

On the evening of August 28-29, 1986 severe thunderstorms struck sections of the Phoenix metropolitan area resulting in flooding in a number of areas below the Arizona Canal. The most extensive flooding damages occurred below Spillway #3 located a few hundred feet east of 32nd Street. This report will describe the storm and the flooding in that area which resulted from it.

The National Weather Service (NWS) Significant Weather/Event Log and radar observations for Thursday, August 28, 1986 indicate that severe weather was in the Phoenix area as early as 6:00 p.m. A severe storm statement was issued at 7:40 p.m. Another severe weather statement was issued at 8:00 p.m. and a flash flood watch issued at 8:50 p.m. The NWS continued to issue severe weather statements and to extend the flash flood watch through the evening.

Most of the severe storm cells were located in the north central portions of the Phoenix metropolitan area, particularly in the area bounded by Scottsdale Road on the east, 55th Avenue on the west, Camelback Road on the south, and Bell Road on the north. A Flood Control District (FCD) telemetered rain gage at Indian Bend Wash near McKellips Road recorded .87" between 6 p.m. and 7 p.m., while another at Dreamy Draw Dam recorded .67" between 10 p.m. and midnight. Reports from observers in the Scottsdale area indicate that intense rainfall in that area occurred between 9:30 p.m. and 11:00 p.m. Apparently, as is typical of "monsoon" storms in this area, a number of short lived but quite intense storms developed over a number of hours.

It appears that one of the most intense of these storm cells was centered over 40th Street and Montebello Avenue. A NWS spotter at that location reported 5.53" of rainfall, and another at 42nd Street and McDonald Drive reported 3.90". Other observers within two miles of these points reported total rainfall values ranging from 1.10" to 2.20". Most of this rainfall occurred during a 2-3 hour period beginning about 9:30 p.m. Unfortunately, there is not enough data for the area above the Arizona Canal to determine the average rainfall over the Cudia City Wash drainage area.

The major source of inflow to the Arizona Canal upstream of 32nd Street was Cudia City Wash. Field investigations after the storm support the indication that the storm was centered near 40th Street and Montebello Avenue. The high water marks on the upstream side of the culverts beneath McDonald Drive show that the peak flow was three feet deep. The discharge associated with that depth of flow is 480 cfs according to the rating curve developed by SRP for that culvert. The flow in the wash increased to 1200 cfs less than one-half

mile downstream at 44th Street, and to 1400 cfs at 40th Street and Stanford Drive. These discharge values were calculated based upon high water marks (depth of flow = 5'-5.5') and the channel geometry of Cudia City Wash. The peak was attenuated as water ponded and spread to the west beneath the office complex located astride Cudia City Wash on the north bank of the Arizona Canal (5080 N. 40th Street). The peak flow into the Arizona Canal at this point was 1150 cfs.

Another wash enters the Arizona Canal just east of 32nd Street directly across from Spillway #3. Flow into the canal at this point is estimated, based on high water marks, to have been 350-400 cfs. Additional runoff entered the Arizona Canal east of 32nd Street at numerous locations, both overflowing the maintenance access road after ponding on the northside, and through storm drains. Total flow from these sources is estimated to have been at least 200 cfs.

As a result of the above listed inflows, the capacity of the Arizona Canal was exceeded. Flow through Spillway #2 is estimated to have been 100 cfs, and 350 cfs through spillway #3. The latter of these flows caused damage to a number of houses below the spillway. SRP releases through/over the gates at 32nd Street peaked at 790 cfs at the time that Spillway #3 was flowing at its maximum rate. Water was also flowing out through the spillway on the northside of the canal near 32nd Street, but it is not possible to estimate the magnitude of this flow. The maximum depth of the water in the forebay at 32nd Street was 3.19'.

Water which exited the canal through Spillway #2 (40th Street) flowed south through a parking lot to Camelback Road and then west. Water which exited the canal through Spillway #3 (32nd Street) flowed south causing extensive damages to a number of residences before crossing 32nd Street and entering the property of the Arizona Biltmore Country Club in the vicinity of Oregon Avenue and Colter Street. It then flowed through a series of small lakes on that property before entering Camelback Road where it combined with other flows moving to the west. The flow from Camelback Road then entered the property of the Biltmore Fashion Park where damage to businesses was experienced.

Another intense storm was centered over the 53rd Avenue and Peoria Avenue area. A NWS observer in that area reported 3.80" of rainfall, and there were numerous reports from NWS and FCD observers of rainfall totaling over 2.00". SRP observers reported in excess of 300 cfs flowing in Cave Creek Wash at

10:30 p.m. The anticipated flows from this storm in part shaped SRP's response in the upper reaches of the Arizona Canal.

In an effort to accept as much of the runoff resulting from the storm as possible, SRP began wasting water from the Arizona Canal at a number of locations including Evergreen Wasteway, Indian Bend Wash and the Old Cross Cut Canal. Table 1 presents a summary of SRP's releases upstream of 48th Street. SRP records indicate that they were releasing as much as was physically possible (i.e., their gates were out of the water) into the old Cross Cut Canal from 9:45 p.m. until midnight. Despite these efforts, the Arizona Canal overflowed at nearly every spillway location between 40th Street and 43rd Avenue. The canal has a design capacity of 700 cfs in this reach, with a top of bank capacity of 1200-1600 cfs. This latter number varies along the canal due to variations in channel geometry.

Table 1. Summary of flows wasted by Salt River Project out of the Arizona Canal above 48th Street.

<u>Time</u>	<u>Evergreen Wasteway</u>	<u>IBW</u>	<u>56th Street*</u>	<u>Old Cross-cut</u>
2045	0 cfs	0 cfs	465 cfs	200 cfs
2115			478 cfs	300 cfs
2130				350 cfs
2145	200 cfs			**
2200		300 cfs	450 cfs	
2225	400 cfs	400 cfs	260 cfs	
2230	600 cfs			
2235		600 cfs	233 cfs	
2245			95 cfs	
2300			55 cfs	
0015	800 cfs			530 cfs
0030	700 cfs	400 cfs		
0040	600 cfs	300 cfs		
0105		0 cfs		
0120	300 cfs			
0135	0 cfs			
0155				0 cfs

* Flow at 56th Street is in the Arizona Canal past that point.

** From 9:45 pm until approximately midnight the gates passing flow from the Arizona Canal into the Old Cross Cut Canal were out of the water. No estimate of discharge by that point is available for that period of time.

SCRIPT
PUBLIC MEETING OCTOBER 9, 1986

7:00 - 9:00
Camelback H.S.

Sue Mutschler - Welcome
Introduce myself

Give purpose of meeting (provide information and answer questions on flooding south of Arizona Canal around 32nd Street)

Explain what I do to facilitate meeting, video taping?

Discuss Agenda

What Happened

The Arizona Canal

The Arizona Canal Diversion Channel

Flood Insurance

Questions and Answers

Introduce VIP's

Show Video Tape

Ask people to hold questions until the end because they may be answered.

Introduce speakers

Stanley L. Smith, Jr., Deputy Chief Engineer of the Flood Control District
"What Happened on the Night of August 28"

Don Womack, Executive Engineer Water - Salt River Project (36 years)
"Salt River Project and the Arizona Canal"

Sid Friar, Manager of Water Operations - Salt River Project (41 years)
"The Arizona Canal near 32nd Street"

Stan Lutz, Project Manager, U. S. Army Corps of Engineers
"The Arizona Canal Diversion Channel"

Ron Nevitt, Floodplain Representative, Flood Control District
"Flood Insurance"

Sue Mutschler - Questions and Answers
(Answer questions only until 9:00 - but agency people will remain to answer additional questions individually.)
Thank people for coming.

General Instructions

1. All agency people will have name tags so can be recognized by the audience.
2. Please sit down in audience during program as standees are distracting.
3. Speakers, please sit in audience during other presentations. For question period, please move your chair to centerfront.
4. During question period, I will listen to question, paraphrase it so all audience will hear it, and select person to answer question. The responder will come up to get microphone from me, answer question, break eye contact with questioner, return microphone to me, then sit down.

People Expected to Attend and Responsibilities

Flood Control District

Stan Smith - Make presentation and answer questions
Ron Nevitt - Make presentation and answer questions
Sue Mutschler - Facilitator and floor manager
John Rodriguez - Stand by displays and answer questions
Joy Ketcham - Greeter, ask people to sign in, refreshments
Tim Sutko - Answer questions
Dave Brozovsky - Operate light switch, add chairs as needed

Salt River Project

Don Womack - Make presentation and answer questions
Sid Friar - Make presentation and answer questions
Joe Gacloch - Operate projector
Larry Crittenden

Corps of Engineers

Stan Lutz - Make presentation and answer questions

City of Phoenix

Dave Harmon - Answer questions
Paul Kienow - Answer questions

Civil Defense

Don Ballard (?) - Answer questions

Department of Water Resources

Les Bond - Answer questions

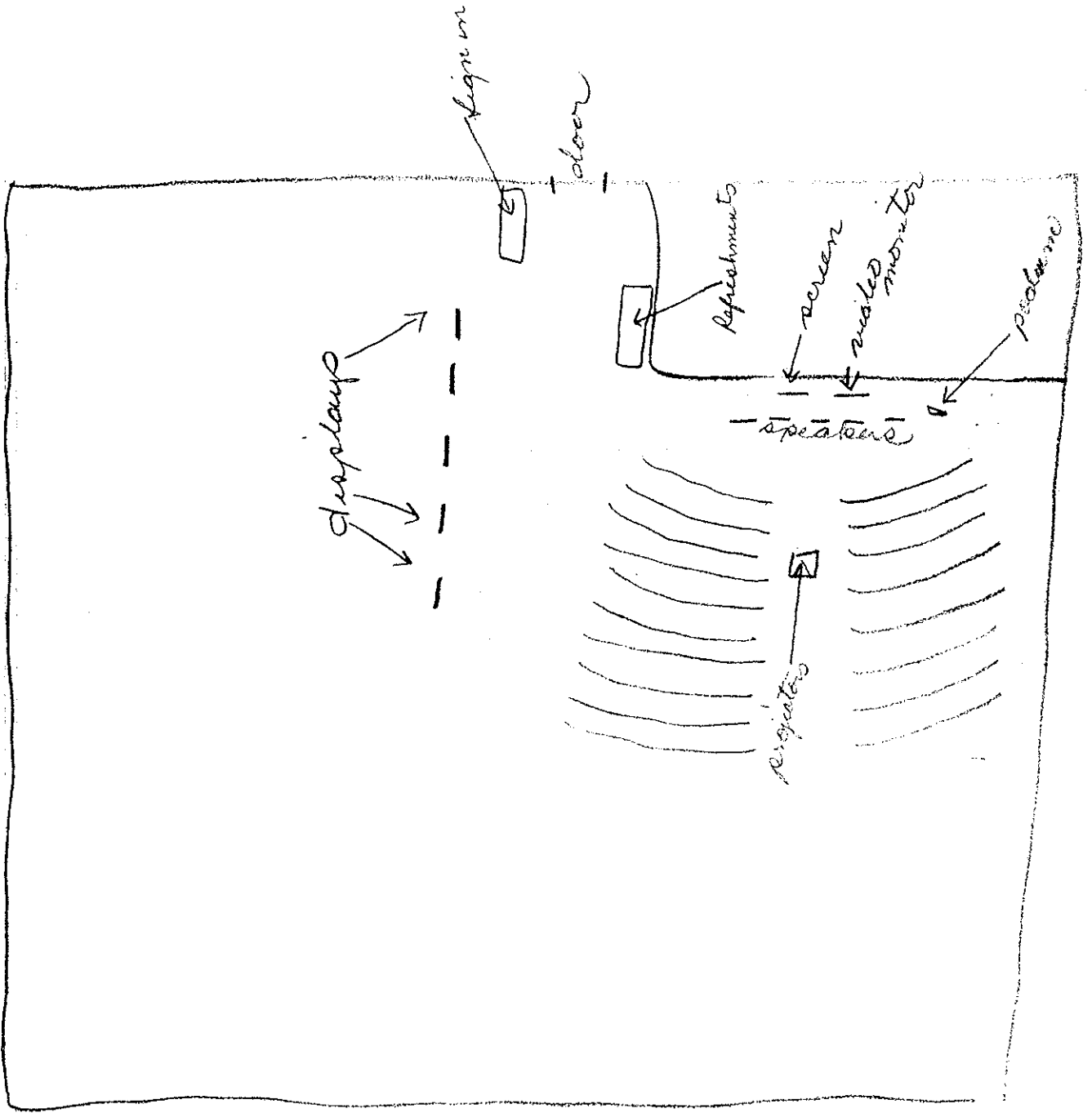
Equipment and Supplies

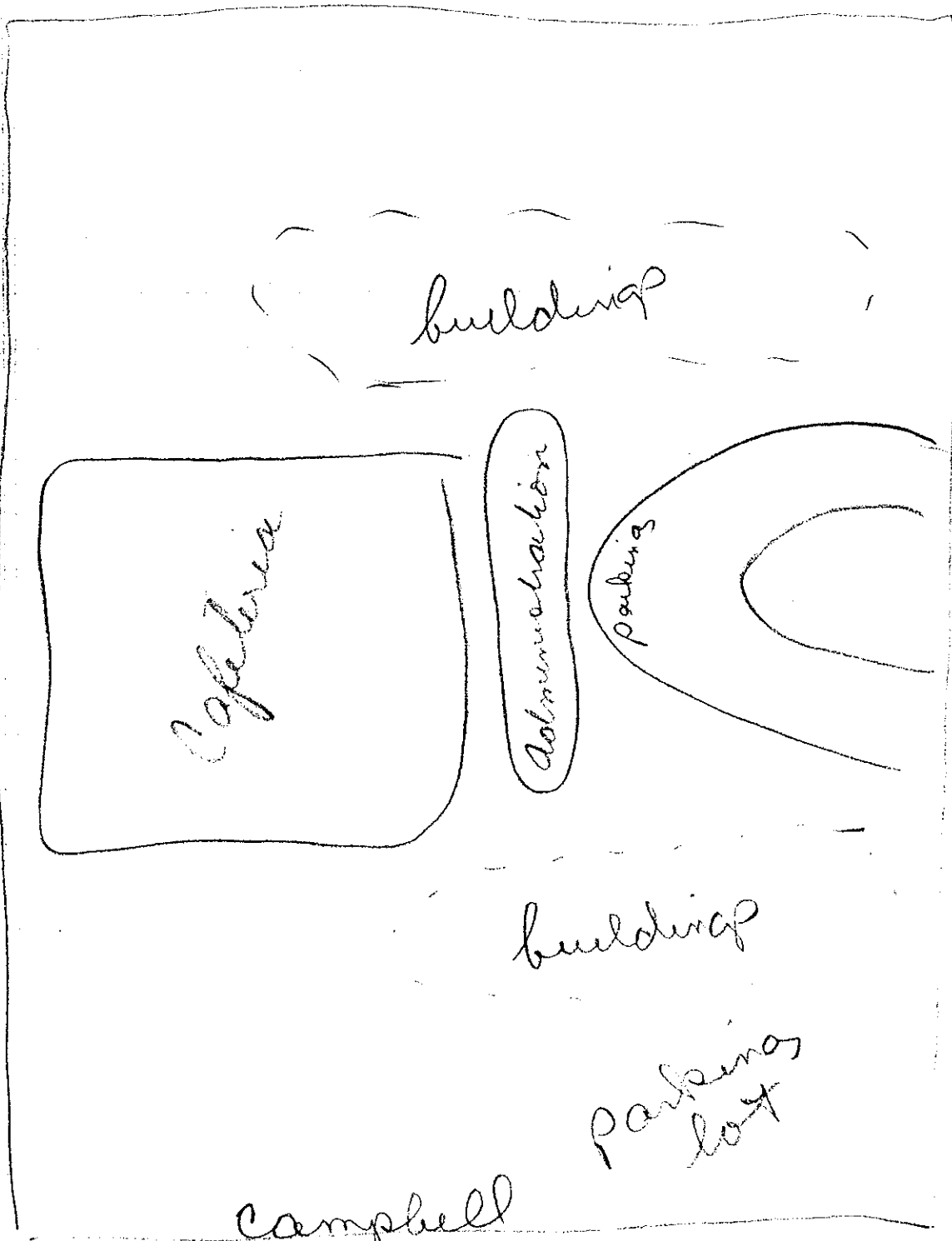
Video monitors/screen - SRP
Video tape - SRP
Slide projector - SRP? FCD?
Screen for slide projector - SRP ~~FCD?~~
Public address system - SRP
Podium - SRP? FCD?
Overhead projector - FCD
Refreshments - FCD
Easels for displays - FCD
Signs pointing to Flood Control meeting - FCD

Displays

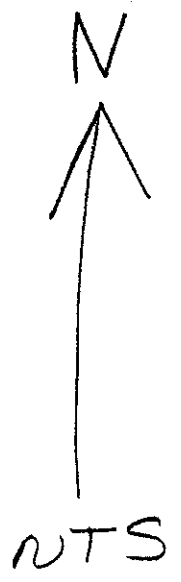
FCD Reach 4 aerials with ACDC delineated - FCD
New colored aerial of 32nd Street area - FCD (aerial is now at SRP)
Biltmore aerial - FCD
ACDC map - FCD (map is now at SRP)

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RTS





28th Street



Campbell