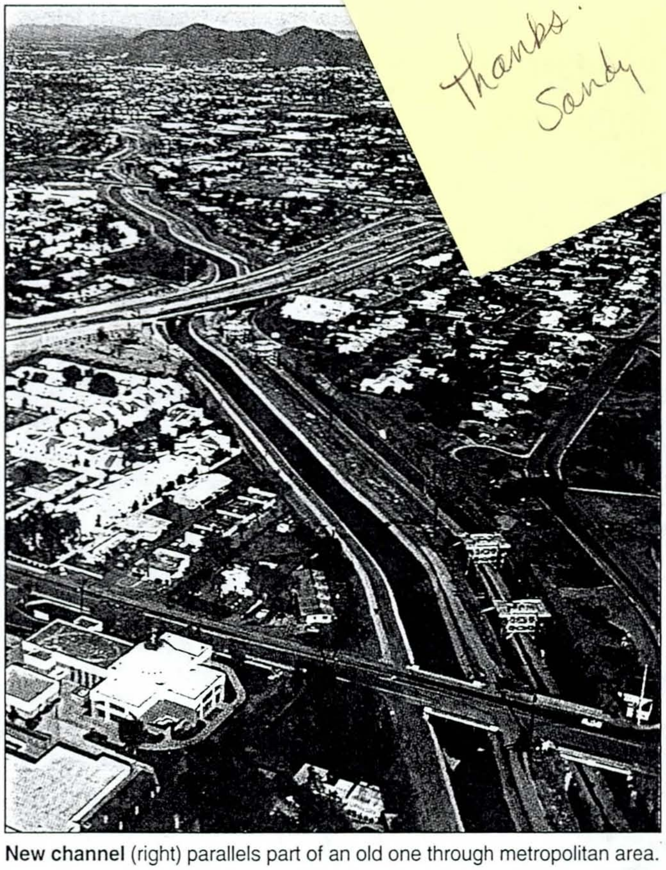

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Controversial. ACDC proponents cite the channel's flood-control benefits, but critics call it an example of pork-barrel politics at work. The Corps estimates the total …ost of the Phoenix and …cinity Flood Control Pro…t—including ACDC—at …0 million, with two-thirds of that sum spent for construction. The tab also includes $55 million for acquiring 600 parcels of land and relocating 260 persons.

The Corps began laying plans for the project in 1959 and received congressional authorization six years later for initial work. From 1974 to '85 it built four earthfill detention dams around Phoenix for $54.7 million. Then work began on the first of four ACDC segments, plus 24 vehicular and several pedestrian bridges over the channel alignment.

Work on the first several segments, called "reaches," went relatively smoothly, by the Phoenix office of Kiewit Western Co.; C.S. Construction Co., Phoenix; Pulice Construction Inc., Phoenix; and Kasler Construction Co., San Bernardino, Calif. Although Kasler and the Corps might resort to alternative dispute resolution over a $1-million item, Erwin views that as a relatively minor cost in the context of the entire $256-million canal.

But hell broke out when it came time to build Reach 4. Looking for a measure of community acceptance on all the reaches, the Corps specified a buff color for concrete and selected stylish black 7-ft-high fences made from steel pickets, not chain link, to place on each side of the channel. None of that made ACDC seem any more attractive to some of the neighbors living along Reach 4. Despite the aesthetic features, even Erwin admits, "It's still a big ditch."

The controversial plans for Reach 4

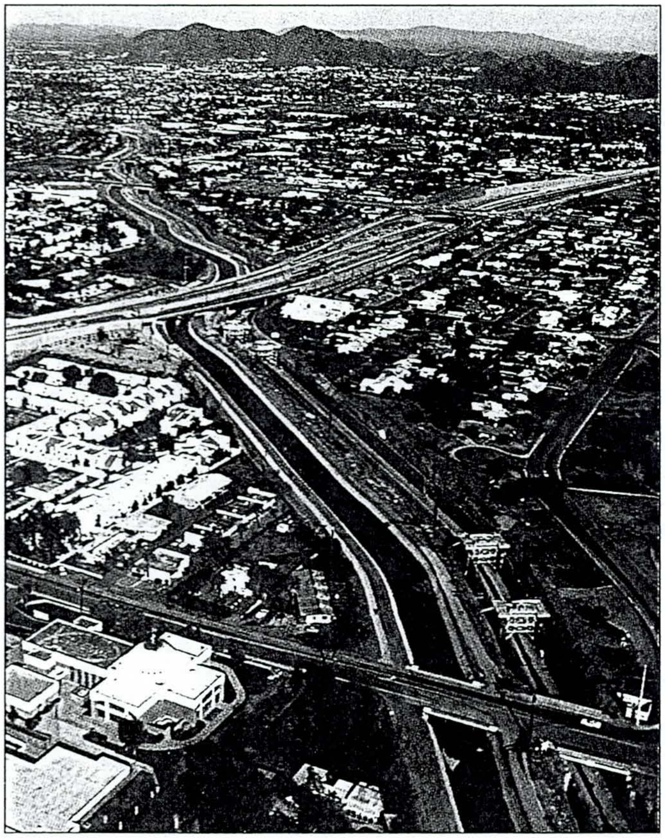
FLOOD CONTROL

Channel snakes through problems

'Big ditch' overcomes aesthetic objections and tough, wet material

Concrete-hard rock, perched groundwater and lack of access for heavy equipment made work tough for builders of a nearly completed drainage channel through metropolitan Phoenix. Toughest of all, perhaps, was keeping a low profile while slicing through a five-star resort and an adjacent neighborhood with million-dollar homes. "Being a good neighbor–critical public relations–was a big part of this job," says Neil S. Erwin, resident engineer for the Corps of Engineers in Phoenix.

As the agency responsible for building the $256-million flood-control channel, the Corps ran into staunch opposition from the Arizona Biltmore Hotel and the affluent community of Paradise Valley. To make matters worse, the contractor uncovered caliche as deep as 30 ft–much of it saturated–while building the last, most expensive and most controversial channel segment. Even so, Tucson-based SundtCorp overcame those challenges and plans to complete channel work by next March.



New channel (right) parallels part of an old one through metropolitan area.

The new Arizona Canal Diversion Channel parallels the existing 47-mile Arizona Canal for 16.5 miles. Both run roughly perpendicular to the topography's natural southwesterly drainage. ACDC, located just 55 ft north of the old canal and designed for 100-year floods, protects the canal from overflowing during storms.

With less than 10 in. of rainfall annually on average, the desert there contains little topsoil or ground cover to prevent sheet flooding, particularly during summer storms. Worsening the flooding threat, agriculture and urbanization have obliterated many natural channels south of the Arizona Canal, following its completion in 1884. The canal has overflowed several times this century during severe storms.

The Arizona Canal, mostly lined and originally built for irrigation, today supplies the city's water from the Salt River Project. The canal averages just 5 ft deep and 40 ft wide–widest in its upstream reaches. In contrast, the stormwater diversion channel becomes wider downstream, broadening from 40 to 500 ft and increasing in depth from 20 to 24 ft.

Controversial. ACDC proponents cite the channel's flood-control benefits, but critics call it an example of pork-barrel politics at work. The Corps estimates the total cost of the Phoenix and Vicinity Flood Control Project–including ACDC–at $450 million, with two-thirds of that sum spent for construction. The tab also includes $55 million for acquiring 600 parcels of land and relocating 260 persons.

The Corps began laying plans for the project in 1959 and received congressional authorization six years later for initial work. From 1974 to '85 it built four earthfill detention dams around Phoenix for $54.7 million. Then work began on the first of four ACDC segments, plus 24 vehicular and several pedestrian bridges over the channel alignment.

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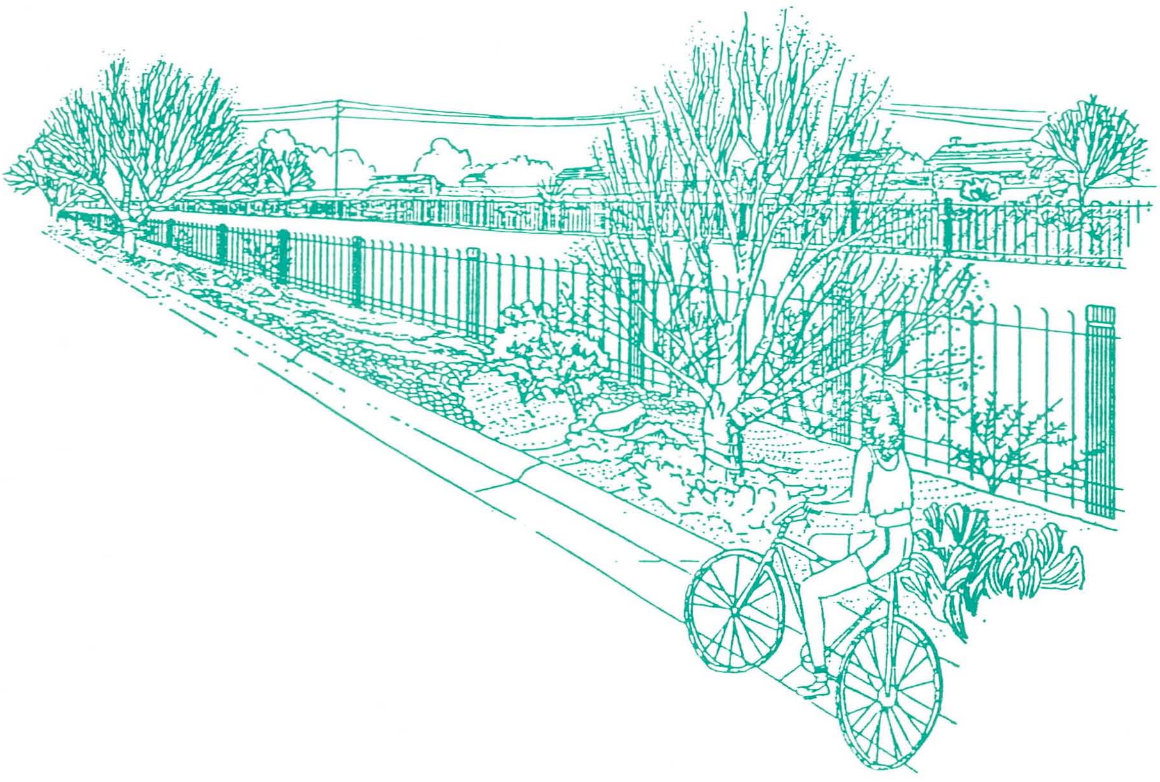
The controversial plans for Reach 4

Flood Control District
of Maricopa County

ACDC



Arizona Canal Diversion Channel

What is the ACDC?

The Arizona Canal Diversion Channel (ACDC) is part of an overall project developed by the U.S. Army Corps of Engineers and sponsored by the Flood Control District of Maricopa County to provide a high measure of flood protection to a large part of the metropolitan area.

The overall project is known as the Phoenix, Arizona and Vicinity (Including New River) Flood Control Project.

This project includes Dreamy Draw Dam, Cave Buttes Dam, Adobe Dam, New River Dam, the ACDC, and flowage easements/bank stabilization on Skunk Creek, New River, and the Agua Fria River.

What is the purpose of the Phoenix, Arizona and Vicinity (Including New River) Flood Control Project?

This project will protect people from flood flows originating in the mountain and desert drainage area lying to the north of and including parts of Phoenix, Glendale, and Peoria.

Many streams including Cudia City Wash, Dreamy Draw, Cave Creek, Skunk Creek, New River, and the Agua Fria River drain flows from this mountain and desert area to the metropolitan area.

How does the Phoenix, Arizona and Vicinity (Including New River) Flood Control Project work?

Dreamy Draw Dam and Cave Buttes Dam, on Cave Creek, collect floodwaters and release the water slowly into the natural creek beds to the ACDC.

The ACDC collects this water as well as floodwaters from several minor tributaries, uncontrolled overland flow, and city storm drains and takes the water to Skunk Creek.

Adobe Dam, on Skunk Creek, and New River Dam collect floodwaters and release the water slowly down Skunk Creek and New River so that the peak flows, after the introduction of the ACDC water, will not be increased.

The acquisition of flowage easements and the construction of bank protection on Skunk Creek, New River, and the Agua Fria River complete the project.

The water from these projects flows into the Agua Fria River and then into the Gila River, which is its original and natural destination.

What is the purpose of the ACDC?

The ACDC is the core of the overall project. It is a 16.5 mile channel from approximately 40th Street and Camelback to 75th Avenue and Greenway in an alignment parallel to and on the northern side of the Arizona Canal.

It will intercept, and carry to Skunk Creek, flows up to a 100 year flood. This is the level of flooding expected to occur on an average of once per century.

For comparison, Phoenix city storm drains are generally planned for protection up to the two year flood.

The ACDC will eliminate flood damages to Phoenix, Glendale, and Peoria south of the Arizona Canal from flows originating north of the Canal up to the 100 year level and will substantially reduce damages from flows in excess of the 100 year level.

What causes the problem?

The natural paths of the streams and overland flows from the mountains and desert area are generally southwesterly across the metropolitan area and into the Salt and Gila Rivers.

These paths have, however, been obstructed by two different actions.

One was the building of the Arizona Canal in 1884.

This Canal, intended to distribute irrigation water, also acted as a dam to the natural flow of water.

As a result, water from small storms runs into the Arizona Canal or ponds along its northern bank. This ponding has resulted in flooding along that bank.

The second action was the obliteration through agriculture and urbanization of natural channels south of the Arizona Canal.

Significant rains drain into the Arizona Canal and quickly exceed the capacity of the Canal and pour over spillways to the south.

In major storms, the flows can and have caused breaks in the south bank of the Canal.

Because of the obliteration of the channels, these flows frequently race down streets, through yards and into homes and businesses.

How will the ACDC help?

The completion of the ACDC will allow the existing drainage to be modified.

Storm drains north of the Arizona Canal will empty into the ACDC and water will be carried to Skunk Creek. This will prevent ponding on the north side.

It will also intercept flows that would have gone into the Arizona Canal thereby preventing overflowing of the Canal caused by these inflows.

The ACDC will also allow the initiation of a new drainage concept south of the Canal.

Instead of having to cope with drainage from north of the Canal, new storm drains with a smaller initial capacity can be constructed to carry storm water to the Salt River.

Because the drain size can be decreased, the cities can save a large amount of money without decreasing protection.

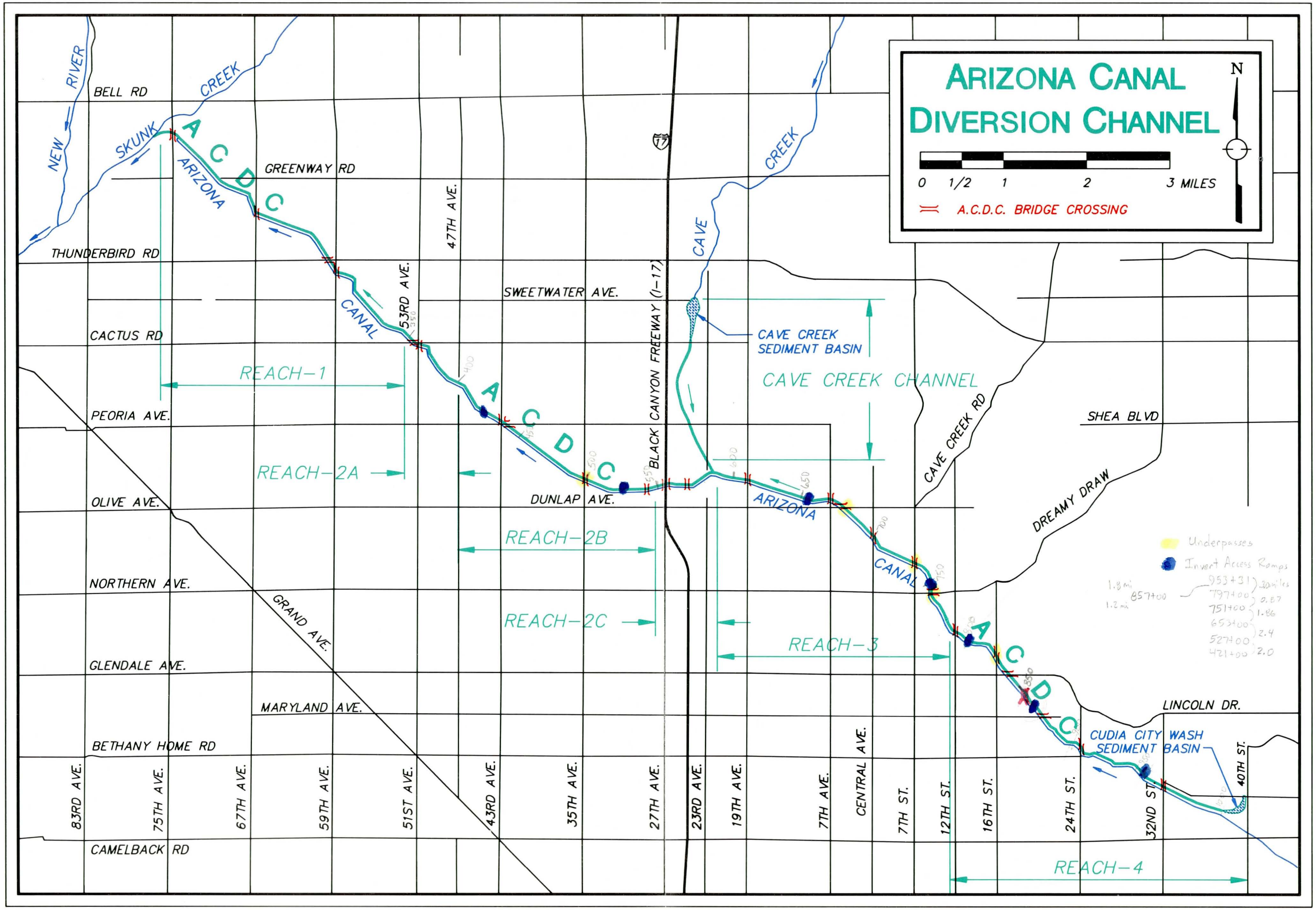
Who is building the ACDC?

The overall Project and the ACDC are being designed and constructed by the U. S. Army Corps of Engineers with federal money.

The Flood Control District of Maricopa County is the local sponsor and is responsible for acquiring the land, building bridges, relocating utilities such as water lines, and then operating and maintaining the project in the future.

The money comes from the Flood Control Tax Levy on all real property within the County.

The cities along its path – Paradise Valley, Phoenix, Glendale, and Peoria – have studied and approved the project through their city limits.


ARIZONA CANAL
DIVERSION CHANNEL
N
0 1/2 1 2 3 MILES
A.C.D.C. BRIDGE CROSSING
Underpasses
Invert Access Ramps
953+31
797+00
751+00
653+00
527+00
421+00
.30 miles
0.87
1.86
2.4
2.0
1.8 mi
857+00
1.2 mi
BELL RD
GREENWAY RD
THUNDERBIRD RD
SWEETWATER AVE.
CACTUS RD
PEORIA AVE.
OLIVE AVE.
DUNLAP AVE.
NORTHERN AVE.
GLENDALE AVE.
MARYLAND AVE.
BETHANY HOME RD
CAMELBACK RD
SHEA BLVD
LINCOLN DR.
GRAND AVE.
CAVE CREEK RD
DREAMY DRAW
NEW RIVER
SKUNK CREEK
CAVE CREEK
ARIZONA CANAL
A C D C
BLACK CANYON FREEWAY (I-17)
17
CAVE CREEK SEDIMENT BASIN
CAVE CREEK CHANNEL
CUDIA CITY WASH SEDIMENT BASIN
REACH-1
REACH-2A
REACH-2B
REACH-2C
REACH-3
REACH-4
47TH AVE.
53RD AVE.
83RD AVE.
75TH AVE.
67TH AVE.
59TH AVE.
51ST AVE.
43RD AVE.
35TH AVE.
27TH AVE.
23RD AVE.
19TH AVE.
7TH AVE.
CENTRAL AVE.
7TH ST.
12TH ST.
16TH ST.
24TH ST.
32ND ST.
40TH ST.

What are the elements of the ACDC?

Reach 1 is a 4.0 mile long earthen channel from Skunk Creek to Cactus Road. This reach is within the Cities of Peoria and Glendale. Glendale is building extensive recreation activities within the approximately 500 feet wide and 20 feet deep channel area.

Reach 2 extends 4.7 miles from Cactus Road to Cave Creek (23rd Avenue). From Cactus to 47th Avenue (0.75 miles) it is a concrete trapezoidal channel from 160 to 200 feet wide. Between 47th Avenue and Cave Creek Wash it is a concrete rectangular channel 110 feet wide. The walls through this Reach are approximately 21 feet deep.

Reach 3 extends 3.6 miles from Cave Creek to Dreamy Draw (12th Street) and will be 50 to 60 feet wide and 20.5 to 23.5 feet deep. It will be covered for a 2,565 foot stretch, so Sunnyslope High School can maintain the use of its athletic fields.

Reach 4 extends 4.2 miles from Dreamy Draw to Cudia City Wash near 40th Street. The rectangular concrete channel will be 36 to 40 feet wide and 20.5 to 24.5 feet deep. The channel will be covered from 24th Street to approximately 30th Street through the Arizona Biltmore Hotel area where costs of covering are less than additional right-of-way costs, and for 1,297 feet beneath Stanford Drive east of 32nd Street to avoid the cost of relocating Stanford Drive.

The Cave Creek Sediment Basin will be constructed just south of the Sweetwater Avenue alignment, and the area around the Basin will be used by the City of Phoenix for recreational acitivities.

The Cave Creek Channel will carry waters from the Sediment Basin to the ACDC. It will be a concrete channel within Phoenix's Cave Creek Park. The District is constructing undercrossings at Peoria and Cactus as well as six pedestrian bridges in connection with the Cave Creek Channel. The maintenance roads will be available for hiking, bicycling, equestrian and other nonvehicular recreation users.

The Cudia City Wash Sediment Basin will be on the grounds of the Phoenix Country Day School near 40th Street and Camelback. The basin is gradually sloping, unlined and relatively unobtrusive. The School's athletic fields, but no structures, will be located within it.

What will the ACDC look like?

The ACDC will mainly be a rectangular concrete channel (except for the earthen portion at the western end in Glendale and Peoria).

The Corps of Engineers, as part of its construction responsibilities, will provide landscaping and other aesthetic treatments.

For example, landscape nodes will be created at most major street intersections and the eye will be drawn to them rather than to the channel.

Bridge railings will help prevent passing automobile passengers from seeing into the channel.

Screening walls, landscaping, and existing back yard fences will conceal the channel from adjacent neighborhoods between major streets. Also, the channel is screened from the south by the banks of the Arizona Canal.

The type of landscaping differs in the various reaches in order to blend with existing neighborhoods; however, all the plants are adapted to the hot, arid environment in this area.

The plants are low water users.

A safety fence made of steel with a wrought iron appearance will prevent children and animals from getting into the channel.

The safety fencing will be only partially visible because there will be a slope from ground level down to the channel walls. The fence will be built at the top of the channel walls.

The south walls will, in most areas, nearly adjoin the north border of the Salt River Project right-of-way.

The Canal and the Channel will share a maintenance road which will also double as a bike path.

Adjacent to the maintenance road will be the existing equestrian path.

Stormwater will flow into the channel easily because the channel will be constructed below the ground surface.

Inlet structures will be built where the flows from major drains enter the channel and pipes will be used where local ponding occurs.

City storm drains constructed by Phoenix will also outlet into the Channel.

What about bridges?

A total of 24 vehicular bridges will be constructed at all present crossings of the Arizona Canal.

Several new pedestrian bridges will also be constructed.

These bridges are being built under the direction of the Flood Control District.

Who will operate and maintain the ACDC?

The Flood Control District will supply the manpower and costs of maintaining the ACDC.

This includes removal of debris and silt that may accumulate in the bottom of the channel as well as maintaining the landscaping on the banks.

Glendale and Phoenix will share in the maintenance responsibilities in areas where recreation features are planned.

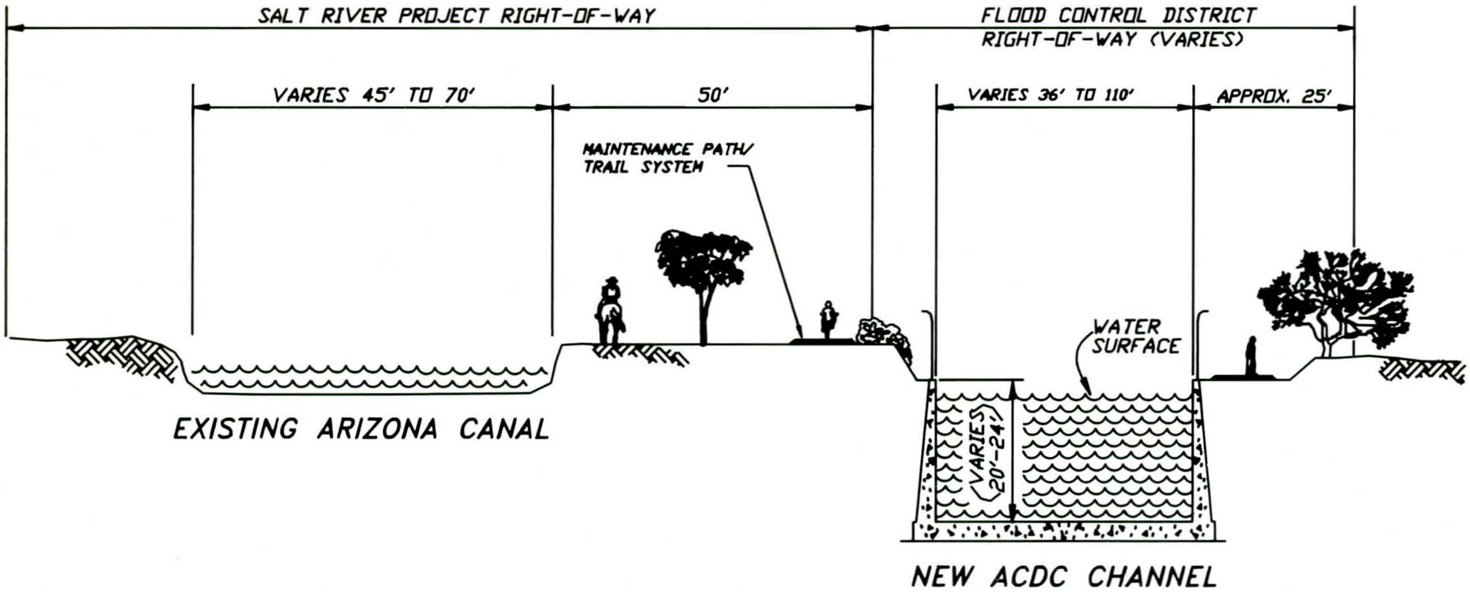
What will the Phoenix and Vicinity (Including New River) Flood Control Project cost?

The total cost for the Phoenix and Vicinity (Including New River) Flood Control Project, which includes the ACDC, four dams, and other measures (flood control and recreational facilities, as well as wildlife mitigation and lands and archaeological mitigation) is estimated at $422 million, of which $254 million is a federal cost and $168 million is a local cost.

What will the ACDC cost?

The combined federal and local costs are estimated to be $254 million.

The costs includes $152 million in federal money and $102 million in local money for the ACDC, including recreation facilities.



TYPICAL CROSS SECTION

CONCRETE RECTANGULAR CHANNEL
47th AVENUE TO 40th STREET

For further information contact:

Public Involvement Coordinator
Flood Control District
of Maricopa County
3335 West Durango
Phoenix, Arizona 85009
262-1501

Greiner

Greiner, Inc.
7310 N. 16th Street, Suite 160
Phoenix, Arizona 85020-2402
(602) 275-5400
FAX: (602) 943-1891

Route
Arizona Diversion Channel Field Trip
December 18, 1990 at 12:00 Noon

Howard Johnson's north to Thunderbird
Thunderbird westbound to ACDC at 59th
Eastbound in channel to Cactus Road
Cactus Road eastbound to Cave Creek Park and channel sediment basin

Down Cave Creek Channel to Arizona Canal at 23rd Avenue

In channel eastbound under 19th Avenue
Out at Sunnyslope High School (Third Avenue)

Eastbound on Dunlap to Central
(South on Central to Northern, then east to ACDC)
(Look for confirmation of access and height clearance)

At Northern - on ACDC Bank East to 12th Street
Then along bank to Glendale
Glendale to Biltmore

(1) Option - Biltmore east to 32nd
(2) Option - 32nd and ACDC to 40th - to view beginning of Reach 4

DIRECTIO.GEN

Greiner

Greiner, Inc.
7310 N. 16th Street, Suite 160
Phoenix, Arizona 85020-2402
(602) 275-5400

November 19, 1990

FLOOD CONTROL DISTRICT
RECEIVED
NOV 20 '90

4	CH ENG		P & PM
3	DEP		HYDRO
	ADMIN		LMGT
	FINANCE		FILE
	C & O	1	RAC
2	ENGR		

REMARKS

Mr. Ed Raleigh
Maricopa County Flood Control District
3335 W. Durango Street
Phoenix, AZ 85009

Re: **Society of American Military Engineers - Field Trip ACDC**

Dear Ed:

Members of the Society of American Military Engineers - Phoenix Post have scheduled a tour of the ACDC for December 18, 1990. This tour is one of the periodic field trips our group makes in order to view and understand the construction activities that are taking place in our valley. This is to confirm your participation in a bus tour of the ACDC design and construction elements.

Our membership is made up of military personnel in the valley, retired military personnel, government employees at the state, county and local level, along with a number of consultants.

Some of our members have actively participated in the formulation, development and implementation of the ACDC. Consequently, there is a strong interest in seeing the progress of the ACDC into the construction phase.

We look for your participation in the tour to give your particular agency's viewpoint on the various design, political and construction aspects as it has all come together.

To begin the tour, we will assemble on December 18th at the Howard Johnson's at 51st Avenue and the West Papago Freeway - northwest corner. Lunch will begin about 11:15 a.m. We expect a short briefing on the ACDC. Following the briefing, we will board the bus at 12:00 p.m. and go directly to the Arizona Canal Diversion Channel. We will look to our tour guides, Ed Raliegh, Bill Hammon and Neil Irwin, to chart the course and to carry appropriate dialogue regarding the project.

In our literature, we are setting the schedule as I have stated above. We expect that the tour will conclude at approximately 2:00 p.m. This may vary by 15 or 20 minutes. We do need to establish a tentative schedule so that the members can plan the balance of their afternoon.

I will look forward to gathering with the tour guides so that we can do a modest modicum of planning in advance of the December 18th date. Please call me if you have questions.

Sincerely,

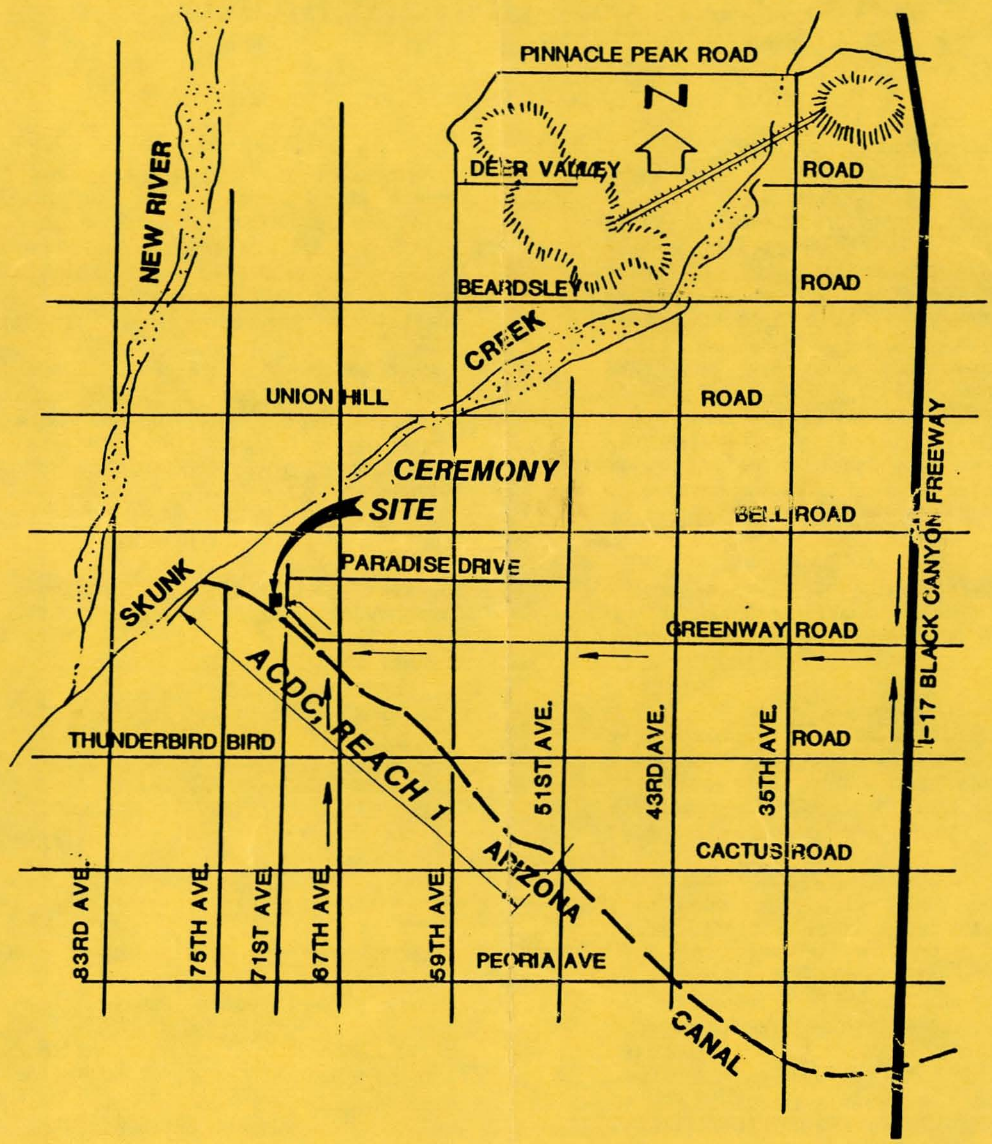
GREINER, INC.

JEA

James E. Attebery, P.E.
Vice President

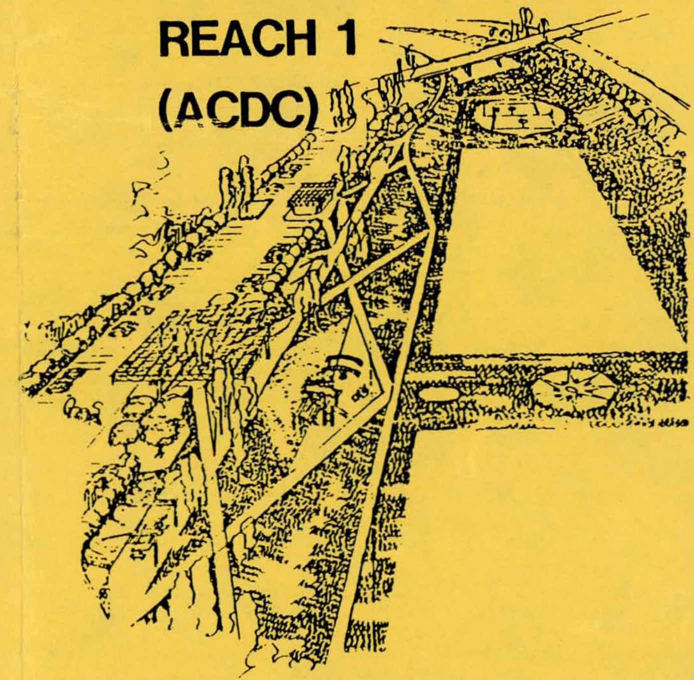
cc: D.C. Black

MCFDACDC.LTR



THE FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
INVITES YOU TO ATTEND
Groundbreaking Ceremony
for the

ARIZONA CANAL DIVERSION CHANNEL, REACH 1 (ACDC)



Thursday,
October 24, 1985
10:30 A.M.

WELCOME TO REACH 1 (A.C.D.C.) GROUNDBREAKING

CEREMONY PROGRAM

Band Selection ....Peoria High School
Jazz Ensemble, John McCord, Director

Master of Ceremonies ....Carole Carpenter
Director, District 4, Flood Control District

Invocation ....Father Pierre Hissey
Saint Jerome Parish

Pledge of Allegiance ....Carole Carpenter

Star-Spangled Banner ......Peoria High School
Jazz Ensemble

Remarks and Introduction
of Guests ....Fred Koory, Jr.
Director, District 3, Flood Control District

Remarks ....Lt. Col. Rick Jackson
U. S. Army Corps of Engineers

Remarks ....Mayor Ron Trevers
City of Peoria

Remarks ....Mayor George Renner
City of Glendale

Benediction ....Father Pierre Hissey

****

Refreshments, Courtesy of
Kiewit Western Co.

****

BACKGROUND INFORMATION

The Arizona Canal Diversion Channel (ACDC) is the last feature to be constructed as part of the Phoenix, Arizona and Vicinity (Including New River) Flood Control Project. Other features of the project include four dams already completed (Dreamy Draw Dam, 1973; Cave Buttes Dam, 1980; Adobe Dam, 1982; and New River Dam, 1985). The ACDC will intercept and divert flows westward to Skunk Creek which would normally pond along or overflow the Arizona Canal. The ACDC will divert all flood flows up to the magnitude of those which would occur once in 100 years on the average.

The ACDC is divided into four reaches for the purpose of staged construction and to facilitate the management of this extensive and complex project.

Reach 1, the downstream end of the ACDC (from Skunk Creek to Cactus Road) is approximately 4.0 miles long and will be unlined except for the extreme east end where it transitions into a concrete lined section. The remaining reaches will be lined with reinforced concrete.

Reach 1 of the ACDC will be developed as a recreational park with three activity areas linked by a system of hiking, jogging, bicycling, and equestrian trails. Recreation facilities in the park will include fourteen shaded picnic sites within the family ramadas and other shading structures, multi-purpose paved courts, and turfed athletic fields. Also planned are a children's playlot, an area for target archery, and physical fitness courses for both handicapped and nonhandicapped users. The recreational features of the ACDC are being developed by the Corps under cost sharing agreements with the Cities of Peoria and Glendale.

The last activity area in the park will be in the area of 73rd Avenue in the City of Peoria where a small, shallow splash pond will be provided at the base of the overflow-spillway structure for the Arizona Canal. The pond will create a visual focal point that will enhance the esthetic qualities of the recreational facilities.

Kiewit Western Co. will build Reach 1 under contract with the U.S. Army Corps of Engineers during the eighteen-month period beginning in October 1985. The entire ACDC is scheduled for completion by the end of 1991.

PROJECT FEATURES

100-year level of flood protection
Capacity at Skunk Creek ....29,000 cfs.

Channel size:
Length ....4.0 miles
Width ....220 feet to 255 feet (bottom)
450 feet (top)

Costs
Federal (construction).........$12,700,000
Flood Control District.........$17,260,000

****

FLOOD CONTROL DISTRICT BOARD OF DIRECTORS

Tom Freestone (Chairman)

George Campbell — Fred Koory, Jr.
Carole Carpenter — Ed Pastor

FLOOD CONTROL ADVISORY BOARD

John E. Miller (Chairman)

Lynn Anderson — Paul E. Perry
James E. Attebery — Charles A. Sykes
William J. LoPiano — Don Weesner

D. E. Sagramoso, Chief Eng. and Gen. Mgr.
FLOOD CONTROL DISTRICT of Maricopa County

The Cave Creek Channel, a concrete channel within Phoenix's Cave Creek Park, will carry waters from the Sediment Basin to the ACDC. Undercrossings at Peoria and Cactus and six pedestrian bridges will be constructed. The maintenance road will be available for hiking, bicycling, equestrian, and other nonvehicular recreation uses.

The Cudia City Wash Sediment is on the grounds of the Phoenix Country Day School near 40th Street and Camelback. The basin slopes gradually, and is unlined and relatively unobtrusive. The school's athletic fields, but no structures, will be located within the basin.

Under the direction of the Flood Control District, twenty-four vehicular bridges will be built at all present crossings of the Arizona Canal, as well as several new pedestrian bridges.

As a part of its construction responsibilities, the Corp of Engineers will provide landscaping to blend with the existing neighborhoods and other aesthetic treatments. For example, landscape nodes will be created at most major street intersections. In addition to the landscaping, bridge railings, screening walls, existing back yard fences, and the banks of the Arizona Canal will help conceal the ACDC from adjacent neighborhoods.

Landscape plants have been chosen that are low water users and adapted to the hot, arid environment found in the greater Phoenix area. Furthermore, the Canal and the ACDC will share a maintenance road, which will also double as a bike path. The existing equestrian path will be adjacent to the maintenance road.

A steel safety fence (with a wrought-iron appearance) will prevent children and animals from getting into the channel. It will be built at the top of the channel and will be partially visible because of the slope from ground level to the channel walls. In most areas, the south walls will nearly adjoin the north border of the Salt River Project right-of-way.

Who is Building the ACDC and What is the Cost?

Using Federal money, the U.S. Army Corps of Engineers is designing and constructing the overall project and the ACDC. The Flood Control District of Maricopa County is the local sponsor and is responsible for acquiring land, building bridges, and relocating utilities. The Flood Control District also supplies the manpower and finances to maintain the ACDC, including removal of debris and silt at the bottom of the channel and maintaining the landscaping on the banks. The Flood Control District is funded by the Flood Control Tax Levy on all real property within Maricopa County.

The cities along the ACDC's path—Paradise Valley, Phoenix, Glendale, and Peoria—have studied and approved the project through their city limits, and Glendale and Phoenix will share in the maintenance responsibilities in areas where recreation features are planned.

The cost of the Phoenix, Arizona and Vicinity (including New River) Flood Control Project and of the ACDC, broken down by funding, is outlined below.

	Cost (million)		
	Federal	Local	Total
Overall Project	$254	$168	$422
ACDC	$152	$102	$254

For more information, contact:

Public Involvement Coordinator
Flood Control District
of Maricopa County
3335 West Durango
Phoenix, Arizona 85009
(602) 262-1501

What is the ACDC?

(Arizona Canal Diversion Channel)

Prepared by

The Flood Control District
of Maricopa County
3335 W. Durango Street
Phoenix, Arizona 85009

(602) 262-1501

What is the ACDC?

The *Arizona Canal Diversion Channel* (ACDC) is a 16.5 mile channel designed to intercept Cudia City Wash and Dreamy Draw flood waters as well as the runoff from the Phoenix Mountains, Cave Creek, and residential street flows north of the channel. It stretches from 40th Street just north of Camelback Road to just west of 75th Avenue near Bell Road (where the channel outlets into Skunk Creek), and is located in an alignment parallel to and on the northern side of the Arizona Canal.

The ACDC is an integral part of the Phoenix, Arizona and Vicinity (including New River) Flood Control Project. As a part of the overall project, the ACDC is designed to protect developed areas—including parts of Phoenix, Glendale, Peoria and the state Capitol complex—up to the 100 year level (the level of flooding expected to occur on an average of once per century). By contrast, the City of Phoenix storm drains are generally planned to protect up to the two year flood.

What is the Phoenix, Arizona and Vicinity (including New River) Flood Control Project?

This project is being designed by the U.S. Corps of Engineers and sponsored by the Flood Control District of Maricopa County to protect people in a large part of the metropolitan area from the flood flows originating in the mountain and desert drainage areas (north of and including parts of Phoenix, Glendale, and Peoria). While the ACDC is a large element of the overall project, other structures involved include the Dreamy Draw Dam, Cave Buttes Dam, Adobe Dam, and New River Dam. Flowage easements and bank stabilization along Skunk Creek, New River, and the Aqua Fria River are also important to the effectiveness of the project.

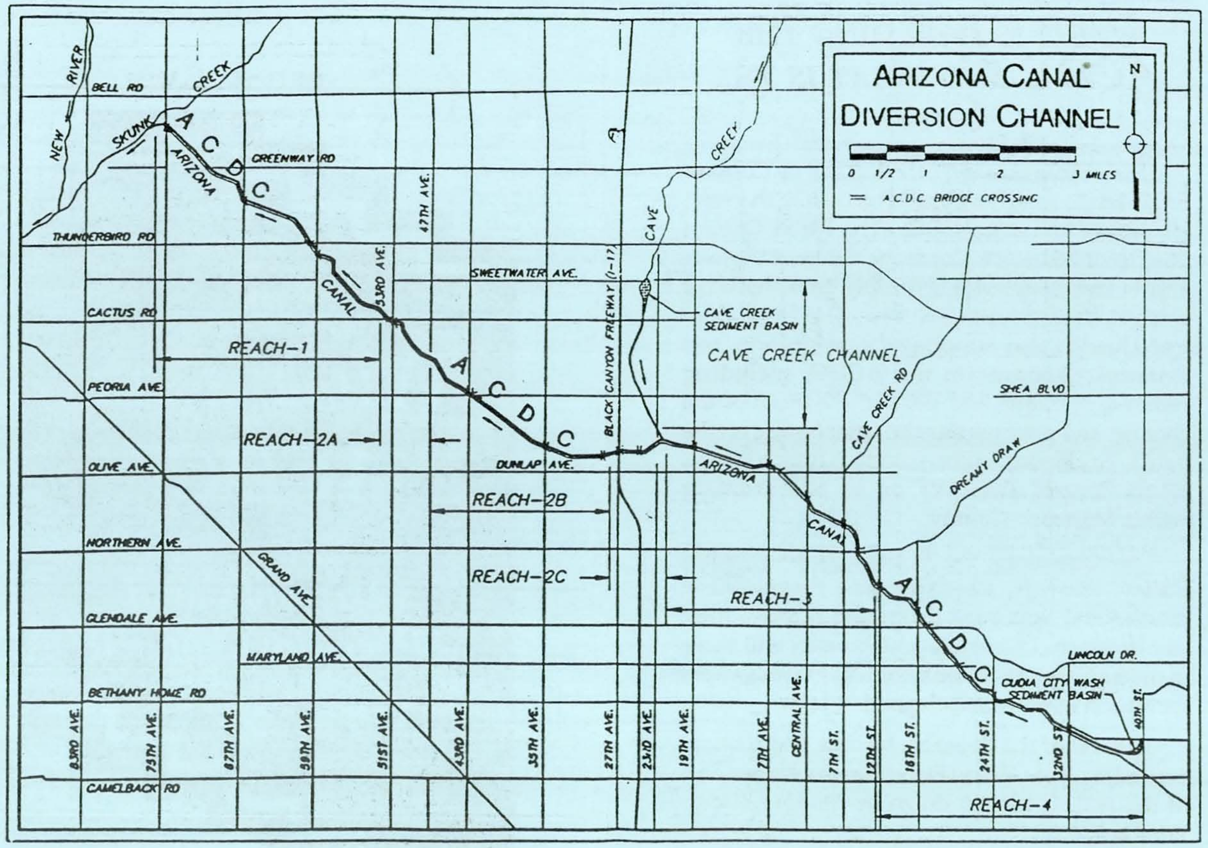
On the east and north sides of the metropolitan area, floodwaters are collected at both Dreamy Draw Dam and Cave Buttes Dam (on Cave Creek) and then released slowly into the natural creek beds to the ACDC. The ACDC then takes this water—as well as floodwaters from several minor tributaries, uncontrolled overland flow, and city storm drains—and drains it into Skunk Creek.

To the west, Adobe Dam and the New River Dam collect floodwaters and release it slowly down Skunk Creek and New River, respectively, so that the peak flows (after the introduction of the ACDC water) are not increased. The water then flows into the Aqua Fria River, and onto the Gila River—its original and natural destination.

What Causes the Flooding Problem?

Late-winter frontal storms and high intensity summer thunderstorms ("monsoons") can produce flooding throughout the greater-Phoenix area. The natural paths of the streams and overland flows that carry the storm water from the mountain, desert, and urban areas run southwesterly across the metropolitan area and into the Salt and Gila Rivers. Although the Arizona Canal was built to distribute irrigation water, it also acted as a dam to these natural flows. After its construction, the water ran either into the Canal, or ponded along its northern bank—resulting in flooding.

South of the Canal, the natural channels were destroyed, causing many problems during major storms. Significant rains drained into the Arizona Canal and quickly exceeded its capacity, pouring over spillways to the south. These flows caused breaks in the south bank, and, without the natural channels, frequently raced down streets, through yards, and into homes and businesses.



How will the ACDC help?

Within its 100-year design capacity, the ACDC will eliminate the overtopping and levee failures along the Arizona Canal and the subsequent flooding of urban Phoenix caused by flood flows.

It will be constructed below ground surface so storm water will easily flow into it. Inlet structures will be built where the flows from major drains enter the channel, and pipes will be used where local ponding occurs. Storm drains constructed by the City of Phoenix will also outlet into the Channel.

Completion of the ACDC will allow existing drainage to be modified by:

1. Placing storm drains north of the Arizona Canal that empty into the ACDC, where water will be carried to Skunk Creek, preventing ponding on the north side; and

2. Intercepting flows that would have gone into the Arizona Canal, preventing overflowing.

The ACDC also introduces a new drainage concept south of the Canal. Since the ACDC carries away runoff from areas north of it, storm drains south of the ACDC carrying water to the Salt River can be made much smaller. With the decreased drain size, the cities save a large amount of money without decreasing protection.

What are the Elements of the ACDC?

The ACDC project is composed of four reaches, two sediment basins, the Cave Creek Channel, vehicular and pedestrian bridges, as well as recreation areas, and bicycle and equestrian paths. Primarily a rectangular concrete channel, the different elements of the ACDC have different specifications. They are:

Reach 1 is a 4.0 mile long earthen channel extending from Skunk Creek to Cactus Road, within the cities of Glendale and Peoria. Glendale is building extensive recreation activities in the channel area (approximately 500 feet wide and 20 feet deep).

Reach 2 extends 4.7 miles from Cactus Road to Cave Creek (23rd Avenue). It is a 110-foot wide concrete rectangular channel with the exception of the 160- to 200-foot wide concrete trapezoidal area from Cactus to 47th Avenue (0.75 miles). The walls through Reach 2 are approximately 21 feet deep.

Reach 3 is a 50- to 60-foot wide, 20.5- to 23.5-foot deep concrete canal that runs 3.6 miles from Cave Creek to Dreamy Draw (12th Street). So Sunnyslope High School can continue to use its athletic fields, 2,565 feet of this Reach will be covered.

Reach 4 stretches 4.2 miles from Dreamy Draw to Cudia City Wash near 40th Street. It is also a concrete rectangular channel, but is 36 to 40 feet wide and 20.5 to 24.5 feet deep. From 24th Street to approximately 30th Street, through the Arizona Biltmore Hotel area, the channel will be covered because the cost of covering is less than that of obtaining additional rights-of-way. Also, 1,297 feet beneath Stanford Drive, east of 32nd Street, will be covered to avoid the cost of relocating Stanford Drive.

The Cave Creek Sediment Basin is south of the Sweetwater alignment and will be used by the City of Phoenix for recreational activities.

The Arizona Canal Diversion Channel

The Arizona Canal Diversion Channel (ACDC) is a flood control project being designed and constructed by the U.S. Army Corps of Engineers. The Flood Control District of Maricopa County is the local sponsor. The Corps is building the ACDC parallel to and upstream of the Arizona Canal from Skunk Creek to Cudia City Wash, a distance of 17 miles. The first segment, from Skunk Creek to 51st Avenue, is now under construction and should be completed this fall. Construction on the second segment will begin this year.

The ACDC is designed to prevent flooding from waters ponding along the north side of the Arizona Canal and from waters overtopping or breaking through the Arizona Canal to the south. The channel will intercept flood waters from the Phoenix Mountains and from Cudia City Wash, Dreamy Draw, Cave Creek and other tributaries, as well as from uncontrolled overland flows and storm drains. ACDC's capacity is expected to intercept and convey to Skunk Creek the flows of a 100-year flood. (A 100-year flood is estimated to have a one percent chance of occurring in any one year.)

According to approved plans, Reach 4 of the ACDC will run 4.2 miles from Dreamy Draw at 12th Street to Cudia City Wash near 40th Street. Reach 4 is designed as a rectangular channel approximately 40 feet wide and up to 24.5 feet deep. The channel will be open, except for a 1,297-foot covered portion along Stanford Drive and another covered portion—4,625 feet—from just east of the Arizona Biltmore Hotel to 24th Street. These portions will be covered because the additional costs of covering the channel will be offset by savings in right-of-way acquisition costs.

An alternative to Reach 4, consisting of four detention basins and a smaller channel, is presently under study by the Corps of Engineers, at the request of the Phoenix City Council.

The Flood Control District estimates the cost of the ACDC, including construction, rights-of-way, relocation of roads, bridges and utilities, and recreation facilities will be $210,087,261. The cost of Reach 4 is estimated to be $58,537,000.

Flash floods move with surprising force and velocity. Storm runoff in Cudia City Wash swept away this vehicle Aug. 28.

SPECIAL REPORT:

Information, facts and figures about the Salt River Project canal system, the storm of August 28, 1986, and the Arizona Canal Diversion Channel.

Flash flood.

The term evokes images of water rolling down washes in a desolate desert. Animals bolt and run to escape the torrent as heavy rains hit the dry desert floor. Following the natural contours of the earth, rainwater gathers speed and volume as it rushes along gullies and washes, eventually finding its way into creeks and rivers. Then, just as suddenly as it started, the storm ends.

That's the way it is in the desert. And that's the way it is here in the Salt River Valley, part of the Sonoran Desert. The washes that have carried water for centuries are still here, although most are now covered with pavement and all the other trappings of civilization. The washes have been camouflaged by development and urbanization, but they are still there. Gentle contours along the surface of the desert are barely evident—until it rains.

Cudia City Wash

Cudia City Wash is one of several desert washes that flow southward to the Salt River. Actually, it has two main branches which converge just north of Stanford Drive, west of 40th Street. The eastern branch originates on the west side of Mummy Mountain in Paradise Valley and is fed by smaller washes coming off the north side of Camelback Mountain. The western branch originates in the Phoenix Mountain Preserve east of Squaw Peak.

In comparison to some others, Cudia City Wash has a relatively small drainage area of about 3,800 acres, or 5.9 square miles. But even a two-inch rain on 5.9 square miles can produce a lot of water. If none of the rain was absorbed or diverted, it would amount to 633 acre feet—or more than 200 million gallons—of water.

Topographic maps of Phoenix show that Cudia City Wash continues from the 3,800-acre watershed south toward the Salt River. From the point where the two main branches converge, the wash gets wider and wider, spreading out into an alluvial fan.

Man-made features

The first residents of the Valley were the Hohokams. Ingenious and industrious, the Hohokams dug an elaborate system of canals to irrigate thousands of acres of crops. For unknown reasons, the Hohokams abandoned the Valley in about 1400 A.D.

Anglo settlers first arrived in the 1860s. Some cleared out the irrigation ditches left by the Hohokams. Other pioneers constructed entirely new canals. The three canals in the Cudia City Wash area are the Grand Canal, the Arizona Canal, and the Old Crosscut Canal.

The Grand Canal is the oldest remaining pioneer canal on the north side of the Salt River. It was planned in 1877 and constructed in 1878 by the Grand Canal Company.

The Arizona Canal was the largest canal built by the pioneers. It stretches 38 miles from the Salt River at Granite Reef to the New River. The Arizona Canal was built in 1883 by the Arizona Improvement Company, which later purchased the Grand Canal.

The Old Crosscut Canal, which parallels 48th Street, was built in 1888 by the owners of the Arizona Improvement Company. In 1886 a spring flood had washed out the old heading for the Grand Canal near Scottsdale Road in the river bottom. In order to get water, a "crosscut" was constructed from the Arizona Canal to the Grand Canal. The three canals were operated by the Arizona Improvement Company as a unified system for the north side of the river.

In 1897, a prolonged drought hit the Valley and the flow in the Salt River wouldn't support all the land that had been cleared for farming. Disputes arose over water rights, and many farmers resorted to guarding the headgates that diverted water to their land.

The National Reclamation Act of 1902 provided a method of obtaining federal loans to build storage dams and other water projects. In February 1903, Valley landowners—mainly farmers—formed the Salt River Valley Water Users' Association in order to negotiate a loan to build Roosevelt Dam. It took some effort, but the landowners got the loan and built the dam. When government engineers came to Phoenix, they referred to the engineering job as the "Salt River Project" and the name stuck.

Up to this time, the canals had been in private hands. But in order to operate the system efficiently and get the water from the dams to the farms, the government purchased the canal companies and made them part of the Project.

The U.S. Reclamation Service operated the canals until 1917, when operation was turned over to the Salt River Valley Water Users' Association. The Association still operates the system, even though the title is still held by the U.S. government.

Canals not for flood control

An irrigation canal, by design, is not intended for flood control. The Arizona Canal, for example, has a capacity of 1,900 cubic feet per second (cfs) at its origin, Granite Reef Diversion Dam. At the other end, the canal's capacity is about 600 cfs. Because the canal has fewer deliveries to make downstream, the capacity or size of the canal gets smaller toward the end of the system.

A true flood-control structure would be designed and built in an opposite manner, with a small capacity at the head of the system and a much greater capacity near the other end, to handle inflows during a storm.

Canal structures

SRP operates a gravity flow canal system. In order to control the water, SRP canals are equipped with two

(continued next page)

Information, facts and figures...

(continued from previous page)

general kinds of water control structures. There are water delivery features and safety features.

Radial gates are the most noticeable of the water delivery features. These are metal, arc-shaped gates which are used to raise or lower the level of water in a section of canal. By adjusting the opening of the gates, the water level can be raised to reach the height of various delivery gates built into the canal banks.

Major drains are important safety features in the canals. These are places where large amounts of storm water can be emptied from the canals to help prevent overflows downstream.

On the Arizona Canal, there are four major drains. Three of them are located upstream from Cudia City Wash. The drains are:

- **Evergreen,** located on the Salt River Indian Reservation,
- **Indian Bend,** in Scottsdale,
- **the Old Crosscut Canal,** which parallels 48th Street in Phoenix down to the Joint Head drain gates into the Salt River near the Pueblo Grande Indian Ruins, and
- **Skunk Creek,** which is at the tail end of the Arizona Canal, at about 73rd Avenue.

It's significant to note that west of the Old Crosscut Canal, there are no major drains for the remaining 20 miles of canal down to Skunk Creek. Ironically, this is an area that includes several major washes, including Dreamy Draw Wash, Sunnyslope Wash, and Cave Creek Wash.

Storm drain connections are another safety feature of the canals. These are relatively small pipeline connections to city storm drains to the Salt River. Typical capacity of the storm drains connections is about 50 cubic feet per second (cfs).

Spillways are safety features designed to prevent canal breaks when canal capacity is exceeded. These are low points built into the canal where the canal intersects major washes.

Canal operations—the Association Dispatch Center

At one time, canal gates were operated by SRP employees who rode the canal banks in pickup trucks. Before two-way radios became common, employees received storm operating instructions by telephone—if the telephone lines were working.

Today, the canal system is operated by remote-control from a central dispatching office—the Association Dispatch Center (ADC)—in Tempe.

Using a computer, a SRP water master gets data from 80 stations on the canal system. Information on the computer screen includes water depth and rate of flow at each particular location. There are warning lights and buzzers that go off if water reaches a certain height. By pushing a button on the control panel, the water master can raise or lower any of 331 radial gates to help correct problems. In the event of a system problem, the gates can be operated manually.

Normally, one water master controls all of the canals on the north side of the Salt River, and another water master controls all of the canals on the south side.

The water masters have two other important sources of information—real time, color radar; and SRP's storm patrol.

The Association Dispatch Center has a direct tie-in to the color radar system operated by the National Weather Service. This information gives the general direction and intensity of heavy storm cells in the Valley and helps indicate where heavy storm runoff might enter the canal system.

The storm patrol is composed of experienced employees who are dispatched to the various washes upstream of the canal system. Patrolmen read the stream gages located in the washes and radio reports of stream flow and weather conditions to ADC.

For more information, contact:

Sue Mutschler *Public Involvement Coordinator Flood Control District of Maricopa County* 262-1501

Larry Crittenden *Press Representative Salt River Project* 236-8333

This report prepared by the Salt River Project and the Flood Control District of Maricopa County.

THE STORM
August 28, 1986

Reports of moderate rain began at about 7 p.m. in Tempe. The storm was moving from east to west with strong winds. SRP dispatched storm patrols shortly after 8 p.m. Heavier rains began about 9 p.m.

As the storm moved into Phoenix, SRP began taking actions to protect the northside canals—opening various storm drains and the tail end of the Arizona Canal.

SRP received a report of runoff in Cudia City Wash at 8:24 p.m. Three minutes later, SRP opened the city drain at 32nd St. and the Arizona Canal to begin moving water out of the canal. At that time, the flow in the Arizona Canal at 32nd St. was 450 cfs. The downstream water order was 485 cfs.

The Joint Head Drain into the Salt River east of 48th Street was opened, along with the gates from the Arizona Canal into the Old Crosscut.

Meanwhile downstream, Cave Creek Wash and other runoff poured into the Arizona Canal. Silt and debris flowed into the canal and reduced its carrying capacity downstream of Cave Creek Wash. Upstream measures continued. Drain gates were opened at Evergreen, Granite Reef and Indian Bend.

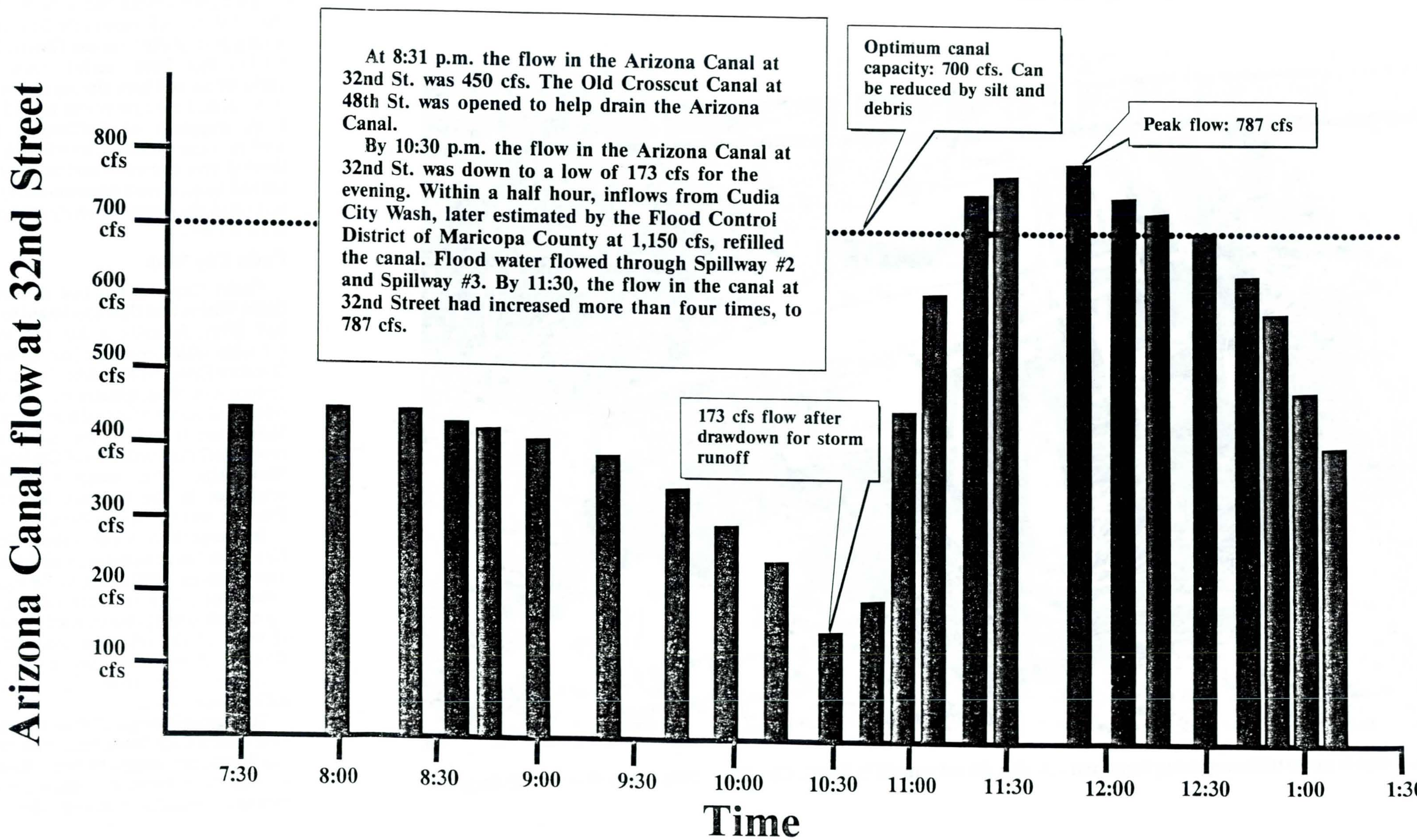
Shortly after 10 p.m., inflows into the downstream portion of the Arizona Canal were greater than the canal's capacity, and water began to flow out of the canal through Spillway #9, west of 27th Avenue.

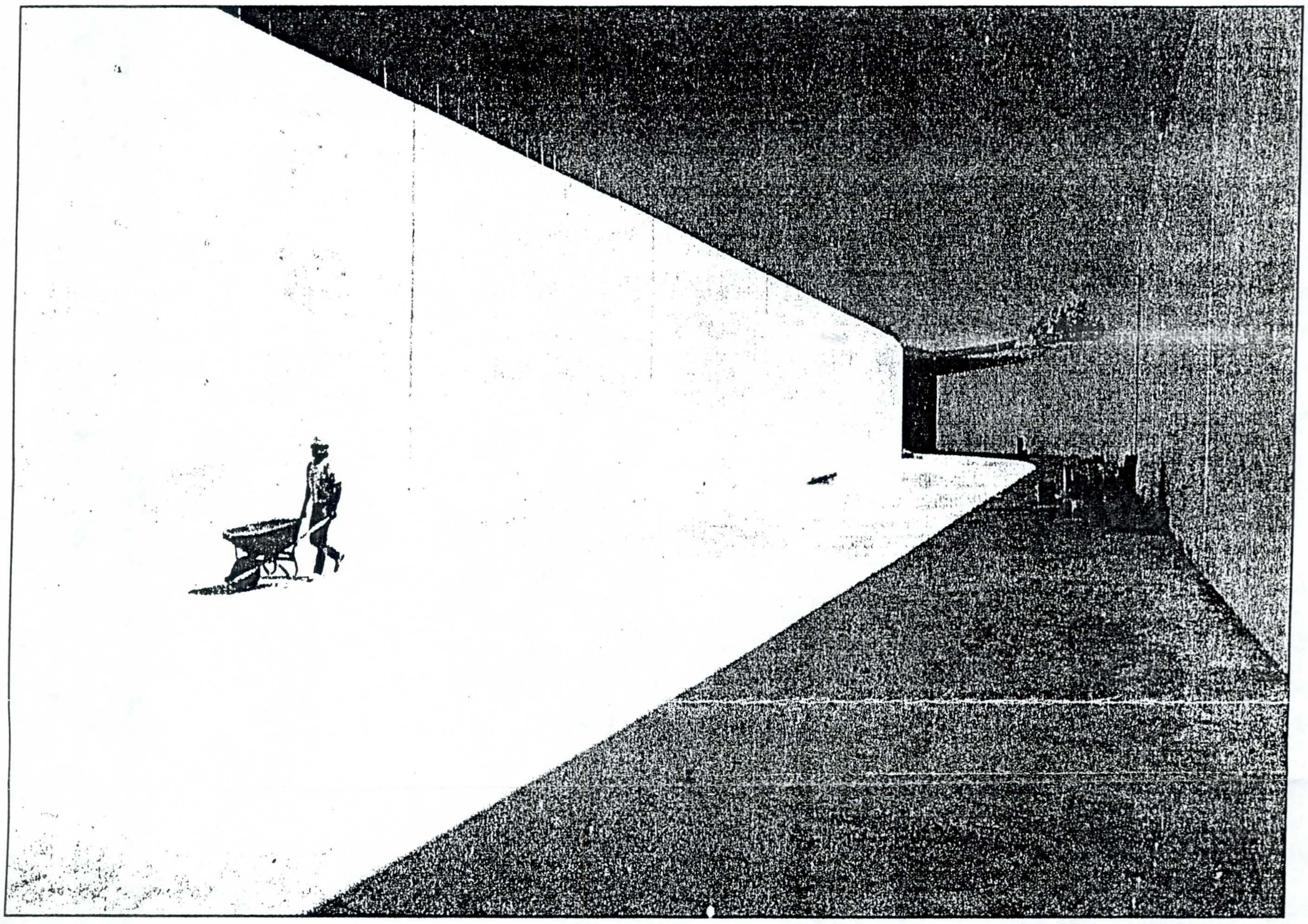
Overtopping continues

At 10:30 p.m., flow in the Arizona Canal at 32nd Street reached a low of 173 cfs, but downstream runoff continued to be heavy.

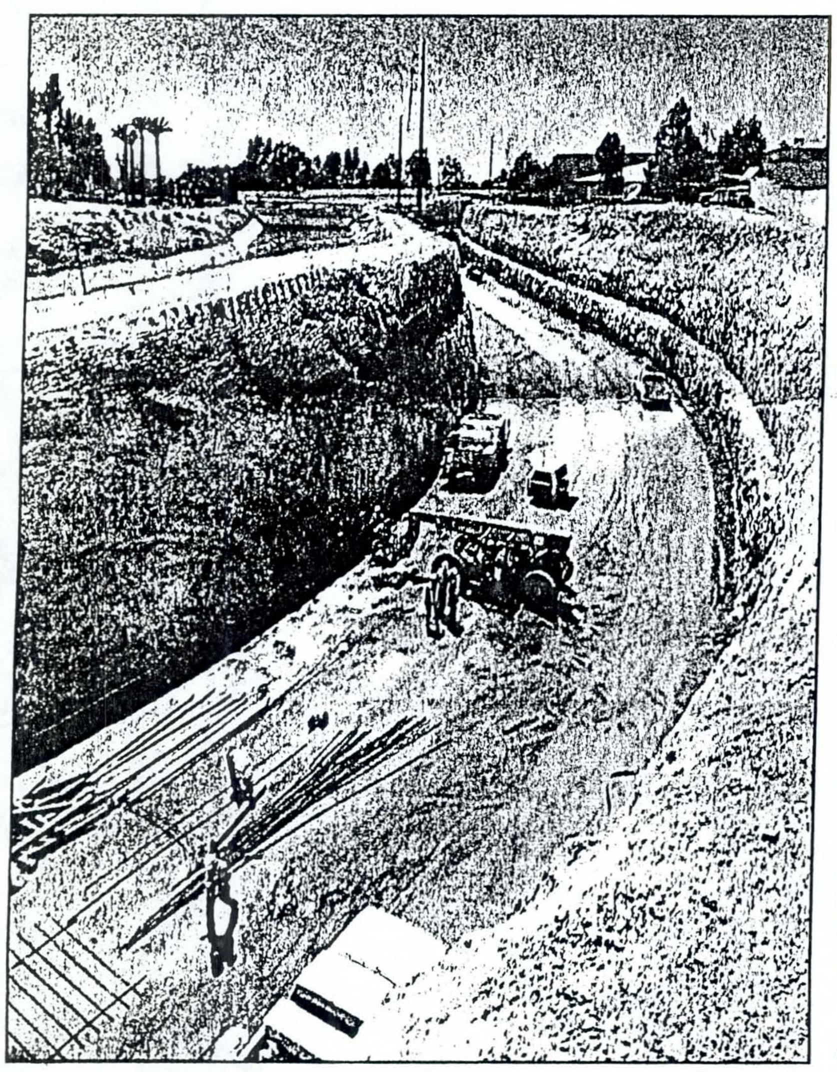
Shortly before 11 p.m., the Arizona Canal was overtopped west of 35th Avenue. Just a few minutes later, flood water began flowing through Spillway #3, east of 32nd Street, below Cudia City Wash.

For the next hour along the Arizona canal, five other spillways flowed.





John Blackmer / Staff photographer
This nearly completed section of the Arizona Canal Diversion Channel is near the Arizona Biltmore, just west of 24th Street.



Community
The ACDC is completed from 75th Avenue to about 12th Street, but work continues in an area east of 24th Street.

Channel challenge

Driving toward finishing ACDC

By Ryan Konig
Staff writer

A white Chevrolet Cavalier glided southeast toward Phoenix on an open stretch of concrete unblemished by stoplights or posted speed limits.

The driver, Bill Hamann, was showing off one of the largest construction feats in Phoenix, the Arizona Canal Diversion Channel.

"You could easily stripe your six lanes of highway here," Hamann said, shifting the Cavalier into a higher gear.

The channel is reserved for storm waters that will flow northwest through the 16.5-mile structure, taking with it Valley's unfortunate status as a "drain" for about half of Arizona's floodwaters. The channel when completed will stretch from 40th Street near Camelback Road to 75th Avenue near Bell Road.

Hamann, as special assistant to the city engineer, acts as Phoenix's liaison with the Army Corps of Engineers, the Maricopa County Flood Control District and residents near the channel's alignment.

His ability to drive down the channel, aside from having keys to the locked access gates, is the result of more than a half-million hours of work and countless drops of sweat.

According to combined estimates from the companies involved in the construction, at least 200,000 cubic yards of concrete have been poured, enough to fill the state's tallest building, the Valley National Bank building at Central Avenue and Van Buren, to about the 30th floor.

Workers have removed about 4 million cubic yards of dirt in digging the channel, enough to fill the 40-story VNB building 16 times over.

Except for a few spots here and there, the channel is virtually complete from 75th Avenue in Peoria to about 12th Street. Construction continues east of that, perhaps most heavily near the Arizona Biltmore.

The project, which is scheduled for completion in 1993, will cost an estimated $269 million, according to Susan Fitzger-

See TOUR, Page 3

ald of the Flood Control District.

Meanwhile, back in the channel, Hamann took his foot off the accelerator and steered to avoid birds wading in a small puddle in the middle of the channel. "Look at the abundance of wildlife," he said dryly, as three birds flew above the motorized intruder.

From a bird's-eye view, the channel resembles an earthquake fissure, one that is being built to prevent a natural disaster, flooding.

In 1972, storm rains flooded, among other things, the Cudia City Wash, which helped put the intersection of Camelback Road and 24th Street under 4 feet of water and destroyed or damaged an estimated 2,000 houses.

If a similar-sized storm were to strike after the channel is completed, traffic at 24th Street and Camelback could flow unimpeded as the flood waters would be intercepted and directed toward the Agua Fria River.

At its widest point in the west, the channel will be able to carry nearly 200,000 gallons of water per second, taking in storm runoff from street drains, the Dreamy Draw and Cave Creek washes, and other sources, and releasing it into Skunk Creek.

The channel is being built to accommodate a "100-year-event," a phrase that describes the magnitude of a storm by the frequency in which it is likely to occur — once every century. Such storms came through the Valley three times in the early 1980s.

Will the channel be ready for such an opponent? Hamann says yes, but he's not anxious to have it proven.

"It's like building a car that can go 200 miles an hour," he said. "You take it out on a track and see if it can do it. But we had a different philosophy with the channel; we know we were right with the figures, but we don't want to see a '100-year-storm' so that we can say, 'See folks, we told you so.' "

The walls and floor of the channel average 2 feet in thickness. The concrete, much of it tinted to mimic the earth tone color of sand, is internally reinforced with steel bars about an inch thick, woven together like a freeway-size chicken coop.

Hamann shifted the white Cavalier into third.

"Look," Hamann said, tilting his head for a better view through the windshield, "there's a news helicopter observing a car in the channel."

Hamann, with his humor and knowledge of seemingly every detail of the channel, continued on until pylons cut short the commuter's dream just as the channel tapered from its 110-foot width to about 60 feet.

"I guess this is where we check out," Hamann said, turning to drive up a concrete embankment to a locked gate near 23rd Avenue.

Hamann drove east along the north side of a section of channel built by Pulice Construction Inc., pointing out the staggered block walls, trees, shrubs and planters that make up the face that fronts nearby neighborhoods.

Pulice is about 85 percent finished with its work on the channel from 23rd Avenue to 12th Street, as well as the section that branches north to meet the Cave Creek Wash, said Cary Patterson, a project manager for the construction company.

Sundt Corp. recently began work on the 4.7 mile section of the channel that will run from 12th Street to 40th Street.

Project engineer Greg Bode said Sundt Corp.'s section of channel is rife with a particularly stubborn mixture of rock and other minerals, which in places has the consistency of concrete. For that, an equally stubborn 230,000-pound D-11 Caterpillar was brought in to break off and break down sections of the material.

The channel's construction in part is due to the existence of the Salt River Project's Arizona Canal, which runs along the south side of the channel.

The canal, which for nearly 100 years has been carrying irrigation water, acted in the past as sort of a dam allowing flood waters to "pond" along its northern side. That along with urban and agriculture development, which destroyed many of the Valley's natural channels, prompted the idea for the diversion channel.

But don't call it a trench or a ditch.

"It's called the Arizona Canal Diversion Channel, the ACDC, and maybe even the 'channel,' Hamann said, smiling. "These are the official terms until you've paid your dues."

"Then you can call it a ditch or a trench."

And so ended the tour of the Arizona Canal Diversion Channel, the ACDC, the channel.

Bringing back nature

Riparian area along Arizona Canal Diversion Channel is dedicated

By Margery Rose-Clapp
Staff writer

Paradise Valley

Samantha Fox, an Adobe Mountain Wildlife Center volunteer, wrapped her fingers gently around the long, spindly legs of the barn owl she was holding. She stroked the bird's golden feathers with her other hand.

"I think this one's a female," she said of the owl, one of two released Thursday by state Game and Fish Department officials in a riparian area along the Arizona Canal Diversion Channel.

Releasing the birds was part of a dedication event for the new urban wildlife corridor project, created jointly by Phoenix and the town of Paradise Valley with county and federal support.

Community
Bob Fox climbs the ladder to the birdhouse.

The dedication was especially meaningful for Paradise Valley residents who live near the channel.

The residents, opposed to the project since the mid-1980s, became increasingly vocal three years ago when work on the channel segment in their area was due to start.

Saying they felt that an open culvert would destroy the aesthetics of the rural desert and that the project wasn't cost-effective, they proposed other flood-control alternatives and urged Arizona congressmen to halt the project or find money for a channel cover.

Ultimately, Paradise Valley and Phoenix formed a coalition with the county, state and federal governments, with all agreeing to contribute toward covering the channel.

The segment, which stretches eastward from the Arizona Biltmore golf course to North 40th Street and Stanford Drive, is part of a 16.5-mile, $422 million flood-control channel project approved by voters in 1963 and funded by Congress in 1965.

A dedication ceremony for the entire project is scheduled at 9 a.m. Friday on the diversion channel at 23rd Avenue and Mountain View Road in Phoenix.

Last week's unveiling of the wildlife habitat held special meaning for Paradise Valley and Phoenix homeowners association members who live near the channel.

Initially, they opposed the project, fearing that the open concrete culvert would ruin the aesthetics of the area.

After an unsuccessful attempt to have the project halted, the groups raised $470,000 in private and public money, to add to $4.7 million in federal funds appropriated for the project.

Phoenix provided $13,685 for the land-

See RIPARIAN, Page 4

Tom Tingle / Staff photographer
Bob Fox, a volunteer with the Adobe Mountain Wildlife Center, carries a barn owl to a birdhouse in a tree near the driving range at the Arizona Biltmore Golf Course on Thursday.

RIPARIAN

From Page 1

scaping project, Paradise Valley donated $27,030, the Army Corps of Engineers contributed $304,000, the Arizona Biltmore Estates Village Association donated $12,750, the Alta Vista Homeowners Association donated $77 and the Paradise Valley Homeowners Association contributed $5,000.

The coalition then applied for and got a $42,800 state Heritage Fund grant to design, select and plant native vegetation atop and on either side of the covered channel.

A small number of schoolchildren, Paradise Valley and Biltmore Estates homeowners, members of the media and others attended Thursday's dedication, hosted by Game and Fish Department officials.

The event included a vehicle caravan to various areas along the canal bank, with ecologists and wildlife officials explaining how and why the project was done.

Game and Fish officials told the group that the two barn owls would help control the area's rodent population. To release them, a wildlife volunteer carried each bird up a ladder and put it inside a large boxlike birdhouse that had been placed high in a eucalyptus tree.

The owls will use the house for nesting, Game and Fish spokesman Rory Aikens said.

He said that American kestrels and other rodent-eating birds, called raptors, will be introduced in the area soon.

Mesquite, paloverde and other trees, as well as various cactuses, shrubs and desert plants were chosen for their low water usage and beauty, officials said.

Those species also are valuable year-round as sources of food, shelter and nest sites for insects, birds and other wildlife displaced by construction, spokesmen added.

Aikens said that three of every five people who move to Arizona ultimately leave.

"What attracts them and encourages them to stay is quality of life," Aikens said, adding that the newly completed wildlife project would contribute to that quality.

ACDC PROFILE

Project: The Arizona Canal Diversion Channel, part of the Phoenix and Vicinity Flood-Control Project.
Includes: 16.5-mile channel from 75th Avenue and Greenway Road (Glendale) to North 40th Street and Stanford Drive (town of Paradise Valley).
Also Includes: Four dams (Dreamy Draw, Cave Buttes, Adobe and New River).
Total cost: $422 million (includes $254 million in federal funds and $168 million in local money).
Sponsors: Designed and built by U.S. Army Corps of Engineers. Local sponsor is Maricopa County Flood Control District.
Design capacity: Peak discharge into Skunk Creek, at 53rd Avenue, is 29,000 cubic feet per second.
Reach areas: Skunk Creek to 53rd Avenue (Reach 1); 53rd to 47th avenues (Reach 2-a); 47th to 27th avenues (Reach 2-b); 27th to 21st avenues, plus 2.5 miles of Cave Creek channelization (Reach 2-c); 21st Avenue to 12th Street (Reach 3); and 12th to 40th streets (Reach 4).
Special features: Recreational paths for biking, walking, jogging; desert landscaping and other aesthetic improvements; use of state Heritage Fund money to establish urban wildlife corridors.

extensive recreation activities in the channel area (approximately 500 feet wide and 20 feet deep), called "Thunderbird Paseo."

Reach 2 extends 4.7 miles from Cactus Road to Cave Creek (23rd Avenue). It is a 110-foot wide concrete rectangular channel with the exception of the 160- to 200-foot wide concrete trapezoidal area from Cactus to 47th Avenue (0.75 miles). The walls through Reach 2 are approximately 21 feet deep.

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In 1991, Congress approved $5.5 million in additional funding (at the request of the City of Phoenix and Town of Paradise Valley) to cover portions of the ACDC that were originally planned to remain open. In Reach 3, 150 feet east of Central Avenue will be covered. In Reach 4, two other areas will be covered: 1,760 feet west from 32nd Street, and beginning 1,250 feet east of 32nd Street to the Cudia City Wash Spillway. Phoenix and Paradise Valley will provide 10% of the cost of covering the areas in their respective jurisdictions.

The *Cave Creek Sediment Basin* is south of the Sweetwater alignment. The City of Phoenix has already developed some of its adjoining right-of-way for recreational activities.

The *Cave Creek Channel,* a concrete channel within Phoenix's Cave Creek Park, will convey storm runoff from the Cave Creek Sediment Basin to the ACDC. Underpasses at Peoria and Cactus Roads and six pedestrian bridges have been constructed. The maintenance road will be available for hiking, bicycling, equestrian, and other non-vehicular recreation uses.

The *Cudia City Wash Sediment Basin* is on the grounds of the Phoenix Country Day School near 40th Street and Camelback Road. The basin slopes gradually, and is unlined and relatively unobtrusive. The school's athletic fields, but no structures, will be located within the basin.

Under the direction of the Flood Control District, twenty-four vehicular bridges were built at all present crossings of the Arizona Canal, as well as several new pedestrian bridges.

As a part of its construction responsibilities, the U.S. Army Corps of Engineers is providing landscaping to blend with the existing neighborhoods and other aesthetic treatments, often adapting recommendations from citizen committees in the affected areas. Additionally, bridge railings, screening walls, existing back yard fences, and the banks of the Arizona Canal will help screen the ACDC from the adjacent neighborhoods. Additionally, the Arizona Canal and the ACDC will share a maintenance road, which will also double as a bike path. The existing equestrian path will be adjacent to the maintenance road.

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COSTS and Sponsors

Using Federal money, the U.S. Army Corps of Engineers designed and constructed the overall project, including the ACDC. The Flood Control District of Maricopa County is the local sponsor and is responsible for acquiring land, building bridges, and relocating utilities. The Flood Control District also supplies the manpower and finances to maintain the ACDC, including maintaining the landscaping on the banks. The Flood Control District is funded by a secondary tax levy on all real property in Maricopa County.

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	Cost (million)		
	Federal	Local	Total
Overall Project	$254	$168	$422
ACDC	$152	$102	$254

For more information on this or any other District project, contact:

Public Involvement Coordinator
Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, Arizona 85009
(602) 506-1501

On the cover: *Cyclists enjoy the recreation paths in the Thunderbird Paseo part of the ACDC. Recreational amenities were funded by the City of Glendale.*

THE ARIZONA CANAL DIVERSION CHANNEL

Another flood control project for Maricopa County

Published by the
Flood Control District of Maricopa County
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Phoenix, Arizona 85009
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The Arizona Canal Diversion Channel (ACDC) is a 16.5-mile channel designed to intercept stormwater runoff that occurs north of the Arizona Canal from large urban washes such as Cave Creek, Dreamy Draw, and Cudia City Wash, as well as city stormdrains. The ACDC drains the stormwater to Skunk Creek to prevent flooding on city streets in large portions of Phoenix, as well as Peoria and Glendale.

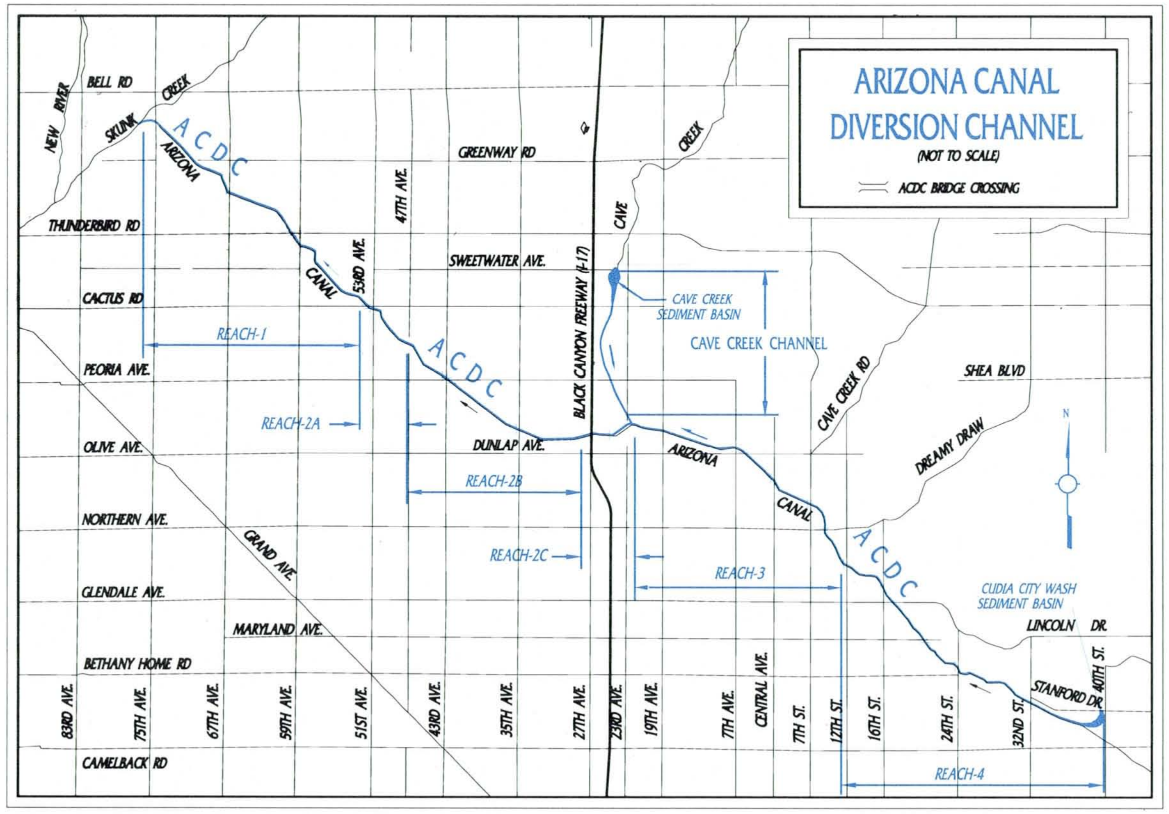
The ACDC is an integral part of the Phoenix, Arizona and Vicinity (including New River) Flood Control Project. As a part of the overall project, the ACDC is designed to protect developed areas—including parts of Phoenix, Glendale, Peoria, and the state Capitol complex—up to the 100-year level (the level that has a 1% chance of happening every year). In the metropolitan Phoenix area, the 100-year flood would inundate 31,540 acres.

WHAT is the Phoenix and Vicinity Project?

The Phoenix and Vicinity (including New River) Flood Control Project is part of a five-phase flood control plan for the metropolitan Phoenix area. The plan was developed between 1959 and 1963. Congress authorized federal funding for the Phoenix and Vicinity project in 1965. The project was designed by the U.S. Army Corps of Engineers. The Flood Control District of Maricopa County, as the local sponsor for the project, acquired rights-of-way, built bridges, and relocated utilities to clear the way for construction.

The entire Phoenix and Vicinity Project includes dams on Dreamy Draw, Cave Creek, Skunk Creek, and New River; channelization of Cave Creek; and bank stabilization and acquisition of flowage easements on Skunk Creek, New River, and Agua Fria. These structures work together with the ACDC to provide substantial flood relief for residents in Phoenix, Glendale, and Peoria.

The Phoenix and Vicinity project handles flows from a 2,695 square-mile drainage area, protecting $10 billion (in 1981 dollars) of development.



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Late-winter frontal storms and high intensity summer thunderstorms (monsoons) can produce flooding throughout the greater Phoenix area. The natural paths of the streams and overland flows that carry the stormwater from the mountain, desert, and urban areas run southwesterly across the metropolitan area and into the Salt and Gila Rivers. Although the Arizona Canal was built to distribute irrigation water, it also acts as a dam to these natural flows. After its construction, the water either ran into the canal, or ponded along its northern bank—resulting in flooding.

South of the Arizona Canal, the natural channels were leveled by agricultural, then residential, development which resulted in flooding problems during major storms. Significant rains drained into the Arizona Canal and quickly exceeded its capacity, pouring over spillways to the south. These flows caused breaks in the south bank, and in the absence of the natural channels, frequently raced down streets, through yards, and into homes and businesses.

HOW will the ACDC help?

Within its 100-year design capacity, the ACDC will eliminate the overtopping and levee failures along the Arizona Canal and the subsequent flooding of urban Phoenix.

It will be constructed below ground surface, so stormwater will flow into it easily through inlet structures where the flows from major drains enter the channel; pipes will be used where local ponding occurs. Stormdrains constructed by the City of Phoenix will also empty into the ACDC.

Completion of the ACDC will allow existing drainage to be modified by: 1) Placing storm drains north of the Arizona Canal that empty into the ACDC where water will be carried to Skunk Creek, preventing ponding on the north side; and 2) Intercepting flows that would have gone into the Arizona Canal preventing flooding south of the canal.

The ACDC also introduces a new drainage concept south of the canal. Since the ACDC carries away runoff from areas north of it, storm drains south of the ACDC carrying water to the Salt River can be made much smaller. With the decreased drain size, the cities save a large amount of money without decreasing protection.

WHAT are the elements of the ACDC?

The ACDC project is composed of four reaches, two sediment basins, the Cave Creek Channel, vehicular and pedestrian bridges, as well as recreation areas, bicycle and equestrian paths, and underpasses. Primarily a rectangular concrete channel, the different elements of the ACDC have different specifications.

Reach 1 is a 4-mile long earthen channel extending from Skunk Creek to Cactus Road, within the cities of Glendale and Peoria. Glendale has built

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extensive recreation activities in the channel area (approximately 500 feet wide and 20 feet deep), called "Thunderbird Paseo."

Reach 2 extends 4.7 miles from Cactus Road to Cave Creek (23rd Avenue). It is a 110-foot wide concrete rectangular channel with the exception of the 160- to 200-foot wide concrete trapezoidal area from Cactus to 47th Avenue (0.75 miles). The walls through Reach 2 are approximately 21 feet deep.

Reach 3 is a 50- to 60-foot wide, 20.5- to 23.5-foot deep concrete channel that runs 3.6 miles from Cave Creek to Dreamy Draw (12th Street). In this reach, the channel will be covered for 2,565 feet so Sunnyslope High School can continue to use its athletic fields.

Reach 4 stretches 4.2 miles from Dreamy Draw to Cudia City Wash near 40th Street. It is also a concrete rectangular channel, but is 36 to 40 feet wide and 20.5 to 24.5 feet deep. From 24th Street to approximately 30th Street, through the Arizona Biltmore Hotel area, the channel will be covered because the cost of covering it is less than the cost of obtaining additional rights-of-way. Also, 1,297 feet beneath Stanford Drive east of 32nd Street will be covered to avoid the cost of relocating Stanford Drive.

In 1991, Congress approved $5.5 million in additional funding (at the request of the City of Phoenix and Town of Paradise Valley) to cover portions of the ACDC that were originally planned to remain open. In Reach 3, 150 feet east of Central Avenue will be covered. In Reach 4, two other areas will be covered: 1,760 feet west from 32nd Street, and beginning 1,250 feet east of 32nd Street to the Cudia City Wash Spillway. Phoenix and Paradise Valley will provide 10% of the cost of covering the areas in their respective jurisdictions.

The *Cave Creek Sediment Basin* is south of the Sweetwater alignment. The City of Phoenix has already developed some of its adjoining right-of-way for recreational activities.

The *Cave Creek Channel*, a concrete channel within Phoenix's Cave Creek Park, will convey storm runoff from the Cave Creek Sediment Basin to the ACDC. Underpasses at Peoria and Cactus Roads and six pedestrian bridges have been constructed. The maintenance road will be available for hiking, bicycling, equestrian, and other non-vehicular recreation uses.

The *Cudia City Wash Sediment Basin* is on the grounds of the Phoenix Country Day School near 40th Street and Camelback Road. The basin slopes gradually, and is unlined and relatively unobtrusive. The school's athletic fields, but no structures, will be located within the basin.

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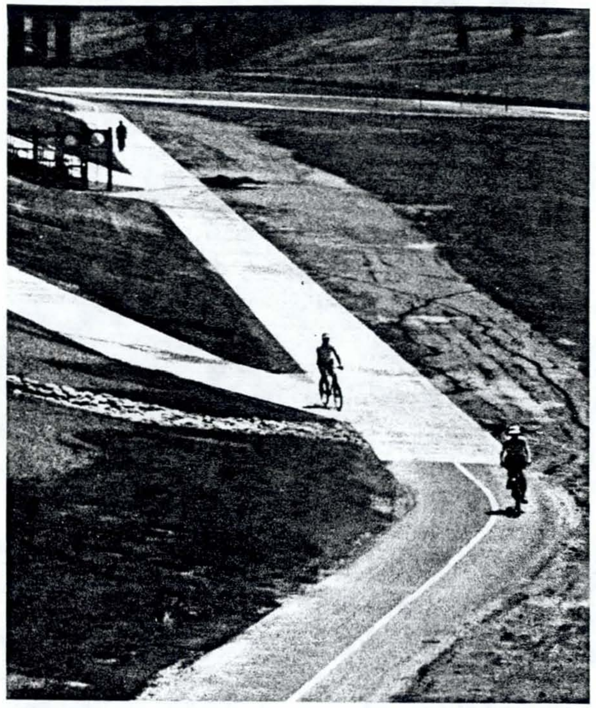

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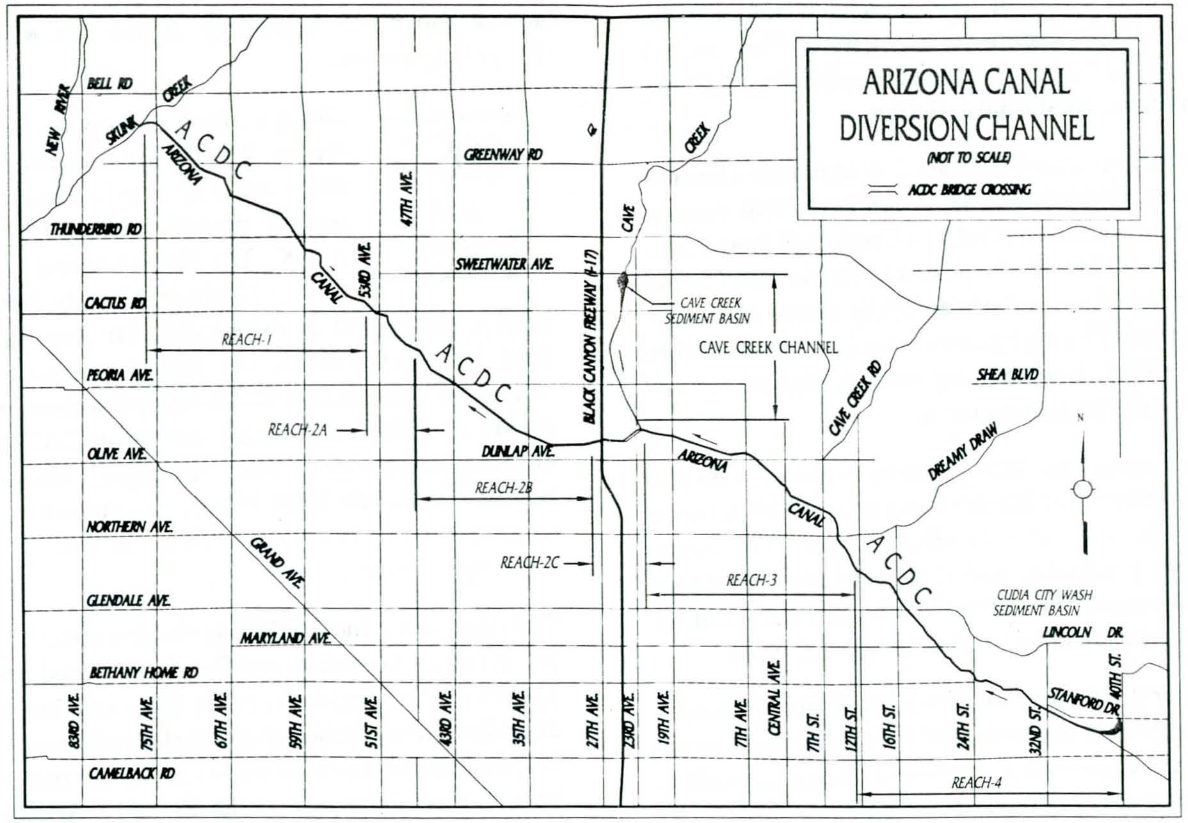

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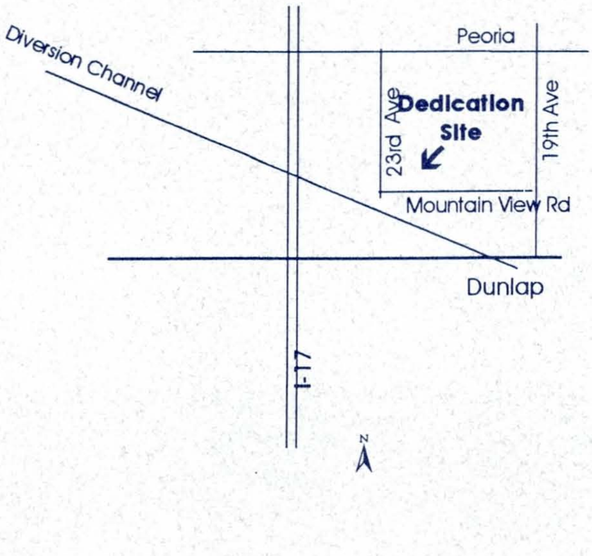
ACDC Dedication



Arizona Canal Diversion Channel

The Arizona Canal Diversion Channel, or ACDC, is a 16.5-mile flood control channel that parallels the Arizona Canal on the north side. The channel diverts stormwater that formerly flooded large areas of metropolitan Phoenix. It now conveys these flows safely across the city to Skunk Creek.

The channel is the final element of the Phoenix and Vicinity (including New River) Flood Control Project, authorized by Congress in 1965. The entire project includes four flood-control dams and channel improvements, and was designed and constructed by the U.S. Army Corps of Engineers in partnership with the Flood Control District of Maricopa County.

The District's responsibility includes obtaining all land and rights-of-way; relocating people, utilities, roads and bridges for the entire project; and maintaining and operating the completed project.

The Maricopa County Board of Supervisors, as the

Flood Control District Board of Directors,

and the

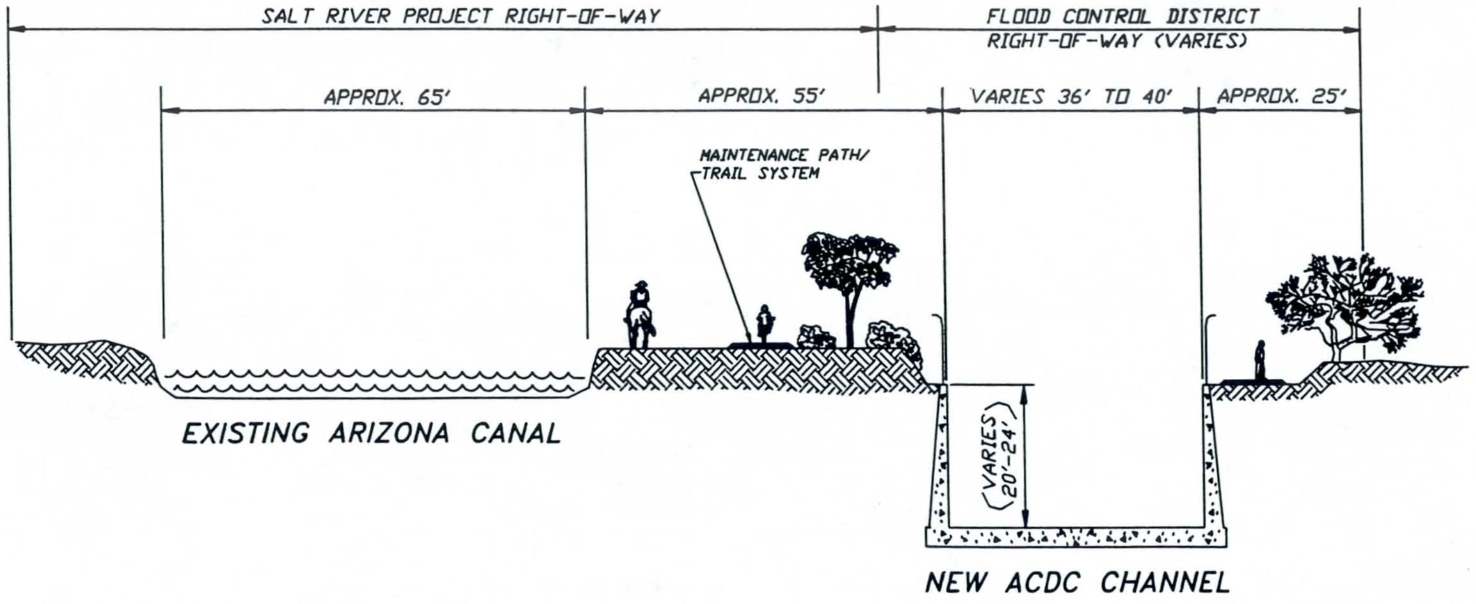
U.S. Army Corps of Engineers

cordially invite you to a dedication ceremony for the

Arizona Canal Diversion Channel

Friday, October 8, 1993
9 a.m.

23rd Avenue and Mountain View, east of Cave Creek Wash
(see map, reverse)



Typical Cross Section of Reach 4 of the ACDC—Shows the relative size of the features of the Arizona Canal and the ACDC.

Flood Control District of Maricopa County
3335 West Durango Street
Phoenix, Arizona 85009

DATED MATERIAL ENCLOSED

ACDC

Arizona Canal Diversion Channel

Flood Control for the Phoenix Metropolitan Area

May 1990

Construction Questions

Where is Reach 4?

Reach 4 of the ACDC runs parallel to and on the north side of the Arizona Canal between 12th Street and Cudia City Wash (40th Street). See map, inside.

Who will be doing the construction?

The U.S. Army Corps of Engineers is expected to award a construction contract in October 1990. The work will be monitored and inspected by staff from the Corps of Engineers.

In what sequence will construction occur?

The construction contractor is expected to do the work generally in the following order:

1. Clearing and demolition of buildings
2. Excavation
3. Construction of channel walls
4. Backfilling
5. Landscaping

The construction contractor will work at many sites within Reach 4 simultaneously rather than working from one end to the other.

How will the construction affect me?

The Corps' contract work will take place within the channel right-of-way and under the bridges. Trucks removing dirt will not be on the streets during rush hour traffic. There will be some traffic disruption during the construction of the bridge at 24th Street by the Corps of Engineers. If you live next to the channel, you will experience additional noise during working hours.

What about bridges?

Bridges at Glendale Avenue and the new Squaw Peak Parkway have already been constructed. A bridge at 16th Street is currently under construction and bridges at 12th Street, Maryland Avenue, and 32nd Street will be under construction from May through November of 1990. Traffic detours will be provided at all these locations. During construction of the 32nd Street bridge, Stanford Drive will be closed.

A bridge at 24th Street will be built during the construction of Reach 4 and detours around the construction will be provided. The bridge at 24th Street has been limited to a 9 month time frame but the exact dates are not presently known.

Will there be any unusual construction activity?

Two areas of Reach 4 will be constructed as a covered channel. The area from just west of 24th Street to the east side of the golf links at the Biltmore Hotel (total length 4500 feet) will be a covered channel. Of that length, 1500 feet immediately in front of the Biltmore Hotel (the parking area) will be constructed under a compressed schedule in the summer months of 1991, when there are fewer people to disrupt. While covered channels are more expensive than open channels, the cost of obtaining replacement parking for the Hotel would be more than the cost of the covered channel.

The Corps will close Stanford Drive east of 32nd Street for 9 months while constructing a covered channel. Stanford Drive will then be restored on top of the covered channel. Rather than destroy the houses along Stanford Drive and relocate those residents, the Corps of Engineers opted for the less expensive option—in this instance—of covering the channel.

In Reach 3 of the ACDC, the Corps faced the similar concern of addressing the issue of covered versus open channels. The channel cut through the athletic facilities at Sunnyslope High School. Again, it was found to be less expensive to cover the channel and replace the facilities than to find an alternative location for them.

Can children get into the construction area?

Work areas will be fenced by the construction contractor until the permanent fences are placed on the channel walls.

Will the area be dusty?

The construction contractor for the Corps of Engineers must obtain earth moving permits from the Maricopa County Department of Health Services and follow its regulations as well as the Corps of Engineers' regulations. The contractor will have water trucks on the haul road. The Corps of Engineers' inspection force is alerted to dust control and monitors the contractor carefully. Call the Corps' office if dust becomes a problem.

Who do I call for more information?

Flood Control District, Public Involvement Coordinator 262-1501

Corps of Engineers 379-3022

When will the project be landscaped?

The landscaping will be done during the last 4 to 6 months of the construction contract. All the plants will be adapted to our hot, arid environment and will be low water users.

What hours will the contractor work?

The construction hours are 7:00 a.m. to 6:00 p.m., with the exception of the months of May through September, 1991, when double-shifting of construction crews will be necessary to construct the covered channel in the vicinity of the Biltmore Hotel.

Who do I call about a problem?

The ACDC is being designed and constructed by the U.S. Army Corps of Engineers. The local office is at 9601 North 21st Drive; telephone 261-3022.

Post-Construction Questions

What will the ACDC look like?

It will be a rectangular concrete channel. The concrete will be earth colored to blend in with the natural terrain. The banks will be landscaped and the permanent picket fences will look like wrought iron. Landscape nodes will be created at most major street intersections. Bridge railings will help prevent passing automobile passengers from seeing into the channel.

Screening walls, landscaping, and existing back yard fences will help conceal the channel from adjacent neighborhoods between major streets. The ACDC is screened from the south by the banks of the Arizona Canal.

Who will operate and maintain the ACDC?

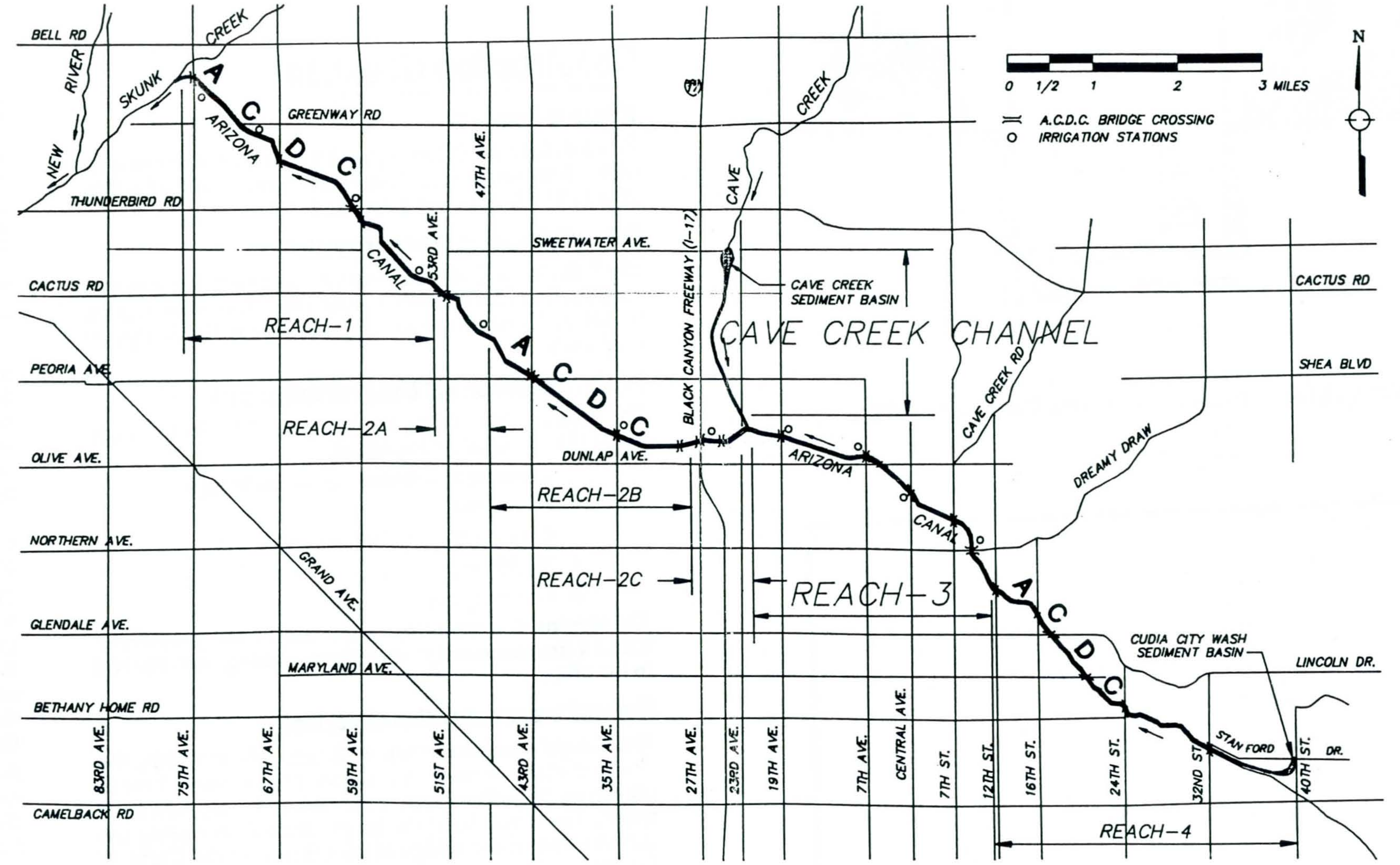
The Flood Control District will operate and maintain the channel and the landscaping after construction. The phone number is 262-1501.

Are there any recreation facilities?

The existing hiking, biking, and equestrian trails along the banks of the Arizona Canal will still be present. The maintenance road between the channel and the canal will also serve as a trail system for bicycle and equestrian purposes. In addition, in some areas, the maintenance road on the north side of the channel can be used as a bike path. Bicycle trail underpasses beneath 12th Street, 16th Street, and the Squaw Peak Parkway will complement those already in place at 24th Street and Glendale Avenue.

Can children get into the ACDC?

The Channel is being designed and constructed with the safety of children in mind. A 7-foot steel picket fence will be constructed on top of the channel wall.



ARIZONA CANAL DIVERSION CHANNEL

How can someone get out of the channel?

Ladders are built into the walls at intervals so people can climb out, and equipment access ramps are located approximately every two miles. The emphasis on safety is to keep people out of the channel. By design, the channel is subject to *flash flooding* with stormwater moving at high velocities. If you witness trespassers in the channel, call the Operations and Maintenance Branch of the Flood Control District at 262-1501.

General Project Questions

What is the ACDC?

The Arizona Canal Diversion Channel is the core of an overall flood control project being designed and constructed by the U. S. Army Corps of Engineers and sponsored by the Flood Control District of Maricopa County.

Why is the ACDC being built?

Its purpose is to provide a high degree of flood protection to large parts of the metropolitan area. Floodwaters will be intercepted and diverted around the city. Water from streams, overland flows, and city storm drains will enter the ACDC and be carried to Skunk Creek and eventually to the Gila River.

How much flood protection will it provide?

The ACDC will intercept, and carry to Skunk Creek, flows up to a 100-year flood. This is the level of flooding expected to occur on an average of once per century.

How big will the ACDC be in Reach 4?

Reach 4 will be approximately 24 feet deep and between 36 and 40 feet wide.

What are the total costs of the ACDC?

When completed the ACDC will be 16.5 miles in total length and will pass under 24 major streets. The most current estimates for federal and local costs for construction are approximately $154 million and $115 million, respectively. Local costs include the cost of purchasing rights-of-way and utility and street relocations.

What are the costs of Reach 4?

The Corps of Engineers' planning, design and construction costs will be about $54 million and the Flood Control District's costs will be about $29 million.

When will the entire ACDC be finished?

Reach 4, the final portion of the ACDC, is scheduled to be completed in the fall of 1992.

From Chris Kronick
4/7/88

Schedules for Phoenix, AZ and Vic.

I NEW RIVER

Complete revisions and forward to P+S Sec.	8 Apr.
Forward amendment to contractor	15 Apr.
Receive contractor's proposal	28 Apr.
Begin negotiations	3 May
Complete negotiations	8 Jun
Award contract *	22 Jun **
NTP	1 Jul

II ACDC Reach 1 Erosion Control and Recreation

	[illegible]
Complete revisions and forward to P+S Sec.	31 ~~Apr~~ Mar
P+S to SPD *	21 Apr
Constructibility Conf.	26 May
P+S to ConOps Div for BCO Review	23 Jun
BCO Certification + Advertise *	7 Jul
Bid opening	18 Aug
Award	1 Sep
NTP	8 Sep

III CAVE CREEK/REACH 2C

Add comments to AE	1 Apr.
Distribute for LAD review	15 Apr.
Design Review Conf.	5 May
P+S to SPD	26 May
Construct Conf.	23 Jun
Advertise	28 Jul
Bid opening	8 Sep
Award	22 Sep.
NTP	29 Sep

IV ACDC Reach 3

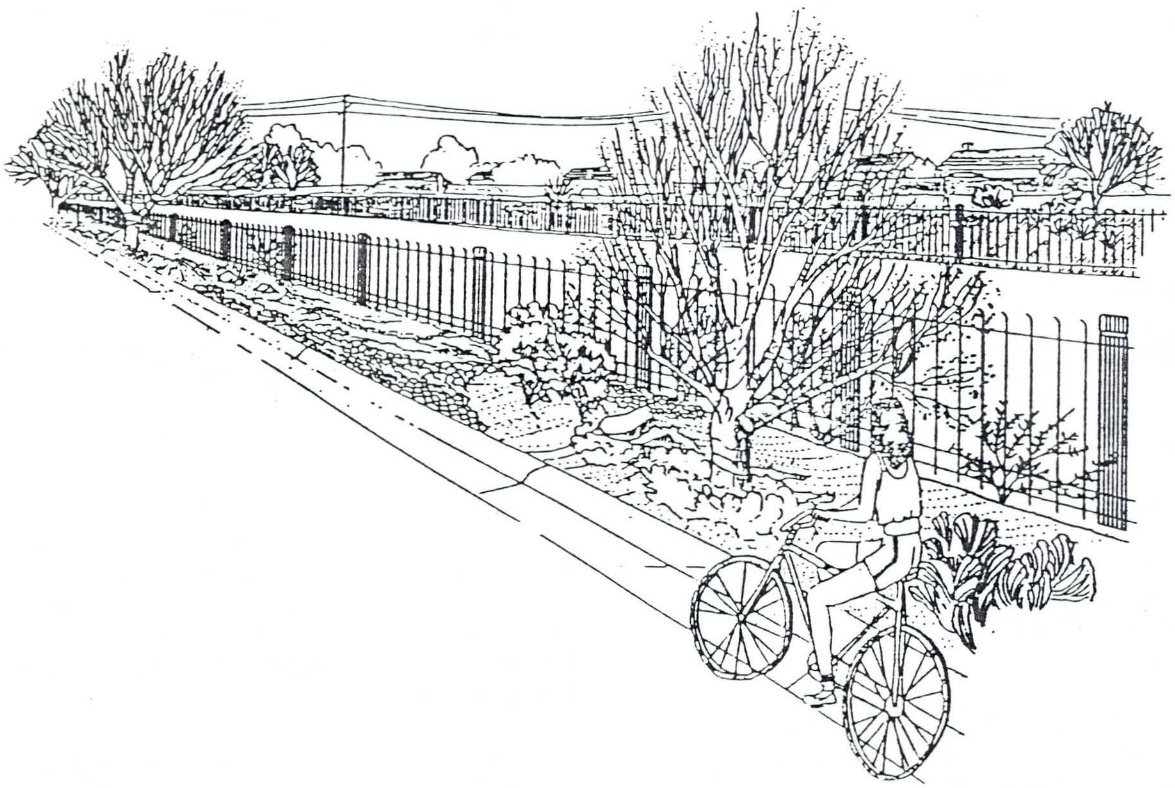
Receive AE's Pre-Final Designs	25 May
Receive final designs	3 Aug
Complete LAD Review	7 Sep.
BCO Review	28 Sep.
Advertise	1 Feb. 89
Bid Opening	15 Mar 89
Award	29 Mar. 89
NTP	5 Apr. 89

V ACDC Reach 4

Draft MOU to St. Louis Dist	15 Apr
Sign MOU	May
Start design work (St. Louis)	Jun
Complete design work (St. Louis)	Dec. 89

Flood Control District
of Maricopa County

ACDC



Arizona Canal Diversion Channel

What is the ACDC?

The Arizona Canal Diversion Channel (ACDC) is part of an overall project developed by the U.S. Army Corps of Engineers and sponsored by the Flood Control District of Maricopa County to provide a high measure of flood protection to a large part of the metropolitan area.

The overall project is known as the Phoenix, Arizona and Vicinity (Including New River) Flood Control Project.

This project includes Dreamy Draw Dam, Cave Buttes Dam, Adobe Dam, New River Dam, the ACDC, and flowage easements/bank stabilization on Skunk Creek, New River, and the Agua Fria River.

What is the purpose of the Phoenix, Arizona and Vicinity (Including New River) Flood Control Project?

This project will protect people from flood flows originating in the mountain and desert drainage area lying to the north of and including parts of Phoenix, Glendale, and Peoria.

Many streams including Cudia City Wash, Dreamy Draw, Cave Creek, Skunk Creek, New River, and the Agua Fria River drain flows from this mountain and desert area to the metropolitan area.

How does the Phoenix, Arizona and Vicinity (Including New River) Flood Control Project work?

Dreamy Draw Dam and Cave Buttes Dam, on Cave Creek, collect floodwaters and release the water slowly into the natural creek beds to the ACDC.

The ACDC collects this water as well as floodwaters from several minor tributaries, uncontrolled overland flow, and city storm drains and takes the water to Skunk Creek.

Adobe Dam, on Skunk Creek, and New River Dam collect floodwaters and release the water slowly down Skunk Creek and New River so that the peak flows, after the introduction of the ACDC water, will not be increased.

The acquisition of flowage easements and the construction of bank protection on Skunk Creek, New River, and the Agua Fria River complete the project.

The water from these projects flows into the Agua Fria River and then into the Gila River, which is its original and natural destination.

What is the purpose of the ACDC?

The ACDC is the core of the overall project. It is a 16.5 mile channel from approximately 40th Street and Camelback to 75th Avenue and Greenway in an alignment parallel to and on the northern side of the Arizona Canal.

It will intercept, and carry to Skunk Creek, flows up to a 100 year flood. This is the level of flooding expected to occur on an average of once per century.

For comparison, Phoenix city storm drains are generally planned for protection up to the two year flood.

The ACDC will eliminate flood damages to Phoenix, Glendale, and Peoria south of the Arizona Canal from flows originating north of the Canal up to the 100 year level and will substantially reduce damages from flows in excess of the 100 year level.

What causes the problem?

The natural paths of the streams and overland flows from the mountains and desert area are generally southwesterly across the metropolitan area and into the Salt and Gila Rivers.

These paths have, however, been obstructed by two different actions.

One was the building of the Arizona Canal in 1884.

This Canal, intended to distribute irrigation water, also acted as a dam to the natural flow of water.

As a result, water from small storms runs into the Arizona Canal or ponds along its northern bank. This ponding has resulted in flooding along that bank.

The second action was the obliteration through agriculture and urbanization of natural channels south of the Arizona Canal.

Significant rains drain into the Arizona Canal and quickly exceed the capacity of the Canal and pour over spillways to the south.

In major storms, the flows can and have caused breaks in the south bank of the Canal.

Because of the obliteration of the channels, these flows frequently race down streets, through yards and into homes and businesses.

How will the ACDC help?

The completion of the ACDC will allow the existing drainage to be modified.

Storm drains north of the Arizona Canal will empty into the ACDC and water will be carried to Skunk Creek. This will prevent ponding on the north side.

It will also intercept flows that would have gone into the Arizona Canal thereby preventing overflowing of the Canal caused by these inflows.

The ACDC will also allow the initiation of a new drainage concept south of the Canal.

Instead of having to cope with drainage from north of the Canal, new storm drains with a smaller initial capacity can be constructed to carry storm water to the Salt River.

Because the drain size can be decreased, the cities can save a large amount of money without decreasing protection.

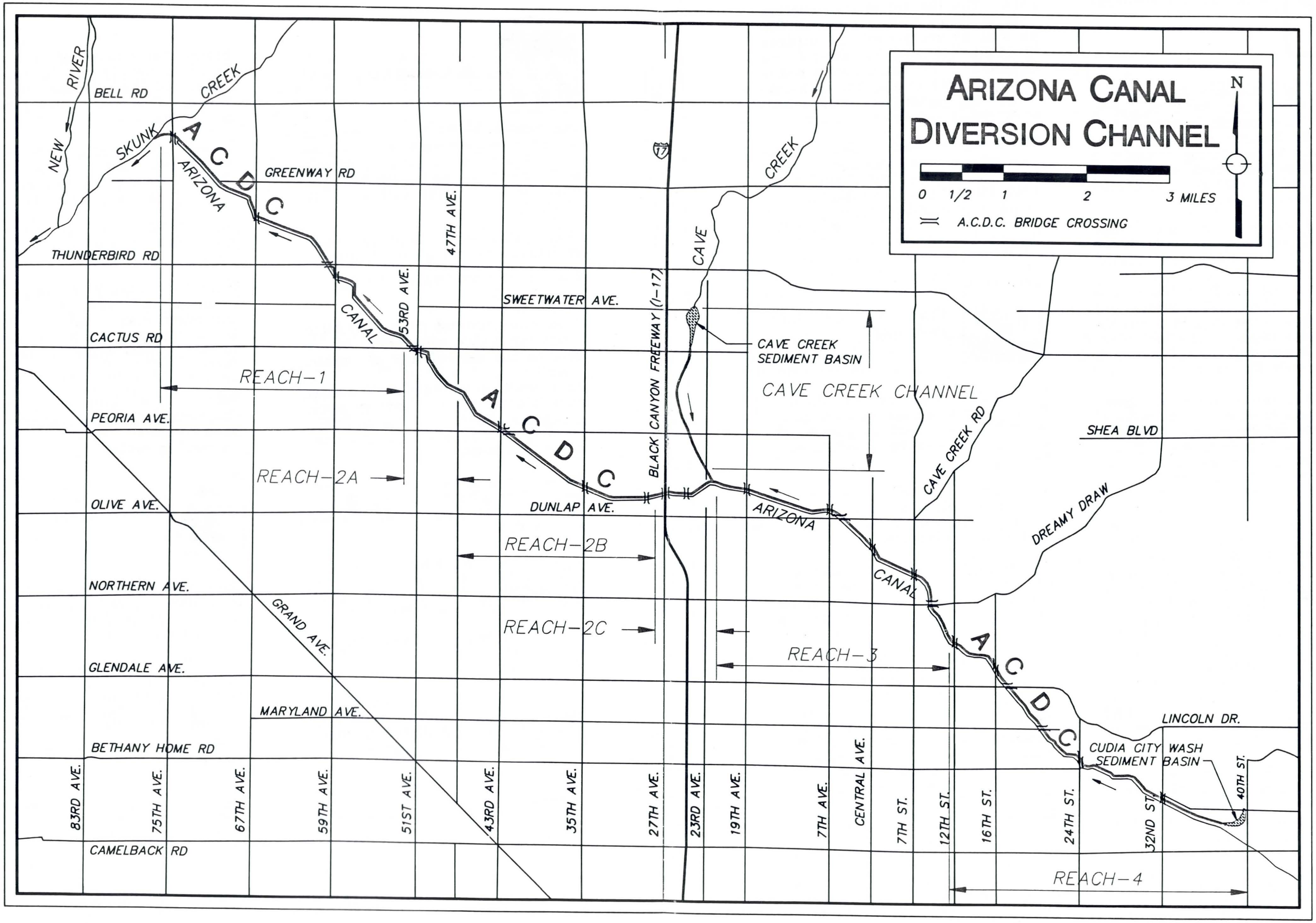
Who is building the ACDC?

The overall Project and the ACDC are being designed and constructed by the U. S. Army Corps of Engineers with federal money.

The Flood Control District of Maricopa County is the local sponsor and is responsible for acquiring the land, building bridges, relocating utilities such as water lines, and then operating and maintaining the project in the future.

The money comes from the Flood Control Tax Levy on all real property within the County.

The cities along its path – Paradise Valley, Phoenix, Glendale, and Peoria – have studied and approved the project through their city limits.



ARIZONA CANAL DIVERSION CHANNEL
N
0 1/2 1 2 3 MILES
A.C.D.C. BRIDGE CROSSING
NEW RIVER
SKUNK CREEK
BELL RD
GREENWAY RD
THUNDERBIRD RD
SWEETWATER AVE.
CACTUS RD
PEORIA AVE.
OLIVE AVE.
DUNLAP AVE.
NORTHERN AVE.
GLENDALE AVE.
MARYLAND AVE.
BETHANY HOME RD
CAMELBACK RD
SHEA BLVD
LINCOLN DR.
GRAND AVE.
CAVE CREEK RD
DREAMY DRAW
CAVE CREEK
CAVE CREEK SEDIMENT BASIN
CAVE CREEK CHANNEL
CUDIA CITY WASH SEDIMENT BASIN
BLACK CANYON FREEWAY (I-17)
17
ARIZONA CANAL
A C D C
REACH-1
REACH-2A
REACH-2B
REACH-2C
REACH-3
REACH-4
83RD AVE.
75TH AVE.
67TH AVE.
59TH AVE.
53RD AVE.
51ST AVE.
47TH AVE.
43RD AVE.
35TH AVE.
27TH AVE.
23RD AVE.
19TH AVE.
7TH AVE.
CENTRAL AVE.
7TH ST.
12TH ST.
16TH ST.
24TH ST.
32ND ST.
40TH ST.

What are the elements of the ACDC?

Reach 1 is a 4.0 mile long earthen channel from Skunk Creek to Cactus Road. This reach is within the Cities of Peoria and Glendale. Glendale is building extensive recreation activities within the approximately 500 feet wide and 20 feet deep channel area.

Reach 2 extends 4.7 miles from Cactus Road to Cave Creek (23rd Avenue). From Cactus to 47th Avenue (0.75 miles) it is a concrete trapezoidal channel from 160 to 200 feet wide. Between 47th Avenue and Cave Creek Wash it is a concrete rectangular channel 110 feet wide. The walls through this Reach are approximately 21 feet deep.

Reach 3 extends 3.6 miles from Cave Creek to Dreamy Draw (12th Street) and will be 50 to 60 feet wide and 20.5 to 23.5 feet deep. It will be covered for a 2,565 foot stretch, so Sunnyslope High School can maintain the use of its athletic fields.

Reach 4 extends 4.2 miles from Dreamy Draw to Cudia City Wash near 40th Street. The rectangular concrete channel will be 36 to 40 feet wide and 20.5 to 24.5 feet deep. The channel will be covered from 24th Street to approximately 30th Street through the Arizona Biltmore Hotel area where costs of covering are less than additional right-of-way costs, and for 1,297 feet beneath Stanford Drive east of 32nd Street to avoid the cost of relocating Stanford Drive.

1.8 miles

The Cave Creek Sediment Basin will be constructed just south of the Sweetwater Avenue alignment, and the area around the Basin will be used by the City of Phoenix for recreational acitivities.

The Cave Creek Channel will carry waters from the Sediment Basin to the ACDC. It will be a concrete channel within Phoenix's Cave Creek Park. The District is constructing undercrossings at Peoria and Cactus as well as six pedestrian bridges in connection with the Cave Creek Channel. The maintenance roads will be available for hiking, bicycling, equestrian and other nonvehicular recreation users.

The Cudia City Wash Sediment Basin will be on the grounds of the Phoenix Country Day School near 40th Street and Camelback. The basin is gradually sloping, unlined and relatively unobtrusive. The School's athletic fields, but no structures, will be located within it.

What will the ACDC look like?

The ACDC will mainly be a rectangular concrete channel (except for the earthen portion at the western end in Glendale and Peoria).

The Corps of Engineers, as part of its construction responsibilities, will provide landscaping and other aesthetic treatments.

For example, landscape nodes will be created at most major street intersections and the eye will be drawn to them rather than to the channel.

Bridge railings will help prevent passing automobile passengers from seeing into the channel.

Screening walls, landscaping, and existing back yard fences will conceal the channel from adjacent neighborhoods between major streets. Also, the channel is screened from the south by the banks of the Arizona Canal.

The type of landscaping differs in the various reaches in order to blend with existing neighborhoods; however, all the plants are adapted to the hot, arid environment in this area.

The plants are low water users.

A safety fence made of steel with a wrought iron appearance will prevent children and animals from getting into the channel.

The safety fencing will be only partially visible because there will be a slope from ground level down to the channel walls. The fence will be built at the top of the channel walls.

The south walls will, in most areas, nearly adjoin the north border of the Salt River Project right-of-way.

The Canal and the Channel will share a maintenance road which will also double as a bike path.

Adjacent to the maintenance road will be the existing equestrian path.

Stormwater will flow into the channel easily because the channel will be constructed below the ground surface.

Inlet structures will be built where the flows from major drains enter the channel and pipes will be used where local ponding occurs.

City storm drains constructed by Phoenix will also outlet into the Channel.

What about bridges?

A total of 24 vehicular bridges will be constructed at all present crossings of the Arizona Canal.

Several new pedestrian bridges will also be constructed.

These bridges are being built under the direction of the Flood Control District.

Who will operate and maintain the ACDC?

The Flood Control District will supply the manpower and costs of maintaining the ACDC.

This includes removal of debris and silt that may accumulate in the bottom of the channel as well as maintaining the landscaping on the banks.

Glendale and Phoenix will share in the maintenance responsibilities in areas where recreation features are planned.

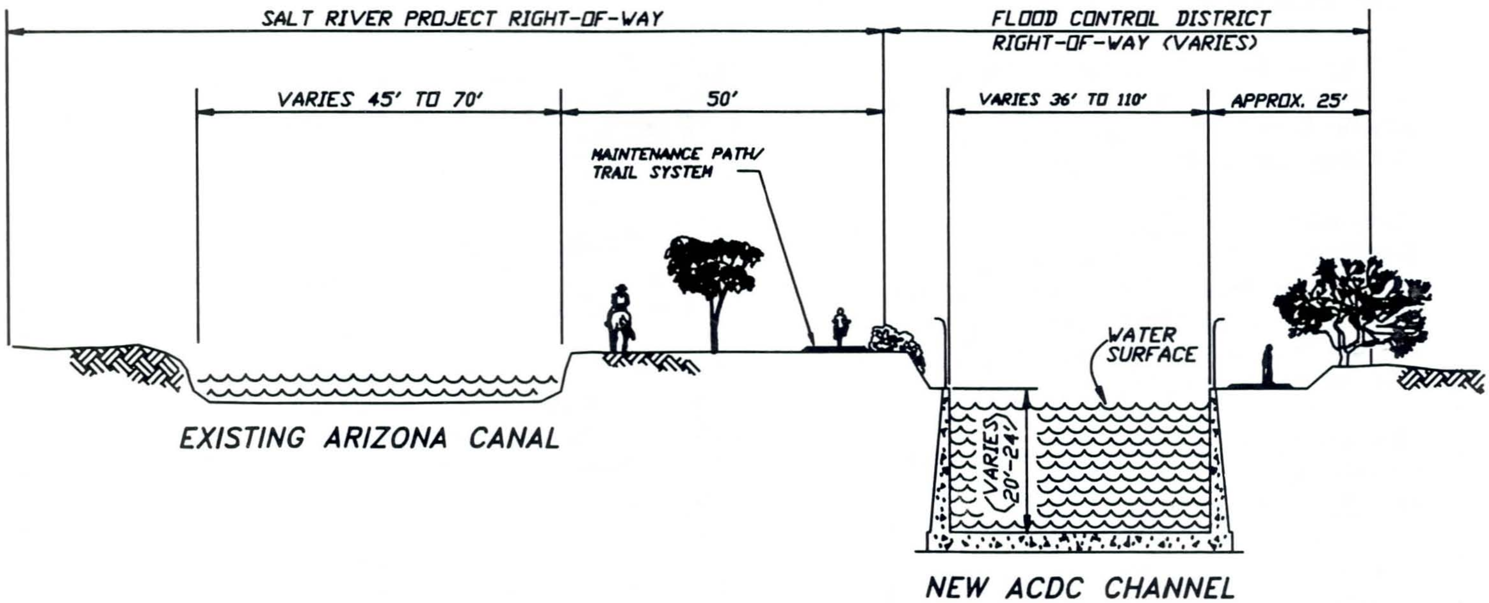
What will the Phoenix and Vicinity (Including New River) Flood Control Project cost?

The total cost for the Phoenix and Vicinity (including New River) Flood Control Project, which includes the ACDC, four dams, and other measures (flood control and recreational facilities, as well as wildlife mitigation and lands and archaeological mitigation) is estimated at $422 million, of which $254 million is a federal cost and $168 million is a local cost.

What will the ACDC cost?

The combined federal and local costs are estimated to be $254 million.

The costs includes $152 million in federal money and $102 million in local money for the ACDC, including recreation facilities.



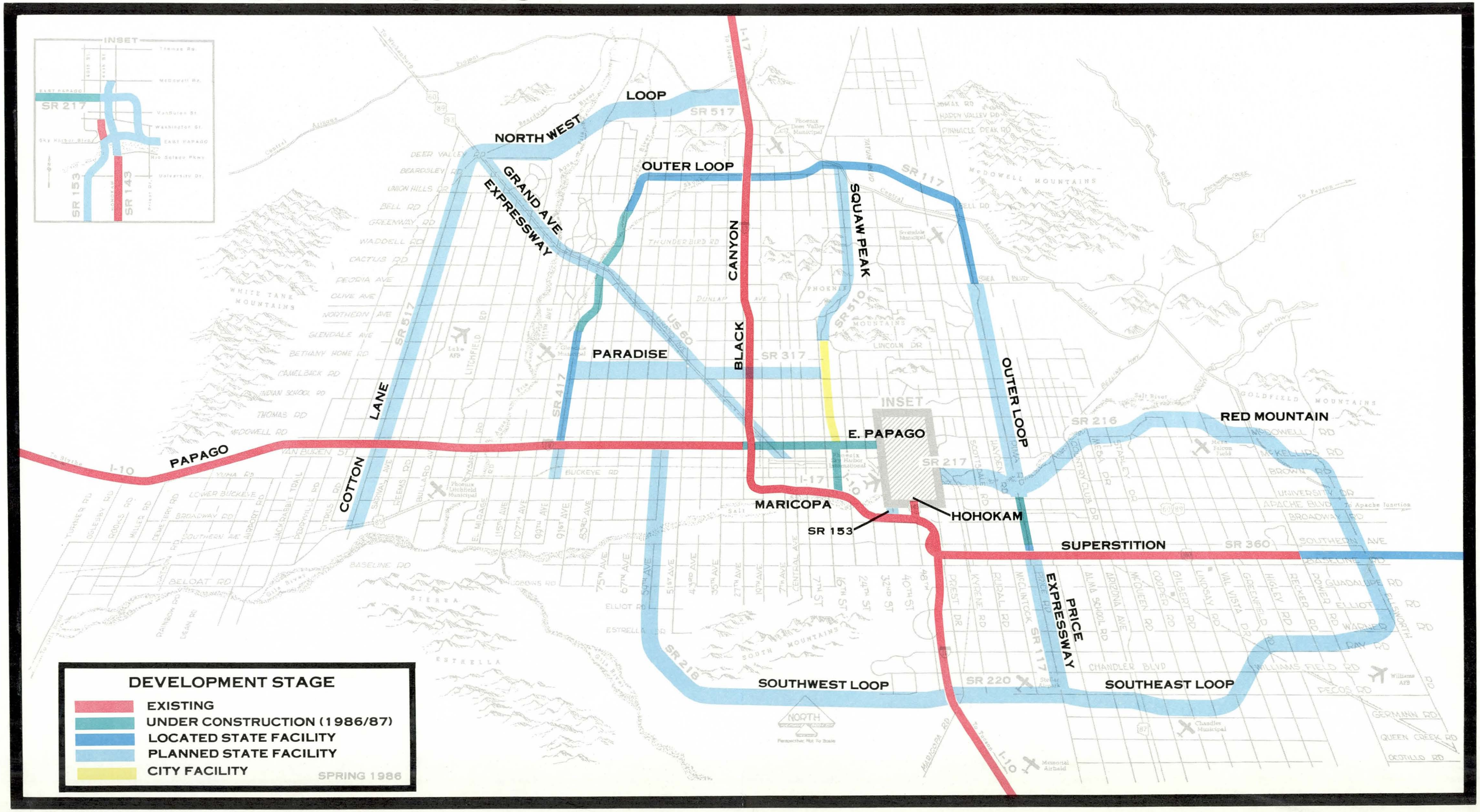
TYPICAL CROSS SECTION

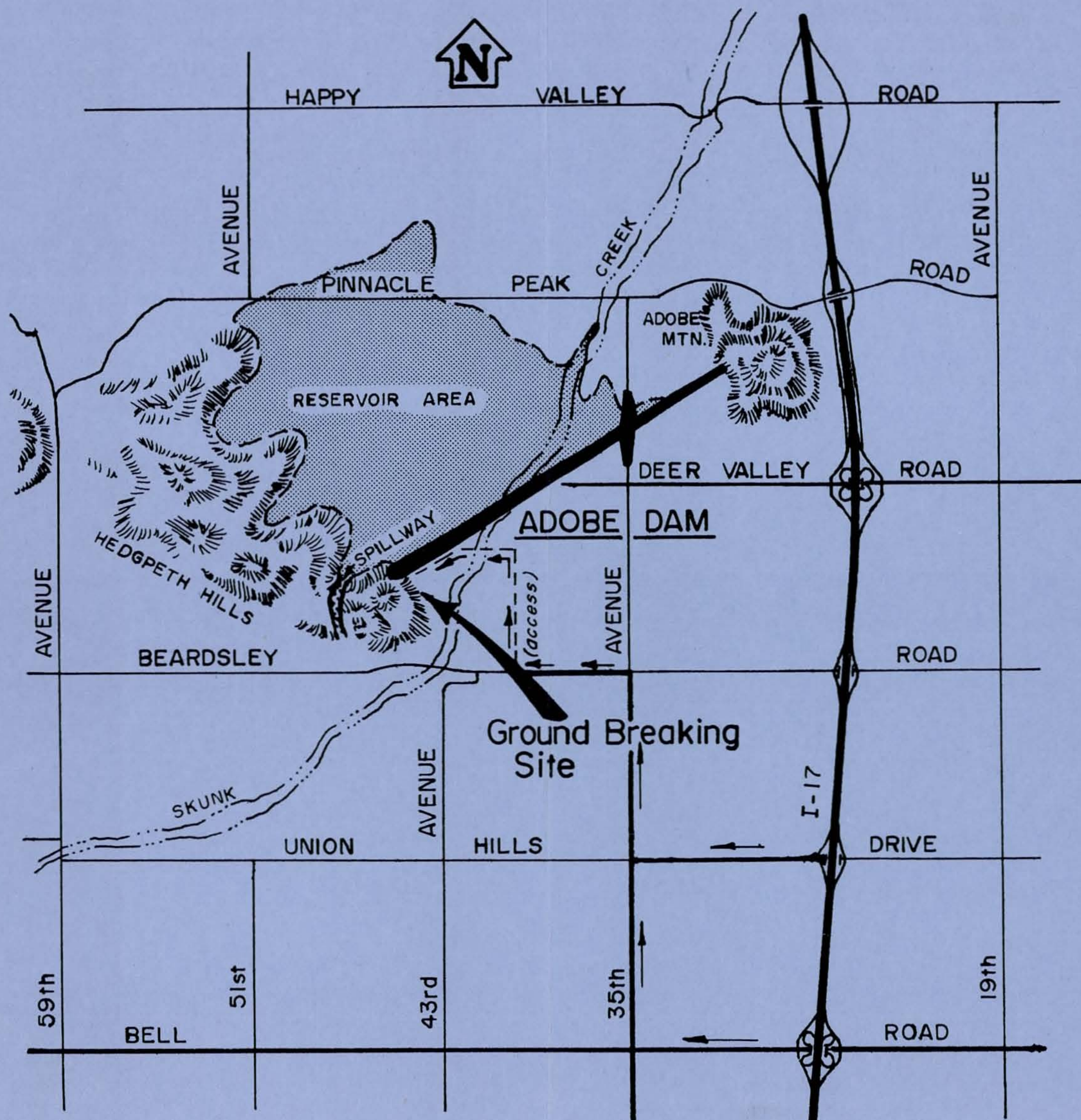
CONCRETE RECTANGULAR CHANNEL
47th AVENUE TO 40th STREET

For further information contact:

Public Involvement Coordinator
Flood Control District
of Maricopa County
3335 West Durango
Phoenix, Arizona 85009
262-1501

ADOT FREEWAYS & EXPRESSWAYS





**From 35th Ave. and Beardsley Road
please follow signs to site.**

**THE FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY**

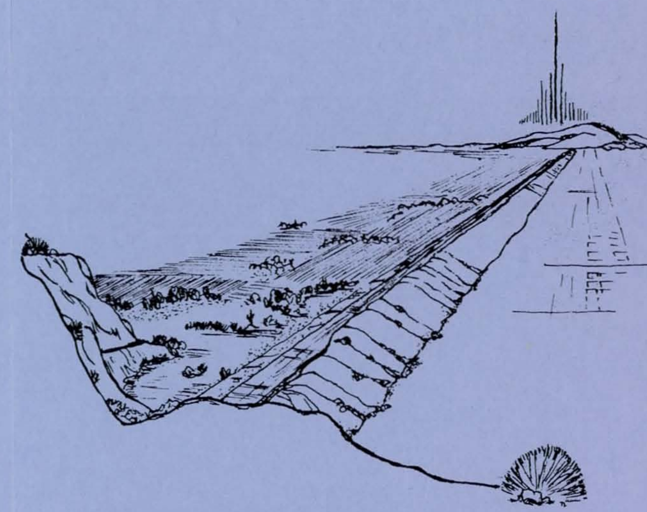
INVITES YOU TO ATTEND

the

Ground Breaking Ceremonies

for

Adobe Dam



Thursday, October 30, 1980

10:00 A.M.

GROUND BREAKING CEREMONIES

Band Selections	Thunderbird High School Marching Band
Master of Ceremonies	Fred Koory, Jr., Chairman Board of Directors
Invocation	Dr. William O. Smith Shadow Rock Congregational Church
Pledge of Allegiance	Fred Koory, Jr.
Star Spangled Banner	Thunderbird Marching Band
Remarks and Introduction of Distinguished Guests	Fred Koory, Jr.
The Petroglyph Story	Patricia Martz Senior Archeologist U.S. Army Corps of Engineers
Remarks	Brig. Gen. Homer Johnstone U.S. Army Corps of Engineers
	Representative of City of Phoenix
	Eldon Rudd U.S. House of Representatives
Benediction	Dr. William O. Smith

ADOBE DAM

Adobe Dam is the third of four dams to be built as elements of a flood control project known as "Phoenix, Arizona, and Vicinity (including New River.)" This project was authorized by the Flood Control Act of 1965 (Public Law 89-298, 89th Congress). Dreamy Draw Dam was completed in 1973, and Cave Buttes Dam was completed in 1980. The fourth dam will be New River Dam which will be constructed about mid-1983. The Arizona Canal Diversion Channel (ACDC) is also a feature of this project, and its construction, from Skunk Creek to 40th Street, will follow the construction of the four dams.

All dams are earthfill dams designated to provide standard project flood protection. The Arizona Canal Diversion Channel will be designed to intercept 100-year frequency floodflows.

The standard project flood represents the flood that would result from the most severe combination of meteorologic and hydrologic conditions considered reasonably characteristic of the region. It normally is larger than any past recorded flood in the area and can be expected to be exceeded in magnitude only on rare occasions. It thus constitutes a standard for design that will provide a high degree of flood protection. The standard project flood is produced by centering the most severe storm of record in the general region critically over the drainage area when ground conditions are conducive to a high rate of runoff.

Adobe Dam will be constructed on Skunk Creek about one mile west of the Black Canyon Highway at about Deer Valley Road. Adobe Dam is designed to provide flood protection by controllng floodwater flow from an 89.6 square mile drainage area. This will pass through an ungated nine foot by six foot outlet in the dam at a rate not exceeding 1,890 cubic feet per second. At this rate it will take nine and a half days to empty the reservoir after such a major flood.

The dam was designed and will be built by the U.S. Army Corps of Engineers. The Construction contractor is M. M. Sundt Construction Company. All rights-of-way, relocations and relocation assistance to home owners was accomplished by the Flood Control District. Following construction, the structures will be operated and maintained by the Flood Control District.

No permanent pool of water will be retained in the reservoir. Instead, the dam and reservoir are designed to trap the floodwater and store it only as long as it takes to release it safely downstream. Reservoir capacity is thus restored to handle a future flood.

Recreation development is planned for Adobe Dam and Reservoir. The Maricopa County Parks and Recreation Department will be the recreation sponsor and will work with the Corps of Engineers. Sports and playfield areas and an equestrian center are planned for the reservoir area. Preservation of a petroglyph area located south of the structure will be part of the project.

PROJECT FEATURE

Type of Structure	Earthfill
Length	11,245 feet
Height	63 feet
Reservoir Capacity	18,350 acre feet
Reservoir Area	1,320 acres
Drainage Area	89.6 square miles
Standard Project Flood	
Peak Inflow	66,000 cfs
Peak Outflow	1,890 cfs
Drawdown Time	229 hours
Costs	
Federal (Construction)	$8,388,025
Flood Control District	$9,000,000
Designer:	U.S. Army Corps of Engineers
Local Sponsor:	Flood Control District
Contractor:	M. M. Sundt Construction Company
Scheduled Completion:	Mid 1982

BOARD OF DIRECTORS FLOOD CONTROL DISTRICT

Fred Koory, Jr. (Chairman)

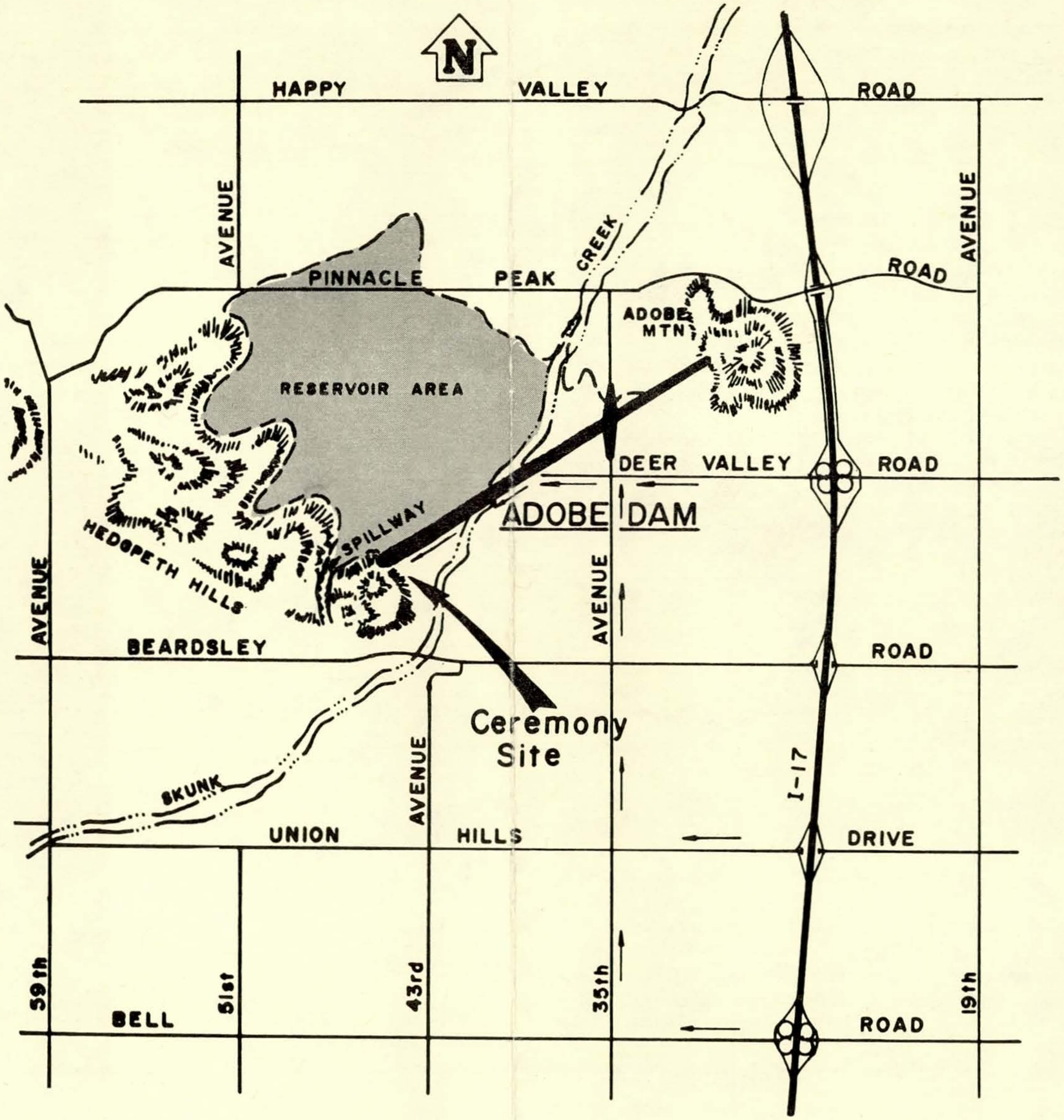
George Campbell, Tom Freestone, Ed Pastor, Hawley Atkinson

CITIZENS' FLOOD CONTROL ADVISORY BOARD

Paul Perry, (Chairman)

Lynn Anderson, John Miller, Jim Attebery, Bill Sykes, Elijah Cardon, Reed Teeples

Bill Mathews, Chief Engineer and General Manager
FLOOD CONTROL DISTRICT of Maricopa County



From 35th Ave. and Deer Valley Road
please follow the signs

THE FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

INVITES YOU TO ATTEND

the

Dedication Ceremony

for

ADOBE DAM

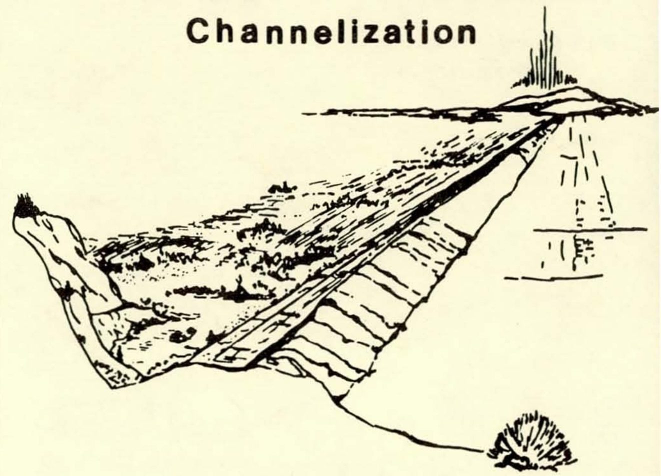
and

Ground Breaking Ceremony

for

SKUNK CREEK

Channelization



Thursday, April 8, 1982
9:30 A.M.

CEREMONY PROGRAM

Band Selections .... Peoria High School Marching Band

Master of Ceremonies .... Fred Koory, Jr.
Board of Directors, Flood Control District

Invocation .... Dr. William O. Smith
Shadow Rock Congregational Church

Pledge of Allegiance .... Fred Koory, Jr.

Star Spangled Banner ..... Peoria High School Marching Band

Remarks and Introduction of Distinguished Guests .... Fred Koory, Jr.

Remarks .... Col. Paul W. Taylor
Cmdr., Los Angeles District
U. S. Army Corps of Engineers

BG Homer Johnstone, Jr.
Cmdr., South Pacific Division
U. S. Army Corps of Engineers

Margaret Hance
Mayor, City of Phoenix

Eldon Rudd
U. S. House of Representatives

Benediction .... Dr. William O. Smith

ADOBE DAM AND SKUNK CREEK CHANNEL AND LEVEES

This ceremony is a double milestone in the flood control measures identified for "Phoenix, Arizona, and Vicinity (including New River)." It marks the completion of the Adobe Dam project, the third of four dams and marks the beginning of the Skunk Creek Channels and Levees project which is designed to gather the floodwaters above Adobe Dam and direct them safely to the reservoir area. This latter project will be completed early in 1983.

Dreamy Draw Dam, the first dam of the flood control measures, was completed in 1973 and Cave Buttes Dam was completed in 1980. The remaining dam, the fourth, will be built on the New River commencing in 1983. The last feature of this undertaking, the Arizona Canal Diversion Channel (ACDC), which will divert flood flows along the north side of the Arizona Canal from the vicinity of 40th Street westward to Skunk Creek, will be constructed following the four dams. The ACDC will be designed to divert all flood flows up to a magnitude expected once in each 100 years on the average.

The four dams are earthfill construction designed to provide protection for the so called standard project flood. This flood is normally larger than any past recorded flood and should be only very rarely exceeded. This design criteria will provide a very high degree of flood protection.

Adobe Dam is located on Skunk Creek about one mile west of the Black Canyon Highway at about Deer Valley Road. Adobe Dam is designed to provide flood protection by controlling floodwater flow from an 89.6 square mile drainage area. The outflow will pass through an ungated nine foot by six foot outlet in the dam at a rate not exceeding 1,890 cubic feet per second. At this rate it would take nine and a half days to empty the reservoir after the standard project flood event.

The dam was designed and built by the U. S. Army Corps of Engineers. The Construction contractor was M. M. Sundt Construction Company. All rights-of-way, relocations, and relocation assistance to homeowners were accomplished by the Flood Control District. The structures will be operated and maintained by the Flood Control District. No permanent pool of water will be retained in the reservoir. Instead, the dam and reservoir are designed to trap the floodwater and store it only as long as it takes to release it safely downstream. Reservoir capacity is thus restored to handle a future flood.

Recreation development is planned for the Adobe Dam Reservoir. The Maricopa County Parks and Recreation Department is the recreation sponsor and will develop the recreation features in conjunction with the Corps of Engineers. Sports and picnicking areas, a multi-use recreation complex and an aquatic facility, are planned for the reservoir area. The petroglyph area located south of the structure was preserved as a part of the project and will be retained for historic and cultural purposes.

PROJECT FEATURES
ADOBE DAM

Type of Structure	Earthfill
Length	11,245 feet
Height	63 feet
Reservoir Capacity	18,350 acre feet
Reservoir Area	1,320 acres
Drainage Area	89.6 sq. miles
Standard Project Flood	
Peak Inflow	66,000 cfs
Peak Outflow	1,890 cfs
Drawdown Time	229 hours
Costs	
Federal (Construction)	$9.7 million
Flood Control District	$9.0 million
Contractor:	M. M. Sundt Construction Company

SKUNK CREEK CHANNEL AND LEVEES

Type of Structure	Earthfill
Length of Levees	East-3,200 feet, west-6,590 feet
Height	Maximum 25 feet
Width of Channel	241 to 1,700 feet
Standard Project Flood	54,000 cfs
Costs	
Federal (Construction)	$3.1 million
Flood Control District	$1.6 million
Contractor:	Lufkin Construction Company
Scheduled Completion	March, 1983
Designer:	U. S. Army Corps of Engineers
Local Sponsor:	Flood Control District

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Hawley Atkinson

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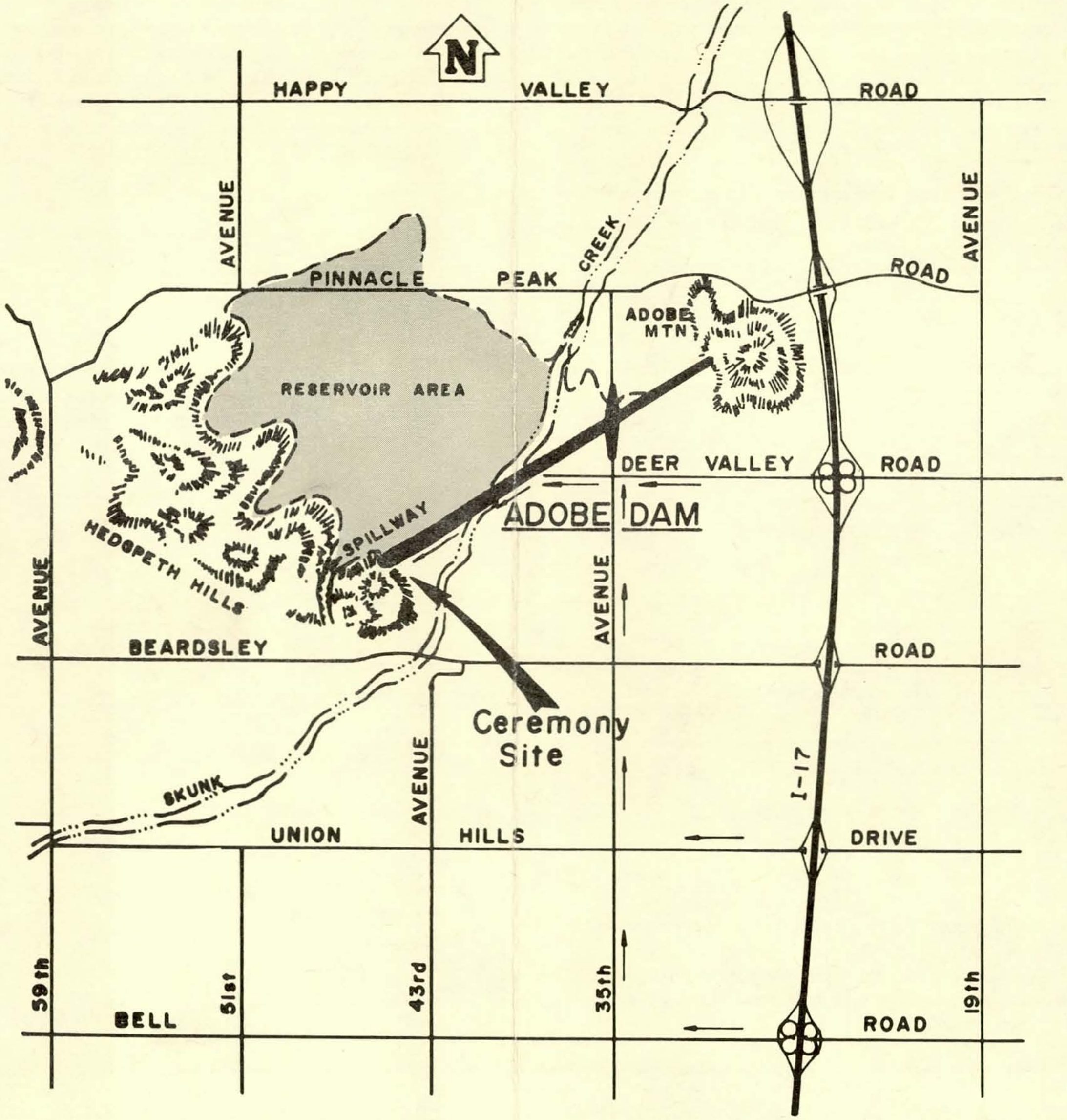

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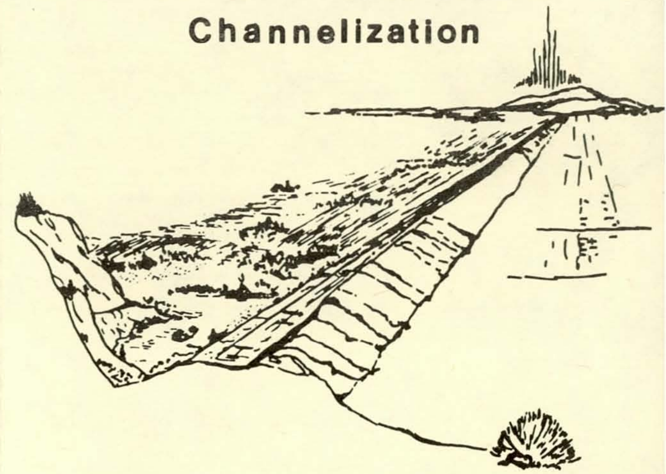

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Jim Attebery
Dean Sellers
John Miller
Paul Perry
Reid Teeples

PROJECT TITLE: Adobe Dam

WATERSHED and relationship to other structures

Location: Township, range, section; description from well known physical features; how to get there.

T4N R2E Sections 8, 9, 10, 14, 15, 21 & 22

Authorization: Flood Control Act oof 1965 (Public Law 89-198, 89th Congress)

Federal Sponsor: Corps of Engineers

Local Sponsor(s): Flood Control District of Maricopa County

Documentation: e.g., Watershed Workplan title/date; supplements EIS date approved
Final Environmental Impact Statement Approved March 1976

Contractor: M. M. Sundt Construction Co.

Date of Construction Award: September 29, 1980

Date of Final Acceptance: May 6, 1982

Functional Description: How it works

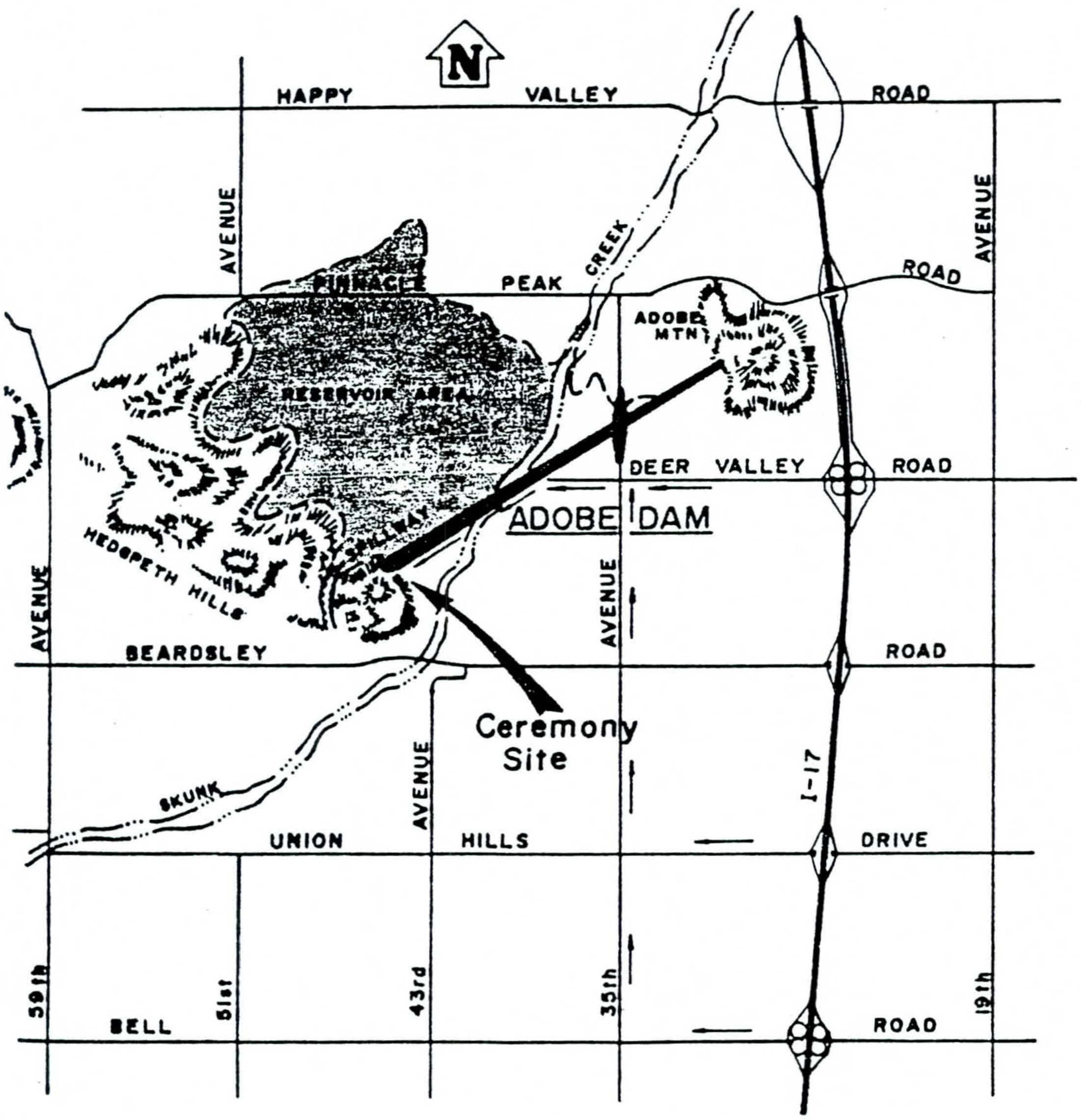
Adobe Dam will collect runoff water from the watershed with the main source of water being Skunk Creek. The impounded water will be released through the ungated outlet into the Skunk Creek channel.

Project Features:

Type of structure	Zoned Earthfill
Top of structure elevation	1403.0
Length of structure	11,245 feet (2.13 mi.)
Maximum height	63 feet
Top crest width	20 feet w/12' paved
Spillway crest elevation	1377.8
Spillway capacity	
Drainage area	89.6 square miles
Storage capacity	18,350 acre feet
Maximum water surface elevation	1397.5
Freeboard	5.5 feet
Peak outflow	
Peak inflow	
Drawdown time	122 hours (5.08 days)
Principal outlet discharge rate	1890 CFS
Principal outlet structure	5.9 X 8.85' conduit w/ headwalls and flared wing walls. Conduit is 290 feet long

Level of protection: Standard Project Flood w/peak inflow of 66,000 CFS

Costs: Federal: $9,700,000
Local: Land, relocations, engineers; total $9,000,000



N
HAPPY VALLEY ROAD
PINNACLE PEAK ROAD
CREEK
AVENUE
ADOBE MTN
RESERVOIR AREA
DEER VALLEY ROAD
ADOBE DAM
SPILLWAY
HEDGPETH HILLS
BEARDSLEY ROAD
Ceremony Site
SKUNK
UNION HILLS DRIVE
I-17
59th
51st
43rd
35th
19th
BELL ROAD

MESSAGE DISPLAY FOR MARTY BRESSOR

To: EAR
Cc: MPB
RWS
KWJ
DRJ
PAC
RGN
SLS

From: Stan Smith:TALOS
Host: TALOS
Postmark: 09/28/93 04:33PM
Delivered: 09/28/93 04:33PM
Status: Previously read Urgent

Subject: ADOBE DAM - 100-YEAR WATER SURFACE ELEVATION

Message:
THE DESIGN MEMORANDUM #7 FOR THE ADOBE DAM MASTER PLAN GIVES THE FOLLOWING WATER SURFACE ELEVATIONS:

SPF••1377.8
100YR••1372.5
50YR••1369.4
25YR••1366.1
10YR••1361.2

ANY STRUCTURES WITHIN THE RESERVOIR SHOULD HAVE FLOORS SET AT ONE FOOT ABOVE THE 100YR OR 1373.5.

I BELIEVE THAT IS CONSISTENT WITH WHAT WE HAVE DONE BEFORE.

PROJECT Features

Flume

Many years ago, a metal flume had been built to carry irrigation water across the Agua Fria by the Roosevelt Irrigation District. The metal flume was a distinctive landmark in the west valley.

The flume, which blocked flows in the Agua Fria and could have been washed away by flood waters, was replaced as part of this project by an inverted siphon to carry the water under the riverbed.

Avondale Landfill

Part of the channelization project required the removal of the old Avondale Landfill from the Agua Fria riverbed. Moving the landfill opened up the river for the passage of floodwaters, and it also cleared up public health concerns about potential contamination of the ground water.

The landfill material was moved to a site outside of the riverbed, along Western Avenue. The new landfill site (built to the highest environmental standards), was then closed and developed into a park by Avondale. Coldwater Park was dedicated in October of 1990 and it includes ball fields, picnic areas, and other recreation amenities developed by Avondale.

Soil Cement

Eight-feet thick soil cement was used to stabilize the banks of the Agua Fria Channel as well as to protect against erosion. This material works like cement but the color blends into the natural channel bottom. The Agua Fria Channel is one of the first major uses of soil cement in Maricopa County.

PROJECT Overview

The following table highlights some of the significant facts of the Agua Fria River Channel.

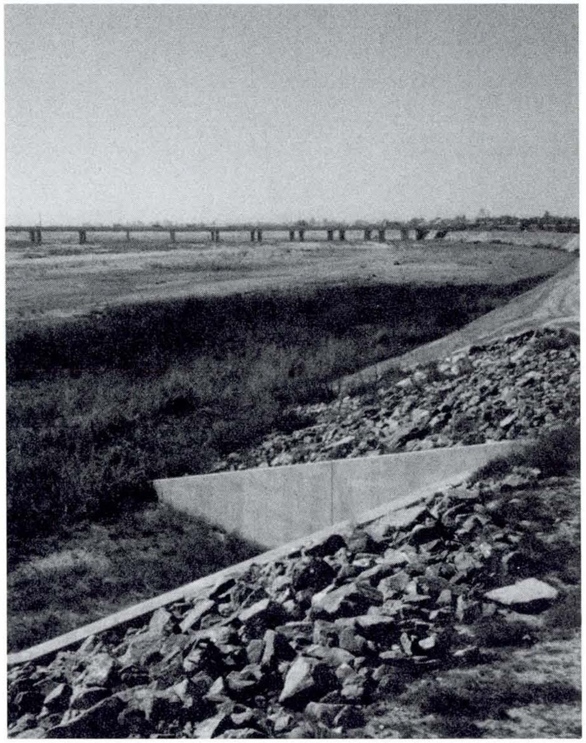
Agua Fria River Improvements (Including Corps of Engineers Levees)

Project Data	
Length	6.0 miles
Channel Capacity	142,000 cfs
Channel Width	900 to 1,400 feet
Levee Height (Channel depth)	Average: 15 feet
Significant Quantities	
Landfill Relocations	450,000 yd^3
Towers Protected	18
Grade Control Structures	5
Soil Cement	703,000 yd^3
Cement and Fly Ash	149,000 tons
Levee Embankment	1,361,000
Channel Excavation	5,100,000 yd^3
Costs	
Flood Control District	$27,900,000
Cost Shared & Dedications	13,265,000
Federal	4,060,000
Total	$45,225,000

For more information on this or any other District project, contact:

Public Involvement Coordinator
Flood Control District of Maricopa County
2801 W. Durango Street
Phoenix, Arizona 85009
(602) 506-1501

On the cover: *Looking down the Agua Fria River Channel, toward the I-10 overpass.*



AGUA FRIA RIVER CHANNELIZATION

Cooperation in Flood Control

Published by the
Flood Control District of Maricopa County
2801 W. Durango Street
Phoenix, Arizona 85009
(602) 506-1501

AGUA FRIA River Project

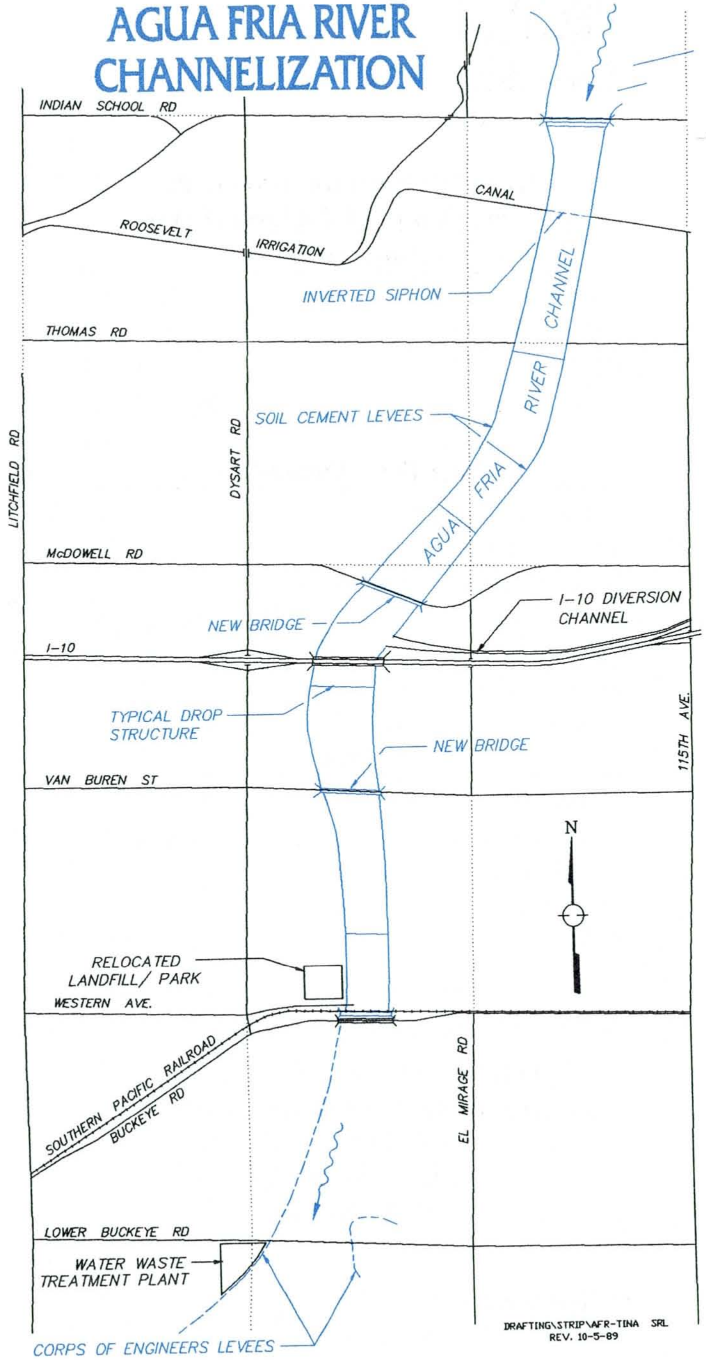
Although the construction of Waddell Dam in 1927 had a taming influence on the Agua Fria, the Dam was built for the purpose of water conservation rather than flood control. Excess flows that could not be contained within the reservoir spilled into the riverbed and flooded land below.

Particularly heavy flows occurred on the Agua Fria in 1978, 1979, and 1980. Farms, houses, and businesses had been built in the floodplain, so when the floods came, the damage was devastating. People lost their homes, their property, and their livelihood.

Because of the flood damages to agricultural areas, homes, and businesses, in 1981 the Flood Control District initiated a study of the flooding problems and solutions on the Agua Fria. A number of problem areas were identified in the District's study and solutions to these problems involved many organizations and governmental agencies.

One of the first agencies to become involved was the Arizona Department of Transportation (ADOT). ADOT needed a channel on the north side of Interstate 10 to protect the freeway and carry drainage to the Agua Fria. ADOT recognized that this channel could result in increased flows in the City of Avondale and proposed building a $5 million detention basin for the increase. However, this basin would not solve Avondale's existing flooding problems from the Agua Fria.

AGUA FRIA RIVER CHANNELIZATION



ADOT then agreed, with concurrence from Avondale, to contribute the $5 million cost of the basin to the District to be used in channeling the Agua Fria. This cooperative effort provided flood protection to Avondale while providing conveyance of the Interstate 10 drainage.

At the same time, a lawsuit had been filed by the County against sand and gravel operators in the Agua Fria for causing the failure of the Indian School Road Bridge during the 1978-80 floods. The lawsuit was settled out of court, and the sand and gravel operators compensated the County in both cash and right-of-way to construct a channel and protect the bridge.

The cooperative effort also included Maricopa County, which built new bridges across the Agua Fria River at McDowell Road and Van Buren Street.

The Flood Control District operates and maintains the channel, which was completed in 1988.

♲ Printed on recycled paper.

PROJECT Features

Flume

Many years ago, a metal flume had been built to carry irrigation water across the Agua Fria by the Roosevelt Irrigation District. The metal flume was a distinctive landmark in the west valley.

The flume, which blocked flows in the Agua Fria and could have been washed away by flood waters, was replaced as part of this project by an inverted siphon to carry the water under the riverbed.

Avondale Landfill

Part of the channelization project required the removal of the old Avondale Landfill from the Agua Fria riverbed. Moving the landfill opened up the river for the passage of floodwaters, and it also cleared up public health concerns about potential contamination of the ground water.

The landfill material was moved to a site outside of the riverbed, along Western Avenue. The new landfill site (built to the highest environmental standards), was then closed and developed into a park by Avondale. Coldwater Park was dedicated in October of 1990 and it includes ball fields, picnic areas, and other recreation amenities developed by Avondale.

Soil Cement

Eight-feet thick soil cement was used to stabilize the banks of the Agua Fria Channel as well as to protect against erosion. This material works like cement but the color blends into the natural channel bottom. The Agua Fria Channel is one of the first major uses of soil cement in Maricopa County.

PROJECT Overview

The following table highlights some of the significant facts of the Agua Fria River Channel.

Agua Fria River Improvements (Including Corps of Engineers Levees)

Project Data	
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Channel Capacity	142,000 cfs
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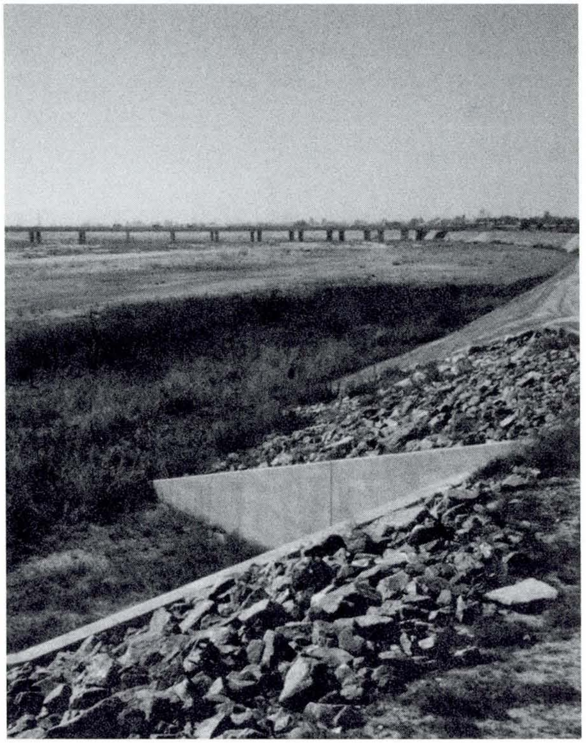

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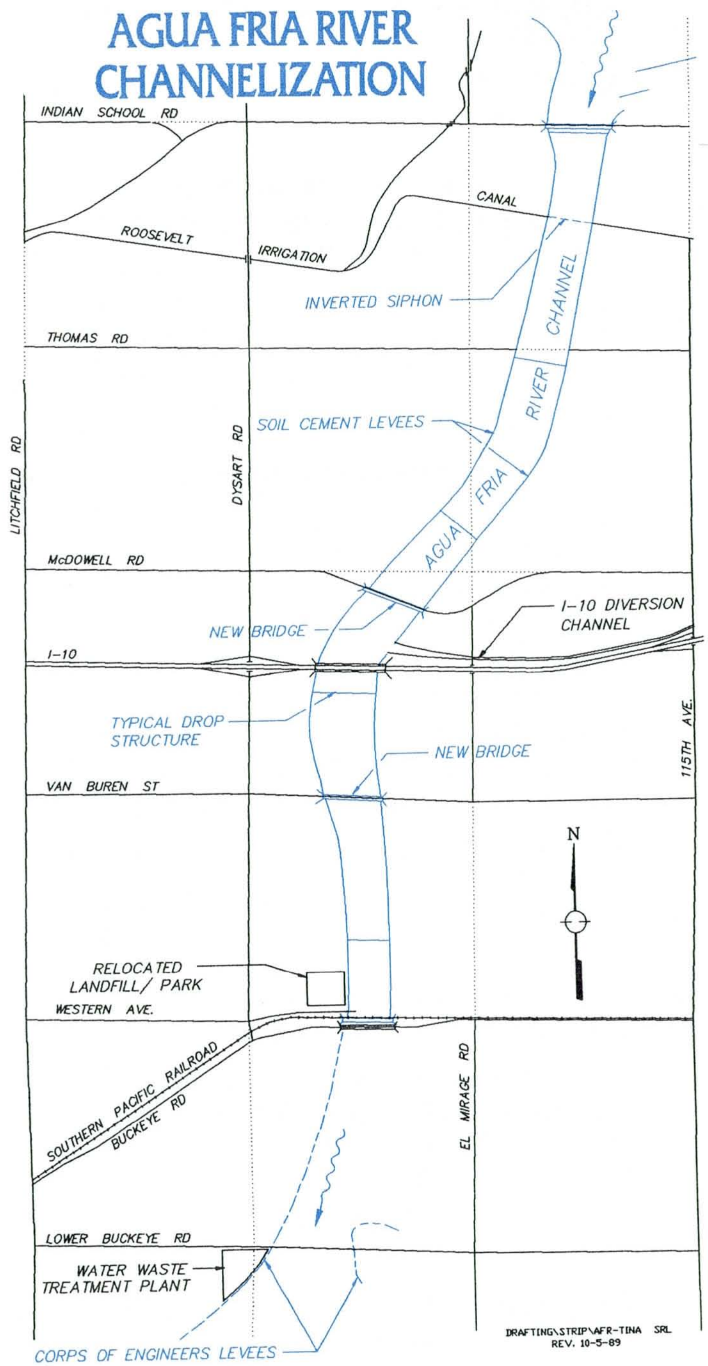

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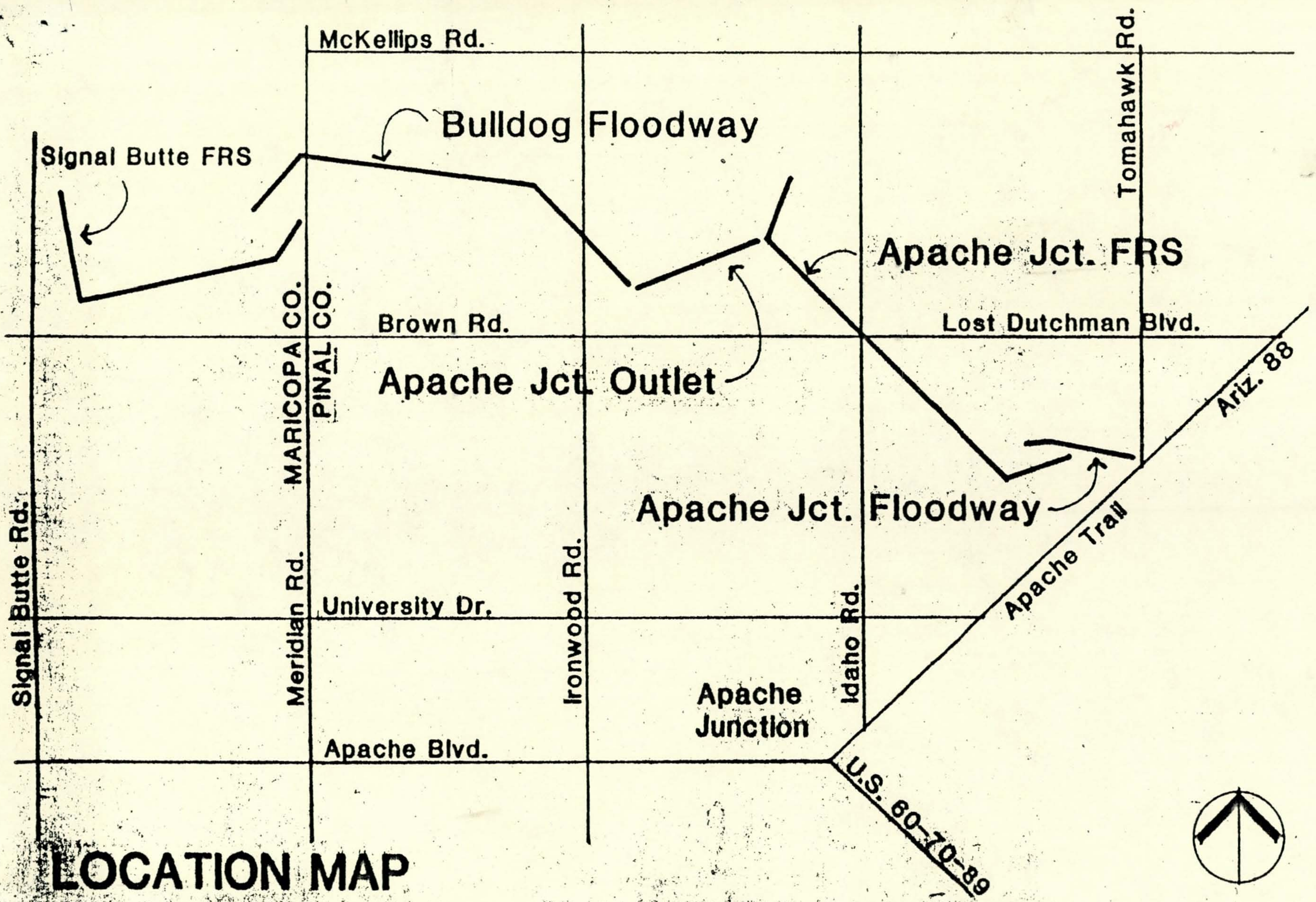

CORRECT

Map taken from Landscape Rehabilitation Phase III Blueprints Jan. 1987

ICOPA NATURAL RESOURCE ERVATION DISTRICT	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY	REVIS

an outlet behind Spookhill Dam. The structure drains 16 square miles above the Apache Trail near the Maricopa-Pinal County Line.

Spookhill Dam and Floodway include a 4-mile earthen dam and a 2-mile floodway that outfalls into the Salt River. The structure drains nearly 14 square miles and is located east of Bush Highway, upslope of the Central Arizona Project Aqueduct.

The original project proposal included construction of a dam on Weekes Wash with an adjoining floodway that would outfall into the reservoir behind Apache Junction Dam. This has not been built.

Recreation USES

Multipurpose uses of flood control projects is encouraged when they do not interfere with the operation of the flood control facility. In the Buckhorn Mesa Watershed Project, the City of Mesa has an agreement with the District to develop recreational features behind Spookhill Dam.

Currently, a remote-control airplane facility is in operation behind the structure. In the future, the Town of Apache Junction has plans to develop an equestrian trail in the vicinity of the Bulldog Floodway. Also, one of the County's larger regional parks, the Usery Mountain Recreation Area, is located on the Buckhorn Mesa Watershed. The park includes an area behind Pass Mountain Diversion.

COSTS and Sponsors

The Soil Conservation Service, an agency of the United States Department of Agriculture, designed and constructed the dams and floodways using federal funds. The Flood Control District of Maricopa County purchased the land rights for the Buckhorn Mesa Watershed Project, relocated utilities and constructed new bridges where the floodways needed to cross beneath roads.

Other project sponsors were the East Maricopa Natural Resource Conservation District and the Board of Supervisors of Pinal County.

Buckhorn Mesa Project Costs

	Construction Costs	
Structure (date of completion)	Federal	Flood Control District
Spook Hill Dam (1979) and Floodway (1984)	$6,956,000	$2,330,000
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* In order to keep the construction of this project on schedule, the Flood Control District advanced this money to the Federal Government.

For more information on this or any other District project, contact:

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On the cover: Signal Butte Floodway.

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Another flood control project for Maricopa County

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The Buckhorn Mesa Watershed, comprising nearly 70,000 acres, is located in eastern Maricopa and northwestern Pinal Counties. The watershed originates in the rough Usery Mountains, Goldfield Mountains and the western flank of the Superstition Mountains. Rain that falls on this watershed drains into a wide alluvial fan upon which valuable improvements, subdivisions and commercial/industrial developments have been built.

The Buckhorn Mesa Watershed Project is a series of four earthen dams with interconnecting floodways. The dams capture floodwater and route it through the floodways to a single outlet which flows into the Salt River.

The project was conceived in the early 1960's after 33 floods were recorded in the area between 1910 and 1960. These floods varied in magnitude and damaged land, homes, businesses, and roads.

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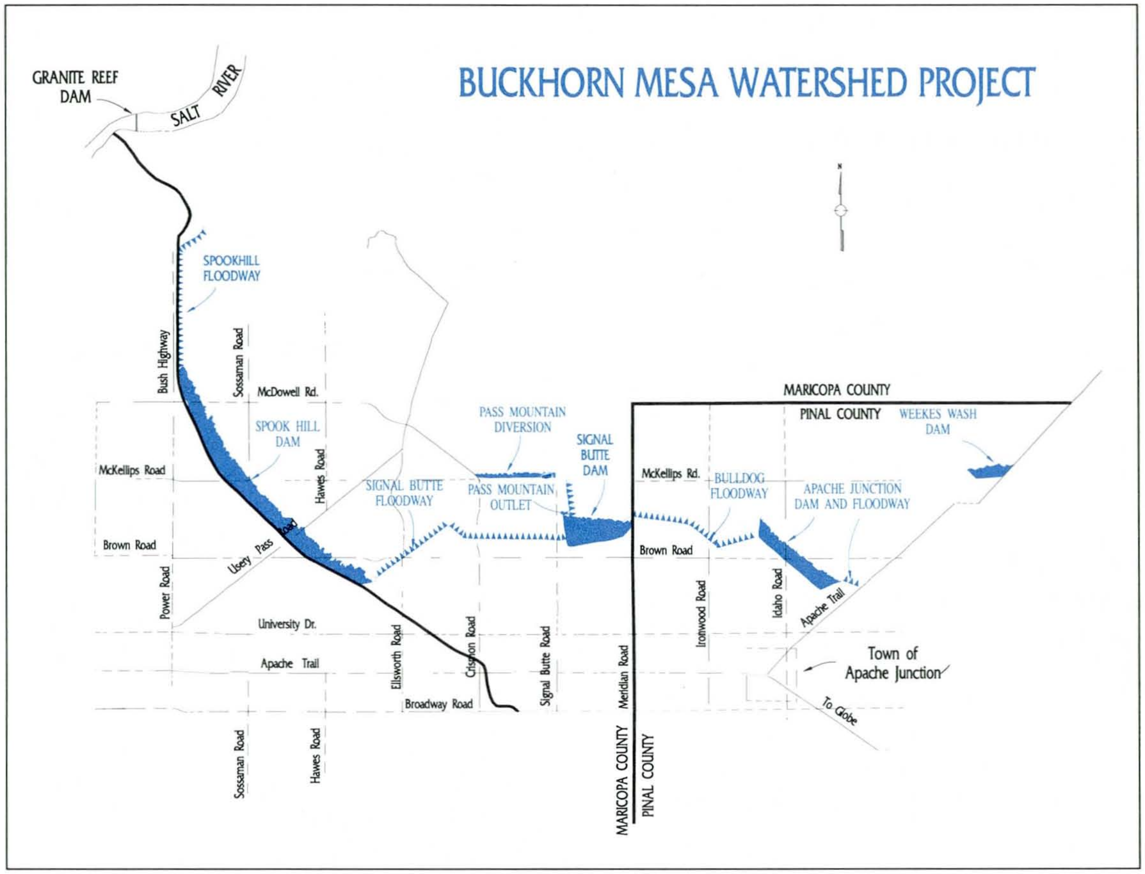

The project was built between 1979 and 1988. In the years between project conception and construction, the area from Mesa east to Apache Junction underwent tremendous growth, increasing the need for flood protection.

PROJECT Features

Apache Junction Dam and Floodway include a 1.6-mile earthen dam and a 1500-foot floodway that diverts floodwater from a wash above the dam and into the reservoir area. The structure drains six square miles north of the Town of Apache Junction.

Bulldog Floodway is 1.7 miles long and transports stormwater impounded behind Apache Junction Dam into the reservoir behind Signal Butte Dam.

Pass Mountain Diversion Dam and Outlet consist of a 1.2-mile earth embankment and a 2,800-foot outlet that drains floodwaters from a four square mile area downstream to the Signal Butte Dam.

Signal Butte Dam and Floodway consist of a 1.3-mile earthen dam and a 2.7-mile floodway that conveys floodwaters discharged from Signal Butte Dam and Pass Mountain Diversion to

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Currently, a remote-control airplane facility is in operation behind the structure. In the future, the Town of Apache Junction has plans to develop an equestrian trail in the vicinity of the Bulldog Floodway. Also, one of the County's larger regional parks, the Usery Mountain Recreation Area, is located on the Buckhorn Mesa Watershed. The park includes an area behind Pass Mountain Diversion.

COSTS and Sponsors

The Soil Conservation Service, an agency of the United States Department of Agriculture, designed and constructed the dams and floodways using federal funds. The Flood Control District of Maricopa County purchased the land rights for the Buckhorn Mesa Watershed Project, relocated utilities and constructed new bridges where the floodways needed to cross beneath roads.

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On the cover: Signal Butte Floodway.

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Another flood control project for Maricopa County

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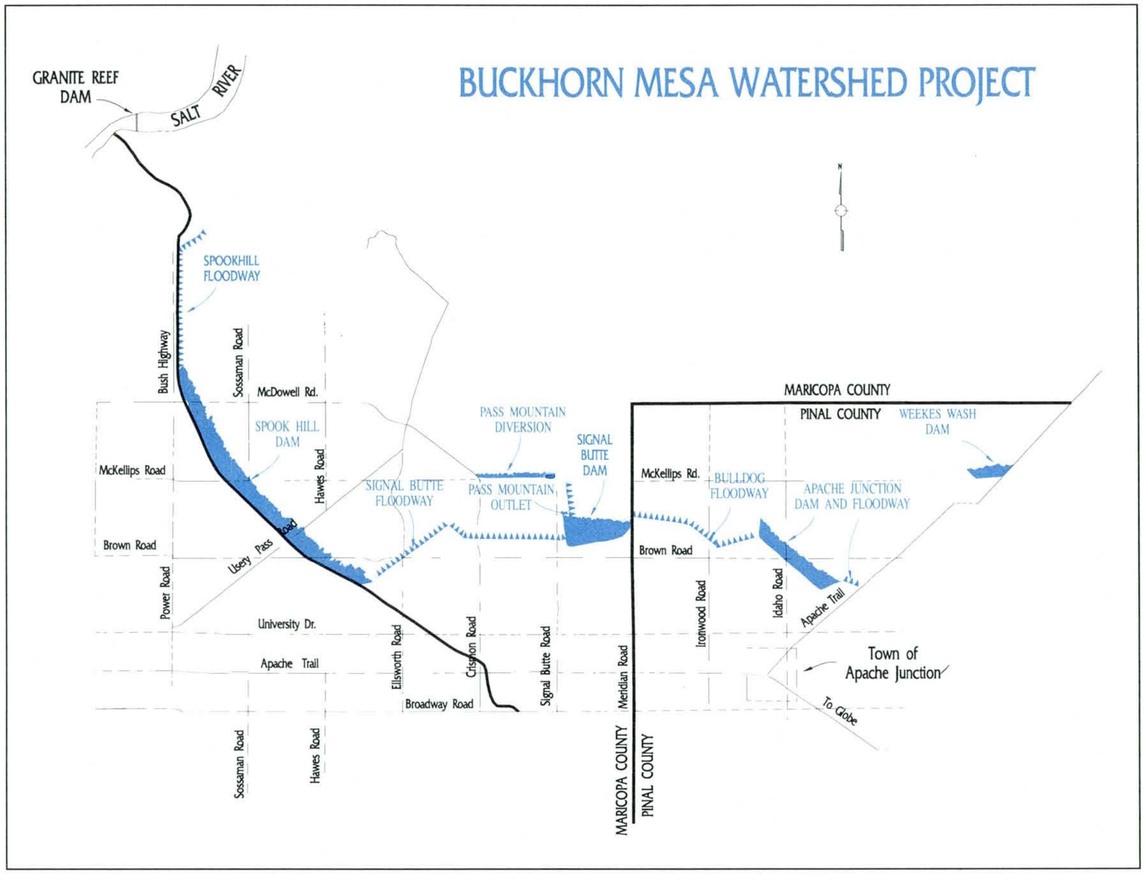

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PROJECT Features

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WATERSHED MAP

U. S. DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

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This FRS will operate independently. Floodwater will be released at a controlled rate from the FRS into Weekes Wash. This water flows towards the Gila River.

In the central section the remaining four FRS will work as a unit to provide flood prevention. Floodwater will be released at a controlled rate from each FRS into a connecting floodway.

The last floodway - Spook Hill Floodway - will outlet into a natural wash which conveys floodwaters to a sediment basin located on the Salt River flood plain. Runoff that originates downslope of these four FRS normally will flow into the Roosevelt Water Conservation District Floodway, which is to be enlarged.

WHAT WILL IT COST?

Individual costs for the project are broken down into five categories: construction, land rights, engineering, relocation payments, and project administration. Estimates of costs are \$20.1 million for construction, \$9.2 million for land rights, \$1.8 million for engineering, \$4,700 for relocation payments, and \$3.9 million for project administration.

WHO CONTRIBUTES?

There are two sources of funds that will finance this project: federal funds and other funds. The federal funds are made available through Public Law 566. The Flood Control District of Maricopa County and the Pinal County Board of Supervisors are responsible for the other funds. The estimated total expenditures are \$9.4 million from other funds and \$25.6 million from Public Law 566 funds. The grand total is \$35 million.

HOW WILL IT BE INSTALLED?

How long will installation take? There are seven phases of installation. Each phase will take at least one year to complete. Therefore, the project should be finished in 1985.

Installation of a structure is broken into five stages: 1. obtain information for design, 2. acquire needed lands, 3. relocate utilities, 4. finalize construction plans, and 5. construct the structure.

HOW DOES CONSTRUCTION AFFECT THE ENVIRONMENT?

In the process of installing the Buckhorn-Mesa Watershed Project, environmental problems will be encountered. Some of these problems are only temporary and can be alleviated during or immediately after installation. For example, blowing dust, caused by the removal of vegetation and the operation of machinery, can be controlled by frequent watering during the construction stage.

But there are some environmental problems that will be permanent if special features are not included in the design and construction stages. One of these is the esthetic problem that construction of a FRS can create. Another problem is scarred, denuded borrow areas which could result from the excavation of earth. The Soil Conservation Service has employed an architectural firm to help find ways to overcome these permanent environmental problems. Landscape architects have developed a design for the Spook Hill FRS. Designs will be developed for other structural measures that will help blend them into the natural terrain. These designs will not interfere with the function of the structures.

WHAT ARE THE BENEFITS?

When completed it is estimated that for every \$1.00 spent \$2.50 in benefits will be realized. In addition residents in the protected area can expect the project to minimize and prevent typical flood scenes such as flooded streets, damaged utilities, costly damages to homes, unsightly sediment and mud that takes time, hard labor, and money to clean up, and flooded agricultural land which results in the loss of crops that may eventually affect the local consumer's pocketbook.

With the completion of the Buckhorn-Mesa Watershed Project, local residents can feel confident that they and their neighborhoods will be provided greater security and protection from the devastation of flash floods so common to Arizona's deserts.

an outlet behind Spookhill Dam. The structure drains 16 square miles above the Apache Trail near the Maricopa-Pinal County Line.

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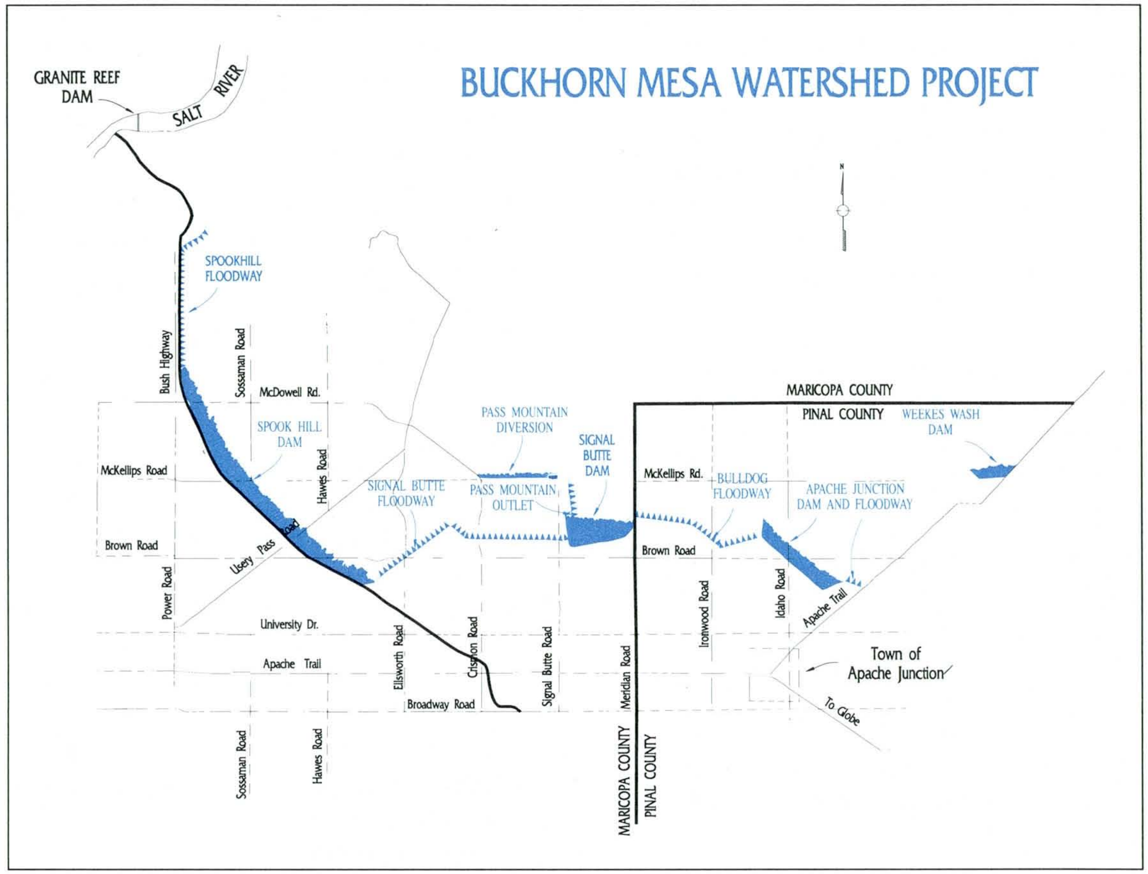

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Project Sponsors and Costs

The Soil Conservation Service, an agency of the United States Department of Agriculture, designed and constructed the dams and channels, using Federal funds.

The Flood Control District of Maricopa County was responsible for purchasing land rights, relocating utilities, and constructing new bridges. The Flood Control District is also responsible for the operation and maintenance of the completed structures.

Other local sponsors were the East Maricopa Natural Resource Conservation District and the Board of Supervisors of Pinal County.

The structures in the Buckhorn-Mesa Watershed are: Spook Hill Dam and Floodway; Signal Butte Floodway; Signal Butte Dam; Pass Mountain Diversion and Outlet; Bulldog Floodway; and Apache Junction Outlet, Dam and Floodway. The construction costs and completion dates for these structures are outlined in the table, opposite.

Because population growth has exacerbated the need for urban improvements, the Flood Control District and the Arizona Department of Transportation are working together so that the Spook Hill rights-of-way can also be used for the Red Mountain Freeway.

For more information, contact:

Public Involvement Coordinator
Flood Control District of
Maricopa County
3335 West Durango Street
Phoenix, Arizona, 85009
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Buckhorn-Mesa Project Costs

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Buckhorn Mesa Watershed Project

Prepared by

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Phoenix, Arizona 85009

(602) 262-1501

Buckhorn-Mesa Watershed Project

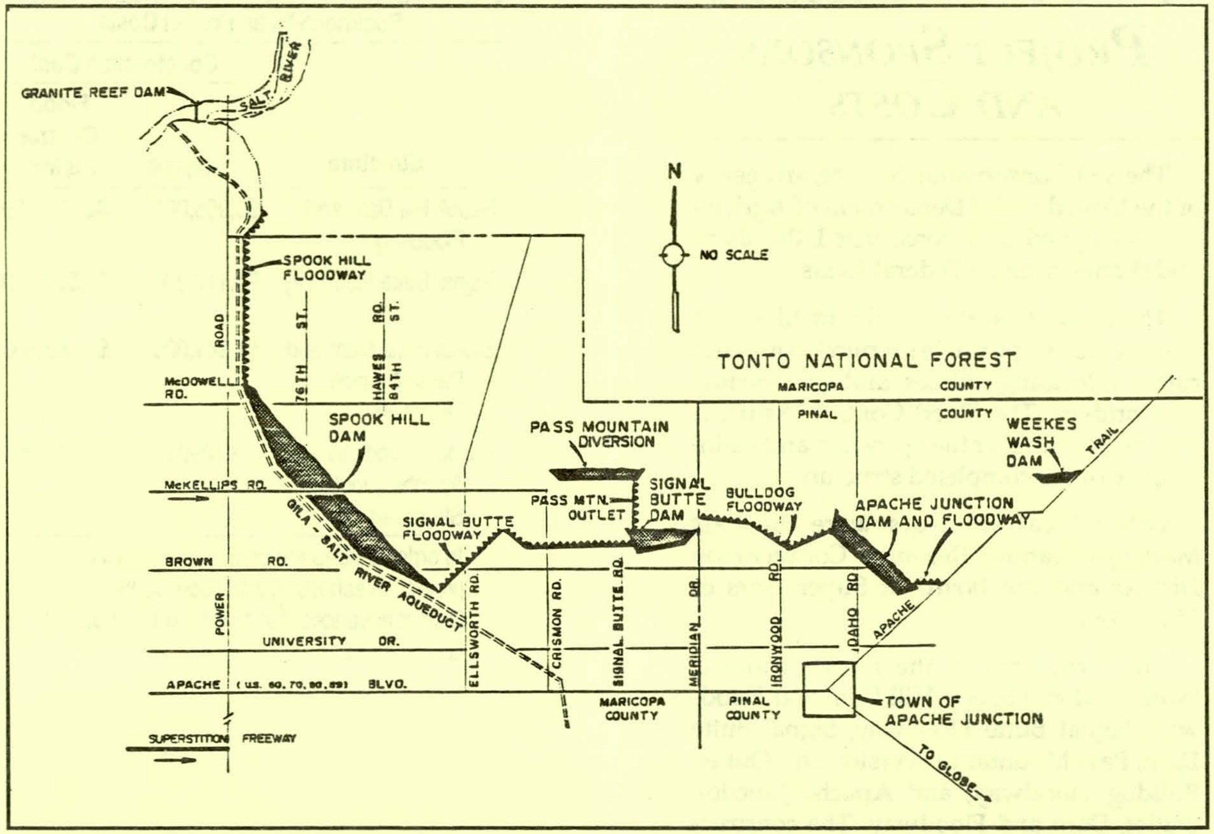
Flooding has been a part of the natural scene in the eastern part of the County since the first settlers established their farms.

As recently as July 1984, localized intensive rainfalls resulted in approximately $2 million in flood damages to residences generally in the area of east Mesa between University Drive and Broadway Road in the vicinity of the Central Arizona Project Aqueduct. At the time of this rainfall, the Signal Butte Floodway and the Central Arizona Project were under construction.

Summer rains are generally associated with thunderstorms that form over the eastern mountains during the afternoon and spread over the valleys in the evening. Rainfall rarely last longer than thirty minutes. Gusty winds and blowing dust usually precede the rain. The "monsoon" season generally starts in early July and ends in early September.

In some years, usually heavy and prolonged rain may fall as a result of weak tropical disturbances moving northward from the Pacific Ocean. These thunderstorms and general storms often produce widespread disastrous flooding. Runoff in 1926, 1930, 1941, 1943, 1954, 1966, 1971, and 1984 caused particularly serious damage.

The 69,172-acre Buckhorn-Mesa Watershed is located in eastern Maricopa and northwestern Pinal Counties. Nearly 60 percent of the watershed is flood prone and 25 percent of the watershed would be inundated by a 100-year flood.



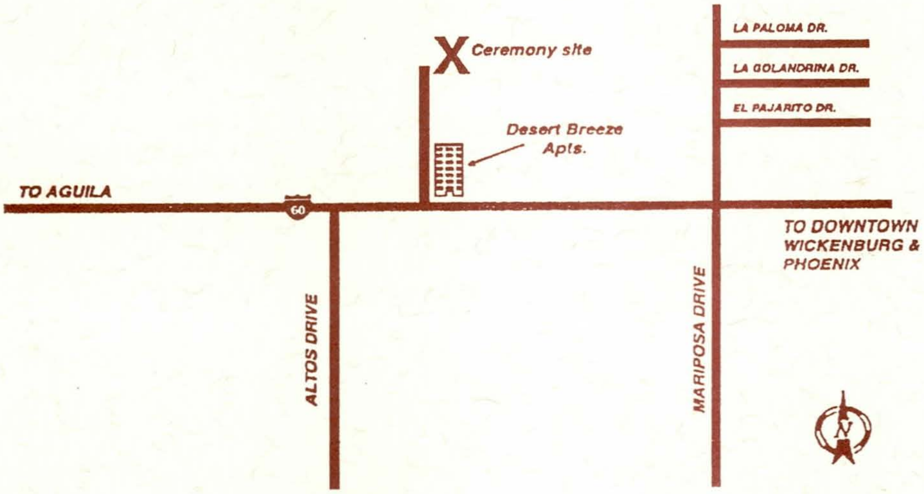
The stormwater falling in the Usery, Goldfield and the western flanks of the Superstition Mountains drains into a wide alluvial fan. Mountain channels have steep grades and high runoff rates. A large volume of water is concentrated in the channels and develops sufficient energy to carry large amounts of sediment. As the water reaches the flatter slopes at the base of the mountains, the velocity of the water decreases rapidly, and the sediment is quickly deposited. The channels become shallower and less defined. Overbank flow occurs, and the water spreads onto the alluvial fan.

In addition to direct damages, there are considerable indirect losses as a result of flooding: traffic is disrupted; businesses lose trade; health hazards are caused by flooded cesspools and ponded water which quickly stagnates and becomes a thriving habitat for mosquitos. Furthermore, a flood during the height of the tourist season can seriously affect the income of those depending on this trade.

The area from Mesa east to Apache Junction is undergoing a tremendous rate of population and development growth. This growth is expected to continue.

Dedication

Casandro Wash Dam and Outfall



The Flood Control District of Maricopa County

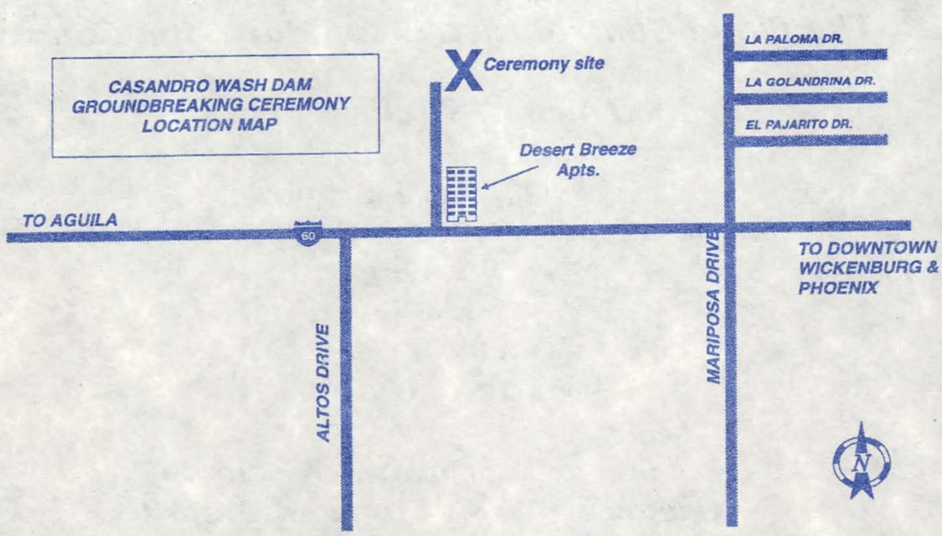
Groundbreaking Ceremony

Casandro Wash Dam and Outfall

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

WICKENBURG, ARIZONA * INCORPORATED JUNE 19TH 1909 *

February 13, 1996

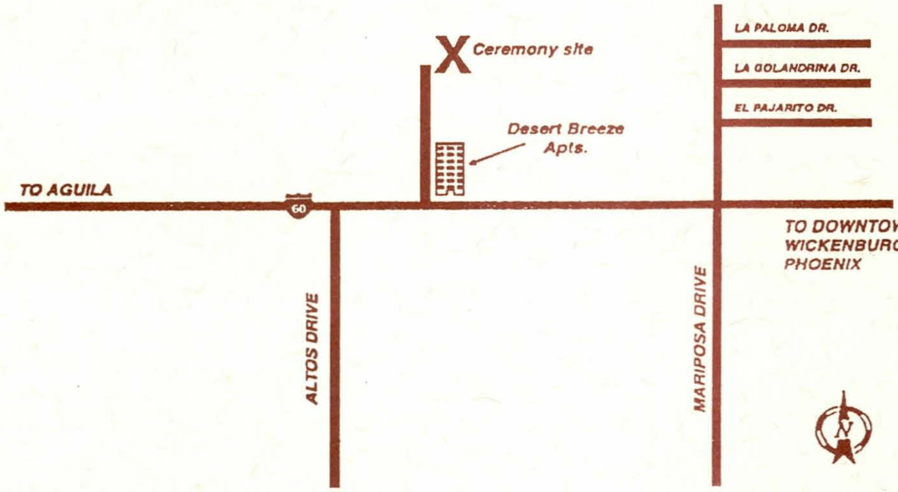


Flood Control District of Maricopa County's Mission:

To reduce flood risks for the people of Maricopa County by providing comprehensive flood and stormwater management services. These services are provided through regulatory activities, master planning, regional coordination, technical assistance, and implementation and maintenance of non-structural and structural projects. Our clients include citizens, municipalities, and other government agencies.

Dedication

Casandro Wash Dam and Outfall



The Flood Control District of Maricopa County

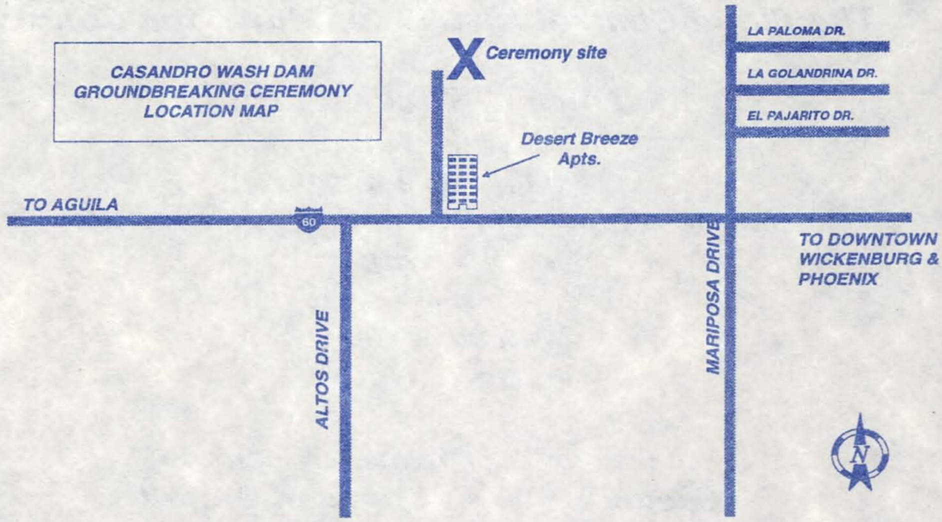
The Flood Control District of Maricopa County
and the
Town of Wickenburg
Cordially invite you to join
Chairman, Maricopa County Board of Supervisors
Ed King
&
Wickenburg Mayor
Rusty Gant
at a dedication ceremony
marking the completion of the
Casandro Wash Dam and Outfall
Thursday, August 29, 1996
9 a.m.
Casandro Wash
behind the Desert Breeze Apartments
854 Wickenburg Way (See map on back)

Refreshments will be served

Groundbreaking Ceremony

Casandro Wash Dam and Outfall

February 13, 1996



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Casandro Wash Dam and Outfall Project

With the completion of Casandro Wash Dam and Outfall Project, nearly 100 homes will no longer be in a designated floodplain area. Future road improvements along Jackson and Mohave streets will also be possible.

Residents along Casandro Wash have weathered flooding, washed out roads and sediment deposits. The Casandro Wash Dam and Outfall Project is designed to protect residents by detaining flows in the wash up to the 100-year maximum flood.

The two-part project consists of a 350-foot-long and 32-foot high earthen dam plus an outfall system beginning approximately 1/2-mile downstream of the dam. The outfall project is currently under construction and consists of two 48-inch diameter storm drains which will capture flows from the wash and convey them underground to Sols Wash above Highway 89.

The Flood Control District of Maricopa County
and the
Town of Wickenburg

Cordially invite you to join
Chairman, Maricopa County Board of Supervisors
Ed King
&
Wickenburg Mayor
Rusty Gant

at the groundbreaking ceremony for
Casandro Wash Dam and Outfall
Tuesday February 13, 1996
10 a.m.

Casandro Wash, behind the Desert Breeze Apartments
located at 854 Wickenburg Way (see map on reverse)

Refreshments

Maricopa County Board of Supervisors/ Flood Control District Board of Directors

Ed King, Chairman, District 4
Tom Rawles, District 1
Don Stapley, District 2
Betsey Bayless, District 3
Mary Rose Wilcox, District 5

Flood Control District Advisory Board

John E. Miller, Jr., Chairman
Melvin Martin, Vice Chairman
Ron Wheat, Secretary
Gilbert "Shag" Rogers, Member
Samuel K. Wu, Member
Paul Cherrington, Ex-Officio Member, Salt River Project
James Matteson, Ex-Officio Member, City of Phoenix

Town of Wickenburg

Rusty Gant, Mayor
Carol Ann Beard, Vice Mayor
Garth Brown, Council Member
Cheryl Burgess, Council Member
Daniel Conly, Council Member
Larry Roberts, Council Member
Lois Walters, Council Member

Groundbreaking Ceremony

Casandro Wash Dam and Outfall

10 :00 a.m., Tuesday
February 13, 1996

Casandro Wash Dam and Outfall Project

With the completion of Casandro Wash Dam and Outfall Project, nearly 100 homes will no longer be in a designated floodplain area. Future road improvements along Jackson and Mohave Streets will now be possible.

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Casandro Wash Dam

Sponsor: Flood Control District
Partner: Town of Wickenburg
Designed by: CH2M Hill
Contractor: Roy E. Ladd, Inc.
Cost: $1.2 million

Staff

Michael Lopez, P.E., Project Manager
Thomas Johnson, P.E., Construction Engineer
Shewa Shivaswamy, P.E., Resident Engineer
Warren Rosebraugh, P.E., Geotechnical Review
Ray Warriner/Chris Banks, Land Acquisition
Doug McLaughlin, Relocations
Catesby Moore/Bill Knight, Environmental
Dave Meinhart, Environmental Permitting

Casandro Wash Outfall

Sponsor: Flood Control District
Partner: Town of Wickenburg
Designed by: Flood Control District
Contractor: B & F Contracting, Inc.
Cost: $750,000

Staff

Michael Lopez, P.E., Project Manager
Thomas Johnson, P.E., Construction Engineer
Shewa Shivaswamy, P.E., Resident Engineer
Sandy Story, Hydrology
Raju Shah, P.E., Hydraulics
Kumar Hanumaiah, P.E., Structural Design
Gary Shapiro/Francis Crosby, Plan Development
Marta Dent, Mapping
Duke Yager, Inspection

Stanley L. Smith Jr., P.E., Interim Chief Engineer and General Manager

Program

MASTER OF CEREMONIES	***The Honorable Ed King*** *Chairman, Board of Supervisors, District 4*
COLOR GUARD	***American Legion*** *Kellis Draper Post #12*
NATIONAL ANTHEM	
PLEDGE OF ALLEGIANCE	***John E. Miller, Jr.*** *Chairman, Flood Control Dist. Advisory Boar*
INVOCATION	***Robert Goldenberg*** *Wickenburg Police Chaplain*
INTRODUCTION OF DISTINGUISHED GUESTS	***Chairman King***
REMARKS	***Jim McArthur*** *Former Council Member, Town of Wickenburg*
	The Honorable Carol Ann Beard *Vice Mayor, Town of Wickenburg*
	The Honorable Rusty Gant *Mayor, Town of Wickenburg*
	Chairman King
GROUNDBREAKING	
REFRESHMENTS	

Casandro Wash Dam and Outfall Project
Wickenburg, Arizona

By

Michael A. Lopez, P.E.

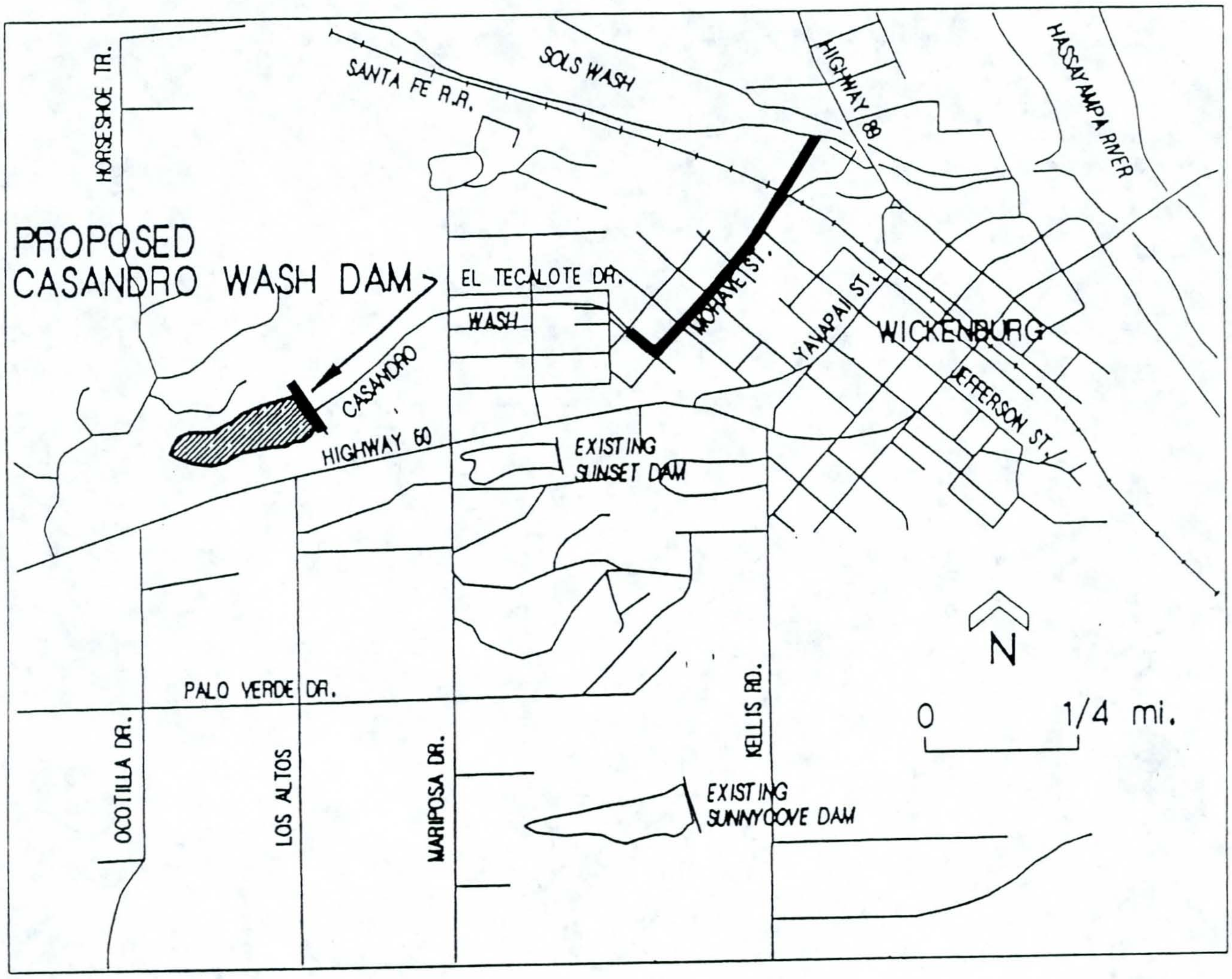
This project was first identified in the DISTRICT's Comprehensive Flood Control Program Report for Maricopa County dated 1963 to remove residents that live along Casandro Wash from the 100-year floodplain. The District entered an Intergovernmental Agreement between the District and the Town of Wickenburg in 1994. The Agreement identifies and defines each parties responsibilities for cost-sharing in the PROJECT.

Casandro Wash originates in the Vulture Mountains, located west of the Town of Wickenburg, is approximately three (3) miles in length. The one hundred (100) year discharge from this watershed is approximately 1800 cfs at Mariposa Drive, and its delineated floodplain includes ninety eight(98) residences and one(1) public building. The project is designed to attenuate the flows that are generated from rain that falls on the wash's contributing watershed which measures approximately 1.23 square miles. The project has been divided into two independent elements: (1) an earthen fill dam to be located approximately 1500 feet west of Mariposa Drive (DAM) in Casandro Wash and (2) an outfall system will collect flows from the dam's principal discharge outlet and runoff that falls downstream of the dam and convey those flows to Sol's Wash (OUTFALL). The Outfall begins approximately one-half mile downstream of the dam at the damage site which is a residential neighborhood that is located along the wash. The wash's flow path follows the alignment of roadways in the neighborhood before it outfalls into Sols Wash. Flows through the neighborhood not only cause flood damage, they also restrict emergency vehicles and residents from getting into and out of their residences.

For More Information Contact:

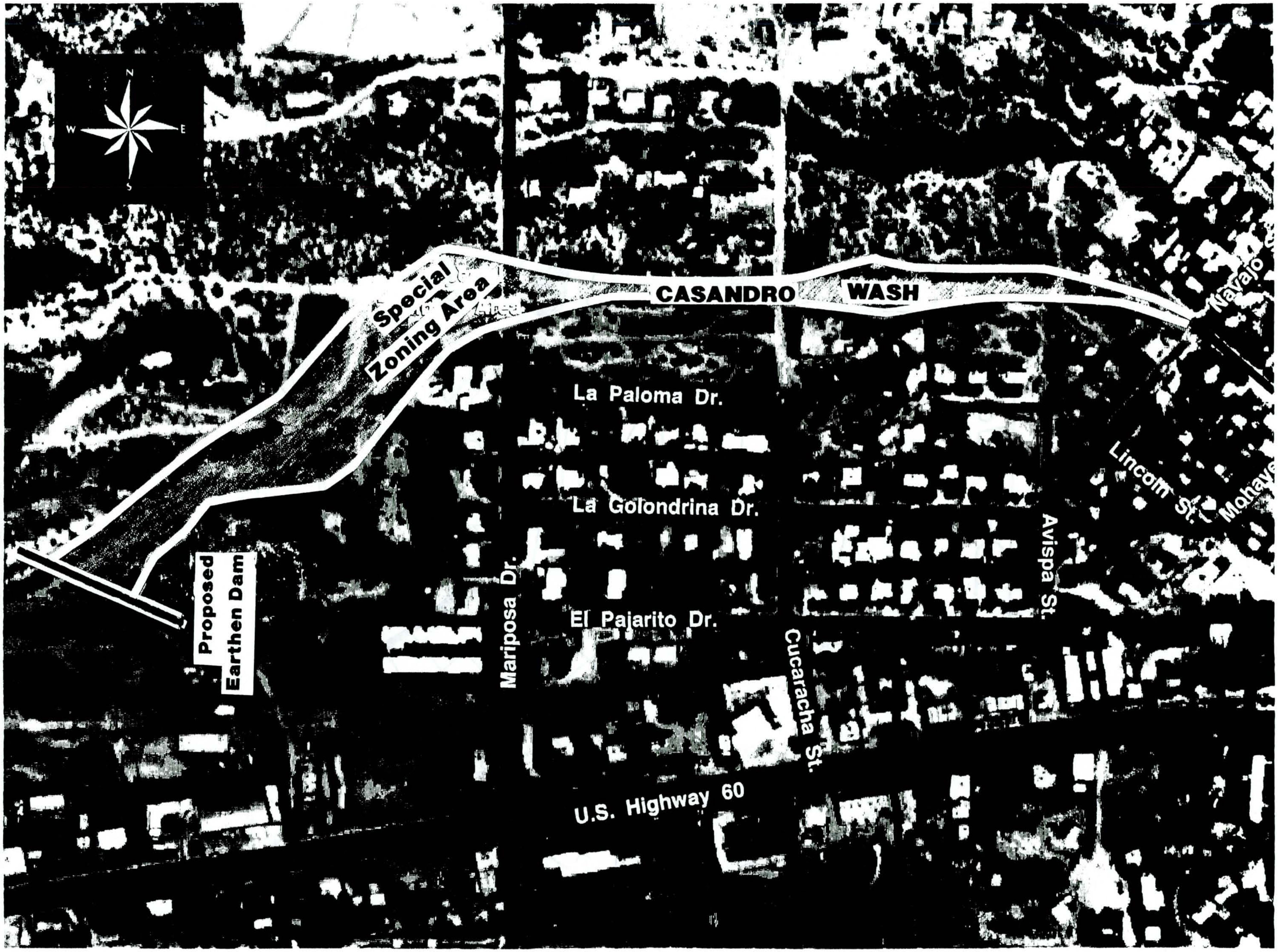
Flood Control District of Maricopa County
2801 West Durango
Phoenix, Arizona 85009
(602) 770-3500

Michael is employed with the Flood Control District of Maricopa County where he is the Branch Manager of the Civil/Structures Branch. He obtained his B.S. degree in Civil Engineering at New Mexico State University in 1984. Prior to joining the District, Mr. Lopez worked as an engineering consultant for nine years and managed and designed numerous flood control and drainage projects.



PROJECT SITE

Exhibit B



N
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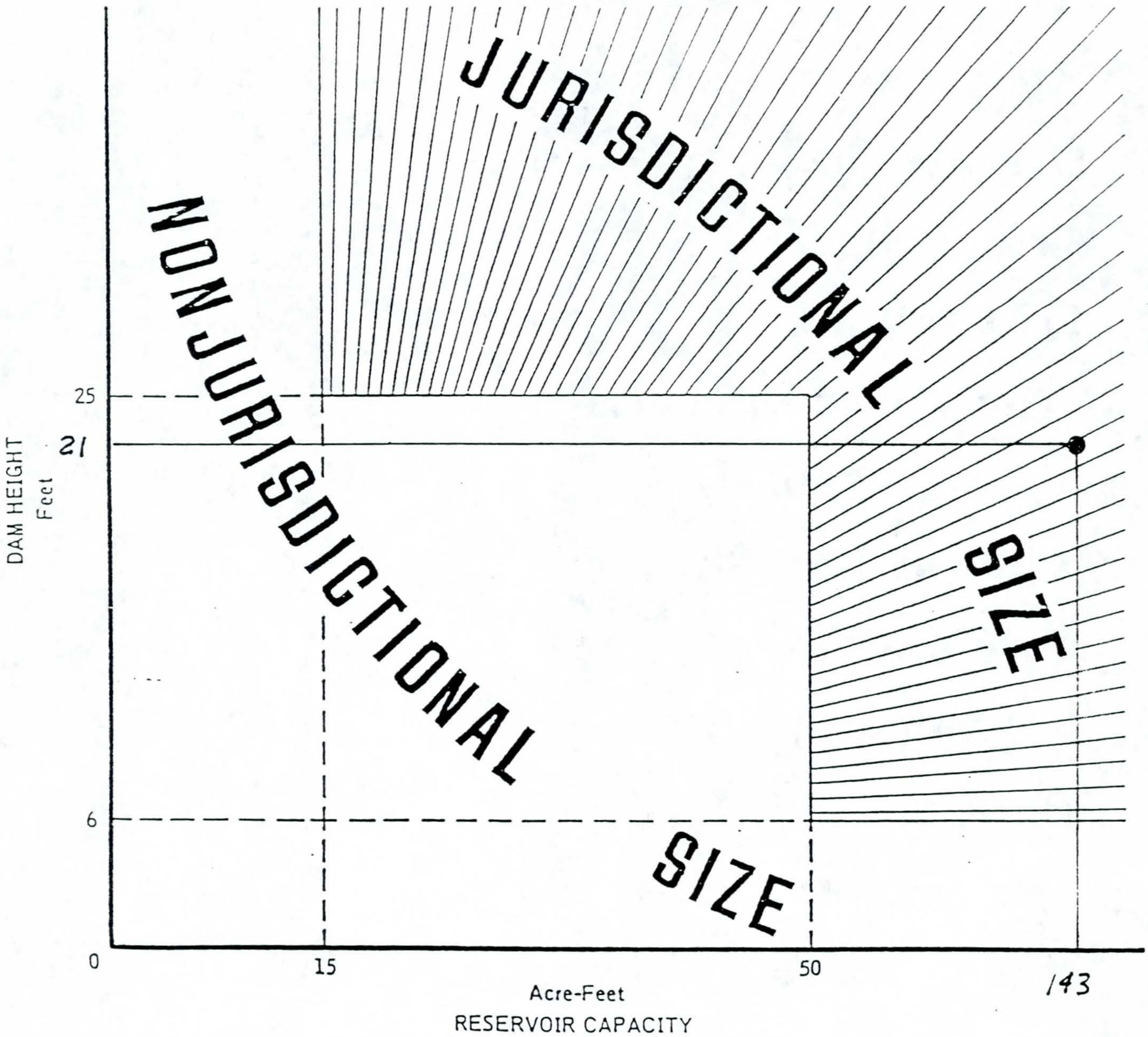
W
Special Zoning Area
CASANDRO WASH
Navajo
La Paloma Dr.
La Golondrina Dr.
El Pajarito Dr.
Mariposa Dr.
Avispa St.
Cucaracha St.
Lincom St.
Mohave
Proposed Earthen Dam
U.S. Highway 60

FLOOD CONTROL DISTRICT
of Maricopa County

Casandro Wash Dam and Outfall Project

Wickenburg, Arizona

STATE OF ARIZONA
DEPARTMENT OF WATER RESOURCES
DIVISION OF SAFETY OF DAMS



A JURISDICTIONAL DAM is either twenty-five feet or more in height or stores more than fifty acre-feet. If it is less than six feet in height regardless of storage capacity or does not store more than fifteen acre-feet regardless of height, it is not in jurisdiction.

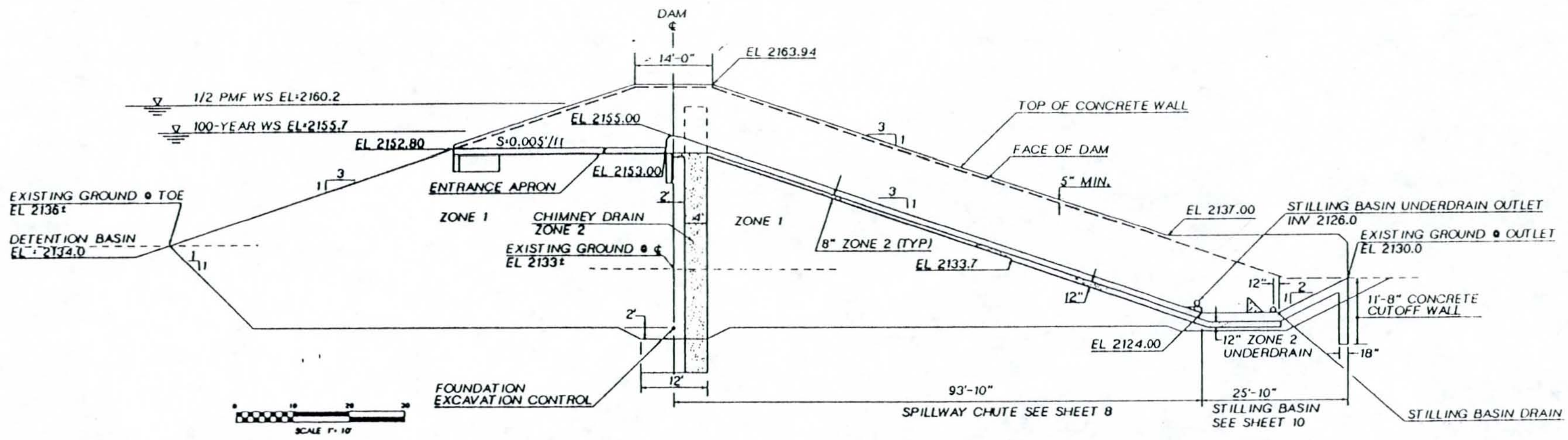
THE HEIGHT is the vertical distance from the lowest elevation of the outside limit of the dam at its intersection with the natural ground surface to the spillway crest elevation.

THE CAPACITY is the maximum storage, in acre-feet which can be impounded by the dam when there is no discharge of water.

Project Features

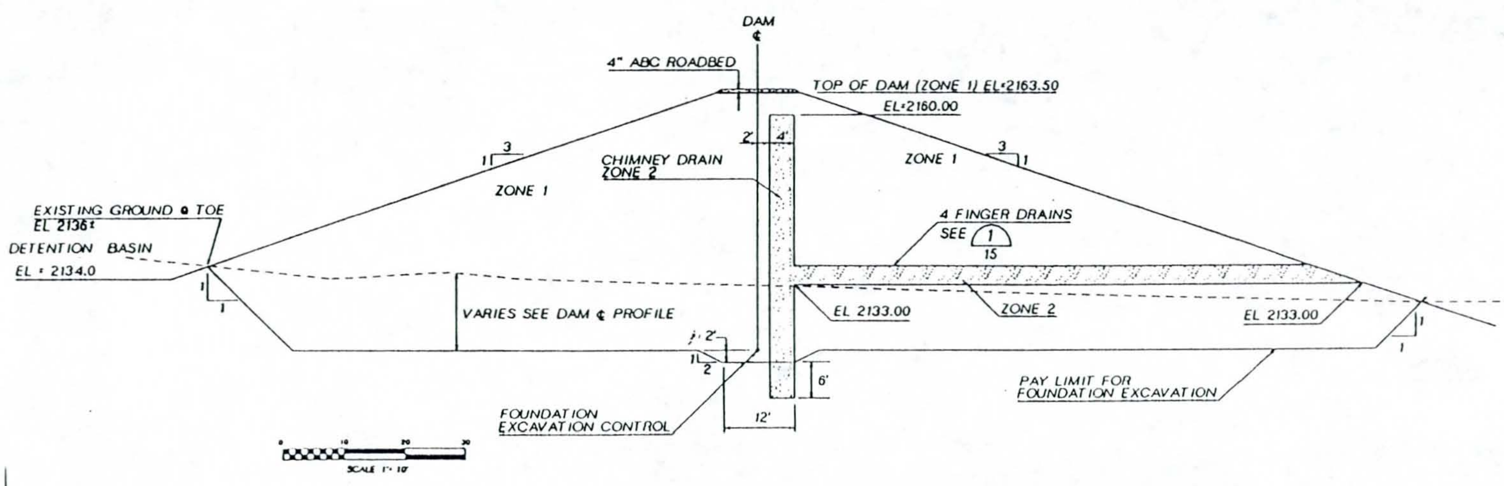
Flood Storage Capacity	143 Ac-Ft
Dam Height:	32.5 Ft
Crest Length:	350 Ft
Peak Inflow:	1,769 cfs
Peak 100-yr Discharge:	150 cfs
Spillway Capacity:	3,700 cfs*
Spillway Length:	80 ft
Type of Dam:	Homogeneous
Impoundment Area:	14 Acres
Principal Outlet:	36" RCP
Drain Time:	10 days
Stilling Basin:	Type III (USBR)
Classification:	small, high hazard

* routed ½ PMF according to classification



SECTION 0/5

DAM SECTION AT SPILLWAY



SECTION P/5

DAM SECTION AT OUTSIDE SPILLWAY

Casandro Wash Dam and Outfall

- Desert Greenbelt
- Rittenhouse Channelization
- Gilbert Basin
-

Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, Arizona 85009
(602) 506-1501
(602) 506-4601 (FAX)

FACT SHEET

PROJECT: **Casandro Wash Dam**

Project Sponsors:

- **Town of Wickenburg:**

Responsible for granting easements for use of town owned R/W and utility easements at no cost to the District

- **Flood Control District:**

Responsible for the design, utility relocation and construction and management of project. Also responsible for obtaining all permits under section 401 and 404 of the Clean Water Act for construction of the project. The District will also maintain and operate the complete project.

Contract Data:

Contract Amount	-	$1,241,698.00
Contractor	-	Roy E. Ladd, Inc.
Designer	-	CH2M Hill
Construction Management	-	Construction and Maintenance Division Flood Control District
Notice to Proceed	-	January 7, 1996
Duration	-	180 calendar days
Contract Completion Date	-	July 5, 1996

Project Features:

Flood Storage Capacity	-	143 Acre Feet
Dam Height	-	32.50 Feet
Crest Length	-	350 Feet
Peak in flow	-	1769 CFS
Peak 100 Yr. Discharge	-	150 CFS
Spillway Length	-	80 feet
Impounded Area	-	14 Acres
Principal Outlet	-	36" Diameter reinforced concrete pipe
Drain Time	-	10 Days

CS941255

INTERGOVERNMENTAL AGREEMENT
For the Design, Construction and Maintenance
of the CASANDRO WASH DAM and OUTLET SYSTEM
Between
The Town of Wickenburg
and
The Flood Control District of Maricopa County

IGA FCD - 93009

This Agreement is entered into by and between the FLOOD CONTROL DISTRICT OF MARICOPA COUNTY, a municipal corporation and political subdivision of the State of Arizona, acting by and through its Board of Directors (DISTRICT) and the TOWN OF WICKENBURG, acting by and through its Town Council (WICKENBURG).

This Agreement shall become effective as of the date it is filed with the Maricopa County Recorder pursuant to Arizona Revised Statutes (A.R.S.) 11-952, as amended.

DATE FILED WITH MARICOPA COUNTY RECORDER 5/12/94 94-0384147

1. The DISTRICT is empowered by Arizona Revised Statutes Section 48-3603 to enter into this Agreement and has authorized the undersigned to execute this Agreement on behalf of the DISTRICT.

2. WICKENBURG is empowered by Arizona Revised Statutes Section 48-572 and Town Charter, Chapter 2 Section 2 to enter into this Agreement.

BACKGROUND

3. Casandro Wash Dam was identified in the DISTRICT's Comprehensive Flood Control Program Report for Maricopa County dated 1963 to remove residents of the Town of WICKENBURG along Casandro Wash from the 100-year floodplain.

4. In 1980, the Community Development Agency for the County conducted a study recommending that an earthen fill dam be constructed on Casandro Wash.

5. The DISTRICT commissioned a drainage study of WICKENBURG in FY 90/91 titled "Wickenburg Area Drainage Master Study." The study identified and delineated approximately 120 miles of new floodplains in the WICKENBURG area.

6. The U.S. Army Corps of Engineers conducted a Reconnaissance (Recon) study, Hassayampa River Near Wickenburg, Arizona dated January 1993. The study recommended the construction of a dam on Casandro Wash to eliminate flooding along Casandro Wash and to remove approximately ninety eight (98) structures from the 100-year floodplain. The economic analysis performed in the Recon study reported a positive benefit-cost ratio for the project, but the project did not meet all of the criteria required for federal funding.

7. Both the DISTRICT and WICKENBURG desire to work together and share in the costs and responsibilities for the planning and construction of the Casandro Wash Dam. The Casandro Wash Dam Project is comprised of two distinct features: (1) an earthen fill dam and emergency spillway to be located approximately 1500 feet west of Mariposa Drive (DAM) and (2) an outfall system that will collect flows from the dam's principal discharge outlet and convey flows to Sol's Wash (OUTFALL SYSTEM). The OUTFALL SYSTEM will begin near the intersection of Navajo and Jackson Streets. The features of this project are detailed on Exhibit A and are hereinafter called the PROJECT. The estimated cost of the PROJECT is $4.0 million.

PURPOSE OF THE AGREEMENT

8. The purpose of this Agreement is to identify and define the responsibilities of the DISTRICT and WICKENBURG for cost-sharing in the design, construction, construction management, utility relocation, maintenance, and land acquisition of the PROJECT.

TERMS OF THE AGREEMENT

9 WICKENBURG will:

9.1. Review and approve the PROJECT plans and specifications designed by the DISTRICT within thirty (30) days of receipt and submit its approval to the DISTRICT or notify the DISTRICT of their concerns.

9.2. Grant easements for use of Town-owned rights-of-way and utility easements at no cost to the DISTRICT to construct, maintain and operate the PROJECT.

9.3. Operate and maintain the OUTFALL SYSTEM at its sole expense. The DISTRICT has the option to inspect and repair and/or maintain the OUTFALL SYSTEM if WICKENBURG fails to take action within sixty (60) days of written notification by the DISTRICT of failure to repair and maintain the OUTFALL SYSTEM. WICKENBURG shall reimburse the DISTRICT for actual costs incurred by the DISTRICT for any such repair or maintenance within ninety (90) days of invoice.

9.4. Adopt a special zoning district to prohibit the building of any permanent structures in the spillway area below Casandro Wash Dam and in the streambed of the existing wash between Mariposa Drive and Navajo Street, as defined in Exhibit B attached hereto and made a part hereof by reference. Other uses may be allowed in this special zoning district as long as they do not restrict the flows from the dam and the surrounding area. This ordinance shall be proposed and adopted prior to the start of construction and shall remain in place for the life of the structure.

9.5. Reimburse the DISTRICT one hundred percent(100%) of the construction cost for drainage components to collect local runoff and discharge into the OUTFALL SYSTEM that are not pertinent to the outfall system other than pipe tees, connector pipes, pipe collars, and pipe plugs, as determined by the DISTRICT (i.e., catch basins, grates, etc.), within thirty (30) days of receipt of an invoice for actual costs.

9.6. Waive all permit fees for the construction of the PROJECT.

9.7. Maintain all drainage pipes or structures that are part of the drainage components that discharge into the PROJECT from WICKENBURG owned or controlled rights-of-way.

9.8. Obtain written permission of the DISTRICT to increase the future flows that discharge into the OUTFALL SYSTEM beyond those amounts designed by the DISTRICT.

9.9. Conduct and/or participate in all of the public involvement activities organized by the DISTRICT concerning the PROJECT, and provide the meeting place at no cost to the DISTRICT.

9.10. Take all required actions within its authority to ensure that waters discharged into the PROJECT from lands owned or regulated by WICKENBURG comply with any applicable requirements of the Clean Water Act or any other applicable discharge requirements, including any permit requirements.

10. The DISTRICT will:

10.1. Obtain all necessary permits required under Sections 401 and 404 of the Clean Water Act for the construction of the PROJECT.

10.2. Obtain all necessary permits and licenses required from Arizona Department of Water Resources for the construction and operation of the PROJECT, and operate and maintain the PROJECT except for the OUTFALL SYSTEM.

10.3. Acquire rights-of-way necessary for the construction and operation of the PROJECT.

10.4. Be the contracting agency and perform all services necessary to administer the construction of the PROJECT.

10.5. Not assume responsibility for the operation or maintenance of the OUTFALL SYSTEM of the project at any time or liability from any damages that may occur from the OUTFALL SYSTEM not functioning because of lack of maintenance, but shall have the authority to perform such services that are not done by WICKENBURG and invoice WICKENBURG for said services.

10.6. Participate in public involvement activities organized and conducted by the WICKENBURG concerning the PROJECT.

10.7. Bear the total cost for design, rights-of-way (not owned by WICKENBURG), utility relocation, construction, and construction management associated with the PROJECT except for any non-flood control related items such as recreational amenities, landscaping beyond PROJECT requirements, etc.

10.8. Not be responsible for the operation and maintenance of aesthetic features, recreational features or non-flood control-related landscaping associated with the PROJECT.

10.9. Reserve the right to review and approve any on-site lateral drainage or flood control projects to be constructed by WICKENBURG that will flow into the PROJECT to ensure that the design capacity is not exceeded.

11. Each party to this Agreement (indemnitor) shall, to the extent legally permissible by law, indemnify, defend and save harmless the others (indemnitees) including, agents, officers, directors, governors and employees thereof, from and against any loss or expense incurred as a result of any claim or suit of any nature whatsoever which arises out of indemnitor's acts or omissions pursuant to this agreement. Such indemnification obligation shall encompass any personal injury, death or property damages resulting from the indemnitor's acts or omissions, as well as reasonable attorney's fees, court costs, and other expenses relating to the defense against claims or litigation, incurred by the indemnitees. Indemnitees shall be liable for their own negligence or wrongful acts as provided by law.

12. Each party to this Agreement will pay for and not seek reimbursement for its own personnel and administrative costs associated with design, rights-of-way/easement acquisition, permitting, coordination, review, construction, inspection, management and administration of the PROJECT.

13. This Agreement shall remain in force and effect for a period of ninety nine (99) years from the effective date of the contract, provided, however that this Agreement may be terminated by either party upon 30 days written notice to the other party but only after the parties have paid their respective amounts accrued or obligated to third parties as of the date of termination.

14. This Agreement is subject to cancellation by either party pursuant to the provisions of Section 38-511, Arizona Revised Statutes (A.R.S.).

15. All notices or demands upon any party to this agreement shall be in writing and shall be delivered in person or sent by mail addressed as follows:

Flood Control District
of Maricopa County
Chief, Planning Branch
3335 West Durango
Phoenix, AZ 85009

Town of Wickenburg
Town Manager
P.O. Box 1269
Wickenburg, AZ 85358

16. Attached hereto and incorporated herein is a copy of the written determination of each party's legal counsel that the parties are authorized under the laws of this State to enter into this Agreement and that the Agreement is in proper form.

IN WITNESS WHEREOF, the parties have executed this agreement the day and year first above written.

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
a Municipal Corporation

Recommended by:

4/1/94
Neil S. Erwin, P.E. Date
Chief Engineer and General Manager

Approved and Accepted:

By: MAY 04 1994
Chairman, Board of Directors Date

Attest:

By: MAY 04 1994
Clerk of the Board Date

This Intergovernmental Agreement, FCD 93009, has been reviewed pursuant to Arizona Revised Statutes 11-952, as amended, by the undersigned General Counsel, who has determined that it is in proper form and within the powers and authority granted to the Flood Control District of Maricopa County under the laws of the State of Arizona.

By: Julie M. Lemmon 4/4/94
General Counsel Date

TOWN OF WICKENBURG
a Municipal Corporation

Dallas C. Gant, Mayor

By: Dallas Gant Date

Attest:

By: Edna Grieves Date 3/16/94
Town Clerk

The foregoing Intergovernmental Agreement, FCD 93009, ~~has~~ been reviewed pursuant to Arizona Revised Statutes 11-952, as amended, by the undersigned attorney who has determined that it is in proper form and within the powers and authority granted to ~~the City of Phoenix~~ Town of Wickenburg under the laws of the State of Arizona.

By: Harry E Craig 3/15/94
Town Attorney Date

Exhibit A

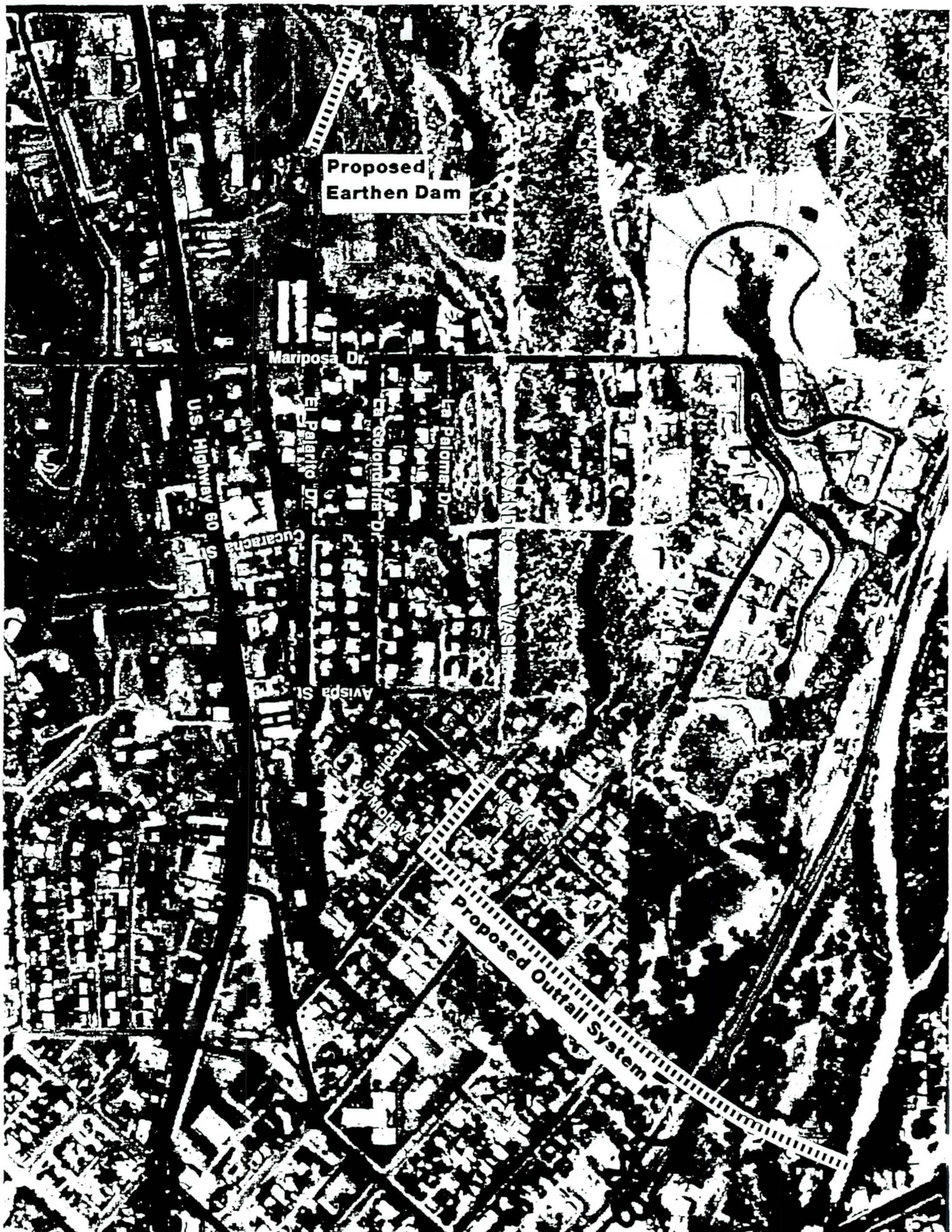
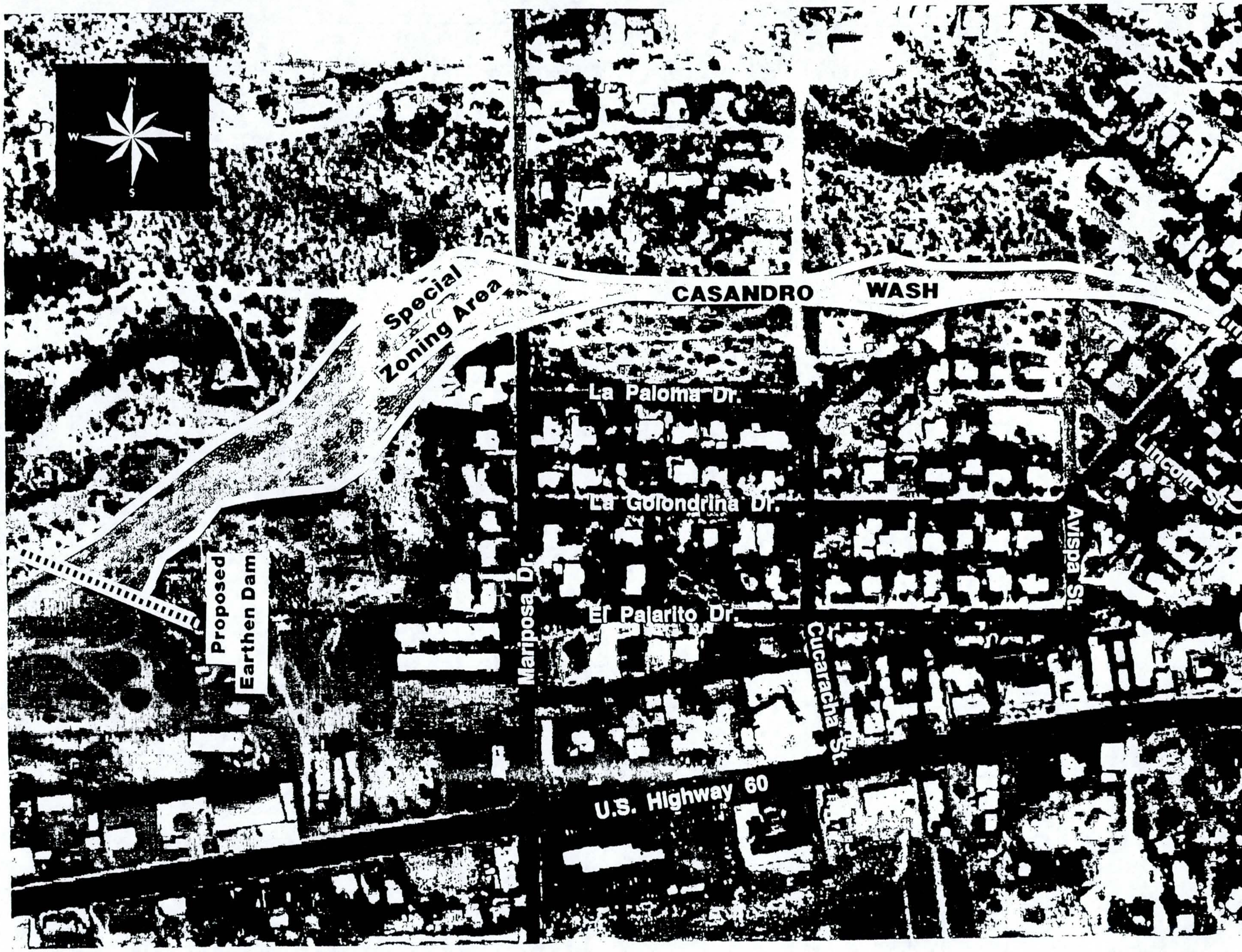

Proposed Earthen Dam
Mariposa Dr.
El Palarito Dr.
La Golondrina Dr.
La Paloma Dr.
CASANDRO WASH
U.S. Highway 60
Cucaracha St.
Avispa St.
Lincoln St.
Mohave
Navajo St.
Proposed Outfall System

Exhibit B



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Special
Zoning Area
CASANDRO WASH
La Paloma Dr.
La Golondrina Dr.
El Pajarito Dr.
Mariposa Dr.
Cucaracha St.
Avispa St.
Lincoln St.
Proposed
Earthen Dam
U.S. Highway 60

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

AGENDA FORM

Contract/Lease for ☐ NEW ☐ RENEWAL ☐ AMENDMENT ☐ CANCELLATION
(for existing, record Encumbrance No. below)

LOW ORG. NO. 6900 DEPARTMENT. Flood Control District CONTROL NUMBER. FCD-1563

ENCUMBRANCE NO. CS941255 AGENCY: ______ CONTROL NUMBER PW-109

1. BRIEF DESCRIPTION OF PROPOSAL AND REQUESTED BOARD ACTION: It is requested that the Board of Directors approve Intergovernmental Agreement (IGA) FCD-93009 with the Town of Wickenburg (Town) for construction, acquisition of rights-of-way, operation and maintenance of the Casandro Wash Dam and outfall system (Project). The Project consists of constructing an earth fill dam upstream (west) of Mariposa Drive on Casandro Wash and an outfall system consisting of a closed conduit to capture local runoff and the discharge from the dam at the intersection of Casandro Wash and Navajo Street and convey the flows to Sol's Wash, approximately 2,400 feet. The Project will provide protection from the 100-year storm event to the homes downstream of the dam. The estimated cost of the Project is $4,040,000 with the Town providing maintenance of the outfall system.

The Board of Directors approved and signed Resolution FCD 93-04 which authorizes the Flood Control District to negotiate an intergovernmental agreement with the Town for the Casandro Wash Dam Project. The Flood Control Advisory Board approved IGA FCD-93009 during their April 1994 meeting.

2. COMPLIANCE WITH MARICOPA COUNTY PROCUREMENT CODE 10 (article) MC1-1004 (paragraph) David A. Brzovely (Procurement Officer)

SOLE SOURCE JUSTIFICATION ______

3. CONTINUED FROM MEETING OF ______

DISCUSSED IN MEETING OF ______

4. ☐ **THIS DEPARTMENT WILL CAUSE PUBLICATION**

☐ **CLERK OF THE BOARD TO CAUSE PUBLICATION**

5. MOTION: It is moved that the Flood Control District of Maricopa County Board of Directors . . . approve and sign Intergovernmental Agreement FCD-93009 authorizing the Flood Control District to participate with the Town of Wickenburg (Town) in the Casandro Wash Dam Project. The total estimated cost of the Project is $4,040,000 to be funded by the District with the Town providing maintenance of the outfall system.

6. FINANCIAL: ☒ Expenditure ☐ Revenue ☒ Budgeted ☐ Contingency ☐ Budget Amendment ☐ Transfer ☐ Grant or other

200,000 FY93-94
740 000 FY94-95
1 500 000 FY 95-96 CIP
$ 1 600,000 FY 96-97 FLOOD
4040,000 Total TOTAL — Fund

Financial Officer: [signature] Date: 4-11-94

7. PERSONNEL: ______ Personnel Director ______ Date

8. FLOOD CONTROL DISTRICT: [signature] Action Recommended by — Date: 4-4-94

9. MATERIALS MANAGEMENT:

A. ______ Materials Management Director ______ Date

B. ______ W/MBE Representative ______ Date

10. LEGAL: Approved as to form and within the powers and authority granted under the laws of the state of Arizona to the Flood Control District of Maricopa County Board of Directors.

Julie M. Lemmon — General Counsel — Date: 4/4/94

11. OTHER: ______ Signature ______ Date

12. APPROVED FOR AGENDA: [signature] Approving Official — Date: 4-4-94

13. OTHER: ______ Signature ______ Date

15. RECOMMENDATION OF COUNTY MANAGER: ☒ Approve ☐ Disapprove

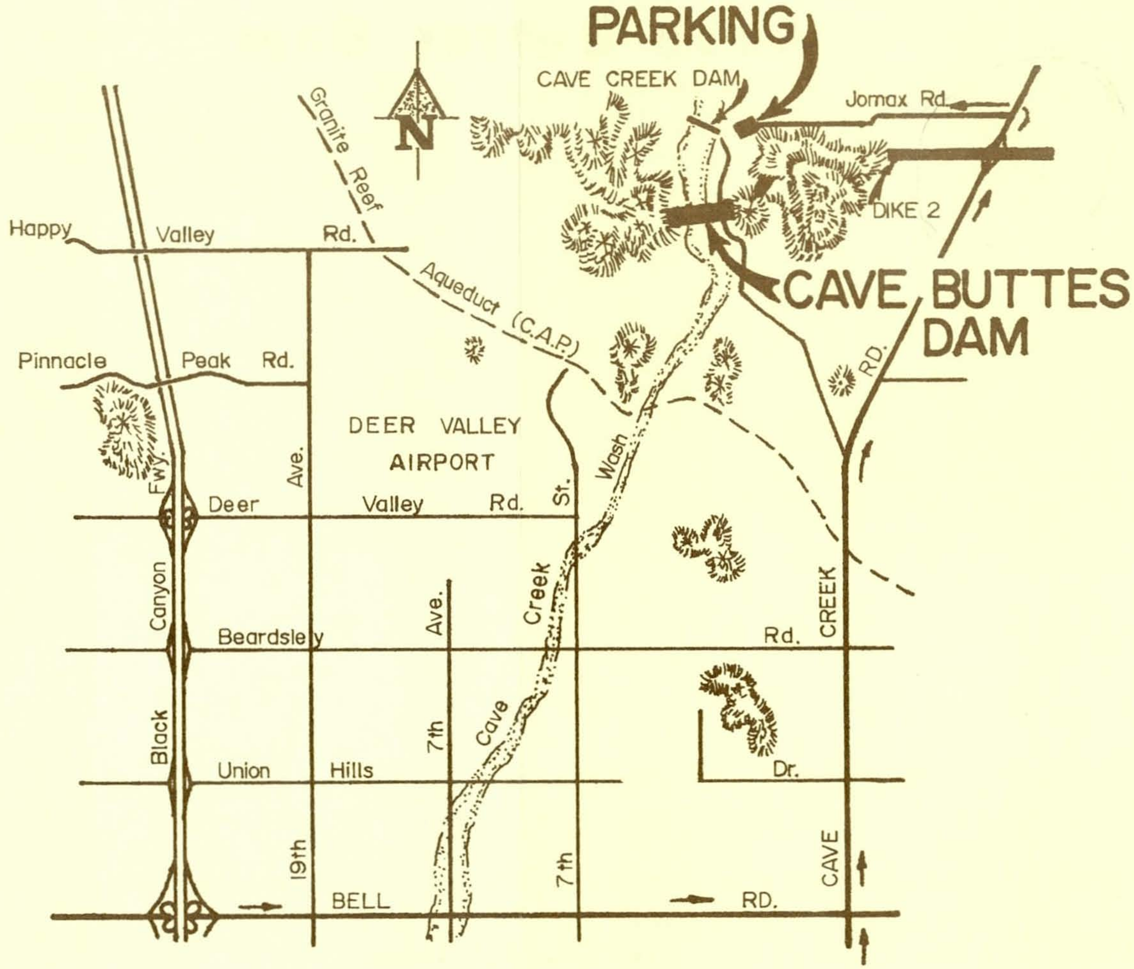
Comments:

Bailey Cooper — County Manager — Date

14. BOARD OF DIRECTORS: Action taken: ☒ Approved ☐ Amended ☐ Disapproved ☐ Deleted

Continued to: ______ (Date and type of meeting)

[signature] Clerk of the Board — Date: 5/4/94



BOARD OF DIRECTORS
FLOOD CONTROL DISTRICT

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George L. Campbell
Tom Freestone
Fred Koory, Jr.
Ed Pastor

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John Miller
Lynn Anderson

Herbert P. Donald, Chief Engineer and General Manager
FLOOD CONTROL DISTRICT of Maricopa County

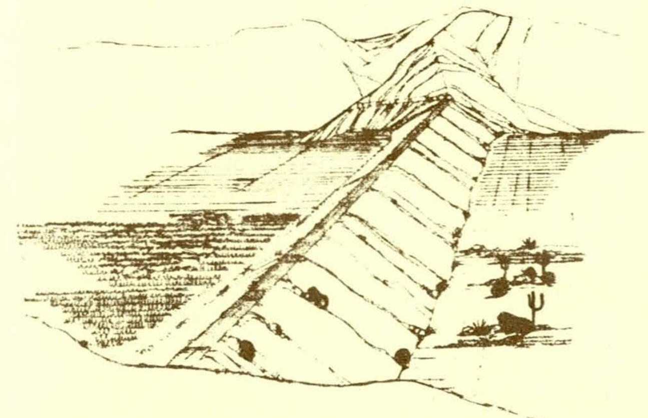
**THE FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
INVITES YOU TO ATTEND**

the

DEDICATION CEREMONIES

for

Cave Buttes Dam



Friday, November 16, 1979
10:00 A.M.

DEDICATION CEREMONIES

for

CAVE BUTTES DAM

Flood Control Project

Friday, November 16, 1979

10:00 A.M.

BAND

MASTER OF CEREMONIES	Fred Koory, Jr. Board of Directors
INVOCATION	Dr. William O. Smith
PLEDGE OF ALLEGIANCE AND INTRODUCTION OF GUESTS	Fred Koory, Jr.
REMARKS	N. G. Delbridge, Jr. Brig. Gen., Corps of Engineers United States Army
REMARKS	Eldon Rudd U.S. House of Representatives
REMARKS	Margaret T. Hance Mayor, City of Phoenix
DEDICATION	
BENEDICTION	Dr. William O. Smith

MUSIC SELECTIONS

Cave Buttes Dam

Cave Buttes Dam is the second of four dams to be built as elements of a flood control project known as "Phoenix, Arizona, and Vicinity (including New River.)" It is designed to provide flood protection to the Phoenix metropolitan area by controlling floodwater flow from a 191 square mile drainage area in the largest amounts that hydrologists feel can reasonably be expected, up to 42,200 acre feet of water flowing to the reservoir at a peak rate of 54,000 cubic feet per second. This water will then pass through an ungated outlet in the dam at a controlled rate not exceeding 486 cubic feet per second. At this rate it will take 48 days to empty the reservoir after such a major flood.

Cave Buttes Dam is located on Cave Creek about 17 miles north of downtown Phoenix and seven-tenths of a mile downstream of the existing Cave Creek Dam. The project consists of the main dam structure, a detached spillway, three dikes, and an overlook structure. The dam is a rolled earthfill structure 2,275 feet long, rising 109 feet above streambed. It is 20 feet wide at the top and contains 2,526,000 cubic yards of earth.

The reservoir area behind the dam is 1,820 acres, with a capacity of 46,600 acre feet. All rights-of-way, relocations and relocation assistance to home owners was accomplished by the Flood Control District.

No permanent pool of water will be retained in the reservoir. Instead the dam and reservoir are designed to trap floodwater and store it only for as long as it takes to release it slowly and safely downstream. Reservoir capacity thus is restored to handle a future flood. The spillway is 510 feet wide at the crest and is located 2,000 feet west of the west abutment of the dam. Construction was completed in October 1979. The structures will be operated and maintained by the Flood Control District of Maricopa County.

PROJECT FEATURES

Type of Structure	Earthfill
Length	2,275 feet
Height	109 feet
Top Width	20 feet
Volume of Earth Used	2,526,000 cubic yards
Reservoir Capacity	46,600 acre feet
Reservoir Area	1,820 Acres
Drainage Area	191 square miles
Spillway Location	2,000 feet west of west abutment
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Dikes:	Material	Earth
	Number 1	935 feet long x 39 feet high
	Number 2	9,000 feet long x 55 feet high
	Number 3	3,245 feet long x 10 feet high
Costs:	Federal Cost	$9,418,840
	Flood Control District	$5,097,772
Designer:	Corps of Engineers Los Angeles District, United States Army	
Contractor:	Washington Construction Company Missoula, Montana	

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Cave Creek Dam was jointly financed by contributions of several public and private agencies and private individuals that totalled $556,982.39. Size of the structure was limited by this amount. It has served Phoenix and the immediate west Valley well for 54 years. Agencies contributing to the fund for old Cave Creek Dam were: the State of Arizona, Maricopa County, the City of Phoenix, the Salt River Valley Water User's Association, Standard Oil Company, Union Oil Company, Santa Fe Railroad Company, Greenwood Cemetery and Arizona Eastern Railway (now the Southern Pacific).

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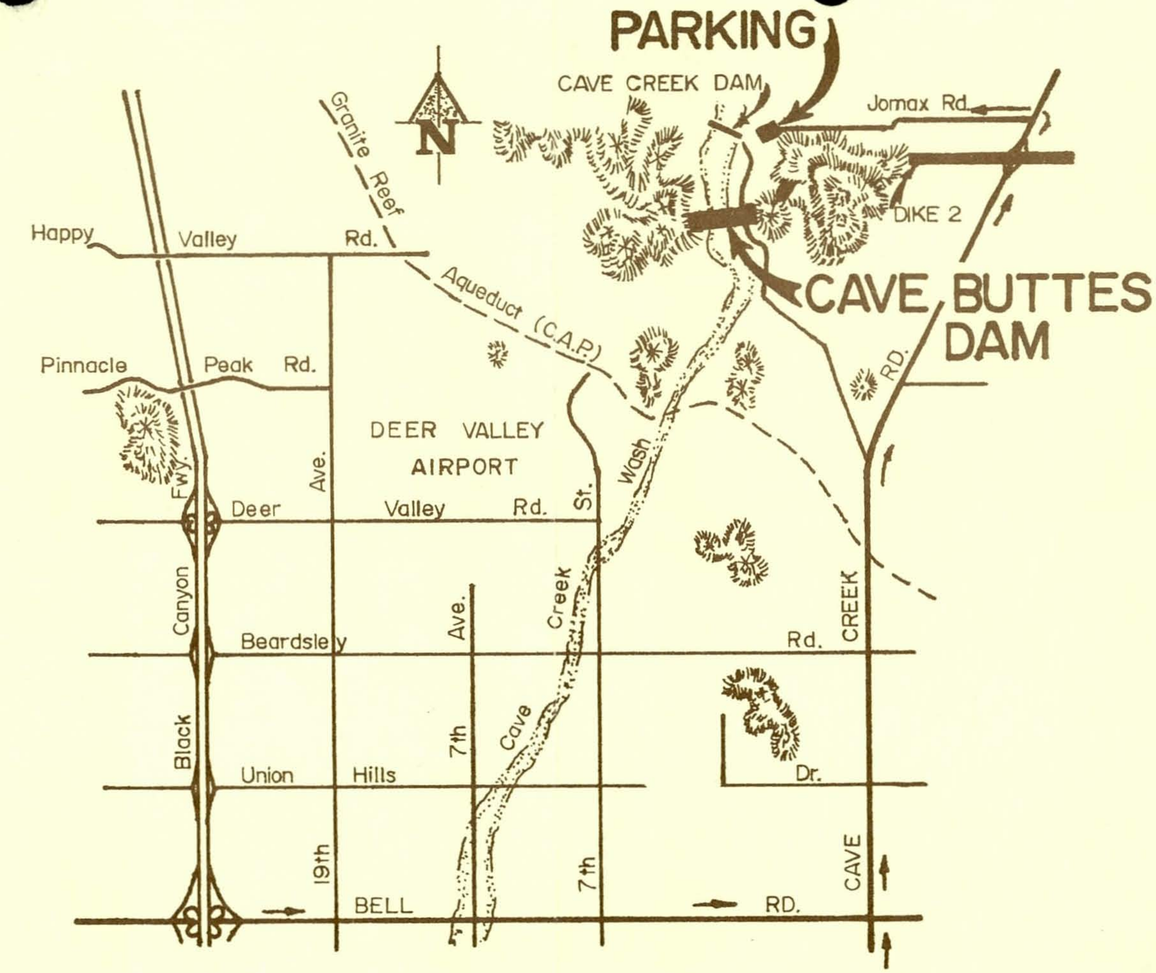

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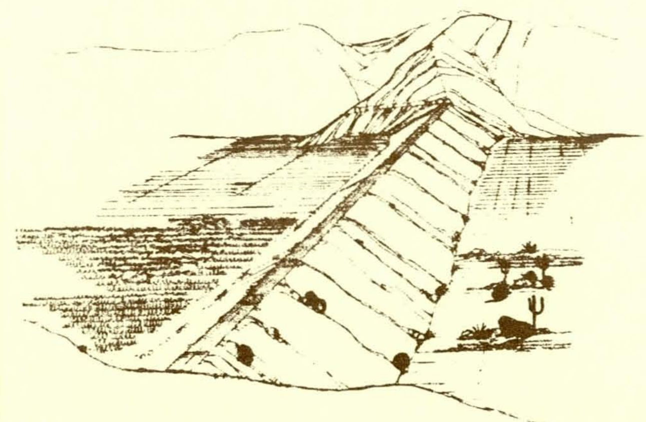

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CAVE BUTTES DAM

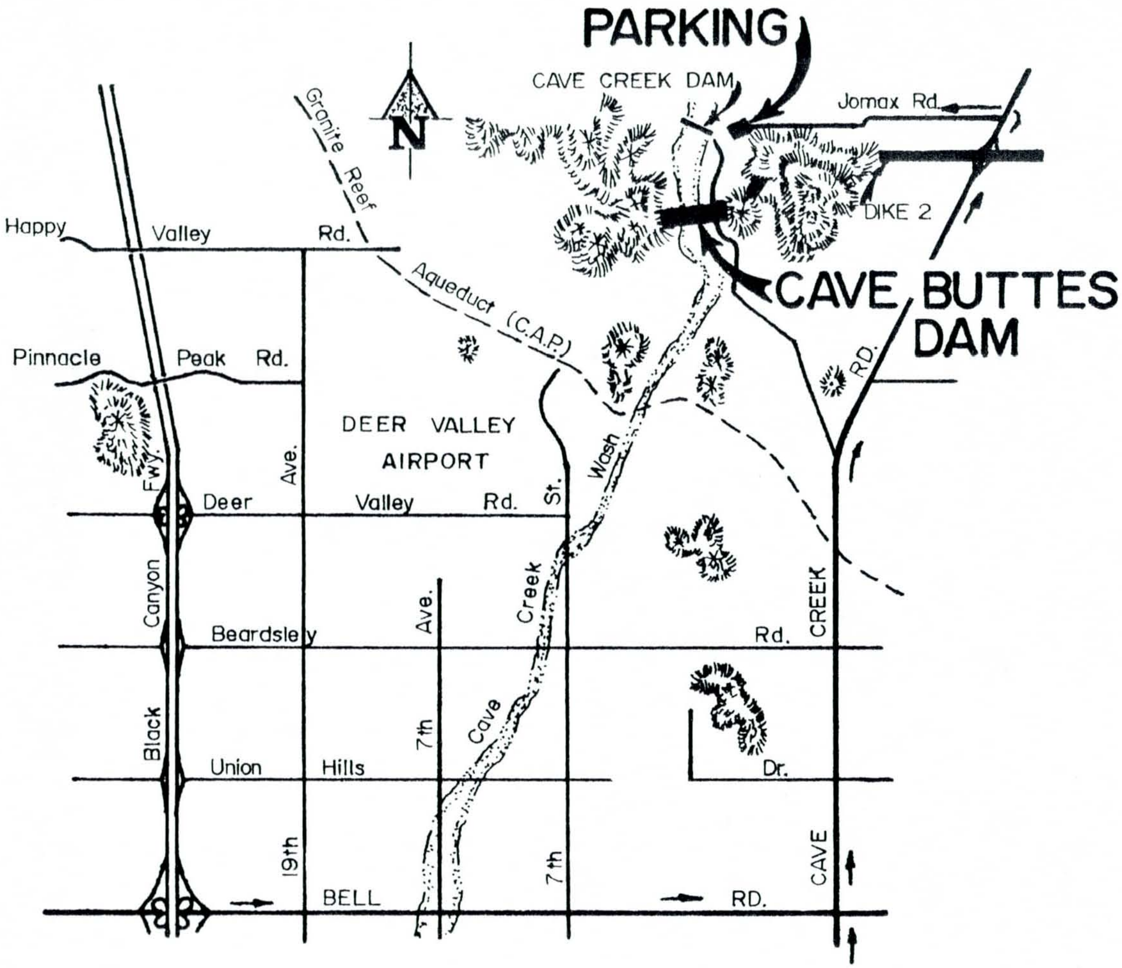
PERTINENT DATA

Drainage area	sq mi	191
Dam (rolled earthfill)		
Crest elevation	ft msl	1,679.1
Max. height above streambed	ft	109
Crest length	ft	2,260
Freeboard	ft	5
Spillway (detached)		
Crest elevation	ft msl	1,657.1
Crest length	ft	510
Elevation of max. water surface	ft msl	1,674.1
Outlet works (ungated conduit)		
Diameter of conduit	ft	3.75
Length	ft	528.75
Intake elevation	ft msl	1,560.7
Saddle dike No. 1		
Crest length	ft	930
Max. Height above existing ground	ft	39
Saddle dike No. 2 or east dike		
Crest length	ft	9,035
Max. height above existing ground	ft	55
Saddle dike No. 3 or west dike		
Crest length	ft	3,245
Max. height above existing ground	ft	10

Cave Buttes Dam

PERTINENT DATA (CONT'D)

Reservoir area at spillway crest	acres	1,820
Capacity (gross) at spillway crest	acre-ft	46,600
Storage allocation below spillway crest		
Flood Control (net)	acre-ft	40,900
Sedimentation	acre-ft	5,700
Standard Project flood		
Total volume	acre-ft	42,900
Peak inflow	cfs	54,000
Peak outflow	cfs	486
Drawdown time	days	48
Maximum probable flood		
Total volume	acre-ft	122,000
Peak inflow	cfs	172,000
Peak outflow	cfs	100,600
Drawdown time	days	61



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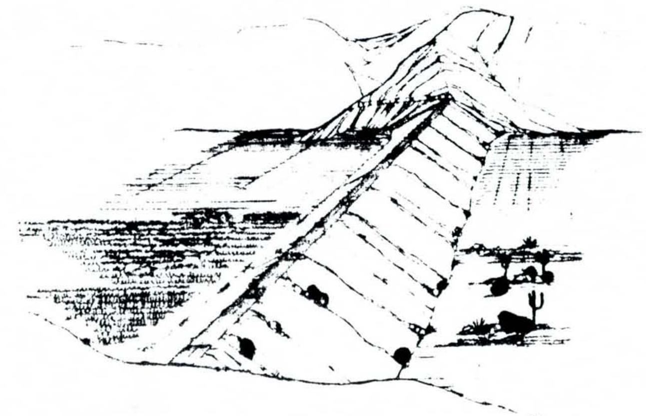

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- *Safety Of Dams Provisions;*
- *Flood Control;*
- *Increased Water Storage; and*
- *Enhanced Recreation.*

Who Opposes Cliff Dam and Why?

At issue are environmentalists' concerns about Cliff Dam's impact on the bald eagle population and the Verde River habitat. Some individuals are concerned about the overall project costs. But, Cliff Dam opponents seem unwilling to discuss mitigation, negotiate or listen to public comment.

The Bald Eagle Population Will Be Protected

Cliff Dam supporters, such as the U.S. Bureau of Reclamation and the Salt River Project, recognize the unique status of Arizona's few bald eagles and will make every effort to ensure the population's continued growth. It is understood that Cliff Dam will eliminate the foraging area of one pair of eagles, and may adversely affect the foraging area of another pair during occasional flood storage.

To protect the eagles, minimum stream flows will be maintained where possible to support fish populations—the eagles' primary food source. A two-year Verde River study is under way to determine minimum flows. In accordance with U.S. Fish & Wildlife Service recommendations, bald eagle management areas will be established on the Verde River, East Verde River, Salt River and Tonto Creek to preserve the integrity of breeding areas and protect and enhance the streamside habitat.

Revegetation of land recovered upstream of Horseshoe Dam will be studied and implemented if feasible. Further, studies are planned to analyze impact on fisheries, bald eagle breeding, food habits and movement. Construction activities WILL be changed if there is a negative impact on the eagles' reproduction.

Other Wildlife and Vegetation Will Be Secured

Fencing will control grazing in the vicinity of Cliff Dam and guard against off-road vehicles, which frequent the area today. Operations will include an effort to control reservoir drawdowns during fish-spawning seasons. In addition, wildlife watering areas will be constructed at a cost of nearly $700,000. A water fowl winter forage area will be provided at an estimated cost of $20,000.

To ensure the adequacy of these mitigation measures, the U.S. Bureau of Reclamation will fund pre- and post-construction studies. The USBR is committed to an existing plan "that will result in no net loss of habitat values to the riparian/wetland communities upstream." Cliff Dam will not be completed until these objectives are met.

Lawsuit Challenges Cliff Dam's EIS

A coalition of environmental interests filed suit in recent months charging that an insufficient environmental impact statement was made regarding one of Cliff Dam's alternatives. The Salt River Project and other intervenors object to this conclusion and SRP will represent its sharholders in this case.

Is Cliff Dam Worth The Cost?

Cliff Dam is worth the price. (See allocated costs table.) In fact, according to the Central Arizona Project Association, Maricopa County taxpayers will receive a minimum of $1.75 in flood control, land enhancement, dam safety, water, power, recreation and fish and wildlife benefits for every $1 spent on Plan 6.

The economic benefit does not include Rio Salado or the effect on land values in the Salt River Valley due to Cliff Dam. The proposed Rio Salado Project, dependent on adequate flood control measures, will increase land values along the Salt River through metropolitan Phoenix. Tax revenues from Rio Salado landowners to the city and county governments will help offset local costs of Plan 6.

Cliff Dam's Allocated Costs
(Represents total costs, not local funding)

Safety of Dams	**$142,000,000**
Water Conservation	**25,000,000**
Flood Control	**223,000,000**
TOTAL	**$390,000,000**

The federal government established that downstream water users should repay a portion of the total costs of flood control protection and Central Arizona Project water storage. Salt River Project shareholders are responsible for 15 percent of the total cost of implementing Safety of Dams Act modifications on the Salt and Verde rivers. In an effort to ensure timely completion of all elements of Plan 6, local entities have pledged $371 million in up-front funds, including approximately $52 million from SRP.

SRP Thinks Cliff Dam Is Worth Fighting For

Cliff Dam's immediate benefits are impressive: flood control to prevent repetition of disaster, or worse; dam safety to save lives and protect property; increased water yield to meet the needs of about 100,000 residents each year; enhanced recreation; enhancement and protection of the bald eagle population; federal government commitment to fund the larger portion of Plan 6's costs; and assured local funding to pay our fair share. Isn't that worth fighting for?

Here's How You Can Save Cliff Dam

Arizona pioneers worked together to find solutions to unique problems in this arid West. They put aside their personal interests to build Theodore Roosevelt Dam and other water-storage dams on the Salt and Verde rivers. Only through these reservoirs was the Salt River Valley able to prosper.

More recently, modern pioneers planned and funded the Central Arizona Project, a system to supply Arizona's rightful share of Colorado River water to central and southern portions of the state.

Salt River Project hopes to rekindle this Western spirit in support of Cliff Dam. SRP urges you to write your congressional delegation. Emphasize your support for Cliff Dam, an integral part of the Central Arizona Project's Plan 6. Urge your friends, relatives and neighbors to get involved—tell the news media why we need Cliff Dam. If you belong to a community organization, start a Cliff Dam support movement.

For further information about Cliff Dam, please write: *Cliff Dam Facts, Salt River Project, Box 52025, Phoenix, AZ 85072-2025.*

Cliff Dam IS Worth Fighting For

SALT RIVER PROJECT
An Equal Opportunity Employer
GA-1046

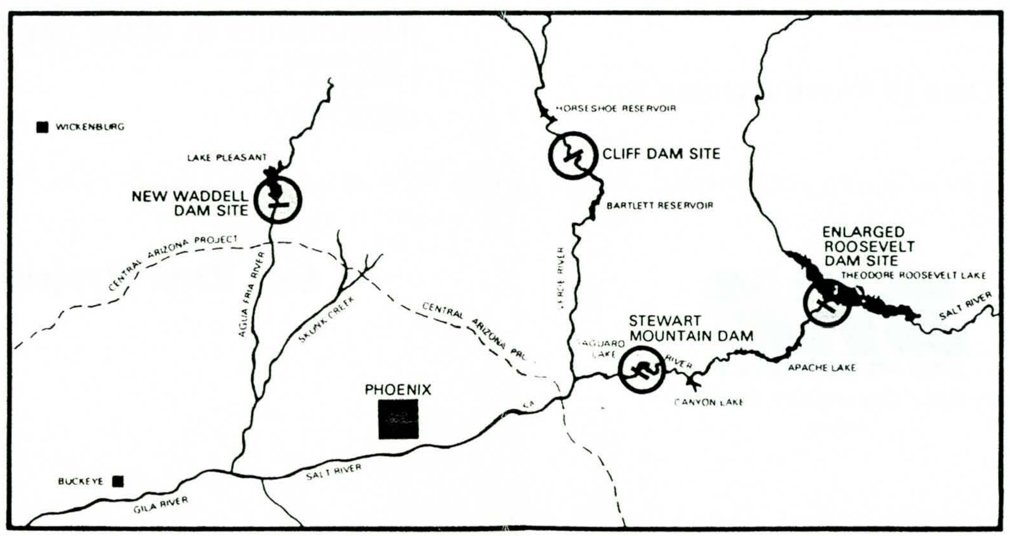
CLIFF DAM:
It's Worth Fighting For

Salt River Project

Cliff Dam Will Help Avoid Headlines Like These:

These headlines illustrate the need for Cliff Dam, an integral part of Plan 6. As part of the Central Arizona Project, Plan 6 includes construction of Cliff Dam on the Verde River (see map), New Waddell Dam on the Aqua Fria River, an enlarged Theodore Roosevelt Dam and an improved Stewart Mountain Dam on the Salt River. The federal government is currently funding Plan 6 projects for CAP water storage, flood control and dam safety benefits for the Salt River Valley.

Salt River Project firmly believes it's in the best interest of the community to complete all Plan 6 elements as quickly as possible.



Plan 6

Cliff Dam Gained Wide Support

Cliff Dam consensus was reached through a broad public involvement process conducted in conjunction with a five-year investigation of the feasibility of Plan 6. A Plan 6 Task Force was representative of affected agencies and special interest groups, including city, county, state and federal representatives, plus input from the public at large.

Factors reviewed included an evaluation of social and environmental impacts, economics, flood control, dam safety, water conservation and energy efficiency.

Some Question Cliff Dam

Faced with the need and strengthened by community support, you may wonder why some interest groups oppose Cliff Dam. In particular, environmental groups have received a great deal of publicity about perceived negative impacts from Cliff Dam.

But, their concerns are misplaced. That's why Salt River Project and the many local, state and federal groups in support of Cliff Dam believe it's important for you to know the dam's benefits. Your understanding and active support are needed.

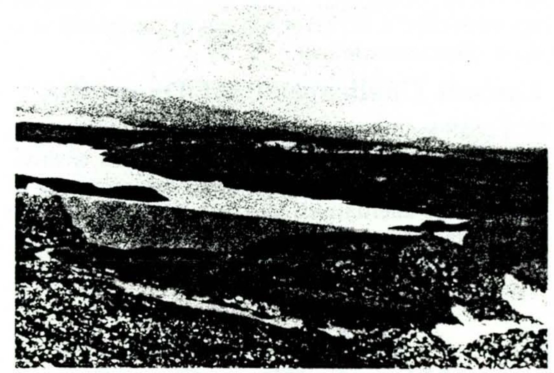
The Benefits of Cliff Dam

Cliff Dam Will Provide Direct Benefits For You And The Salt River Valley

Flood Control

Cliff Dam will replace Horseshoe Dam on the Verde River and reduce the impact of the U.S. Bureau of Reclamation's hypothesized worst-case flood. Cliff Dam will significantly reduce the potential for loss of life and property damage.

A flood control outlet will be located near the bottom of the dam (see artist's rendering), which means



Artist's rendering of proposed Cliff Dam. Arrow indicates flood-control works.

water releases could be controlled **BEFORE** water in Cliff reservoir exceeds safe conservation levels—something that can't be done today at Horseshoe Dam.

The highest flow this century on the Verde River reached 111,000 cubic feet per second (cfs) in a severe flood in 1980. (A cubic foot equals 7.48 gallons.) But, preliminary results of research indicate Verde River flows have reached up to 200,000 cfs or more. Following is a table of the flood-control benefits of Cliff Dam during a 200-year flood, with about a four-fold reduction in economic loss:

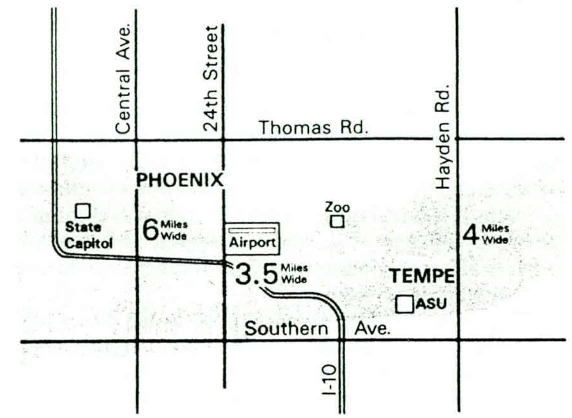
Impacts of a 200-Year Flood (215,000 cfs)

Type of Impact	Plan 6 With Cliff Dam	Plan 6 Without Cliff
1) Downstream flow	92,000 cfs	215,000 cfs
2) Property damage	$602,000	about $18.9 million
3) Bridges open	15	3
4) Road/bridge damage	less than $5 million	more than $9 million
5) Electric facility damage	less than $1 million	more than $4.8 million
6) Waste water treatment facility damage	none	$135,000
7) Emergency cost	less than $80,000	more than $809,000
8) Business loss	about $6.2 million	about $21.8 million
TOTAL $$$ LOSS	about $12.9 million	about $55.4 million

Safety of Dams

Cliff Dam will eliminate dam-safety concerns.

Horseshoe Dam, an earthen dam upstream of the Cliff Dam site, was built 40 years ago without a large water outlet near its base to enable early release of flood waters. Experts predict the Probable Maximum Flood (PMF) from the Verde River watershed would overtop Horseshoe Dam, causing Horseshoe and Bartlett dams to fail. Likewise, the Maximum Credible Earthquake (MCE) could produce the same scenario. Flood waters would sweep through downtown Tempe and Arizona State University. In turn, flood waters would churn through Phoenix Sky Harbor International Airport and much of downtown Phoenix, including the Arizona Capitol Mall. All bridges, waste water treatment plants, and major water, power and telephone utility crossings would be destroyed. Newspaper headlines would be far more dreadful than the ones in this brochure.



Worst-case flood flows.

Water Conservation

Cliff Dam will be located six miles downstream of Horseshoe Dam, which will be breached. It will serve as an effective water-storage dam to capture additional runoff that otherwise would be spilled. Cliff Dam's increased size and capacity will provide an additional 202,000 acre-feet of water conservation space, which will yield enough water to meet the needs of about 100,000 residents each year. (An acre-foot equals 325,850 gallons.) The increased water storage represents a 10 percent rise in the storage capacity of SRP's six reservoirs.

Enhanced Recreation

There's another important benefit with Cliff Dam. It will provide a host of new recreational opportunities, with more than 1,000 planned campsites and picnic areas. There also will be increased opportunities for boating.

The benefits of Cliff Dam are worth re-emphasizing:

Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, Arizona 85009
(602)506-1501

Colter Channel
Fact Sheet

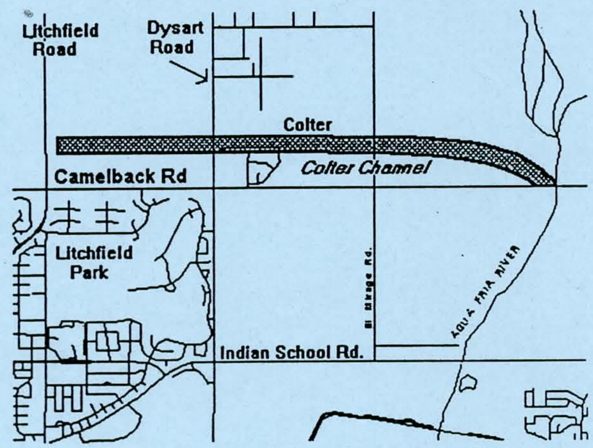
Colter Channel

The Colter Channel is an earthen stormwater diversion channel located 1/4-mile north of Camelback Road running west-to-east between Litchfield Road and the Agua Fria River. The channel is designed to intercept 100-year storm flows from the north and convey them to the Agua Fria River. The Colter Channel Project was identified as a flood control project during the White Tanks-Agua Fria Area Drainange Master Study performed in the area following heavy flooding in Litchfield Park and surrounding communities in 1988. The principal feature is a 2.8-mile-long earthen channel that varies in width from 50 to 250 feet. The project coincided with improvements being made by the Maricopa County Department of Transportation (MCDOT) to Dysart Road and planned improvements to Camelback Road. The channel will help protect these road improvements, which prompted MCDOT to cost-share in the channel's construction. In addition to protecting roads, the project also provides some flood protection to Litchfield Park and the surrounding area and will eliminate a portion of an "A" Zone floodplain, removing about 20 homes from the floodplain.

Cost: The project was completed at a cost of $2.94 million which was shared between the Flood Control District and MCDOT.

Designed by: C.R.S.S. Civil Engineering Inc.

Contractor: H. W. Johnston Construction Engineering



Design capacity: Peak discharge into the Agua Fria River is 1200 cubic feet per second.

		Averages
Channel dimensions:	Litchfield Road to Dysart Road:	100 ft. wide x 6 ft. deep
	Dysart Road to El Mirage Road:	112 ft. wide x 7 ft. deep
	El Mirage Road to confluence with Agua Fria:	200 ft. wide x 4 ft. deep

Construction specifications:

Earthen-lined channel; bridge crossings at Dysart Road and El Mirage Road; construction of box culvert and flume at the Airline Canal; two inverted syphons to convey irrigation water and Dale Creek under the channel; fenced to prevent entry.

Maintenance: Flood Control District performs full maintenance of the channel.

Multi-use potential:

The channel was designed to accommodate future landscaping in the event landowners develop the surrounding area and wish to blend the channel improvements into their development.

one mile east of 16th Street on the Dreamy Draw; Northern Avenue splits around the Dam. A detached spillway is located in a saddle about 400 feet east.

CAVE BUTTES DAM

Cave Buttes Dam is located on Cave Creek about 17 miles north of downtown Phoenix and less than a mile downstream of the existing Cave Creek Dam. The project consists of the main dam structure, a detached spillway, three dikes, and an overlook structure. The dam is 2,275 feet long, rising 109 feet above the streambed. It is 20 feet wide at the top.

The reservoir area behind the dam is 1,820 acres with a capacity of 46,600 acre-feet. A permanent pool will not be retained in the reservoir, instead, the dam and reservoir are designed to trap floodwater and store it only for as long as it takes to release it slowly and safely downstream. Reservoir capacity thus is restored to handle a future flood.

The spillway is 510 feet wide at the crest and is located 2,000 feet west of the west abutment of the dam. Construction was completed in October 1979.

ADOBE DAM

Adobe Dam is located on Skunk Creek about one mile west of the Black Canyon Highway (I-17) at about Deer Valley Road. It is 11,245 feet long, and 63 feet high. Construction was completed in 1980. The reservoir area is 1,320 acres and will hold 18,350 acre-feet. Like the Cave Buttes Dam, no permanent pool of water will be retained in the reservoir; floodwater will be stored and released slowly and safely downstream.

The Maricopa County Parks and Recreation Department is developing recreation areas in the Adobe Dam Reservoir.

The Adobe Dam site is also a historic treasure. Petroglyphs (rock carvings created by the Hohokam Indians around 1000 AD) are grouped south of the Dam and have been preserved as a part of the project. They will be retained for historic and cultural purposes.

NEW RIVER DAM

New River Dam is located on New River about 8 miles upstream from the Skunk Creek confluence and was completed in 1985. The 0.45 mile long earthfill dam will control the standard project flood with a basin capacity of 43,520 acre-feet at the spillway crest. It will provide flood protection to residences, businesses and other land uses along the New and Agua Fria Rivers by detaining the floodwaters and releasing them at a greatly reduced rate. The decrease in peak flows will offset the effect of diverting flows from the ACDC drainage area to the New River when the ACDC is completed.

Because of the abundance of natural vegetation and wildlife, development of formal recreational facilities is not scheduled at the New River Dam site at this time.

COSTS and Sponsors

All four dams were constructed by the U.S. Army Corps of Engineers. The Flood Control District of Maricopa County was responsible for acquiring land, building bridges, and relocating utilities. The completed structures are operated and maintained by the Flood Control District.

The cost of each of the dams and the amount of money contributed by federal and local agencies is outlined below.

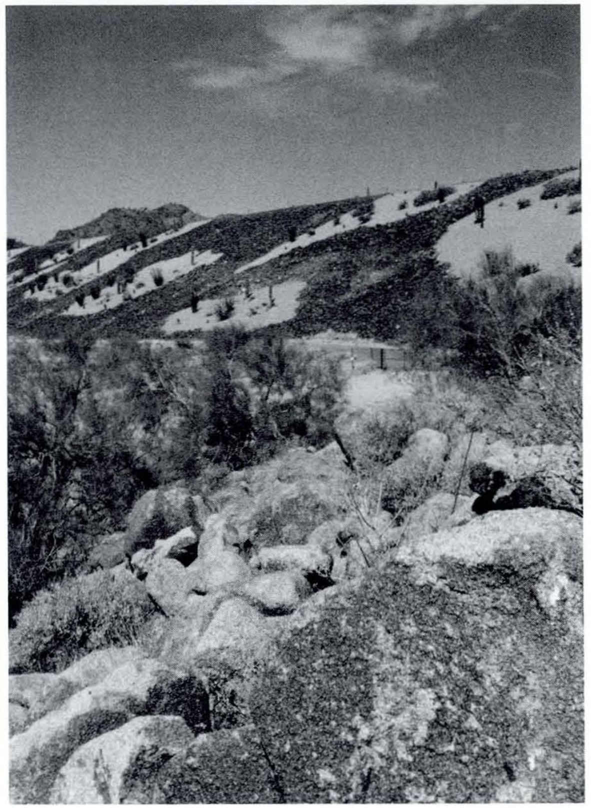
	Costs		
Structure	Federal	Flood Control District	ADWR*
Dreamy Draw	704,958	27,000	—
Cave Buttes	9,418,840	3,112,000	2,550,000
Adobe	9,700,000	7,357,000	6,092,000
New River	10,300,000	4,027,000	1,457,000

*Arizona Department of Water Resources

For more information on these or any other District projects, contact:

Public Involvement Coordinator
Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, Arizona 85009
(602) 506-1501

On the cover: *New River Dam.*



DREAMY DRAW, CAVE BUTTES, ADOBE, and NEW RIVER

Dams of the Phoenix and Vicinity Flood Control Project

Published by the
Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, Arizona 85009
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WHAT is the Phoenix and Vicinity Project?

The Phoenix, Arizona and Vicinity (including New River) flood control project has been designed and is being constructed by the U.S. Corps of Engineers to protect people in a large part of the metropolitan Phoenix area from the flood flows originating in the mountain and desert drainage areas north of and including parts of Phoenix, Glendale, and Peoria. The Flood Control District of Maricopa County is the local sponsor for the project.

The following structures have been built (or are in progress) as a part of the Phoenix and Vicinity Project:

- Arizona Canal Diversion Channel (ACDC)
- Dreamy Draw Dam
- Cave Buttes Dam
- Adobe Dam
- New River Dam

Flowage easements and bank stabilization along Skunk Creek, New River, and the Agua Fria River are also important to the effectiveness of the overall project.

As the ACDC works with the dams to control flooding, it is important to understand what it is and how it works. The ACDC is a 16.5 mile channel designed to intercept Cudia City Wash and Dreamy Draw floodwaters as well as the runoff from the Phoenix Mountains, Cave Creek, and residential street flows north of the channel. It stretches from 40th Street just north of Camelback Road to just west of 75th Avenue near Bell Road (where the channel outlets into Skunk Creek), and is located in an alignment parallel to and on the northern side of the Arizona Canal.

As a part of the overall project, the ACDC is designed to protect developed areas—including

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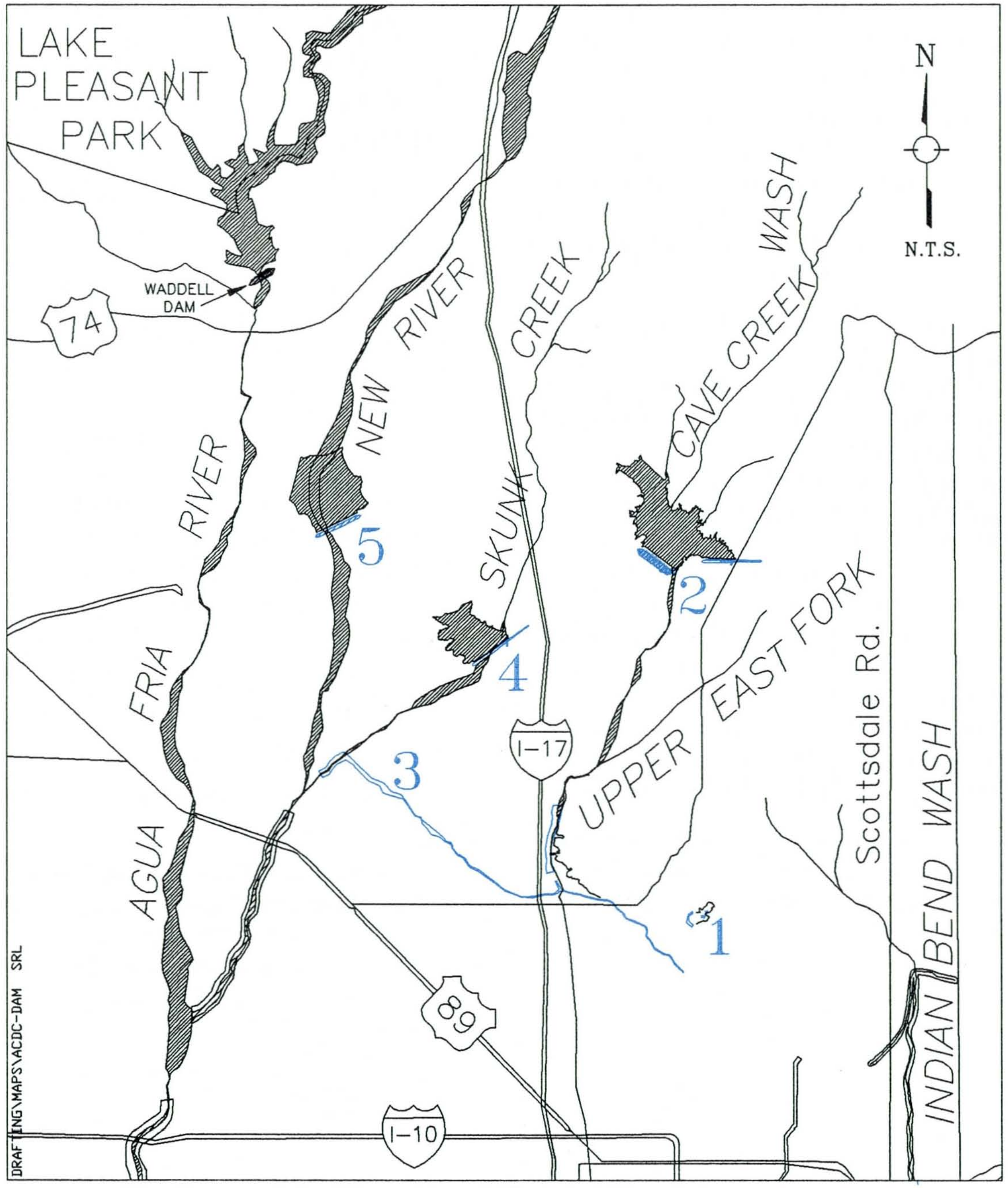

The Dams of the Phoenix and Vicinity Flood Control Project

Dreamy Draw (1) and Cave Buttes (2) Dams release floodwaters slowly into creek beds that lead to the Arizona Canal Diversion Channel (ACDC) (3). The ACDC takes water to Skunk Creek. Adobe (4) and New River (5) Dams release water down Skunk Creek and New River so that peak flows, after the introduction of the ACDC water, will not be increased.

parts of Phoenix, Glendale, Peoria, and the State Capitol complex—up to the 100 year level (the level of flooding expected to occur on an average of once per century).

the DAMS and the ACDC

On the east and north sides of the metropolitan area, floodwaters collect at both Dreamy Draw Dam and Cave Buttes Dam (on Cave Creek) and then are released slowly into the natural creek beds to the ACDC. The ACDC then takes this water—as well as floodwaters from several minor tributaries, uncontrolled overland flow, and city storm drains—and empties into Skunk Creek.

To the west, Adobe Dam on Skunk Creek and the New River Dam on New River collect floodwaters and release them slowly, so that the peak flows (after the introduction of the ACDC water) are not increased. The water then flows into the Agua Fria River and onto the Gila River, its original and natural destination.

The four dams are all earthfill construction designed to provide protection for the "standard project flood," normally larger than any past recorded flood and only very rarely exceeded.

The four dams are all earthfill construction which have been landscaped to prevent erosion. They look more like large dirt berms than what is conventionally regarded a "dam." Outstanding features of each dam are listed below:

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Dreamy Draw Dam was the first of the four dams to be constructed as part of the overall plan. Completed in December, 1974, it has a maximum height of 56 feet and a top crest width of 20 feet. Located in northern Phoenix, Dreamy Draw Dam is one mile east of 16th Street on the Dreamy Draw; Northern Avenue splits around the Dam. A detached spillway is located in a saddle about 400 feet east.

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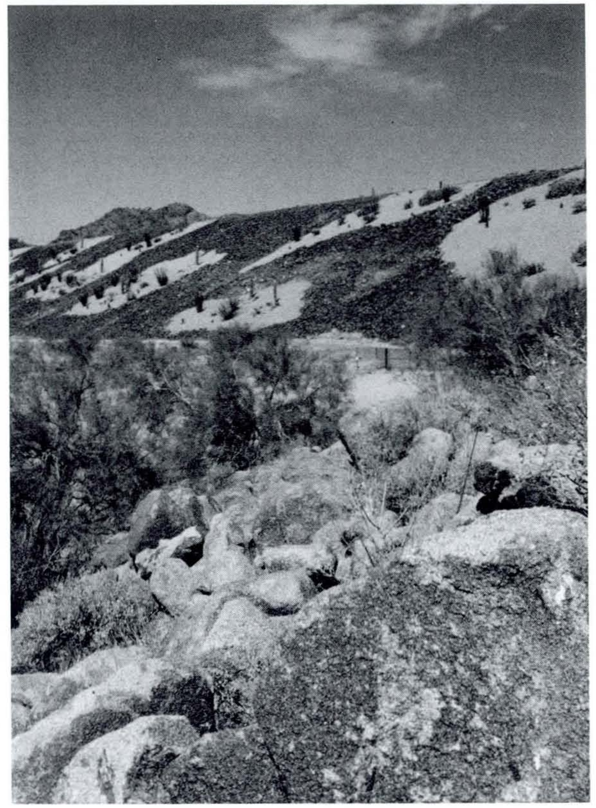

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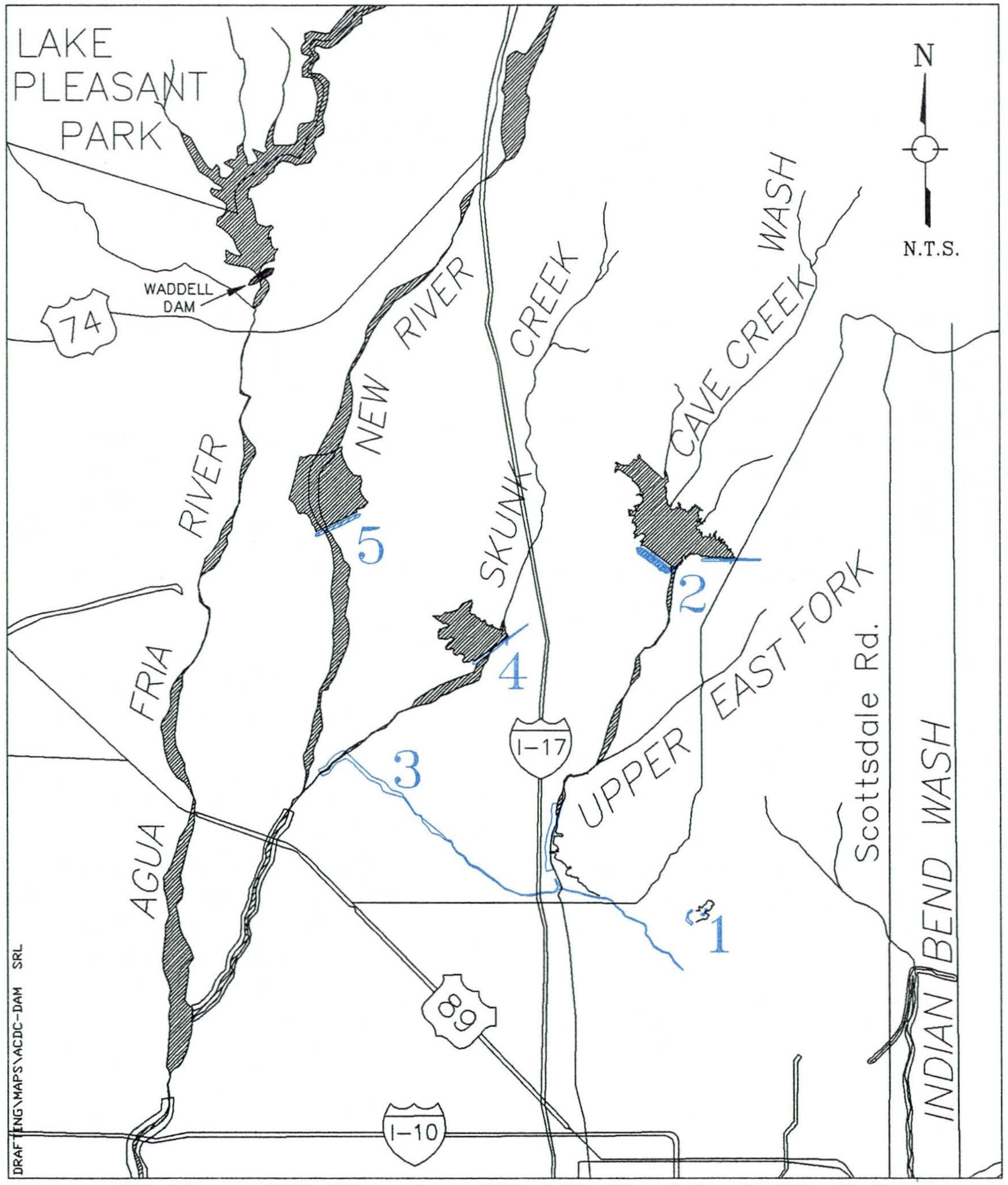

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Dreamy Draw Dam was the first of the four dams to be constructed as part of the overall plan. Completed in December, 1974, it has a maximum height of 56 feet and a top crest width of 20 feet. Located in northern Phoenix, Dreamy Draw Dam is local sponsors of the EMF are the East Maricopa Natural Resource Conservation District and the Board of Supervisors of Pinal County.

The project was constructed in six reaches, with Reach 6 being completed in June of 1989. Construction costs were paid by Federal funds through the sponsorship of the Soil Conservation Service. The Flood Control District of Maricopa County was responsible for the cost of purchasing land rights, relocating utilities, and constructing new bridges. The costs are broken down as follows:

Construction Costs for the EMF	
Federal	$20,174,376
Flood Control District	$17,366,000

WATERSHEDS

In 1963, the Soil Conservation Service published three watershed work plans that proposed a comprehensive flood control program for the area between the Salt River and Queen Creek, east of Mesa and Chandler. Buckhorn-Mesa covers the area between the Salt River and Apache Trail. Apache Junction-Gilbert ocvers the area between the Apache Trail and Ray Road. Williams-Chandler covers the area between Ray Road and Queen Creek. (See map.) Within these watershed projects, the flood flows originating east of the Roosevelt Water Conservation District Irrigation Canals are controlled by land treatment, nonstructural measures, floodwater retarding structures, and floodways.

Several flood retarding structures were built in each of the watersheds, including Spook Hill Dam; Signal Butte Floodway and Dam; Pass Mountain Diversion; Bull Dog Floodway; Apache Junction Dam; Powerline Dam and Floodway; Vineyard Dam; and Rittenhouse Dam.

RECREATIONAL FACILITIES

One interesting thing going on in the Floodway is the development of the land (by the private sector) for recreational uses. Two such developments are the golf courses at Superstition Springs and Leisure World.

Floodways such as the EMF are perfect for parks and golf courses as they slow the velocity of the water and incur no, or little, structural damage should flooding occur. They also enhance the value of the property around them.

For more information, contact:

Public Involvement Coordinator
Flood Control District
of Maricopa County
3335 West Durango Street
Phoenix, Arizona 85009
(602) 262-1501

EAST MARICOPA FLOODWAY

Prepared by

The Flood Control District
of Maricopa County
3335 W. Durango Street
Phoenix, Arizona 85009

(602) 262-1501

WHAT IS THE EAST MARICOPA FLOODWAY?

The East Maricopa Floodway (EMF) is a compacted earthen channel, approximately 200 feet wide and ranging in depth from eight to twelve feet. The channel runs north-south, parallel to the Roosevelt Water Conservation District (RWCD) irrigation canal, from Princess Basin (above Brown Road in Mesa), across Hunt Highway, and then easterly through Pinal County and the Gila River Indian Reservation, emptying into the Gila River midway between State Route 93 and Interstate 10. In total, the EMF is more than 27 miles long and travels through three watershed projects (Buckhorn-Mesa, Apache Junction-Gilbert, and Williams-Chandler).

The overall objective of the EMF is to restore, maintain, and enhance the quality of human environment through watershed protection and flood prevention. The goals for installing land treatment and protection of watershed lands are to:

- Reduce erosion rates and sediment yield to acceptable limits.
- Increase infiltration rates of the soils.
- Increase crop production.
- Improve irrigation water management.

The goals for flood prevention in the three watersheds include reducing floodplain scour and erosion and providing a high level of protection for:

- Highly productive irrigated lands.
- Residential and retail-commercial porperties, roads, and highways.
- Salt River Project and Roosevelt Water Conservation District's (RWCD) Irrigation Canals and on-farm irrigation facilities.
- Lands now undergoing rapid urbanization.

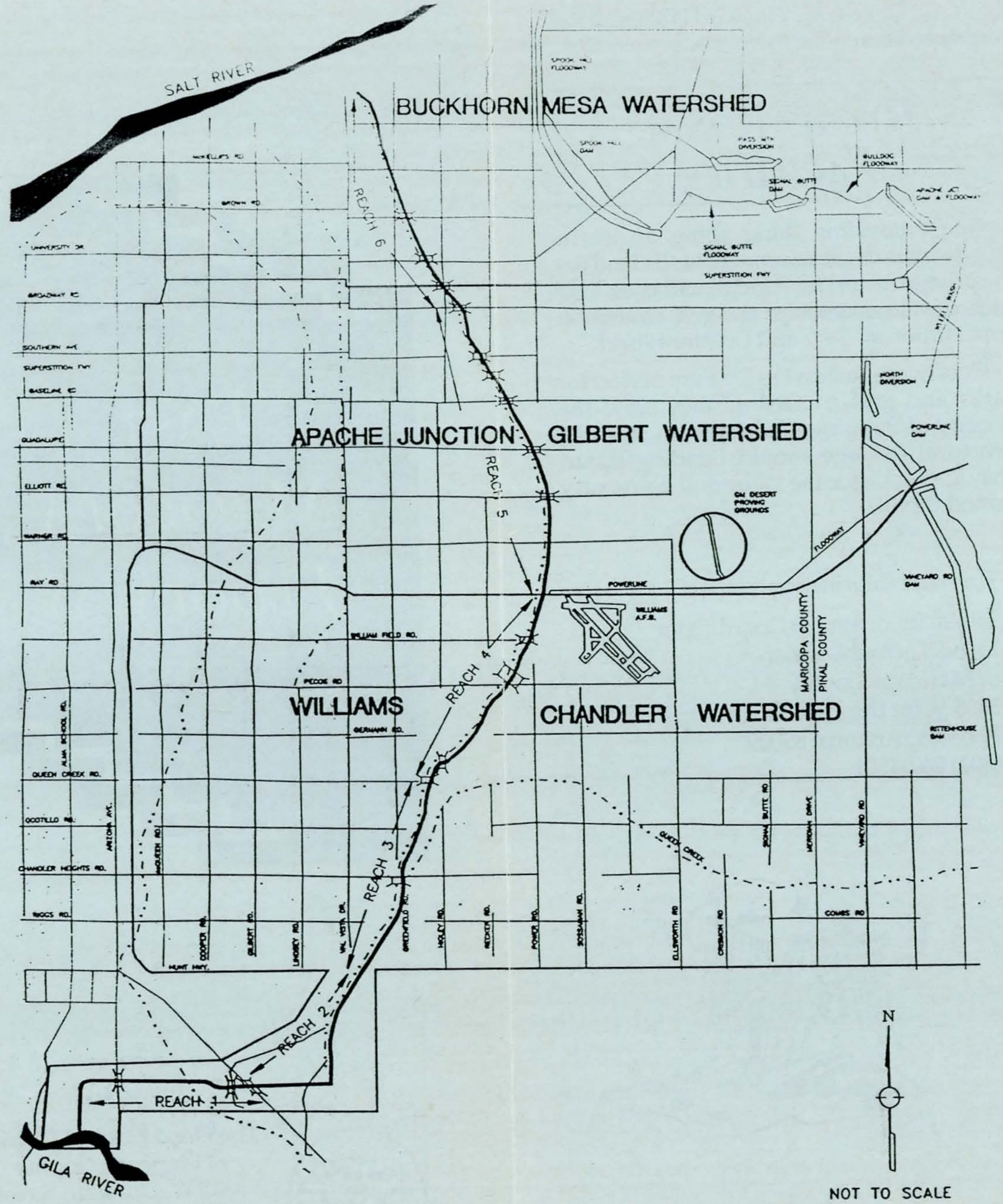
Flooding in the East Valley

Before man altered the drainage pattern in the project area, water flowed in a north-east to southwest direction through numerous washes and into the Gila River. Floodwaters spread over the undeveloped desert. The introduction of irrigated farming and the construction of the associated irrigation canals altered the course of the flood-waters. Subsequent improvements such as farm ditches and land leveling obliterated the washes. Floodwaters could no longer follow their natural courses and were forced across developed land, and, in general, follow constructed floodways, irrigation ditches, and roadways.

As development continued and property values increased, the failure of manmade waterways to convey floodwaters created ever-increasing damages. With construction of the EMF, however, the chance of such damages occurring has been dramatically reduced, if not eliminated.

As recently as July 1984, localized intensive rainfalls resulted in approximately $2 million in flood damages to residences generally in the area of east Mesa, between University Drive and Broadway Road in the vicinity of the Central Arizona Project Aqueduct. At the time of this rainfall, the Signal Butte Floodway and the Central Arizona Project were under construction.

Summer rains, such as those causing the flooding in 1984, are generally associated with thunderstorms that form over the eastern mountains during the afternoon and spread over the valleys in the evening. These rains are known as "monsoons." Gusty winds and blowing dust usually precede the rainfall that rarely lasts longer than thirty minutes. The monsoon season generally starts in early July and ends in early September.



As a result of weak tropical disturbances moving northward from the Pacific Ocean usually heavy and prolonged rain may fall. These thunderstorms and general storms often produce widespread disastrous flooding. Runoff in 1926, 1930, 1941, 1943, 1954, 1966, 1971, and 1984 caused particularly serious damage.

Furthermore, the stormwater falling in the Usery, Goldfield, and the western flanks of the Superstition Mountains drains into a wide alluvial fan. Mountain channels have steep grades and high runoff rates. A large volume of water is concentrated in the channels and develops sufficient energy to carry large amounts of sediment. As the water reaches the flatter slopes at the base of the mountains, the velocity of the water decreases rapidly, and the sediment is quickly deposited. The channels become more shallow and less defined. Overbank flow occurs, and the water spreads onto the alluvial fan.

In addition to direct damage to land and property, there are considerable indirect losses as a result of flooding: traffic is disrupted; businesses lose trade (a flood during the height of the tourist season can seriously affect the income of those depending on this trade); and health hazards are caused by flooded cesspools, and ponded water which quickly stagnates and becomes a thriving habitat for mosquitos.

Project Sponsors and Costs

The Soil Conservation Service, an agency of the United States Department of Agriculture, designed and constructed the dams and channels. The Flood Control District is also responsible for the operation and maintenance of the completed structures, with the exception of the recreational facilities developed and maintained privately. Other

The City of Mesa set up a committee of area residents to work with the Flood Control District on the design of the landscaping and of a maintenance road which would double as a bicycle and jogging trail. The landscape design includes varieties of Acacia and Palo Verde trees; ground cover such as Sweet Acacia with accents of Ocotillo, Cassia, and Bird of Paradise; and seeded grasses and shrubs like Bursage, Creosote, and Fillaree.

Included in the landscaping were areas set aside for trees that could be donated by interested citizens. Through this unique "tree donation" program, citizens donated money for the purchase of trees selected from a list of low-water-use and heat-resistant plants. This program resulted in more trees being planted than the District was prepared to purchase, and it allowed area residents to become partners in the process of landscaping their neighborhood.

OTHER Project Features

Floodways such as the EMF are perfect for parks and golf courses as they slow the velocity of the water and incur little or no structural damage should flooding occur. They also enhance the value of the property around them.

Private developments in such areas include golf courses at Superstition Springs and Leisure World.

Under an agreement with the District, the City of Mesa will be allowed to install recreational amenities in the landscaped portion—at its own expense. Any change proposed by the city requires the District's review and approval to ensure that these additions do not diminish the flood control capacity of the floodway.

OTHER East Valley Projects

In 1963, the Soil Conservation Service published three watershed work plans that proposed a comprehensive flood control program for the area between the Salt River and Queen Creek, east of Mesa and Chandler. Buckhorn-Mesa covers the area between the Salt River and Apache Trail. Apache Junction-Gilbert covers the area between the Apache Trail and Ray Road. Williams-Chandler covers the area between Ray Road and Queen Creek.

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For more information about this or other Flood Control District projects, contact:

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2801 West Durango Street
Phoenix, Arizona 85009
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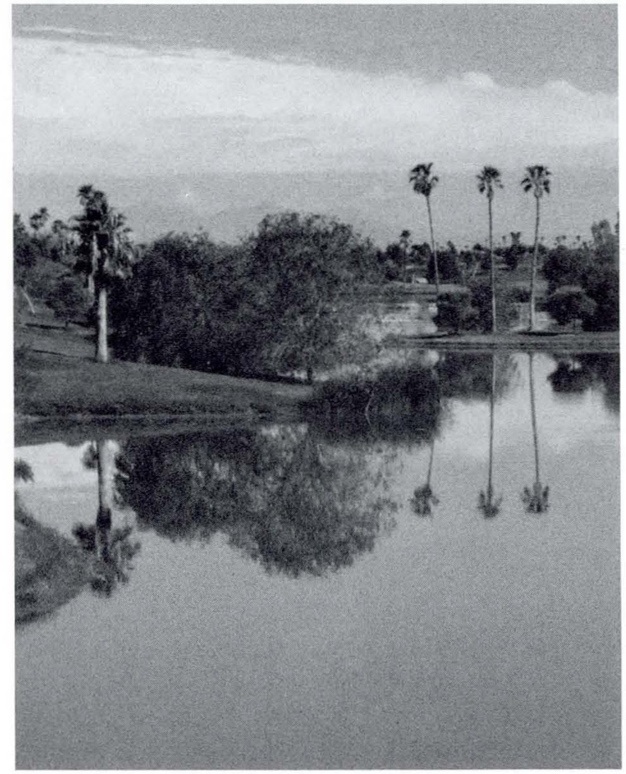
On the cover: *This golf course is an example of combining recreational uses with flood control structures. The golf course has been developed privately on the East Maricopa Floodway.*



THE EAST MARICOPA FLOODWAY

Another flood control project for Maricopa County

Published by the
Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, Arizona 85009
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EAST Valley Flooding

Before man altered the drainage pattern in the East Valley, water flowed in a northeast-to-southwest direction, through numerous washes, and into the Gila River. Floodwaters spread across the undeveloped desert. The introduction of irrigated farming and the construction of the associated irrigation canals altered the course of the floodwaters. Subsequent improvements such as farm ditches and land leveling, obliterated the washes. Floodwaters could no longer follow their natural courses and were forced across developed land. As development continued and property values increased, the failure of manmade waterways to convey floodwaters resulted in ever-increasing damages.

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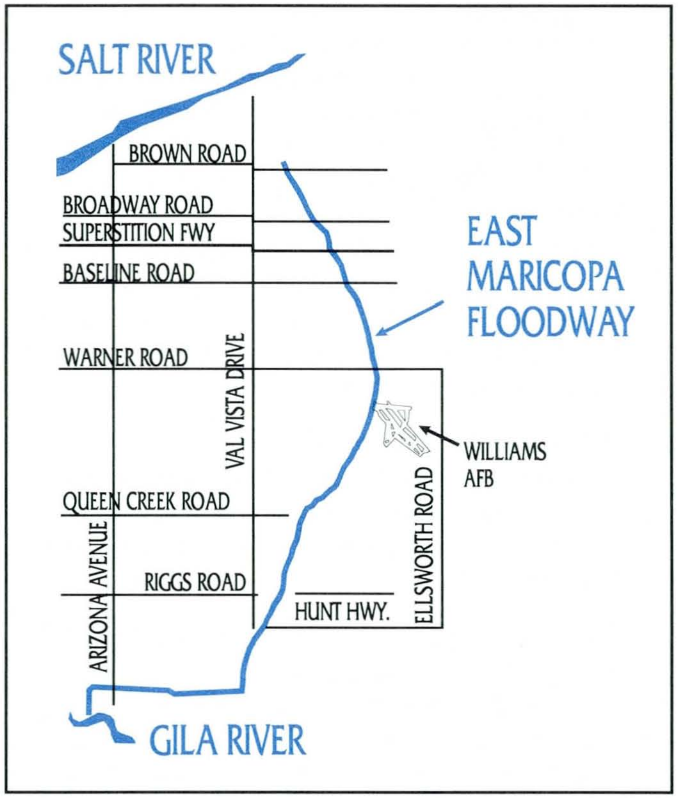
Summer rains (or monsoons), such as those causing the flooding in 1984, are generally associated with thunderstorms that form over the eastern mountains during the afternoon and spread over the valleys in the evening. Gusty winds and blowing dust usually precede the rainfall, which rarely lasts more than thirty minutes.

WHAT is the EMF?

The East Maricopa Floodway (EMF) was constructed to provide flood protection for development in the East Valley. The channel is more than 27 miles long and is located parallel to the Roosevelt Water Conservation District irrigation canal from Princess Basin (above Brown Road in Mesa), across Hunt Highway, and then westerly through Pinal County and into the Gila River, midway between State Route 93 and Interstate 10.



The structure is a compacted earthen channel, approximately 200 feet wide and ranging in depth from eight to twelve feet. The EMF spans three watershed projects: Buckhorn-Mesa, Apache Junction-Gilbert, and Williams-Chandler.

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COSTS and Sponsors

The Soil Conservation Service, an agency of the United Sates Department of Agriculture, designed and constructed the dams and channels. The Flood Control District is responsible for the operation and maintenance of the completed structures, with the exception of the recreational facilities developed and maintained privately. Other local sponsors of the EMF are the East Maricopa Natural Resource Conservation District and the Board of Supervisors of Pinal County.

The project was constructed in six reaches, with the last reach being completed in June of 1989. The Soil Conservation Service funded construction of the project. The Flood Control District of Maricopa County purchased land rights, relocated utilities, and constructed new bridges. The costs are broken down as follows:

Construction Costs for the EMF

Soil Conservation Service	$20,174,376
Flood Control District	$17,366,000

In 1992, Reach 6 of the EMF (between Brown and Broadway Roads) was landscaped by the District at a cost of $740,000. The District entered into an agreement with the City of Mesa to provide water for the plants.

Printed on recycled paper.

The City of Mesa set up a committee of area residents to work with the Flood Control District on the design of the landscaping and of a maintenance road which would double as a bicycle and jogging trail. The landscape design includes varieties of Acacia and Palo Verde trees; ground cover such as Sweet Acacia with accents of Ocotillo, Cassia, and Bird of Paradise; and seeded grasses and shrubs like Bursage, Creosote, and Fillaree.

Included in the landscaping were areas set aside for trees that could be donated by interested citizens. Through this unique "tree donation" program, citizens donated money for the purchase of trees selected from a list of low-water-use and heat-resistant plants. This program resulted in more trees being planted than the District was prepared to purchase, and it allowed area residents to become partners in the process of landscaping their neighborhood.

OTHER Project Features

Floodways such as the EMF are perfect for parks and golf courses as they slow the velocity of the water and incur little or no structural damage should flooding occur. They also enhance the value of the property around them.

Private developments in such areas include golf courses at Superstition Springs and Leisure World.

Under an agreement with the District, the City of Mesa will be allowed to install recreational amenities in the landscaped portion—at its own expense. Any change proposed by the city requires the District's review and approval to ensure that these additions do not diminish the flood control capacity of the floodway.

OTHER East Valley Projects

In 1963, the Soil Conservation Service published three watershed work plans that proposed a comprehensive flood control program for the area between the Salt River and Queen Creek, east of Mesa and Chandler. Buckhorn-Mesa covers the area between the Salt River and Apache Trail. Apache Junction-Gilbert covers the area between the Apache Trail and Ray Road. Williams-Chandler covers the area between Ray Road and Queen Creek.

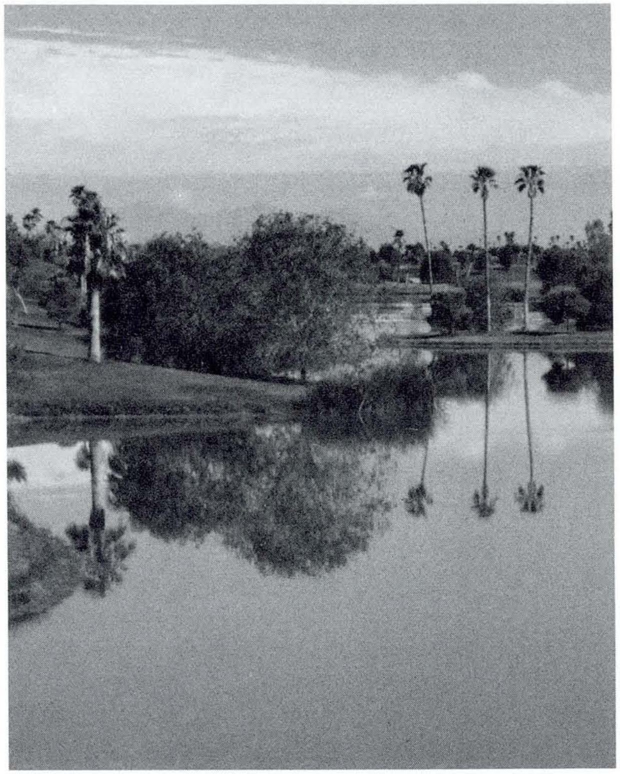
Within these watershed projects, the flood flows originating east of the RWCD irrigation canals are controlled by land treatment, nonstructural measures, floodwater retarding structures, and floodways.

Several flood retarding structures were built in each of the watersheds, including Spook Hill Dam; Signal Butte Floodway and Dam; Pass Mountain Diversion; Bull Dog Floodway; Apache Junction Dam; Powerline Dam and Floodway; Vineyard Dam; and Rittenhouse Dam.

For more information about this or other Flood Control District projects, contact:

Public Involvement Coordinator
Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, Arizona 85009
(602) 506-1501

On the cover: This golf course is an example of combining recreational uses with flood control structures. The golf course has been developed privately on the East Maricopa Floodway.



THE EAST MARICOPA FLOODWAY

Another flood control project for Maricopa County

Published by the
Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, Arizona 85009
(602) 506-1501

EAST Valley Flooding

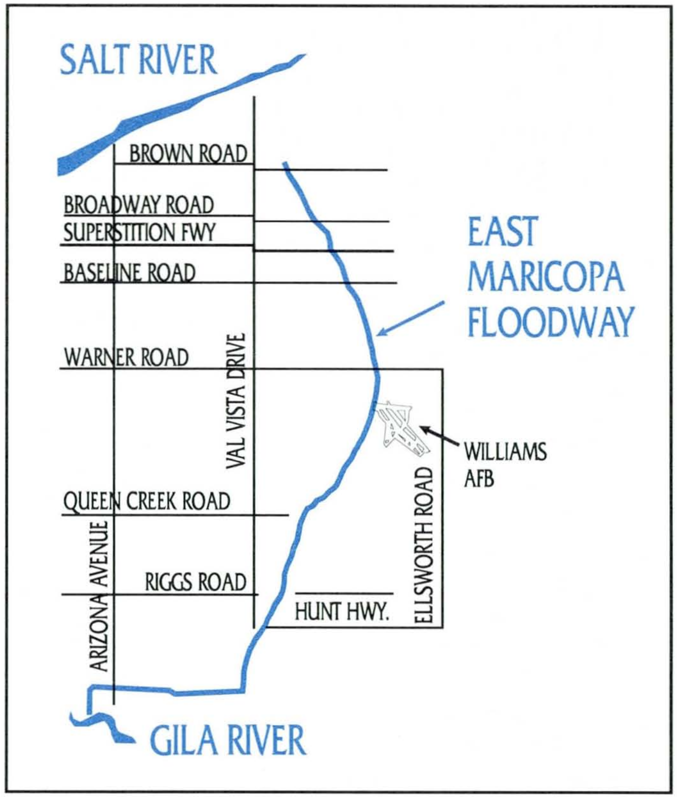
Before man altered the drainage pattern in the East Valley, water flowed in a northeast-to-southwest direction, through numerous washes, and into the Gila River. Floodwaters spread across the undeveloped desert. The introduction of irrigated farming and the construction of the associated irrigation canals altered the course of the floodwaters. Subsequent improvements such as farm ditches and land leveling, obliterated the washes. Floodwaters could no longer follow their natural courses and were forced across developed land. As development continued and property values increased, the failure of manmade waterways to convey floodwaters resulted in ever-increasing damages.

As recently as July 1984, localized heavy rainfalls resulted in approximately $2 million in flood damages to residences in East Mesa (between University Drive and Broadway Road in the vicinity of the Central Arizona Project Aqueduct).

Summer rains (or monsoons), such as those causing the flooding in 1984, are generally associated with thunderstorms that form over the eastern mountains during the afternoon and spread over the valleys in the evening. Gusty winds and blowing dust usually precede the rainfall, which rarely lasts more than thirty minutes.

WHAT is the EMF?

The East Maricopa Floodway (EMF) was constructed to provide flood protection for development in the East Valley. The channel is more than 27 miles long and is located parallel to the Roosevelt Water Conservation District irrigation canal from Princess Basin (above Brown Road in Mesa), across Hunt Highway, and then westerly through Pinal County and into the Gila River, midway between State Route 93 and Interstate 10.



The structure is a compacted earthen channel, approximately 200 feet wide and ranging in depth from eight to twelve feet. The EMF spans three watershed projects: Buckhorn-Mesa, Apache Junction-Gilbert, and Williams-Chandler.

The overall objective of the EMF is to restore, maintain, and enhance the quality of human environment through watershed protection and flood prevention.

COSTS and Sponsors

The Soil Conservation Service, an agency of the United Sates Department of Agriculture, designed and constructed the dams and channels. The Flood Control District is responsible for the operation and maintenance of the completed structures, with the exception of the recreational facilities developed and maintained privately. Other local sponsors of the EMF are the East Maricopa Natural Resource Conservation District and the Board of Supervisors of Pinal County.

The project was constructed in six reaches, with the last reach being completed in June of 1989. The Soil Conservation Service funded construction of the project. The Flood Control District of Maricopa County purchased land rights, relocated utilities, and constructed new bridges. The costs are broken down as follows:

Construction Costs for the EMF

Soil Conservation Service	$20,174,376
Flood Control District	$17,366,000

In 1992, Reach 6 of the EMF (between Brown and Broadway Roads) was landscaped by the District at a cost of $740,000. The District entered into an agreement with the City of Mesa to provide water for the plants.

Printed on recycled paper.

Mitigation 280 acres
Possibly BLM Land near Elliot & Ogglesby

RWCD FLOODWAY PROJECT December 29, 1980

The RWCD Floodway Project is planned to control floodwaters in East Maricopa County and northwest Pinal County. The Federal Agency responsible for design and construction of the project is the Soil Conservation Service a branch of the U. S. Department of Agriculture. In 1963 the SCS published three watershed work plans. The Buckhorn-Mesa watershed covers the area from the Salt River to Apache Blvd. The Apache Junction - Gilbert watershed covers the area from Apache Blvd. to Ray Road. The Williams-Chandler Watershed covers the area from Ray Road to the Gila River in the Gila River Indian Reservation in Pinal County. The RWCD Floodway is in all three watersheds. The project is funded under Public Law 566.

The Floodway is approximately 27.5 miles long and extends from a point 300 feet north of Brown Road to the Gila River near Sacaton, Arizona. It is adjacent to and immediately east of the RWCD Canal. The project is being designed and constructed in 6 reaches.

1. Reach 1 extends from the Gila River to State Highway 87 in the reservation. It is an earth lined channel with a 200' bottom width and is approximately 5.5 miles in length. Construction of the floodway began in August 1980. ADOT has completed construction of a bridge on State Highway 93 where it intersects the Floodway. Flood Control District has constructed a bridge on San Tan Road where it intersects the Floodway. During construction of the floodway FCD will construct two vehicular dip crossings through the channel. All utility relocation work in Reach 1 has been completed by the District. The project is designed for a 100-year storm and the designed discharge at the Gila River is 8,700 cfs. The Federal costs for Reach 1 is estimated to be 6.2 million and District costs estimated to be 0.6 million.

2. Reach 2 will extend from State Highway 87 to the north boundary of the Indian Reservation (Hunt Highway). It is approximately 5 miles in length,

a 200' wide bottom width earth lined channel with 3:1 side slopes and a maintenance road will be constructed on each side of the channel. About 1 mile within the Reach will be a concrete lined 50' wide vertical sidewall section. A bridge is to be constructed by ADOT over the channel where it intersects State Highway 87. A railroad bridge adjacent to State Highway near Gilbert Road and where the Southern Pacific Railroad Company spur line intersects the channel will be constructed by the SCS and the Flood Control District. Two vehicular dip crossings will be constructed across the channel in Reach 2. Gilbert Road is to be relocated to the west thus avoiding constructing a bridge where it intersects the channel at the present time. Utility relocation work is underway in Reach 2. Estimated construction costs and Flood Control District costs are not available for Reach 2 at this time. Construction of the channel is expected to begin in mid year 1981 and will take about 1 year to construct.

3. Reach 3 will extend from Hunt Highway (north boundary of Indian Reservation) to Queen Creek Road. The reach is approximately 4 miles in length and will be an earth lined channel with a bottom width of approximately 250 feet. The channel side slopes will be 3:1 with a maintenance road on each side of the channel. The RWCD channel will be constructed immediately east and upstream of the RWCD irrigation canal. The RWCD Floodway will intercept the existing Queen Creek channel at or near Queen Creek Road. The Flood Control District has constructed bridges at Chandler Heights Road and Queen Creek Road where they intersect the channel. The cost of each bridge was approximately $500,000.00. The SCS is presently doing geological exploration in this reach and will begin design of the channel in the near future. The District is active acquiring land rights for this reach but has not begun utility relocation work. Construction of the channel in this Reach is expected to begin in mid year 1982 and will take approximately one year to complete.

Additional bridges across the channel for this Reach are not required.

Reach 4. Reach 4 extends from Queen Creek Road to Ray Road a distance of approximately four miles. The channel bottom will vary in width from 130' to 200' with 3:1 side slopes and maintenance roads will be constructed on each side of the channel. One section of the channel will be a concrete lined channel. The bottom width is undetermined at this time. The concrete lined section will be near the Williams Field Road bridge. Bridges have been constructed by the District at Higley Road and Rittenhouse Road where they intersect the channel. The cost of each bridge was approximately $500,000. Bridges that remain to be constructed are the Southern Pacific Railroad bridge at Rittenhouse Road and a bridge at Williams Field Road where they intersect the channel. The District is active in acquiring right-of-way in this Reach. The SCS has not begun preliminary design of the channel and the District is in the process of doing some utility relocation work. The channel is planned for construction in mid year 1983. The channel will be constructed immediately east and upstream of the RWCD canal. The RWCD Floodway channel will intercept the flows from the existing Powerline Floodway channel that serves as an outlet for the Powerline FRS (dam), the Vineyard Road FRS (dam) and the Rittenhouse Road FRS (dam) all existing structures in Pinal County. It will take approximately one year to construct this Reach. Construction costs by the Soil Conservation Service for the channel nor local right-of-way costs are not available at this time.

Reach 5. Reach 5 extends from Ray Road to Apache Blvd. It is approximately 6.5 miles long and the channel bottom width varies from 90 feet to 170 feet. The channel side slopes will be 3:1 with a maintenance road constructed on each side of the channel. The channel will be earth lined. No bridges have been constructed in this reach. Bridges will be constructed at Elliot Road, Guadalupe Road, Baseline Road, the Superstition Freeway, Southern Avenue and Broadway Road where they all intersect the floodway. The cost of each bridge is estimated to be approximately $500,000.00. This cost will be borne by the Flood Control District except the Superstition Freeway crossing. It will be constructed by ADOT. The District has acquired some right-of-way within this Reach. Utility relocation work has not begun. The Soil Conservation Service has not started preliminary design. Construction of the channel is expected to start in mid year 1984 and will take approximately 2 years to complete.

Construction channel costs are not available at this time nor are FCD costs available. The channel will be constructed immediately east and adjacent to the RWCD Canal.

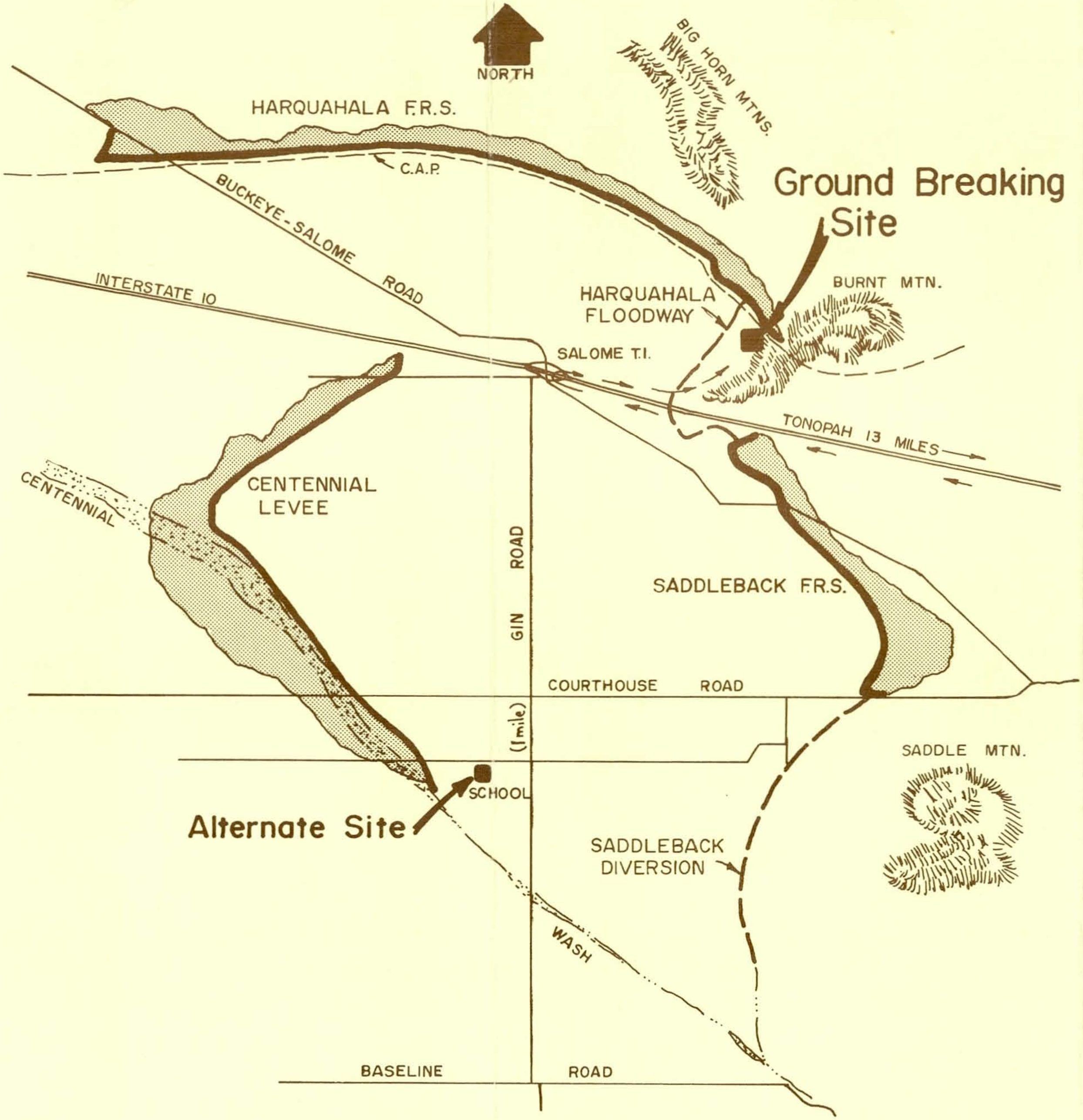
Reach 6. Reach 6 is approximately 1.5 miles long extending from Apache Blvd. to a point approximately 300 feet north of Brown Road. The channel bottom width will vary from 26 feet to 90 feet. A maintenance Road will be constructed on each side of the channel. No bridges have been constructed in this Reach. Bridges will be constructed at Apache Blvd., University Drive and Brown Road where they all intersect the floodway. Utility relocation work in this Reach remains to be done. Some right-of-way has been acquired. The Soil Conservation Service has not started preliminary design. This Reach is expected to be constructed in 1986 which will complete the project. Construction channel costs are not available at this time nor are local (FCD) costs available. Each bridge is expected to cost approximately $500,000.00. The FCD will bear the costs of bridges at University Drive and Brown Road. ADOT will construct the Apache Blvd. bridge.

GENERAL

The Soil Conservation Service (SCS) is the Federal agency responsible for design and construction of the floodway using Federal funds. The Flood Control District of Maricopa County (FCD or local agency) is responsible for acquiring right-of-way (R/W) for the project as well as constructing all bridges, roads, streets and relocating all utilities such as telephone, power, gas, sewer and water lines. When the project is completed the Flood Control District will operate and maintain the floodway or channel. Total costs for the project is expected to be approximately 40 million with local costs running about 20 million.

Sid Brase

DET



THE FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
INVITES YOU TO ATTEND

the

Ground Breaking Ceremonies

for the

Harquahala Valley Watershed Flood Control Project

Wednesday, April 9, 1980

10:30 A.M.

GROUND BREAKING CEREMONIES

BAND	Buckeye Union High School Concert Band
MASTER OF CEREMONIES	Hawley Atkinson, Board of Directors
INVOCATION	Maurice Ledford, Haraquahala Valley
PLEDGE OF ALLEGIANCE AND INTRODUCTION OF GUESTS	Hawley Atkinson
REMARKS	Thomas G. Rockenbaugh, State Conservationist Soil Conservation Service
	Edward H. Hallenbeck, Projects Manager Water andPower Resources Service
	John Fornes, Chairman, Buckeye-Roosevelt NRCD
	Frank Rogers, President, Harquahala Irrigation District
	Senator S. H. "Hal" Runyon
	Representative James B. Ratliff
	Representative Bob Denny
BENEDICTION	Maurice Ledford, Harquahala Valley

GROUND BREAKING

MUSIC SELECTIONS

Refreshments furnished by the Harquahala Cotton Company

HARQUAHALA VALLEY WATERSHED PROJECT

The objectives of the Harquahala Valley Watershed project are a watershed and conservation land treatment program to prevent and reduce floodwater, sediment, and erosion damages to productive agricultural lands, existing irrigation facilities, Interstate Highway 10, county and farm roads, commercial establishments, residences and public facilities. It is also desired that project measures provide maximum protection and benefit for the proposed Granite Reef Aqueduct of the Central Arizona Project and the proposed system of canals, laterals, and other improvements that will be installed in Harquahala Valley to distribute Central Arizona Project waters.

The Harquahala Valley Watershed project is actually composed of three individual projects—the Saddleback Floodwater Retarding Structure (FRS) and Diversion, the Harquahala Floodwater Retarding Structure and Floodway, and the Centennial Levee. (See map)

Construction will begin this year on the most downstream portion of the whole project, the Saddleback Diversion and then the Saddleback FRS. The Harquahala structures are scheduled for construction in 1981 and will be built jointly by the Soil Conservation Service and the Water and Power Resources Service. Construction of Centennial Levee will follow in 1982.

The water collected behind the Saddleback FRS and Diversion will outlet into Centennial Wash, going around most of the agricultural area. When the Harquahala structures are finished, the waters collected from them will be channeled into an existing wash and through existing box culverts under I-10 and then enter the pool area behind the Saddleback structures, eventually going into Centennial Wash also.

As required under Public Law 566, the Flood Control District has been acquiring rights-of-way for all three projects and relocating utility facilities in the area. During project construction, the Flood Control District will construct a bridge on Court House Road, a road ramp over the Saddleback FRS on Buckeye-Salome Road and relocate roads where necessary.

The structures are being designed by and will be constructed by the Soil Conservation Service. The local sponsors are the Flood Control District of Maricopa County, the Buckeye-Roosevelt NRCD and the Wickenburg NRCD. The Flood Control District will operate and maintain the structures upon completion.

PROJECT FEATURES

	Saddleback F.R.S.	Saddleback Diversion	Harquahala F.R.S.	Harquahala Floodway	Centennial Levee
Type of structure	Earthfill Dam	Earth Lined Channel	Earthfill Dam	Rock Riprap Channel	Compacted Earth Embankment
Length (miles)	5.27	4.64	11.5	3.43	9.45
Maximum Height (feet)	22	—	55	—	9.5
Drainage area (square miles)	29.6	8.65	102.3	.98	20.99
Total capacity	4,247 AF	6,289 cfs	10,911 AF	1,265 cfs	7,540 cfs
Top width (feet)	11	—	14	—	10
Volume of fill (cubic yards)	584,051	—	4,530,558	—	100,000
Bottom width (feet)	133	35 to 232	234	18 to 35	—
Costs (Estimated)					
Federal (x $1,000,000)	2.0	2.0	13.0		.5
Local (x $1,000,000)	.527	.331	.5		.7

Figures from the Supplemental Watershed Work Plan No. 1, **Harquahala Valley Watershed,** March, 1977

SPONSORING BOARDS

BOARD OF DIRECTORS FLOOD CONTROL DISTRICT

Fred Koory, Jr. (Chairman)
George Campbell
Ed Pastor
Tom Freestone
Hawley Atkinson

BUCKEYE-ROOSEVELT NRCD

John Fornes (Chairman)
Harry Porterfield
Wallace Bales
R. M. "Corkey" Narramore
Dick Napolitano

William D. Mathews, Chief Engineer and General Manager
FLOOD CONTROL DISTRICT of Maricopa County

Jerry Johnson
935-2802

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BUCKEYE-ROOSEVELT NRCD

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Harry Porterfield
Wallace Bales
R. M. "Corkey" Narramore
Dick Napolitano

William D. Mathews, Chief Engineer and General Manager
FLOOD CONTROL DISTRICT of Maricopa County

PROJECT Features

The most outstanding feature of Indian Bend Wash is the **greenbelt** through Scottsdale. As a flood control channel, it conveys flood flows through Scottsdale to the Salt River. As a recreational amenity, it provides open space, grass, golf courses, ball fields, hiking and bicycle trails, picnic areas, boating, and many other quality of life features for residents and visitors alike.

It is the greenbelt which makes the Indian Bend Wash acclaimed throughout Maricopa County, the State of Arizona, and the nation.

The greenbelt extends from McDonald Drive to McKellips Road and conveys flood flows from the Inlet to the Outlet at the Salt River.

The **outlet channel** is an earthen excavated channel from McKellips Road south to the Salt River. It was completed in 1977.

The **inlet** is an earthen channel from Indian Bend Road south to McDonald Drive which collects flows above the Arizona Canal, conveys them across the canal, and discharges the flows into the greenbelt floodway. It was completed in 1979.

The **siphon** passes water in the Arizona Canal under Indian Bend Wash. It was designed to permit diversion of canal flows in the wash, but prevents wash flows from entering the Arizona Canal.

The **interceptor** was constructed north of the Arizona Canal and east of the Wash between Pima and Hayden Roads. It intercepts and disposes of floodwaters that pond behind the north bank of the Arizona Canal. It also contains a spillway section where the Arizona Canal can overflow into the interceptor channel rather than overtopping its south bank and causing flood damages. It was completed in 1981.

The **collectors and side channels** are a series of channels and underground pipes that collect floodwaters from the west side of the Arizona Canal to prevent ponding and overtopping of the canal. The collectors and side channels were completed in 1985.

COSTS and Sponsors

The project was designed and constructed by the U.S. Army Corps of Engineers with the Flood Control District as the local flood control sponsor and the City of Scottsdale as the recreation sponsor.

The Corps of Engineers contributed $29 million of the Indian Bend Wash. The Flood Control District purchased the land rights, built bridges, and relocated utilities and spent approximately $12.5 million for its local sponsor costs. The City of Scottsdale spent $14 million in developing the greenbelt.

For more information on this or any other District project, contact:

Public Involvement Coordinator
Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, Arizona 85009
(602) 506-1501

On the cover: A bicyclist takes advantage of the paved paths alongside the Indian Bend Wash.

INDIAN BEND WASH

Innovation in Flood Control

Published by the
Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, Arizona 85009
(602) 506-1501

WHAT is the Indian Bend Wash?

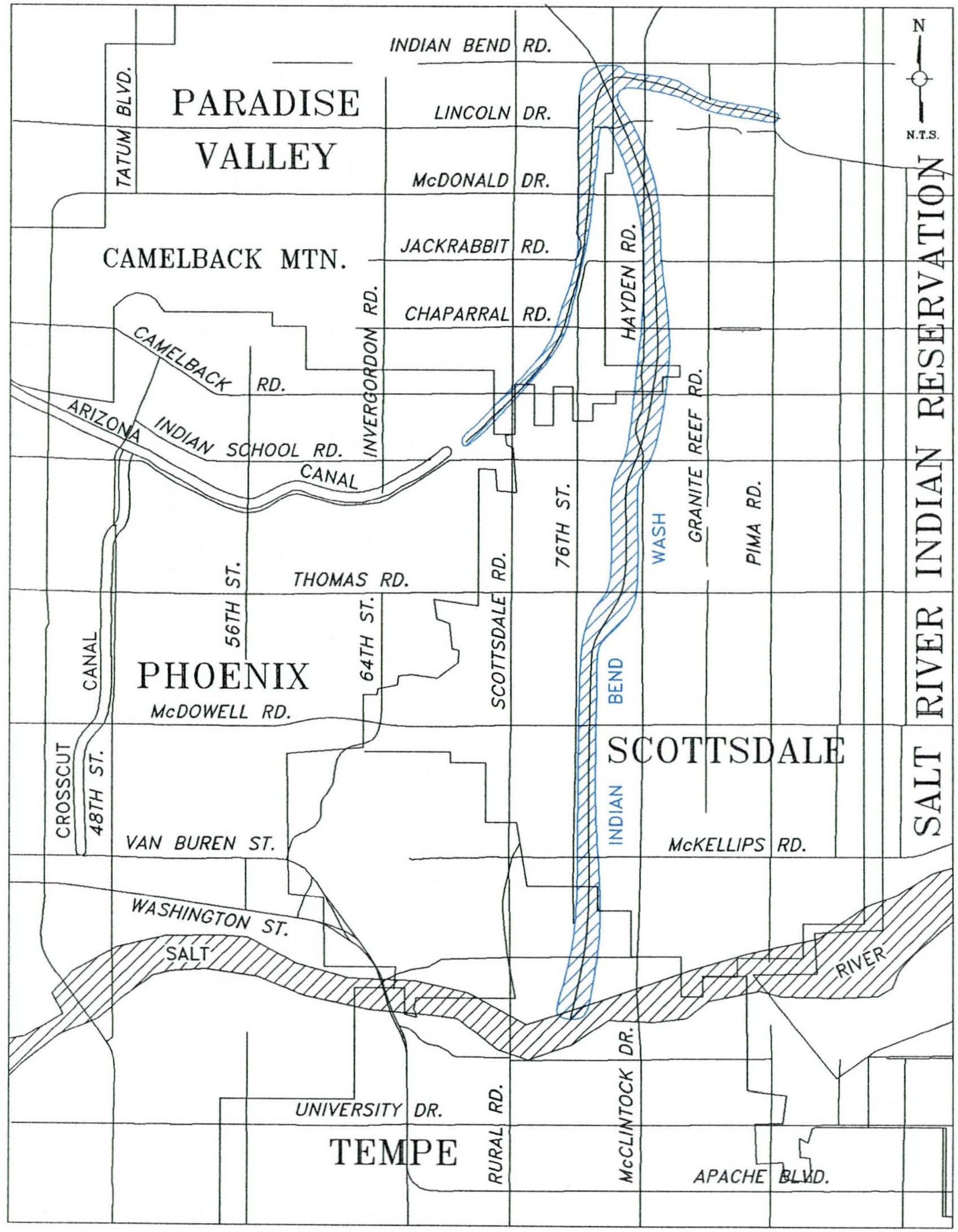
The creators of the Indian Bend Wash Flood Control Project took a lesson from nature and then gave nature a helping hand.

Nature typically provides a riverbed for flows and a floodplain on either side to handle floods in particularly wet years. In a natural setting, this works fine; however, people often encroach on the river and build homes or businesses in the floodplain.

The concept for Indian Bend Wash was to confine the flood to its natural path with structural elements and then enrich the natural path with golf courses, trails, picnic areas, ball fields, and other recreation features. The heart of the concept is the greenbelt, a 4 1/2-mile grassy swale, ranging in width from 600 to 1,100 feet.

Indian Bend Wash is designed to safely handle the 100 year flood, which is a major flood with a mathematical probability of occurring once every 100 years. There is no guarantee included with that timetable. It could happen 100 years from now, or it could happen tomorrow.

Floodwater poses a major erosion problem in the fragile desert environment. The engineering answer in the case of Indian Bend Wash was grass. Well-planted, well-kept, and well-maintained grassy areas give the land the protection needed to withstand the fast-moving floodwaters.



Printed on recycled paper.

GILA RIVER BASIN, ARIZONA
INDIAN BEND WASH
DESIGN MEMORANDUM NO. 4

FEATURE DESIGN
FOR INTERCEPTOR CHANNEL

REPORTS PREVIOUSLY ISSUED

Title	Date of Report	Date Approved
Interim Report on Survey for Flood Control, Indian Bend Wash, Arizona	15 Apr 1962	4 Sep 1963 (by OCE)
Final Environmental Statement Indian Bend Wash, Arizona	23 Oct 1973	22 Jul 1974 (Filed with CEQ)
Design Memorandum No. 1, GDM Phase 1, Plan Formulation for Indian Bend Wash	23 Oct 1973	3 Apr 1974 (by OCE)
Design Memorandum No. 1, GDM Phase 1, Plan Formulation for Indian Bend Wash Supplementary Report on Side Channels System	Sep 1974	May 1975 (by OCE)
Design Memorandum No. 1, GDM Phase II, Project Design for Indian Bend Wash	May 1975	17 Jul 1975 (by OCE)
Design Memorandum No. 1, GDM Phase II, Project Design for Indian Bend Wash Supplemental Report No. 1 *	15 Apr 1976	18 Jun 1976 (by SPD)
Design Memorandum No. 2 Recreation Master Plan Indian Bend Wash	May 1975	25 Sep 1975 (by OCE)

REPORTS PREVIOUSLY ISSUED (continued)

Title	Date of Report	Date Approved
Design Memorandum No. 2 Recreation Master Plan Indian Bend Wash Supplemental Report No. 1 *	15 Apr 1976	18 Jun 1976 (by SPD)
Design Memorandum No. 2 Recreation Master Plan Indian Bend Wash Supplemental Report No. 2	Jan 1977	23 Feb 1977 (by SPD)
Design Memorandum No. 3 Feature Design for Inlet Channel Indian Bend Wash	Jan 1978	23 Feb 1978 (by SPD)

SCHEDULED FOR FUTURE ISSUANCE

Title	Date of Report	Date Approved
Design Memorandum No. 5 Feature Design for Side Channel System, Indian Bend Wash	Jun 1980 **	Jul 1980 ** (by SPD)

* A supplemental letter report for General Design Memorandum - Phase II and the Recreation Master Plan. The report presented a revised beautification plan for the outlet and reallocated costs for recreation landscaping.

** Anticipated date.

GILA RIVER BASIN, ARIZONA
INDIAN BEND WASH

DESIGN MEMORANDUM NO. 4

FEATURE DESIGN FOR INTERCEPTOR CHANNEL

PERTINENT DATA

PHYSICAL DATA

Project Drainage Area, Square Miles 206[1/]

Flood Control Components	Design Discharge (cfs)[2/]	Length	Type of channel	Width[3/] (ft)	Depth (ft)
Interceptor channel Pima Road to Indian Bend Wash	5,500	1.3 mi	Trapezoidal, unlined	100 to 150	7 to 10
Wasteway	2,500	110 ft	Reinforced concrete	60	0 to 13.5
Siphon	2,000	1,763 ft[5/]	Reinforced-concrete open channel and box	62 to 30	
Inlet Channel (Indian Bend Road to McDonald Dr.)	30,000	1.3 mi	Trapezoidal[4/]	420 to 640	12 to 14
Greenbelt floodway (McDonald Dr. to Van Buren St.)	30,000	4.5 mi	Greenbelt	200 to 2,300	varies
Outlet channel (Van Buren St. to the Salt River)	30,000	1.9 mi	Trapezoidal[4/]	540 to 600	3.4 to 9.4
Collector Channels[6/]					
(open)	50 to 2,000	1.4 mi	Trapezoidal, unlined	4 to 134	2 to 4
(covered)	100 to 325	1.8 mi	Reinforced concrete pipes	48" to 96" dia	--

Project Function (continued)

Flood Control Components	Design Discharge (cfs)2/	Length	Type of Channel	Width3/ (ft)	Depth (ft)
Side channels6/					
McDonald Drive	645	0.4 mi	Two reinforced concrete pipes	75" dia.	--
Chaparral Road	610	0.6 mi	One reinforced concrete pipe	93" dia.	--
Camelback Road	1,100	1.0 mi	Reinforced concrete box	9.5 x 9.5	--

Recreation Components	Location	Size
Trail System	Salt River -Pima Rd	11 miles
Scottsdale Bike Stop	Thomas Rd.	2 acres
Indian School Park	Between Camelback Rd. and Indian School Rd	60 acres
Hohokam Plaza	McDowell Rd.	8 acres
McKellips Lake	Upstream from McKellips Rd.	18 acres

1/ Does not not include drainage area east of Pima Road, which contributes flow to Arizona Canal and interceptor channel

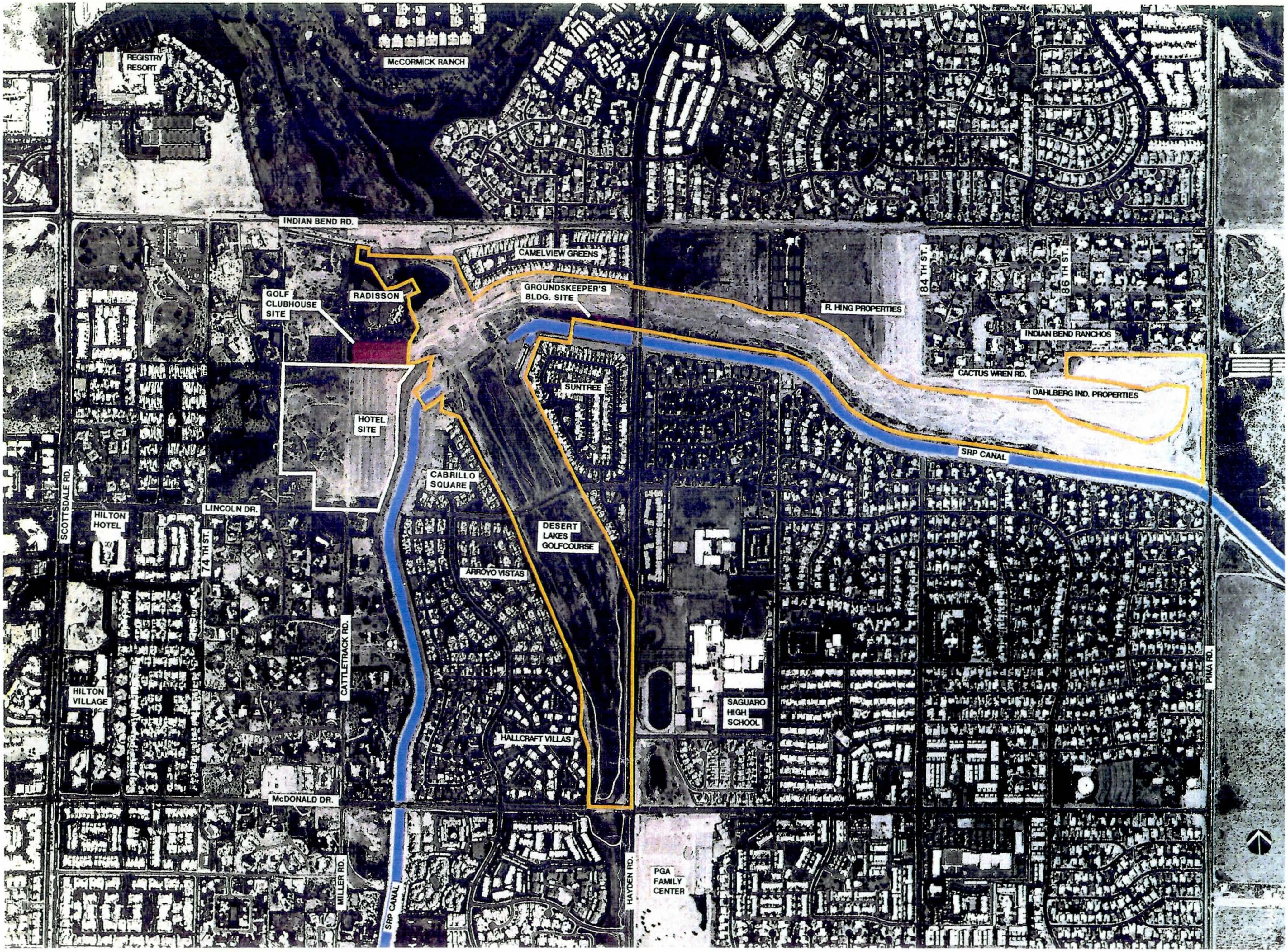
2/ Design discharges are based on a 100-year flood, except for the collector and side channels which are based on 50- and 25- year floods.

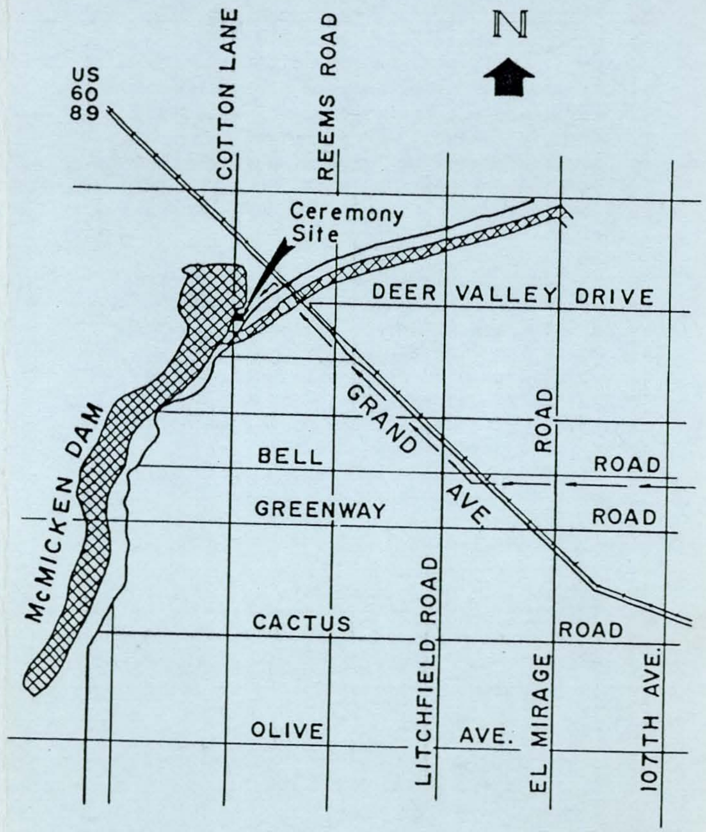
3/ Bottom width for trapezoidal section.

4/ Stone revetted banks covered by landscape fill-unlined invert.

5/ Includes outlet and inlet sections.

6/ Data shown for Side Channel System is in accordance with Phase II GDM design. Feature Design will be presented in DM No. 5.

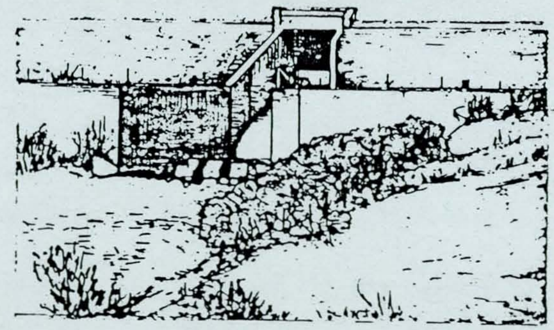

REGISTRY RESORT
McCORMICK RANCH
INDIAN BEND RD.
CAMELVIEW GREENS
GOLF CLUBHOUSE SITE
RADISSON
GROUNDSKEEPER'S BLDG. SITE
R. HING PROPERTIES
84TH ST.
86TH ST.
INDIAN BEND RANCHOS
CACTUS WREN RD.
DAHLBERG IND. PROPERTIES
SUNTREE
HOTEL SITE
SRP CANAL
CABRILLO SQUARE
SCOTTSDALE RD.
HILTON HOTEL
LINCOLN DR.
74TH ST.
DESERT LAKES GOLFCOURSE
ARROYO VISTAS
CATTLETRACK RD.
HILTON VILLAGE
SAGUARO HIGH SCHOOL
HALLCRAFT VILLAS
PIMA RD.
McDONALD DR.
MILLER RD.
SRP CANAL
HAYDEN RD.
PGA FAMILY CENTER



THE FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
INVITES YOU TO ATTEND
Dedication Ceremony
for

RESTORATION OF McMICKEN DAM

(TRILBY WASH DETENTION BASIN)



Thursday, September 27, 1984
10:00 A.M.

DEDICATION CEREMONY

for the

RESTORATION OF

MCMICKEN DAM

FLOOD CONTROL PROJECT

THURSDAY, SEPTEMBER 27, 1984

10:00 A.M.

Band Selections	Peoria High School Jazz Ensemble
Master of Ceremonies	Hawley Atkinson Board of Supervisors
Pledge of Allegiance	Hawley Atkinson
Star Spangle Banner	Peoria High School Jazz Ensemble
Invocation	Rev. Dr. Gene Siekmann Faith Presbyterian Church
Remarks and Introduction of Guests	Hawley Atkinson
Remarks	Col. Arley W. McRae, USAF Base Commander, Luke AFB
Remarks	Paul Tatz, President Del E. Webb Development Co.
Remarks	Hank Raymond, President Board of Directors Maricopa Water District
Benediction	Rev. Dr. Gene Siekmann

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Refreshments will be provided by the Del E. Webb Development Company

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Hawley Atkinson	Tom Freestone
George Campbell	Ed Pastor

D. E. Sagramoso, P. E. Chf Eng & Gen Mgr
Flood Control District of Maricopa County

McMICKEN DAM

(TRILBY WASH DETENTION BASIN)

McMicken Dam was built in 1956 by the Corps of Engineers and until it was declared unsafe and breached by the Corps in July of 1977, it served to provide flood protection from the Trilby Wash drainage basin for Luke Air Force Base, the Beardsley Canal and its laterals, agricultural land, Phoenix Litchfield Municipal Airport, and the communities of Goodyear, Avondale and Litchfield Park. McMicken Dam is located approximately eight miles northwest of Luke Air Force Base and extends along the Beardsley Canal alignment from Peoria Avenue to Grand Avenue. The dam intercepts flows from the 248 square mile Trilby Wash drainage basin and conveys them in a controlled fashion to the Agua Fria River.

In the summer of 1951, heavy rains over the Trilby Wash drainage basin resulted in estimated flood damages of $3 million to Luke Air Force Base and agricultural and residential developments in Litchfield and Goodyear. In response to this flooding, a 4 mile long, 23 foot high earth embankment was constructed by the Agua Fria Soil Conservation District and the Maricopa Water District in 1952, a portion of which was later incorporated into the northern 2.3 miles of McMicken Dam.

The Trilby Wash Detention Basin and Outlet Channel (McMicken Dam) was authorized by Congress in 1953 for emergency flood protection for Luke Air Force Base. The Corps of Engineers was authorized to design the structure and construction of the dam was completed in July 1956 on properties and easements obtained by the local sponsor, Maricopa County.

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PROJECT FEATURES

Random earthfill dam, 9.4 miles in length, averaging 25 feet in height with a 12 foot wide crest

Principal outlet is 20 x 11 feet with a maximum discharge of 4,450 cfs

Drainage basin - 248 square miles; reservoir area - 2,300 acres; reservoir pool - 19,300 acre-feet; outlet channel to the Agua Fria River - 6 miles long

16 February 1982

FACT SHEET

McMICKEN DAM

PHYSICAL DATA

Drainage Area	- 247 sq. mi.
Construction	- Compacted earth-fill
Dam Crest	- Elevation 1361 FMSL Length 52,400 ft. (including spillway)
Spillway	- Elevation 1354 FMSL Length 2,000 ft. grouted stone
Auxiliary Spillway	- Elevation 1343 erodible to elevation 1341 FMSL Length 700 ft. notch
Outlet	- Elevation 1335 FMSL, ungated 11 X 20 rectangular orfice
Auxiliary Outlet	- Elevation 1340 FMSL Length 110 ft. notch
Gross Storage	- 19,300 acre-feet
Design Flood	- 35,000 cfs; 32,800 acre-feet
Spillway Design Flood	- 52,000 cfs; 44,000 acre-feet

HISTORY

Aug 1951	- Large floods spurred flood control efforts
March 1952	- Corps of Engineers authorized to make study
Summer 1952	- Agua Fria Soil Conservation District and M.C.M.W.C.D. No. 1 build 4 mile long interim structure
Aug 1953	- 83rd Congress authorized Secretary of the Air Force to construct Trilby Wash Detention Basin
Aug 1953	- Maricopa County Board of Supervisors adopted a resolution making that Agency the local sponsor
May 1954	- SCS Dams No. 3 & 4 completed
March 1955	- Appropriation of $2,873,000 approved for construction

July 1955	-	Contract awarded for construction.
July 1956	-	Construction completed.
Aug 1956	-	Structure turned over to Maricopa County for O&M.
Aug 1963	-	Cracks noted on annual inspection by M.W.D.
1964) 1966) 1969) 1971)	-	Surface irregularities noted during inspection by Corps; rodent holes and depressions filled with dirt and grout; grading of crest and side slopes to fill erosion ditches and surface cracks.
Mar 1972	-	Transverse cracks up to 14 feet deep discovered during Corps investigation.
Jan 1973	-	Corps report on cause of embankment cracking and recommended remedial treatment.
Feb 1974	-	Corps notified Air Force they would have to fund further work or studies.
July 1976	-	Air Force notified Corps that dam was not their property.
Aug 1976	-	Maricopa County FCD advises Corps that they cannot fund remedial work which is beyond normal O&M.
Jan 1977	-	Chief of Engineers directed Los Angeles District to determine feasibility of temporary remedial construction or breaching.
May 1977	-	Los Angeles District requests PL99 funds to breach dam at two locations, funds made available.
June 1977	-	Maricopa County Board of Supervisors gives local assurances.
21 Jun 1977	-	Construction begins on breaches.
25 Jul 1977	-	Construction on breaches completed.
1977	-	Senate Bill 1529 - Transfer Dam to Secretary of Army for repair (not acted on by Congress).
2 Mar 1978	-	Flood occurs-more than 1 foot of water flows through breaches.
Oct 1979	-	House Bill H.R. 4788 - Transfer Dam to Secretary of Army for repair (not acted on by Congress).

May 1981 - Resolution by Board of Directors of F.C.D. authorized study to determine feasibility of repair.

Sep 1981 - Notice to Proceed given Sergent, Hauskins & Beckwith

PRELIMINARY FINDINGS & SOLUTIONS

I It is possible to repair the Dam.

II Remedial measures being considered:

A. Fill and grout existing cracks.

B. Upstream grading and filling to eliminate ponding.

C. Internal drains using filter fabric, plus A & B.

D. Upstream slope membrane with partial cutoff wall, plus A & B.

E. Pervious overbuilt fill on downstream slope with toe drain, plus A & B.

F. Some combination of C.D. & E. plus A & B.

May 1982 - Submit final report.

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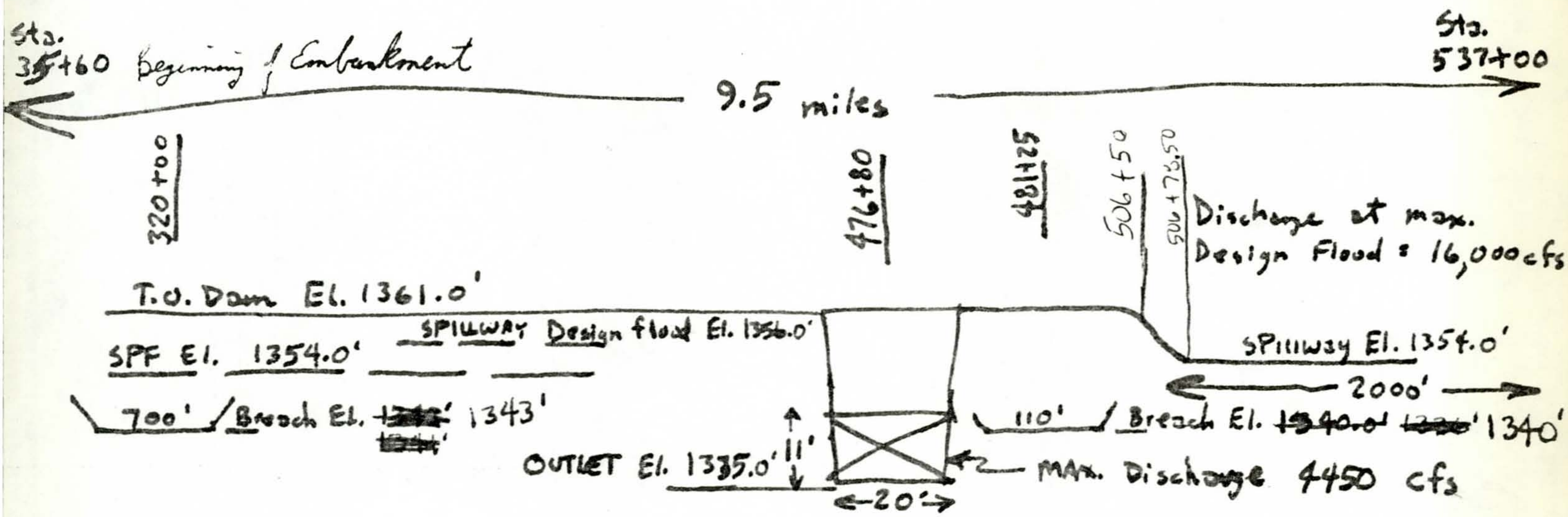
McMicken Dam

3-2-81



(Bottom El. of minor flood channel = 1335.0')

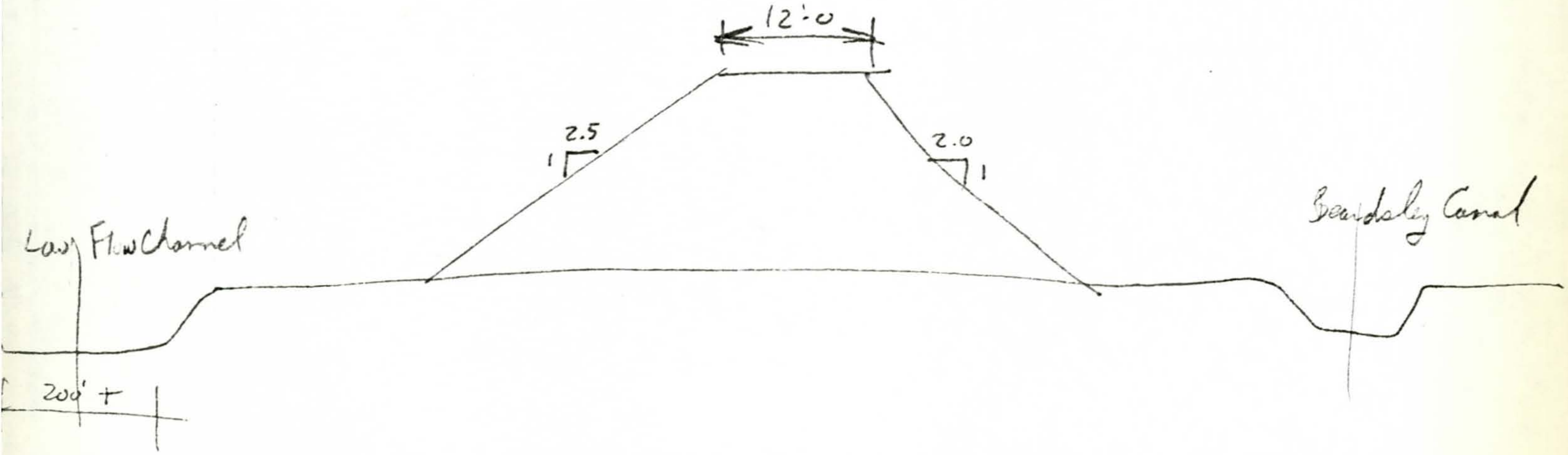


Table 7

Summary of pertinent data, Trilby Wash detention basin, Arizona

Item	Unit	Quantity
Drainage area	Square miles	247
Dam (earth-, sand-, and gravel-fill):		
Crest elevation	Feet, m.s.l.	1,361.0
Height above streambed	Feet	31.5
Average height	do	20.5
Length at crest	do	49,500
Freeboard	do	5.0
Spillway, on left abutment (broad crest - grouted stone):		
Crest length	do	2,000
Crest elevation	Feet, m.s.l.	1,354.0
Outlets:		
Flood control (ungated):		
10'x10' double box	Number	1
Invert elevation at intake	Feet, m.s.l.	1,335.0
Conduit length	Feet	110
Drainage (gated):		
24" diameter pipes	Number	6
Standard project flood (design flood):		
Peak inflow	C.f.s	35,000
Peak outflow	do	4,450
Volume (3.5 days)	Acre-feet	32,800
Spillway design flood:		
Peak inflow	C.f.s	52,000
Peak outflow	do	22,000
Volume (3.5 days)	Acre-feet	44,000
Storage allocation:		
Flood control	Acre-feet	16,800
Sediment	do	2,500
Total	do	19,300
Spillway:		
Crest elevation	Feet, m.s.l.	1,354.0
Area	Acres	2,230
Maximum water surface:		
Elevation	Feet, m.s.l.	1,356.0
Area	Acres	2,520
Capacity (Gross)	Acre-feet	23,800

DM No. 1, Hydrology and Hydraulic Design for Trilby Wash
Detention Basin and Outlet Channel
November 1953

McMicken Dam

stage recorder would be on the downstream end of the railroad bridge pier. Three reservoir water level recorders would be installed at the approximate locations shown on plate 11. The stilling wells would be placed in the embankment of the dam and intake pipes extended to the flood flow channel so that all inflow would be recorded. These recorders would be so placed that water surface elevations to top of dam would be recorded. The rain gages, stream gaging station and water surface recorders would be operated and maintained by local interests, with data furnished to the District Engineer, Los Angeles District, Corps of Engineers.

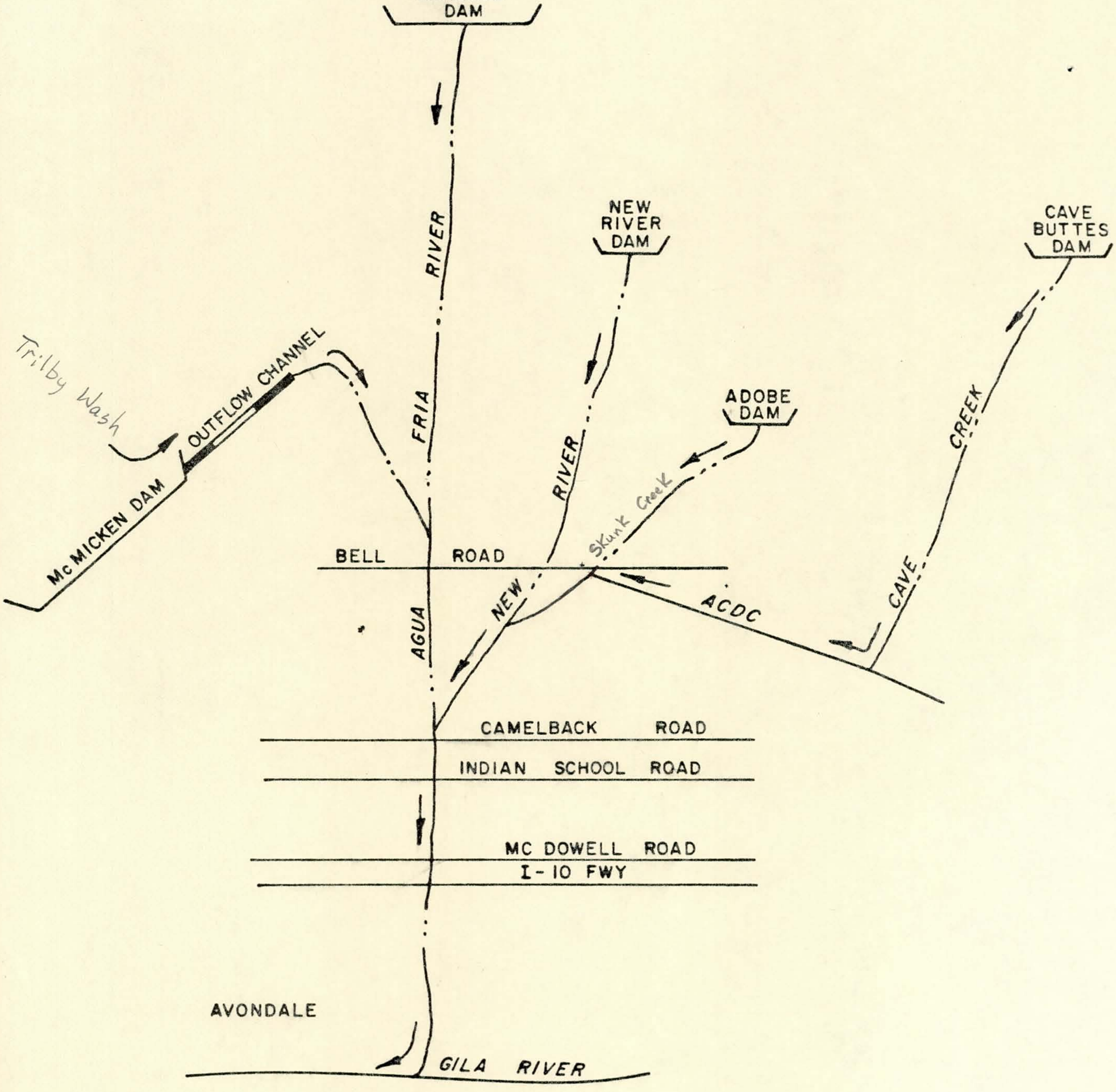
44. Detention-basin operation.--As previously indicated, the standard project flood was selected for use in the design of Trilby Wash detention basin. Because outlets would be ungated, the outflow from the detention basin would be uncontrolled. Under the operation of the detention basin, the standard project flood (peak inflow of 35,000 cubic feet per second) would be reduced to a peak outflow of 4,450 cubic feet per second, and the reservoir water surface would reach elevation 1,354.0 (spillway crest), as indicated on plate 15. As in the project design flood, the maximum water surface elevations resulting from the spillway-design and maximum-probable floods were determined by assuming that such floods would occur with reservoir empty. Routing studies, shown on plate 16, indicate that the spillway design flood (peak inflow of 52,000 cubic feet per second) would be reduced to a peak outflow of 22,000 cubic feet per second, with the maximum water surface at elevation 1,356.0 feet. The maximum probable flood peak inflow of 120,000 cubic feet per second would be reduced to 95,000 cubic feet per second, with the maximum water surface at elevation 1,360.0 feet. With water surface at spillway crest (elevation 1,354.0), the detention basin evacuation time would be about 3 days. Computations are shown on pages 22 to 29.

45. Six gated drainage pipes through the existing embankment would be lengthened. These pipes, which would be maintained and operated by local interests, would drain pockets at various low points along the embankment. The outflow from these pipes would be directed into the Beardsley Canal. This outflow was not considered in the routing studies.

46. Control of stream during construction of dam.--During construction of the dam, flows would be permitted to follow natural water courses through gaps left in the embankment. The existing detention dam would remain in operating condition until the outlet works and diversion channel are completed.

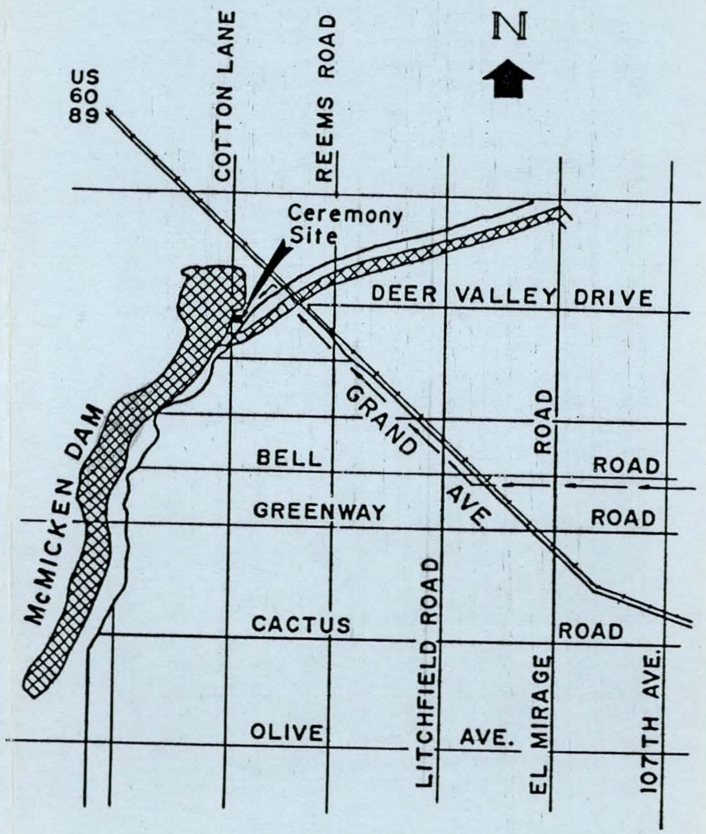
Summary

47. Summary of pertinent data.--A summary of pertinent data on Trilby Wash detention basin is given in table 7.



SCHEMATIC FLOW DIAGRAM

PLATE 6



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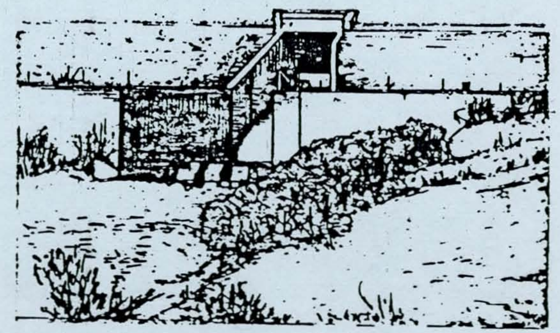

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			Engineer	Construct	C/E
IBW	Side Channels Approvals	CA.3.1			
	Side Channel Extension	CA.3.1 (26.S.3)			
	Greenbelt Approvals	CD.3.2.2			
	Topo. Mapping	CD.3.2.2			
	Inlet Approvals	CB.12.1			
	Outlet Channel Approvals	CC.12.1			
ACDC	Phoenix Utility Masterplan	CI.1.1.2.1	84-39		
General Corresp. CI.1.1	Glendale	CI.1.1.3			
COE CI.1.1.1	Glendale Utilities	CI.1.1.3.1			
	SRP	CI.1.1.5			
Phx. CI.1.1.2	ADOT I-17	CI.1.1.8			
	59th Avenue Bridge	CI.5.3.1.1	82-18	83-20	
Glndle CI.1.1.3	59th Ave. Canal Bridge			82-32	
	Thunderbird Road Bridge	CI.5.3.1.2	82-20	83-19	
Peoria CI.1.1.4	T'Bird Rd. Canal Bridge			82-33	
SRP CI.1.1.5	67th Avenue Bridge	CI.5.3.1.3	82-19	84-23	
	51st Avenue & Cactus Road	CI.5.3.1.4	83-29	85-2	
Pblc. Mtg. CI.1.4	Temp. Haul Bridge			83-25	
	51st Canal Bridge Widen.			83-39	
	Cactus Canal Bridge Widen.			83-40	
	47th Ped. Bridge AZ Canal			84-18	
	75th Avenue Bridge	CI.5.3.1.5	84-8	85-3	
	43rd Ave. & Peoria	CI.5.3.1.6	84-9		
	43rd Ave. Sewer & Siphon	"	"	85-44	
	35th Ave. Bridge	CI.5.3.1.7	84-10		
	29th Ave. Bridge	CI.5.3.1.8	84-11	85-40	85-46
	25th Ave. Bridge	CI.5.3.1.9	84-12	85-1	
	Fabricate Box Girders			84-37	
	Hatcher Rd. 19th Ave.	CI.5.3.1.10	84-34	86-17	
	25th Ave. Sewer Siphon	CI.5.3.1.11	85-27		
	19th Ave. Sewer Siphon	CI.5.3.1.12			
	47th Ped. Bridge ACDC	CI.5.3.1.13	85-36		
	APS	CI.5.3.3.1			
	APS Gas Southwest Gas	CI.5.3.7			
Reach 4' Tunnel Alternative	Mountain Bell	CI.5.3.6	86-37		
New River	Desert Harbor Drop Struct.	CJ.1.1			
McMicken Dam	Preliminary Design	CK.10			
	Final Design	CK.10.1		83-31	
PVSP	ADWR	LC.1.1.8			
	Phoenix	LC.1.1.2			
	Scottsdale	LC.1.1.6			
	Paradise Valley	LC.1.1.7			
	Coord. With Agencies	LC.3.2			
	Construction Agreements	LC.1.2.3			
	B/C Study	LC.1.3.3			
Scottsdale	General File	26.S.3			
Paradise Valley	General File	26.P.2			
	Drainage Study	26.P.2			
Glendale	General File	26.G.6			
Peoria	General File	26.P.3			
Land Subsidence		26.L.4			
White Tanks	White Tanks #3&4 Repairs	SO.12.3			
Bulldog Floodwy	Soils, Merid. Rd. Ironwd.		FCD 85-33		

Paradise Valley Drainage Study (Lincoln Drive Storm Drain) 26.P.2 ~~6C0275~~

Union Hills Drainage Study File: LL-UH

- Stoneridge Dam
- Sunridge Canyon Dam
- Tat Momolikot Dam

- Aspen Dam
- Golden Eagle Park Dam
- Hesperus Dam
- North Heights Dam

Model	Structure	Crest of Spillway	IDF	Top of Structure	Acres to IDF	Cost to IDF	Acres to Top of Structure	Cost to Top of Structure
DEM-100'	Adobe Dam	1377.8	1397.5	1403	2403.6	$144,216,000	3338.6	$200,316,000
DEM-100'	Cave Butte Dam	1657.1	1674.1	1679.1	2602	$65,050,000	2828.3	$70,707,500
A203.603	Dreamy Draw Dam	1409	1404.50	1419.0	24.4	$4,270,000	47.2	$8,260,000
DEM-100'	New River Dam	1456.2	1481.1	1486.7	2987	$23,896,000	3179.8	$25,438,400
digitized contours	McMicken Dam	1354	1356.0	1361.0	2499.1	$19,992,800	3080.7	$24,645,600
dtm	Apache Jct	1799.77	~	1810		~~$0~~	178.2	$4,989,600
(-channel)dtm	Buckeye 1	1079.8	~	1089.5		~~$0~~	1905	$2,286,000
(-check w.end)dtm	Buckeye 2	111.2	~	1117		~~$0~~	188.3	$414,260
dtm	Buckeye 3	1163.2	~	1170		~~$0~~	274.3	$960,050
DEM-100'	Guadalupe	1274.0	1278.4	1281.5	44.1	$15,435,000	61.5	$21,525,000
dtm	Harquahala	1408.4	1412.66	1419.7	1324.6	$1,059,680	2023.6	$1,618,880
dtm	Powerline	1583..	~	1589.1		$0	607.4	$12,148,000
dtm	Rittenhouse	1597.6	~	1602.3		~~$0~~	767.9	$19,197,500
dtm	Saddleback	no emergenc	~	1193		~~$0~~	865	$865,000
dtm	Signal Butte	1712.4	~	1721		~~$0~~	188.5	$5,655,000
dtm	Spook Hill	1582.0	1584.7	(1591-) 1593.3	251.6	$7,548,000	465	$13,950,000
digitized contours	Sunnycove	2170	~	2178.5		~~$0~~	22.2	$777,000
digitized contours	Sunset	2131	~	2141.5		~~$0~~	14.5	$507,500
dtm	Vineyard	1574.8	1575.5	1579.5	657.3	$13,146,000	987.3	$19,746,000
contours(-subsidenc	White Tanks 3	1210	1213	1216	382	$2,292,000	451.5	$2,709,000
digitized contours	White Tanks 4	1050	1053	1056.0	184.9	$2,218,800	232.7	$2,792,400
digitized contours	Casandro	2155	2160.2	2163.5	13.5	$472,500	14.5	$507,500
	DATA Close enough for questimate .....Assume all data suspect based upon disparity in data, change of datum points, subsidence and working from design manuals ---- need to verify "As-Builts"					**$299,596,780**		**$440,016,190**

Other Gauges

In addition to "telemetry" rain gauges, the District uses mechanical gauges to record information which must be retrieved "in-person", either by District employees or volunteers.

Recording Chart Rain Gauges

This gauge measures water by weight. A small scale built into the gauge weighs the rainfall and mechanically records the amount on a paper chart using an ink pen. The chart is then removed from the gauge by District staff or mailed in by a volunteer.

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The District actively recruits volunteers to report rainfall at their homes. Depending on the location, the District may supply and install a clear-view gauge. Volunteers then mail monthly rainfall information to the District office. The information gathered from volunteers is added to the District's rainfall records and is used the build a history of rainfall and to supplement other rain gauge readings in Maricopa County. Currently, about 200 volunteers mail rainfall information to the District each month.

Weather Statistics: Phoenix, Arizona

Hottest Day: 122 degrees, June 26, 1990

Coldest Day: 16 degrees, January 7, 1913

Driest Year: 2.82 inches, 1956

Wettest Year: 19.73 inches, 1905

Wettest 24-hour Period: 4.98 inches, July 1-2, 1911

Wettest Hour: 1.72 inches, August 18, 1966

Normal Annual Rainfall at Sky Harbor Airport: 7.11 inches

Requests for Data

The District will provide upon request rainfall, stream-flow, and weather sensor data from the ALERT gauges. In some cases rainfall data goes back to the mid-1980's. There is a charge for the data based on the time taken to extract it from the database or from hardcopy notebooks. To request data, call 506-1501 and ask for a member of the "Special Projects Branch".

For further information about the District's Flood Detection and Data Collection Program, or any other District activity, contact:

Public Involvement Coordinator

Flood Control District of Maricopa County

2801 W. Durango St., Phoenix, AZ 85009

(602) 506-1501

Flood Detection and Data Collection Program

Prepared by

The Flood Control District of Maricopa County

2801 W. Durango Street

Phoenix, Arizona 85009

(602) 506-1501

Flood Control District of Maricopa County

Flood ALERT System

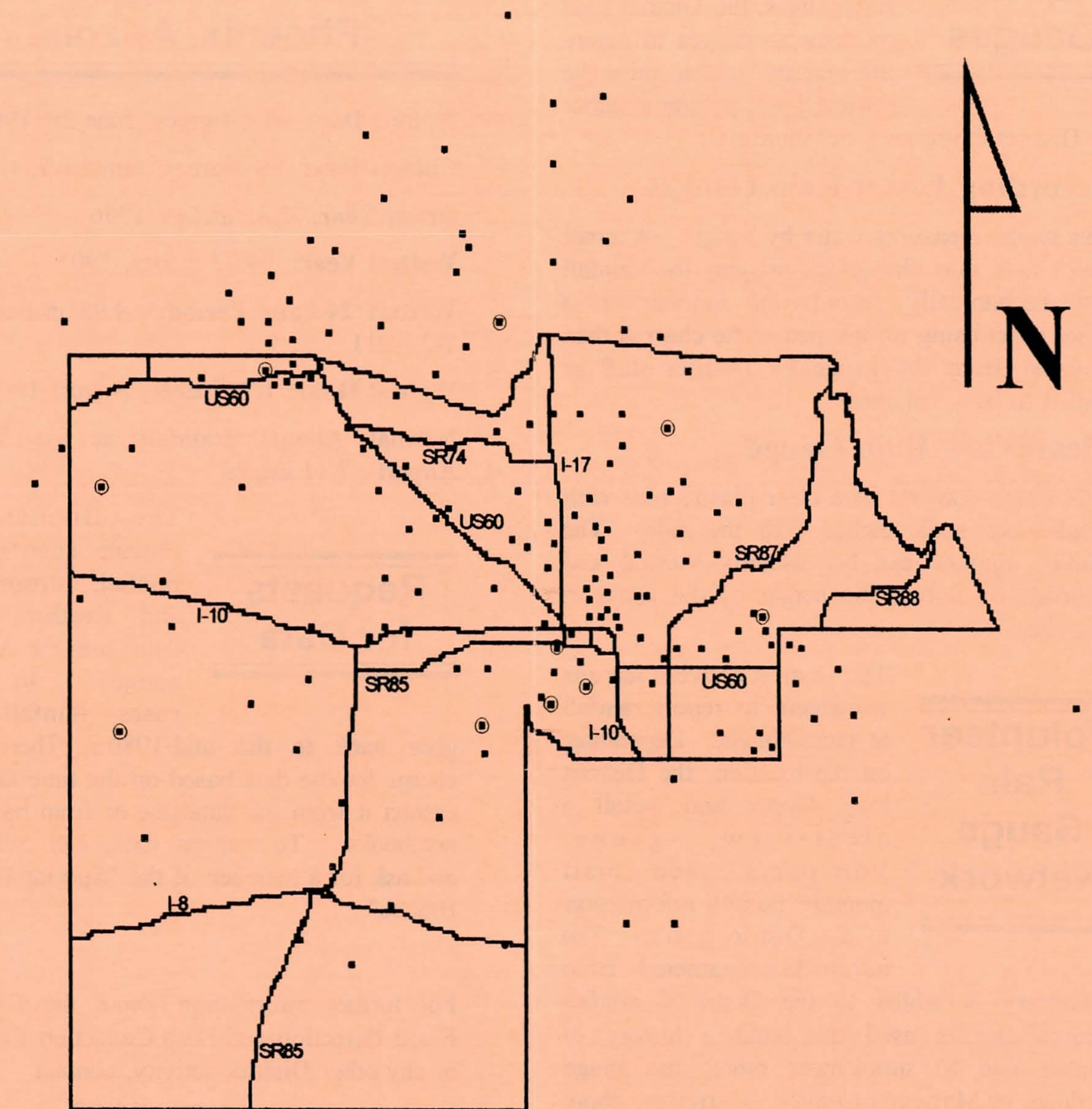
The Flood Control District of Maricopa County operates a rain, stream, and weather gauge network which provides current or "real time" information about rainfall, stormwater runoff, and weather conditions in Maricopa County. This network operates in the National Weather Service ALERT format, which stands for "Automated Local Evaluation in Real Time", and is commonly referred to as an ALERT system.

The ALERT system uses "automatic" telemetry gauges, meaning that the gauges transmit their information to the District base computer via radio waves. The computer can quickly compile the information and display it on video screens. The automatic gauges are powered by 12-volt batteries which are recharged using small solar panels attached to the top or sides of the gauges.

The information provided by the ALERT system is important to the District because heavy rainfall can generate stream flows which can significantly impact flood control facilities such as dams and channels. The information is also simultaneously received by the National Weather Service which uses the information when issuing flash flood warnings and other weather advisories.

The ALERT system is also valuable after a storm. The storm data can be used to reconstruct the storm event to show the origin of flooding problems and provide data for use in floodplain studies, computer modeling of watersheds, and design of future flood control structures.

Currently, the District has installed and maintains 160 automatic rain gauges, 64 automatic stream gauges, and 10 automatic weather stations throughout Maricopa and neighboring counties.



ALERT Automatic Gauge Locations

▪ Rain and/or Stream Gauge Locations

◉ Weather Station Locations

Refrigerators, stoves and other hard goods should be hosed off and kept for the adjuster's inspection. A good deodorizer when cleaning major appliances is to add one teaspoon of baking soda to a quart of water. Any partially damaged items should be dried and aired—the adjuster will make recommendations as to their repair or disposal. **Take all wooden furniture outdoors** but keep it out of direct sunlight **to prevent warping**—a garage or carport is a good place for drying. Remove drawers and other moving parts as soon as possible., but do not pry open swollen drawers from the front—remove the backing and push the drawers out.

Shovel out mud while it is still moist to give walls and floor a chance to dry. Once plastered walls have dried, brush off loose dirt. Wash with a mild soap solution and rinse with clean water; always start at the bottom and work up—ceilings are done last! **Special attention should be paid to cleaning out heating and plumbing systems.**

Mildew can be removed from dry wood with a solution of 4 to 6 tablespoons of trisodium phosphate (TSP), 1 cup liquid chlorine bleach, and 1 gallon water. Clean metal at once then wipe with a kerosene-soaked cloth. A light coat of oil will **prevent iron from rusting**. Scour all utensils, and if necessary, use fine steel wool on unpolished surfaces. Aluminum may be brightened by scrubbing with a solution of vinegar, cream of tartar, and hot water.

Quickly separate all laundry items to avoid running colors. **Clothing and household fabrics should be allowed to dry slowly,** away from direct heat, before brushing off loose dirt. If you cannot get to a professional cleaner, rinse the items in lukewarm water to remove lodged soil; then wash with mild detergent; rinse, and dry in sunlight.

Flooded basements should be drained and cleaned as soon as possible. However, structural damage can occur by pumping out the water too quickly. **After** the floodwaters around your property have subsided, begin draining the basement in stages, about 1/3 of the water volume each day.

after the flood, process your CLAIM!

To reiterate, first call your local insurance agent to report the flood damage so that the Notice of Loss Form can be submitted to the NFIP and an adjuster can be assigned to assist you. Then photograph the premises both on the outside to show the flooding and the damage, and the inside to show the height of the floodwaters and the damaged property.

Next, separate the damage from the undamaged personal property and put it in the best possible order for the adjuster's examination. If reasonably possible, protect the structure and contents from further damage. Damaged property which presents a health hazard or which may hamper local clean-up operations should be disposed of in accordance with instructions from local authorities. Be sure to adequately describe discarded items so that when an adjuster examines your losses and your records, these articles are included in the documentation. When the adjuster visits your property, let him/her know if you need an advance or partial payment of loss.

Good records can assist the NFIP in giving you an advance payment. Good records also speed up settlement of your claim. Use your inventory to work with the adjuster in presenting your claim.

Be sure to submit your signed and sworn Proof of Loss Form to the NFIP within 60 days after the date of loss!

Printed on recycled paper.

What to do in case of Flood

Reprinted from Golden State Floodlight, California Floodplain Management Newsletter, Volume 2, No. 4, November 1987.

Prepared by
The Flood Control District
of Maricopa County
2801 W. Durango Street
Phoenix, Arizona 85009
(602) 506-1501

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

well before the flood INSURE!

Losses due to flooding are not covered under most homeowners insurance policies, but **homes and their contents can be protected through the National Flood Insurance Program (NFIP) if your community is a participant in the program.** Flood insurance is available in participating communities on almost any enclosed building—including homes, condominiums, manufactured homes on foundations, businesses, and farms. The **contents** of insurable buildings, including rental units, **are also insurable.**

Compile and maintain a room-by-room inventory of the insured contents—including, when possible, receipts or proofs of purchase (especially for major appliances) noting the manufacturer's name, serial number, model number, price, date, and place of purchase.

immediately before the flood PREPARE!

If, and ONLY if, time permits, turn off all utilities at the main power switch and close the main gas valve if evacuation appears necessary. **Do not touch any electrical equipment** unless it is in a dry area and you are standing on a piece of dry wood while wearing rubber gloves and rubber-soled boots or shoes. **Move valuable papers,** furs, jewelry, clothing, and other contents to upper floors or higher elevations. Fill bathtubs, sinks, and jugs with clean water in case regular supplies are contaminated. These containers can be sanitized first by rinsing with bleach. **Board up windows** or protect them with storm shutters or tape to prevent flying glass. **Bring outdoor possessions inside the house** or tie them down securely—this includes lawn furniture, garbage cans, tools, signs, and other moveable objects that might be swept away or hurled about.

when the flood comes EVACUATE!

Since floodwaters can rise very rapidly, be prepared to evacuate before the water level reaches your property. **Keep a battery-powered radio tuned to a local station,** and follow all emergency instructions. If you are caught in the house by suddenly rising water, **move to an upper floor,** if possible, or to the roof, if necessary. **Take warm clothing,** a flashlight, and portable radio with you. Then wait for help—**don't try to swim to safety.** Rescue teams will be looking for you.

When outside the house, **remember floods are deceptive.** Try to avoid flooded areas and don't attempt to walk through floodwaters that are more than knee deep.

If it is safe to evacuate by car, **stock the car** with nonperishable foods (like canned goods), a plastic container of water, blankets, first aid kit, flashlights, dry clothing and any special medication needed by members of your family or group. **Keep the gas tank at least half full** since gasoline pumps will not be working if the electricity has been cut off. **Do not drive where water is over the road**—parts of the road may already be washed out. **If your car stalls in the flooded area, abandon it** as soon as possible. Floodwaters can rise rapidly and sweep a car (and its occupants) away. Many deaths have resulted from attempts to move stalled vehicles.

after the flood CLEAN UP!

If your home, apartment or business has suffered flood damage, immediately call the agent or broker who handles your flood insurance policy; the agent will submit a Notice of Loss Form to the National Flood Insurance Program. An adjuster will be assigned to inspect your property as soon as possible. **Be sure to take pictures of the damage done to your building and its contents before you start to clean up.**

Check buildings for structural damage **prior to entering**—make sure they are not in danger of collapsing. **Turn off any outside gas lines at the meter or tank** if you didn't have time to before the flood and let the building air for several minutes to remove foul odors or escaping gas. Upon entering the building, **do not use open flame** as a source of light since gas may still be trapped inside—a non-metallic, fully sealed flashlight is ideal. **Watch for electrical shorts or live wires** before making certain that the main power switch is turned off. **Do not turn on any lights** or appliances until an electrician has checked the system for short circuits. **Cover broken windows and holes** in the roof or walls to prevent further weather damage. The expense of these temporary repairs is usually covered under your flood insurance policy (subject to the policy deductible). It is important, therefore, to **save receipts.**

Proceed with immediate cleanup measures to **prevent any health hazards.** Perishable items which pose a health problem should be listed and photographed before discarding. **Throw out fresh food and previously opened medicines that have come in contact with floodwaters.** Until the public water system is declared safe, **water** should be **boiled** vigorously for ten minutes before it is used for drinking or food preparation. The flat taste can be removed by pouring the water from one container or by adding a pinch of salt. Another method of disinfecting drinking water is to mix 1/2 teaspoon of liquid commercial laundry bleach with 2-1/2 gallons of water—let stand for five minutes before using. If no other source is available, water may be obtained by draining a hot water tank or by melting ice cubes.

Other GAUGES

In addition to "telemetry" rain gauges, the District uses mechanical gauges which record information that must be retrieved "in-person", either by District employees or volunteers.

Recording Chart Rain Gauge

This gauge measures water by weight. A small scale built into the gauge weighs the rainfall and mechanically records the amount on a paper chart using an ink pen. The chart is then removed from the gauge by District staff.

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Wettest Hour: 1.72 inches, August 18, 1966

Normal Yearly Rainfall: 7.11 inches

For further information about the District's Flood ALERT system, or any other District activity, contact:

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Phoenix, Arizona 85009
(602) 506-1501

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Flood ALERT System

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FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

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The Flood Control District of Maricopa County operates a rain and stream gauge network which provides current or "real time" information about rainfall and stormwater runoff in Maricopa County. This network is called the Automated Local Evaluation in Real Time (ALERT) system.

The ALERT system uses "telemetry" gauges, which means the gauges transmit their information to the District via radio waves. A computer is used to quickly compile the information and display it on video screens. The telemetry gauges are powered by 12-volt batteries which are recharged using small panels of photovoltaic cells (solar panels) attached to the tops of the gauges.

The information provided by the ALERT system is important to the District because heavy rainfall and stream flows will significantly impact flood control facilities such as dams and channels. The information is also shared with the National Weather Service which uses the information when issuing flash flood warnings and other weather advisories.

The ALERT system is also valuable after a storm. The storm data can be used to reconstruct the storm event to show the origin of flooding problems and provide data for use in floodplain studies, computer modeling of watersheds, and design of future flood control structures.

Currently, the District has 140 telemetry rain gauges and 45 telemetry stream gauges in Maricopa and neighboring counties.

Telemetry Rain and Stream Gauge Locations

Q: *Who decides what corrective measures will be taken, if any?*

A: While the consultant engineer and District staff are primarily responsible for proposing remedies to stormwater drainage problems, the final decision on what to implement is made by the Board of Directors of the Flood Control District. The Board may decide, once an ADMS is complete, that no immediate action is necessary, based on the amount of development and severity of flooding problems.

Q: *If no action is taken right away, why do the study?*

A: Even if none of the structures recommended in the study are built, the ADMS is still a valuable resource. Compiled in one document is all the up-to-date information about the study area including current mapping, floodplain delineations, and hydrology reports. In some areas, the maps, delineations, and hydrology are non-existent prior to the ADMS.

In the future, information contained in the ADMS report can be used by private interests to develop the watershed and minimize the risk of flood damage in that area.

If, at a later date, the ADMS watershed should experience significant development, some of the proposals presented in the ADMP may be desirable.

Q: *Is everything that is recommended in the study done?*

A: Even when the Board of Directors considers an ADMP, that does not mean that all structural and non-structural means of correction will be implemented. The Board may decide that only certain key features will be constructed at public expense, and that remaining facilities will be provided at private expense.

Q: *How many studies have been completed, and where are they?*

A: The map in this brochure shows the delineations of all the ADMSs that are either completed, in progress, or proposed.

Eleven ADMSs have been completed or are in progress. They are in the following areas or watersheds:

- Spook Hill
- East Maricopa County
- Glendale/Peoria
- East Fork Cave Creek
- Wittmann
- Queen Creek
- Wickenburg
- White Tanks/Agua Fria
- Laveen
- Arizona Canal Diversion Channel
- Gilbert/Chandler

Several more ADMSs are planned for the future, including in the following areas:

- New River
- Adobe Dam
- Cave Creek/Carefree
- Pinnacle Peak
- Buckeye/Sun Valley
- Hohokam
- Gilbert/Chandler
- Maryvale
- Rainbow Valley/Waterman Wash
- Gila Bend
- Foothills
- Fountain Hills

For more information about the ADMS Program or any Flood Control District structure or program, contact:

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The Flood Control District
of Maricopa County
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Phoenix, Arizona 85009
(602) 506-1501

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Area Drainage Master Study

Planning for Maricopa County's Continuing Development

Prepared by
The Flood Control District
of Maricopa County
2801 W. Durango Street
Phoenix, Arizona 85009
(602) 506-1501

Q: *What is the ADMS Program?*

A: The Area Drainage Master Study (ADMS) Program began in 1983 in order to analyze watersheds that experienced street flooding and home and yard damage virtually every time it rained. The program's purpose is to identify flooding and drainage problems and develop solutions for the existing and future development of the area.

The first two studies began in 1984 and several more followed. By early 1985, a total of 18 areas were on the project list. In April, 1985, the Board of Directors of the Flood Control District passed a resolution to implement the ADMS Program, thereby acknowledging the presence of severe stormwater management problems in a number of localities throughout unincorporated and incorporated areas of Maricopa County.

Two other benefits came from implementing the program: consolidation of effort and cost-sharing by different jurisdictions. Stormwater drainage problems are rarely confined to one jurisdiction. Conditions in one jurisdiction, such as Peoria, can cause drainage problems in a neighboring jurisdiction, such as Glendale. Furthermore, municipalities cannot always finance the best solutions to the stormwater problems that face them or their neighbors.

The Flood Control District has the unique capability to facilitate multi-jurisdictional stormwater management *and* to cost-share in the implementation of the solutions, helping municipalities to obtain the best solutions without picking up the entire bill. The ADMS program helps to identify multi-jurisdictional problems and the municipalities or other jurisdictions that should participate in cost-sharing a solution.

Q: *Who performs the study?*

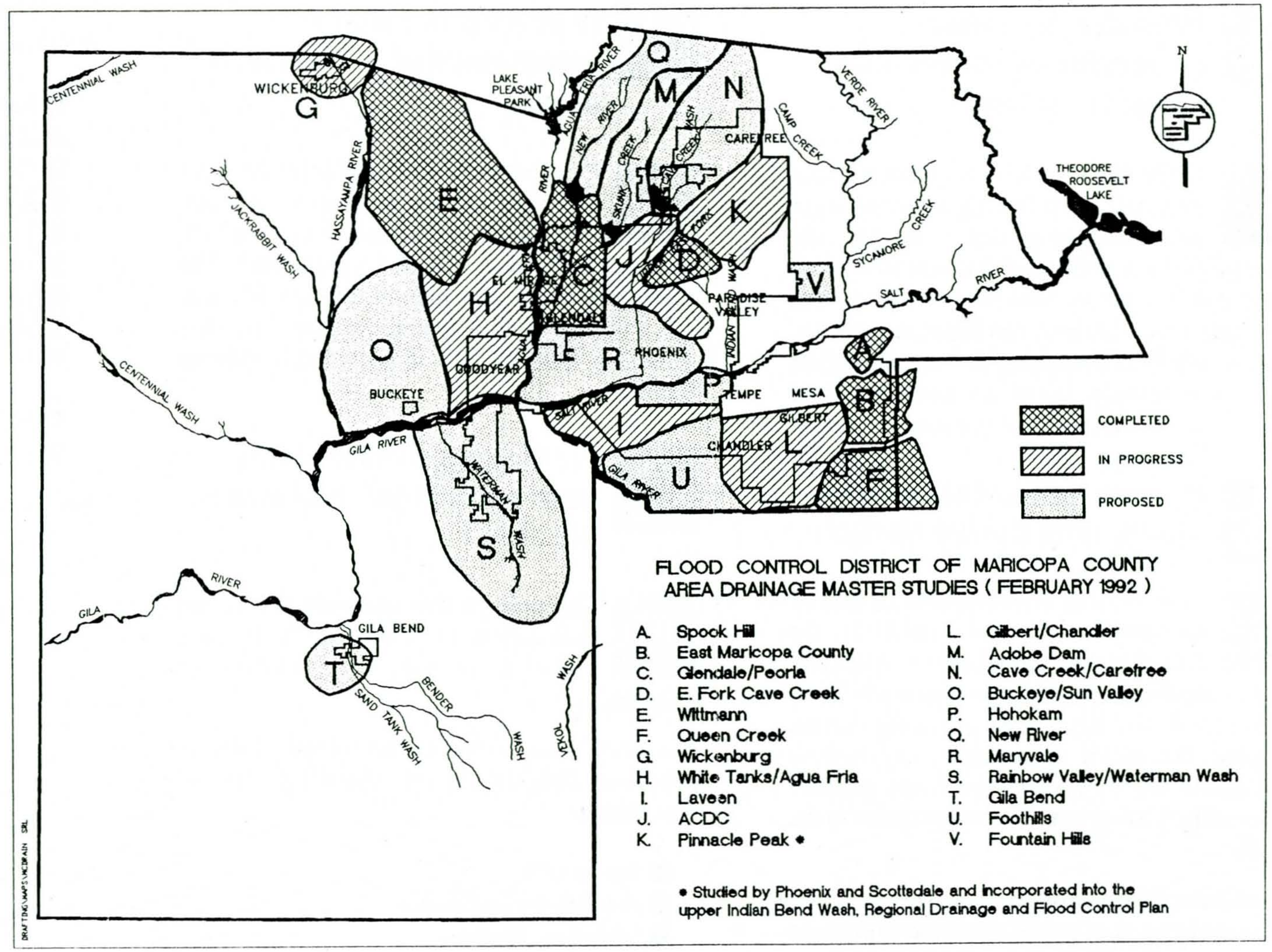
A: ADMSs are usualy conducted by consultant engineers under contract with the Flood Control District. ADMS contracts are managed by one of the District's Water Resources Planners.

Each watershed is unique, therefore each ADMS will require different information and study products. Generally, however, the following documents/data will be produced as a part of the ADMS:

- Collection and study of background materials
- Mapping
- Hydrology
- Floodplain delineations
- Area Drainage Master Plan (ADMP)
- Supporting documentation
- Project coordination and public information

Q: *What is an ADMP?*

A: The Area Drainage Master Plan (ADMP) is a product of the ADMS. The ADMS is the study from which the plan is developed. The study identifies what the current problems are, as well as what problems may occur in the future as development continues, while the plan proposes a series of solutions. The consultant engineer, during the course of developing the plan, will conduct a benefit to cost analysis to determine which of the alternatives has the highest benefit to cost ratio.



However, the least expensive solution or even the solution with the highest benefit to cost ratio may not be the solution recommended for an area. Part of the reason for this is in the process. The consultant engineer will conduct public meetings and residents are encouraged to voice their opinions about flood control projects in their area. Often, residents will prefer the more expensive alternative of retaining open space and perhaps installing a greenbelt through a watershed area, rather than choosing the less expensive option of building a concrete channel. The opinions of those who live near a proposed structure are heavily weighed in the decision of what solution alternative will be chosen.

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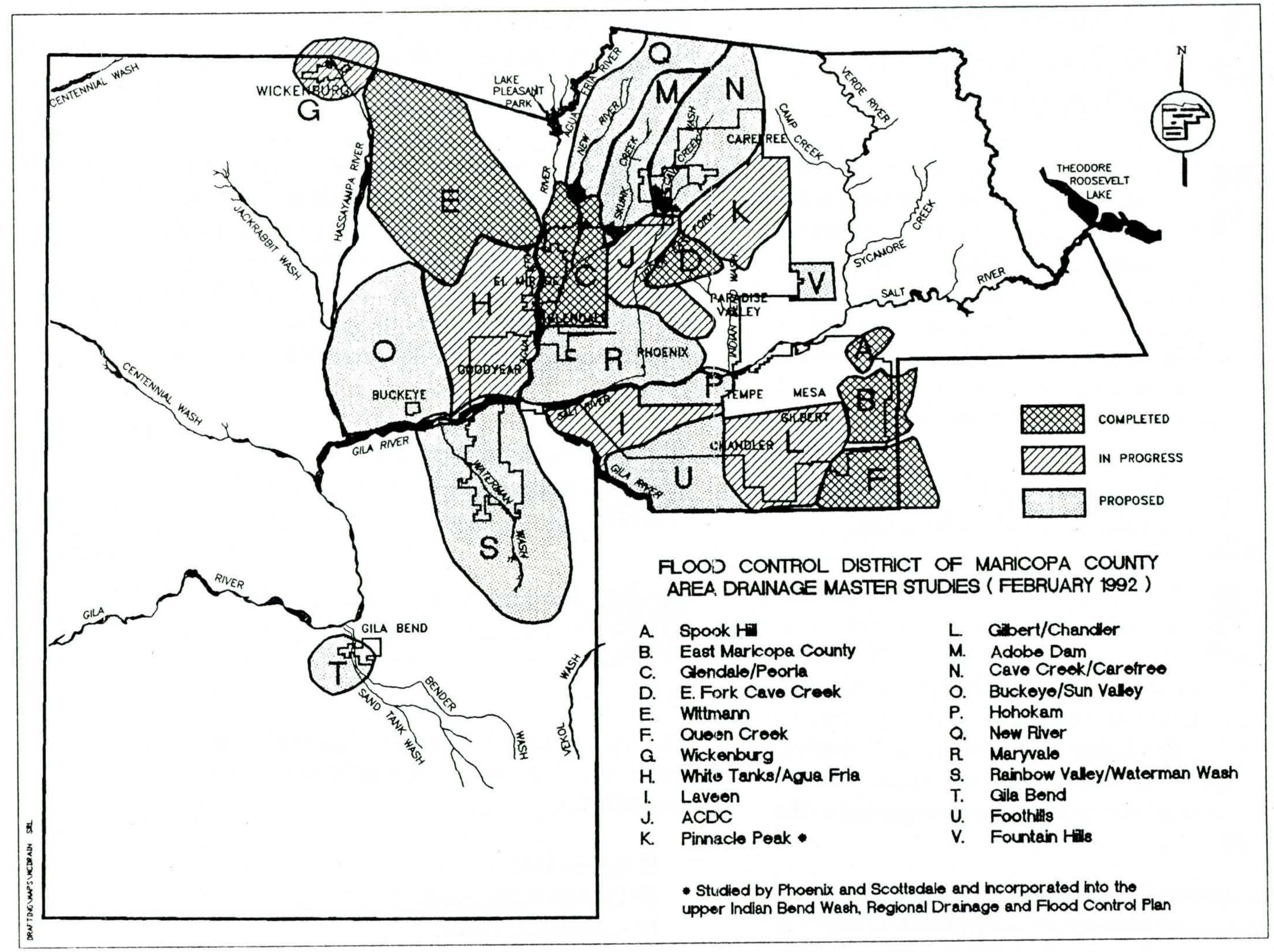

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Q: *Who decides what corrective measures will be taken, if any?*

A: While the consultant engineer and District staff are primarily responsible for proposing remedies to stormwater drainage problems, the final decision on what to implement is made by the Board of Directors of the Flood Control District. The Board may decide, once an ADMS is complete, that no immediate action is necessary, based on the amount of development and severity of flooding problems.

Q: *If no action is taken right away, why do the study?*

A: Even if none of the structures recommended in the study are built, the ADMS is still a valuable resource. Compiled in one document is all the up-to-date information about the study area including current mapping, floodplain delineations, and hydrology reports. In some areas, the maps, delineations, and hydrology are non-existent prior to the ADMS.

In the future, information contained in the ADMS report can be used by private interests to develop the watershed and minimize the risk of flood damage in that area.

If, at a later date, the ADMS watershed should experience significant development, some of the proposals presented in the ADMP may be desirable.

Q: *Is everything that is recommended in the study done?*

A: Even when the Board of Directors considers an ADMP, that does not mean that all structural and non-structural means of correction will be implemented. The Board may decide that only certain key features will be constructed at public expense, and that remaining facilities will be provided at private expense.

Q: *How many studies have been completed, and where are they?*

A: The map in this brochure shows the delineations of all the ADMSs that are either completed, in progress, or proposed.

Eleven ADMSs have been completed or are in progress. They are in the following areas or watersheds:

- Spook Hill
- East Maricopa County
- Glendale/Peoria
- East Fork Cave Creek
- Wittmann
- Queen Creek
- Wickenburg
- White Tanks/Agua Fria
- Laveen
- Arizona Canal Diversion Channel
- Gilbert/Chandler

Several more ADMSs are planned for the future, including in the following areas:

- New River
- Adobe Dam
- Cave Creek/Carefree
- Pinnacle Peak
- Buckeye/Sun Valley
- Hohokam
- Gilbert/Chandler
- Maryvale
- Rainbow Valley/Waterman Wash
- Gila Bend
- Foothills
- Fountain Hills

For more information about the ADMS Program or any Flood Control District structure or program, contact:

Public Involvement Coordinator
The Flood Control District
of Maricopa County
2801 W. Durango Street
Phoenix, Arizona 85009
(602) 506-1501

Printed on recycled paper

Area Drainage Master Study

Planning for Maricopa County's Continuing Development

Prepared by
The Flood Control District
of Maricopa County
2801 W. Durango Street
Phoenix, Arizona 85009
(602) 506-1501

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

Q: *What is the ADMS Program?*

A: The Area Drainage Master Study (ADMS) Program began in 1983 in order to analyze watersheds that experienced street flooding and home and yard damage virtually every time it rained. The program's purpose is to identify flooding and drainage problems and develop solutions for the existing and future development of the area.

The first two studies began in 1984 and several more followed. By early 1985, a total of 18 areas were on the project list. In April, 1985, the Board of Directors of the Flood Control District passed a resolution to implement the ADMS Program, thereby acknowledging the presence of severe stormwater management problems in a number of localities throughout unincorporated and incorporated areas of Maricopa County.

Two other benefits came from implementing the program: consolidation of effort and cost-sharing by different jurisdictions. Stormwater drainage problems are rarely confined to one jurisdiction. Conditions in one jurisdiction, such as Peoria, can cause drainage problems in a neighboring jurisdiction, such as Glendale. Furthermore, municipalities cannot always finance the best solutions to the stormwater problems that face them or their neighbors.

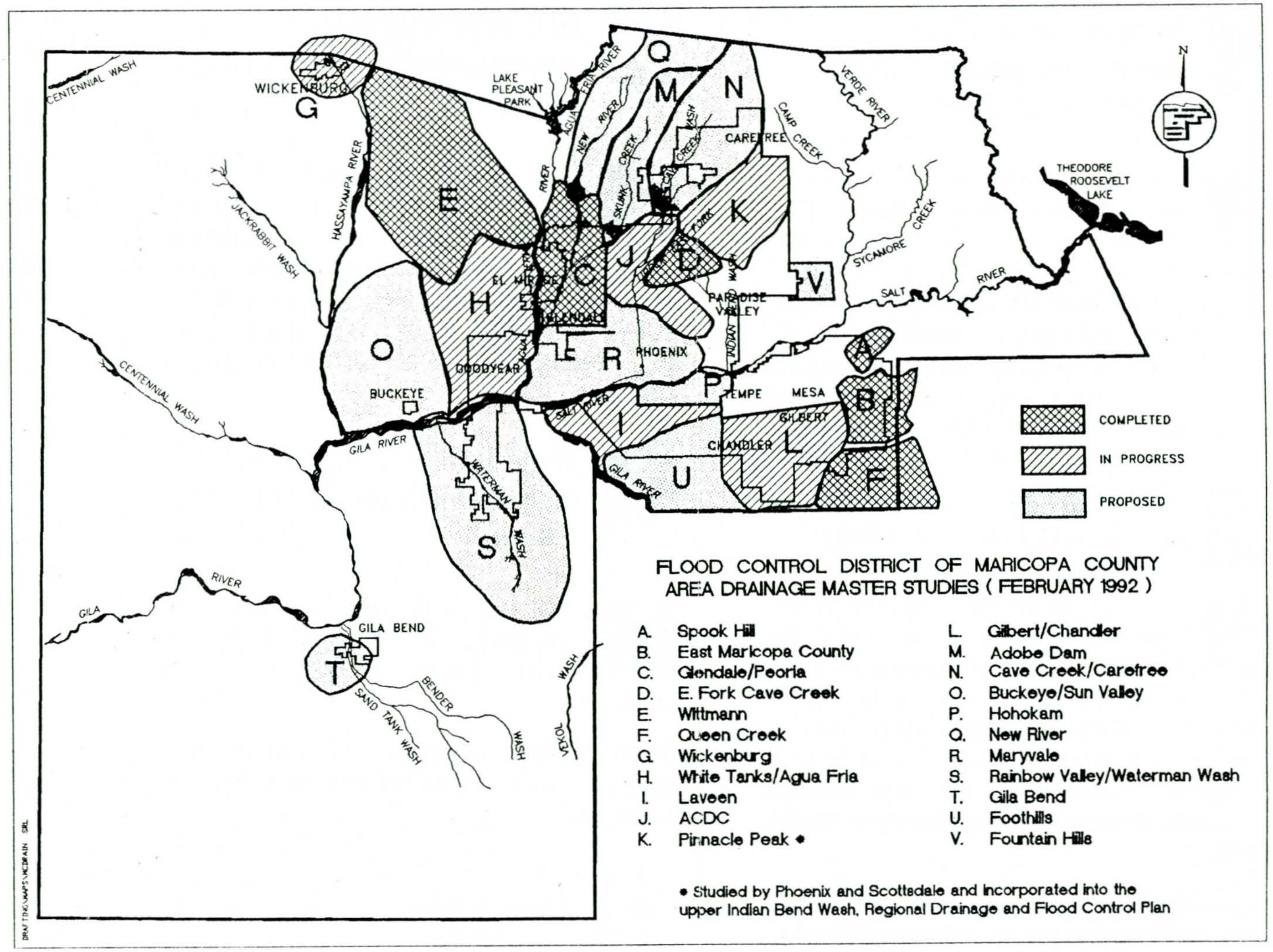
The Flood Control District has the unique capability to facilitate multi-jurisdictional stormwater management *and* to cost-share in the implementation of the solutions, helping municipalities to obtain the best solutions without picking up the entire bill. The ADMS program helps to identify multi-jurisdictional problems and the municipalities or other jurisdictions that should participate in cost-sharing a solution.

Q: *Who performs the study?*

A: ADMSs are usualy conducted by consultant engineers under contract with the Flood Control District. ADMS contracts are managed by one of the District's Water Resources Planners.

Each watershed is unique, therefore each ADMS will require different information and study products. Generally, however, the following documents/data will be produced as a part of the ADMS:

- Collection and study of background materials
- Mapping
- Hydrology
- Floodplain delineations
- Area Drainage Master Plan (ADMP)
- Supporting documentation
- Project coordination and public information



Q: *What is an ADMP?*

A: The Area Drainage Master Plan (ADMP) is a product of the ADMS. The ADMS is the study from which the plan is developed. The study identifies what the current problems are, as well as what problems may occur in the future as development continues, while the plan proposes a series of solutions. The consultant engineer, during the course of developing the plan, will conduct a benefit to cost analysis to determine which of the alternatives has the highest benefit to cost ratio.

However, the least expensive solution or even the solution with the highest benefit to cost ratio may not be the solution recommended for an area. Part of the reason for this is in the process. The consultant engineer will conduct public meetings and residents are encouraged to voice their opinions about flood control projects in their area. Often, residents will prefer the more expensive alternative of retaining open space and perhaps installing a greenbelt through a watershed area, rather than choosing the less expensive option of building a concrete channel. The opinions of those who live near a proposed structure are heavily weighed in the decision of what solution alternative will be chosen.

Am I required to carry flood insurance?

Yes, if you live in a flood hazard area and your mortgage is secured by a federally-backed loan. Before granting a loan, lenders are responsible for determining if a building is in a flood hazard zone. If it is, the lender will then either "force place" flood insurance on the building through an insurance company of their choice, or require proof from you that you have already obtained insurance.

If your home is flooded and you do not have flood insurance, you may receive emergency aid such as food and temporary shelter, but it's possible you may not be eligible for other disaster relief or for a low interest loan to restore those items not covered by insurance.

When you sell your property, you and your realtors may be held responsible for not disclosing to a buyer or a lender that the property is located within a flood hazard zone.

How much insurance can I get and where can I get it?

There are limits to the amount of insurance you can purchase. The maximum amounts available are:

Single family homes:	$185,000
Other residential:	$250,000
Non-residential:	$200,000
Small business:	$250,000

Most policies may be written by a private insurance company of your choice. Check with your homeowners insurance agent for details.

If you live in the unincorporated area of Maricopa County, be sure your insurance agent knows you qualify for a **15 percent discount (20 percent effective October 1, 1994).** This discount is available because Maricopa County is highly rated through the National Flood Insurance Program's Community Rating System for its overall flood management activities.

Flood Protection

What can I do to minimize flood damage to my property?

Your home or business may have been built prior to the present laws and regulations or before the extent of the flood damage potential for your area became known. Even if your home was built with possible flood damage in mind, there are several things—depending on the severity of the risk—that you can do to further reduce flood damage:

- Make sure the ground around the building slopes down so water drains away from the building.
- If you can't raise the building or its lowest floor, consider lowering significant portions of the yard surrounding it. *But,* be sure to allow for proper drainage to minimize standing water without increasing the drainage onto adjacent properties.
- Use a waterproof coating or siding for the outside walls from below ground to several feet above.
- Install seals around all doors to the outside.
- Build a low retaining wall around the house and keep slide-in panels or sand bags ready to insert in any wall openings for walkways or a driveway during an emergency.
- Make sure drainage pipes, culverts, drainage easements, washes and other systems that carry runoff on or near your property are properly maintained and clear of obstructions.
- Call your local building permit official or floodplain administrator for a list of flood-proofing materials, additional methods of flood proofing, or a list of local contractors who can provide free cost estimates for flood-proofing measures.

Floodplain Use Permits/Variances

I want to make changes, as you suggest. What's my first step?

If you want to make changes to land within a 100-year flood hazard area, local regulations require you to obtain a permit or authorization before you build, add, grade, or install walls or fencing. These requirements are to minimize flood damage potential to your property without increasing the flood risk to your neighbor's property.

Before you make any changes, check with your local building permit official or floodplain administrator.

Note: Some uses within a main channel may also require approval from State or Federal agencies.

Drainage System Maintenance

What else should I know if I plan on changing my property?

You need to be aware of natural and artificial drainage systems in your area, so you don't disrupt the natural or planned flow of water from your property onto someone else's. These drainage systems include artificial lakes, detention basins, storm drains and flood control channels. Additionally, there are private drainage easements and small washes that may drain surface runoff through your property. Few of these systems involve floodplains or appear on maps.

When you landscape or fence an area, you must be careful not to inadvertently obstruct a drainage easement or another hard-to-detect yet essential drainage-way. You may cause a diversion or backup of floodwater into your home or onto your neighbor's property. Again, you must check with your local building permit official because it is generally against the law to make such improvements if they have a negative impact on adjacent property.

Remember, when it comes to protecting yourself and your property from flooding, what you don't know *can* hurt you. The good news is there *are* agencies around to help you prepare for the inevitable:

The Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, AZ 85009
(602) 506-1501
(Ask for a floodplain representative.)

Are you ready for the next big storm?

Learn to keep floodwater away from your door

Prepared by the
Flood Control District
of Maricopa County
2801 West Durango Street
Phoenix, Arizona 85009
(602) 506-1501

Are you ready for the next big storm?

If this brochure was mailed to you, chances are you own property in a flood hazard zone and are required to carry flood insurance. Being insured isn't enough, though, when you need to protect your irreplaceable belongings, your pets, your family—yourself.

Besides insurance, your best protection is information: spare yourself painful losses by knowing your property can be flooded and preparing ahead of time.

This brochure is designed to provide you with general information to get you started in your flood protection measures. If, after reading this, you have specific concerns about your property, call the **Flood Control District's floodplain administration department at (602) 506-1501**.

The Flood Hazard in Maricopa County

It doesn't flood in the desert—does it?

If you lived in Maricopa County during January 1993, you know about local flood hazards. Nearly every river, creek and wash in the County swelled during the week-long series of storms.

That flood was one of five major floods in Maricopa County since 1977, three of which resulted in presidential disaster declarations after homes, businesses, and bridges were destroyed or damaged, farm land and dump sites were eroded, and lives were lost.

But major rainfall events such as these should not be the only concern of Maricopa County residents. In fact, every year, property is flooded somewhere in Maricopa County. Sometimes the flooding happens when local drainage systems fail to carry all the flow. Usually, though, flooding occurs when natural waterways—creeks, rivers and washes—cannot contain the flow of a large rainfall event.

We expect natural waterways and the land near them to flood during heavy storms—and the areas susceptible to flooding are officially delineated as 100-year floodplains on Federal Flood Insurance Rate Maps. But there are other routinely flooded areas that are also delineated on these maps: areas along elevated railroads, roads and highways, and along irrigation canals and flood control channels. These are generally referred to as "ponding zones."

There are other areas in Maricopa County that flood frequently that are *not* recorded on the Federal maps because they don't meet the national standards for official designation as a flood hazard area, but they may still be designated on local flood management maps and are subject to local regulation because of their flood-prone nature.

Flood Warning

How will I know if a storm threatens to flood my house or property?

One way is to be aware of flood watches and warnings issued by the National Weather Service and broadcast on local television and radio stations. Also, local dam operators (such as Salt River Project) issue news releases and contact local municipalities when they must release large amounts of water downstream.

You may also be notified of flooding directly. The Maricopa County Department of Emergency Management (DEM) maintains an emergency call list of properties that have flooded in the past, so property owners will be specifically notified when flooding is imminent in their area. If you live in unincorporated Maricopa County, check with DEM **(602 273-1411)** to find out if you are in one of these areas and verify that your name and phone number are on the list. Call this number also to learn about evacuation routes, emergency shelter locations, aid for the physically challenged, and other emergency information, or to report flooding or to learn where and how to submit a flood damage report.

How much warning time can I expect?

Unfortunately, there is no one answer to this question for every rainfall event. Flood warning times vary based on storm location, direction, intensity, duration, and on the topography of the area.

Flash flooding typically results from high intensity, short duration rainfall events, such as the summer monsoons. There may be little or no time for a warning other than a general alert. Storms large enough to produce flood levels along major watercourses often take many hours to develop. Flood warning times can vary from hours to days and may depend—to some extent—on releases from dams.

How is flood warning information gathered?

The Flood Control District operates a flood threat recognition system called ALERT (Automated Local Evaluation in Real Time) where data is collected by rain and stream gauges and sent by radio waves back to the base station at the District. Because the data is collected and transferred instantaneously, District staff are able to relay the gauge readings to the National Weather Service, the County Department of Emergency Management, and local dam operators so they can issue the appropriate warnings and prepare for evacuations, if necessary.

The District continues to improve its ALERT System and, currently, has nearly 200 stream and rain gauges throughout Maricopa County and in neighboring areas that affect our watersheds.

Flood Safety

What do I do if a warning turns into an evacuation?

If evacuation appears necessary and *only* if time permits:

- Turn off the electricity at the main power switch and gas at the main gas valve.
- Move valuable papers and personal items to upper floors or higher elevations.
- Move outdoor possessions inside or to a garage, or anchor them down or tie them together so they don't get carried away.
- Keep a battery-powered radio handy and tuned in to a local emergency broadcast station: follow all emergency instructions.
- Move to high ground or an established emergency shelter. If it is safe to evacuate by car, take nonperishable foods, blankets, a flashlight, dry clothing and any special medications. Be aware that many stores and gas stations will be closed since pumps and registers may not function if electricity has been cut off.
- **Do not drive where water is over the road:** part of the road may be washed out and be much deeper than it looks.

What should I do when I return home?

When you return to your home and find that it has been flooded, check first for structural damage. Then air out the home against possible gas leaks. **Do not turn on gas or electricity** until they have been checked for gas leaks and short circuits by utility representatives.

Report structural damage as soon as possible to the phone numbers that you will hear given on radio or television, or to your local permit official, Arizona Department of Water Resources (542-1541), or Maricopa County Department of Emergency Management (273-1411).

Flood Insurance

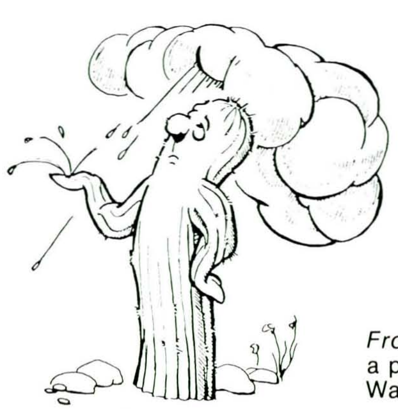
What can I do to protect myself from flood damage?

First and foremost: Insure! Most homeowner policies do not cover flood losses, so special flood policies are required. Until the National Flood Insurance Act of 1968, flood insurance in flood-prone areas was difficult to obtain and expensive to keep. This Act made it possible for structures and their contents to be covered by affordable flood insurance, although these policies do not cover fencing or walls, swimming pools, landscaping, or small storage sheds.

The Flood Disaster Protection Act of 1973 requires mandatory purchase of flood insurance for buildings mortgaged by federally-backed loans. This requirement became part of the National Flood Insurance Program (NFIP) administered by the Federal Insurance Administration, which is part of the Federal Emergency Management Agency.

Under NFIP, flood insurance is available for buildings and contents everywhere within Maricopa County, not just buildings within an official flood hazard zone. In most cases, you will need to acquire a certificate with the elevation of the lowest floor in the structure. Depending on the type of flood zone your property is in, you may be allowed to complete this Federal form yourself, but you may have to hire an Arizona Registered Land Surveyor to certify the lowest floor elevation.

Flood Control in the Desert



Front Cover: Bicycle path along a portion of the Indian Bend Wash Flood Control Project

Table of Contents

What Causes Flooding?

A flash flood roused these people from sleep. Note the water line on the door.

Types of Rainstorms

Large area storms normally occur in the winter and spring.

During these seasons, rains can melt the existing snow in the mountains.

The rain with the added snow melt flows down rivers and their tributaries, sometimes causing the streams to overflow their banks.

Floods from these storms, which are generally associated with major water courses, develop slowly and timely warnings can be given.

Flash floods are the result of localized heavy precipitation.

These storms result in raging torrents of water that rip through river-beds and surge over the banks, sweeping everything before them.

These storms are most commonly summer thunderstorms.

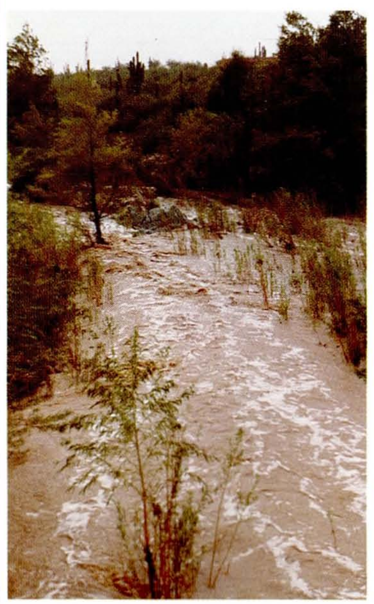
Prediction times, and thus warning times, are minimal.

Rivers and Streams

Maricopa County is the "drain" for about half the State of Arizona.

The rivers and streams that drain into the Gila River, and eventually into the Colorado River at Yuma, flow through Maricopa County.

The Gila, Salt, Verde, and Agua Fria Rivers, as well as their tributaries, all have the potential of overflowing their banks, flooding homes,



Dry riverbeds can suddenly fill with water.

businesses, and agricultural land. These same waters also trap the unwary drivers who attempt to cross flooded dip crossings.

Building in Floodplains

Homes and farms have been built in floodplains because of the closeness of water and the fertility of the soil.

Snow melt sometimes causes streams to overflow their banks.

Turning the desert into farmland has wiped out the natural drainage courses.

Covering the desert with buildings, roofs, and pavement, which do not absorb water, increases the amount of stormwater runoff.

Homes and businesses built in washes block the natural flow of water.

Developments have been built following zoning and building regulations, but without heeding floodplain or drainage hazards.

As a result, homes, businesses, and entire communities have been constructed in flood hazard areas without regard for the simple rule that water runs downhill.

This has caused a great deal of the trouble.

Vehicle in Cudia City Wash near 40th Street and Camelback.

What We Can Do Ourselves

Flood Insurance

Almost everyone has some risk of flooding. It is just a matter of how great the risk.

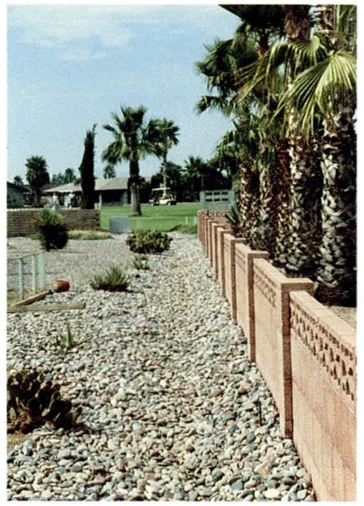
Areas with a one percent or greater risk of flooding in any given year are regulated by the government and people living there can be required to carry flood insurance by their mortgage companies.

Many other people should carry flood insurance because they live in flood hazard areas.

To find out if you are in a floodplain or a flood hazard area:

- In the unincorporated portion of Maricopa County, call 262-1501.
- In the cities, call the city hall and ask for the floodplain administrator.

Losses due to flooding are not covered under



A drainage easement can be attractively landscaped as well as functional.

most homeowners' policies. Ask your insurance agent.

Drainage

Check the drainage around your house.

Many properties were designed with a stormwater detention basin in the yard. Be careful about changing the contour of the land without checking on the drainage.

In fact, altering your property to change the flow of water may be a violation of the law.

Be sure drainage easements are kept free of debris and silt so that stormwater runoff will not flood you or a neighbor.

The wall is being undercut by improper bank protection.

Driving in Washes

Don't drive across flooded washes even if you have a pick-up truck or jeep.

The flow of water may be stronger or deeper than expected and the vehicle will be forced downstream causing damage to the vehicle and possible loss of life.

A hidden danger is that the road may be washed away under the flowing water.

Official News

If floods threaten, tune your radio to KTAR, 620-AM, for official information on emergency conditions.

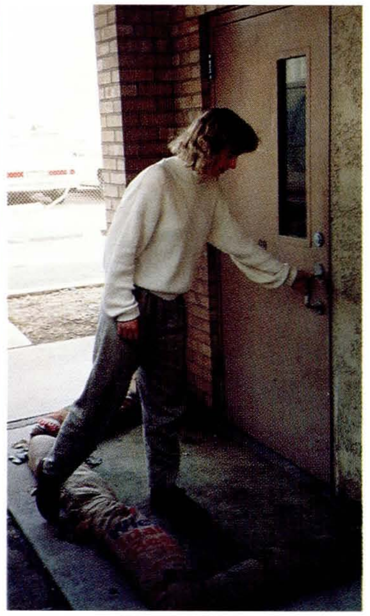
Flash Flooding

In the event of a flash flood watch, listen to the radio for a possible flash flood warning and reports of flooding in progress. Be prepared to move out of danger's way at a moment's notice.

If driving, watch for flooding at bridges, dips, and low areas. Watch for signs (thunder, lightning) of distant rainfall.

Evacuation

If you live in a low-lying area, learn evacuation routes avoiding bridges and low level roadways. Careful preparation and prompt response will ensure personal safety.



Sandbags will divert a lot of water.

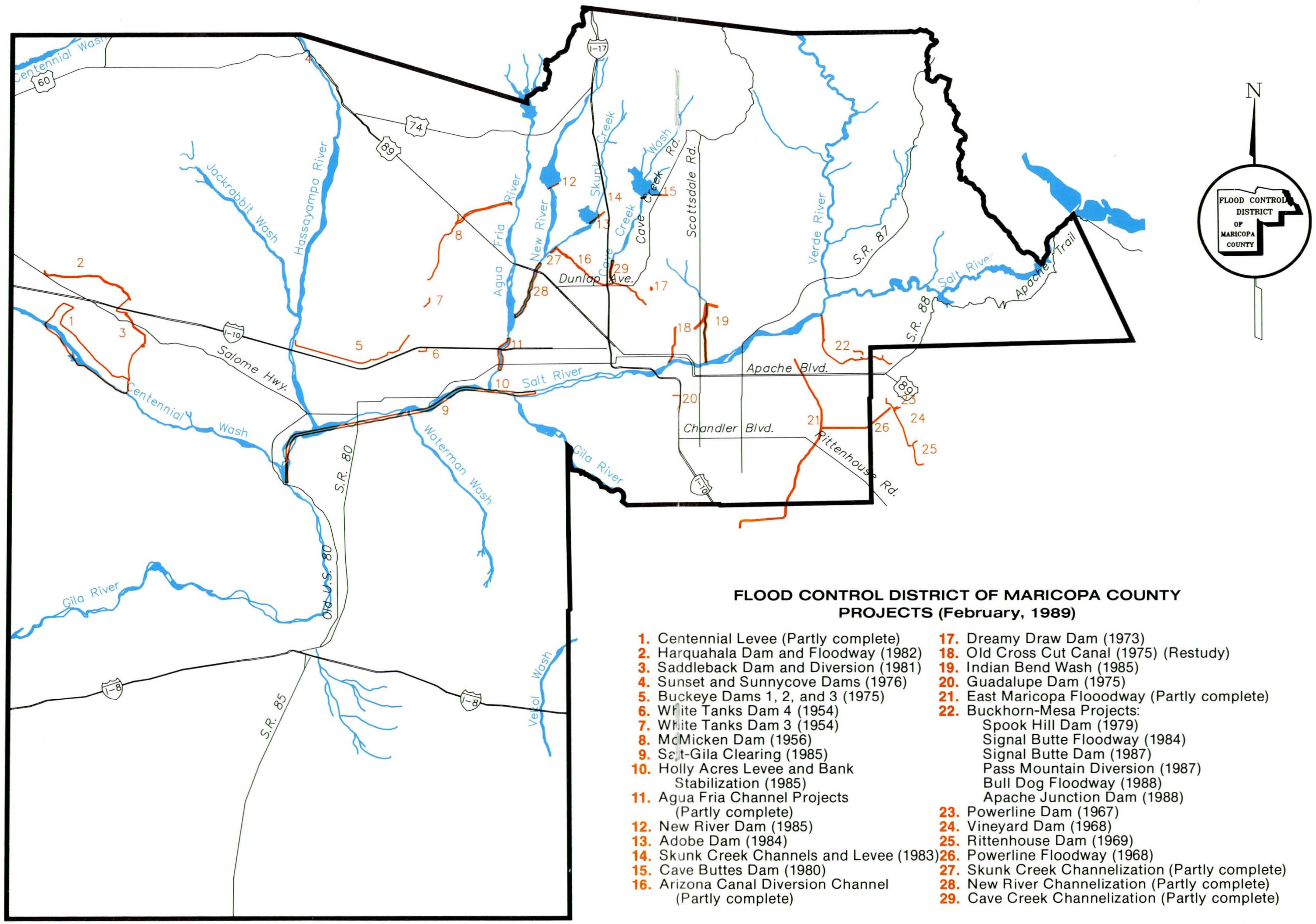
Sandbags

Burlap bags filled about half full with sand or dirt and tightly packed in front of doors will divert a lot of water. Remember, wet soil is heavy.

In a pinch, plastic bags partially filled with water and sealed will work like sandbags.

The road may be washed away under flowing water.

Flood Control in the Desert



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY PROJECTS (February, 1989)

1. Centennial Levee (Partly complete)
2. Harquahala Dam and Floodway (1982)
3. Saddleback Dam and Diversion (1981)
4. Sunset and Sunnycove Dams (1976)
5. Buckeye Dams 1, 2, and 3 (1975)
6. White Tanks Dam 4 (1954)
7. White Tanks Dam 3 (1954)
8. McMicken Dam (1956)
9. Salt-Gila Clearing (1985)
10. Holly Acres Levee and Bank Stabilization (1985)
11. Agua Fria Channel Projects (Partly complete)
12. New River Dam (1985)
13. Adobe Dam (1984)
14. Skunk Creek Channels and Levee (1983)
15. Cave Buttes Dam (1980)
16. Arizona Canal Diversion Channel (Partly complete)
17. Dreamy Draw Dam (1973)
18. Old Cross Cut Canal (1975) (Restudy)
19. Indian Bend Wash (1985)
20. Guadalupe Dam (1975)
21. East Maricopa Flooodway (Partly complete)
22. Buckhorn-Mesa Projects:
    - Spook Hill Dam (1979)
    - Signal Butte Floodway (1984)
    - Signal Butte Dam (1987)
    - Pass Mountain Diversion (1987)
    - Bull Dog Floodway (1988)
    - Apache Junction Dam (1988)
23. Powerline Dam (1967)
24. Vineyard Dam (1968)
25. Rittenhouse Dam (1969)
26. Powerline Floodway (1968)
27. Skunk Creek Channelization (Partly complete)
28. New River Channelization (Partly complete)
29. Cave Creek Channelization (Partly complete)

FEBRUARY 1989

What is the Flood Control District Doing?

What We Do

The purpose of the District is to prevent injury or loss of life and to eliminate or minimize property damage in Maricopa County.

Dams and Channels

Traditionally, flood control planning has focused on the protection of existing development through construction of dams and channels.

Technicians landscaping the south bank of the ACDC. The Cactus Road Bridge crosses the Channel in the background.

Dams and detention basins collect floodwater and release the water slowly to minimize damage. The reservoirs and basins are normally empty.

The Chandler Heights Road Bridge crossing the East Maricopa Floodway which extends from Brown Road in Mesa to the Gila River.

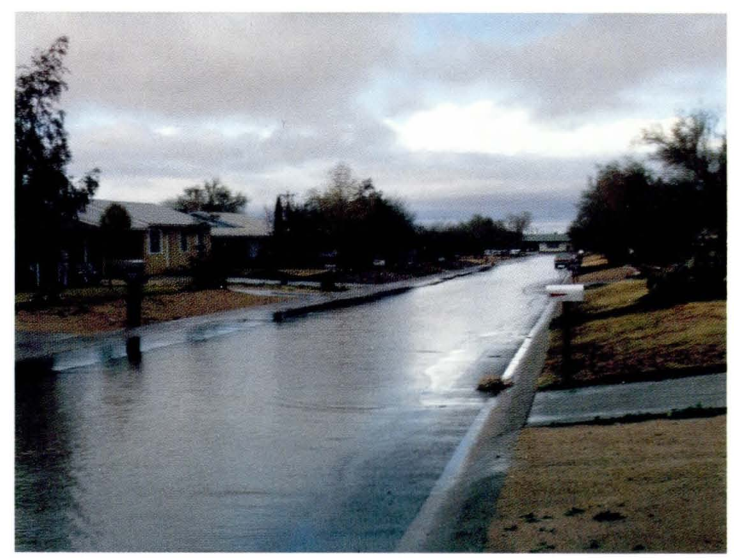
Channels move floodwater to rivers large enough to handle the flow. Channeling may involve excavation, lining, and building dikes and levees as well as clearing vegetation and obstructions.

Channels are not necessarily constructed along natural streambeds.

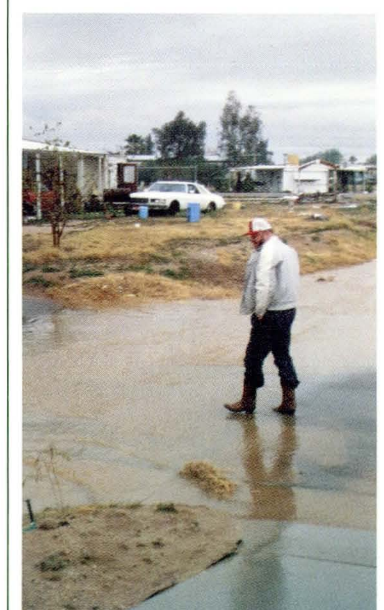
Giant earth moving machines excavate dirt from the ACDC near Peoria and 43rd Avenue. Over 10 million cubic yards of dirt will be moved between 75th Avenue and 40th Street.

The District builds dams, levees, and channels, often in cooperation with cities, the County, the State, the Federal Government, or private organizations.

The District also serves as the local sponsor for flood control projects being designed and constructed by the U.S. Army Corps of Engineers and the Soil Conservation Service. The District acquires property at fair market value, relocates people and facilities, builds bridges, and operates and maintains the completed structures.



Streets may be designed to carry stormwater away from houses.



Flood Control District Drainage Investigator.

The District operates and maintains more than 20 dams and 88 miles of channels spread around Maricopa County.

Don't drive across flooded washes. Even school buses can be washed away.

Drainage Management

Developers and builders must submit their drainage plans before they can start building.

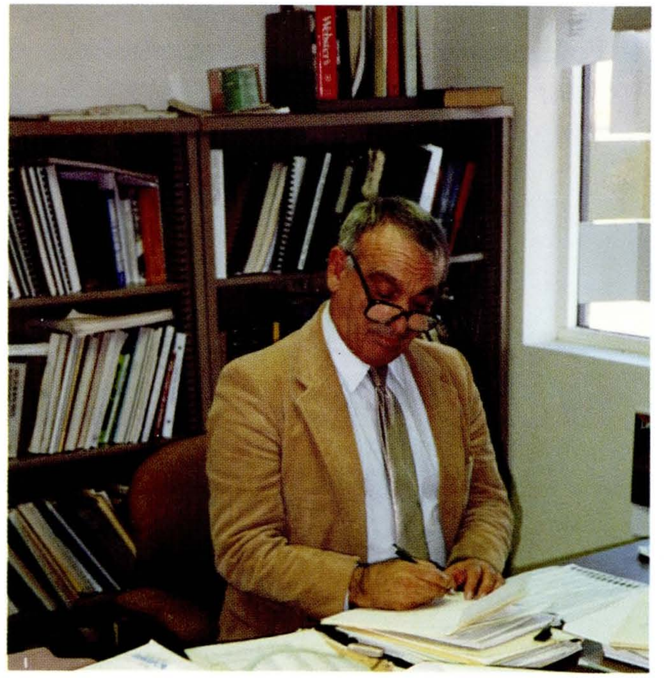
The plans are reviewed to be sure the water flow is not increased and that the development doesn't cause damage to its own or neighboring properties.

The property is later inspected to be sure the plans were followed.

Stormwater in streets may be a nuisance, and it may slow traffic, but it isn't a "flood." It is just stormwater drainage.

In this part of the country, with our low annual rainfall scattered throughout the year, it just isn't economically feasible to design a system to control all stormwater.

Therefore, the streets are frequently designed to carry stormwater away from houses and businesses.



Drainage plans of developers and builders are reviewed by District engineers.

Floodplain Management

The National Flood Insurance Program gives communities a way of managing floodplains.

If communities adopt and enforce floodplain regulations, residents can buy insurance.

With few exceptions, the insurance is available to just about everybody in Maricopa County whether in a floodplain or not. (One of the few exceptions is a new policy after the previous owner was flooded and paid off.)

Contents may be insured for both owners and renters.

In managing floodplains the communities determine what uses can safely occur in a floodplain (such as farming or a golf course) and whether the use is adequately protected from flooding.

For the unincorporated area of Maricopa County, the Flood Control District administers floodplain regulations.

Early Warning

The Flood Control District assists in providing early warning of potential floods with data collected by rain and stream gauges.

More than 240 rain gauge stations and 20 stream gauges are operated by the District. Information from these gauges is consolidated by a computer at the District where further computerized analysis and forecasting can begin.

Flood Emergencies

The District also provides technical information during flood emergencies to Civil Defense and Emergency Services so people can be moved to safety.

District technicians often work on top of their trucks to repair rain gauges. The data is transmitted by radio waves to the Flood Control District and the National Weather Service.

What is the Flood Control District of Maricopa County?

Board of Directors

The District, founded in 1959, is a municipal corporation and political subdivision of the State of Arizona.

The District is governed by a Board of Directors which is also the Board of Supervisors of Maricopa County.

Flood Control Advisory Board

A Flood Control Advisory Board is appointed by the Board of Supervisors and holds regular meetings open to the public.

The Advisory Board studies the flood control, floodplain regulation, drainage, and water conservation needs of the District and makes recommendations to the Board of Directors.

The Advisory Board also acts as the Floodplain Board of Review and Drainage Review Board to make interpretations of regulations and to hear requests for variances and appeals.

Where the Money Comes From

The activities of the District are funded by a Flood Control Tax Levy assessed on all real property within Maricopa County and a variety of cost sharing arrangements with other agencies. The District's FY 88/89 budget is about $85 million.

Board of Directors. From left Tom Freestone, Carole Carpenter, Fred Koory, Jr., Jim Bruner, Ed Pastor, and Clerk of the Board Cherie Pennington.

Flood Control District
of Maricopa County
3335 West Durango
Phoenix, Arizona 85009
(602) 262-1501

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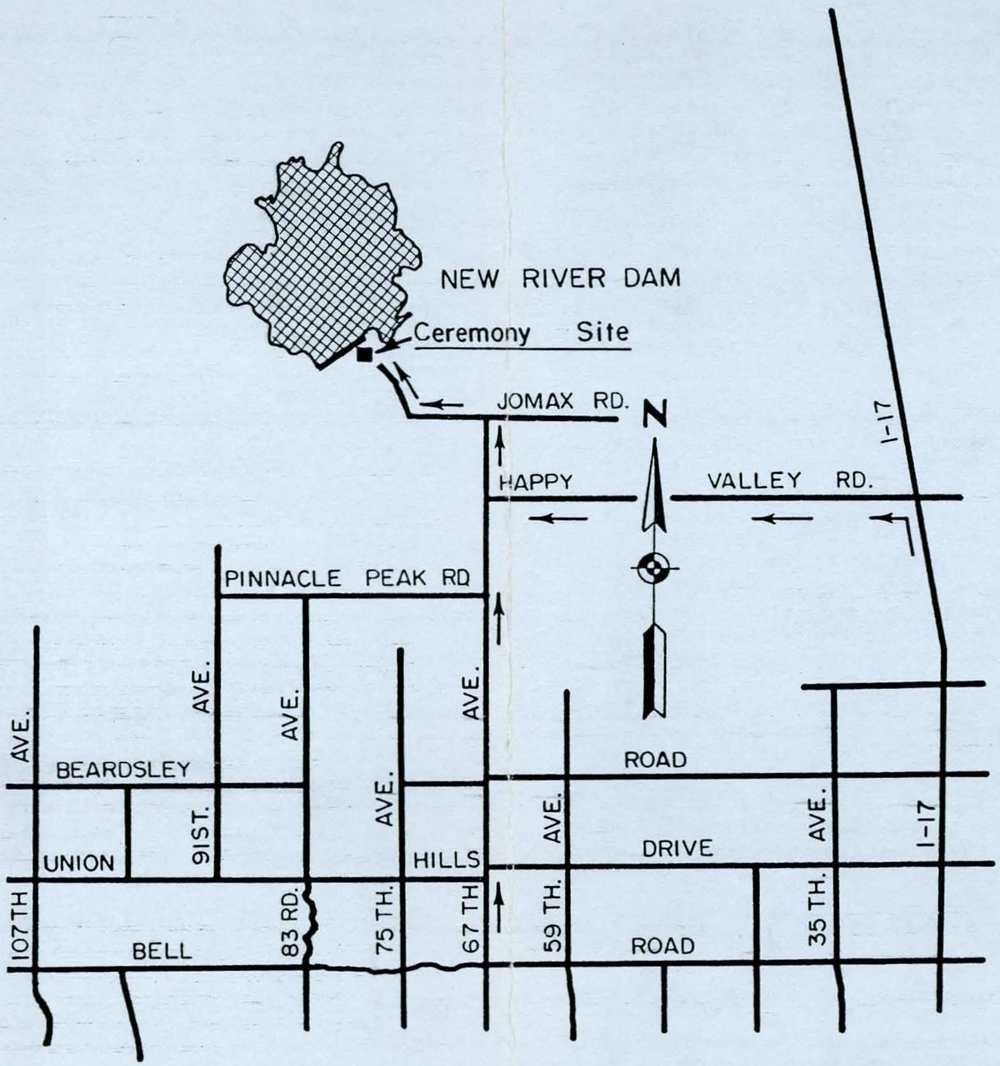
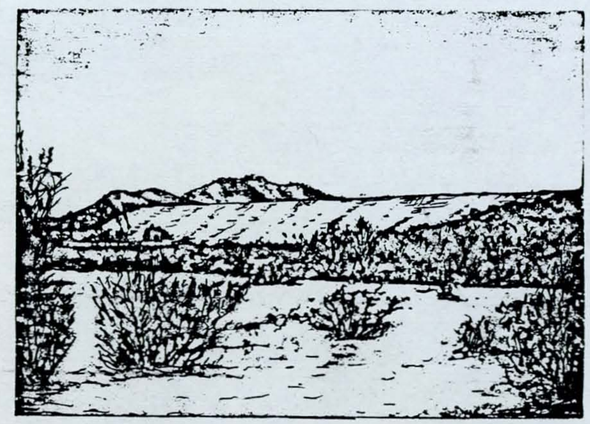
Phoenix, Arizona 85009
(602) 262-1501



THE FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
INVITES YOU TO ATTEND
Dedication Ceremony
for

NEW RIVER DAM



Thursday, February 7, 1985
11:00 A. M.

WELCOME TO NEW RIVER DAM DEDICATION

CEREMONY PROGRAM

Band Selections ....Peoria High School Marching Band

Master of Ceremonies..........Fred Koory, Jr.
Board of Directors, Flood Control District

Invocation ....Dr. Roger Stressman
Willowbrook United Methodist Church

Pledge of Allegiance ....Fred Koory, Jr.

Star Spangled Banner .... Peoria High School Marching Band

Remarks and Introduction of Guests ....Fred Koory, Jr.

Remarks ....BG Donald J. Palladino
U. S. Army Corps of Engineers

Remarks ....Edmund Tang
Mayor, City of Peoria

Remarks ....Congressman Eldon Rudd

Benediction..............Dr. Roger Stressman

****

Refreshments will be provided by
M. M. Sundt Construction Company

****

BACKGROUND INFORMATION

New River Dam is the fourth and final dam to be constructed as a part of the "Phoenix, Arizona and Vicinity (Including New River)" Flood Control Project. Dreamy Draw Dam, the first in the series was completed in 1973; Cave Buttes was completed in 1980; and Adobe Dam was completed in 1982. The Arizona Canal Diversion Channel (ACDC), the last feature of this undertaking, will divert flows along the north side of the Arizona Canal from the vicinity of 40th Street westward to Skunk Creek will be constructed in four reaches, starting in late 1985. The ACDC will divert all flood flows up to a magnitude expected once in each 100 years on the average.

New River Dam is located on New River about 8 miles upstream from the Skunk Creek confluence. The 0.45 mile-long earthfill dam will control the standard project flood with a basin capacity of 43,520 acre-feet at the spillway crest. It will provide flood protection to residences, businesses, and other land uses along the New and Agua Fria Rivers by detaining the floodwaters and releasing them at a greatly reduced rate. The decrease in peak flows will offset the effect of diverting flows from the Arizona Canal Diversion Channel (ACDC) drainage area to the New River when the ACDC is constructed. To assure the long-term capabiilty to operate New River Dam as designed, the Flood Control District by agreement is required to manage and maintain a designated floodway and floodway fringe along the New River between the dam and Skunk Creek.

The dam was designed and built by the U. S. Army Corps of Engineers. The construction contract was awarded in August 1983 to M. M. Sundt Construction Company. A project tour and review of this project was held in May 1984. All rights-of-way were acquired by the Flood Control District with cost sharing by the Arizona Department of Water Resources. There were no relocations of people or facilities. No permanent pool of water will be retained in the reservoir. Instead, the dam and reservoir are designed to trap the floodwater and store it only as long as it takes to release it safely downstream. Reservoir capacity, thus, is restored to

BACKGROUND INFORMATION Cont'd

handle a future flood. Development of formal recreational facilities is not scheduled at the New River Dam site at this time. The abundance of natural vegetation and wildlife was a factor in the decision not to undertake recreational development in the area.

PROJECT FEATURES
NEW RIVER DAM

Type of Structure..............Earthfill
Length ....2,320 feet
Height...........................104 feet
Reservoir Capacity.......43,520 acre-feet
Reservoir Area ....1,780 acres

Standard Project Flood

Peak Inflow................45,000 cfs
Peak Outflow ....2,665 cfs
Drawdown Time................13.4 days

Costs

Federal (Construction)...$10.3 million
Flood Control District ...$3.7 million
Dept. of Water Resources..$1.5 million

Contractor...... M. M. Sundt Construction
Designer... U. S. Army Corps of Engineers
Local Sponsor..... Flood Control District

BOARD OF DIRECTORS FLOOD CONTROL DISTRICT

Tom Freestone (Chairman)

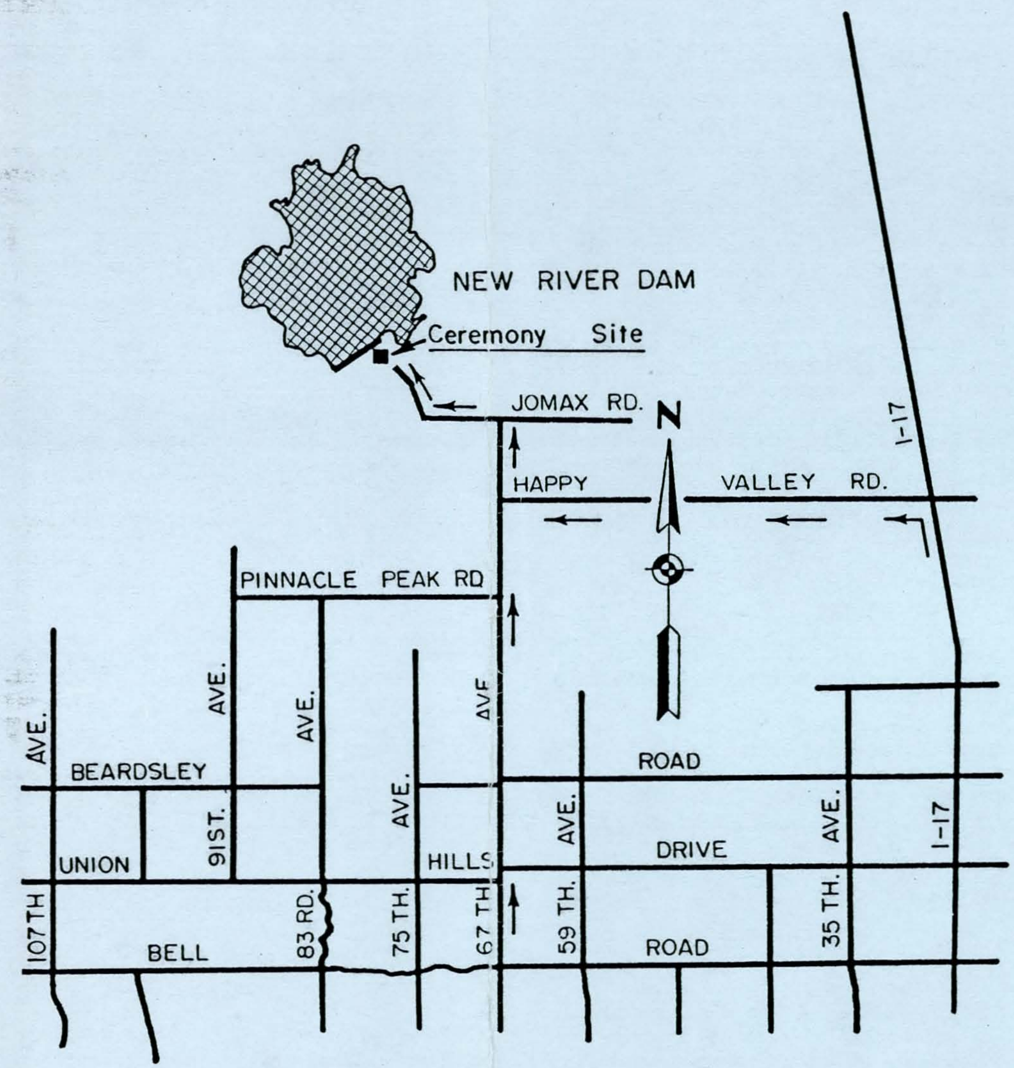
George Campbell
Carole Carpenter
Fred Koory, Jr.
Ed Pastor

FLOOD CONTROL ADVISORY BOARD

John Miller (Chairman)

Lynn Anderson
James E. Attebery
William LoPiano
Paul Perry
Charles Sykes
Reid Teeples

D. E. Sagramoso, Chief Eng. and Gen. Mgr.
FLOOD CONTROL DISTRICT of Maricopa County



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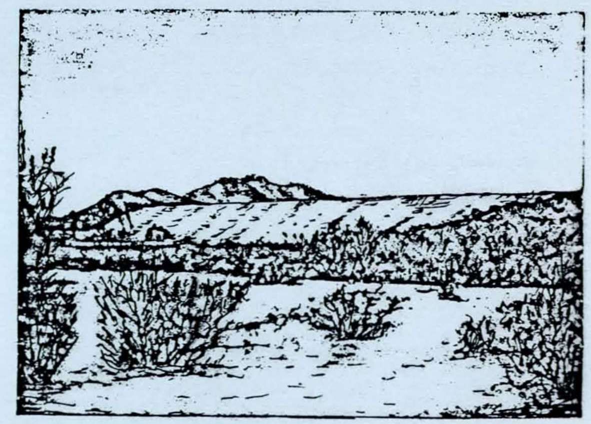

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Republic City Editor
Richard Robertson

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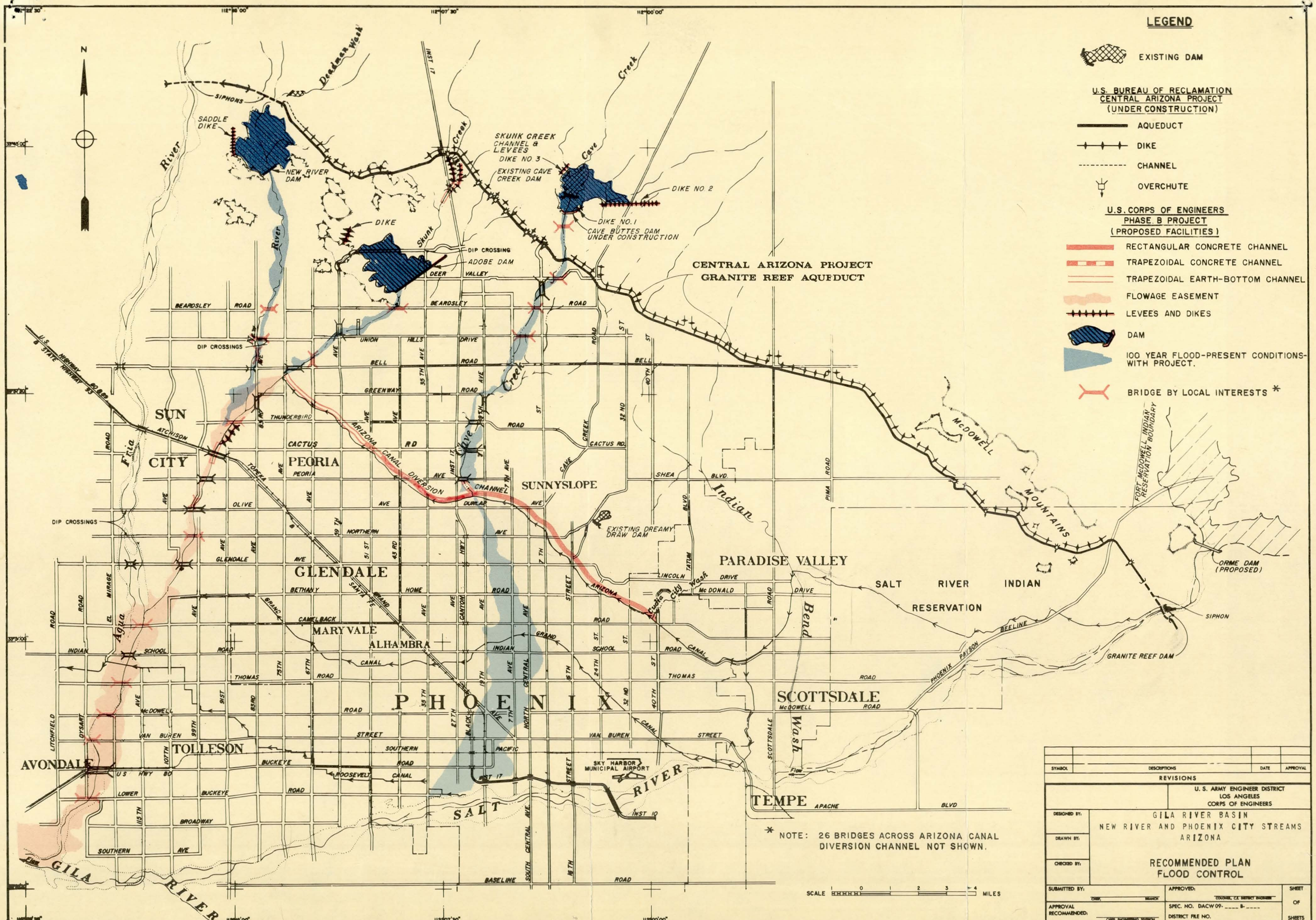

LEGEND
EXISTING DAM
U.S. BUREAU OF RECLAMATION
CENTRAL ARIZONA PROJECT
(UNDER CONSTRUCTION)
AQUEDUCT
DIKE
CHANNEL
OVERCHUTE
U.S. CORPS OF ENGINEERS
PHASE B PROJECT
(PROPOSED FACILITIES)
RECTANGULAR CONCRETE CHANNEL
TRAPEZOIDAL CONCRETE CHANNEL
TRAPEZOIDAL EARTH-BOTTOM CHANNEL
FLOWAGE EASEMENT
LEVEES AND DIKES
DAM
100 YEAR FLOOD-PRESENT CONDITIONS-WITH PROJECT.
BRIDGE BY LOCAL INTERESTS *
CENTRAL ARIZONA PROJECT
GRANITE REEF AQUEDUCT
SADDLE DIKE
NEW RIVER DAM
SIPHONS
Deadman Wash
SKUNK CREEK CHANNEL & LEVEES
DIKE NO 3
EXISTING CAVE CREEK DAM
DIKE NO 2
DIKE NO. 1
CAVE BUTTES DAM UNDER CONSTRUCTION
DIKE
DIP CROSSING
ADOBE DAM
DEER VALLEY
DIP CROSSINGS
SUN CITY
PEORIA
SUNNYSLOPE
GLENDALE
MARYVALE
ALHAMBRA
PARADISE VALLEY
SALT RIVER INDIAN RESERVATION
McDOWELL MOUNTAINS
FORT McDOWELL INDIAN RESERVATION BOUNDARY
ORME DAM (PROPOSED)
SIPHON
GRANITE REEF DAM
EXISTING DREAMY DRAW DAM
ARIZONA CANAL DIVERSION CHANNEL
P H O E N I X
SCOTTSDALE
TOLLESON
AVONDALE
TEMPE
SKY HARBOR MUNICIPAL AIRPORT
SALT RIVER
GILA RIVER
Agua Fria River
New River
Skunk Creek
Cave Creek
Indian Bend Wash
* NOTE: 26 BRIDGES ACROSS ARIZONA CANAL DIVERSION CHANNEL NOT SHOWN.
SCALE 0 1 2 3 4 MILES
REVISIONS
U. S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS
GILA RIVER BASIN
NEW RIVER AND PHOENIX CITY STREAMS
ARIZONA
RECOMMENDED PLAN
FLOOD CONTROL
DESIGNED BY:
DRAWN BY:
CHECKED BY:
SUBMITTED BY:
APPROVAL RECOMMENDED:
APPROVED:
SPEC. NO. DACW09-
DISTRICT FILE NO.
SHEET OF SHEETS

PLATE 1

JER

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
P. O. BOX 2711
LOS ANGELES, CALIFORNIA 90053

REPLY TO
ATTENTION OF:

December 10, 1987

FLOOD CONTROL DISTRICT
RECEIVED
DEC 14 '87

	CH ENG	2	P & PM
	DEP		HYDRO
	ADMIN		LMGT
	FINANCE		FILE
	C & O		
	ENGR		

REMARKS cc: DES RCP

Office of the Chief
Project Management Branch

Mr. D.E. Sagramoso
Chief Engineer and General Manager
Flood Control District of Maricopa County
3335 West Durango Street
Phoenix, Arizona 85009

Dear Mr. Sagramoso:

Within the next year, we plan to advertise and award four new construction contracts for the Phoenix and Vicinity Project. The contracts and schedules are as follows:

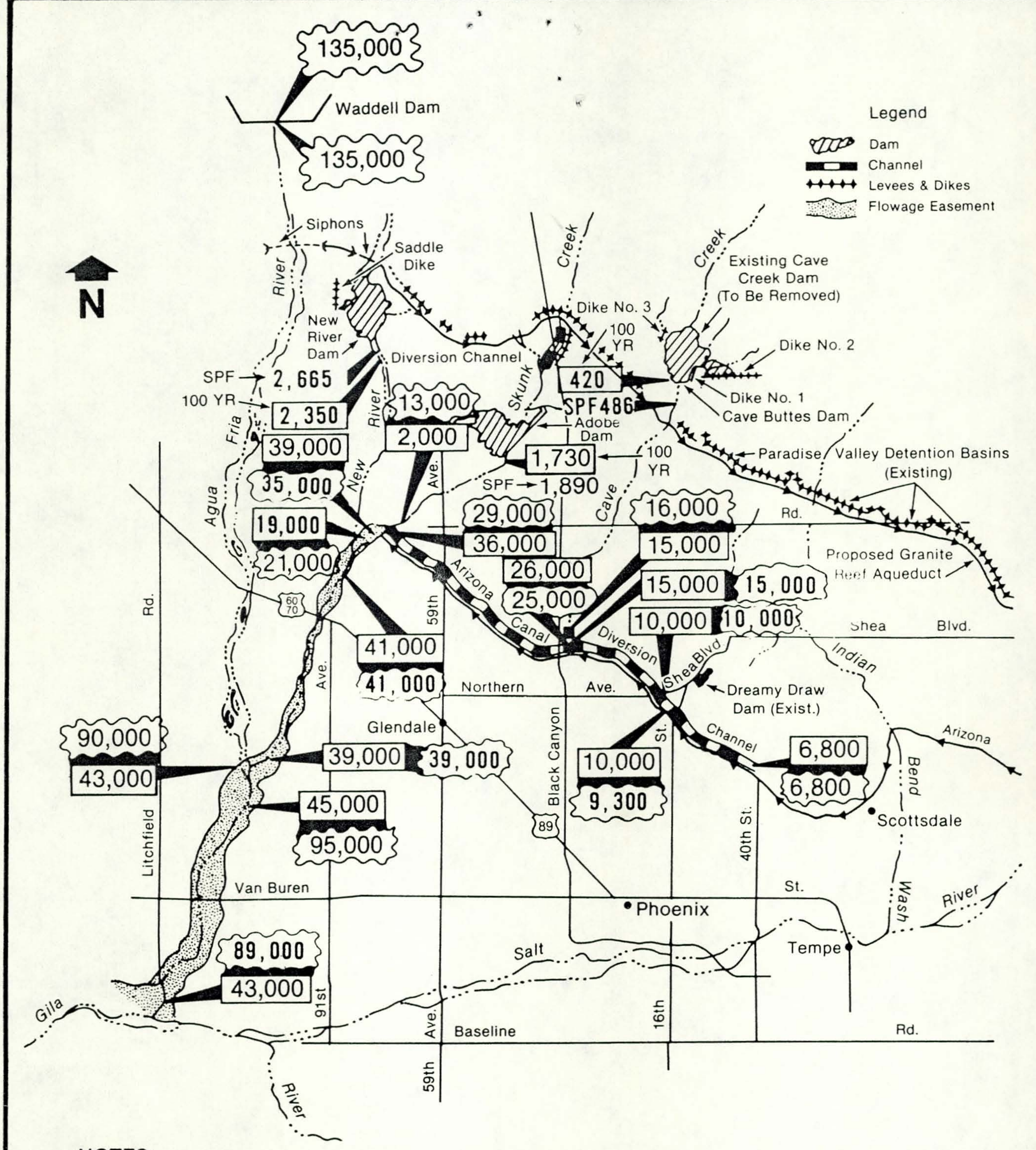
Construction Increment	Advertise Date	Award Date
New River channelization and bank stabilization	December 16,1987	March 1, 1988
Cave Creek (Including Reach 2C of the Arizona Canal Diversion Channel)	August 1, 1988	October 1, 1988
Reach 3 of the Arizona Canal Diversion Channel	September 1,1988	November 1, 1988
Erosion control and recreation in Reach 1 of the Arizona Canal Diversion Channel	April 1, 1988	June 1, 1988

The schedule is furnished to you so that you can plan rights-of-way acquisition and relocations accordingly.

Sincerely,

Robert L. Hall
CARL F. ENSON
Chief, Engineering Divisin

New River Dam DM No. 3, Nov. '82



NOTES:

1. Discharges and flow rates are in c.f.s. based on future conditions of development.
2. SPF discharges given at dams; 100-year flow rates given for channels, except as noted.

LEGEND

Q — Phase I Design Discharges

Q — Revised Design Discharges

SCALE 1 0 1 2 3 4 5 MILES

GILA RIVER BASIN,
NEW RIVER & PHOENIX CITY STREAMS, AZ

REVISED
DESIGN DISCHARGES
FOR
RECOMMENDED PLAN

US ARMY CORPS OF ENGINEERS
LOS ANGELES DISTRICT

SKIK HELLERUD
Aq. Prof. Permits

The duration of a 100-year flood is dependent on the type of storm occurring and its location. It is possible for flood stages to rise from the riverbed to the flood crest in less than eight hours following intense local thunderstorms. In other cases, it may take as long as thirty-six hours for flood stages to crest during and after winter or summer storms.

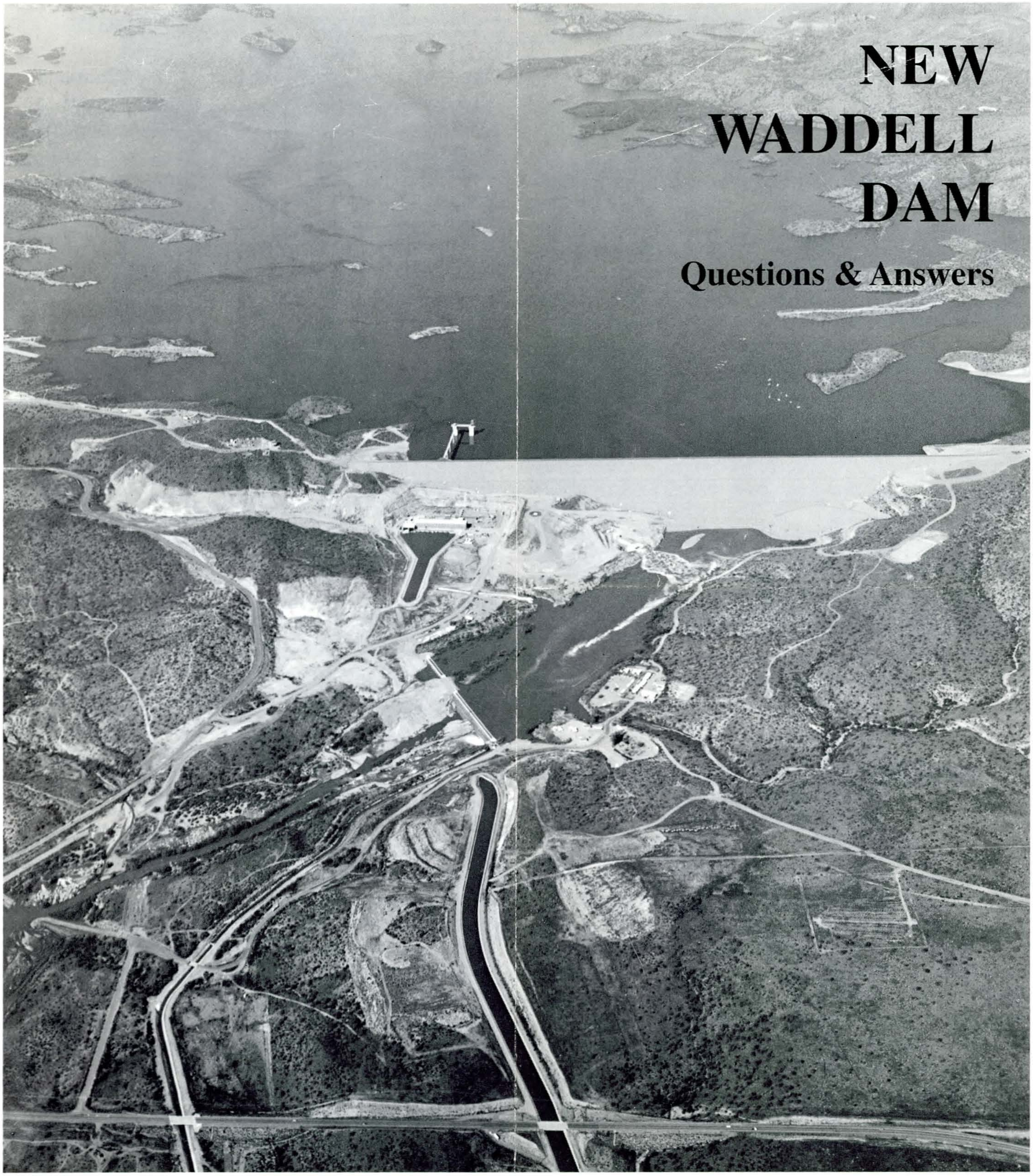
Table 3: New River/Skunk Creek/Agua Fria River Estimated Flow Rates

Location	100-year Flood Flow Rate
Reach 1 New River @ Proposed New River Dam	2,200 cfs
New River @ Happy Valley Road	4,250 cfs
New River @ Pinnacle Peak Road	6,130 cfs
New River 0.1 mile (0.16 km) U/S of Deer Valley Drive	7,870 cfs
New River 0.1 mile (0.16 km) U/S of Beardsley Road	9,600 cfs
New River @ Union Hills Drive	13,860 cfs
New River 0.2 miles (0.32 km) U/S of Bell Road	13,860 cfs
Reach 2 Skunk Creek @ Adobe Dam	1,730 cfs
Skunk Creek @ Bell Road	13,000 cfs
Skunk Creek D/S of the Arizona Canal Diversion Channel	36,000 cfs
Reach 3 New River U/S of New River/Skunk Creek Confluence	18,620 cfs
New River D/S of New River/Skunk Creek Confluence	41,000 cfs
Reach 4 Agua Fria River D/S of Agua Fria River/New River Confluence	95,000 cfs
Agua Fria River @ Camelback Road	95,000 cfs
Agua Fria River @ Indian School Road	94,000 cfs
Agua Fria River @ McDowell Road	91,000 cfs
Agua Fria River @ I-10 Freeway	91,000 cfs
Agua Fria River @ Avondale	90,000 cfs
Agua Fria River @ Agua Fria River/Gila River Confluence	89,000 cfs

Source: U.S. Army Corps of Engineers, 1981A.

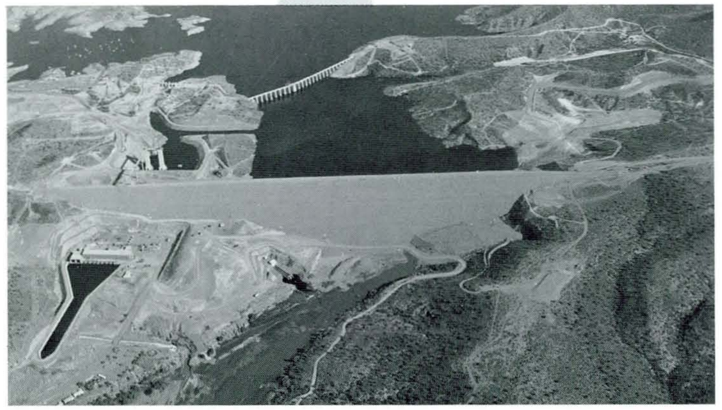
NEW WADDELL DAM

Questions & Answers



What is New Waddell Dam

Constructed by the U.S. Bureau of Reclamation (USBR), New Waddell Dam is a zoned earthfill dam, 300 feet high and 4,700 feet long. Located at Lake Pleasant on the Agua Fria River 35 miles northwest of Phoenix, Arizona, New Waddell Dam is the primary regulatory storage feature of the Central Arizona Project (CAP). Work on the dam began in 1985 and will be completed in 1995.



(Foreground) New Waddell Dam will provide regulatory storage for CAP water. Old Waddell Dam is in the background.

What is the Central Arizona Project (CAP)

Operated and maintained by the Central Arizona Water Conservation District (CAWCD), the CAP is a 336 mile long water conveyance system. Its major components consist of interconnected aqueducts, pumping plants, check structures, turnouts, an electronic control center, inverted siphons, tunnels, road bridges, wildlife and cattle crossings, overchutes and culverts that carry local storm runoff water over or under the canal, earthen dikes, power transmission lines and switchyards.

Why was the CAP built

The CAP is being constructed to deliver Colorado River water from Arizona's western border into the central and southern portions of the state. In 1968, Congress authorized construction of the CAP under the Colorado River Basin Project Act. Construction of this mammoth project began in 1973 and will continue through 1996. CAP water will largely replace groundwater uses, supplement other surface water supplies, and specifically address a statewide groundwater overdraft problem. The system is designed to bring into the state an average of 1.5 million acre-feet (maf) of Colorado River water. CAP's direct service area includes Maricopa, Pima, and Pinal counties, encompassing the largest portions of the state's population and irrigated agriculture. (One acre-foot equals 325,851 gallons).

CAP will bring 1.5 million acre-feet of Colorado River water into Arizona.

Why is New Waddell Dam important to CAP

As the principal water storage feature of the CAP, New Waddell Dam's Lake Pleasant reservoir contributes to the assurance of a reliable water supply for central and southern Arizona. The regulatory storage aspects of the reservoir permit the large electrical pumping demands of the CAP facilities to be managed by moving that pump load to non-peak use time frames thereby enhancing the value of the CAP's electrical resources. In addition, revenue from hydroelectric power generated by the dam contribute to repayment of CAP construction costs. Additional benefits from the dam include storage of Agua Fria River runoff, incidental flood protection by controlling flood flows of the Agua Fria and greatly enhanced water-based recreation.

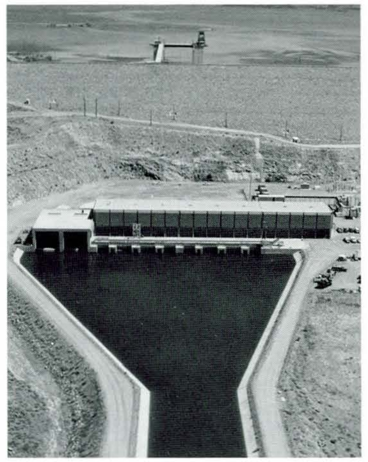
What originally formed Lake Pleasant

In 1927, Lake Pleasant was formed following construction of the original Waddell Dam. Formerly named Pleasant Dam, Waddell was the largest multiple arch dam in the world. As part of an extensive effort to develop the scarce water resources of Central Arizona, this project became the Valley's only local water facility successfully constructed by private interests. The original Waddell Dam is now covered with water from the new lake, but the structure will not be a hazard to boaters or other water sports enthusiasts.

Old Waddell Dam has been overtopped by Lake Pleasant, but will not inconvenience water-recreation enthusiasts.

How will the system work

The Waddell Canal will carry Colorado River water from the CAP aqueduct to and from New Waddell Dam. This canal connects the dam with the main CAP aqueduct about five miles south of the dam site. Water will be pumped from the Waddell Canal into Lake Pleasant by a Pumping/Generating (P/G) plant. When water is released from New Waddell Dam to CAP customers, it will flow back through the P/G plant and the Waddell Canal to the main CAP aqueduct. The water will generate up to 45 megawatts (MW) of non-polluting hydroelectric power as it is released. The flow capacity at the P/G plant is 3,000 cubic feet per second (cfs) in pumping or generating mode. Colorado River water will be pumped into storage from October through March during a normal operating year. From April to September, water will be released from the reservoir to meet CAP needs. If necessary, floodwaters can be released into the river from the dam through the river outlet works tunnel and the P/G plant bypass structure. The floodwaters conveyed through the bypass structure are released into the river via a wasteway structure. The wasteway structure flow capacity is 3,500 cfs. The river outlet works flow capacity is 5,500 cfs. If the reservoir's flood storage capacity is ever exceeded, floodwaters will be released over two uncontrolled spillways located about 7,500 feet west of the dam. The water would flow down Morgan City Wash back to the Agua Fria River about one mile below New Waddell Dam. The total flow capacity of the spillway is 315,000 cfs.



The Pump/Generating Plant will pump Colorado River water into and out of Lake Pleasant. The water's release will generate up to 45MW of pollution-free hydroelectric power.

How will the CAP operation affect Lake Pleasant

During a normal year's CAP operation, the reservoir water level may fluctuate as much as 100 feet. The maximum allowable water surface fluctuation is 150 feet. Generally, lake levels will rise October through March while Colorado River water is pumped into the reservoir. Conversely, lake levels will drop April through September while water is released back into the CAP system for customer deliveries. From November 1993 through April 1994 New Waddell filling and pump testing will fill the lake to elevation 1701. However, certain circumstances such as extensive storm runoff into Lake Pleasant could change the current operational plan. When completed, recreational facilities have been located so access to them and to the water, will be available during both high and low water periods.

What are the time frames for lake facilities' development

The construction of the 10 lane boat ramp is now in progress and the first phase will be constructed to elevation 1666. This facility is scheduled for public use by May 1994. The restroom facilities and the fish cleaning station will be constructed with the first campsites in late 1994 and completed within nine to 12 months from the start of the construction. The marina will be under construction by May 1994 as will the Operation/Ranger Center. It is anticipated that construction of the replacement facilities for removed campgrounds, picnic areas, restrooms, etc., will be completed by 1997.

How will Lake Pleasant recreation be affected

New Waddell Dam will add a maximum of 7,000 surface acres to Lake Pleasant, greatly increasing the recreational value of Lake Pleasant Regional Park managed by Maricopa County Parks and Recreation Department. Recreational facilities will be concentrated on the reservoir's western shore. An outdoor education center is planned for the eastern shore. The remaining part of the eastern shore and part of the northern shore will be closed to development. Planned recreational facilities include multi-lane boat ramps with fish cleaning stations, picnic sites, campsites which include provisions for tent and primitive camping, improved camping with full utility hook-ups and recreational vehicle sanitary dump facilities, and the traditional shoreline camping. There are plans for an Operation/Ranger Center, group use areas, overlooks, vistas, full service marina equipped to handle 500 or more boats, and seven miles of trails.

The increased acreage of Lake Pleasant will allow lake visitors to enjoy enhanced recreational opportunities.

What environmental protection was considered for New Waddell Dam

Thousands of cacti were salvaged by BOR and the general public.

Protecting the natural environment and mitigating impacts at Lake Pleasant is a high priority. USBR has constructed several wildlife water catchments on the west and north sides of the reservoir to help reduce animal/vehicle collisions and improve wildlife distribution. A study, funded by CAP appropriations, was conducted to assess the affects of the introduction of fish species from the Colorado River into the reservoir on existing fisheries and to determine what affect the reservoir's operation will have on the fish and the bald eagles that use the lake. In addition, a post-construction study will be conducted to determine any further impact of the reservoir's operation. Reclamation has committed to fence lands acquired for the reservoir to restrict grazing and off-road vehicle access; leave as much vegetation as possible in the reservoir for fish habitat; maintain a minimum water pool to provide a carry-over habitat for fish in times when the reservoir normally would be dry; evaluate the feasibility of developing the Agua Fria River floodplain as a riparian habitat between New Waddell Dam and Highway 74; close the area around a bald eagle nesting site on the upper reservoir to boaters, vehicles, and hikers during breeding seasons when the eagles occupy the nests; and erect a barrier on a tributary in the upper lake to protect a population of endangered native Gila topminnow from non-native fish that might move upstream from the reservoir during high water periods.

What are the vital statistics of New Waddell Dam and the new lake

NEW WADDELL DAM

Type	Zoned earthfill
Height	300 feet above streambed
Crest elevation	1,730 feet
Crest length	4,700 feet

SPILLWAYS

	Service Spillway	*Auxiliary Spillway*
Type	ungated, free overflow	fuseplug embankment
Crest length	590 feet	370 feet
Crest elevation	1,706.5 feet	1,711 feet

RESERVOIR

Maximum levels	
Reservoir capacity	1,108,600 acre-feet
Water surface elevation	1,725 feet
Surface acres at maximum	12,040 acres
Anticipated Operating Levels	
Conservation storage capacity	812,100 acre-feet
Conservation storage elevation maximum	1,702 feet
Surface acres at conservation storage maximum	9,970 acres
Conservation storage elevation minimum	1,552 feet
Minimum pool	40,500 acre-feet

PUMP-GENERATING PLANT

Number of units	8
Capacity	3,000 cubic feet per second
Power generation maximum	45 megawatts
Maximum lift	192 feet

WADDELL CANAL

Length	4.9 miles
Width	Top--82.5 to 88.5 feet, Bottom--24 feet
Typical water depth	16.5 feet
Capacity	3,000 cubic feet per second

HISTORIC WADDELL DAM

Type	Concrete multiple arch
Height	176 feet
Crest length	2,160 feet
Maximum storage capacity	157,600 acre-feet

A HISTORY OF CAP WATER DEVELOPMENT

In 1922, the Colorado River Compact divided the waters of the Colorado River system between the upper and lower basins. Arizona, California, and Nevada are the lower basin states and Colorado, Utah, New Mexico, and Wyoming are the upper basin states. The Compact apportioned about 7.5 million acre-feet (maf) to each basin.

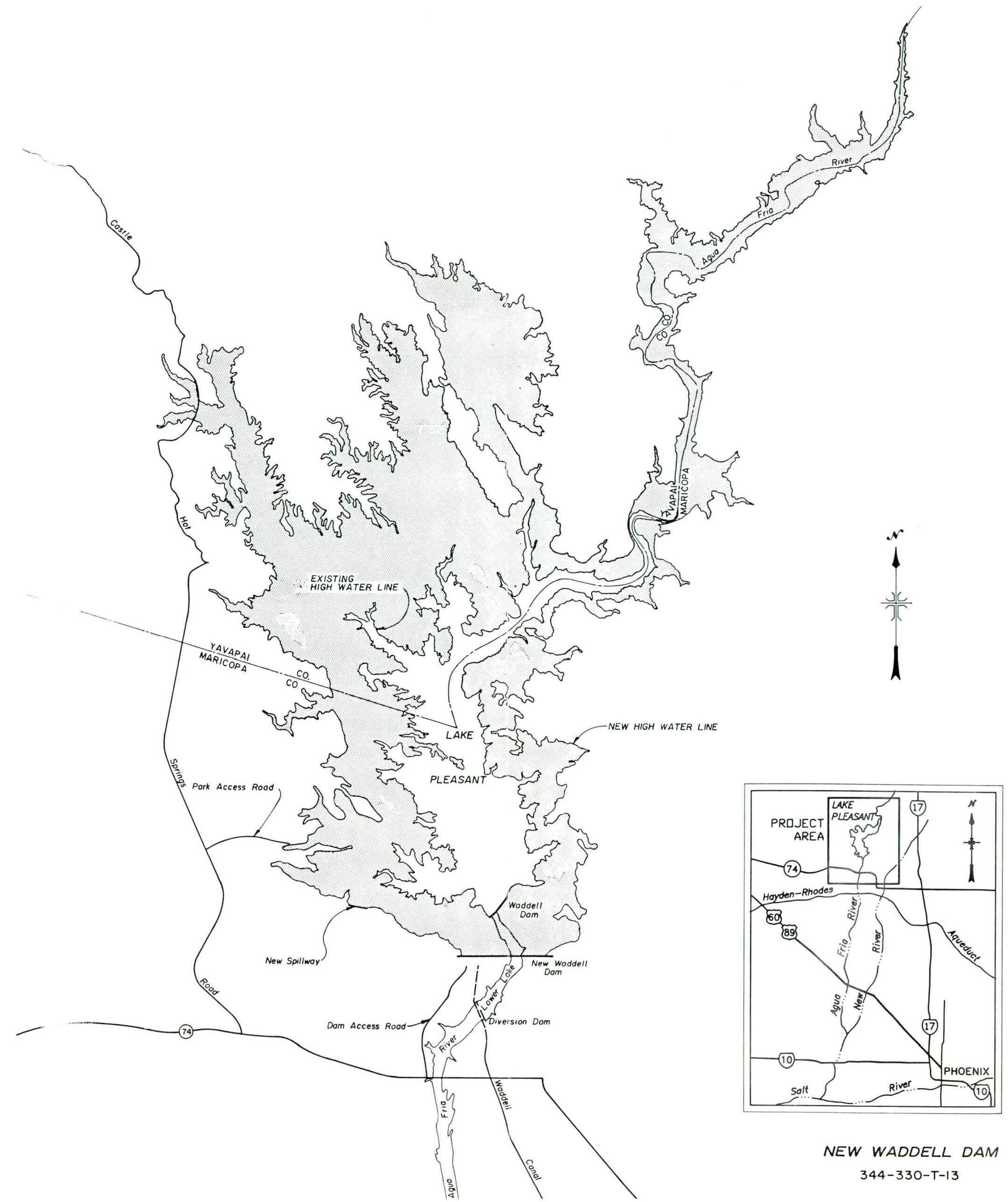
In 1928, Congress passed the Boulder Canyon Project Act authorizing construction of Hoover Dam, its power plant and the All American Canal.

In 1963, the U.S. Supreme Court, in a landmark case called Arizona v. California, interpreted the Boulder Canyon Act as a congressional apportionment of the first 7.5 maf, allotting Arizona 2.8 maf of annual use.

The 1968 Colorado River Basin Project Act authorized construction of the Central Arizona Project (CAP).

CAP construction began in 1973 and will continue through 1996. The first CAP water was delivered to an agricultural irrigation district in 1985. Phoenix received its first CAP water in 1986 and Tucson deliveries began in 1991.

President Lyndon B. Johnson hands Senator Carl Hayden the pen with which he signed the Colordo River Basin Project Act authorizing the Central Arizona Project.



NEW WADDELL DAM

344-330-T-13

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

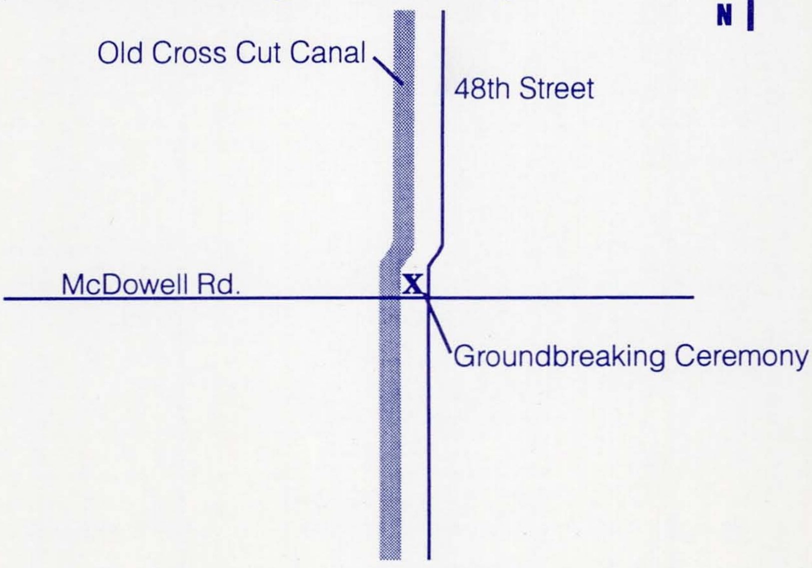
City of Phoenix

Groundbreaking Ceremony

Old Cross Cut Canal Improvement Project
Phase 2

Wednesday, June 26, 1996

Old Cross Cut Canal Improvement Project



The Groundbreaking Ceremony for the Old Cross Cut Canal Improvement Project will be held at the northwest corner of 48th Street and McDowell Road in Phoenix.

Old Cross Cut Canal Improvement Project
Phase 2

This joint project between the Flood Control District of Maricopa County and the City of Phoenix marks the beginning of the second of a three-phase project to improve the Old Cross Cut Canal (OCC) and provide a drainage outlet for the Arcadia area. The project will improve the safety of the canal and its ability to convey SRP irrigation water and Arcadia-area stormwater, plus accommodate roadways and park improvements.

Phase 1 involved the relocation of major water and sewer lines and roadway improvements along the OCC between McDowell and Thomas Roads. This work readied the canal for Phase 2 which will replace the existing earthen channel with a concrete box culvert from McDowell Road to Thomas Road. The culvert will be buried to allow for future park improvements planned by the City of Phoenix. Phase 3 will extend the box culvert and provide surface improvements north from Thomas Road to Indian School Road.

The flood control and other improvements associated with this project are possible because of the cooperation and commitment of community members and local governments. In addition to the progress on this project, it is this spirit of unity that will be celebrated at this brief ceremony.

The Flood Control District of Maricopa County

and the

City of Phoenix

Cordially invite you to join
Maricopa County Supervisor

Tom Rawles

&

Phoenix City Councilman

Sal DiCiccio

at the groundbreaking ceremony for

Old Cross Cut Canal Improvement Project

Phase 2

Wednesday, June 26, 1996
8:00 a.m.
Northwest corner of 48th Street and McDowell Road
(See map on reverse)

Refreshments

6/10/91

PVSP PROJECT SUMMARY

A recently completed 7-acre detention basin at the end of a Scottsdale Airport runway is also the end of the road for a regional flood control project that spanned 9 years and established itself as an outstanding example interjurisdictional cooperation.

While the project as ultimately constructed cost less than $5 million, its significance lies not in the amount on money expended, but in the way in which the project was accomplished. Three municipalities with a common drainage problem joined with the Flood Control District to develop a long term but resilient strategy for structurally resolving the flooding problems. The project was called the Paradise Valley-Scottsdale-Phoenix Flood Control Project (PVSP).

Two of the three municipalities joined with the District to pool over $2 million to serve as the initial seed money from which funds would be withdrawn to pay for the channels, basins and pipes that would make up the features of the PVSP project. The departure of one of the original participants and the loss of state financial assistance initially counted on would not prevent the project from progressing through to completion.

PROJECT INCEPTION

The PVSP project was initiated in November of 1976 when the mayor of Phoenix sent a letter to the Flood Control District requesting that the District take a leadership role in the resolution of flooding problems that were occurring in northeast Phoenix, northern Paradise Valley and northwest Scottsdale. The project area was bounded by the CAP Aqueduct to the north, Indian Bend Wash to the south, Scottsdale Road to the east and 56th Street to the west. Most of the area consisted of single family homes of high value on large lots. In addition, there were several commercial establishments along Scottsdale Road, one public school and a golf course in the area.

A $50,000 drainage study was conducted in 1978 by the firm Collar, Williams & White in which specific drainage problems were identified and various corrective measures proposed. The solution of choice consisted of seven detention basins, outlet pipes, culverts and channels to direct stormwater in a controlled manner to upper Indian Bend Wash. This plan was later downsized to only five detention basins when two basins were deemed unnecessary.

FUNDING

The estimated cost of construction for the project was $6,684,958 in 1978 dollars. The District offered to contribute 25 percent towards the total cost, with the remaining costs to be shared by Phoenix, Scottsdale and Paradise Valley.

The formula used to determine each municipality's cost share was based on four elements: the drainage area within each community which contributed to the flood flows; the assessed valuation of the property in each municipality that would be protected by the project; the amount of stormwater runoff generated under existing conditions; and the anticipated amounts of future runoff.

While the formula was considered logical and fair, it caused the City of Phoenix to withdraw from the cost-sharing portion of the proposed PVSP agreement. This was because Phoenix would wind up paying for 45.61 percent of the total cost of the project when only 44.54 percent of the construction expenditures were to involve the building of flood control facilities within Phoenix city limits.

The position taken by Phoenix was best stated by then Phoenix City Engineer, J. E. Atteberry, in a March 1979 memo to his supervisors. "Since the estimated cost of the projects within Phoenix City limits is very close to the recommended 45.61% of the total cost, it appears to be simpler for the City of Phoenix to construct all the projects within its own boundaries and let the Flood Control District work with the other jurisdictions to resolve their problems. This approach will free us from being burdened by the capital improvement schedules of other jurisdictions. Additionally, we believe that the actual construction costs will far exceed the costs estimated in the present study. This could result in substantial additional liabilities for the City of Phoenix if the recommended cost-sharing formula were adopted."(a)

The Phoenix decision to construct its own part of the PVSP Project meant the total project cost was diminished by nearly half (from \$6,684,950 to \$3,707,600). Rather than apply its 25 percent cost-sharing commitment to the newly-reduced project cost, the District agreed to contribute nearly \$1.7 million, which was 25 percent of the project cost before Phoenix pulled out. In terms of the new project cost, the District's contribution equated to 45.56 percent of the new total. This became the District's cost share percentage which was agreed to in writing in April of 1982 when the PVSP Flood Control Project Intergovernmental Agreement between Scottsdale, Paradise Valley and the District was finally signed.

By 1982, however, the estimated construction costs for the project had risen to \$4.48 million. This increased the District's cost share from \$1.7 million to just under \$2.1 million. Scottsdale's cost share under the agreement was 37.69 percent (\$752,000) and Paradise Valley agreed to shoulder 16.75 percent of the project expense (\$1.69 million). City of Phoenix construction estimates for the PVSP features it would build rose from about \$3 million to nearly \$4 million by 1982, but because Phoenix was not a party to the cost sharing agreement, such an increase had to be borne by Phoenix alone.

In accordance with the PVSP cost sharing agreement, Paradise Valley, Scottsdale and the District deposited 50 percent of their cost share amounts into separate interest-bearing accounts set up by the District. This occurred on July 2, 1982. It was the District's responsibility to then withdraw sufficient funds to pay for design and construction expenses associated with the project. The cost sharing agreement was to remain in effect until all project features were constructed or until the year 1990. The agreement could also be dissolved at any time by mutual agreement of all parties. Provisions were included for the deposit of additional funds by Paradise Valley and Scottsdale in order to complete the PVSP project.

STATE PARTICIPATION

An additional component of the PVSP Project agreement involved the possibility of receiving additional funds from the Arizona Department of Water Resources. These State funds were available under a law passed in 1973 which permitted allocations from the State's general fund for flood control projects. Called the Alternative Flood Control Assistance Fund, the monies were only available to flood control districts and would finance any single flood control project in an amount not to exceed 50 percent of the total cost of the project or $5 million, whichever amount was less. In the cost sharing agreement with Paradise Valley and Scottsdale, and in a separate agreement with the City of Phoenix, the District agreed to pass on any funds received by the State.

The prospect of having half of the PVSP project costs picked up by the State was exciting to those involved with the project, but was dependent on the project having a positive benefit/cost ratio. A study was therefore commissioned by the project participants and a positive benefit/cost ratio was in fact demonstrated. The study was performed by the Natelson Company at a cost of approximatley $30,000.

For all the effort put forth in negotiating an agreement with the State for 50 percent funding, less than half a million dollars was ultimately contributed by them ($437,277). This was because two years into the project, the State legislature discontinued its appropriations for Alternative Flood Control Assistance. The departure of the State as a source of additional funding lead to Phoenix's withdrawal from the PVSP Project altogether. Phoenix had constructed three basins in accordance with recommendations set forth in the earlier studies by Collar, Williams & White and the Natelson Company, but future project features such as outlets and storm sewers would be built independent of recommendations made in these studies. By 1983, Phoenix was no longer a PVSP Project participant.

CONSTRUCTION

The City of Phoenix constructed three detention basins by 1983 at a cost of $1,007,100.**(b)** The basins are located at 56th Street and Sweetwater Avenue, 61st Street and Acoma, and 65th Street and Hearn Road. The city has since developed the basins into parks. Except for $71,800 received from the State's Alternative Flood Control Assistance Fund, the basins were funded entirely by Phoenix. Phoenix did not immediately pursue construction of outlet channels for these basins because at the time they were masterplanning a storm drainage system and were considering changing the proposed channels to underground pipes. This is in fact what occurred. These flood control features, however, were built after Phoenix's withdrawal from the PVSP Project.

PVSP features built by Paradise Valley and Scottsdale consisted of two detention basins and channel and pipe improvements along Scottsdale Road and 66th Street from the Scottsdale Airport to Indian Bend Wash. The project features were designed to handle flows from a 50-year flood.

As originally conceived and written into the PVSP agreement with Paradise Valley and Scottsdale, the District was to "act as the final design management, construction management and contracting agency for the PVSP Flood Control Project features." However, the agreement allowed for the District to assign these responsibilities to Paradise Valley and Scottsdale if such was agreed to by them. This latter arrangement was in fact how construction of the project features was handled.

The first project to be built under the PVSP agreement was the Cactus Basin Outlet in Scottsdale. It was bid in October 1982 and Scottsdale awarded the contract to KIP, Inc. Construction began in December of that year and took approximately six months to complete. The outlet would route stormwater through a series of channels and 60" pipe south along Scottsdale Road to Cholla Street. It then turned west for about one block before running south for a mile to the Berneil Ditch near Chaparral High School. The cost for design and construction of the Cactus Basin Outlet was just over $561,000.

In October of 1983, Paradise Valley started work on improvements to the Berneil Ditch. The contractor was MGC construction and the scope of work involved widening the existing channel and lining it with concrete. The work took about eight months and cost just under $560,000.

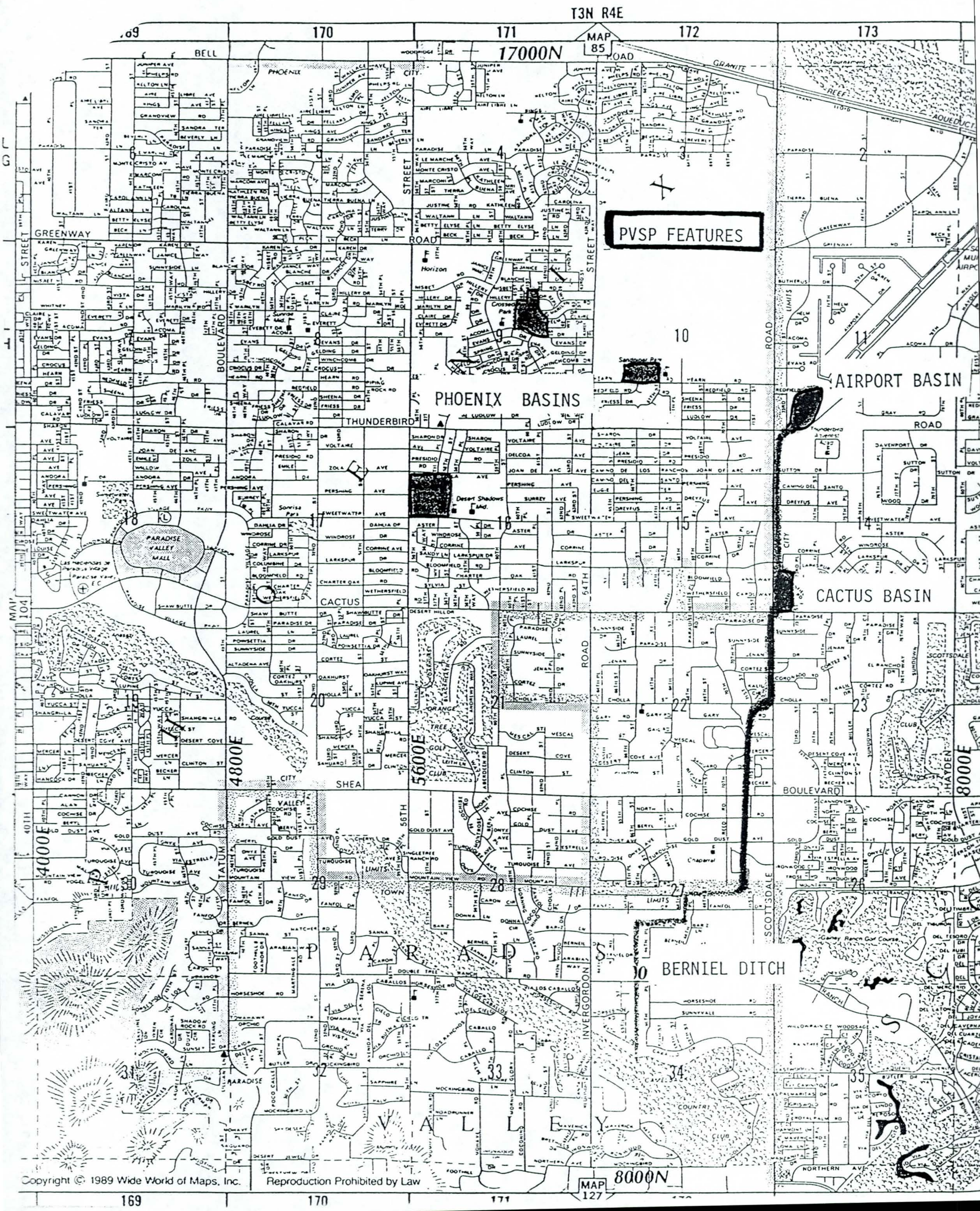
The 17-acre Cactus Basin at Cactus and Scottsdale Roads was the next project begun. The contract was awarded by Scottsdale to C. S. Construction and work began in June of 1984. In addition to the basin, a series of pipes and channels was built north of the basin along Scottsdale Road to capture upstream runoff and eventually act as an outlet to a basin proposed for the southern end of the Scottsdale Airport. The Cactus Basin and associated features were built at a cost of approximately $1.8 million. The city has since turned the basin into a park complete with an Olympic-size swimming pool, picnic facilities and a recreation building with classrooms and exercise rooms. All buildings were constructed on a raised plateau in the middle of the basin to avoid flood damage.

The last PVSP flood control feature to be constructed was the Scottsdale Airport Detention Basin south of the airport in a clear zone north of Thunderbird Road and east of Scottsdale Road. The basin captures runoff from the area south of the Central Arizona Project dike to the airport. Before construction could begin, however, additional funds were necessary, as less than $240,000 remained in the PVSP project accounts. Scottsdale contributed an additional $45,000 in July of 1988 and another $150,000 in May of 1989. At the same time the District contributed its corresponding 45.56 percent as stipulated in the PVSP cost sharing agreement. Additional funds also were obtained by Scottsdale from the Arizona Department of Transportation which was involved in the project as a result of the basin being located on airport property. Construction of the basin was begun in February 1990 and took about 9 months to complete. Scottsdale's contractor on the job was Geno's Concrete Asphalt Sawing, Inc., of Tempe. The final cost for the design and construction of the basin was $452,000.

FINAL ACCOUNTING

A final project accounting shows that $3,425,000 was withdrawn from the PVSP account to pay for the project features constructed in Scottsdale and Paradise Valley. Of this amount, nearly $750,000 was money earned through interest paid on funds kept in the account. When combined with the amount spent by Phoenix on their three basins and with funds contributed by the State early on in the project, the final sum expended on the Paradise Valley-Scottsdale-Phoenix Flood Control Project was $4.7 million.

(a) Memo to Mr. Brunton, Development Services Manager
(b) Basin costs provided by Chris Cornell, City of Phoenix



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DRAFT

SALT & GILA RIVERS

TRAVEL TIMES FROM GRANITE REEF DAM TO GILLESPIE DAM FOR VARIOUS FLOOD LEVELS- THEORETICAL FROM HEC-2 MODEL

6 hours from Bartlett to Gran Reef

Location	Distance From Granite Reef Dam (Miles)	Travel Time From Granite Dam (Hours) Discharge (cfs) Note! Varies along channel				
		100000 (10 yr)	195000 (50 yr)	240000 (100 yr)	350000 (500 yr)	
Granite Reef Dam	0.00	0.00	0.00	0.00	0.00	
Higley Rd.	1.79	0.34	0.27	0.24	0.20	
Val Vista Rd.	4.26	0.73	0.61	0.54	0.47	
Gilbert Dr.	6.48	1.16	0.98	0.87	0.74	
Stapley Dr.	7.39	1.34	1.13	1.01	0.87	
Mesa Dr.	9.44	1.65	1.41	1.26	1.10	
Country Club Dr.	10.76	1.87	1.60	1.45	1.25	
Alma School Rd.	11.87	2.08	1.78	1.60	1.38	
Price Rd.	14.55	2.68	2.30	2.09	1.82	
Hayden Rd.	15.49	2.89	2.47	2.25	1.97	
Scottsdale Rd.	16.46	3.08	2.63	2.39	2.10	
Priest Rd.	18.27	3.43	2.93	2.67	2.36	
Hohokam Hwy.	19.78	3.66	3.12	2.84	2.50	
I-10 Hwy.	22.51	4.20	3.59	3.28	2.90	
24th Street	22.94	4.32	3.69	3.37	2.99	
16th Street	24.04	4.50	3.86	3.55	3.18	
7th Street	25.01	4.64	3.99	3.66	3.30	
Central Ave.	25.53	4.74	4.05	3.72	3.36	
7th Ave.	26.05	4.81	4.13	3.80	3.44	
19th Ave.	27.19	5.02	4.31	3.97	3.62	
35th Ave.	29.08	5.51	4.74	4.34	3.92	
51st Ave.	31.09	5.98	5.13	4.70	4.23	

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Location	Distance From Granite Reef Dam (Miles)	Travel Time From Granite Dam (Hours) Discharge (cfs)				
		100000 (10 yr)	195000 (50 yr)	240000 (100 yr)	350000 (500 yr)	
67th Ave.	33.11	6.47	5.55	5.09	4.61	
91st Ave.	36.03	7.19	6.18	5.65	5.14	
115th Ave.	39.04	8.03	6.90	6.36	5.71	
Agua Fria River	42.49	9.32	7.89	7.41	6.68	
Bullard Ave	43.24	9.60	8.11	7.60	6.88	
Reems Rd.	43.88	9.74	8.25	7.74	7.01	
Sarival Ave.	44.82	9.98	8.48	7.98	7.25	
Cotton Lane	45.83	10.24	8.74	8.24	7.51	
Corgett Wash	47.86	11.01	9.51	9.01	8.28	
Perryville Rd.	48.02	11.05	9.56	9.05	8.33	
Tuthill Rd.	50.12	11.68	10.18	9.68	8.95	
Airport Rd.	51.14	11.93	10.44	9.93	9.20	
Waterman Wash	51.94	12.15	10.65	10.15	9.42	
Rainbow Rd.	53.19	12.57	11.07	10.56	9.84	
Miller Rd.	56.49	13.77	12.28	11.77	11.05	
Az. State Hwy 85	58.72	14.59	13.09	12.59	11.86	
Wilson Rd.	60.76	15.24	13.75	13.24	12.52	
Paolo Verde Rd.	61.85	15.55	14.06	13.55	12.84	
Hassayampa River	63.76	16.16	14.70	14.23	13.60	
Johnson Rd.	63.90	16.20	14.74	14.27	13.65	
Lukes Wash	66.71	17.22	15.59	15.07	14.37	
Cactus Rose Rd.	67.41	17.83	16.09	15.53	14.80	

DRAFT

DRAFT

Location	Distance From Granite Reef Dam (Miles)	Travel Time From Granite Dam (Hours) Discharge (cfs)				
		100000 (10 yr)	195000 (50 yr)	240000 (100 yr)	350000 (500 yr)	
Desert Rose Rd.	68.82	19.03	17.17	16.57	15.80	
Centennial Wash	69.33	19.43	17.51	16.89	16.09	
Agua Caliente Rd.	70.01	19.94	18.08	17.32	16.49	
Gillespie Dam	72.31	21.61	19.37	18.62	17.67	

DRAFT

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
P.O BOX 532711
LOS ANGELES, CALIFORNIA 90053-2325

July 21, 1997

FLOOD CONTROL DISTRICT
RECEIVED

8/4/97

cf: Julie Lemmon

Office of the Chief
Hydrology and Hydraulics Branch

Ms. Leslie Myers
U.S. Bureau of Reclamation
P.O. Box 9980
Phoenix, Arizona 85068

Dear Ms. Myers:

On March 5, 1996, the Los Angeles District, Corps of Engineers, sent a letter to Mr. Richard Perreault of the Flood Control District of Maricopa County, in response to an inquiry concerning the status of the Water Control Study for Modified (Theodore) Roosevelt Dam, and a corollary request for discharge-frequency values for locations along the Salt and Gila Rivers between Granite Reef Dam and Gillespie Dam.

That letter stated that the Water Control Agreement and Letter of Understanding had been signed by the Bureau of Reclamation and the Salt River Project. In addition, Table 2-4, contained in the water control study (SECTION 7 STUDY FOR MODIFIED ROOSEVELT DAM, ARIZONA, (THEODORE ROOSEVELT DAM), HYDROLOGIC EVALUATION OF WATER CONTROL PLANS, SALT RIVER PROJECT TO GILA RIVER AT GILLESPIE DAM), dated March 1996, was enclosed to satisfy the request noted above. In that letter we mentioned that the US Fish and Wildlife Service had requested modifications to the draft biological opinion, and the impact of that analysis on our Section 7 water control documents was not known.

The Water Control Agreement and Letter of Understanding for Modified Roosevelt Dam have now been signed by all parties, and the Water Control Manual has been approved by the South Pacific Division Office of the Corps of Engineers. As a consequence, the discharge-frequency values based upon that approved plan and presented in the Table 2-4 (enclosure) of the water control study, are appropriate for floodplain management of the Salt and Gila Rivers in accordance with Federal Emergency Management Agency (FEMA) regulations.

If you have any questions or require additional information, please contact Mr. Joseph Evelyn at (213) 452-3525.

Sincerely,

Robert E. Koplin, PE
Chief, Engineering Division

Enclosure

Copies Furnished:

✓Mr. Richard C. Perreault,
Manager, Planning Branch
Flood Control District of Maricopa County
2801 West Durango St
Phoenix, Arizona 85009

Ms. Lisa Jackson,
Congressional Administrative Assistant
211 Cannon Building
Washington D.C 20515

TABLE 2-4. DISCHARGE FREQUENCY VALUES
SALT RIVER AND GILA RIVER
RECOMMENDED PLAN (P6OP2) VERSUS W/O PROJECT

LOCATION		RETURN PERIOD						
		500-YR	200-YR	100-YR	50-YR	20-YR	10-YR	5-YR
PEAK DISCHARGES (ft^3/s) IN SALT RIVER AT:								
CP-40	W/P	250,000	210,000	175,000	150,000	100,000	60,000	22,000
	WO/P	360,000	290,000	245,000	175,000	141,000	102,000	45,000
CP-109	W/P	246,000	207,000	172,000	145,000	95,000	58,000	21,000
	WO/P	345,000	285,000	230,000	170,000	139,000	100,000	44,000
CP-110	W/P	243,000	204,000	169,000	140,000	90,000	55,000	20,500
	WO/P	330,000	275,000	215,000	160,000	135,000	93,000	40,000
CP-111	W/P	240,000	202,000	166,000	135,000	87,000	53,000	20,200
	WO/P	325,000	265,000	200,000	155,000	130,000	91,000	39,000
CP-112	W/P	237,000	200,000	164,000	132,000	84,000	51,000	20,000
	WO/P	315,000	255,000	190,000	150,000	126,000	90,000	38,000
CP-113	W/P	235,000	198,000	162,000	130,000	82,000	49,000	19,500
	WO/P	310,000	250,000	185,000	145,000	125,000	85,000	36,000
PEAK DISCHARGES (ft^3/s) IN GILA RIVER AT:								
CP-1310	W/P	285,000	243,000	227,000	185,000	92,000	57,000	23,500
	WO/P	360,000	295,000	250,000	200,000	135,000	95,000	40,000
CP-1216	W/P	270,000	225,000	210,000	160,000	68,000	46,000	17,000
	WO/P	350,000	290,000	245,000	195,000	133,000	88,000	39,000
CP-1217	W/P	270,000	220,000	203,000	153,000	67,000	42,000	15,000
	WO/P	340,000	280,000	240,000	190,000	129,000	82,000	38,000
CP-1218	W/P	270,000	215,000	195,000	145,000	65,000	38,000	12,000
	WO/P	335,000	277,000	235,000	186,000	124,000	78,000	37,000

DEFINITIONS:
W/P = Recommended Plan, P6OP2. WO/P = without project/existing conditions per 1982 CAWCS Hydrology Report, Table 23.
CP-40, at Granite Reef Dam
CP-109, at Gilbert Road
CP-110, at Tempe Bridge
CP-111, at Central Avenue
CP-112, at 67th Avenue
CP-113, above confluence with Gila River
CP-1310, below confluence with Salt River
CP-1216, below confluence with Waterman Wash
CP-1217, below confluence with Hassayampa River
CP-1218, at Gillespie Dam

Enclosure

WELCOME TO SIGNAL BUTTE FLOODWAY DEDICATION

DEDICATION CEREMONIES

for

SIGNAL BUTTE FLOODWAY

Flood Control Project

Thursday, August 16, 1984

9:00 A.M.

MASTER OF CEREMONIES - Tom Freestone

INVOCATION - Rev. Herbert E. Osman
Red Mountain United Methodist Church

PLEDGE OF ALLEGIANCE - Tom Freestone
AND INTRODUCTION OF
GUESTS

REMARKS - Verne M. Bathurst, State Conservationist, Soil Conservation Service

REMARKS Sumner "Al" Brooks
Mayor, City of Mesa

REMARKS Congressman John McCain

BENEDICTION - Ross Farnsworth, Second Counselor, Mesa North State Presidency

**Refreshments will be served by JWJ Contracting Company

****

The Signal Butte Floodway is the second of seven flood control projects to be constructed by the U. S. Soil Conservation Service in the Buckhorn-Mesa Watershed as part of the Flood Prevention Program authorized by the 83rd U. S. Congress in July 1963 under the provisions of Public Law 83-566. The Spook Hill Flood Retarding Structure (FRS) and its Floodway were completed in November 1979.

The Buckhorn-Mesa Watershed, comprising nearly 70,000 acres, is located in eastern Maricopa and northwestern Pinal Counties, Arizona. Originating in the rough Usery Mountains, Goldfield Mountains and the western flanks of the Superstition Mountains, the watershed drains into a wide alluvial fan on which valuable improvements, subdivisions, and commercial/industrial developments have been established. Nearly 60 percent of the watershed is flood prone and 25 percent would be inundated by a 100-year rainfall event. Other flood control measures planned for the watershed are the Signal Butte FRS and the Pass Mountain Diversion Structure scheduled for construction during the fall of 1985; the Apache Junction FRS and floodway; the Weekes Wash FRS; the Bulldog Floodway; and the Roosevelt Water Conservation District (RWCD) Floodway. Reaches 1 and 2 of the RWCD Floodway are completed and Reach 3 is scheduled for construction during the fall of 1984.

The Signal Butte Floodway will convey waters to be discharged from the future Signal Butte FRS and the Pass Mountain Diversion structure to an outlet behind the Spook Hill FRS. From the Spook Hill structure, the floodwaters will flow into the Salt River upstream of the Granite Reef diversion dam. The Floodway will also intercept washes and sheet flow, and protect the area downstream from damages caused by inundation or muddy sediment.

The Signal Butte Floodway project was designed and funded by the U. S. Soil Conservation Service. The construction contract was awarded to JWJ Contracting Company in the amount of $2.4 million. Construction was started in October 1983. The Flood Control District of Maricopa County as one of the local sponsors, acquired the rights-of-way necessary for the project, relocated impacted utilities, and will assume operations and maintenance responsibilities for the project when completed. The District's cost are approximately $1.5 million.

PROJECT FEATURES

100-year Level of Flood Protection
Discharge for 100-year event: 2,000 cfs
Channel length and configuration:
- 1.53 miles, earthern trapezoidal cross section
  - 20 feet bottom width
- 1.13 miles, concrete rectangular cross section
  - 14 feet, bottom width
- 5.5 feet, depth of flow

Side flow: 25 grouted rock riprap inlets
Vegetative outlets: seven 12-inch pipes with basins

****

FLOOD CONTROL DISTRICT BOARD OF DIRECTORS

Fred Koory, Jr. (Chairman)

Hawley Atkinson
George L. Campbell
Tom Freestone
Ed Pastor

CITIZENS' FLOOD CONTROL ADVISORY BOARD

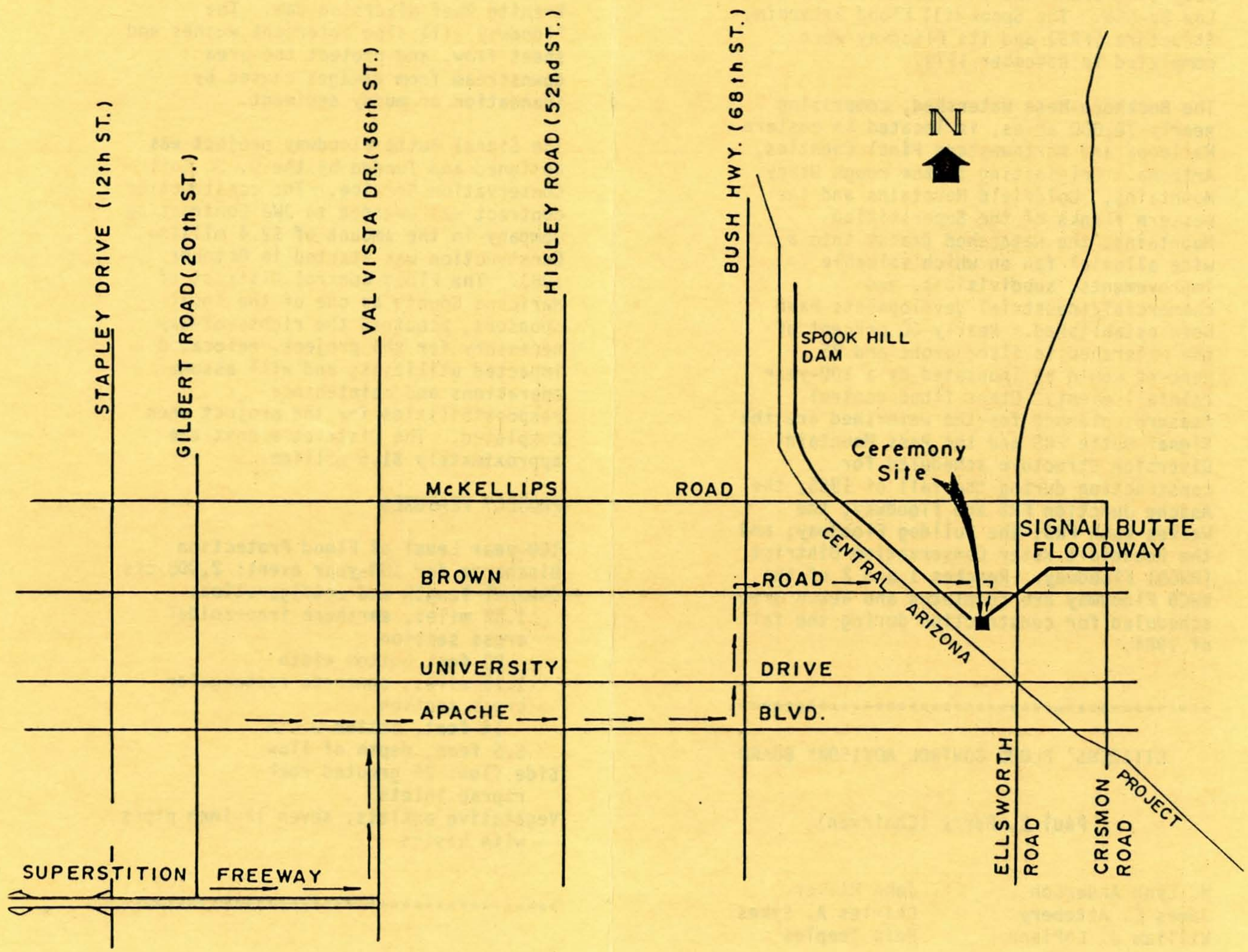
Paul E. Perry (Chairman)

H. Lynn Anderson
James E. Attebery
William J. LoPiano
John Miller
Charles A. Sykes
Reid Teeples

OTHER SPONSORS

Pinal County Board of Supervisors
East Maricopa Natural Resource Conservation District

D. E. Sagramoso, Chief Engineer and General Manager
FLOOD CONTROL DISTRICT of Maricopa County



THE FLOOD CONTROL DISTRICT

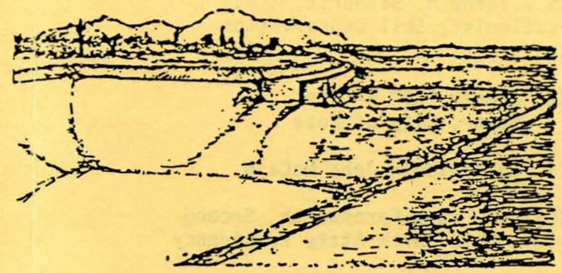
OF MARICOPA COUNTY

INVITES YOU TO ATTEND

Dedication Ceremony

for

SIGNAL BUTTE FLOODWAY



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William J. LoPiano　　Reid Teeples

The Signal Butte Floodway will convey waters to be discharged from the future Signal Butte FRS and the Pass Mountain Diversion structure to an outlet behind the Spook Hill FRS. From the Spook Hill structure, the floodwaters will flow into the Salt River upstream of the Granite Reef diversion dam. The Floodway will also intercept washes and sheet flow, and protect the area downstream from damages caused by inundation or muddy sediment.

The Signal Butte Floodway project was designed and funded by the U. S. Soil Conservation Service. The construction contract was awarded to JWJ Contracting Company in the amount of $2.4 million. Construction was started in October 1983. The Flood Control District of Maricopa County as one of the local sponsors, acquired the rights-of-way necessary for the project, relocated impacted utilities, and will assume operations and maintenance responsibilities for the project when completed. The District's cost are approximately $1.5 million.

PROJECT FEATURES

100-year Level of Flood Protection
Discharge for 100-year event: 2,000 cfs
Channel length and configuration:
- 1.53 miles, earthern trapezoidal cross section
  - 20 feet bottom width
- 1.13 miles, concrete rectangular cross section
  - 14 feet, bottom width
- 5.5 feet, depth of flow

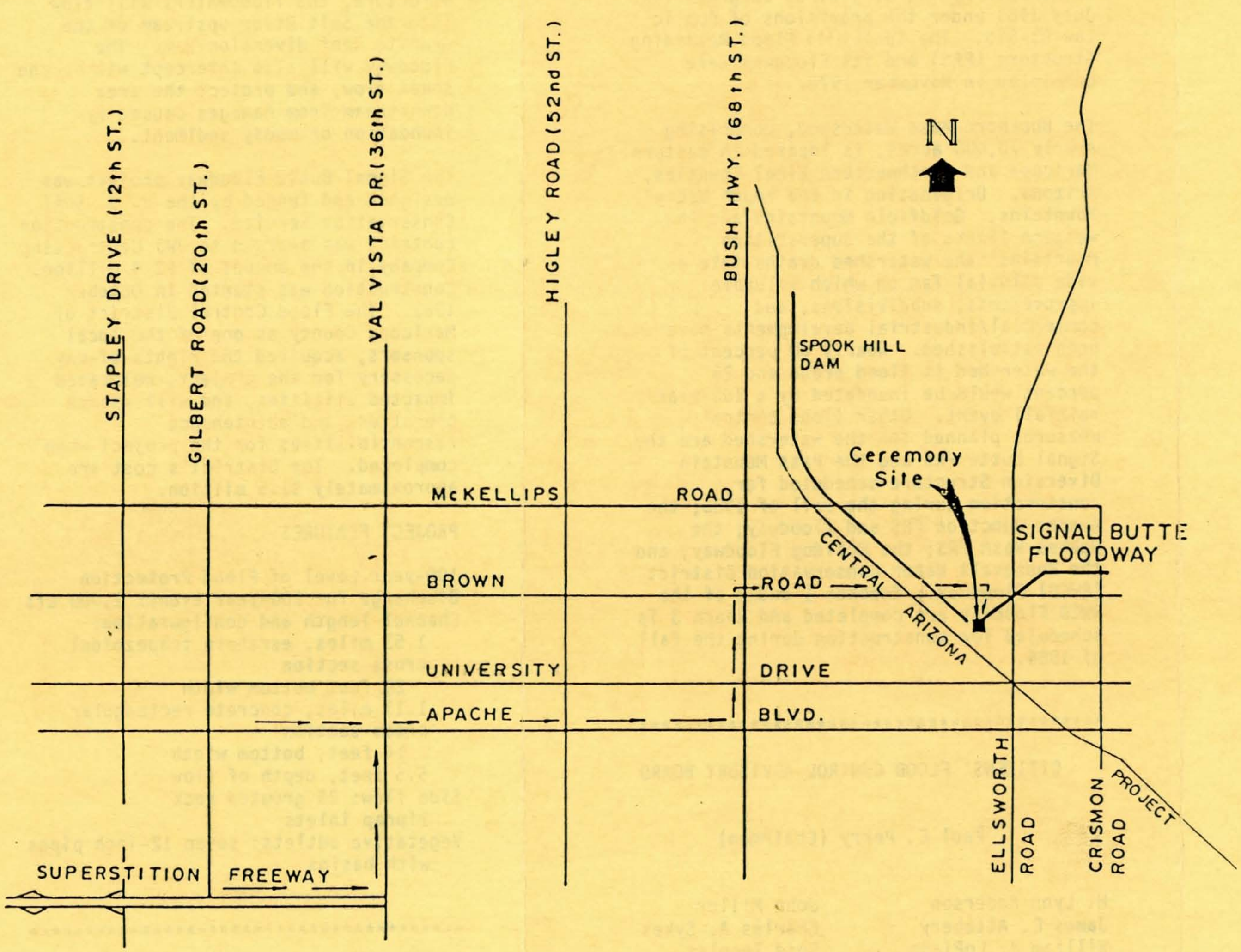
Side flow: 25 grouted rock riprap inlets
Vegetative outlets: seven 12-inch pipes with basins

****

OTHER SPONSORS

Pinal County Board of Supervisors
East Maricopa Natural Resource Conservation District

D. E. Sagramoso, Chief Engineer and General Manager
FLOOD CONTROL DISTRICT of Maricopa County



THE FLOOD CONTROL DISTRICT

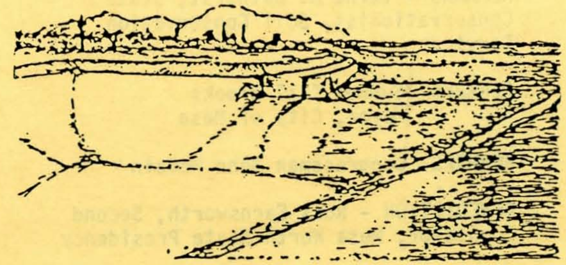
OF MARICOPA COUNTY

INVITES YOU TO ATTEND

Dedication Ceremony

for

SIGNAL BUTTE FLOODWAY



Thursday, August 16, 1984

9:00 A.M.

SIGNAL BUTTE FLOODWAY

1/12/81

1. The Watershed Work Plan was approved and signed by the Flood Control District on February 25, 1963. A resolution approving same also dated February 25, 1963.

2. In the fall of 1975 the District began to take a hard look at the work plan alignment for the Signal Butte Floodway Project. After several field trips and a study of maps the District requested and discussed with S.C.S. the possibility of studying alternate alignments for the Floodway. S.C.S. agreed and meetings and discussions continued into 1976 eliminating suggested routes and on July 22, 1976, by letter to S.C.S., the District requested that Alternate #3 (present alignment) be studied as apossible alignment replacing the Work Plan Alignment.

3. On October 20, 1975, the Board of Supervisors concur in the E.I.S. and offer full support.

4. FCD comments on E.I.S. to SCS on October 20, 1975. Comments include the following statement, "Proposed alignment of floodways may be modified to reduce impact on certain existing developments.

5. Supplemental Watershed Work Plan #2 approved and signed by Flood Control District of Directors on July 6, 1976.

6. On March 1, 1978 the District was notified by letter from the SCS that it had completed its study of Alternate #3 (present alignment) and it proved to be more economical than the Work Plan alignment. The service said they would proceed with design based on the District's proposed alignment (Alternate #3).

7. In April 1978 the District proceeded with Right-of-Way Survey.

8. On June 4, 1979, by Resolution (no. FCD 79-8), the District's Board authorized the Chief Engineer and General Manager to acquire Right-of-Way for Signal Butte Floodway Project.

9. In August 1979 Mr. Elijah A. Cardon visited the District office inquiring about Signal Butte Floodway alignment. On August 20, 1979 Mr. Cardon was mailed a typical channel cross section design of floodway where it crosses property near the northeast corner of Ellsworth and Brown Roads. Cardon acquired property on 10/4/79.

10. On February 13, 1980 a meeting was held at the SCS at the request of Elijah Cardon who requested at that time that the channel alignment be changed back to the original Work Plan Alignment.

11. On April 7, 1980 the District received a letter from Jennings, Strouss & Salmon who represented Cardon requesting that we furnish Mike Manthey of Engineering and Surveying of Arizona engineering design and cost documentation of both Alternate #3 and Work Plan Alignment.

12. On April 10,1980 SCS was advised accordingly by letter from the District.

13. On May 4, 1980 the District received a letter from the law office of Jennings, Strouss and Salmon representing Mr. Cardon that Mr. Cardon's Engineer needed to have acess to and review all documents relating to Alternate #3 and the Working Plan Alignment. SCS was notified accordingly by the District by letter dated May 16, 1980.

14. On May 28, 1980 Paul Gilbert of Jennings, Strouss and Salmon, Mike Manthey (Engineer for Cardon), the District's legal counsel, Paul Monville (SCS Engineer) met and Manthey submitted a comparative study report for review by SCS and the District.

15. On August 6, 1980 District officials and legal counsel met with SCS Staff at SCS office and discussed the results of the SCS latest study. Results as follows:

Work Plan - Total Federal Cost	$3,357,200
Alternate No. 3 - Total Federal Cost	$3,084,977

16. On August 25, 1980 SCS submitted a complete cost analysis and comparison of the Work Plan Alignment and the Alternate No. 3 alignment using 1978 base costs:

Work Plan - Total Costs	$4,246,400
Alternate No. 3 - Total Costs	$3,618,277

It was pointed out by letter that several issues were not addressed that could increase the cost of the Work Plan Alignment, such as, relocation of guy wires, restricted embankment heights to clear transmission lines, etc.

February 3, 1981

FACTS REGARDING SIGNAL BUTTE FLOODWAY ALIGNMENT

1. ALTERNATE NO. 3 SEVERS APPROXIMATELY 22 PARCELS OF LAND.

   WORK PLAN ALIGNMENT SEVERS MORE THAN 30 PARCELS OF LAND. In addition the Work Plan cuts through a recorded undeveloped housing tract.

2. Three bridges will have to be constructed across the floodway in Alternate 3 alignment.

   The Work Plan alignment would require the construction of five (5) bridges and the relocation of Brown Road. (approximately 3/4 of a mile)

3. Brown Road is a major east-west road in the area and is planned to be a four lane road in the future. Brown Road as it extends east of Ellsworth Road to Signal Butte Road is like a roller coaster with eleven dips created by natural washes crossing the road. By moving the alignment about 1/4 mile north, the floodway will provide flood protection for Brown Road as well as additional land downstream of the floodway.

4. In reviewing the Work Plan Alignment in the field it was also noted that approximately fifteen (15) guy line anchor footings and guy lines supporting the S. R. P. transmission line extended into the proposed work plan floodway alignment. In discussing the matter with S. R. P. officials it was apparent that the above would possibly have to be relocated at an undetermined cost and height clearance restrictions would be imposed. S. R. P. representatives also stated it is not certain that any construction within S. R. P. right-of-way could be allowed.

   <u>CONSENSUS</u>

   The cost analysis and comparison of the Work Plan Alignment and the Alternate No. 3 Alignment prepared by the S. C. S. and submitted to the District on August 25, 1981 shows a cost savings of $628,123.00. In addition a lessor number of property owners will be affected, Brown Road will be provided flood protection and additional property owners downstream of the floodway will be provided flood protection. (See photo showing both alignment locations).

In the event the floodway location was changed back to the original Work Plan Alignment the S. C. S. informed the District as follows:

1. The project would be delayed 1-1/2 to 2 years. The entire Watershed Project would be delayed accordingly.
2. Floodway construction costs would increase approximately $300,000.00 plus increased cost due to inflation and delay. This cost would be borne by the District.
3. Design of the floodway established by the S. C. S. to be between $50,000.00 and $100,000.00 would be borne by the District.
4. The S. C. S. and the District made a committment to the Water and Power Resource Service to have the Watershed Project completed by 1983 to provide maximum protection for the Central Arizona Project aqueduct.

The above information was transmitted by phone to Sid Brase of the District by William Osterquist, State Administrative Officer of the S. C. S. and William Anderson, Assistant State Engineer.

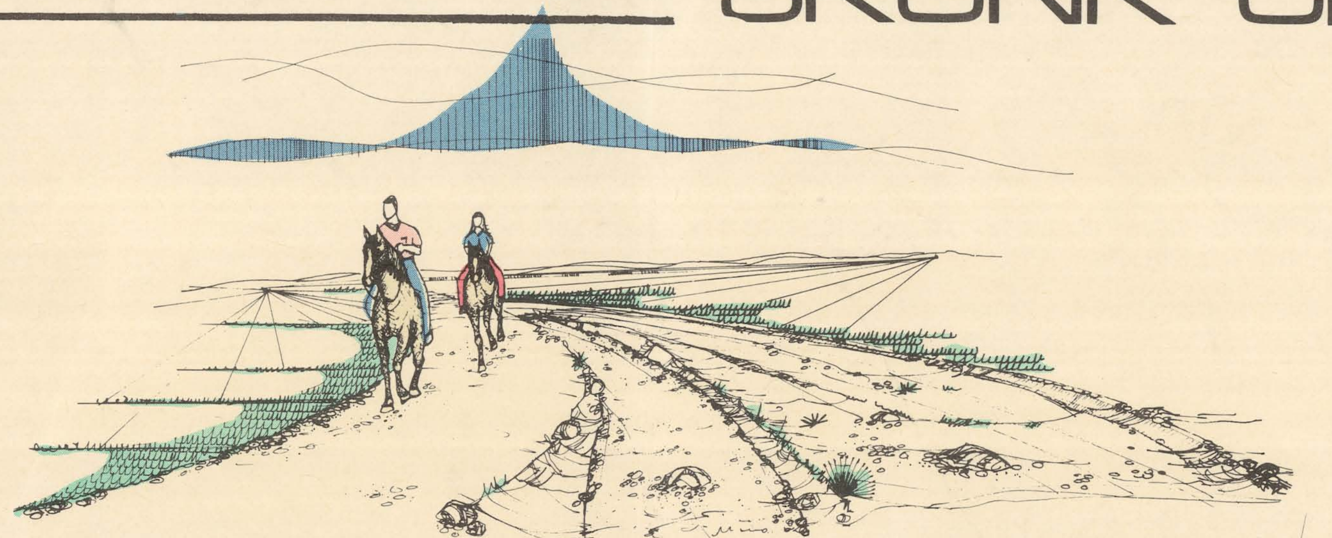
The District's costs to date on the Alternate No. 3 Alignment are as follows:

1.	Survey work and bridge design	$ 52,328.85
2.	Land rights acquisition	518,168.69
		$570,497.54

Sid Brase

Sid Brase
Project Engineer

SKUNK CREEK, NEW RIVER AND AGUA FRIA RIVER



NOTES:

1. flowage easement delineation approximates future 100-year flood plain, with project, and is subject to revision.
2. flood proofing measures, other than dikes, not shown.
3. hiking and riding trails follow the perimeter of the flowage easement.

LEGEND

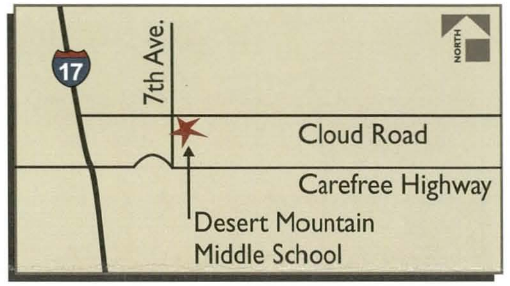
- flowage easement
- channel
- levee or dike
- bank stabilization

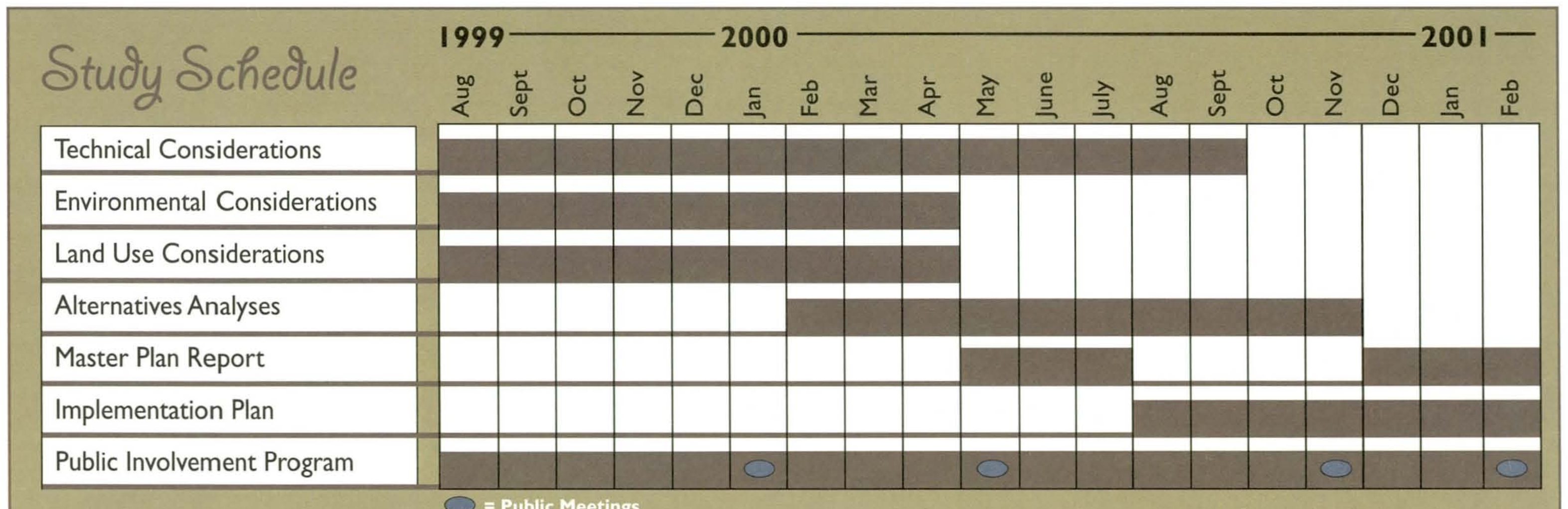
Get Involved

We invite you to get involved in the study process. There will be an opportunity to give your initial comments at the first public meeting. If you cannot attend, but would like to be on the mailing list to receive future information on the Skunk Creek Watercourse Master Plan, please fill out the enclosed postcard and mail it back to us.

First Public Meeting

The first public meeting is scheduled for January 27, 2000 from 6:30 p.m. to 8:00 p.m. at the Desert Mountain Middle School, 35959 North 7th Avenue, Phoenix, Arizona. A brief presentation will be made at 6:45 p.m. Members of the Study Team will provide more information on the watercourse master plan process, existing regulations, and how the watercourse master plan process differs from traditional floodplain management approaches. Opportunities for the public to identify issues and concerns related to floodplain management of Skunk Creek will occur after the presentation. We hope you can attend this first in a series of public meetings and give us your input on the Skunk Creek Watercourse Master Plan.





A telephone Hotline has been established to respond to questions or concerns regarding Flood Control District of Maricopa County projects.

602-506-0750 For more information please check our web site at: **fcd.maricopa.gov**

Skunk Creek Watercourse Master Plan

Logan Simpson Design
51 West Third Street
Suite 450
Tempe, AZ 85281

January 2000

Skunk Creek
Watercourse Master Plan

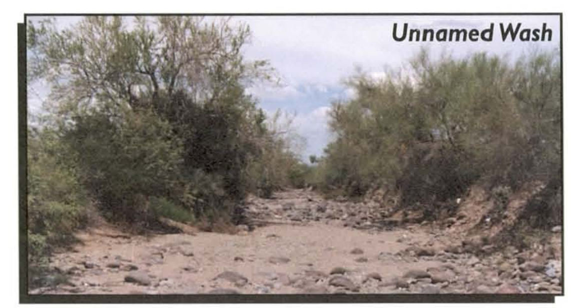
Skunk Creek Watercourse Master Plan

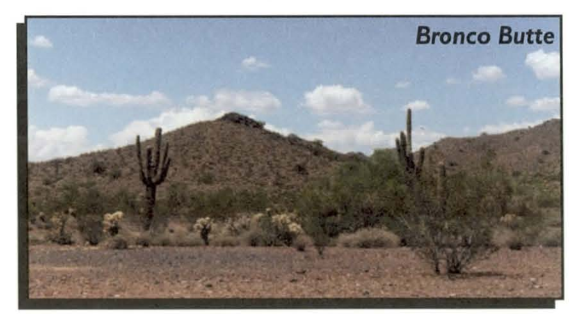
A Comprehensive Approach to Floodplain Management

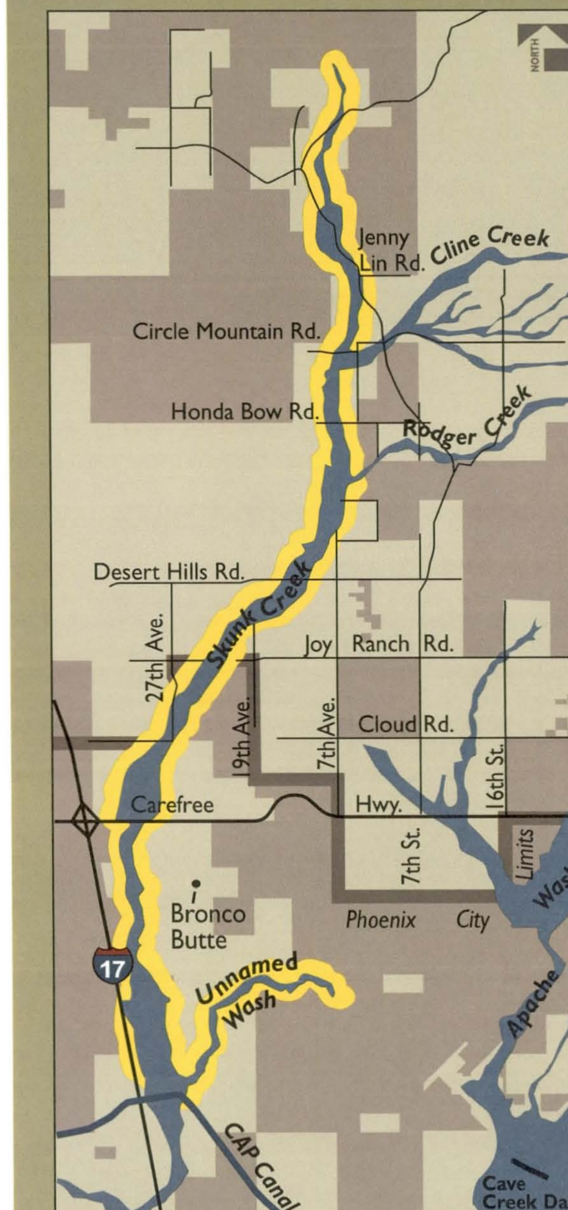
The Flood Control District of Maricopa County has teamed with the City of Phoenix to develop a Watercourse Master Plan for Skunk Creek. See map (right) for location of the Study Area. A watercourse master plan represents a state-of-the-art approach to floodplain management. It evaluates and recommends strategies and actions to manage flooding while enhancing the quality of life for the community. The strategies and actions developed under a watercourse master plan evaluate flooding impacts from planned and existing land use and development. Traditional hydraulic and hydrologic analysis and potential long-term bank erosion or lateral movement are also examined. Your involvement in the planning process is critical to the development of the Master Plan. Information about upcoming public meetings is located on the back page of this newsletter.

A Watercourse Master Plan Includes:

- 'State of the art' engineering;
- Comprehensive consideration of potential bank erosion;
- Identification of lowest cost and maximum benefit options for county taxpayers;
- Assurance that no one property owner carries the entire burden for floodplain management;
- Responsiveness to future land use development; and
- A planning process that incorporates public and private interests, issues and concerns.







Study Area Not to Scale

- Project Area
- Phoenix City Limits
- State Land

SKUNK CREEK HISTORIC NOTES

1449 - Hohokam Indians established farming and cultivated maize, squash, and beans in the area. After the Hohokam left the area, the Maricopa and Yavapai Indians considered the basin as no-man's land.

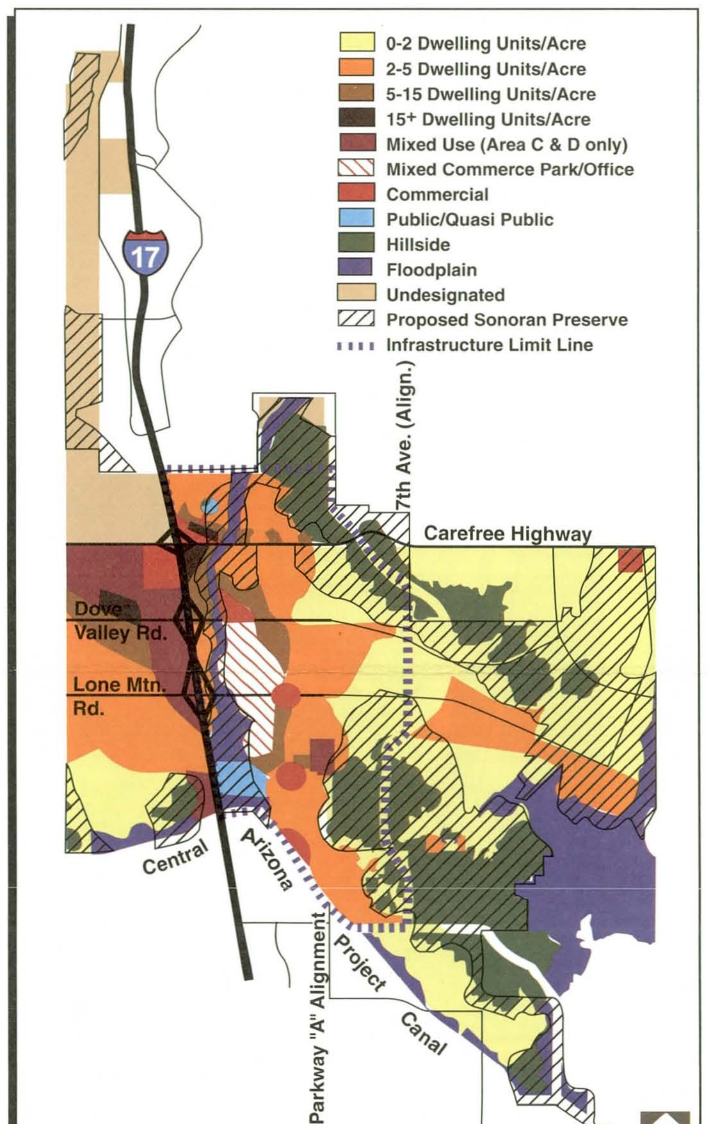
1598 - Captain Marcos Farfan, while searching for a salt spring in central Arizona, claimed the area near the headwaters of Skunk Creek for Spain.

1820 - Fur trappers, including Kit Carson, explored the area for beavers, mountain lions, coyotes and bobcats. By 1840, trapping in the area declined as the population of these animals dwindled.

Overview of Skunk Creek

The portion of the Skunk Creek Watercourse Master Plan below the Carefree Highway will be used by the City of Phoenix and the Flood Control District of Maricopa County to identify strategies and options for development, transportation and open space conservation along washes in the Black Canyon (I-17) Corridor. Master Plan alternatives developed for this southern portion of the study will consider the City of Phoenix's North Black Canyon Corridor Plan. One of the goals of the City's plan is to integrate washes and other open space resources into a sustainable community. The plan also envisions that washes would provide open space links for residents to the approved Phoenix Sonoran Preserve. To assist the Flood Control District in completing the study, the City initiated a policy not to approve rezoning requests in the 100-year floodplain of Skunk Creek and its unnamed tributary until the study is completed.

The study for the area north of the Carefree Highway is scheduled for completion by February 2001. This second, or northern, phase will consider the Maricopa County General Plan and plans for development north of the Carefree Highway to the Tonto National Forest Boundary.



North Black Canyon Corridor Plan

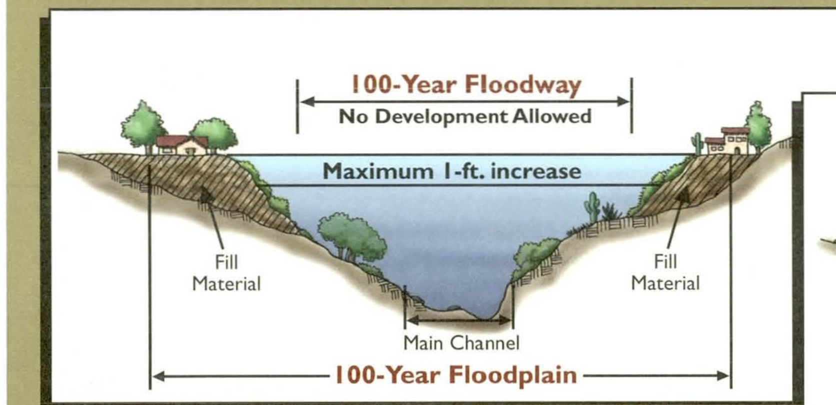
Skunk Creek Watercourse Master Plan Goals

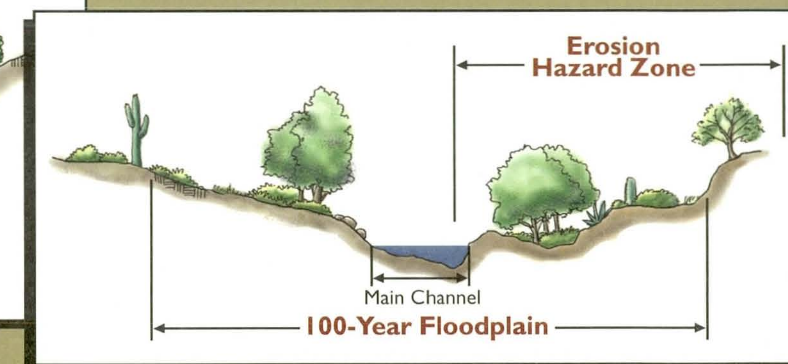
- Protect existing and future residents from the 100-year flood event and possible damages associated with channel erosion of Skunk Creek and Unnamed Wash.
- Consider structural, non-structural, and a combination of structural and non-structural alternatives.
- Minimize future expenditures of public funds for flood control and emergency management.
- Conform with the City of Phoenix's North Black Canyon Corridor Plan.
- Consider multiple-use opportunities for floodplain areas.
- Develop a watercourse management plan that generates widespread support and is implementable.

Why is the Flood Control District doing this Study?

- Development in or near the floodplain could result in serious flooding and erosion risk unless bank armoring is used which is not in conformance with the City and general public's goals for this area.
- If site-specific flood control approaches are used, substantial public expense may be necessary to address unintentional adverse impacts to adjacent property.
- Public facilities such as the Central Arizona Project (CAP) and the City's planned water treatment plant could require substantial public investment to protect them from flooding due to upstream impacts from site specific solutions to flood control.

Floodplain, Floodway, and Erosion Hazard Considerations





100-year Flood - The 100-year flood is a flood that has a one percent chance of occurring in any given year. For Skunk Creek near the Carefree Highway, approximately five inches of rain in 24 hours would produce a 100-year flood.

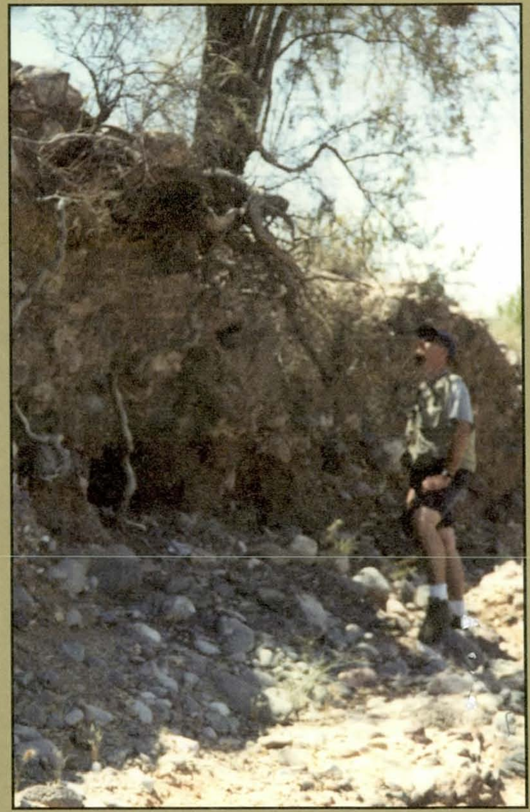
100-year Floodplain - The 100-year floodplain is the area of the channel and the bank adjoining the main channel that would be covered with water during the 100-year flood. Certain development activities can occur in the floodplain area as long as those activities are permitted by the agency with regulatory authority.

100-year Floodway - The 100-year floodway is the area within the floodplain needed to contain the 100-year flood when a limited amount of fill material is placed within the floodplain. Fill material within the floodplain is limited to the amount of material that would increase the water surface elevation of the floodway by no more than one foot. The floodway usually contains the main part of the channel where the water is the deepest and the fastest.

Regulatory Requirements - Floodplains and floodways are regulated by federal, state, county, and city governments to minimize public safety risks as well as to protect public and private investments. Regulatory requirements for floodplains historically included establishing finish floor elevations for buildings so that they are one foot above the 100-year floodplain elevation. Development is not allowed within the 100-year floodway.

Erosion Hazard - Erosion hazards in southwestern channels can be categorized as one of two types, vertical or horizontal channel movement. Vertical channel bottom movement occurs when the channel either "fills-in" with sediment from upstream or when the channel lowers because dirt is being eroded away by water. The second type of erosion hazard is horizontal channel bank movement where the channel bank will "retreat" or move sideways away from the main channel bottom. Both types of channel bank movement can occur naturally. Erosion can also be impacted by construction activities that remove vegetation or increase flows to the channel in excess of the "stable" channel conditions.

Erosion Hazard Zone - The vertical and horizontal channel movement of Skunk Creek and the Unnamed Wash will be analyzed to determine their erosion hazard potential. The results of this erosion hazard analysis will be used to develop an erosion hazard zone for the channels in the study area. The hazard zone boundary will be used in conjunction with floodplain and floodway boundaries to establish a basis for developing appropriate uses of the watercourses for various activities. Historically erosion hazard zones have not been regulated. However, because of the importance of public safety, funding issues, and opportunities for preservation, the results of the erosion hazard zone analysis may be adopted as part of the watercourse master plan.



Bank erosion along Skunk Creek

SKUNK CREEK HISTORIC NOTES

1860's - Vulture Mine in Wickenburg spawned settlements throughout the region. Subsequent developments arose due to mining, irrigated agriculture, and livestock grazing.

1880's - Cattle industry grew as the valley became a popular winter and spring grazing area. Sheep for wool production also became a valley export producing 1,000,000 lbs of wool/year.

1891 - Rio Verde Canal Company designed a system of aqueducts in an attempt to irrigate the Skunk Creek Basin for agriculture. 25 miles of aqueduct were constructed before the project was canceled.

1940's - Yet another attempt to cultivate the area finally succeeded with the production of cotton and melon being established in the surrounding basin.

1950's - Tracts of private land converted from agricultural to residential housing. Land ownership developed into a mosaic of city, county, state, federal, and private lands.

1999 - Development intensifies in the skunk Creek area. Planned community development is being reviewed for possible future construction within the North Black Canyon Corridor.

Place
postage
here

Skunk Creek
Watercourse Master Plan

Flood Control District of
Maricopa County

2801 West Durango Street
Phoenix, Arizona 85009

How can you get involved?

The first step is to give your input. There will be an opportunity to learn more and give your comments at the public meeting (see information on back page of newsletter.) Please fill out and mail this card to receive future information on the Skunk Creek Watercourse Master Plan.

Name

Address

Phone

Comments/Questions

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

	Percent of Spillway Capacity													
	10%			25%			50%			100%			0 ft gage height	Design Event
Structure	Stage	Q	V	Stage	Q	V	Stage	Q	V	Stage	Q	V	(ft MSL)	
Adobe Dam	17.66	1,100	1,878	24.34	1,398	4,694	31.07	1,632	9,388	39.96	1,980	18,776	1,337.76	SPF
Apache Junction	10.91	78	53	12.35	84	133	13.86	89	265	16.05	97	530	1,783.75	
Aspen	8.14	146	18	13.24	204	46	19.16	255	92	26.79	304	183	1,808.61	
Buckeye #1	6.08		812	9.51		2,031	13.47		4,062	18.62		8,124	1,061.36	
Buckeye #2	5.40	124	84	8.24	134	210	11.34	143	420	14.99	155	840	1,098.49	
Buckeye #3	5.15	82	162	7.83	88	406	11.11	93	812	15.66	98	1,624	1,151.64	
Casandro Dam[1]	3.90	13	14	8.20	16	36	12.00	19	72	20.00	30	143	2,135.00	
Cave Buttes Dam	51.20	417	4,610	67.50	499	11,525	81.20	565	23,050	97.10	600	46,100	1,560.00	SPF
Crossroads	5.23	pump	46	10.30	pump	114	16.38	pump	228	23.33	pump	456	1,248.00	
Dreamy Draw	17.80	159	30	22.80	177	75	28.10	195	149	35.40	227	298	1,369.82	
EFCC #1	2.30	41	6	3.30	80	15	4.70	137	30	7.16	211	59	1,487.84	
EFCC #3[2]	3.10	288	18	3.90	321	44	5.05	383	88	14.60	498	175	1,417.00	
EFCC #4	3.50	66	7	4.70	103	19	6.00	139	37	8.00	180	74	1,462.00	
Freestone	9.40	pump	22	13.20	pump	54	18.00	pump	109	25.00	pump	218	1,217.49	
Golden Eagle	11.93	455	10	14.42	519	24	16.99	576	48	20.35	642	95	1,694.51	
Guadalupe[3]	7.30	0	33	12.00	0	82	17.40	0	165	24.46	0	329	1,249.54	
Harquahala	25.70	327	859	28.50	339	2,148	31.50	350	4,295	35.60	362	8,590	1,372.94	
Hesperus	16.74	233	28	22.26	277	69	28.57	313	138	37.10	347	276	1,851.88	
McMicken Dam[4]	6.90	691	2,007	11.41	1,664	5,018	15.54	2,574	10,035	21.10	3,600	20,070	1,332.55	
New River Dam	26.88	1,800	4,370	38.99	2,127	10,925	52.12	2,518	21,850	67.04	2,800	43,700	1,389.36	
North Heights	14.10	213	14	19.62	259	35	25.13	295	69	31.83	328	138	1,778.97	
Powerline[5]	7.90	94	420	11.50	121	1,050	15.50	146	2,100	20.94	177	4,200		
										19.55	167	3,600	1,562.36	
Reatta Pass										13.74				
Rittenhouse[6]	10.86	111	333	12.60	120	831	15.16	131	1,663	18.48	145	333	1,577.21	
Saddleback[7]	6.60	469	701	9.63	832	1,753	12.59	1,098	3,506	16.10	1,343	7,012	1,176.90	
Signal Butte[8]	12.46	0	138	16.76	104	344	21.07	143	688	26.95	169	1,375	1,685.52	
Spookhill[9]	11.80	730	90	12.48	777	226	13.90	855	451	16.00	950	902	1,566.00	
Stoneridge	9.12	66	6	14.18	83	17	17.79	90	33	23.84	100	66	1,678.86	
Sunnycove Dam[10]	15.10	38	22	21.80	58	54	28.50	71	108	37.10	77	216	2,133.00	
Sunridge	20.00	262	9	27.25	307	24	33.47	334	47	40.14	358	94	1,884.66	
Sunset Dam[11]	6.50	22	9	10.00	28	22	13.90	56	43	19.50	71	86	2,112.20	
Tenth St. Wash #1[12]	2.64	24	2	4.46	40	5	7.08	55	11	11.50	76	22	1,306.80	
Vineyard[13]	3.91	79	312	5.51	122	781	7.48	160	1,561	10.10	205	3,122	1,562.74	
White Tanks #3[14]	5.75	268	223	10.21	362	565	14.32	429	1,131	19.60	501	2,261	1,186.61	
White Tanks #4[15]	below gage	0	124	below gage	0	311	0.90	69	622	7.84	124	1,243	1,041.77	

1 Principle outlet only. Not including emergency gated outlet. See station folder for its rating curve.
2 No true emergency spillway. Above 14.6 ft flows enter 20th Street.
3 Gated outlet normally closed.
4 Multiple gate outlets normally closed. Q's shown assume fully open gates.
5 Multiple gated outlets not included in discharge rating. Q's for principle outlet only. Also, uncertain if datum for capacity and discharge ratings are the same. Waiting for new HIS analysis.
6 Multiple gated outlets not included in discharge rating. Q's only for principle ungated outlet.
7 No spillway -- all values given as percentage of top of dam capacity.
8 Middle outlet gated. Q's shown here only for ungated principle outlet.
9 Gated outlet below 11.5 ft included in discharges shown.
10 Gated outlet normally closed. Q's shown here assume fully open gate.
11 Gated outlet normally closed. Q's shown here assume fully open gate.
12 Multiple gated vegetative outlets normally closed not included in Q's shown here. Q's shown only for ungated principle outlet.
13 2 gated outlets normally closed. Q's shown assume fully open gates.
14 3 gated outlets normally closed. Q's shown assume fully open gates.

units?

STRUCTURE	TYPE	TOPELEV	LENGTH	HEIGHT	WIDTH	SPILLELEV	CHANLCAP	SPILLCAP	DRAINAGE	STORAGE	MAXH20ELEV	FREEBOARD	PEAKINFLOW	PEAKOUTFLO	DRAWDOWN
WHITE TANKS 3	Compacted earthfill	1216.0	7667.00	30	10	1210.0	0.00	11750.00	24.00	2655.00	1213.00		0.00	0	3.3
WHITE TANKS 4	Compacted earthfill	1056.0	6839.00	20	10	1050.0	0.00	0.00	14.23	2250.00	1053.00		0.00	0	5
McMICKEN DAM	Compacted Earthfill	1361.0	49500.00	34	12	1354.0	0.00	16000.00	247.00	23800.00	1356.00	5	0.00	0	3.5
DREAMY DRAW DAM	Zoned compact earth	1418.0	448.00	56	20	1405.0	0.00	0.00	1.30	317.00	0.00	5	3600.00	220	.7
GUADALUPE FRS	Homogenous Earthfill	1281.5	2910.00	34.5	14	1274.00	0.00	12000.00	1.87	298.00	1278.40	7.5	13385.00	12221	5
BUCKEYE 1	Compacted Earthfill	1089.5	37699.20	31.5	14	1079.8	0.00	0.00	73.90	8195.00	1088.50		0.00	0	10 Days
BUCKEYE 2	Compacted Earthfill	1117.0	12144.00	26	14	1111.2	0.00	0.00	5.70	1920.00	1116.98		0.00	0	10
BUCKEYE 3	COMPACTED EARTH	1170.0	15840.00	34	14	1163.2	0.00	4660.00	9.30	2098.00	1169.80		21065.00	15440	10 Days
SPOOKHILL FRS & OUTLET	Conpacted Earthfill	1593.3	21120.00	25	14	1582.2	0.00	0.00	13.60	866.00	1585.20		0.00	0	10
APACHE JUNCTION FRS	Earthfill	N/A	8600.00	22	14	N/A	81.00	1560.00	3661.00	552.00	0.00	N/A	0.00	81	
SIGNAL BUTTES FRS	Earthfill		7038.00	39	18		0.00	0.00	164.00	1365.00	0.00		0.00	0	
POWERLINE FRS	Compacted Earthfill	1589.1	13358.00	24	14	1583.3	0.00	17500.00	49.90	4194.00	0.00	5	0.00	0	30
VINEYARD FRS	Compacted Earthfill	1579.5	28829.00	16.5	14	1574.8	0.00	8000.00	57.80	4310.00	1575.50	4.7	0.00	0	10
RITTENHOUSE FRS	Compacted Earthfill	1602.3	19008.00	20	14	1597.6	0.00	0.00	51.30	4060.00	0.00	4.7	0.00	0	30
HARQUAHALA FRS	Compacted Earthfill	1419.7	60720.00	55	14	1408.4	0.00	9650.00	102.30	10911.00	1412.66	N/A	0.00	0	9
SADDLEBACK FRS	Compact earthfill, center drainage co	1193.0	27825.60	22	12	no spillway	0.00	0.00	29.60	42.47	1193.00		0.00	0	8.5days
SUNSET DAM	Zoned, modified homogenous	2141.5	488.00	30.5	14	2131.	0.00	3400.00	0.60	55.00	2134.70	10.5	3393.00	2381	10
SUNNYCOVE DAM	Zoned, Compacted earthfill	2178.5	714.00	48.5	14	2170.0	0.00	6300.00	1.35	2.18	2177.80	8.5	7709.00	7188	10
CAVE BUTTES DAM	Zoned Earthfill	1679.1	2275.00	190	20	1657.1	0.00	0.00	191.00	46600.00	1674.10	5	54000.00	494	48
ADOBE DAM	Zoned Earthfill	1403.0	11245.00	63.00	20.00	1377.80	0.00	0.00	89.60	18350.00	1397.50	5.5	0.00	0	5
NEW RIVER DAM	Zoned Earthfill	1488.0	2320.00	104	20	1456.2	0.00	62000.00	164.00	43520.00	1482.50	5.5	2665.00	48000	13.4

176,371

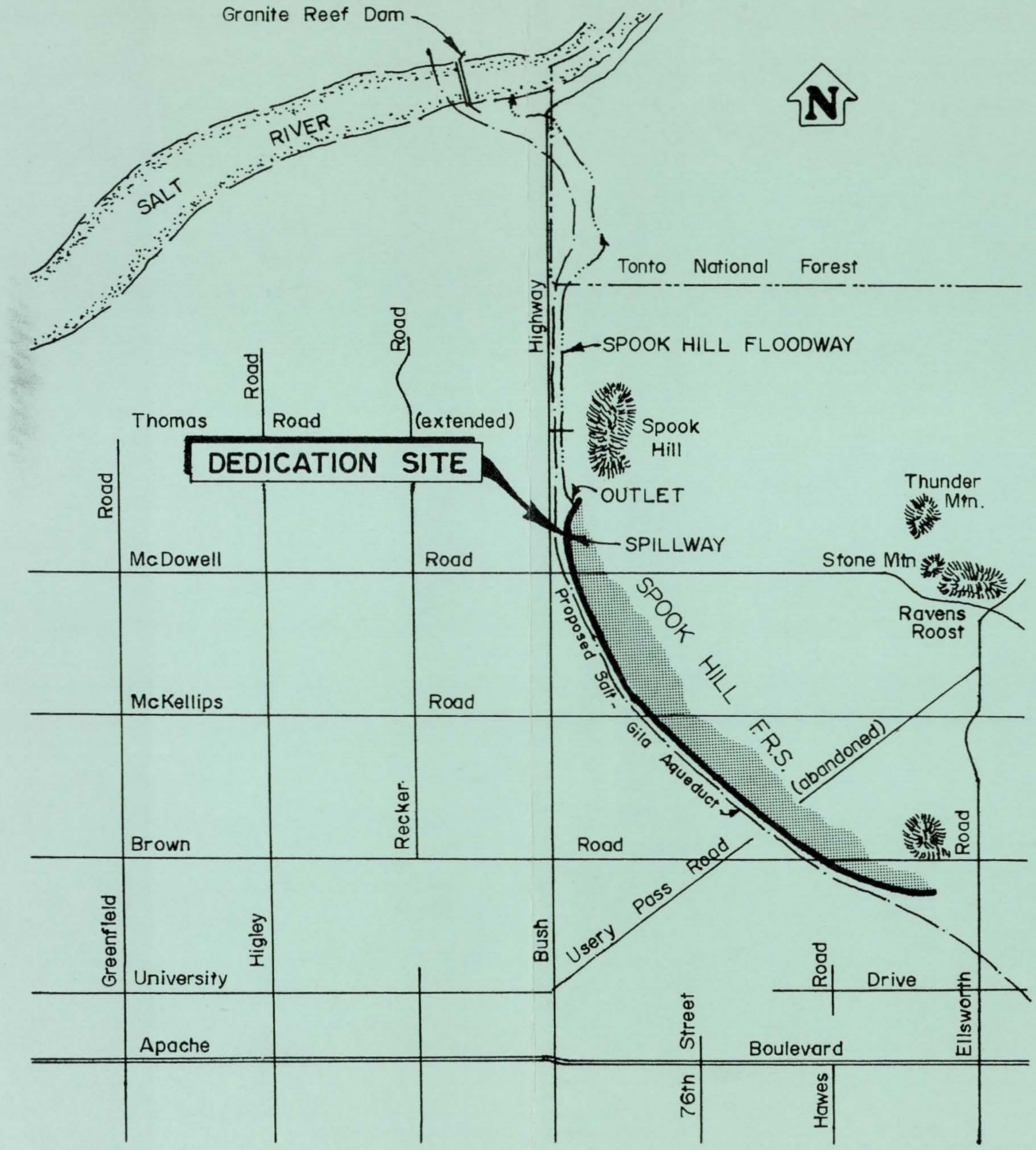
Source: O&M Structure Book 6/3/96

* No data on Casandro Wash Dam

TABLE 15

Peak Discharges for Major Recorded Floods in Phoenix and Vicinity

Number	Location	Date	Drainage Area (sq. mi.)	Peak Discharge (c.f.s.)	Discharge (c.f.s./sq. mi.)
1	Shea Wash, at Shea Blvd. NR Scottsdale	6/22/72	1.79	945	528
2	Shea Wash Trib. No. 3, at Shea Blvd. NR Scottsdale	6/22/72	0.09	86	956
3	Shea Wash Trib. No. 2, at Shea Blvd. NR Scottsdale	6/22/72	0.14	103	736
4	Shea Wash Trib. No. 1, at Shea Blvd. NR Scottsdale	6/22/72	0.12	80	667
5	Indian Bend Wash Trib. No. 1, at Tatum Blvd. in Paradise Valley	6/22/72	0.026	88	3,400
6	Indian Bend Wash Trib. No. 2, at Tatum Blvd. in Paradise Valley	6/22/72	0.075	144	1,920
7	Indian Bend Wash, at Camelback Country Club in Paradise Valley	6/22/72	83	14,500	175
8	Indian Bend Wash (at Indian Bend Road) NR Scottsdale (USGS Gaging Station)	6/22/72	142	20,000	141
9	Cudia City Wash NR Phoenix, 1,000 ft. upstream from McDonald Drive	6/22/72	2.16	4,200	1,940
10	Cudia City Wash Trib., at 40th St. and Rancho Drive	6/22/72	0.08	219	2,750
11	Dreamy Draw at Phoenix, at 16th St.	6/22/72	1.24	860	694
12	Hassayampa R. at Box Damsite (NR Wickenburg)	Sept. 1970	417	58,000	139
13	New River NR Glendale	Sept. 1970	323	19,200	59
14	New River NR Rock Springs	Sept. 1970	67.3	18,600	276



ANNOUNCING

the

Dedication Ceremonies

for

SPOOK HILL

Floodwater Retarding Structure

THE FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

INVITES YOU TO ATTEND

the

DEDICATION CEREMONIES

for

SPOOK HILL F.R.S.

FLOOD CONTROL PROJECT

Friday, November 2, 1979

10:00 A.M.

BAND

MASTER OF CEREMONIES Hawley Atkinson, Chairman, Board of Directors

INVOCATION To Be Announced

PLEDGE OF ALLEGIANCE AND INTRODUCTION OF GUESTS Hawley Atkinson

REMARKS Thomas G. Rockenbaugh, State Conservationist, Soil Conservation Service

REMARKS Walter D. White, East Maricopa Natural Resource Conservation District

REMARKS Wayne C. Pomeroy, Mayor, City of Mesa

REMARKS John J. Rhodes, U.S. House of Representatives

BENEDICTION To Be Announced

MUSIC SELECTIONS

SPOOK HILL F.R.S.

The Spook Hill Flood Retarding Structure is the first of five structures to be constructed as a part of the Buckhorn-Mesa Watershed Flood Prevention Plan which was approved by Congress in July 1963. After several years of diligent work by the people living in the Buckhorn-Mesa Watershed together with the East Maricopa Natural Resource Conservation District, the Pinal County Board of Supervisors, the Flood Control District of Maricopa County (local sponsors) and the Soil Conservation Service, a branch of the United States Agriculture Department, construction plans became a reality. The final Environmental Impact Statement was approved in September 1976. Mardian Construction Company of Phoenix, Arizona was awarded the construction contract for the Spook Hill Flood Retarding Structure on January 27, 1978. Actual construction began during February 1978. Upon completion the Flood Control District of Maricopa County will operate and maintain the structure.

The reservoir area behind the structure will retain 866 acre feet. The floodwaters retained will be released at a controlled rate into the Spook Hill floodway which outlets into a natural wash which conveys the floodwaters to a sediment basin adjacent to the Salt River near Granite Reef Dam. The floodwaters will ultimately enter the Salt River.

When the Buckhorn-Mesa Watershed Project is completed it is estimated that for every $1.00 spent $2.50 in benefits will be realized. In addition residents in the protected area can expect the project to minimize and prevent typical flood scenes such as flooded streets, damaged utilities, costly damages to homes, unsightly sediment and mud that takes time, hard labor, and money to clean up, and flooded agricultural land which results in the loss of crops that may eventually affect the local consumer's pocketbook. With the completion of the Buckhorn-Mesa Watershed Project, local residents can feel confident that they and their neighborhoods will be provided greater security and protection from the devastation of flash floods so common to Arizona's deserts.

PROJECT FEATURES

Type of Structure	Earthfill
Length	21,000 feet
Maximum Height	25 feet
Amount of Earth Fill	1,250,000 cubic yards
Reservoir Capacity	866 Acre Feet
Drainage Area Controlled	8,700 Acres
Principal Outlet Capacity	808 CFS
Emergency Spillway Width	206 Feet
Floodway Channel Length	10,700 Feet
Floodway Channel Bottom Width	30 Feet
Costs: Federal	$5,570,000
Local	$2,330,000

Designer: Soil Conservation Service

Contractor: Mardian Construction Company, Phoenix, Arizona

SPONSORING BOARDS

BOARD OF DIRECTORS FLOOD CONTROL DISTRICT

Hawley Atkinson (Chairman)
George L. Campbell
Tom Freestone
Fred Koory, Jr.
Ed Pastor

PINAL COUNTY BOARD OF SUPERVISORS

Wm. "Bill" Mathieson (Chairman)
Jimmy Karam
Jimmie B. Kerr

CITIZENS' FLOOD CONTROL ADVISORY BOARD

Lynn Anderson (Chairman)
Elijah Cardon
Henry Brodersen
Reid Teeples
Jim Attebery
John Miller
Paul Perry

EAST MARICOPA RESOURCE CONSERVATION DISTRICT

James A. Miller (Chairman)
Jim Ferrin (Vice Chairman)
Robert J. Bogle (Secretary)
C. Louis Moyers
Walter D. White
Kenneth G. Fooks
Mark W. Dobson

Herbert P. Donald, Chief Engineer and General Manager
FLOOD CONTROL DISTRICT of Maricopa County

EAR

WATER FACT SHEET

U.S. GEOLOGICAL SURVEY, DEPARTMENT OF THE INTERIOR

FLOODS IN ARIZONA, JANUARY 1993

An unusual series of storms from the Pacific Ocean starting on January 6, 1993, and continuing through January 19, 1993, caused heavy and prolonged precipitation across the State of Arizona. These heavy rains caused the most widespread and severe flooding in Arizona since the turn of the century. The highest flows of record were observed at some streamflow-gaging stations in every major river basin in the State. The protracted rainfall over the 2-week period caused multiple flood peaks on most streams and rivers.

THE STORM

Precipitation data for selected sites were obtained from the National Weather Service and compared with normal January precipitation to show the unusual nature of these storms (fig. 1). The stations for which data are presently available show precipitation from 388 to 572 percent of normal. The rainfall was greatest in the area north and east of Phoenix, although the entire State received precipitation in excess of 300 percent of normal.

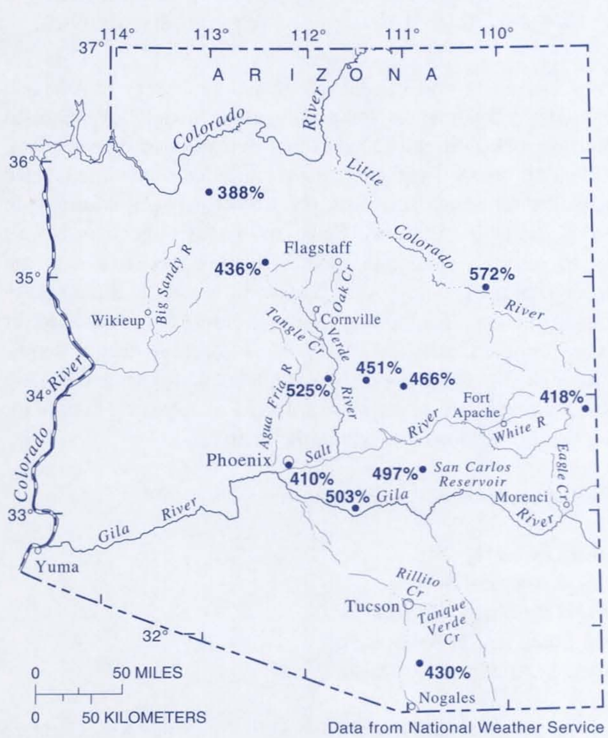


Figure 1.—January 1993 precipitation as a percentage of normal January precipitation (1931-60 period).

THE FLOODS

The first flooding occurred on small drainage basins. Floods such as those observed at Tanque Verde Creek in Tucson, Oak Creek near Cornville, Big Sandy River near Wikieup, Eagle Creek near Morenci, and White River near Fort Apache all have less than a 5-percent chance of occurring in any given year. As these small streams contributed flow to the larger streams, floods began to occur on the Verde, Salt, Gila, and Agua Fria Rivers and Rillito Creek. The accumulated waters produced floods on these streams that have only a 1- to 2-percent chance of occurring in any given year. Although these peak flows are high, the most unusual aspect of these floods was the volume of water produced. For example, on the Gila River just above San Carlos Reservoir, the highest flood ever recorded at that site occurred in 1983 during a storm that affected the southern part of Arizona. At the peak of the flood, about 150,000 cubic feet per second of water passed that station. In January 1993, the highest of the three peaks that occurred in the flood is estimated to be 109,000 cubic feet per second (fig. 2).

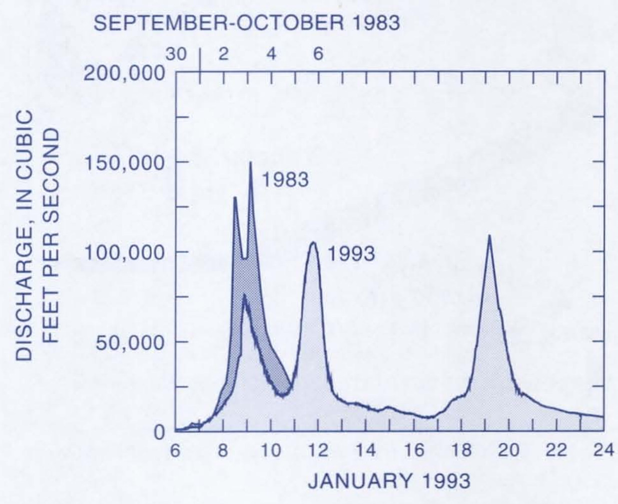


Figure 2.—Comparison of Gila River flood discharges for 1983 and 1993.

When the volumes of water in the two floods are compared, however, the flood of 1993 is estimated to be 76 percent larger than the flood in 1983. In 1983, the flood volume was 503,000 acre-feet, but in January 1993, the prolonged period of rainfall caused a much longer duration of flooding and the flood volume was 884,900 acre-feet—more than enough water to fill the San Carlos Reservoir downstream whose available storage capacity for flood control at the time was 239,500 acre-feet. Other streams also contributed water to the reservoir, resulting in a spillway discharge from the reservoir of 32,500 cubic feet per second. To demonstrate that this phenomenon was not peculiar to just one part of Arizona, the expected volume of a flood with only a 1-percent chance of occurring in any given year is compared with the volume of the 1993 flood at several stations around the State (fig. 3).

Of the station records shown in figure 3, only Salt River near Roosevelt and Big Sandy River near Wikieup indicate less flood volume in the 1993 flood than for a flood with a 1-percent chance of occurring at those sites. Because of the high elevation of many tributary drainages to the Salt River, part of the precipitation fell as snow, which has yet to melt. This effect explains the low volume of flood runoff in the Salt River compared with the surrounding stations. The National Weather Service reports that because of these storms, the snowpack is at 154 percent of normal in the Salt-Verde watershed, and runoff from this snowpack is projected at 342 percent of normal.

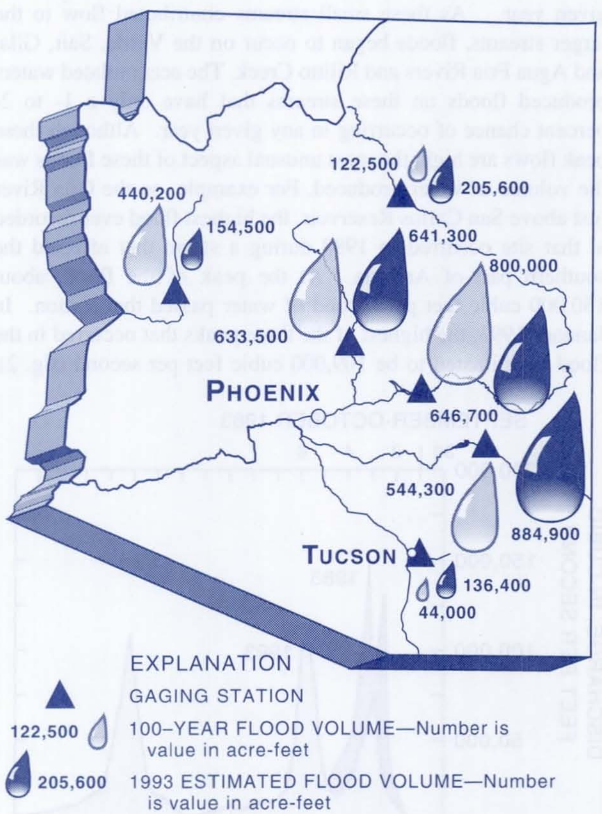


Figure 3.—Comparison of 100-year and 1993 floods.

Figure 5.—Verde River gaging station.

MONITORING STREAMFLOW

The U.S. Geological Survey (USGS) operates a network of 192 streamflow-gaging stations throughout Arizona. At 168 of these stations, the data recorded at the station are also relayed by satellite telemetry to a computer in Tucson, Arizona (fig. 4).

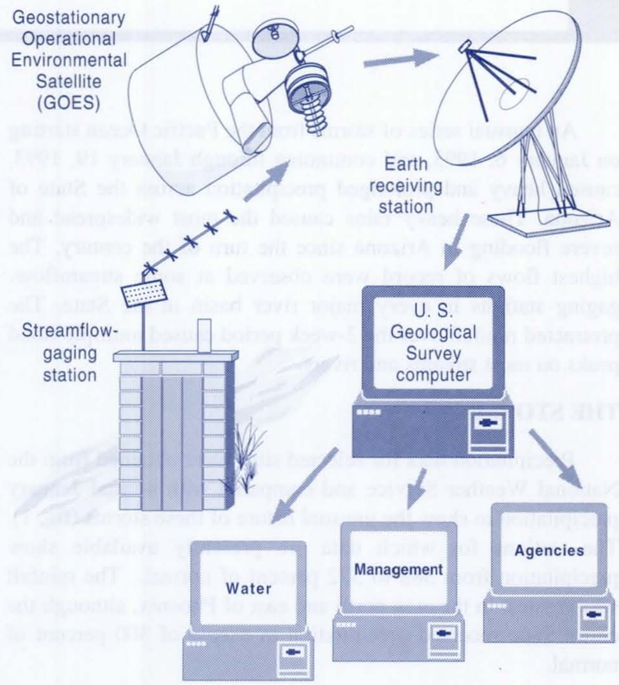


Figure 4.—Schematic diagram showing how streamflow data are transmitted, processed, and distributed.

During a flood, the data are transmitted every 15 minutes, and within 30 minutes these data are generally available to decision makers in the agencies involved in flood management. Although many agencies have additional data-telemetry networks for their operations, the USGS network is statewide and is available to County, State, and Federal agencies as well as to utility companies and irrigation districts for the management of storage and release of water. Streamflow-gaging stations, like the one shown in figure 5 on Verde River below Tangle Creek, are susceptible to damage during floods. Although 35 stations were lost or damaged during the 1993 flood, enough critical stations remained in operation to monitor the flood conditions throughout the State.

For further information, write to:

District Chief
U.S. Geological Survey
Water Resources Division
375 South Euclid Avenue
Tucson, Arizona 85719-6644

R.D. Mac Nish, C.F. Smith, and K.E. Goddard

Open-File Report 93-54 1993

FLOOD CONTROL DISTRICT
of
MARICOPA COUNTY

Interoffice Memorandum

DATE: January 6, 1997

TO: Greg Rodzenko, P.E., P&PM Manager
Margaret Bejarano, Support Services Supervisor
Betty Dickens, Quality Coordinator
Gwen Loving, HR Analyst
Joe Young, Budget Analyst
Lisa Young, Public Information Coordinator

FROM: David A. Brozovsky, CPM, Administrator

SUBJECT: New Board Members Briefing Book

We have been tasked to provide a briefing book that will be made available to the new members of the Board of Directors (Jan Brewer, District 4 and Fulton Brock, District 1). Attached is a copy of the tasking letter and the specific information required. Please note that the information is due this Friday. In order to meet that deadline, please submit all the information to Lisa Young not later than noon this Thursday, January 9th. She will assemble the book and coordinate with Stan for submission. To facilitate timely completion, I am assigning the following tasks to the individuals indicated:

Previous Information

Fact Sheet	Lisa Young
ADMS/CIP Information	Greg Rodzenko (P&PM Division Staff)

Newly Requested Information

CIP Projects (Our previous submission updated should work)	Greg Rodzenko (P&PM Division Staff)
Organization Chart	Gwen Loving
Mission/Vision	Margaret Bejarano
Strategic Plan	Margaret Bejarano
Budget	Joe Young
Key Department Personnel	Gwen Loving
Brief Explanation of Division Functions	Lisa Young (Based upon Admin Manual 2.4 inputs)
Quality Initiative, etc	Betty Dickens

Special Projects	Greg Rodzenko (P&PM Division Staff)
Any other useful inputs	ALL

If you have any questions or ideas about inputs, please give either myself or Lisa a call.

Enclosure

Copy to:
Stanley L. Smith, Jr., P.E., Interim Chief Engineer and General Manager
Dave Johnson, Regulatory Division Manager
Tom Johnson, P.E., R.L.S., C&M Division Manager
~~Ed Raleigh~~, P.E., Engineering Division Manager
Jim Schwartzmann, Land Management Division Manager

FLOOD CONTROL DISTRICT
RECEIVED
JAN 03 1997

MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION
INTER-OFFICE MEMO

Maricopa County Department of Transportation
Inter-Office Memo

Date: January 2, 1997

To: Tom Buick, Director, MCDOT
Stan Smith, General Manager, FCD
Bill Scalzo, Director, Rec Svs
Jill Herberg Kusy, Director, PID
Christine Holloway, Director, SWM
Chris Cole, Library District

Fm: Carol A. Black Carol

Re: Board of Supervisors Briefing Book

At the request of Supervisor Stapley's office, we have been asked to put together an organizational briefing book for the two new Board members. The format for this book will be similar to the one prepared in 1994.

Attached is a copy of your departmental summary which was included in the last briefing book. Please review and update the summary, as needed.

We would also like to include the following items in the book:

- CIP projects
    - brief description
    - budget
    - listing of projects by BOS district
    - map showing project locations
- Organizational Chart
- Mission/Vision
- Strategic Plan
- Budget
    - breakdown by personnel services, services and supplies, fixed assets, CIP
    - funding sources
    - fund use restrictions
- Key department personnel including phone and fax numbers.

- Brief explanation of division functions.
- Brief description of any quality initiatives, completed projects, impacts and savings.
- Brief description of any special projects, i.e. Comp Plan, AzTech, Lake Pleasant Education Center.
- Anything else you feel may be useful to the new board members.

Please forward your information to my attention by January 10, 1997. I will compile it into the overall book. If you have any questions or comments, please give me a call at 506-4611.

Thanks

FLOOD CONTROL DISTRICT of Maricopa County
2801 West Durango Street
Phoenix, AZ 85009
(602) 506-1501
(602) 506-4601 (Fax)

October 1994

FACT SHEET

Mission

To provide flood and stormwater management services for the benefit of the people of Maricopa County.

These services are provided through regulatory activities, master planning, technical assistance, and structural projects such as dams, channels, and stormdrains. Our customers are the citizens, municipalities, and other governmental agencies.

Authorized Staff: 258

Fiscal Year 1994-95 Budget

Operating Expenditures		
Personnel	7,096,541	13.1%
Supplies/Services	9,163,676	16.9%
Capital Outlay	738,611	1.3%
Unexpected Repair		.4%
Contingency	200,000	31.7%
Total Operating	$17,198,828	
Capital Improvements		
Personnel	2,102,622	3.9%
Supplies/Services	6,047,919	11.1%
Capital Outlay	26,150,209	48.3%
Land Litigation		
Contingency	2,682,000	5.0%
Total Capital Imp.	$36,982,750	68.3%
Total Expenditures	$54,181,578	100.0%

The District is governed by its Board of Directors, which is also the Maricopa County Board of Supervisors. The Board of Directors is advised by an appointed seven-member Flood Control Advisory Board that also functions as the Floodplain Review and Drainage Review Boards.

Our Mission Encompasses Eight Programs

- **Maintenance.** $7,565,357. We maintain 22 dams and well over 50 miles of major underground conduits and improved channels to acceptable functional and aesthetic standards.

- **Environmental**. $1,294,928. We provide regional guidance and coordinate programs to aid impacted agencies in meeting federally mandated stormwater quality regulations. These programs include operation of 13 stormwater quality monitoring stations, preparation of the region stormwater quality reports, and inspection of suspected polluting discharges into stormdrain facilities. We provide educational outreach materials on improving stormwater quality and conduct research into best management practices to cost effectively treat and control pollutants in stormwater runoff.

- **Floodplain Administration**. $1,813,370. We manage the floodplains under the District's jurisdiction by identifying and delineating areas subject to the "100-year" flood, evaluating requests and when warranted issuing permits to construct or repair structures within the floodplain, and identifying violators. We provide floodplain information to real estate brokers, agents and the general public. We maintain a good standing with the Federal Flood Insurance Program to ensure the County is eligible for Federal Disaster Relief and so that citizens may purchase federally sponsored flood insurance. We participate in the Community Rating System (CRS) program that provides flood insurance discounts to citizens.

- **Drainage Administration**. $1,051,574. We administer the County Drainage Regulation (prepared by the District) to reduce existing and potential flooding caused by local storm water. We coordinate with County Planning, Transportation, Public Health and Building Safety staff to insure that new development will not increase runoff, divert flows to another watershed or back water on other property. We investigate reports of flooding and possible flood hazards reported by citizens.

- **Property Management**. $334,517. We manage all aspects of District owned real property interests. This includes preparing leases for commercial property, preparing agreements for joint use of District property and issuing licenses for access to or through District property. We sell property identified as excess (post project construction) when market conditions are favorable.

- **Flood Warning and Data Collection.** $1,495,540. We design, implement and maintain an accurate, reliable, real-time flood warning system to monitor our flood control structures and to provide data to Emergency Management for flood event planning and evacuation purposes. The system information is used by the National Weather Service, the Bureau of Reclamation, the U.S. Geological Survey, Pinal County, Yavapai County and several state, municipal and Maricopa County agencies. We identify and develop warning and evacuation plans for areas downstream of structures and within floodplains that are subject to inundation due to major storms or structure failure. We disseminate rainfall and stream gauge information for use by various agencies.

- **Planning**. $3,643,542. We identify regional drainage and flood control problems and develop alternative solutions to protect the life and property of Maricopa County residents. We accomplish this through area drainage master studies, the comprehensive plan, watercourse master plans and a formal project prioritization process that ranks project requests from local municipalities. Public involvement and environmental assessment are integral parts of our planning process.

- **Capital Improvement Projects**. $36,982,750. Flood control and stormwater management projects identified through the planning process and recommended for inclusion into the 5-year Capital Improvement Program (CIP) are approved by the Board of Directors. The CIP includes acquisition of rights-of-way, relocation of utilities, design and construction of drainage and flood control facilities, including aesthetic features. Public involvement is integral to all CIP projects.

Our mission is best served when we work with other jurisdictions - cities, counties, state and federal agencies. This cooperation results in greater service to the public because it is based upon a regional approach which optimizes overall project effectiveness, expertise and cost-sharing. The regional concept results in the best project for the money.

FLOOD CONTROL DISTRICT

of

Maricopa County

2801 W[illegible] • Phoenix, Arizona 85009
Telephone (602) 506-1501
FAX (602) 506-4601
TT (602) 506-5859

BOARD OF DIRECTORS
Betsey Bayless
John T. Katsenes
Ed King
Tom Rawles
Mary Rose Garrido Wilcox

Briefing for Don Stapley, Supervisor, District 2

October 17, 1994

SUBJECT: Flood Control Programs/Projects in District 2

Welcome to the Board of Supervisors. The information provided below is intended to provide you with some background on the status of completed, ongoing and planned Flood Control District activities located wholly or partially within District 2 (partial denoted with *). Our efforts in District 2 have focused in three general areas--planning, design and construction, and operations and maintenance. The Flood Control District has served as the local sponsor for several Federal undertakings (see Table 2), including the Indian Bend Wash and East Maricopa Floodway projects. Specifics on the three general areas listed above are summarized in a series of tables covering Area Drainage Master Studies, completed Capital Improvement Program (CIP) projects, and ongoing/planned CIP projects.

The information provided in Table 3 is based on the District's FY 94-95 *Procedure for Identifying and Prioritizing Potential 5-Year Projects* and the FY 94-95 Budget and 5-Year CIP (flat rate @ $0.3632). Full funding of the District's proposed share of project costs is budgeted only for the Sossaman Channel and Basin and the Reata Pass Channel - Phase I. Brief project summaries of the projects listed in Table 3 are enclosed for your information. We look forward to working with you to further the District's mission.

Table 1 - Area Drainage Master Studies (in 1993 $)

ADMS Name	General Location	FCD Cost
East Maricopa (1987)	Mesa - east of RWCD Canal along U.S. 60 corridor	$477,000
Spook Hill (1989)	Northeast Mesa - McDowell Rd./Power Rd. vicinity	$120,000
Upper Indian Bend* (1992)	Phoenix/Scottsdale - north of CAP canal	$39,000
Fountain Hills (in progress)	Town of Fountain Hills	N/A
Cave Creek/Carefree* (proposed)	Towns of Cave Creek and Carefree	N/A

Table 2 - Completed CIP Projects (in 1993 $)			
Project Name/Year Completed	**FCD Cost**	**Fed./State Cost**	**1993-94 O&M**
Apache Junction FRS & Bulldog Floodway (1988)	$14,987,000	$12,158,000	$35,000
Cactus Rd. Flood Control System (1994)	$1,300,000	$0	$0
East Maricopa Floodway* (1981-1993)	$24,744,000	$47,886,000	$1,041,000
Gilbert Detention Basins (1986 & 1992)	$6,862,000	$0	$0
Indian Bend Wash* (1977-1984)	$20,237,000	$47,050,000	$59,000
Paradise Valley-Scottsdale-Phoenix* (1985)	$2,274,000	$638,000	$0
Signal Butte/Pass Mtn. FRS & Floodway (1984-87)	$1,544,000	$9,538,000	$154,000
Sossaman Rd. Drain (1981)	$5,320,000	$0	$26,000
Spook Hill FRS & Floodway (1980 & 1993)	$423,000	$15,372,000	$102,000
University Drive Drainage Improvements (1994)	$967,000	$0	$0
Total	**$78,658,000**	**$132,642,000**	**$1,417,000**

Table 3 - Current and Proposed CIP Projects				
Project Name	**City/Town**	**Total Cost**	**FCD Cost**	**FY 95-99**
Sossaman Channel & Basin	Mesa/U.C.	$967,000	$967,000	$967,000
Reata Pass Channel - Phase I	Scottsdale	$5,288,000	$2,644,000	$2,644,000
84th St./Cholla Rd. Basin & Drain	Scottsdale	$1,700,000	$750,000	$350,000
Rawhide Wash Channel - Phase I	Scottsdale	$6,600,000	$3,300,000	$300,000
Pima Road Channel	Scottsdale	$18,300,000	$9,150,000	$2,670,000
Reata Pass Channel - Phase II	Scottsdale	$11,100,000	$5,550,000	$0
Rawhide Wash Channel - Phase II	Scottsdale	$1,800,000	$900,000	$0
Tatum Wash Channel & Basins*	Phoenix	$10,000,000	$10,000,000	$291,000
Doubletree Ranch Rd. Regional Drain	P. Valley	$10,500,000	$10,500,000	$240,000
Total		**$66,225,000**	**$43,731,000**	**$7,432,000**

UIBW ADMP

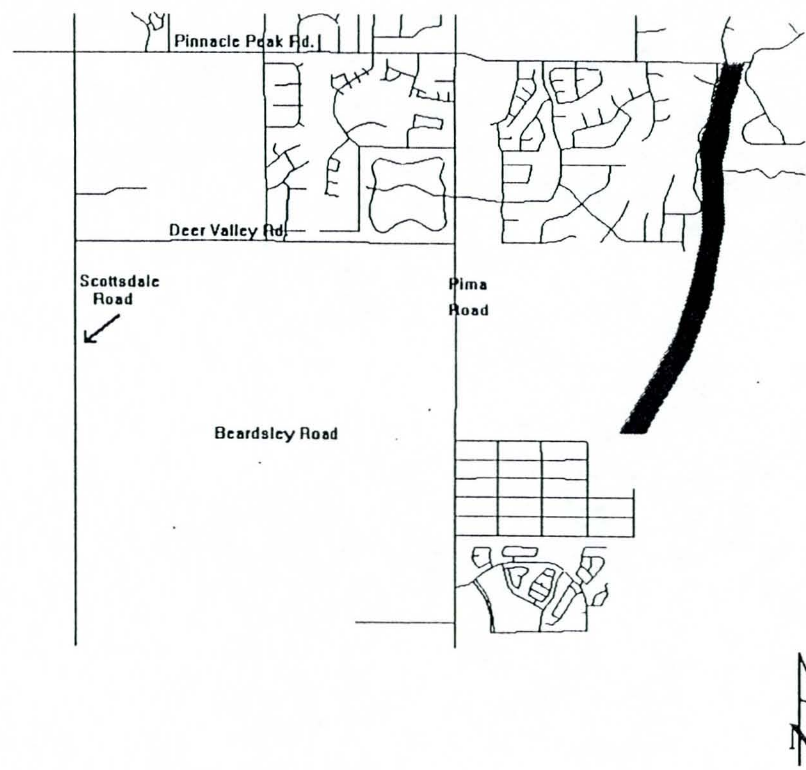
Activity Code: P6A680

Supervisor District: 2

Township/Range: T4N R5E S8, 17, 20, 29

Project Name: Reata Pass Channel - Phase I

This project includes a 100-year channel (11,500 cfs) between Pinnacle Peak Road and Beardsley Road that will protect 750 homes and 760 multi-family units from flows 1-3' deep. The project is a major component of the UIBW ADMP and will allow for future removal of 8.5 square miles of 100-year floodplain. Flows will be conveyed into regional detention basins, allowing for potential recharge and water quality enhancements. The channel will preserve existing vegetation, where feasible, and serve as a future recreational corridor connecting the Westworld area with the McDowell Mountains. The Reata Pass channel also reduces drainage requirements along the Pima Road and Loop 101 corridors.



Total costs for the project are estimated at $6.2 million, with 50% by the District. Scottsdale will provide future operations and maintenance of the constructed features.

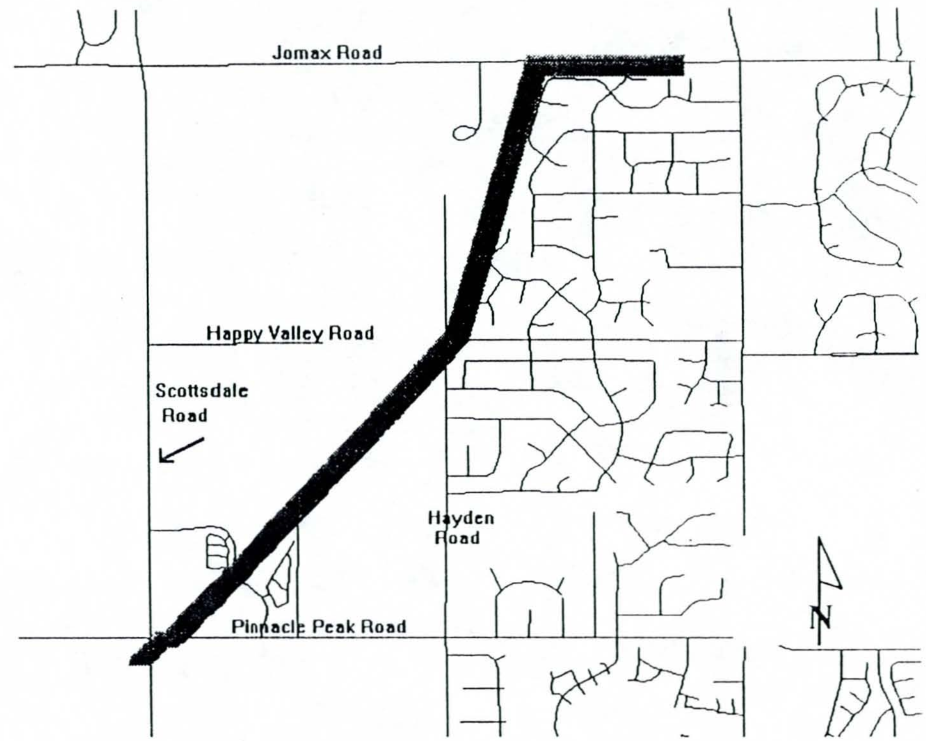
UIBW ADMP

Activity Code: P6A680

Supervisor District: 2

Township/Range: T4N R4E S1-2, 11, 14

Project Name: Rawhide Wash Channel - Phase I



This project includes a 100-year channel (11,000 cfs) between Jomax Road and Pinnacle Peak Road that will protect 460 homes, 25 commercial structures and a 160-acre theme park from flows 1-3' deep. The project is a major component of the UIBW ADMP and will allow for future removal of 4.5 square miles of 100-year floodplain in Scottsdale and 6.1 square miles in Phoenix. Flows will be conveyed into regional detention basins allowing for potential recharge and water quality enhancements. The channel will preserve existing vegetation, where feasible, and serve as a future recreational corridor.

Total costs for the project are estimated at $6.6 million, with 50% by the District. Scottsdale will provide future operations and maintenance of the constructed features.

CITY OF SCOTTSDALE

Activity Code: P6A027

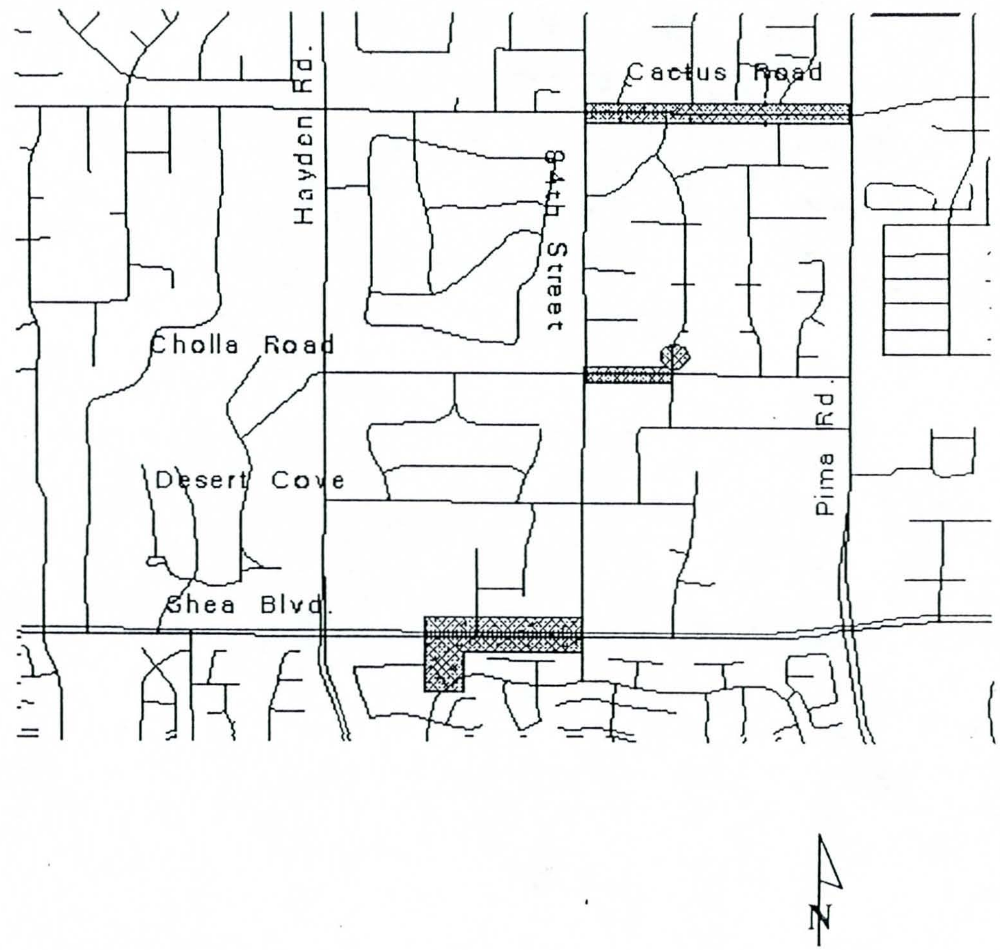
Supervisor District: 2

Township/Range: T3N R4E S24

Project Name: 84th Street/Cholla Basin & Storm Drain

The 84th Street/Cholla Basin and Storm Drain project includes improvements (650 cfs) in the Cholla Wash watershed of north Scottsdale between Cactus Road and Shea Boulevard to provide a 100-year level of protection. The project improves flood protection for approximately 200 homes and 1 church in a fully-developed, 250-acre area. Of this figure, 21 homes are immediately adjacent to the Cholla Wash floodplain. The project area is part of the City of Scottsdale's Hayden/Shea Area Drainage Master Plan.

A funding split of $925,000 for Scottsdale and $750,000 for the District is proposed to construct a storm drain system, an open channel and a detention basin. Scottsdale will provide future operations and maintenance of the constructed features.



UIBW ADMP

Activity Code: P6A680

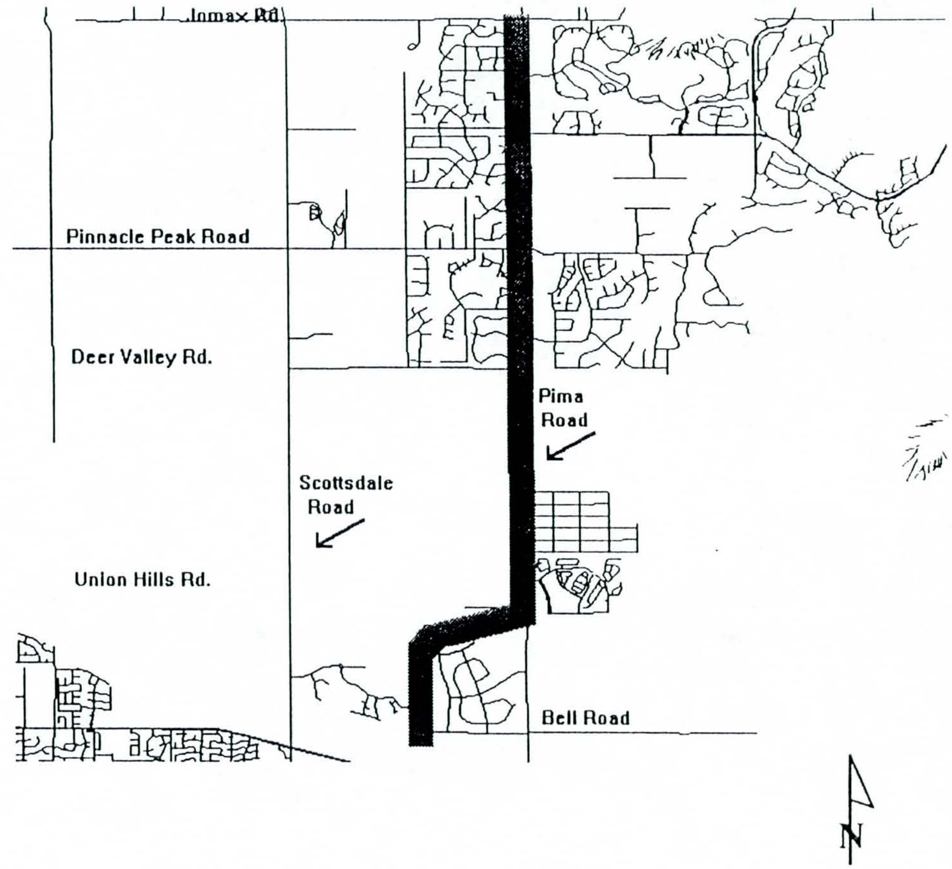
Supervisor District: 2

T/R: T4N R4E S24-25, 36; T4N R5E S6-7, 18-19

Project Name: Pima Road Channel

This project includes a 100-year channel (6,100 cfs) between Jomax Road and Bell Road that will protect 1250 homes, 40 commercial structures and a water treatment plant from flows < 1' deep originating in a watershed of 7 square miles. The project is a major component of the UIBW ADMP. Flows will be conveyed into regional detention basins allowing for potential recharge and water quality enhancements. The channel will preserve existing vegetation, where feasible, and serve as a future recreational corridor. The channel also reduces drainage requirements along the Pima Road and Loop 101 corridors.

Total costs for the project are estimated at $18.3 million, with 50% by the District. Scottsdale will provide future operations and maintenance of the constructed features.



UIBW ADMP

Activity Code: P6A680

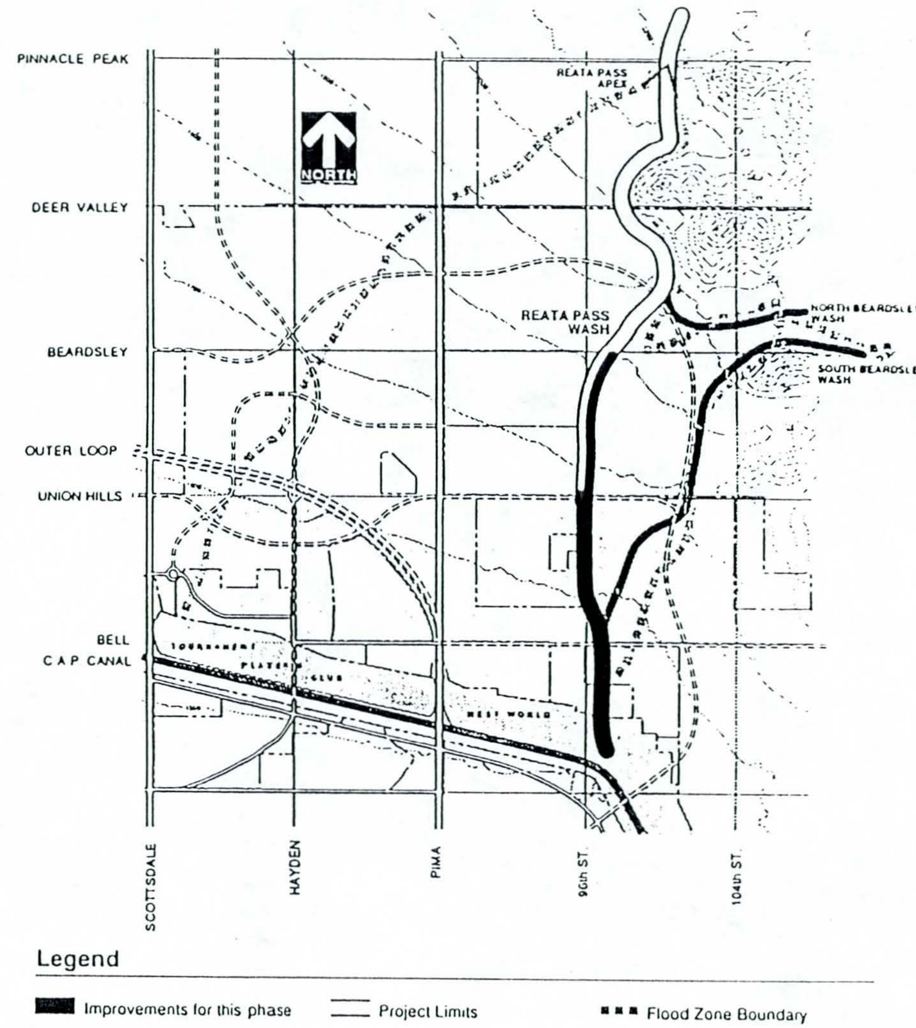
Supervisor District: 2

Township/Range: T4N R5E S20, 29,

Project Name: Reata Pass Channel - Phase II

This project includes a 100-year channel (16,700 cfs) between Beardsley Road and Westworld through presently undeveloped lands. The project is a component of the UIBW ADMP and, when combined with the Phase I improvements, will allow for future removal of 8.5 square miles of 100-year floodplain. Flows will be conveyed into regional detention basins, allowing for potential recharge and water quality enhancements. The channel will preserve existing vegetation, where feasible, and serve as a future recreational corridor connecting the Westworld area with the McDowell Mountains.

Total costs for the project are estimated at $11.1 million, with 50% by the District. Scottsdale will provide future operations and maintenance of the constructed features.



Reata Pass / Beardsley Wash
Phase 2 Plan

ACDC ADMP (Continued)

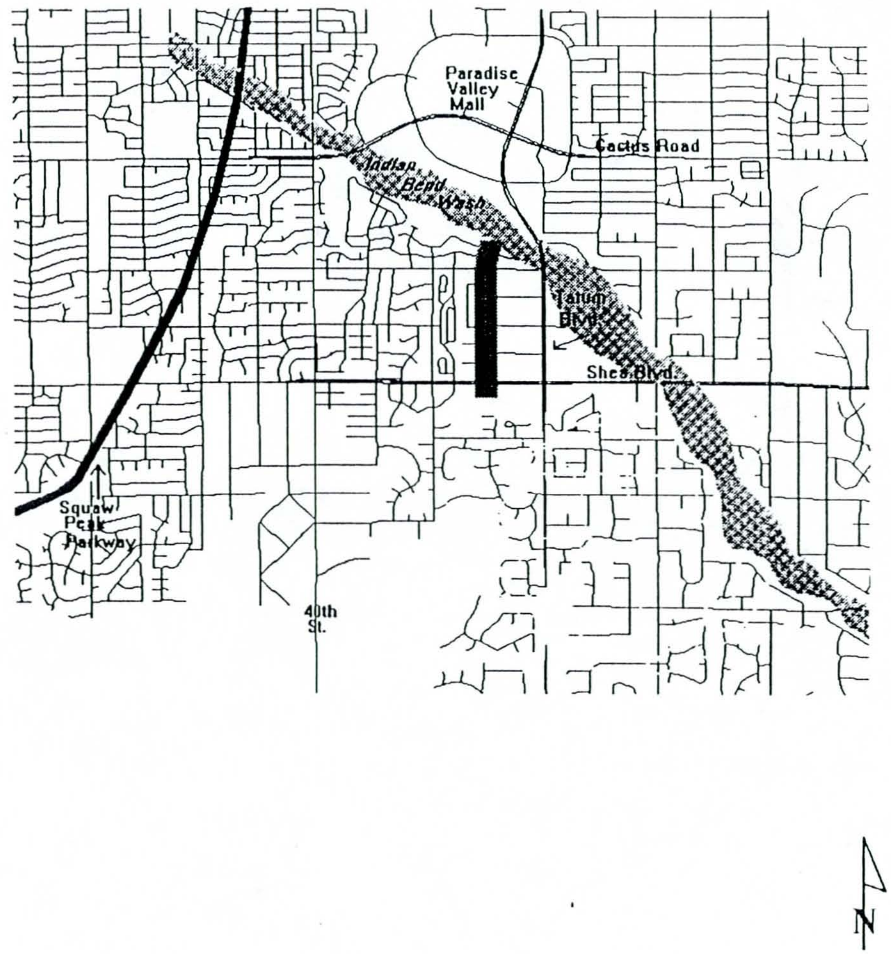
Activity Code: P6A580

Supervisor District: 2, 3

T/R: T3N R3E S24-25, 36; T3N R4E S19-20, 29-30

Project Name: Tatum Wash Channel & Basin (46th St./Shea)

A 3-square mile watershed, which extends from the Phoenix Mountain Preserve northeast to Indian Bend Wash (IBW) near the Shea Boulevard/Tatum Boulevard intersection, generates approximately 2000 cfs during the 100-year event and causes 500 acres of fully developed residential and commercial property to be flooded. Historically, thunderstorms have caused flooding in the area, to the point where relatively minor storms generate enough water to flood houses along Cholla Street. A system of detention basins and channels extending from the Mountain Preserve to Indian Bend Wash will provide 100-year protection to 350+ structures in the project area.



The project will improve flood protection throughout the downstream reaches of the previously-constructed IBW project. An additional benefit of this project will be to lessen roadway flooding on Shea and Tatum Boulevards, two very heavily traveled arterial streets. Total costs are estimated at $10 million. Majority funding by the District is currently assumed and O&M responsibilities remain undefined.

UIBW ADMP

Activity Code: P6A680

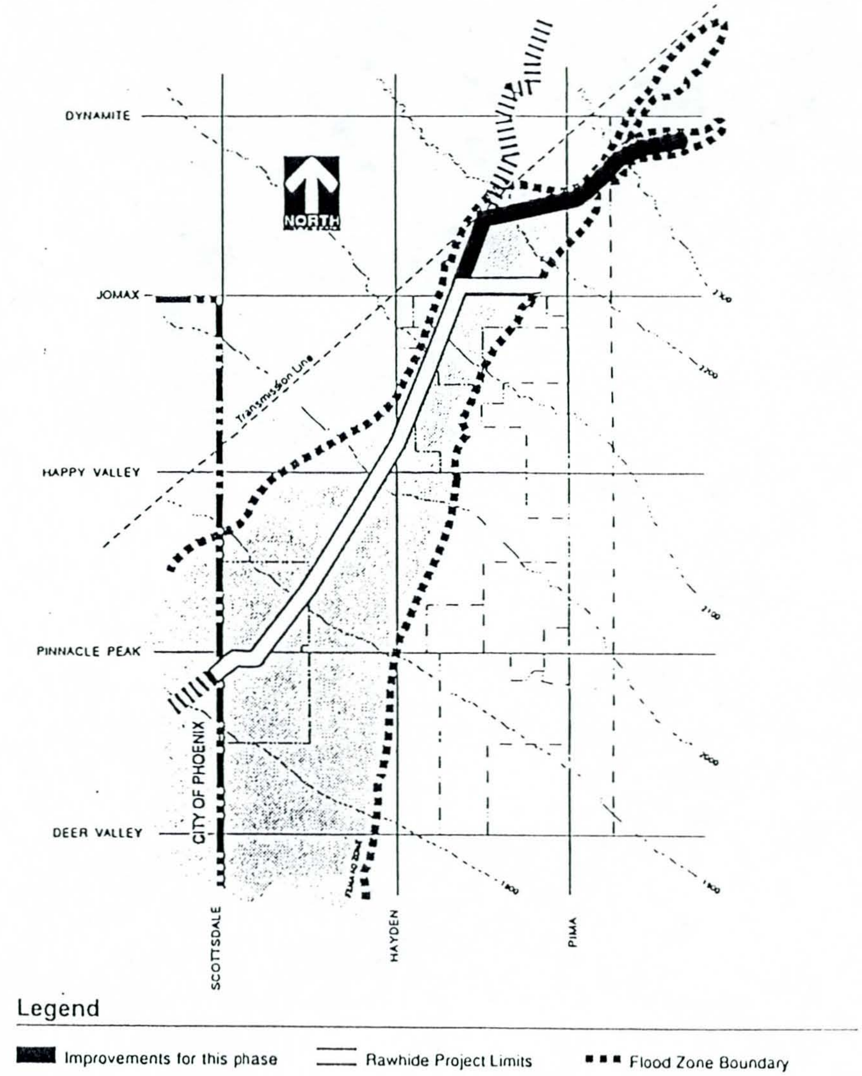
Supervisor District: 2

Township/Range: T4N R4E S36: T4N R5E S31

Project Name: Rawhide Wash Channel - Phase II

This project includes a 100-year channel (11,000 cfs) between Dynamite Road and Jomax Road that will complete Scottsdale's portion of the Rawhide Alluvial Fan improvements. The project is a component of the UIBW ADMP and will assist in the future removal of 4.5 square miles of 100-year floodplain in Scottsdale and 6.1 square miles in Phoenix. Flows will be conveyed into regional detention basins allowing for potential recharge and water quality enhancements. The channel will preserve existing vegetation, where feasible, and serve as a future recreational corridor.

Total costs for the project are estimated at \$1.8 million, with 50% by the District. Scottsdale will provide future operations and maintenance of the constructed features.



Rawhide Wash - Phase II

ACDC ADMP (Continued)

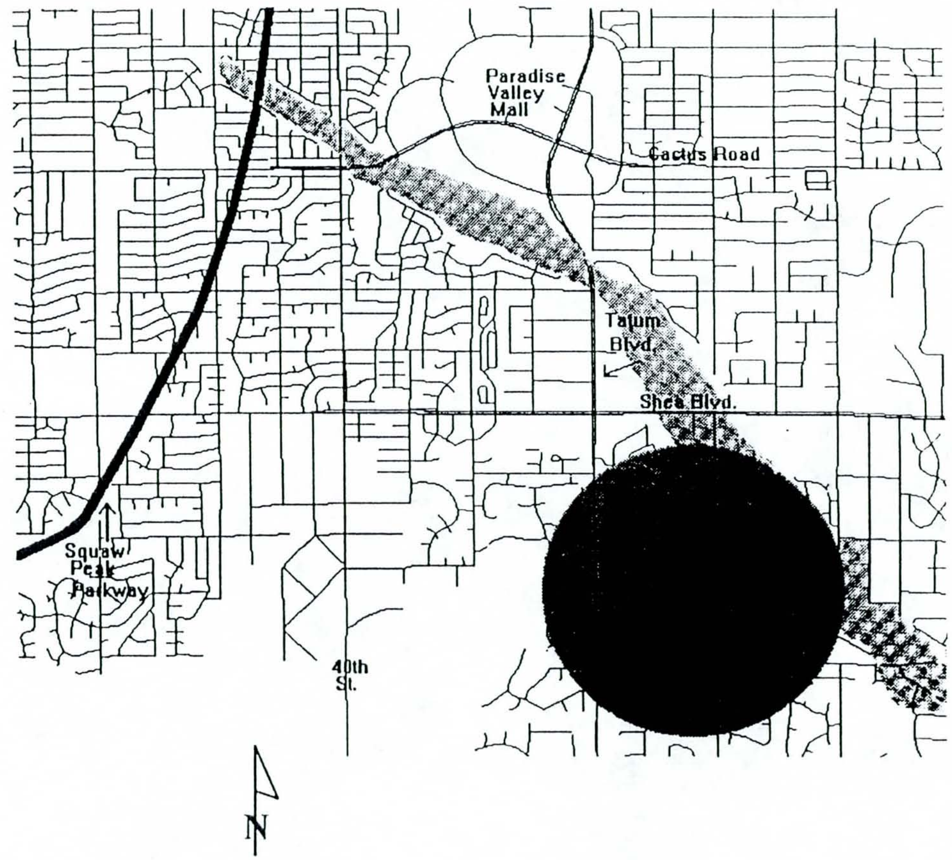
Activity Code: P6A580

Supervisor District: 2

Township/Range: T3N R4E S28-29, 32-33

Project Name: Doubletree Ranch Road Improvements

This project includes 10-year minimum protection for a fully-developed watershed in Paradise Valley which flows northeast from the Phoenix Mountain Preserve to Indian Bend Wash (100-year flow = 2700 cfs). Presently, a grade school is virtually inaccessible during heavy rains, and a number of homes near Indian Bend Wash, the project's outfall, have experienced severe flooding in recent years. The project will be combined with roadway improvements to Doubetree Ranch Road.



Total costs for the project are estimated at $10.5 million. Pre-design study costs are estimated at $240,000 (100% District). Design of preferred alternatives is estimated at $250,000 (100% District). Funding for land and construction costs is to be determined by future Intergovernmental Agreement. Paradise Valley will provide O&M for this project.

SOSSAMAN CHANNEL AND BASIN

Activity Code: P6A108

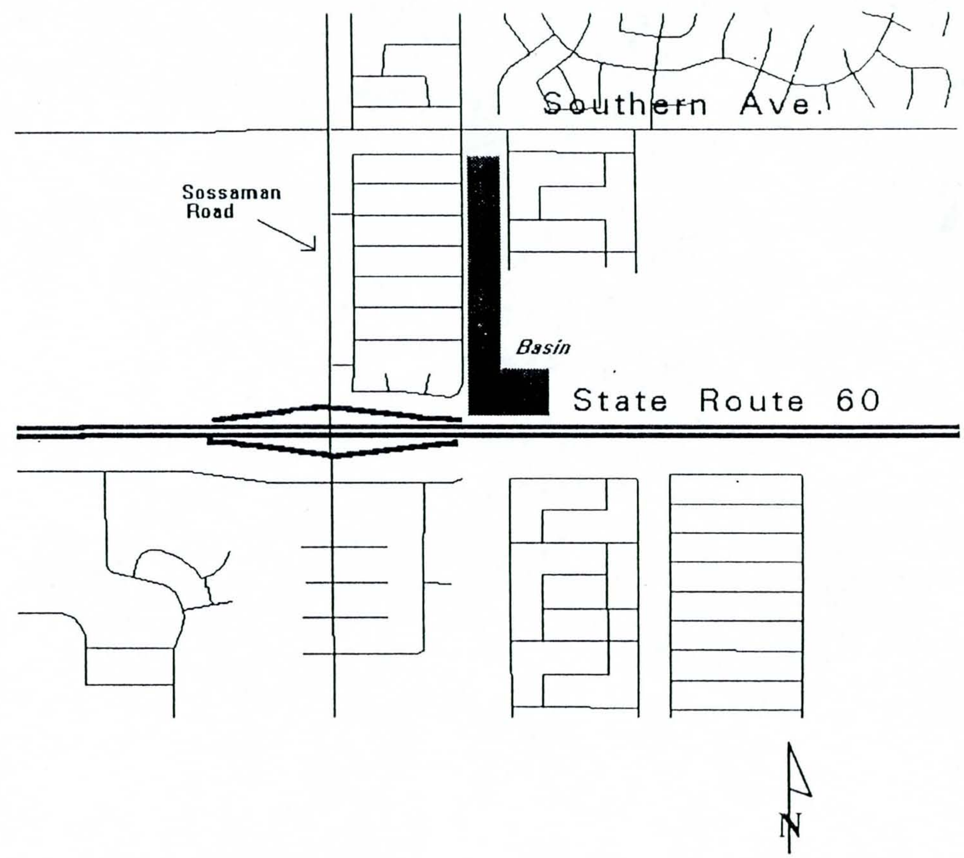
Supervisor District: 2

Township/Range: T1N R7E S31-32

Project Name: Sossaman Channel and Basin

This project is located in east Mesa between Sossaman Road and Haws Road and Southern Avenue and the Superstition Freeway (U.S. 60). Downstream improvements, owned and operated by the District, can accommodate the conveyance of 2400 cfs. The 100-year flow is in excess of 3000 cfs. This project will improve the channel from Southern Avenue to U.S. 60 and construct a basin at the northeast corner of U.S. 60 and Sossaman Channel. The basin will act as a peaking facility, releasing flows in a manner that will not overtax the District's downstream improvements.

Construction of the Sossaman Channel project began on June 8, 1994 and will be complete by December 1994. Total cost of the improvements is $1,069,000.



Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, Arizona 85009
(602)506-1501

Arizona Canal Diversion Channel
Fact Sheet

Arizona Canal Diversion Channel

16.5-mile flood control channel, originating near 40th Street and Stanford Drive on the grounds of the Phoenix Country Day School, and terminating at 75th Avenue and Greenway Road where the storm drainage flows into Skunk Creek. The Channel protects large portions of Phoenix, and areas of Glendale and Peoria from 100-year flood damage. A 100-year flood has a 1% chance of happening in any year.

The Diversion Channel is part of the Phoenix and Vicinity (including New River) Flood Control Project proposed by a citizens' committee in 1963, and funded by Congress in 1965. The project also includes four dams: Dreamy Draw, completed 1974; Cave Buttes, on Cave Creek Wash, completed 1979; Adobe Dam, on Skunk Creek, completed in 1982; and New River Dam, completed 1985. Related improvements include channelization of Cave Creek Wash from the confluence with the ACDC upstream to Sweetwater Avenue; channelization of Skunk Creek downstream of its confluence with the ACDC; and channelization of the New River downstream of confluence with Skunk Creek; and channelization of the Agua Fria River near the Gila River.

Designed and Built by: U.S. Army Corps of Engineers, with the Flood Control District of Maricopa County as local sponsor.

ACDC Cost:

$254 million total; $152 million for construction, paid 97.7% by Corps of Engineers and 2.3% by local sponsor, Flood Control District; $102 million for property acquisition, relocation of people, roads, bridges, utilities, paid by the Flood Control District.

Total cost for the Phoenix and Vicinity (including New River) Flood Control Project, including the dams, is $422 million ($254 million federal; $168 million local).

Contractors:	Reach 1, Skunk Creek - 53rd Avenue:	Kiewit Western
	Reach 2a, 53rd Avenue - 47th Avenue:	C.S. Construction
	Reach 2b, 47th Avenue - 27th Avenue:	Kasler Corp.
	Reach 2c, 27th Avenue - 21st Avenue (+ 2.5 miles of Cave Creek channelization):	Pulice Construction
	Reach 3, 21st Avenue - 12th Street:	Pulice Construction
	Reach 4, 12th Street - 40th Street:	SundtCorp

Design capacity: Peak discharge into Skunk Creek is 29,000 cubic feet per second.

Channel dimensions:	Upstream end near 40th Street/Stanford Drive:	36 ft. wide x 21 ft. deep
	At confluence with Cave Creek Wash:	110 ft. wide x 20 ft. deep
	Downstream confluence with Skunk Creek:	500 ft. wide x 20 ft. deep

Construction specifications:

Concrete lined channel; covered box at Sunnyslope High School and from upstream end near 40th St. to just west of 24th St. (including the covered channel portion at the Arizona Biltmore Hotel) ; fenced to prevent entry; earthen channel starting at 55th Ave. to Skunk Creek.

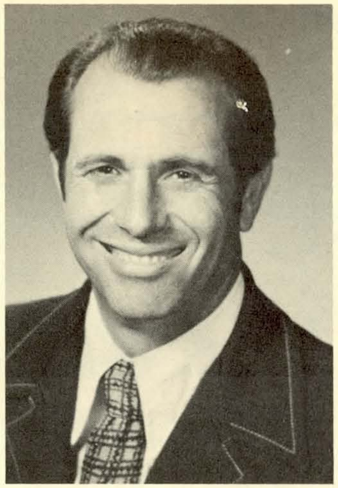
(over)

EAR

Agenda
Board of Supervisor's Orientation
March 31, 1997
Adobe Room

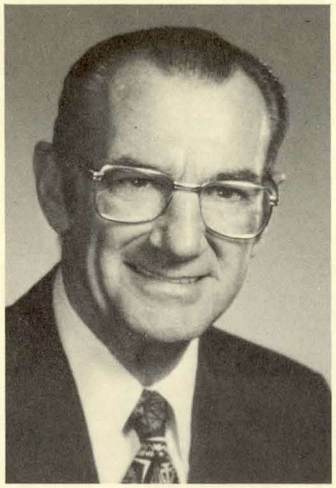
9:00 - 9:05	Intro and Welcome Dangers related to flooding in the Valley Backlog of projects District goals	Stan Smith
 9:05 - 9:10 9:10 - 9:15	CIP Project specific On-going construction efforts	 Greg Rodzenko Tom Johnson
9:15 - 9:20	Multi-use aspects of flood control	Jim Schwartzmann
9:20 - 9:25	Budget	Dave Brozovsky
9:25 - 9:30	Floodplain Delineations Troubles with cities Liberal cities	Dave Johnson
9:30 - 9:35	Technology - GIS example of how we saved the County $ through cutting-edge technology	Stan Smith
9:35 - 9:40	IOC Flood operations Support Dept. of Emergency Management (not the operations center)	Dave Brozovsky
9:40 - 9:50	Tour of the ALERT Room	Ed Raleigh and Steve Waters
9:50 - 9:55	Closing remarks	Stan Smith
9:55 - 10:00	Walk to MCDOT	Stan Smith

MARICOPA COUNTY SUPERVISORS



TOM FREESTONE

DISTRICT 1



GEORGE CAMPBELL

DISTRICT 2

FRED KOORY

DISTRICT 3

CAROLE CARPENTER

DISTRICT 4

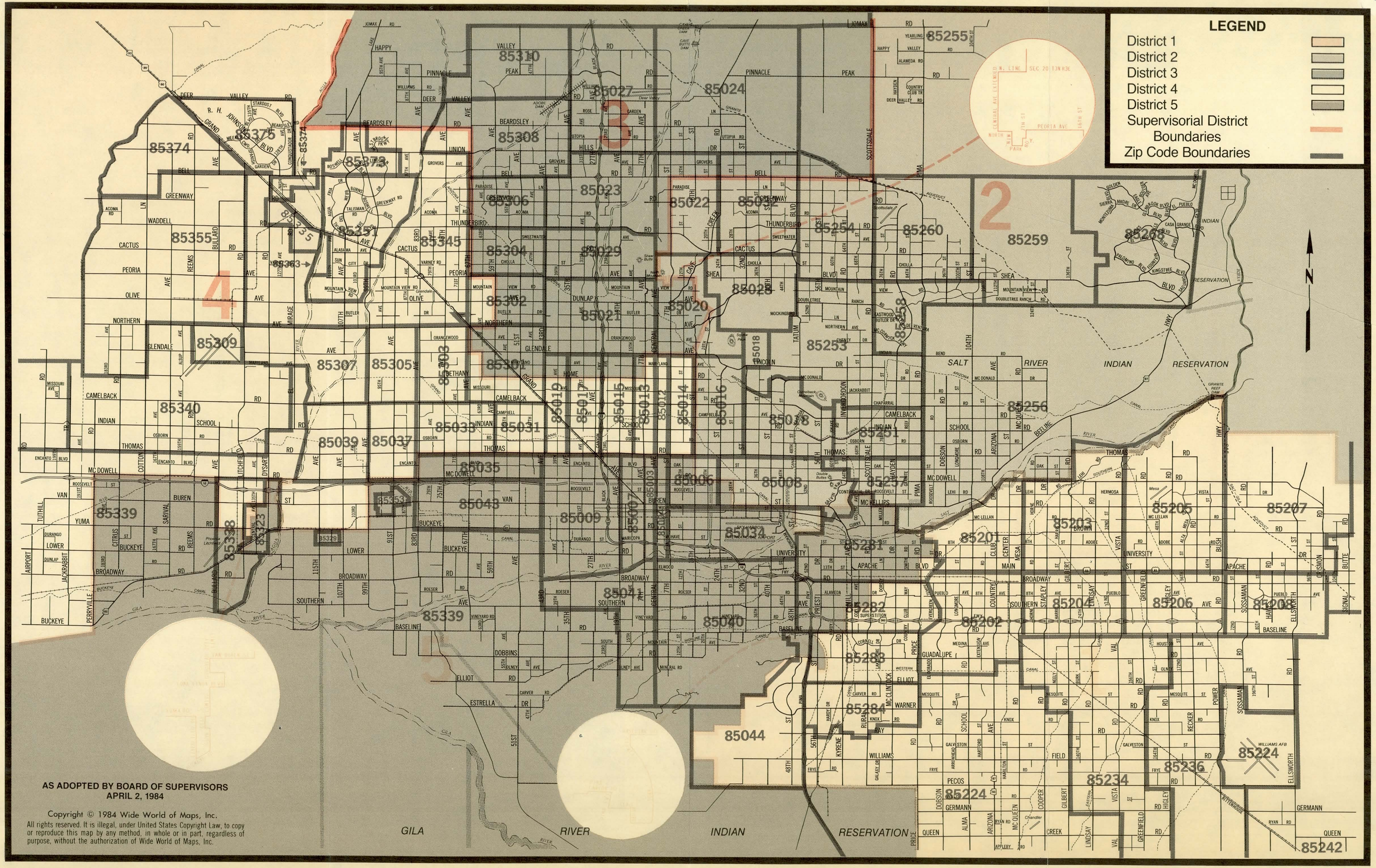
ED PASTOR

DISTRICT 5

MARICOPA COUNTY SUPERVISORIAL DISTRICT MAP

Prepared by
MARICOPA COUNTY PUBLIC INFORMATION OFFICE
605 Administration Bldg., 111 S. Third Ave., Phoenix, AZ 85003

Adopted by
BOARD OF SUPERVISORS
April 2, 1984



AS ADOPTED BY BOARD OF SUPERVISORS
APRIL 2, 1984

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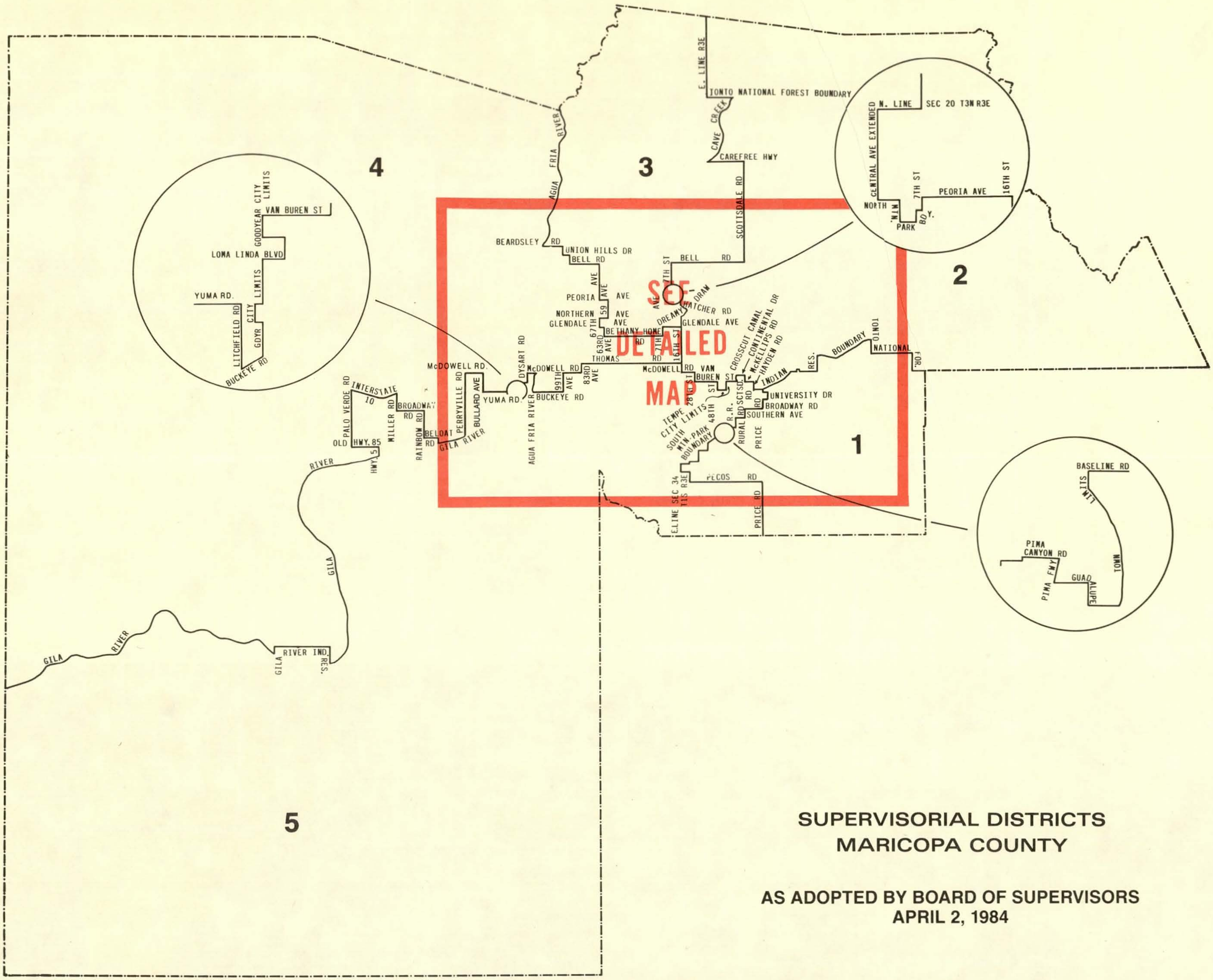

SUPERVISORIAL DISTRICTS
MARICOPA COUNTY

AS ADOPTED BY BOARD OF SUPERVISORS
APRIL 2, 1984