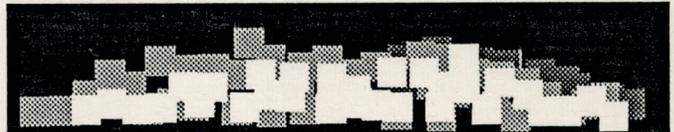
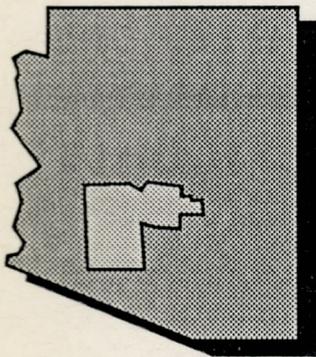


PROPOSED
TOWN of GILBERT
CROSS ROADS PARK
DETENTION BASIN
Maricopa County, Arizona



HYDROLOGY and FLOOD
PLAIN DELINEATION
In Support of a
CONDITIONAL LETTER OF MAP
REVISION



FLOOD CONTROL DISTRICT
of MARICOPA COUNTY
Contract Number FCD 87-24

March 1991
Revised January 1992

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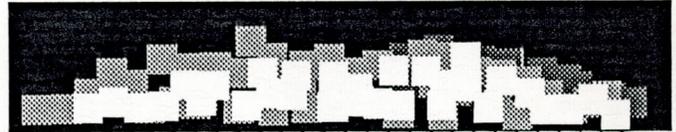


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ENGINEERING COMPANY

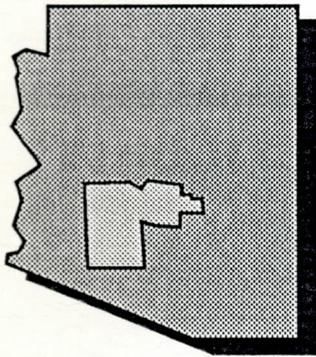


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PROPOSED
TOWN of GILBERT
CROSS ROADS PARK
DETENTION BASIN
Maricopa County, Arizona



HYDROLOGY and FLOOD
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PROPOSED

**TOWN OF GILBERT
CROSS ROADS PARK DETENTION BASIN
MARICOPA COUNTY, ARIZONA**

**HYDROLOGY
AND
FLOODPLAIN DELINEATION
IN SUPPORT OF A
CONDITIONAL LETTER OF MAP REVISION**

**MARCH 1991
REVISED JANUARY 1992**

**FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
CONTRACT NUMBER FCD 90-71**

**Prepared by
Franzoy Corey Engineering Company
7776 Pointe Parkway West, Suite 290
Phoenix, Arizona 85044
(602) 438-2200**

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CROSS ROADS PARK DETENTION BASIN STUDY

CROSS ROADS PARK

DETENTION BASIN CLOMR

1. INTRODUCTION

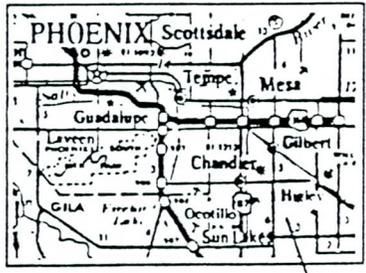
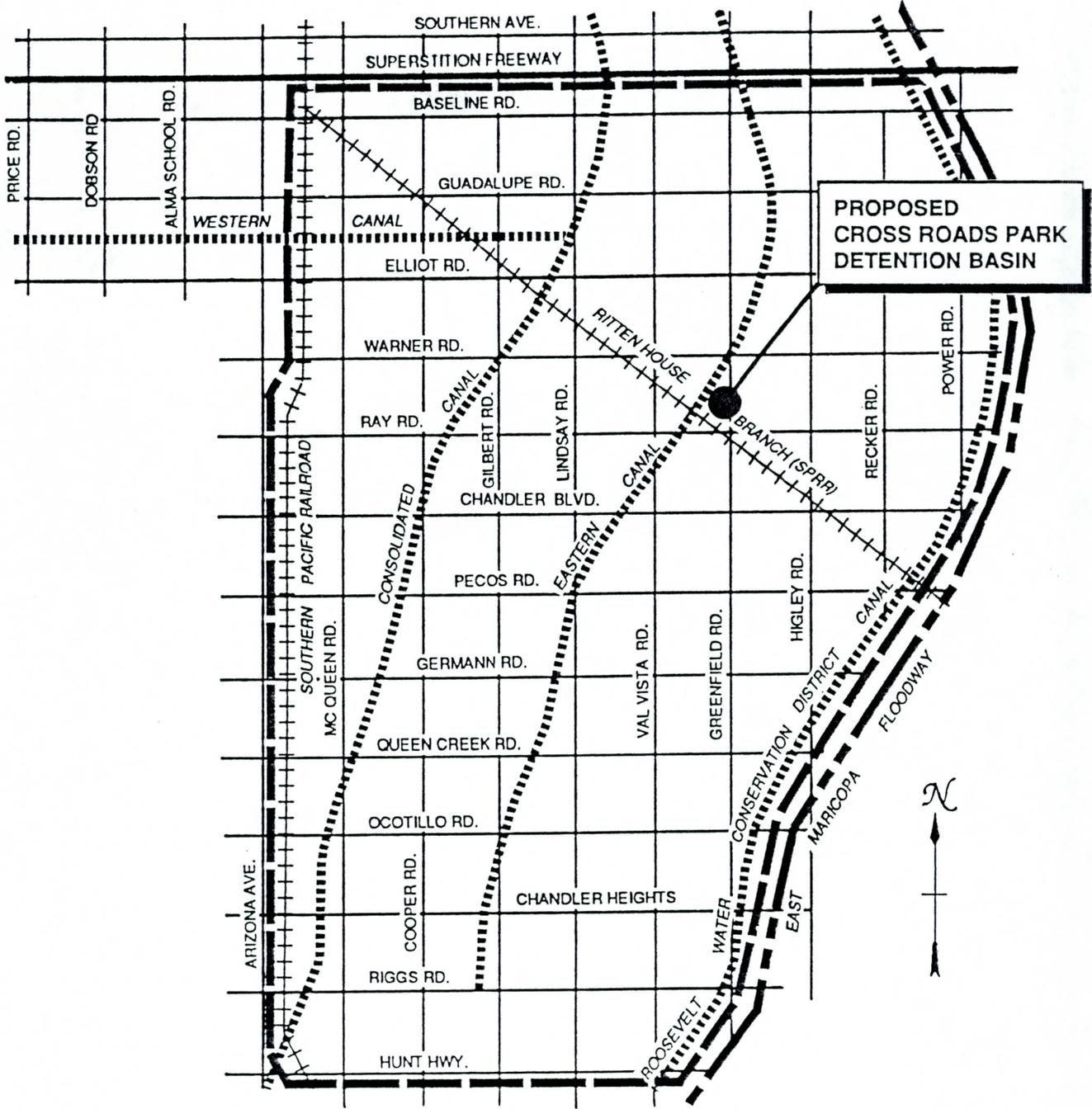
1.1 Purpose of Study

This study documents the effect of the proposed Town of Gilbert Cross Road Park Detention Basin upon the downstream floodplain. The proposed basin will be located at the intersection of the Eastern Canal and the Southern Pacific Railroad (SPRR) in section 21, T1S, R6E. The detention basin, located adjacent to and northeast of the canal and SPRR, is designed to retain 450 acre-feet of floodwater. Supporting documentation is to be submitted to the Federal Emergency Management Agency (FEMA) requesting a conditional letter of map revision (CLOMR) to revise existing flood insurance maps. The study data and revised mapping will be used by the Town of Gilbert for floodplain management of existing and future development. Actuarial rates, as part of the National Flood Insurance Program, will be updated.

1.2 Authority and Acknowledgement

This study, along with designs and construction of the detention basin, were undertaken through an interagency cooperative agreement (no. 90014), between the Town of Gilbert and the Flood Control District of Maricopa County. A CLOMR will be requested under the authority of Title 44, Chapter 1, Part 65 of the Code of Federal Regulations.

The base data used in completing this study were developed in completing the "Flood Insurance Study Gilbert-Chandler Area, Maricopa County, Arizona", September 1990. The Gilbert-Chandler Area Flood Insurance Study, completed by Franzoy Corey Engineering Company, is



STUDY LOCATION

--- BOUNDARY OF STUDY AREA

FIGURE 1
 STUDY AREA SOUTH OF THE
 SUPERSTITION FREEWAY
 GILBERT-CHANDLER FLOODPLAIN DELINEATION STUDY



CROSS ROADS PARK DETENTION BASIN STUDY

currently in review by FEMA, and when approved, will result in revision and reprinting of existing flood insurance rate maps for the area.

1.3 Coordination

Upon completion of initial studies by the Town of Gilbert, the potential effects of the proposed basin were identified. At the request of the Town of Gilbert, an agreement with the Flood Control District of Maricopa County was completed following technical review of the project merits and endorsement by the District Board and Town Council.

The Town of Gilbert will purchase the land for the basin, participate in funding the designs and construction, and own, operate, and maintain the basin. The Flood Control District will participate in funding the design and construction of the basin, conduct all technical reviews and approvals, and award and administer subcontracts for the design and construction.

2. AREA STUDIES

2.1 Scope of Study

The scope of this study includes incorporation of the proposed detention basin parameters into previously developed hydrologic and hydraulic models of the area to document the effects of the basin upon the downstream floodplain. The previous study is documented in the report "Flood Insurance Study, Gilbert-Chandler Area, Maricopa County, Arizona".

The area studied includes, and is consistent with, the previous study area. The area, shown on figure 1, is bounded on the north by the Superstition Freeway (SR360), on the east by the Maricopa Floodway, on the west by the SPRR paralleling Arizona Avenue, and on the south by the Hunt Highway (Maricopa County line).

2.2 Description of the Proposed Facility

The proposed basin will be located adjacent to and northeast of the intersection of the Rittenhouse branch of the SPRR and the Eastern Canal. The basin is incorporated into a multi-use regional park which includes flood protection and recreational facilities. The park is located in an area currently subject to shallow ponding. The basin will be sized to contain 450 acre-feet of water at or below the existing ground surface. The park and access roads will occupy approximately 49 acres and will have inlets for surface flow from the north along the Eastern Canal and from the east along the SPRR. The basin will be evacuated with discharge into the Roosevelt Water Conservation District's tailwater drainage system which parallels the east side of the Eastern Canal and flows toward the southwest. The basin will incorporate permanent pumps with a total pumping capacity of 5,000 gpm. Portable pumps will be utilized to evacuate flood water volumes which exceed the capabilities of the permanent pumps.

2.3 Principal Flood Problems

Discussion of the historic flood problems within the study area is contained in previous studies. The previous report "Flood Insurance Study, Gilbert-Chandler Area" documented anticipated flood conditions resulting from a 100-year recurring storm. Runoff from areas west of the East Maricopa Floodway and north of the Rittenhouse branch of the SPRR currently flows generally toward the southwest and collects against the embankments of the Eastern Canal and the SPRR. Floodwater concentrating along the Eastern Canal flows along the eastern embankment in a southwesterly direction. Floodwater concentrating along the SPRR flows along the north side of the embankment toward the northwest. At the intersection of the Eastern Canal and the SPRR, water ponds and overtops the Eastern Canal. The overtopping water flows toward the northwest along the north side of the SPRR until intercepted by the Consolidated Canal

CROSS ROADS PARK DETENTION BASIN STUDY

embankment. At the intersection of the SPRR and the Consolidated Canal, water ponds against the two embankments until the canal is overtopped. The overtopping water then continues northwesterly along the SPRR through the business district of the Town of Gilbert.

2.4 Flood Protection Provided

Based upon the 100-year flows predicted by the hydrologic model, construction of the Cross Road Park detention basin will reduce the volume of floodwater overtopping the Eastern Canal at the SPRR and eliminate floodwater overtopping the Consolidated Canal at the SPRR. The proposed detention basin will have the most significant effect on the downstream floodplain along the SPRR between the Consolidated Canal and the Western Canal. Within this area, significant flooding is eliminated with remaining flows carried in the streets and existing swales to the existing detention basin located at the Western Canal and the SPRR where water ponds against the two embankments.

3. ENGINEERING METHODS

Engineering methods used to complete this study are consistent with methods used in the previous study and as documented in the "Flood Insurance Study, Gilbert-Chandler Area, Maricopa County, Arizona", September 1990. HEC-1 and HEC-2 computer models were developed for the Gilbert-Chandler Area Flood Insurance Study. These models were used to complete this study with appropriate revisions.

3.1 Hydrologic Analysis

The existing HEC-1 model was revised to incorporate the proposed detention basin. A detailed account of study methods and parameters is contained in the previous report and is not duplicated herein. The HEC-1 diversion cards were inserted in the subarea 12 data file at

CROSS ROADS PARK DETENTION BASIN STUDY

concentration point number 5. The inflows were diverted up to 450 acre-feet. Execution of the remaining model components documented the downstream hydrologic effect. No other modifications to the model were necessary.

3.2 Hydraulic Analysis

The majority of the floodplain within the study area results from shallow ponding along the canals or railroads. The maximum stage of the ponded water at these sites was computed utilizing the level-pool reservoir routing routines in the COE HEC-1 computer program. At locations where water flows along the canal or railroad between the ponding sites, the COE HEC-2 computer program was utilized. Tables 1 through 4 from the report "Flood Insurance Study, Gilbert-Chandler Area" were revised to reflect the changes resulting from the Cross Roads Park Detention Basin. Footnotes on the tables (see following pages) indicate the locations where changes were made.

4. FLOODPLAIN MANAGEMENT APPLICATIONS

Revisions to the floodplain mapping resulting from the proposed detention basin were made using the same methods and base data developed under the previous study. The delineations are based on photogrammetrically generated topographic mapping at a scale of 1.0 inches equals 400 ft with 2.0-foot contours, photogrammetrically digitized hydraulic cross sections, and field surveys at selected locations. At selected locations where the floodplain boundary passes through high density residential areas, the base topographic data was supplemented with subdivision grading and drainage drawings or as-built street drawings.

Floodplain mapping and hydraulic profiles developed under the previous flood insurance study were revised where changes occurred resulting from the proposed detention basin. These revised drawings are included herein as appendix A and are bound separately.

TABLE 1 (Page 1 of 2)
 Summary of Water Surface Elevations
 Eastern Canal
 Town of Gilbert
 Cross Roads Park Detention Basin
 March 1991 (Revised January 1992)

Location	Approximate Station Location	Cross Section	Water Surface Elevation
Riggs Road North approximately three-quarter mile	0 - 58+50	5106 - 5098 (ponded)	1250.4
Chandler Heights Road north approximately one-quarter mile	59+10 - 70+70	5097.1 - 5097 (ponded)	1253.6
North of Chandler Heights Road approximately one-quarter mile	76+70	5096	1253.7 ¹
North of Chandler Heights Road approximately three-eighths mile	81+70	5095	1253.9 ¹
North of Chandler Heights Road approximately one-half mile	86+00	5094	1254.7 ¹
North of Chandler Heights Road approximately five-eighths mile	97+50	5093	1257.4 ¹
North of Chandler Heights Road approximately three-quarters mile	107+50	5092	1258.4 ¹
Downstream side of Ocotillo Road	118+00 BK = 125+60 AHD	5091	1258.7 ¹
Ocotillo Road north approximately three-quarters mile	126+10 - 173+50	5090 - 5092 (ponded)	1257.5
South side of Queen Creek Road	184+20	5081	1260.1 ¹
Centerline of Queen Creek Road	184+80	5080	1260.1 ¹
Approximately one-eighth mile north of Queen Creek Road	194+00	5078	1260.4 ¹
Approximately one-quarter mile north of Queen Creek Road	199+00	5076	1261.2 ¹
Approximately three-eighths mile north of Queen Creek Road	206+50	5075	1260.4 ¹
Approximately one-half mile north of Queen Creek Road	212+10	5074	1261.2 ¹
Approximately one-half mile north of Queen Creek Road	212+60 BK = 217+70 AHD	5073	1261.2 ¹
Ryan Road north approximately one-half mile	218+40 - 245+50	5072 - 5070 (ponded)	1259.8 ¹

TABLE 1 (Page 2 of 2)
 Summary of Water Surface Elevations
 Eastern Canal
 Town of Gilbert
 Cross Roads Park Detention Basin
 March 1991 (Revised January 1992)

Location	Approximate Station Location	Cross Section	Water Surface Elevation
Germann Road north approximately one-half mile	253 + 10 = 279 + 20	5068 - 5065.2 (ponded)	1262.5
One-quarter mile south of Pecos Road to one-half mile north of Pecos Road	293 + 80 - 369 + 00	5064 - 5055 (ponded)	1264.9
Chandler Blvd north to Val Vista Road	389 + 60 - 403 + 50	5054 - 5051 (ponded)	1265.8
Val Vista Road north to Ray Road	404 + 00 - 433 + 50	5049 - 5042 (ponded)	1266.5*
Ray Road north to the SPRR	433 + 80 - 467 + 40	5041 - 5038 (ponded)	1267.7
SPRR north to Warner Road	477 + 70 - 509 + 20	5037 - 5033 (ponded)	1271.1*
Warner Road north approximately one-half mile	509 + 40 - 538 + 25	5032 - 5027 (ponded)	1273.2
Approximately one-quarter mile south of Elliot Road	552 + 45 BK = 556 + 30 AHD	5026	1277.3
South side of Elliot Road	571 + 30	5025	1277.1 ¹
Elliot Road north to Guadalupe Road	571 + 90 - 599 + 10	5024 - 5020 (ponded)	1277.1*
Elliot Road north to Guadalupe Road	599 + 60 - 652 + 90	5020 - 5017 (ponded)	1277.7*
Guadalupe Road north to Houston Road	625 + 60 - 652 + 90	5016 - 5012 (ponded)	1279.4
Houston Road north to Baseline Road	653 + 30 - 679 + 20	5011 - 5007.1 (ponded)	1280.8
Baseline Road north to Superstition Freeway	679 + 60 - 700 + 00	5007 - 5001 (ponded)	1282.4

¹Flowing water overtops the canal bank. The elevation of the canal maintenance road plus 6 inches is used.

*Revised per Cross Roads Park Detention Basin.

TABLE 2 (Page 1 of 2)
 Summary of Water Surface Elevations
 Consolidated Canal
 Town of Gilbert
 Cross Roads Park Detention Basin
 March 1991 (Revised January 1992)

Location	Approximate Station Location	Cross Section	Water Surface Elevation
Chandler Heights Road south approximately one-half mile to railroad spur	64+00 - 95+25	4091 - 4086 (ponded)	1220.5
North side of Chandler Heights Road	95+70 - 100+00	4085 - 4084 (ponded)	1223.2
Approximately one-quarter mile north of Chandler Heights Road to north approximately one-half mile	105+40 - 131+70	4083 - 4081 (ponded)	1222.4
Ocotillo Road north to Queen Creek Road	165+40 - 211+00	4076.1 - 4072 (ponded)	1227.9
Queen Creek Road north to Germann Road	211+20 - 268+90	4071 - 4062 (ponded)	1229.4
Germann Road north to Pecos Road	275+00 - 328+90	4060 - 4053.1	1230.6*
Pecos Road north to Cooper Road	328+90 - 377+00	4053.1 - 4050 (ponded)	1233.3
Cooper Road north to three-quarter mile north of Chandler Blvd	377+20 - 425+50	4049 - 4038 (ponded)	1236.0
Three-quarter mile north of Chandler Blvd to north approximately one-eighth mile	426+70 - 439+50	4038 - 4037 (ponded)	1236.8
Pecos Road north to Knox Road	442+50 - 473+70	4035 - 4030 (ponded)	1238.5
Knox Road north to Warner Road	478+00 - 510+80	4029 - 4022 (ponded)	1238.8
Warner Road north approximately one-half mile	410+80 - 561+30	4021 - 4018 (ponded)	1240.1
Southern Pacific Railroad north to Lindsay Road	561+60 - 605+50	SPRR - 4012 (ponded)	1243.1*
Freestone Park Detention Basin	605+50 - 618+50	4012 - 4011 (ponded)	1242.5*
Guadalupe Road south approximately one-quarter mile to Guadalupe Road north approximately one-half mile	618+50 - 632+40	4011 - 4006 (ponded)	1245.6

TABLE 2 (Page 2 of 2)
Summary of Water Surface Elevations
Consolidated Canal
Town of Gilbert
Cross Roads Park Detention Basin
March 1991 (Revised January 1992)

Location	Approximate Station Location	Cross Section	Water Surface Elevation
Approximately one-half mile north of Guadalupe north to Baseline Road	661+30 - 686+60	4006 - 4005 (ponded)	1246.9
Baseline Road north to the Superstition Freeway (SR 360)	687+50 - 711+10	4004 - 4001 (ponded)	1248.7

*Revised per Cross Roads Park Detention Basin.

TABLE 3
Summary of Water Surface Elevations
Southern Pacific Railroad at Arizona Avenue
Town of Gilbert
Cross Roads Park Detention Basin
March 1991 (Revised January 1992)

Location	Approximate Station Location	Cross Section	Water Surface Elevation
Hunt Highway north to Consolidated Canal	0 - 26+50	2092 - 2090 (ponded)	1219.1
Consolidated Canal north to railroad spur line	32+80 - 94+20	2088 - 2080 (ponded)	1216.3
SPRR spur line to Chandler Heights Road	99+10 - 108+40	2079 - 2078 (ponded)	1219.0
Chandler Heights Road north to Ocotillo Road	108+90 - 150+50	2077 - 2074 (ponded)	1217.2
Ocotillo Road north to Appleby Road	159+10 - 185+60	2072 - 2070 (ponded)	1220.9
Appleby Road north to Queen Creek Road	188+30 - 212+20	2070 - 2067 (ponded)	1219.1
Queen Creek Road north to Willis Road	212+20 - 287+80	2067 - 2055 (ponded)	1218.3
Willis Road north to Pecos Road	291+50 - 319+30	2053 - 2049 (ponded)	1219.7
Pecos Road north to Ray Road	319+30 - 425+10	2049 - 2031 (ponded)	1216.5
Ray Road north to Warner Road	425+10 - 475+50	2031 - 2025 (ponded)	1214.7
Warner Road north to Elliot Road	492+70 - 533+60	2021 - 2019 (ponded)	1214.2
Elliot Road north to Western Canal	535+30 - 560+80	2017 - 2014 (ponded)	1212.7*
Western Canal north to Baseline Road	560+80 - 641+00	2014 - 2004 (ponded)	1211.9*

*Revised per Cross Roads Park Detention Basin

TABLE 4
 Summary of Water Surface Elevations
 Southern Pacific Railroad at Rittenhouse Road
 Town of Gilbert
 Cross Roads Park Detention Basin
 March 1991 (Revised January 1992)

Location	Approximate Station Location	Cross Section	Water Surface Elevation
Intersection with Chandler Boulevard	56+50 - 72+80	1007 - 1010 (ponded)	1301.3
Intersection with Eastern Canal	175+00 - 195+00	1022 - 1028 (ponded)	1271.1*
Intersection with Consolidated Canal	295+30 - 315+00 BK = 316+60 AHD	1042 - 1044 (ponded)	1243.1*
Gilbert Road to Western Canal	360+30 - 379+30	1046 - 1047 (ponded)	1230.5*
Western Canal to Guadalupe Road	380+20	1049	1229.8*
Western Canal to Guadalupe Road	380+20	1049.1	1225.6*
Western Canal to Guadalupe Road	388.50	1050	1223.3*
Western Canal to Guadalupe Road	398+50	1051	1221.5*
Western Canal to Guadalupe Road	409+70	1052	1221.3*
Western Canal to Guadalupe Road	421+20	1058.1	1220.0*
Guadalupe Road to McQueen Road	427+95	1058.2	1219.4*
Guadalupe Road to McQueen Road	436+70	1058.3	1217.6
Guadalupe Road to McQueen Road	446+70	1059	1214.5*
Guadalupe Road to McQueen Road	466+90	1060	1213.1
Intersection with Superstition Freeway (SR 360)	446+90 - 537+70	1060 - SR 360	1213.1

*Revised per Cross Roads Park Detention Basin

TABLE 5 (Page 1 of 2)
 Summary of Discharges
 Eastern Canal and SPRR
 Town of Gilbert
 Cross Roads Park Detention Basin
 March 1991 (Revised January 1992)

Location	Flooding Source	Cross Sections	Drainage Area ¹ (sq miles)	Peak Discharge (cfs)
<i>EASTERN CANAL</i>				
Gilbert Road south to ponded water above Chandler Heights Road	Subarea 30 - subbasins A, B, C, D, E1, E2, F, G, H, I, J	5097 - 5093	3.88	993
Ocotillo Road south to Gilbert Road	Subarea 30 - subbasins A, D, E1, E2, G, H	5092 - 5091	2.2	548
Queen Creek Road south to ponded water above Ocotillo Road	Subarea 29 - subbasin D and flows overtopping Ryan Road	5082 - 5081	0.22	673
Ryan Road south to Queen Creek Road	Subarea 29 - V-flows overtopping Ryan Road	5080 - 5074	0.0	720
Elliot Road south to ponded water above Warner Road	Subarea 9 - V-flows overtopping Elliot Road	5027 - 5025	0.0	469
<i>SPRR - RITTENHOUSE</i>				
Consolidated Canal to north Burk Street	Flows overtopping the Consolidated Canal	1044.3 - 1044.1	0.0	N/A*
Burk Street to Gilbert Road at SPRR	Flows overtopping the Consolidated Canal and subarea 7 - subbasins A and B	1044.4 - 1044.7	0.05	N/A*
Gilbert Road at SPRR to Western Canal at SPRR	Flows overtopping the Consolidated Canal and subarea 7 - subbasins A and B	1048 - 1045	0.05	N/A*
Western Canal at SPRR to Neely Street at SPRR	Flows from Subarea 6 - Subbasins A0, A, A1, B, B1, C, D, E, and F	1050 - 1049	0.59	373*

TABLE 5 (Page 2 of 2)
 Summary of Discharges
 Eastern Canal and SPRR
 Town of Gilbert
 Cross Roads Park Detention Basin
 March 1991 (Revised January 1992)

Location	Flooding Source	Cross Sections	Drainage Area ¹ (sq miles)	Peak Discharge (cfs)
Neely Street at SPRR to Cooper/Guadalupe Road at SPRR	Flows from Subarea 6 - subbasins A0, A, A1, B, B1, C, D, E, F, G and H	1058.1 - 1051	0.73	373*
Cooper/Guadalupe Road at SPRR to Nevada Way at SPRR	Flows from Subarea 6 - subbasins A0, A, A1, B, B1, C, D, E, F, G, and I	1059 - 1058.2	0.83	203*
Nevada Way at SPRR to McQueen Road at SPRR	Flows from Subarea 6 - subbasins A0, A, A1, B, B1, C, D, E, F, G, I, J, and K	1060	1.01	160*

¹Drainage area for flows from upstream subareas or subbasins is not included.

*Revised per Cross Roads Park Detention.