FLOOD STUDY
TECHNICAL DATA NOTEBOOK

for

WHITE TANKS/AGUA FRIA
AREA DRAINAGE MASTER STUDY

APPENDIX L
VOLUME 15 OF 15

STUDY ABSTRACTS

Prepared for:
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

Prepared by:
THE WLB GROUP, INC.
333 East Osborn Road, Suite 380
Phoenix, Arizona 85012
(602) 279-1016

May 28, 1992

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY |X| RESTUDY | | LOMR | | OTHER | |
SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	Maricopa County, Unincorporated Areas
1B	COMMUNITY NUMBER	040037
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	
1F	STUDY CONTRACTOR CONTACT (S) ADDRESS PHONE	The WLB Group, Inc. Jeff Erickson or Mark Gavan 333 East Osborn Road, Suite 380 Phoenix, Arizona 85012 (602) 279-1016
1G	TECH. REVIEWER (FEMA) PHONE	Michael Baker Jr., Inc. Contact: Michelle Monde (703) 960-8800
1H	FEMA REGIONAL REVIEWER PHONE	N/A
1I	STATE REVIEWER PHONE	N/A
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Contact: Greg Rodzenko (602) 506-1501
1K	RIVER OR STREAM NAME	Beardsley Canal Wash (Wash 1)
1L	REACH DESCRIPTION	FIRM Panel Numbers 1575 and 1600 - Wash begins in the detention basin of White Tanks Structure #3 and continues north upstream along the west side of Beardsley Canal and terminates just south of McMicken Dam. Mouth - Latitude: 33° 32' 09" Longitude: 112° 28' 10" Head - Latitude: 33° 34' 46" Longitude: 112° 28' 10"
1M	STUDY TYPE	Detailed Analysis - Riverine
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	Waddell 7.5 min.
2B	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89

STUDY DOCUMENTATION ABSTRACT - Beardsley Canal Wash (Wash 1)		
SECTION 3: HYDROLOGY		
3A	MODEL OR METHOD USED (including vendor and version description)	HEC-1 Flood Hydrograph Package, Version 4.0 from McTrans Center
3B	STORM DURATION	24-Hour
3C	HYETOGRAPH TYPE	SCS Type II
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	Gage data is not compiled sufficiently in this area for calibration of model. Q's were compared to a number of previous studies to make sure the computed discharges were reasonable.
3F	RAINFALL AMOUNTS AND REFERENCE	4.03 in. - NOAA Atlas 2, Volume VIII
3G	UNIQUE CONDITIONS AND PROBLEMS	X1 = 0.000 to X1 = 0.390 Discharge equals Q at CP12 plus approximately 70% Q from subwatershed WT3. Q = 4125 + (.7)413 = 4414 CFS. X1 = 0.465 to X1 = 0.770 Discharge equals Q at CP12. Q = 4125 CFS. (Continued)
3H	COORDINATION OF Q'S (agency, date, comments)	Flood Control District of Maricopa County - July 9, 1991 Hydrology accepted - ongoing review and comments were incorporated throughout the study.
SECTION 4: HYDRAULICS		
4A	MODEL OR METHOD USED (including vendor and version description)	HEC-2 Water Surface Profiles, Version 4.6.0, February 1991, from McTrans Center
4B	REGIME	Subcritical
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	Initially methods 10.4 or 10.6 were used then floodways were smoothed using method 9.1. Floodways were calculated to provide a natural conveyance corridor and may not reach the 1.0 ft. rise in WSEL designated for floodway encroachment. This was incorporated per instructions from the Flood Control District of Maricopa County.
4E	UNIQUE CONDITIONS AND PROBLEMS	Begin backwater analysis at normal depth. Tie floodplain and floodway into 100-year ponding WSEL behind White Tanks Structure #3. Northern Avenue - X1 = 1.148 Cross section extended - Approximately 1480 cfs breaks out east over Beardsley Canal for the next three upstream cross sections. Two undersized culverts are located at Northern Avenue and causes ponding to occur in the right overbank upstream of the Northern Avenue culverts. Floodplain and floodplain will be coincident for X1 = 1.159 to X1 = 1.313 due to requirement of maintaining existing flow conditions. (Continued)

STUDY DOCUMENTATION ABSTRACT - Beardsley Canal Wash (Wash 1)

ADDITIONAL STUDY INFORMATION

ITEM	DESCRIPTION / DISCUSSION
3G UNIQUE CONDITIONS AND PROBLEMS (Continued)	X1 = 0.846 to X1 = 0.998 Discharge equals (Q at CP12 plus Q at CP10) divided by two. Q = (4125 + 3655) ÷ 2 = 3890 CFS X1 = 1.074 to X1 = 1.148 Discharge equals Q at CP10 (downstream of diversion at Northern Avenue). Q = 3655 CFS X1 = 1.159 Discharge equals Q at CP10 minus a portion of the breakout flow to the east. Q = 5141 - 991 = 4150 CFS X1 = 1.237 Discharge equals Q at CP10 minus a portion of the breakout flow to the east. Q = 5141 - 495 = 4645 CFS X1 = 1.313 to X1 = 1.466 Discharge equals Q at CP10 (upstream of diversion at Northern Avenue). Q = 5141 CFS X1 = 1.556 Q = 3816 CFS X1 = 1.556 to X1 = 1.996 Discharge equals Q at subwatershed 10 divided by 4 plus the Q at CP3 just downstream of the diversion at Olive Avenue. Q = 1173 ÷ 4 + 1755 = 2048 CFS X1 = 2.072 to X1 = 2.159 Discharge equals Q at CP3 (downstream of diversion at Olive Avenue). Q = 1755 CFS X1 = 2.107 to X1 = 2.267 Discharge equals Q at CP3 (upstream of diversion at Olive Avenue). Q = 2245 CFS X1 = 2.330 to X1 = 2.640 Discharge equals Q at intermediate concentration point I1CP3. Q = 997 CFS X1 = 2.741 to X1 = 3.081 Discharge equals Q at subwatershed 3A plus Q at subwatershed 3 divided by 2. Q = 296 + 828 ÷ 2 = 710 CFS X1 = 3.167 to X1 = 3.540 Discharge equals Q at subwatershed 3A. Q = 296 CFS X1 = 3.610 to X1 = 3.678 Discharge equals Q at subwatershed 3A divided by 2. Q = 296 ÷ 2 = 148 CFS See following report, Section 3: Hydrologic Analysis, for a description of conditions and unique problems encountered throughout the watershed.

STUDY DOCUMENTATION ABSTRACT - Beardsley Canal Wash (Wash 1)	
ADDITIONAL STUDY INFORMATION	
ITEM	DESCRIPTION / DISCUSSION
4E UNIQUE CONDITIONS AND PROBLEMS (Continued)	In other words, the diversion flow must not be increased due to encroachment and the subsequent rise in WSEL behind the culverts unless steps are taken to increase the capacity of the culverts and/or raise the left bank protecting Beardsley Canal. X1 = 1.616 Cross section extended due to overtopping of Beardsley Canal Dike. Capacity in this reach is exceeded. Olive Avenue - X1 = 2.159 The next three upstream cross sections are extended - Approximately 490 cfs breaks out east over Beardsley Canal. Floodplain limits downstream of Olive Avenue are based upon upstream flow coming over the top of Olive Avenue. Ponding occurs in the right overbank upstream of the Olive Avenue culverts. Floodplain and floodway will be coincident for the next three upstream cross sections due to the requirements of maintaining the existing flow conditions. In other words, the diversion flow must not be increased due to encroachment and the subsequent rise in WSEL behind the culverts unless steps are taken to increase the capacity of the culverts and/or raise the left bank protecting Beardsley Canal.

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: Maricopa County, Unincorporated Area — Page 1 of 2

COUNTY: Maricopa | STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: Beardsley Canal Wash (Wash 1) | RUN DATE: 10/30/91 10:08:31

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		0.000		
		0.070		
		0.156		
		0.231		
		0.307		
		0.390		
		0.465		
		0.543		
		0.620		
		0.696		
		0.770		
		0.846		
		0.920		
		0.998		
		1.074		
		1.148		
		1.159		
		1.237		
		1.313		
		1.388		
		1.466		
		1.556		
		1.616		
		1.692		
		1.768		
		1.844		
		1.920		
		1.996		
		2.072		
		2.159		

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: Maricopa County, Unincorporated Area

COUNTY: Maricopa | STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: Beardsley Canal Wash (Wash 1) | RUN DATE: 10/30/91 10:08:31

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		2.167		
		2.186		
		2.267		
		2.330		
		2.392		
		2.468		
		2.553		
		2.640		
		2.741		
		2.826		
		2.907		
		3.009		
		3.081		
		3.167		
		3.214		
		3.301		
		3.383		
		3.460		
		3.540		
		3.610		
		3.678		

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY |X| RESTUDY | | LOMR | | OTHER | |
SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	Maricopa County, Unincorporated Areas
1B	COMMUNITY NUMBER	040037
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	
1F	STUDY CONTRACTOR CONTACT (S) ADDRESS PHONE	The WLB Group, Inc. Jeff Erickson or Mark Gavan 333 East Osborn Road, Suite 380 Phoenix, Arizona 85012 (602) 279-1016
1G	TECH. REVIEWER (FEMA) PHONE	Michael Baker Jr., Inc. Contact: Michelle Monde (703) 960-8800
1H	FEMA REGIONAL REVIEWER PHONE	N/A
1I	STATE REVIEWER PHONE	N/A
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Contact: Greg Rodzenko (602) 506-1501
1K	RIVER OR STREAM NAME	Cholla Wash (Wash 1A)
1L	REACH DESCRIPTION	FIRM Panel Numbers 1575 and 1600 - Wash begins at the confluence with Beardsley Canal Wash, 1/2 mile north of Northern Avenue, and continues upstream north and northwest into the White Tank Mountains. Mouth - Latitude: 33° 33' 29" Longitude: 112° 28' 11" Head - Latitude: 33° 32' 44" Longitude: 112° 33' 23"
1M	STUDY TYPE	Detailed Analysis - Riverine
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	White Tank Mts. SE, Waddell 7.5 min.
2B	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89

STUDY DOCUMENTATION ABSTRACT - Cholla Wash (Wash 1A)		
SECTION 3: HYDROLOGY		
3A	MODEL OR METHOD USED (including vendor and version description)	HEC-1 Flood Hydrograph Package, Version 4.0 from McTrans Center
3B	STORM DURATION	24-Hour
3C	HYETOGRAPH TYPE	SCS Type II
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	Gage data is not compiled sufficiently in this area for calibration of model. Q's were compared to a number of previous studies to make sure the computed discharges were reasonable.
3F	RAINFALL AMOUNTS AND REFERENCE	4.03 in. - NOAA Atlas 2, Volume VIII
3G	UNIQUE CONDITIONS AND PROBLEMS	X1 = 0.000 to X1 = 1.233 Discharge equals Q at intermediate concentration point I1CP10. Q = 3816 CFS X1 = 1.328 to X1 = 2.078 Discharge equals (Q at I1CP10 + Q at CP9) divided by 2. Q = (3816 + 3227) ÷ 2 = 3522 CFS X1 = 2.155 to X1 = 3.587 Discharge equals Q at CP9. Q = 3227 CFS X1 = 3.678 to X1 = 4.242 Discharge equals Q at intermediate concentration point I1CP9. Q = 2527 CFS See following report, Section 3: Hydrologic Analysis, for a description of conditions and unique problems encountered throughout the watershed.
3H	COORDINATION OF Q'S (agency, date, comments)	Flood Control District of Maricopa County - July 9, 1991 Hydrology accepted - ongoing review and comments were incorporated throughout the study.
SECTION 4: HYDRAULICS		
4A	MODEL OR METHOD USED (including vendor and version description)	HEC-2 Water Surface Profiles, Version 4.6.0, February 1991, from McTrans Center
4B	REGIME	Subcritical
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	Initially methods 10.4 or 10.6 were used then floodways were smoothed using method 9.1. Floodways were calculated to provide a natural conveyance corridor and may not reach the 1.0 ft. rise in WSEL designated for floodway encroachment. This was incorporated per instructions from the Flood Control District of Maricopa County.
4E	UNIQUE CONDITIONS AND PROBLEMS	Beginning WSEL = 1249.07 from Beardsley Canal Wash - X1 = 1.556. This is the confluence with Beardsley Canal Wash. No unique conditions or problems exist in this reach.

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: Maricopa County, Unincorporated Area

COUNTY: Maricopa | STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: Cholla Wash (Wash 1A) | RUN DATE: 10/30/91 14:51:44

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		0.000		
		0.095		
		0.188		
		0.278		
		0.373		
		0.466		
		0.560		
		0.680		
		0.765		
		0.848		
		0.951		
		1.044		
		1.138		
		1.233		
		1.328		
		1.419		
		1.509		
		1.604		
		1.697		
		1.790		
		1.886		
		1.977		
		2.078		
		2.155		
		2.250		
		2.345		
		2.426		
		2.500		
		2.560		
		2.629		

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: Maricopa County, Unincorporated Area

COUNTY: Maricopa | STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: Cholla Wash (Wash 1A) | RUN DATE: 10/30/91 14:51:44

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		2.727		
		2.826		
		2.920		
		3.019		
		3.116		
		3.214		
		3.312		
		3.407		
		3.508		
		3.587		
		3.678		
		3.773		
		3.864		
		3.956		
		4.049		
		4.100		
		4.150		
		4.242		

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY |X| RESTUDY | | LOMR | | OTHER | |
SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	Maricopa County, Unincorporated Areas
1B	COMMUNITY NUMBER	040037
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	
1F	STUDY CONTRACTOR CONTACT (S) ADDRESS PHONE	The WLB Group, Inc. Jeff Erickson or Mark Gavan 333 East Osborn Road, Suite 380 Phoenix, Arizona 85012 (602) 279-1016
1G	TECH. REVIEWER (FEMA) PHONE	Michael Baker Jr., Inc. Contact: Michelle Monde (703) 960-8800
1H	FEMA REGIONAL REVIEWER PHONE	N/A
1I	STATE REVIEWER PHONE	N/A
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Contact: Greg Rodzenko (602) 506-1501
1K	RIVER OR STREAM NAME	North Fork Cholla Wash (Wash 1A1)
1L	REACH DESCRIPTION	FIRM Panel Number 1575 - Wash begins at confluence with Cholla Wash and continues upstream west and northwest into the White Tank Mountains. Mouth - Latitude: 33° 34' 16" Longitude: 112° 31' 13" Head - Latitude: 33° 33' 55" Longitude: 112° 33' 13"
1M	STUDY TYPE	Detailed Analysis - Riverine
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	White Tank Mts. SE 7.5 min.
2B	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89

STUDY DOCUMENTATION ABSTRACT - North Fork Cholla Wash (Wash 1A1)		
SECTION 3: HYDROLOGY		
3A	MODEL OR METHOD USED (including vendor and version description)	HEC-1 Flood Hydrograph Package, Version 4.0 from McTrans Center
3B	STORM DURATION	24-Hour
3C	HYETOGRAPH TYPE	SCS Type II
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	Gage data is not compiled sufficiently in this area for calibration of model. Q's were compared to a number of previous studies to make sure the computed discharges were reasonable.
3F	RAINFALL AMOUNTS AND REFERENCE	4.03 in. - NOAA Atlas 2, Volume VIII
3G	UNIQUE CONDITIONS AND PROBLEMS	X1 = 0.000 to X1 = 0.100 Discharge equals Q at cross section 3.587 from Cholla Wash. Q = 3227 CFS X1 = 0.100 to X1 = 0.525 Discharge equals Q at subwatershed 8. Q = 704 CFS See following report, Section 3: Hydrologic Analysis, for a description of conditions and unique problems encountered throughout the watershed.
3H	COORDINATION OF Q'S (agency, date, comments)	Flood Control District of Maricopa County - July 9, 1991 Hydrology accepted - ongoing review and comments were incorporated throughout the study.
SECTION 4: HYDRAULICS		
4A	MODEL OR METHOD USED (including vendor and version description)	HEC-2 Water Surface Profiles, Version 4.6.0, February 1991, from McTrans Center
4B	REGIME	Subcritical
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	Initially methods 10.4 or 10.6 were used then floodways were smoothed using method 9.1. Floodways were calculated to provide a natural conveyance corridor and may not reach the 1.0 ft. rise in WSEL designated for floodway encroachment. This was incorporated per instructions from the Flood Control District of Maricopa County.
4E	UNIQUE CONDITIONS AND PROBLEMS	Beginning WSEL = 1675.32 from X1 = 3.587 of Cholla Wash. Confluence with Cholla Wash. No unique conditions or problems exist in this reach.

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: Maricopa County, Unincorporated Area

COUNTY: Maricopa | STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: North Fork Cholla Wash (Wash 1A1) | RUN DATE: 10/30/91 15:28:16

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		0.000		
		0.100		
		0.195		
		0.286		
		0.381		
		0.447		
		0.525		

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY |X| RESTUDY | | LOMR | | OTHER | |
SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	Maricopa County, Unincorporated Areas
1B	COMMUNITY NUMBER	040037
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	
1F	STUDY CONTRACTOR CONTACT (S) ADDRESS PHONE	The WLB Group, Inc. Jeff Erickson or Mark Gavan 333 East Osborn Road, Suite 380 Phoenix, Arizona 85012 (602) 279-1016
1G	TECH. REVIEWER (FEMA) PHONE	Michael Baker Jr., Inc. Contact: Michelle Monde (703) 960-8800
1H	FEMA REGIONAL REVIEWER PHONE	N/A
1I	STATE REVIEWER PHONE	N/A
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Contact: Greg Rodzenko (602) 506-1501
1K	RIVER OR STREAM NAME	Waterfall Wash (Wash 1B)
1L	REACH DESCRIPTION	FIRM Panel Numbers 1575 and 1600 - Wash begins at Beardsley Canal Wash (Wash 1) and continues upstream west and northwest into the White Tank Mountains. Mouth - Latitude: 33° 31' 11" Longitude: 112° 21' 05" Head - Latitude: 33° 31' 59" Longitude: 112° 23' 34"
1M	STUDY TYPE	Detailed Analysis - Riverine
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	White Tank Mts. SE, Waddell 7.5 min.
2B	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89

STUDY DOCUMENTATION ABSTRACT - Waterfall Wash (Wash 1B)		
SECTION 3: HYDROLOGY		
3A	MODEL OR METHOD USED (including vendor and version description)	HEC-1 Flood Hydrograph Package, Version 4.0 from McTrans Center
3B	STORM DURATION	24-Hour
3C	HYETOGRAPH TYPE	SCS Type II
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	Gage data is not compiled sufficiently in this area for calibration of model. Q's were compared to a number of previous studies to make sure the computed discharges were reasonable.
3F	RAINFALL AMOUNTS AND REFERENCE	4.03 in. - NOAA Atlas 2, Volume VIII
3G	UNIQUE CONDITIONS AND PROBLEMS	X1 = 0.000 to X1 = 0.680 Discharge equals Q at CP3 before diversion. Q = 2245 CFS X1 = 0.773 to X1 = 2.083 Discharge equals Q at CP2. Q = 2284 CFS X1 = 2.169 to X1 = 3.555 Discharge equals (Q at CP2 plus Q at CP1) divided by 2. Q = (2284 + 1342) ÷ 2 = 1813 CFS See following report, Section 3: Hydrologic Analysis, for a description of conditions and unique problems encountered throughout the watershed.
3H	COORDINATION OF Q'S (agency, date, comments)	Flood Control District of Maricopa County - July 9, 1991 Hydrology accepted - ongoing review and comments were incorporated throughout the study.
SECTION 4: HYDRAULICS		
4A	MODEL OR METHOD USED (including vendor and version description)	HEC-2 Water Surface Profiles, Version 4.6.0, February 1991, from McTrans Center
4B	REGIME	Subcritical
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	Initially methods 10.4 or 10.6 were used then floodways were smoothed using method 9.1. Floodways were calculated to provide a natural conveyance corridor and may not reach the 1.0 ft. rise in WSEL designated for floodway encroachment. This was incorporated per instructions from the Flood Control District of Maricopa County.
4E	UNIQUE CONDITIONS AND PROBLEMS	Beginning WSEL = 1278.10 from X1 = 2.186 on Beardsley Canal Wash (Wash 1). Confluence with Beardsley Canal Wash. X1 = 0.000 to X1 = 0.055 Cross section extended - Flow will breakout over Beardsley Canal to the east because capacity is exceeded due to undersized culverts at Olive Avenue. Approximately 490 CFS will break out to the east. (Continued)

STUDY DOCUMENTATION ABSTRACT - Waterfall Wash (18)	
ADDITIONAL STUDY INFORMATION	
ITEM	DESCRIPTION / DISCUSSION
4E UNIQUE CONDITIONS AND PROBLEMS (Continued)	Ponding occurs in the right overbank upstream of the Olive Avenue culverts. Floodplain and floodway will be coincident for X1 = 0.000 and X1 = 0.055 due to requirements of maintaining existing flow conditions. In other words, the diversion flow must not be increased due to encroachment and the subsequent rise in WSEL behind the culverts unless steps are taken to increase the capacity of the culverts and/or rise the left bank protecting Beardsley Canal. X1 = 0.873 to X1 = 1.223 Right overbank flow is effective due to upstream inflow at X1 = 1.352.

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: Maricopa County, Unincorporated Area

COUNTY: Maricopa | STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: Waterfall Wash (Wash 1B) | RUN DATE: 10/31/91 08:37:11

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		0.000		
		0.055		
		0.131		
		0.206		
		0.282		
		0.358		
		0.434		
		0.509		
		0.585		
		0.680		
		0.773		
		0.847		
		0.873		
		0.945		
		1.049		
		1.144		
		1.223		
		1.352		
		1.479		
		1.585		
		1.706		
		1.803		
		1.850		
		1.926		
		2.013		
		2.083		
		2.169		
		2.263		
		2.313		
		2.360		

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: Maricopa County, Unincorporated Area

COUNTY: Maricopa | STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: Waterfall Wash (Wash 1B) | RUN DATE: 10/31/91 08:37:11

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		2.403		
		2.456		
		2.551		
		2.646		
		2.742		
		2.837		
		2.934		
		3.030		
		3.125		
		3.220		
		3.314		
		3.409		
		3.479		
		3.555		

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY |X| RESTUDY | | LOMR | | OTHER | |
SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	Maricopa County, Unincorporated Areas
1B	COMMUNITY NUMBER	040037
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	
1F	STUDY CONTRACTOR CONTACT (S) ADDRESS PHONE	The WLB Group, Inc. Jeff Erickson or Mark Gavan 333 East Osborn Road, Suite 380 Phoenix, Arizona 85012 (602) 279-1016
1G	TECH. REVIEWER (FEMA) PHONE	Michael Baker Jr., Inc. Contact: Michelle Monde (703) 960-8800
1H	FEMA REGIONAL REVIEWER PHONE	N/A
1I	STATE REVIEWER PHONE	N/A
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Contact: Greg Rodzenko (602) 506-1501
1K	RIVER OR STREAM NAME	White Tank #3 Wash (Wash 2)
1L	REACH DESCRIPTION	FIRM Panel Numbers 1575 and 1600 - Wash begins at White Tanks Structure #3 detention basin and continues upstream north and northwest into the White Tank Mountains. Mouth - Latitude: 33° 31' 44" Longitude: 112° 28' 41" Head - Latitude: 33° 33' 32" Longitude: 112° 31' 39"
1M	STUDY TYPE	Detailed Analysis - Riverine
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	White Tank Mts. SE, Waddell 7.5 min.
2B	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89

STUDY DOCUMENTATION ABSTRACT - White Tank #3 Wash (Wash 2)		
SECTION 3: HYDROLOGY		
3A	MODEL OR METHOD USED (including vendor and version description)	HEC-1 Flood Hydrograph Package, Version 4.0 from McTrans Center
3B	STORM DURATION	24-Hour
3C	HYETOGRAPH TYPE	SCS Type II
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	Gage data is not compiled sufficiently in this area for calibration of model. Q's were compared to a number of previous studies to make sure the computed discharges were reasonable.
3F	RAINFALL AMOUNTS AND REFERENCE	4.03 in. - NOAA Atlas 2, Volume VIII
3G	UNIQUE CONDITIONS AND PROBLEMS	X1 = 0.000 to X1 = 1.085 Discharge equals Q at CP13. Q = 1743 CFS X1 = 1.179 to X1 = 1.752 Discharge equals (Q at CP13 plus Q at subwatershed 11) divided by 2. Q = (1743 + 1313) ÷ 2 = 1528 CFS (Continued)
3H	COORDINATION OF Q'S (agency, date, comments)	Flood Control District of Maricopa County - July 9, 1991 Hydrology accepted - ongoing review and comments were incorporated throughout the study.
SECTION 4: HYDRAULICS		
4A	MODEL OR METHOD USED (including vendor and version description)	HEC-2 Water Surface Profiles, Version 4.6.0, February 1991, from McTrans Center
4B	REGIME	Subcritical
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	Initially methods 10.4 or 10.6 were used then floodways were smoothed using method 9.1. Floodways were calculated to provide a natural conveyance corridor and may not reach the 1.0 ft. rise in WSEL designated for floodway encroachment. This was incorporated per instructions from the Flood Control District of Maricopa County.
4E	UNIQUE CONDITIONS AND PROBLEMS	Begin Backwater Analysis at normal depth. Match floodplain and floodway into the 100-year ponding water surface elevation behind White Tank Structure #3. (Continued)

STUDY DOCUMENTATION ABSTRACT - White Tank #3 Wash (Wash 2)	
ADDITIONAL STUDY INFORMATION	
ITEM	DESCRIPTION / DISCUSSION
3G UNIQUE CONDITIONS AND PROBLEMS (Continued)	X1 = 1.837 to X1 = 2.487 Discharge equals Q at subwatershed 11. Q = 1313 CFS X1 = 2.581 to X1 = 3.247 Discharge equals Q at subwatershed 11 divided by 2. Q = 1313 ÷ 2 = 656 CFS See following report, Section 3: Hydrologic Analysis, for a description of conditions and unique problems encountered throughout the watershed.
4E UNIQUE CONDITIONS AND PROBLEMS (Continued)	X1 = 0.452 to X1 = 0.551 Wash flows through a small retention basin created by testing equipment on the Caterpillar Proving Grounds. X1 = 1.862 Wash flows through a break in the dike surrounding the perimeter of the Caterpillar Proving Grounds.

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: Maricopa County, Unincorporated Area

COUNTY: Maricopa | STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: White Tank #3 Wash (Wash 2) | RUN DATE: 10/31/91 09:57:11

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		0.000		
		0.082		
		0.162		
		0.244		
		0.338		
		0.392		
		0.423		
		0.437		
		0.452		
		0.484		
		0.551		
		0.630		
		0.703		
		0.799		
		0.896		
		0.991		
		1.085		
		1.179		
		1.272		
		1.369		
		1.465		
		1.560		
		1.657		
		1.752		
		1.837		
		1.862		
		1.928		
		2.021		
		2.134		
		2.208		

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: Maricopa County, Unincorporated Area — Page 2 of 2

COUNTY: Maricopa | STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: White Tank #3 Wash (Wash 2) | RUN DATE: 10/31/91 09:57:11

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		2.304		
		2.360		
		2.394		
		2.487		
		2.581		
		2.676		
		2.766		
		2.869		
		2.963		
		3.071		
		3.152		
		3.247		

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY |X| RESTUDY | | LOMR | | OTHER | |
SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	Maricopa County, Unincorporated Areas
1B	COMMUNITY NUMBER	040037
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	
1F	STUDY CONTRACTOR CONTACT (S) ADDRESS PHONE	The WLB Group, Inc. Jeff Erickson or Mark Gavan 333 East Osborn Road, Suite 380 Phoenix, Arizona 85012 (602) 279-1016
1G	TECH. REVIEWER (FEMA) PHONE	Michael Baker Jr., Inc. Contact: Michelle Monde (703) 960-8800
1H	FEMA REGIONAL REVIEWER PHONE	N/A
1I	STATE REVIEWER PHONE	N/A
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Contact: Greg Rodzenko (602) 506-1501
1K	RIVER OR STREAM NAME	Bedrock Wash (Wash 3)
1L	REACH DESCRIPTION	FIRM Panel Numbers 1575 and 1600 - Wash begins at the Detention Basin behind White Tanks Structure #3 and continues upstream west and northwest into the White Tank Mountains. Mouth - Latitude: 33° 31' 38" Longitude: 112° 28' 44" Head - Latitude: 33° 32' 05" Longitude: 112° 31' 14"
1M	STUDY TYPE	Detailed Analysis - Riverine
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	White Tank Mts. SE, Waddell 7.5 min.
2B	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89

STUDY DOCUMENTATION ABSTRACT - Bedrock Wash (Wash 3)		
SECTION 3: HYDROLOGY		
3A	MODEL OR METHOD USED (including vendor and version description)	HEC-1 Flood Hydrograph Package, Version 4.0 from McTrans Center
3B	STORM DURATION	24-Hour
3C	HYETOGRAPH TYPE	SCS Type II
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	Gage data is not compiled sufficiently in this area for calibration of model. Q's were compared to a number of previous studies to make sure the computed discharges were reasonable.
3F	RAINFALL AMOUNTS AND REFERENCE	4.03 in. - NOAA Atlas 2, Volume VIII
3G	UNIQUE CONDITIONS AND PROBLEMS	X1 = 0.000 to X1 = 0.700 Discharge equals Q at intermediate concentration point I1CP17. Q = 1738 CFS X1 = 0.793 to X1 = 1.222 Discharge equals Q at CP15. Q = 1920 CFS X1 = 1.317 to X1 = 2.430 Discharge equals Q at subwatershed 15 divided by 2. Q = 1039 ÷ 2 = 520 CFS See following report, Section 3: Hydrologic Analysis, for a description of conditions and unique problems encountered throughout the watershed.
3H	COORDINATION OF Q'S (agency, date, comments)	Flood Control District of Maricopa County - July 9, 1991 Hydrology accepted - ongoing review and comments were incorporated throughout the study.
SECTION 4: HYDRAULICS		
4A	MODEL OR METHOD USED (including vendor and version description)	HEC-2 Water Surface Profiles, Version 4.6.0, February 1991, from McTrans Center
4B	REGIME	Subcritical
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	Initially methods 10.4 or 10.6 were used then floodways were smoothed using method 9.1. Floodways were calculated to provide a natural conveyance corridor and may not reach the 1.0 ft. rise in WSEL designated for floodway encroachment. This was incorporated per instructions from the Flood Control District of Maricopa County.
4E	UNIQUE CONDITIONS AND PROBLEMS	Begin backwater analysis at normal depth. Match floodplain and floodways into 100-year ponding WSEL behind White Tank Structure #3. X1 = 0.395 Wash flows through earthen enbankment created by Case Proving Grounds test equipment.

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: Maricopa County, Unincorporated Area

COUNTY: Maricopa | STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: Bedrock Wash (Wash 3) | RUN DATE: 11/07/91 16:57:09

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		0.000		
		0.076		
		0.168		
		0.243		
		0.337		
		0.388		
		0.395		
		0.478		
		0.603		
		0.700		
		0.793		
		0.892		
		0.978		
		1.058		
		1.124		
		1.222		
		1.317		
		1.349		
		1.409		
		1.500		
		1.598		
		1.634		
		1.664		
		1.686		
		1.779		
		1.870		
		1.965		
		2.019		
		2.062		
		2.120		

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: Maricopa County, Unincorporated Area — Page 2 of 2

COUNTY: Maricopa | STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: Bedrock Wash (Wash 3) | RUN DATE: 11/07/91 16:57:09

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		2.155		
		2.221		
		2.248		
		2.285		
		2.341		
		2.379		
		2.430		

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY |X| RESTUDY | | LOMR | | OTHER | |
SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	Maricopa County, Unincorporated Areas
1B	COMMUNITY NUMBER	040037
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	
1F	STUDY CONTRACTOR CONTACT (S) ADDRESS PHONE	The WLB Group, Inc. Jeff Erickson or Mark Gavan 333 East Osborn Road, Suite 380 Phoenix, Arizona 85012 (602) 279-1016
1G	TECH. REVIEWER (FEMA) PHONE	Michael Baker Jr., Inc. Contact: Michelle Monde (703) 960-8800
1H	FEMA REGIONAL REVIEWER PHONE	N/A
1I	STATE REVIEWER PHONE	N/A
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Contact: Greg Rodzenko (602) 506-1501
1K	RIVER OR STREAM NAME	North Fork Bedrock Wash (Wash 3A)
1L	REACH DESCRIPTION	FIRM Panel Numbers 1575 and 1600 - Wash begins at confluence with Bedrock Wash and continues upstream west and northwest into the White Tank Mountains. Mouth - Latitude: 33° 32' 07" Longitude: 112° 29' 36" Head - Latitude: 33° 32' 49" Longitude: 112° 32' 44"
1M	STUDY TYPE	Detailed Analysis - Riverine
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	White Tank Mts. SE, Waddell 7.5 min.
2B	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89

STUDY DOCUMENTATION ABSTRACT - North Fork Bedrock Wash (Wash 3A)		
SECTION 3: HYDROLOGY		
3A	MODEL OR METHOD USED (including vendor and version description)	HEC-1 Flood Hydrograph Package, Version 4.0 from McTrans Center
3B	STORM DURATION	24-Hour
3C	HYETOGRAPH TYPE	SCS Type II
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	Gage data is not compiled sufficiently in this area for calibration of model. Q's were compared to a number of previous studies to make sure the computed discharges were reasonable.
3F	RAINFALL AMOUNTS AND REFERENCE	4.03 in. - NOAA Atlas 2, Volume VIII
3G	UNIQUE CONDITIONS AND PROBLEMS	X1 = 0.000 to X1 = 0.094 Discharge equals Q at CP15. Q = 1920 CFS X1 = 0.147 to X1 = 0.964 Discharge equals Q at RCP14 plus (Q at subwatershed 15 divided by 2). Q = 1041 + (1039 ÷ 2) = 1560 CFS X1 = 1.063 to X1 = 1.545 Discharge equals (Q at X1 = 0.964 plus Q at subwatershed 14) divided by 2. Q = (1560 + 1163) ÷ 2 = 1362 CFS X1 = 1.640 to X1 = 1.736 Discharge equals Q at subwatershed 14. Q = 1163 CFS See following report, Section 3: Hydrologic Analysis, for a description of conditions and unique problems encountered throughout the watershed.
3H	COORDINATION OF Q'S (agency, date, comments)	Flood Control District of Maricopa County - July 9, 1991 Hydrology accepted - ongoing review and comments were incorporated throughout the study.
SECTION 4: HYDRAULICS		
4A	MODEL OR METHOD USED (including vendor and version description)	HEC-2 Water Surface Profiles, Version 4.6.0, February 1991, from McTrans Center
4B	REGIME	Subcritical
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	Initially methods 10.4 or 10.6 were used then floodways were smoothed using method 9.1. Floodways were calculated to provide a natural conveyance corridor and may not reach the 1.0 ft. rise in WSEL designated for floodway encroachment. This was incorporated per instructions from the Flood Control District of Maricopa County.
4E	UNIQUE CONDITIONS AND PROBLEMS	Beginning WSEL = 1238.32 from X1 = 1.124 on Bedrock Wash (Wash 3). Confluence with Bedrock Wash. No other unique conditions or problems exist on this wash.

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: Maricopa County, Unincorporated Area — Page 1 of 1

COUNTY: Maricopa — STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: North Fork Bedrock Wash (Wash 3A) — RUN DATE: 11/07/91 16:52:09

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		0.000		
		0.094		
		0.147		
		0.194		
		0.230		
		0.310		
		0.400		
		0.496		
		0.590		
		0.684		
		0.777		
		0.870		
		0.964		
		1.063		
		1.158		
		1.254		
		1.351		
		1.451		
		1.545		
		1.640		
		1.736		

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY |X| RESTUDY | | LOMR | | OTHER | |
SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	Maricopa County, Unincorporated Areas
1B	COMMUNITY NUMBER	040037, 040039
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	
1F	STUDY CONTRACTOR CONTACT (S) ADDRESS PHONE	The WLB Group, Inc. Jeff Erickson or Mark Gavan 333 East Osborn Road, Suite 380 Phoenix, Arizona 85012 (602) 279-1016
1G	TECH. REVIEWER (FEMA) PHONE	Michael Baker Jr., Inc. Contact: Michelle Monde (703) 960-8800
1H	FEMA REGIONAL REVIEWER PHONE	N/A
1I	STATE REVIEWER PHONE	N/A
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Contact: Greg Rodzenko (602) 506-1501
1K	RIVER OR STREAM NAME	Jackrabbit Trail Wash (Wash 4)
1L	REACH DESCRIPTION	FIRM Panel Numbers 1600 and 2055 - Wash begins at White Tanks Structure #4 and continues upstream north along the west side of Jackrabbit Trail to the Limit of Study at Medlock Drive, approximately 1000 feet north of Camelback Road Extended. Mouth - Latitude: 33° 27' 01" Longitude: 112° 28' 51" Head - Latitude: 33° 30' 41" Longitude: 112° 28' 42"
1M	STUDY TYPE	Detailed Analysis - Riverine
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	Waddell, Perryville 7.5 min.
2B	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89

STUDY DOCUMENTATION ABSTRACT - Jackrabbit Trail Wash (Wash 4)		
SECTION 3: HYDROLOGY		
3A	MODEL OR METHOD USED (including vendor and version description)	HEC-1 Flood Hydrograph Package, Version 4.0 from McTrans Center
3B	STORM DURATION	24-Hour
3C	HYETOGRAPH TYPE	SCS Type II
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	Gage data is not compiled sufficiently in this area for calibration of model. Q's were compared to a number of previous studies to make sure the computed discharges were reasonable.
3F	RAINFALL AMOUNTS AND REFERENCE	4.03 in. - NOAA Atlas 2, Volume VIII
3G	UNIQUE CONDITIONS AND PROBLEMS	A split flow analysis was performed on Jackrabbit Trail to compute discharges for the final HEC-2 run. This analysis is included in this submittal for review along with the calculated discharges. (Continued)
3H	COORDINATION OF Q'S (agency, date, comments)	Flood Control District of Maricopa County - July 9, 1991 Hydrology accepted - ongoing review and comments were incorporated throughout the study.
SECTION 4: HYDRAULICS		
4A	MODEL OR METHOD USED (including vendor and version description)	HEC-2 Water Surface Profiles, Version 4.6.0, February 1991, from McTrans Center
4B	REGIME	Subcritical
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	Initially methods 10.4 or 10.6 were used then floodways were smoothed using method 9.1. Floodways were calculated to provide a natural conveyance corridor and may not reach the 1.0 ft. rise in WSEL designated for floodway encroachment. This was incorporated per instructions from the Flood Control District of Maricopa County.
4E	UNIQUE CONDITIONS AND PROBLEMS	Final discharges were computed in the split flow analysis run for Jackrabbit Trail Wash and are included in this submittal for review. Begin backwater analysis at normal depth and match floodplain and floodway into 100-year ponding WSEL = 1040.07 behind White Tanks Structure #4. X1 = 0.440 to X1 = 0.566 Approximately 250 cfs will break out to the east over Jackrabbit Trail in the next three upstream cross sections. Breakout flows then continue overland to the southeast as sheet flow. X1 = 0.759 to X1 = 0.847 5 - 10' x 4' box culverts are located underneath the eastbound offramp of I-10 and 4 - 12' x 4.5' box culverts are located under the westbound onramp of I-10. A concrete lined channel connects these two culverts. (Continued)

STUDY DOCUMENTATION ABSTRACT - Jackrabbit Trail Wash (Wash 4)

ADDITIONAL STUDY INFORMATION

ITEM	DESCRIPTION / DISCUSSION
3G UNIQUE CONDITIONS AND PROBLEMS (Continued)	X1 = 0.000 to X1 = 0.348 Q = 1093 CFS X1 = 0.440 to X1 = 0.499 Approximately 250 CFS will breakout to the east over Jackrabbit Trail in the next three upstream cross sections. Breakout flows then continue overland to the southeast as sheet flow. Q = 963 CFS X1 = 0.566 to X1 = 1.254 Q = 1186 CFS. (This is the average discharge over the next upstream cross sections.) X1 = 1.159 Flow will breakout to the east over Jackrabbit Trail, however very small amount in the next three upstream cross sections. Breakout flows will then continue overland to the southeast as sheet flow. X1 = 1.348 to X1 = 1.725 Q = 955 CFS X1 = 1.631 Approximately 390 CFS will breakout to the east over Jackrabbit Trail for the next three upstream cross sections. Breakout flows will continue overland to the southeast as sheet flow. X1 = 1.818 to X1 = 2.482 Q = 1105 CFS X1 = 2.576 to X1 = 2.912 Q = 915 CFS X1 = 2.973 to X1 = 3.342 Q = 726 CFS X1 = 3.436 to X1 = 3.719 Q = 994 CFS X1 = 3.813 to X1 = 4.016 Q = 221 CFS X1 = 4.016 Approximately 152 CFS will breakout to the east over Jackrabbit Trail for the next three upstream cross sections. Breakout flows will then continue overland to the southeast as sheet flow. X1 = 4.086 Q = 68 CFS X1 = 4.152 Q = 187 CFS. Again, these discharges are connected to the split flow analysis run which was computed previously and this run is included for your review. See following report, Section 3: Hydrologic Analysis, for a description of conditions and unique problems encountered throughout the watershed.

STUDY DOCUMENTATION ABSTRACT - Jackrabbit Trail Wash (Wash 4)	
ADDITIONAL STUDY INFORMATION	
ITEM	DESCRIPTION / DISCUSSION
4E UNIQUE CONDITIONS AND PROBLEMS (Continued)	X1 = 0.959 to X1 = 0.969 4 - 12' x 4.5' box culverts convey flows underneath McDowell Road. X1 = 1.159 to X1 = 1.348 Flow will break out to the east over Jackrabbit Trail, however, this is a small amount in the next three upstream cross sections. Break out flows then continue overland to the southeast as sheet flow. X1 = 1.631 to X1 = 1.818 Approximately 390 cfs will break out to the east over Jackrabbit Trail for the next three upstream cross sections. Break out flows continue overland to the southeast as sheet flow. X1 = 2.973 to X1 = 3.154 Wash flows through a man-made retention basin east of the Caterpillar Proving Grounds buildings. X1 = 4.016 to X1 = 4.152 Approximately 152 cfs will break out to the east over Jackrabbit Trail for the next three upstream cross sections. Break out flows will then continue overland to the southeast as sheet flow.

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: Maricopa County, Unincorporated Area

COUNTY: Maricopa | STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: Jackrabbit Trail Wash (Wash 4) | RUN DATE: 11/25/91 12:43:07

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		0.000		
		0.070		
		0.142		
		0.228		
		0.312		
		0.348		
		0.440		
		0.499		
		0.566		
		0.610		
		0.668		
		0.722		
		0.759		
		0.769		
		0.792		
		0.822		
		0.847		
		0.857		
		0.914		
		0.959		
		0.969		
		1.016		
		1.064		
		1.159		
		1.254		
		1.348		
		1.443		
		1.536		
		1.631		
		1.725		

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: Maricopa County, Unincorporated Area

COUNTY: Maricopa | STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: Jackrabbit Trail Wash (Wash 4) | RUN DATE: 11/25/91 12:43:07

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		1.818		
		1.913		
		2.008		
		2.107		
		2.202		
		2.296		
		2.389		
		2.482		
		2.576		
		2.670		
		2.765		
		2.860		
		2.912		
		2.973		
		3.059		
		3.154		
		3.247		
		3.342		
		3.436		
		3.530		
		3.625		
		3.719		
		3.813		
		3.930		
		4.016		
		4.086		
		4.152		

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY |X| RESTUDY | | LOMR | | OTHER | |
SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	Maricopa County, Unincorporated Areas and Town of Buckeye
1B	COMMUNITY NUMBER	040037, 040039
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	
1F	STUDY CONTRACTOR CONTACT (S) ADDRESS PHONE	The WLB Group, Inc. Jeff Erickson or Mark Gavan 333 East Osborn Road, Suite 380 Phoenix, Arizona 85012 (602) 279-1016
1G	TECH. REVIEWER (FEMA) PHONE	Michael Baker Jr., Inc. Contact: Michelle Monde (703) 960-8800
1H	FEMA REGIONAL REVIEWER PHONE	N/A
1I	STATE REVIEWER PHONE	N/A
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Contact: Greg Rodzenko (602) 506-1501
1K	RIVER OR STREAM NAME	Tuthill Dike Wash (Wash 5)
1L	REACH DESCRIPTION	FIRM Panel Numbers 1600 and 2055 - Wash begins in the middle of White Tanks Structure #4 detention basin and continues upstream, approximately 1/2 mile, to the Tuthill Road Alignment, then turns north and continues along the west side of Tuthill Dike and terminates approxiately 1/2 mile north of Camelback Road Extended. Mouth - Latitude: 33° 27' 11" Longitude: 112° 29' 45" Head - Latitude: 33° 28' 54" Longitude: 112° 29' 45"
1M	STUDY TYPE	Detailed Analysis - Riverine
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	Waddell, Perryville 7.5 min.
2B	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89

STUDY DOCUMENTATION ABSTRACT - Tuthill Dike Wash (Wash 5)		
SECTION 3: HYDROLOGY		
3A	MODEL OR METHOD USED (including vendor and version description)	HEC-1 Flood Hydrograph Package, Version 4.0 from McTrans Center
3B	STORM DURATION	24-Hour
3C	HYETOGRAPH TYPE	SCS Type II
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	Gage data is not compiled sufficiently in this area for calibration of model. Q's were compared to a number of previous studies to make sure the computed discharges were reasonable.
3F	RAINFALL AMOUNTS AND REFERENCE	4.03 in. - NOAA Atlas 2, Volume VIII
3G	UNIQUE CONDITIONS AND PROBLEMS	X1 = 0.000 to X1 = 1.067 Discharge equals Q at intermediate concentration point I6CWT4. Q = 4057 CFS (Continued)
3H	COORDINATION OF Q'S (agency, date, comments)	Flood Control District of Maricopa County - July 9, 1991 Hydrology accepted - ongoing review and comments were incorporated throughout the study.
SECTION 4: HYDRAULICS		
4A	MODEL OR METHOD USED (including vendor and version description)	HEC-2 Water Surface Profiles, Version 4.6.0, February 1991, from McTrans Center
4B	REGIME	Subcritical
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	Initially methods 10.4 or 10.6 were used then floodways were smoothed using method 9.1. Floodways were calculated to provide a natural conveyance corridor and may not reach the 1.0 ft. rise in WSEL designated for floodway encroachment. This was incorporated per instructions from the Flood Control District of Maricopa County.
4E	UNIQUE CONDITIONS AND PROBLEMS	Begin backwater analysis at normal depth behind White Tank Structure #4. Match floodplain and floodway into the 100-year ponding WSEL = 1040.07 behind White Tanks Structure #4. Flow is conveyed through four 10 foot x 8 foot box culverts underneath I-10. X1 = 1.110 to X1 = 1.198 Portion of flow for the next four cross sections upstream is lost as weir flow over the dike to the east. Approximately 1440 cfs flows east over the dike. (Continued)

STUDY DOCUMENTATION ABSTRACT - Tuthill Dike Wash (Wash 5)	
ADDITIONAL STUDY INFORMATION	
ITEM	DESCRIPTION / DISCUSSION
3G UNIQUE CONDITIONS AND PROBLEMS (Continued)	X1 = 1.067 to X1 = 1.198 Discharge equals Q at CP43 after diversion. Q = 4061 CFS This flow is left over after weir flow over the dike upstream of the culvert. A portion of the flow for the next four upstream cross sections is lost as weir flow and approximately 1440 CFS flows east over the dike. X1 = 1.260 to X1 = 1.322 Discharge equals routed Q at CP42. Q = 6601 CFS X1 = 1.362 to X1 = 1.614 Discharge equals (Q at CP39 plus 1/5 of the hydrograph at watershed 42). Q = 1618 + 1/5(1029) = 6225 CFS X1 = 1.710 to X1 = 2.088 Discharge equals (Q at X1 = 1.299 plus Q at CP39) divided by 2. Q = (6225 + 6110) ÷ 2 = 6168 CFS X1 = 2.170 to X1 = 2.659 Discharge equals Q at CP39. Q = 6110 CFS X1 = 2.753 to X1 = 3.250 Discharge equals Q at CP27. Q = 3011 CFS X1 = 3.344 to X1 = 3.912 Discharge equals Q at CP25. Q = 1414 CFS X1 = 3.691 to X1 = 4.410 Discharge equals (Q at CP25 plus Q at CP22A) divided by 2. Q = (1414 + 1108) ÷ 2 = 1261 CFS See following report, Section 3: Hydrologic Analysis, for a description of conditions and unique problems encountered throughout the watershed.

STUDY DOCUMENTATION ABSTRACT - Tuthill Dike Wash (Wash 5)	
ADDITIONAL STUDY INFORMATION	
ITEM	DESCRIPTION / DISCUSSION
4E UNIQUE CONDITIONS AND PROBLEMS (Continued)	Effective flow option is incorporated for the next five upstream cross sections as a result of ponding and upstream and downstream expansion and contraction flow situations. Actual mapped floodplain limits correspond to WSEL and are shown correctly on the floodplain work map. X1 = 1.313 to X1 = 1.362 The next three upstream cross sections flow through a man-made retention basin on the Caterpillar Proving Grounds and effective flow limits are imposed to model this situation correctly. Mapped limits are shown on the floodplain map to correctly depict the actual ponding area. This is also the confluence with Bulldozer Wash. X1 = 2.563 Confluence of Caterpillar Wash. X1 = 3.250 Confluence of Tractor Wash. X1 = 3.344 to X1 = 3.535 Wash flows through a man-made retention basin on the Caterpillar Proving Grounds. X1 = 4.725 This is the confluence of Caterpillar Dike Wash and the Limit of the Study.

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: Maricopa County, Unincorporated Area

COUNTY: Maricopa | STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: Tuthill Dike Wash (Wash 5) | RUN DATE: 11/14/91 10:30:31

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		0.000		
		0.075		
		0.186		
		0.314		
		0.415		
		0.540		
		0.634		
		0.729		
		0.823		
		0.917		
		1.012		
		1.067		
		1.110		
		1.118		
		1.152		
		1.198		
		1.260		
		1.287		
		1.313		
		1.322		
		1.362		
		1.422		
		1.518		
		1.614		
		1.710		
		1.805		
		1.898		
		1.994		
		2.088		
		2.170		

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: Maricopa County, Unincorporated Area — Page 2 of 2

COUNTY: Maricopa | STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: Tuthill Dike Wash (Wash 5) | RUN DATE: 11/14/91 10:30:31

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		2.279		
		2.373		
		2.468		
		2.563		
		2.659		
		2.753		
		2.848		
		2.943		
		3.057		
		3.148		
		3.250		
		3.344		
		3.439		
		3.535		
		3.631		
		3.724		
		3.818		
		3.912		
		4.006		
		4.101		
		4.196		
		4.289		
		4.375		
		4.469		
		4.563		
		4.653		
		4.725		

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY |X| RESTUDY | | LOMR | | OTHER | |
SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	Maricopa County, Unincorporated Areas
1B	COMMUNITY NUMBER	040037
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	
1F	STUDY CONTRACTOR CONTACT (S) ADDRESS PHONE	The WLB Group, Inc. Jeff Erickson or Mark Gavan 333 East Osborn Road, Suite 380 Phoenix, Arizona 85012 (602) 279-1016
1G	TECH. REVIEWER (FEMA) PHONE	Michael Baker Jr., Inc. Contact: Michelle Monde (703) 960-8800
1H	FEMA REGIONAL REVIEWER PHONE	N/A
1I	STATE REVIEWER PHONE	N/A
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Contact: Greg Rodzenko (602) 506-1501
1K	RIVER OR STREAM NAME	Bulldozer Wash (Wash 5A)
1L	REACH DESCRIPTION	FIRM Panel Numbers 2050 and 2055 - Wash begins at confluence with Tuthill Dike Wash and continues upstream west and northwest into the White Tank Mountains. Mouth - Latitude: 33° 27' 54" Longitude: 112° 29' 45" Head - Latitude: 33° 28' 46" Longitude: 112° 31' 37"
1M	STUDY TYPE	Detailed Analysis - Riverine
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	Perryville, Valencia 7.5 min.
2B	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89

STUDY DOCUMENTATION ABSTRACT - Bulldozer Wash (Wash 5A)		
SECTION 3: HYDROLOGY		
3A	MODEL OR METHOD USED (including vendor and version description)	HEC-1 Flood Hydrograph Package, Version 4.0 from McTrans Center
3B	STORM DURATION	24-Hour
3C	HYETOGRAPH TYPE	SCS Type II
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	Gage data is not compiled sufficiently in this area for calibration of model. Q's were compared to a number of previous studies to make sure the computed discharges were reasonable.
3F	RAINFALL AMOUNTS AND REFERENCE	4.03 in. - NOAA Atlas 2, Volume VIII
3G	UNIQUE CONDITIONS AND PROBLEMS	X1 = 0.000 to X1 = 0.120 Discharge equals Q at CP42. Q = 6765 CFS X1 = 0.178 to X1 = 0.602 Discharge equals Q at R40 plus (4/5 of subwatershed 42). Q = 427 + (4/5)1029 = 1250 CFS (Continued)
3H	COORDINATION OF Q'S (agency, date, comments)	Flood Control District of Maricopa County - July 9, 1991 Hydrology accepted - ongoing review and comments were incorporated throughout the study.
SECTION 4: HYDRAULICS		
4A	MODEL OR METHOD USED (including vendor and version description)	HEC-2 Water Surface Profiles, Version 4.6.0, February 1991, from McTrans Center
4B	REGIME	Subcritical
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	Initially methods 10.4 or 10.6 were used then floodways were smoothed using method 9.1. Floodways were calculated to provide a natural conveyance corridor and may not reach the 1.0 ft. rise in WSEL designated for floodway encroachment. This was incorporated per instructions from the Flood Control District of Maricopa County.
4E	UNIQUE CONDITIONS AND PROBLEMS	Beginning WSEL = 1100.98 from X1 = 1.313 on Tuthill Dike Wash HEC-2 run. Confluence with Tuthill Dike Wash. X1 = 0.000 to X1 = 0.120 Next three upstream cross sections extend through a man-made retention basin on Caterpillar Proving Grounds and indicate ponding. X1 = 0.705 to X1 = 0.810 Flow in left overbank is effective due to upstream inflow.

STUDY DOCUMENTATION ABSTRACT - Bulldozer Wash (Wash 5A)

ADDITIONAL STUDY INFORMATION

ITEM	DESCRIPTION / DISCUSSION
3G UNIQUE CONDITIONS AND PROBLEMS (Continued)	X1 = 0.705 to X1 = 1.184 Discharge equals Q at (R40 plus 1/2 of subwatershed 40). Q = 427 + (1/2)1029 = 942 CFS X1 = 1.224 to X1 = 1.723 Discharge equals Q at subwatershed 40. Q = 525 CFS X1 = 1.723 to X1 = 2.616 Discharge equals Q at subwatershed 40 divided by 2. Q = 262 CFS See following report, Section 3: Hydrologic Analysis, for a description of conditions and unique problems encountered throughout the watershed.
4E UNIQUE CONDITIONS AND PROBLEMS (Continued)	X1 = 0.988 to X1 = 1.085 Right overbank is a minor retention basin on the Caterpillar Proving Grounds. Flow is effective due to upstream inflow. X1 = 1.224 Wash flows through opening in Caterpillar Proving Grounds perimeter dike.

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: Maricopa County, Unincorporated Area

COUNTY: Maricopa | STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: Bulldozer Wash (Wash 5A) | RUN DATE: 11/14/91 10:51:50

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		0.000		
		0.009		
		0.062		
		0.120		
		0.178		
		0.274		
		0.367		
		0.456		
		0.602		
		0.705		
		0.801		
		0.902		
		0.988		
		1.085		
		1.184		
		1.224		
		1.282		
		1.373		
		1.424		
		1.471		
		1.527		
		1.562		
		1.597		
		1.631		
		1.661		
		1.723		
		1.762		
		1.811		
		1.855		
		1.918		

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: Maricopa County, Unincorporated Area — Page 2 of 2

COUNTY: Maricopa | STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: Bulldozer Wash (Wash 5A) | RUN DATE: 11/14/91 10:51:50

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		1.951		
		2.005		
		2.046		
		2.095		
		2.140		
		2.220		
		2.275		
		2.346		
		2.399		
		2.466		
		2.524		
		2.616		

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY |X| RESTUDY | | LOMR | | OTHER | |
SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	Maricopa County, Unincorporated Areas
1B	COMMUNITY NUMBER	040037
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	
1F	STUDY CONTRACTOR CONTACT (S) ADDRESS PHONE	The WLB Group, Inc. Jeff Erickson or Mark Gavan 333 East Osborn Road, Suite 380 Phoenix, Arizona 85012 (602) 279-1016
1G	TECH. REVIEWER (FEMA) PHONE	Michael Baker Jr., Inc. Contact: Michelle Monde (703) 960-8800
1H	FEMA REGIONAL REVIEWER PHONE	N/A
1I	STATE REVIEWER PHONE	N/A
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Contact: Greg Rodzenko (602) 506-1501
1K	RIVER OR STREAM NAME	Caterpillar Wash (Wash 5B)
1L	REACH DESCRIPTION	FIRM Panel Numbers 1575 and 1600 - Wash begins at confluence of Tuthill Dike Wash and is located approximately 1/4 mile north of Thomas Road Extended and continues upstream west and northwest into the White Tank Mountains. Mouth - Latitude: 33° 29' 07" Longitude: 112° 29' 45" Head - Latitude: 33° 29' 42" Longitude: 112° 33' 33"
1M	STUDY TYPE	Detailed Analysis - Riverine
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	Perryville, Valencia 7.5 min.
2B	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89

STUDY DOCUMENTATION ABSTRACT - Caterpillar Wash (Wash 5B)		
SECTION 3: HYDROLOGY		
3A	MODEL OR METHOD USED (including vendor and version description)	HEC-1 Flood Hydrograph Package, Version 4.0 from McTrans Center
3B	STORM DURATION	24-Hour
3C	HYETOGRAPH TYPE	SCS Type II
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	Gage data is not compiled sufficiently in this area for calibration of model. Q's were compared to a number of previous studies to make sure the computed discharges were reasonable.
3F	RAINFALL AMOUNTS AND REFERENCE	4.03 in. - NOAA Atlas 2, Volume VIII
3G	UNIQUE CONDITIONS AND PROBLEMS	X1 = 0.000 Discharge equals Q at X1 = 2.563 from Tuthill Dike Wash. Q = 6110 CFS X1 = 0.077 to X1 = 0.566 Discharge equals (Q at subwatershed 39 divided by two) plus R38. Q = (558 ÷ 2) + 3133 = 3412 CFS (Continued)
3H	COORDINATION OF Q'S (agency, date, comments)	Flood Control District of Maricopa County - July 9, 1991 Hydrology accepted - ongoing review and comments were incorporated throughout the study.
SECTION 4: HYDRAULICS		
4A	MODEL OR METHOD USED (including vendor and version description)	HEC-2 Water Surface Profiles, Version 4.6.0, February 1991, from McTrans Center
4B	REGIME	Subcritical
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	Initially methods 10.4 or 10.6 were used then floodways were smoothed using method 9.1. Floodways were calculated to provide a natural conveyance corridor and may not reach the 1.0 ft. rise in WSEL designated for floodway encroachment. This was incorporated per instructions from the Flood Control District of Maricopa County.
4E	UNIQUE CONDITIONS AND PROBLEMS	Beginning WSEL = 1191.10 computed from Tuthill Dike Wash HEC-2 run, X1 = 2.563. Confluence with Tuthill Dike Wash. X1 = 0.164 to X1 = 0.384 Divided flow in the next four upstream cross sections is due to upstream inflow and wide undefined floodplain. X1 = 0.898 to X1 = 0.971 Ponding in the right overbank between the next two cross sections is assumed ineffective flow. (Continued)

STUDY DOCUMENTATION ABSTRACT - Caterpillar Wash (Wash 5B)

ADDITIONAL STUDY INFORMATION

ITEM	DESCRIPTION / DISCUSSION
3G UNIQUE CONDITIONS AND PROBLEMS (Continued)	X1 = 0.649 to X1 = 1.084 Discharge equals (Q at X1 = 0.556 plus Q at CP38 after storage) divided by 2. Q = (3412 + 3220) ÷ 2 = 3316 CFS X1 = 1.147 to X1 = 1.676 Discharge equals Q at CP38 before storage. Q = 3253 CFS X1 = 1.764 to X1 = 2.066 Discharge equals Q at CP36. Q = 2886 CFS X1 = 2.139 to X1 = 2.225 Discharge equals Q at subwatershed 37. Q = 672 CFS See following report, Section 3: Hydrologic Analysis, for a description of conditions and unique problems encountered throughout the watershed.
4E UNIQUE CONDITIONS AND PROBLEMS (Continued)	X1 = 1.188 Ponding in the right overbank is defined as ineffective flow and limits of effective flow are designated by encroachment stations identified on the ET 6.1 record. X1 = 1.553 to X1 = 1.916 The next six upstream cross sections reflect divided flow. These areas are effective due to upstream inflow at X1 = 1.984.

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: Maricopa County, Unincorporated Area

COUNTY: Maricopa | STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: Caterpillar Wash (Wash 5B) | RUN DATE: 11/14/91 15:36:46

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		0.000		
		0.077		
		0.164		
		0.240		
		0.309		
		0.384		
		0.483		
		0.566		
		0.649		
		0.732		
		0.800		
		0.898		
		0.971		
		1.010		
		1.084		
		1.147		
		1.188		
		1.265		
		1.334		
		1.373		
		1.394		
		1.467		
		1.553		
		1.604		
		1.676		
		1.764		
		1.843		
		1.916		
		1.984		
		2.066		

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: Maricopa County, Unincorporated Area

COUNTY: Maricopa | STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: Caterpillar Wash (Wash 5B) | RUN DATE: 11/14/91 15:36:46

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		2.139		
		2.225		

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY |X| RESTUDY | | LOMR | | OTHER | |
SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	Maricopa County, Unincorporated Areas
1B	COMMUNITY NUMBER	040037
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	
1F	STUDY CONTRACTOR CONTACT (S) ADDRESS PHONE	The WLB Group, Inc. Jeff Erickson or Mark Gavan 333 East Osborn Road, Suite 380 Phoenix, Arizona 85012 (602) 279-1016
1G	TECH. REVIEWER (FEMA) PHONE	Michael Baker Jr., Inc. Contact: Michelle Monde (703) 960-8800
1H	FEMA REGIONAL REVIEWER PHONE	N/A
1I	STATE REVIEWER PHONE	N/A
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Contact: Greg Rodzenko (602) 506-1501
1K	RIVER OR STREAM NAME	Tractor Wash (Wash 5C)
1L	REACH DESCRIPTION	FIRM Panel Numbers 1575, 2050, 2055 - Begins at the confluence with Tuthill Dike Wash at approximately the interesection of Indian School Road Extended and Tuthill Dike. Continues upstream to the northwest into the White Tank Mountains. Mouth - Latitude: 33° 29' 38" Longitude: 112° 29' 45" Head - Latitude: 33° 30' 46" Longitude: 112° 32' 00"
1M	STUDY TYPE	Detailed Analysis - Riverine
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	Perryville, Valencia, White Tank Mts. SE 7.5 min.
2B	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89

STUDY DOCUMENTATION ABSTRACT - Tractor Wash (Wash 5C)		
SECTION 3: HYDROLOGY		
3A	MODEL OR METHOD USED (including vendor and version description)	HEC-1 Flood Hydrograph Package, Version 4.0 from McTrans Center
3B	STORM DURATION	24-Hour
3C	HYETOGRAPH TYPE	SCS Type II
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	Gage data is not compiled sufficiently in this area for calibration of model. Q's were compared to a number of previous studies to make sure the computed discharges were reasonable.
3F	RAINFALL AMOUNTS AND REFERENCE	4.03 in. - NOAA Atlas 2, Volume VIII
3G	UNIQUE CONDITIONS AND PROBLEMS	X1 = 0.000 Discharge equals Q at X1 = 3.250 on Tuthill Dike Wash. Q = 4560 CFS X1 = 0.037 to X1 = 0.629 Discharge equals Q at intermediate concentration point I1CP27. Q = 1648 CFS (Continued)
3H	COORDINATION OF Q'S (agency, date, comments)	Flood Control District of Maricopa County - July 9, 1991 Hydrology accepted - ongoing review and comments were incorporated throughout the study.
SECTION 4: HYDRAULICS		
4A	MODEL OR METHOD USED (including vendor and version description)	HEC-2 Water Surface Profiles, Version 4.6.0, February 1991, from McTrans Center
4B	REGIME	Subcritical
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	Initially methods 10.4 or 10.6 were used then floodways were smoothed using method 9.1. Floodways were calculated to provide a natural conveyance corridor and may not reach the 1.0 ft. rise in WSEL designated for floodway encroachment. This was incorporated per instructions from the Flood Control District of Maricopa County.
4E	UNIQUE CONDITIONS AND PROBLEMS	Beginning WSEL = 1214.42 at X1 = 3.250 on Tuthill Dike Wash, confluence with Tuthill Dike Wash. X1 = 0.037 Disregard extended cross section which ties into Tuthill Dike Wash floodplain. X1 = 0.305 Ponding area to the right of station 10100 is ineffective flow as defined by expansion criteria. (Continued)

STUDY DOCUMENTATION ABSTRACT - Tractor Wash (Wash 5C)

ADDITIONAL STUDY INFORMATION

ITEM	DESCRIPTION / DISCUSSION
3G UNIQUE CONDITIONS AND PROBLEMS (Continued)	X1 = 0.720 to X1 = 1.137 Discharge equals (Q at I1CP27 plus Q at subwatershed 26) divided by 2. Q = (1648 + 943) ÷ 2 = 1295 CFS X1 = 1.196 to X1 = 1.998 Discharge equals Q at subwatershed 26. Q = 943 CFS X1 = 2.042 to X1 = 2.691 Discharge equals Q at subwatershed 26 divided by 2. Q = 943 ÷ 2 = 472 CFS See following report, Section 3: Hydrologic Analysis, for a description of conditions and unique problems encountered throughout the watershed.
4E UNIQUE CONDITIONS AND PROBLEMS (Continued)	X1 = 1.210 Recent flooding evidence indicates that the road will wash out in this area and flow will continue to the east, thus the reason for taking the entire flow to the east at this cross section. Topographic mapping does not reflect this. Disregard extended cross section message. X1 = 1.531 Wash flows through a man-made retention basin on the Caterpillar Proving Grounds.

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: Maricopa County, Unincorporated Area

COUNTY: Maricopa | STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: Tractor Wash (Wash 5C) | RUN DATE: 11/14/91 15:57:06

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		0.000		
		0.037		
		0.095		
		0.188		
		0.251		
		0.305		
		0.347		
		0.389		
		0.455		
		0.504		
		0.549		
		0.629		
		0.720		
		0.786		
		0.828		
		0.894		
		0.955		
		1.017		
		1.085		
		1.137		
		1.196		
		1.210		
		1.298		
		1.364		
		1.416		
		1.478		
		1.531		
		1.620		
		1.719		
		1.812		

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: Maricopa County, Unincorporated Area

COUNTY: Maricopa | STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: Tractor Wash (Wash 5C) | RUN DATE: 11/14/91 15:57:06

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		1.880		
		1.934		
		1.998		
		2.042		
		2.094		
		2.137		
		2.189		
		2.248		
		2.301		
		2.347		
		2.402		
		2.500		
		2.595		
		2.691		

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY |X| RESTUDY | | LOMR | | OTHER | |
SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	Maricopa County, Unincorporated Areas
1B	COMMUNITY NUMBER	040037
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	
1F	STUDY CONTRACTOR CONTACT (S) ADDRESS PHONE	The WLB Group, Inc. Jeff Erickson or Mark Gavan 333 East Osborn Road, Suite 380 Phoenix, Arizona 85012 (602) 279-1016
1G	TECH. REVIEWER (FEMA) PHONE	Michael Baker Jr., Inc. Contact: Michelle Monde (703) 960-8800
1H	FEMA REGIONAL REVIEWER PHONE	N/A
1I	STATE REVIEWER PHONE	N/A
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Contact: Greg Rodzenko (602) 506-1501
1K	RIVER OR STREAM NAME	Caterpillar Dike Wash (Wash 5D)
1L	REACH DESCRIPTION	FIRM Panel Numbers 1575 and 1600 - Wash begins at the confluence with Tuthill Dike Wash and continues upstream to the west to the limit of the study at a man-made detention basin. Mouth - Latitude: 33° 30' 54" Longitude: 112° 29' 45" Head - Latitude: 33° 30' 32" Longitude: 112° 30' 37"
1M	STUDY TYPE	Detailed Analysis - Riverine
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	White Tank Mts. SE, Waddell 7.5 min.
2B	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89

STUDY DOCUMENTATION ABSTRACT - Caterpillar Dike Wash (Wash 5D)		
SECTION 3: HYDROLOGY		
3A	MODEL OR METHOD USED (including vendor and version description)	HEC-1 Flood Hydrograph Package, Version 4.0 from McTrans Center
3B	STORM DURATION	24-Hour
3C	HYETOGRAPH TYPE	SCS Type II
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	Gage data is not compiled sufficiently in this area for calibration of model. Q's were compared to a number of previous studies to make sure the computed discharges were reasonable.
3F	RAINFALL AMOUNTS AND REFERENCE	4.03 in. - NOAA Atlas 2, Volume VIII
3G	UNIQUE CONDITIONS AND PROBLEMS	X1 = 0.000 to X1 = 0.179 Discharge equals Q at CP22A. Q = 1111 CFS X1 = 0.273 to X1 = 0.432 Discharge equals Q at subwatershed 22A divided by 2. Q = 764 ÷ 2 = 382 CFS (Continued)
3H	COORDINATION OF Q'S (agency, date, comments)	Flood Control District of Maricopa County - July 9, 1991 Hydrology accepted - ongoing review and comments were incorporated throughout the study.
SECTION 4: HYDRAULICS		
4A	MODEL OR METHOD USED (including vendor and version description)	HEC-2 Water Surface Profiles, Version 4.6.0, February 1991, from McTrans Center
4B	REGIME	Subcritical
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	Initially methods 10.4 or 10.6 were used then floodways were smoothed using method 9.1. Floodways were calculated to provide a natural conveyance corridor and may not reach the 1.0 ft. rise in WSEL designated for floodway encroachment. This was incorporated per instructions from the Flood Control District of Maricopa County.
4E	UNIQUE CONDITIONS AND PROBLEMS	Beginning WSEL = 1285.39 at X1 = 4.725 from Tuthill Dike Wash HEC-2 run, confluence with Tuthill Dike Wash. X1 = 0.084 to X1 = 0.273 Next three upstream cross sections are extended due to overtopping of the man-made dike. X1 = 0.416 to X1 = 0.432 Wash flows through a dip section on a man-made road on Caterpillar Proving Grounds.

STUDY DOCUMENTATION ABSTRACT - Caterpillar Dike Wash (Wash 5D)	
ADDITIONAL STUDY INFORMATION	
ITEM	DESCRIPTION / DISCUSSION
3G UNIQUE CONDITIONS AND PROBLEMS (Continued)	X1 = 0.504 to X1 = 0.938 Discharge equals Q at subwatershed 22A divided by 4. Q = 764 ÷ 4 = 191 CFS See following report, Section 3: Hydrologic Analysis, for a description of conditions and unique problems encountered throughout the watershed.

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: Maricopa County, Unincorporated Area — Page 1 of 1

COUNTY: Maricopa | STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: Caterpillar Dike Wash (Wash 5D) | RUN DATE: 11/14/91 16:19:21

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		0.000		
		0.084		
		0.179		
		0.273		
		0.369		
		0.416		
		0.432		
		0.504		
		0.585		
		0.675		
		0.777		
		0.862		
		0.938		

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY |X| RESTUDY | | LOMR | | OTHER | |
SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	Maricopa County, Unincorporated Areas
1B	COMMUNITY NUMBER	040037
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	
1F	STUDY CONTRACTOR CONTACT (S) ADDRESS PHONE	The WLB Group, Inc. Jeff Erickson or Mark Gavan 333 East Osborn Road, Suite 380 Phoenix, Arizona 85012 (602) 279-1016
1G	TECH. REVIEWER (FEMA) PHONE	Michael Baker Jr., Inc. Contact: Michelle Monde (703) 960-8800
1H	FEMA REGIONAL REVIEWER PHONE	N/A
1I	STATE REVIEWER PHONE	N/A
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Contact: Greg Rodzenko (602) 506-1501
1K	RIVER OR STREAM NAME	White Granite Wash (Wash 5E)
1L	REACH DESCRIPTION	FIRM Panel Numbers 1575 - Wash begins at a retention basin on the Caterpillar Proving Grounds and continues upstream west into the White Tank Mountains. Mouth - Latitude: 33° 30' 52" Longitude: 112° 30' 22" Head - Latitude: 33° 31' 44" Longitude: 112° 32' 35"
1M	STUDY TYPE	Detailed Analysis - Riverine
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	White Tank Mts. SE 7.5 min.
2B	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89

STUDY DOCUMENTATION ABSTRACT - White Granite Wash (Wash 5E)		
SECTION 3: HYDROLOGY		
3A	MODEL OR METHOD USED (including vendor and version description)	HEC-1 Flood Hydrograph Package, Version 4.0 from McTrans Center
3B	STORM DURATION	24-Hour
3C	HYETOGRAPH TYPE	SCS Type II
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	Gage data is not compiled sufficiently in this area for calibration of model. Q's were compared to a number of previous studies to make sure the computed discharges were reasonable.
3F	RAINFALL AMOUNTS AND REFERENCE	4.03 in. - NOAA Atlas 2, Volume VIII
3G	UNIQUE CONDITIONS AND PROBLEMS	X1 = 0.000 to X1 = 0.680 Discharge equals Q at CP21. Q = 1933 CFS X1 = 0.777 to X1 = 1.444 Discharge equals Q at subwatershed 21 divided by 2. Q = 688 ÷ 2 = 344 CFS See following report, Section 3: Hydrologic Analysis, for a description of conditions and unique problems encountered throughout the watershed.
3H	COORDINATION OF Q'S (agency, date, comments)	Flood Control District of Maricopa County - July 9, 1991 Hydrology accepted - ongoing review and comments were incorporated throughout the study.
SECTION 4: HYDRAULICS		
4A	MODEL OR METHOD USED (including vendor and version description)	HEC-2 Water Surface Profiles, Version 4.6.0, February 1991, from McTrans Center
4B	REGIME	Subcritical
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	Initially methods 10.4 or 10.6 were used then floodways were smoothed using method 9.1. Floodways were calculated to provide a natural conveyance corridor and may not reach the 1.0 ft. rise in WSEL designated for floodway encroachment. This was incorporated per instructions from the Flood Control District of Maricopa County.
4E	UNIQUE CONDITIONS AND PROBLEMS	Match floodplain into 100-year ponding WSEL = 1347.82 at retention basin. X1 = 0.324 to X1 = 0.408 Next three upstream cross sections indicate divided flow. This is due to upstream inflow therefore making the overbank flow effective. X1 = 0.585 Confluence with North Fork White Granite Wash.

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: Maricopa County, Unincorporated Area — Page 1 of 1

COUNTY: Maricopa | STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: White Granite Wash (Wash 5E) | RUN DATE: 11/14/91 16:17:54

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		0.000		
		0.033		
		0.099		
		0.168		
		0.245		
		0.324		
		0.381		
		0.408		
		0.477		
		0.585		
		0.680		
		0.777		
		0.863		
		0.969		
		1.044		
		1.113		
		1.155		
		1.236		
		1.291		
		1.329		
		1.408		
		1.444		

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY |X| RESTUDY | | LOMR | | OTHER | |
SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	Maricopa County, Unincorporated Areas
1B	COMMUNITY NUMBER	040037
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	
1F	STUDY CONTRACTOR CONTACT (S) ADDRESS PHONE	The WLB Group, Inc. Jeff Erickson or Mark Gavan 333 East Osborn Road, Suite 380 Phoenix, Arizona 85012 (602) 279-1016
1G	TECH. REVIEWER (FEMA) PHONE	Michael Baker Jr., Inc. Contact: Michelle Monde (703) 960-8800
1H	FEMA REGIONAL REVIEWER PHONE	N/A
1I	STATE REVIEWER PHONE	N/A
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Contact: Greg Rodzenko (602) 506-1501
1K	RIVER OR STREAM NAME	North Fork White Granite Wash (Wash 5E1)
1L	REACH DESCRIPTION	FIRM Panel Numbers 1575 - Wash begins at confluence with White Granite Wash and continues upstream northwest into the White Tank Mountains. Mouth - Latitude: 33° 30' 53" Longitude: 112° 31' 03" Head - Latitude: 33° 32' 33" Longitude: 112° 33' 12"
1M	STUDY TYPE	Detailed Analysis - Riverine
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	White Tank Mts. SE 7.5 min.
2B	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89

STUDY DOCUMENTATION ABSTRACT - North Fork White Granite Wash (Wash 5E1)		
SECTION 3: HYDROLOGY		
3A	MODEL OR METHOD USED (including vendor and version description)	HEC-1 Flood Hydrograph Package, Version 4.0 from McTrans Center
3B	STORM DURATION	24-Hour
3C	HYETOGRAPH TYPE	SCS Type II
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	Gage data is not compiled sufficiently in this area for calibration of model. Q's were compared to a number of previous studies to make sure the computed discharges were reasonable.
3F	RAINFALL AMOUNTS AND REFERENCE	4.03 in. - NOAA Atlas 2, Volume VIII
3G	UNIQUE CONDITIONS AND PROBLEMS	X1 = 0.000 to X1 = 0.091 Discharge equals Q at X1 = 0.585 from White Granite Wash (Wash 5E). Q = 1933 CFS X1 = 0.134 to X1 = 0.661 Discharge equals Q at CP19. Q = 1353 CFS See following report, Section 3: Hydrologic Analysis, for a description of conditions and unique problems encountered throughout the watershed.
3H	COORDINATION OF Q'S (agency, date, comments)	Flood Control District of Maricopa County - July 9, 1991 Hydrology accepted - ongoing review and comments were incorporated throughout the study.
SECTION 4: HYDRAULICS		
4A	MODEL OR METHOD USED (including vendor and version description)	HEC-2 Water Surface Profiles, Version 4.6.0, February 1991, from McTrans Center
4B	REGIME	Subcritical
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	Initially methods 10.4 or 10.6 were used then floodways were smoothed using method 9.1. Floodways were calculated to provide a natural conveyance corridor and may not reach the 1.0 ft. rise in WSEL designated for floodway encroachment. This was incorporated per instructions from the Flood Control District of Maricopa County.
4E	UNIQUE CONDITIONS AND PROBLEMS	Beginning WSEL = 1398.89 at X1 = 0.585 from White Granite Wash HEC-2 run, confluence with White Granite Wash. No other unique conditions or problems exist on this wash.

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: Maricopa County, Unincorporated Area — Page 1 of 1

COUNTY: Maricopa | STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: North Fork White Granite Wash (Wash 5E1) | RUN DATE: 11/14/91 16:25:47

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		0.000		
		0.091		
		0.134		
		0.185		
		0.280		
		0.375		
		0.469		
		0.563		
		0.661		

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY |X| RESTUDY | | LOMR | | OTHER | |
SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	Town of Buckeye and Maricopa County, Unincorporated Areas
1B	COMMUNITY NUMBER	040037, 040039
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	
1F	STUDY CONTRACTOR CONTACT (S) ADDRESS PHONE	The WLB Group, Inc. Jeff Erickson or Mark Gavan 333 East Osborn Road, Suite 380 Phoenix, Arizona 85012 (602) 279-1016
1G	TECH. REVIEWER (FEMA) PHONE	Michael Baker Jr., Inc. Contact: Michelle Monde (703) 960-8800
1H	FEMA REGIONAL REVIEWER PHONE	N/A
1I	STATE REVIEWER PHONE	N/A
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Contact: Greg Rodzenko (602) 506-1501
1K	RIVER OR STREAM NAME	191st Avenue Wash (Wash 6)
1L	REACH DESCRIPTION	FIRM Panel Numbers 1600 and 2055 - Limits of study for this wash are follows: Begin at I-10, approximately 1/2 mile east of Jackrabbit Trail, continue upstream north along the 191st Avenue alignment to the limit of study at approximately Bethany Home Road. Mouth - Latitude: 33° 27' 46" Longitude: 112° 28' 02" Head - Latitude: 33° 30' 51" Longitude: 112° 28' 10"
1M	STUDY TYPE	Detailed Analysis - Riverine
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	Perryville , Waddell 7.5 min.
2B	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89

STUDY DOCUMENTATION ABSTRACT - 191st Avenue Wash (Wash 6)		
SECTION 3: HYDROLOGY		
3A	MODEL OR METHOD USED (including vendor and version description)	HEC-1 Flood Hydrograph Package, Version 4.0 from McTrans Center
3B	STORM DURATION	24-Hour
3C	HYETOGRAPH TYPE	SCS Type II
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	Gage data is not compiled sufficiently in this area for calibration of model. Q's were compared to a number of previous studies to make sure the computed discharges were reasonable.
3F	RAINFALL AMOUNTS AND REFERENCE	4.03 in. - NOAA Atlas 2, Volume VIII
3G	UNIQUE CONDITIONS AND PROBLEMS	Discharges for this HEC-2 run are taken from a split flow analysis that was run previously and is also submitted for your review. These discharges will vary frequently throughout the model based on the number of breakouts that occur throughout this particular HEC-2 run. Refer to the output of the HEC-2 split flow analysis run to verify discharges within the actual HEC-2 run. Documentation is also provided within the split flow run to show how discharges were calculated in each reach. See following report, Section 3: Hydrologic Analysis, for a description of conditions and unique problems encountered throughout the watershed.
3H	COORDINATION OF Q'S (agency, date, comments)	Flood Control District of Maricopa County - July 9, 1991 Hydrology accepted - ongoing review and comments were incorporated throughout the study.
SECTION 4: HYDRAULICS		
4A	MODEL OR METHOD USED (including vendor and version description)	HEC-2 Water Surface Profiles, Version 4.6.0, February 1991, from McTrans Center
4B	REGIME	Subcritical
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	Initially methods 10.4 or 10.6 were used then floodways were smoothed using method 9.1. Floodways were calculated to provide a natural conveyance corridor and may not reach the 1.0 ft. rise in WSEL designated for floodway encroachment. This was incorporated per instructions from the Flood Control District of Maricopa County.
4E	UNIQUE CONDITIONS AND PROBLEMS	Discharges for this HEC-2 run are taken from a split flow analysis that was computed separately and which is also submitted for review. Divided flows, wherever they occur, are due to braided channel type. Encroachment stations are basically limited to floodplain stations due to the potential of increasing the breakout flows over the left bank unless otherwise permissible. (Continued)

STUDY DOCUMENTATION ABSTRACT - 191st Avenue Wash (Wash 6)

ADDITIONAL STUDY INFORMATION

ITEM	DESCRIPTION / DISCUSSION
4E UNIQUE CONDITIONS AND PROBLEMS (Continued)	X1 = 0.000 to X1 = 0.863 Match floodplain and floodway to the ponding WSEL computed in the HEC-1 model behind I-10. First cross section will begin approximately 200 feet north of I-10 and approximately 101 cfs will break out and continue overland to the southeast as sheet flow. X1 = 1.184 to X1 = 1.654 Approximately 489 cfs will break out and flows will continue overland to the southeast as sheet flow. X1 = 2.140 to X1 = 2.241 Approximately 405 cfs will break out and flows will continue overland to the southeast as sheet flow. X1 = 2.555 to X1 = 3.161 Approximately 354 cfs will break out and flows will continue overland to the southeast as sheet flow. X1 = 3.161 to X1 = 3.829 Approximately 472 cfs will break out and flows will continue overland to the southeast as sheet flow.

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: Town of Buckeye and Maricopa County, Unincorporated Areas

COUNTY: Maricopa | STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: 191st Avenue Wash (Wash 6) | RUN DATE: 03/13/92 15:36:12

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		0.000		
		0.087		
		0.165		
		0.266		
		0.342		
		0.426		
		0.508		
		0.593		
		0.680		
		0.773		
		0.863		
		0.950		
		1.045		
		1.138		
		1.184		
		1.271		
		1.354		
		1.438		
		1.509		
		1.594		
		1.654		
		1.734		
		1.821		
		1.969		
		2.000		
		2.083		
		2.136		
		2.140		
		2.155		

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: Town of Buckeye and Maricopa County, Unincorporated Areas

COUNTY: Maricopa | STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: 191st Avenue Wash (Wash 6) | RUN DATE: 03/13/92 15:36:12

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		2.241		
		2.337		
		2.438		
		2.544		
		2.555		
		2.731		
		2.845		
		2.938		
		3.057		
		3.129		
		3.161		
		3.247		
		3.352		
		3.446		
		3.547		
		3.635		
		3.730		
		3.829		
		3.929		
		4.024		

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY |X| RESTUDY | | LOMR | | OTHER | |
SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	City of Glendale and Maricopa County, Unincorporated Areas
1B	COMMUNITY NUMBER	040037, 040045
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	
1F	STUDY CONTRACTOR CONTACT (S) ADDRESS PHONE	The WLB Group, Inc. Jeff Erickson or Mark Gavan 333 East Osborn Road, Suite 380 Phoenix, Arizona 85012 (602) 279-1016
1G	TECH. REVIEWER (FEMA) PHONE	Michael Baker Jr., Inc. Contact: Michelle Monde (703) 960-8800
1H	FEMA REGIONAL REVIEWER PHONE	N/A
1I	STATE REVIEWER PHONE	N/A
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Contact: Greg Rodzenko (602) 506-1501
1K	RIVER OR STREAM NAME	Perryville Road Wash (Wash 7)
1L	REACH DESCRIPTION	FIRM Panel Number 1600 - The beginning limits of study for Perryville Road Wash is located 1/2 mile west of Citrus Road along the north side of Camelback Road in an agricultural reservoir and continues upstream west 1/2 mile to Perryville Road then continues north along Perryville Road to the limit of study at Northern Avenue where flows break out from Beardsley Canal Wash. Mouth - Latitude: 33° 30' 30" Longitude: 112° 27' 08" Head - Latitude: 33° 32' 20" Longitude: 112° 28' 08"
1M	STUDY TYPE	Detailed Analysis - Riverine
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	Waddell 7.5 min.
2B	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89

STUDY DOCUMENTATION ABSTRACT - Perryville Road Wash (Wash 7)		
SECTION 3: HYDROLOGY		
3A	MODEL OR METHOD USED (including vendor and version description)	HEC-1 Flood Hydrograph Package, Version 4.0 from McTrans Center
3B	STORM DURATION	24-Hour
3C	HYETOGRAPH TYPE	SCS Type II
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	Gage data is not compiled sufficiently in this area for calibration of model. Q's were compared to a number of previous studies to make sure the computed discharges were reasonable.
3F	RAINFALL AMOUNTS AND REFERENCE	4.03 in. - NOAA Atlas 2, Volume VIII
3G	UNIQUE CONDITIONS AND PROBLEMS	Starting water surface elevation and discharges are taken from a split flow analysis run that was performed previously. This split flow analysis run is included for your review and should be refered to when reviewing the discharges as input into this HEC-2 model. (Continued)
3H	COORDINATION OF Q'S (agency, date, comments)	Flood Control District of Maricopa County - July 9, 1991 Hydrology accepted - ongoing review and comments were incorporated throughout the study.
SECTION 4: HYDRAULICS		
4A	MODEL OR METHOD USED (including vendor and version description)	HEC-2 Water Surface Profiles, Version 4.6.0, February 1991, from McTrans Center
4B	REGIME	Subcritical
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	Initially methods 10.4 or 10.6 were used then floodways were smoothed using method 9.1. Floodways were calculated to provide a natural conveyance corridor and may not reach the 1.0 ft. rise in WSEL designated for floodway encroachment. This was incorporated per instructions from the Flood Control District of Maricopa County.
4E	UNIQUE CONDITIONS AND PROBLEMS	Begin detailed study at agricultural reservoir located 1/2 mile west of Citrus Road along the north side of Camelback Road. Floodplain and floodway is coincident in most cases, however, small incremental rises in WSEL are allowed to smooth the floodway without overtopping the limiting elevations along the roadway. Starting WSEL and discharges are taken from the split flow analysis run for this particular wash. This run is included also for your review. Where cross sections are extended the split flow analysis was used to calculate the actual discharge that would be contained and then conveyed to the south or east along Perryville Road. (Continued)

STUDY DOCUMENTATION ABSTRACT - Perryville Road Wash (Wash 7)

ADDITIONAL STUDY INFORMATION

ITEM	DESCRIPTION / DISCUSSION
3G UNIQUE CONDITIONS AND PROBLEMS (Continued)	X1 = 0.000 Approximately 680 CFS breaks out and continues south as sheet flow. Q = 470 CFS X1 = 0.088 Approximately 148 CFS breaks out and continues south as sheet flow. Q = 1129 CFS X1 = 0.177 Q = 1277 CFS X1 = 0.265 to X1 = 0.422 Q = 1234 CFS X1 = 0.489 to X1 = 0.938 Q = 1190 CFS X1 = 0.938 Approximately 385 CFS breaks out over the next four upstream cross sections. Breakout flow continue overland to the southeast as sheet flow. X1 = 1.025 Q = 1116 CFS X1 = 1.123 Q = 1335 CFS X1 = 1.225 to X1 = 1.389 Q = 1477 CFS X1 = 1.429 to X1 = 1.545 Q = 1375 CFS X1 = 1.545 Approximately 108 CFS breaks out over the next three upstream cross sections. Brakout flows continue overland to the southeast as sheet flow. X1 = 1.640 Q = 1343 CFS X1 = 1.737 to X1 = 2.381 Q = 1484 CFS X1 = 2.453 to X1 = 3.549 Q = 1450 CFS X1 = 3.585 to X1 = 3.681 Discharge equals Q at CP188. Q = 1457 CFS X1 = 3.705 Discharge equals Q at CP10. Q = 1486 CFS See following report, Section 3: Hydrologic Analysis, for a description of conditions and unique problems encountered throughout the watershed.

STUDY DOCUMENTATION ABSTRACT - Perryville Road Wash (Wash 7)

ADDITIONAL STUDY INFORMATION

ITEM	DESCRIPTION / DISCUSSION
4E UNIQUE CONDITIONS AND PROBLEMS (Continued)	Approximately 830 cfs breaks out over the next two upstream cross sections at the agricultural reservoir and continues south as sheet flow. X1 = 0.489 The wash turns to the north at the intersection of Camelback Road and Perryville Road. X1 = 0.938 to X1 = 1.225 Approximately 385 cfs breaks out over the next four upstream cross sections. Break out flows continue overland to the southeast as sheet flows. X1 = 1.548 to X1 = 1.737 Approximately 108 cfs breaks out over the next three upstream cross sections. Break out flows continue overland to the southeast as sheet flows. X1 = 3.549 The wash backs up behind an existing irrigation canal and weirs over the top of this canal and continues to the southeast. Floodplain and floodway widths are coincident for the next five upstream cross sections due to ponding constraints. X1 = 3.727 This is the limit of the detailed study at Northern Avenue and Beardsley Canal Wash where flows break out from the west over Beardsley Canal.

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: City of Glendale and Maricopa County, Unincorporated Areas

COUNTY: Maricopa | STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: Perryville Road Wash (Wash 7) | RUN DATE: 11/25/91 15:44:16

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		0.000		
		0.088		
		0.177		
		0.265		
		0.350		
		0.422		
		0.489		
		0.523		
		0.606		
		0.686		
		0.736		
		0.830		
		0.938		
		1.025		
		1.123		
		1.225		
		1.318		
		1.389		
		1.429		
		1.463		
		1.545		
		1.640		
		1.737		
		1.851		
		1.937		
		2.018		
		2.066		
		2.136		
		2.216		
		2.303		

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: City of Glendale and Maricopa County, Unincorporated Areas

COUNTY: Maricopa | STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: Perryville Road Wash (Wash 7) | RUN DATE: 11/25/91 15:44:16

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		2.381		
		2.453		
		2.501		
		2.576		
		2.626		
		2.704		
		2.785		
		2.874		
		2.955		
		3.045		
		3.116		
		3.197		
		3.262		
		3.326		
		3.400		
		3.461		
		3.549		
		3.558		
		3.653		
		3.681		
		3.727		

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY |X| RESTUDY | | LOMR | | OTHER | |
SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	City of Glendale, Town of Goodyear and Maricopa County, Unincorporated Areas
1B	COMMUNITY NUMBER	040037, 040045, 040046
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	
1F	STUDY CONTRACTOR CONTACT (S) ADDRESS PHONE	The WLB Group, Inc. Jeff Erickson or Mark Gavan 333 East Osborn Road, Suite 380 Phoenix, Arizona 85012 (602) 279-1016
1G	TECH. REVIEWER (FEMA) PHONE	Michael Baker Jr., Inc. Contact: Michelle Monde (703) 960-8800
1H	FEMA REGIONAL REVIEWER PHONE	N/A
1I	STATE REVIEWER PHONE	N/A
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Contact: Greg Rodzenko (602) 506-1501
1K	RIVER OR STREAM NAME	Cotton Lane Wash, along west side of AT&SF RR, from Indian School Road to Olive Avenue (Wash 8)
1L	REACH DESCRIPTION	FIRM Panel Numbers 1600 and 2060 - This study begins at the intersection of Indian School Road and the AT&SF RR and continues upstream north along the west side of the AT&SF RR to the limit of approximate study at Olive Avenue. Begin - SE Corner of Section 23, T2N, R2W End - NE Corner of Section 35, T3N, R2W
1M	STUDY TYPE	Approximate Study as directed by Flood Control District of Maricopa County
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	Perryville, Waddell 7.5 min.
2B	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89

STUDY DOCUMENTATION ABSTRACT - Cotton Lane Wash, along west side of AT&SF RR, from Indian School Road to Olive Avenue (Wash 8)		
SECTION 3: HYDROLOGY		
3A	MODEL OR METHOD USED (including vendor and version description)	HEC-1 Flood Hydrograph Package, Version 4.0 from McTrans Center
3B	STORM DURATION	24-Hour
3C	HYETOGRAPH TYPE	SCS Type II
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	Gage data is not compiled sufficiently in this area for calibration of model. Q's were compared to a number of previous studies to make sure the computed discharges were reasonable.
3F	RAINFALL AMOUNTS AND REFERENCE	4.03 in. - NOAA Atlas 2, Volume VIII
3G	UNIQUE CONDITIONS AND PROBLEMS	Major concentration points were located at every mile intersection point along the AT&SF Railroad. Diversions were then computed at these points to divert flow that would exceed the capacity behind the Railroad. However, situations occur along the length of the Railroad that may have diversions or flow going over the top of it, between the mile intersection points. For the ease of running the hydrology model, these were combined at the major mile intersection points and diverts were then taken out at that point. Discharge for the HEC-2 model are explained in Section 4E of this abstract. (Continued)
3H	COORDINATION OF Q'S (agency, date, comments)	Flood Control District of Maricopa County - July 9, 1991 Hydrology accepted - ongoing review and comments were incorporated throughout the study.
SECTION 4: HYDRAULICS		
4A	MODEL OR METHOD USED (including vendor and version description)	HEC-2 Water Surface Profiles, Version 4.6.0, February 1991, from McTrans Center
4B	REGIME	Subcritical
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	Approximate study, no floodway was calculated. Approximate Floodplain documented by HEC-2 run.
4E	UNIQUE CONDITIONS AND PROBLEMS	Two profiles were run for this particular wash to calculate an approximate floodplain delineation. Discharges for the first profile are derived from the 100-year, 24-hour storm in the HEC-1 model. Discharges for the second profile are the capacities which limit the WSEL extension over the railroad to no more than 1.5 feet in any given area and are then used for the approximate floodplain delineation. Breakout flows over the railroad, along the length of the wash, will continue south in a ditch between Cotton Lane and the railroad and along Cotton Lane itself. Any flows that exceed the capacity of Cotton Lane will continue overland to the southeast as sheet flow. Diversions were used in the HEC-1 model at the major mile intersections to divert any flow that would be diverted throughout that 1 mile stretch.

STUDY DOCUMENTATION ABSTRACT - Cotton Lane Wash, along west side of AT&SF RR, from Indian School Road to Olive Avenue (Wash 8)	
ADDITIONAL STUDY INFORMATION	
ITEM	DESCRIPTION / DISCUSSION
3G UNIQUE CONDITIONS AND PROBLEMS (Continued)	See following report, Section 3: Hydrologic Analysis, for a description of conditions and unique problems encountered throughout the watershed.

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: Town of Goodyear, City of Glendale and Maricopa County, Unincorporated Areas

COUNTY: Maricopa | STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: Cotton Lane Wash, Along the West side of the AT&SF RR, from Indian School Road to Olive Avenue (Wash 8) | RUN DATE: 12/02/91 14:08:29

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		0.000		
		0.059		
		0.103		
		0.213		
		0.305		
		0.413		
		0.517		
		0.631		
		0.758		
		0.862		
		0.956		
		1.011		
		1.056		
		1.118		
		1.223		
		1.312		
		1.380		
		1.453		
		1.536		
		1.643		
		1.738		
		1.832		
		1.925		
		2.006		
		2.038		
		2.055		
		2.138		
		2.233		
		2.312		

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: Town of Goodyear, City of Glendale and Maricopa County, Unincorporated Areas

COUNTY: Maricopa

STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: Cotton Lane Wash, Along the West side of the AT&SF RR, from Indian School Road to Olive Avenue (Wash 8)

RUN DATE: 12/02/91 14:08:29

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		2.399		
		2.492		
		2.587		
		2.689		
		2.790		
		2.886		
		2.986		
		3.014		
		3.109		
		2.194		
		3.277		
		3.384		
		3.472		
		3.562		
		3.645		
		3.768		
		3.880		
		4.003		
		4.022		
		4.100		
		4.181		
		4.253		
		4.330		
		4.415		
		4.498		
		4.587		
		4.662		
		4.746		
		4.831		

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: Town of Goodyear, City of Glendale and Maricopa County, Unincorporated Areas

COUNTY: Maricopa

STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: Cotton Lane Wash, Along the West side of the AT&SF RR, from Indian School Road to Olive Avenue (Wash 8)

RUN DATE: 12/02/91 14:08:29

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		4.922		
		5.009		

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY |X| RESTUDY | | LOMR | | OTHER | |
SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	City of Glendale, Town of Surprise and Maricopa County, Unincorporated Areas
1B	COMMUNITY NUMBER	040037, 040045, 040053
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	
1F	STUDY CONTRACTOR CONTACT (S) ADDRESS PHONE	The WLB Group, Inc. Jeff Erickson or Mark Gavan 333 East Osborn Road, Suite 380 Phoenix, Arizona 85012 (602) 279-1016
1G	TECH. REVIEWER (FEMA) PHONE	Michael Baker Jr., Inc. Contact: Michelle Monde (703) 960-8800
1H	FEMA REGIONAL REVIEWER PHONE	N/A
1I	STATE REVIEWER PHONE	N/A
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Contact: Greg Rodzenko (602) 506-1501
1K	RIVER OR STREAM NAME	Cotton Lane Wash, along west side of AT&SF RR, from Olive Avenue to Waddell Road (Wash 9)
1L	REACH DESCRIPTION	FIRM Panel Number 1600 - Begin approximate study at Olive Avenue and continue upstream north along the west side of the AT&SF RR to approximately 1/2 mile north of Waddell Road and the limit of the approximate study. Begin - SE Corner of Section 26, T3N, R2W End - W1/4 Corner of Section 11, T3N, R2W
1M	STUDY TYPE	Approximate Study as directed by Flood Control District of Maricopa County
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	Waddell 7.5 min.
2B	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89

STUDY DOCUMENTATION ABSTRACT - Cotton Lane Wash, along west side of AT&SF RR, from Olive Avenue to Waddell Road (Wash 9)		
SECTION 3: HYDROLOGY		
3A	MODEL OR METHOD USED (including vendor and version description)	HEC-1 Flood Hydrograph Package, Version 4.0 from McTrans Center
3B	STORM DURATION	24-Hour
3C	HYETOGRAPH TYPE	SCS Type II
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	Gage data is not compiled sufficiently in this area for calibration of model. Q's were compared to a number of previous studies to make sure the computed discharges were reasonable.
3F	RAINFALL AMOUNTS AND REFERENCE	4.03 in. - NOAA Atlas 2, Volume VIII
3G	UNIQUE CONDITIONS AND PROBLEMS	Major concentration points were located at every mile intersection point along the AT&SF Railroad. Diversions were then computed at these points to divert flow that would exceed the capacity behind the Railroad. However, situations occur along the length of the Railroad that may have diversions or flow going over the top of it, between the mile intersection points. For the ease of running the hydrology model, these were combined at the major mile intersection points and diverts were then taken out at that point. Discharges for the HEC-2 model are explained in Section 4E of this abstract.
3H	COORDINATION OF Q'S (agency, date, comments)	Flood Control District of Maricopa County - July 9, 1991 Hydrology accepted - ongoing review and comments were incorporated throughout the study.
SECTION 4: HYDRAULICS		
4A	MODEL OR METHOD USED (including vendor and version description)	HEC-2 Water Surface Profiles, Version 4.6.0, February 1991, from McTrans Center
4B	REGIME	Subcritical
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	Approximate study, no floodway was calculated. Approximate Floodplain documented by HEC-2 run.
4E	UNIQUE CONDITIONS AND PROBLEMS	Two profiles are computed to calculate an approximate delineation for this wash. Discharges for the first profile are derived from the 100-year, 24-hour storm in the HEC-1 model. Discharges for the second profile are the capacities which limit the WSEL extension over the top of the railroad to no more than 1.5 feet and are then used for the approximate floodplain delineation. Breakout flows over the railroad, along the length of the wash, will continue south in a ditch between Cotton Lane and the railroad and along Cotton Lane itself. Any flows that exceed the capacity of Cotton Lane will continue overland to the southeast as sheet flow. Diversions in the HEC-1 model are taken at the major mile intersection points, although frequent diversions may occur throughout the mile stretch. See Section 3 in the Hydrology Analysis for a more complete description of this situation.

STUDY DOCUMENTATION ABSTRACT - Cotton Lane Wash, along west side of AT&SF RR, from Olive Avenue to Waddell Road (Wash 9)	
ADDITIONAL STUDY INFORMATION	
ITEM	DESCRIPTION / DISCUSSION
3G UNIQUE CONDITIONS AND PROBLEMS (Continued)	See following report, Section 3: Hydrologic Analysis, for a description of conditions and unique problems encountered throughout the watershed.

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: Town of Surprise, City of Glendale and Maricopa County, Unincorporated Areas

COUNTY: Maricopa

STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: Cotton Lane Wash, Along the West side of the AT&SF RR, from Olive Avenue to Waddell Road (Wash 9)

RUN DATE: 12/02/91 14:33:51

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		0.000		
		0.083		
		0.098		
		0.160		
		0.263		
		0.371		
		0.459		
		0.567		
		0.662		
		0.761		
		0.848		
		0.938		
		1.018		
		1.141		
		1.211		
		1.306		
		1.428		
		1.533		
		1.628		
		1.717		
		1.812		
		1.906		
		1.954		
		1.995		
		2.087		
		2.180		
		2.266		
		2.366		
		2.427		

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: Town of Surprise, City of Glendale and Maricopa County, Unincorporated Areas

COUNTY: Maricopa

STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: Cotton Lane Wash, Along the West side of the AT&SF RR, from Olive Avenue to Waddell Road (Wash 9)

RUN DATE: 12/02/91 14:33:51

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		2.534		
		2.635		
		2.752		
		2.832		
		2.941		
		2.973		
		3.050		
		3.152		
		3.258		
		2.368		
		3.486		

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY [X] RESTUDY [ ] LOMR [ ] OTHER [ ]
SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	Maricopa County - Unincorporated Areas, City of Goodyear, Town of Litchfield Park
1B	COMMUNITY NUMBER	040037, 040046, 040128
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	
1F	STUDY CONTRACTOR CONTACT (S) ADDRESS PHONE	The WLB Group, Inc. Jeff Erickson or Mark Gavan 333 East Osborn Road, Suite 380 Phoenix, Arizona 85012 (602) 279-1016
1G	TECH. REVIEWER (FEMA) PHONE	Michael Baker Jr., Inc. Contact: Michelle Monde (703) 960-8800
1H	FEMA REGIONAL REVIEWER PHONE	N/A
1I	STATE REVIEWER PHONE	N/A
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Contact: Greg Rodzenko (602) 506-1501
1K	RIVER OR STREAM NAME	Bullard Wash (Wash 10)
1L	REACH DESCRIPTION	FIRM Panel Numbers 1600, 2060, and 2070 - Wash delineations begin at Buckeye Canal and Agua Fria River and continue north upstream to Reems Road and Northern Avenue. Mouth - Latitude 33° 33' 07" Longitude 112° 23' 34" Head - Latitude 33° 23' 57" Longitude 112° 23' 29"
1M	STUDY TYPE	Combination Detailed Study and Approximate Study. Approximate study is documeted by the HEC-2 model.
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	Tolleson, Perryville, Waddell 7.5 min.
2B	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89

STUDY DOCUMENTATION ABSTRACT - Bullard Wash (Wash 10)		
SECTION 3: HYDROLOGY		
3A	MODEL OR METHOD USED (including vendor and version description)	HEC-1 Flood Hydrograph Package, Version 4.0 from McTrans Center
3B	STORM DURATION	24-Hour
3C	HYETOGRAPH TYPE	SCS Type II
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	Gage data is not compiled sufficiently in this area for calibration of model. Q's were compared to a number of previous studies to make sure the computed discharges were reasonable.
3F	RAINFALL AMOUNTS AND REFERENCE	4.03 in. - NOAA Atlas 2, Volume VIII
3G	UNIQUE CONDITIONS AND PROBLEMS	Discharges for the approximate study from X1 = 0.000 to X1 = 2.297 were originally taken from the HEC-1 model however, they have been reduced to reflect breakouts that occur in this stretch and are based upon the capacity of the channel plus a maximum of 1' over the top where capacity is exceeded. These situations are documented throughout the HEC-2 model. (Continued)
3H	COORDINATION OF Q'S (agency, date, comments)	Flood Control District of Maricopa County - July 9, 1991 Hydrology accepted - ongoing review and comments were incorporated throughout the study.
SECTION 4: HYDRAULICS		
4A	MODEL OR METHOD USED (including vendor and version description)	HEC-2 Water Surface Profiles, Version 4.6.0, February, 1991, From McTrans Center
4B	REGIME	Subcritical
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	Initially method 10.4 then floodways were smoothed using method 9.1
4E	UNIQUE CONDITIONS AND PROBLEMS	Due to the complexity of the downstream reach (Cross Section 0.000 to 2.297) an approximate floodplain delineation has been shown in this reach. However, the HEC-2 model was set up including these cross sections to aid in producing a reasonable approximate delineation. This approximate delineation is as shown on the maps and is based on engineering judgement reflecting the existing topography and using information from the HEC-2 model to estimate where break out flows will occur. Also, an approximate delineation has been shown for the uppermost reach of Bullard Wash, starting at Cross Section 10.269 to 14.023. The HEC-2 model was also utilized to estimate the approximate delineation in this reach. A detailed analysis was performed on Bullard Wash from Cross Sections 2.371 to 6.320 and from 9.189 to 10.197. (Continued)

STUDY DOCUMENTATION ABSTRACT - Bullard Wash (Wash 10)

ADDITIONAL STUDY INFORMATION

ITEM	DESCRIPTION / DISCUSSION
3G UNIQUE CONDITIONS AND PROBLEMS (Continued)	X1 = 0.000 to X1 = 0.531 Discharge from the HEC-1 model equals 3110 CFS and has been reduced to 850 CFS to the capacity of this area. X1 = 0.616 to X1 = 0.964 Q = 4895 CFS This area is able to contain the entire flow. X1 = 1.081 to X1 = 1.435 HEC-1 discharge equals 4895 CFS and has been reduced to 2596 CFS which is the capacity of the channel plus 1' in this reach. X1 = 1.474 to X1 = 1.823 Discharge from the HEC-1 model equals 4899 CFS and has been reduced to 2600 CFS to reflect the capacity of the channel plus 1' in this reach. X1 = 1.893 to X1 = 2.435 Q = 4899 CFS which is the capacity of the channel plus approximately 1'. X1 = 2.536 to X1 = 2.883 Discharge equals Q at CP335. Q = 4906 CFS X1 = 2.977 to X1 = 3.070 Discharge equals Q at CP334. Q = 4915 CFS X1 = 3.167 to X1 = 3.491 Discharge equals Q at intermediate concentration point 1I334. Q = 4432 CFS X1 = 3.602 to X1 = 4.496 Discharge equals Q at CP316. Q = 4438 CFS X1 = 4.625 to X1 = 5.430 Discharge equals Q at CP298. Q = 4446 CFS X1 = 5.460 to X1 = 5.563 Discharge equals Q at CP287. Q = 5319 CFS X1 = 5.727 to X1 = 6.864 Discharge equals Q at CP286. Q = 4662 CFS X1 = 6.877 to X1 = 7.045 Discharge equals Q at CP268. Q = 4703 CFS X1 = 7.124 to X1 = 7.924 Discharge equals Q at intermediate concentration point 1I268. Q = 4088 CFS X1 = 7.977 to X1 = 8.468 Discharge equals Q at CP253. Q = 4121 CFS X1 = 8.544 to X1 = 9.034 Discharge equals (Q at CP41, after storage routing, plus Q at CP253) divided by 2. Q = (4245 + 4121) ÷ 2 = 4183 CFS (Continued)

STUDY DOCUMENTATION ABSTRACT - Bullard Wash (Wash 10)

ADDITIONAL STUDY INFORMATION

ITEM	DESCRIPTION / DISCUSSION
3G UNIQUE CONDITIONS AND PROBLEMS (Continued)	X1 = 9.095 to X1 = 9.189 Discharge equals Q at CP241. Q = 4243 CFS X1 = 9.292 to X1 = 9.544 Discharge equals Q at intermediate concentration point 2I241. Q = 3693 CFS X1 = 9.641 to X1 = 9.807 Discharge equals Q at 2I241 from the HEC-1 model, which equals 3693 CFS. This Q has been reduced by the same amount that exceeded the capacity of the channel at the upstream reach from X1 = 10.269 to X1 = 10.639. That exceeded flow will return at X1 = 9.544. Q = 3113 CFS X1 = 9.898 to X1 = 10.197 Discharge equals routed flow from subwatershed 222, equals 1342 CFS. The Q has been reduced in this reach by the same amount that exceeded the capacity of the channel at the upstream reach from X1 = 10.269 to X1 = 10.639. That exceeded flow will also return at X1 = 9.544. Q = 762 CFS X1 = 10.269 to X1 = 10.639 Begin approximate floodplain delineation upstream to Northern Avenue. Discharge equals Q at CP22 equals 1380 CFS. The Q through this reach has been reduced to the capacity of the channel plus a maximum of 1' over the limiting elevation at the right overbank from X1 = 10.493 to X1 = 10.639. Exceeded flow will return at X1 = 9.544. Q = 800 CFS X1 = 10.709 to X1 = 11.580 Discharge equals Q at CP222. Q = 1380 CFS X1 = 11.676 to X1 = 12.534 Discharge equals Q at CP221A. Q = 1377 CFS X1 = 12.633 to X1 = 13.161 Discharge equals Q at CP212 which equals 1350 CFS. However, this Q has been reduced to the capacity of the channel plus a maximum of 1' over the limiting elevation at the left overbank. Exceeded flow will return at X1 = 12.534. Q = 1000 CFS X1 = 13.248 to X1 = 14.023 Discharge equals (Q at intermediate concentration point 1I212 plus diverted flow from subwatershed 193) divided by 2. Q = (1344 + 1536) ÷ 2 = 1440 CFS

STUDY DOCUMENTATION ABSTRACT - Bullard Wash (Wash 10)

ADDITIONAL STUDY INFORMATION

ITEM	DESCRIPTION / DISCUSSION
4E UNIQUE CONDITIONS AND PROBLEMS (Continued)	The area between cross section 6.320 and cross section 9.189 is currently under construction. No floodplain has been prepared for this area of Bullard Wash. However, the HEC-1 analysis was continued based on existing conditions at the time of the aerial mapping to compute water surface elevations upstream and downstream of this reach. The discharge in Field 4 of the QT cards is the actual discharge derived from the 100-year 24-hour HEC-1 model. This discharge is for comparison purposes only and no profile is being computed for it. Discharges for profiles 1 and 2 are used to delineate the floodplain and floodway respectively. These discharges are based upon the capacity of the channel plus a maximum of 1 foot over the top where capacity is exceeded. These situations are documented throughout the HEC-2 model. X1 = 0.000 Begin approximate floodplain delineation. Cross Section at Buckeye Canal This Q has been reduced to the capacity of the channel plus a maximum of 1 foot over the limiting elevation of the right overbank. Exceeded flow will continue as sheet flow to the west. Any WSEL extension at X1 = 0.047 to X1 = 0.616 is due to the limiting elevation at the right overbank. X1 = 0.384 Divided flow occurs for the next four upstream cross sections, however, these flows are effective due to upstream inflow at X1 = 0.668. X1 = 0.668 to X1 = 1.378 Any WSEL extension in this reach is due to the limiting elevation at the left overbank. X1 = 1.081 This Q has been reduced by the same amount that exceeded the capacity of the channel at the upstream reach from X1 = 1.474 to X1 = 1.823. That exceeded flow will return at approximately X1 = 0.964. Flows will weir over the top of the Southern Pacific due to the undersized culverts that go under the RR in this reach. X1 = 1.153 Divided flow occurs for the next four upstream cross sections. However, these flows are effective due to upstream inflow at X1 = 1.435. X1 = 1.474 This Q has been reduced to the capacity of the channel plus a maximum of 1 foot over the limiting elevation at the right overbank. Exceeded flow will return at approximately X1 = 0.964. Any WSEL extension from X1 = 1.474 to X1 = 1.823 is due to the limiting elevation at the right overbank. (Continued)

STUDY DOCUMENTATION ABSTRACT - Bullard Wash (Wash 10)

ADDITIONAL STUDY INFORMATION

ITEM	DESCRIPTION / DISCUSSION
4E UNIQUE CONDITIONS AND PROBLEMS (Continued)	X1 = 1.893 Divided flow occurs for the next five upstream cross sections. These flows are effective due to upstream inflow at X1 = 2.371. X1 = 2.058 to X1 = 2.185 Extended WSEL's are due to the limiting elevations at the left overbank. X1 = 2.297 End of approximate floodplain delineation. X1 = 2.371 Begin detailed floodplain and floodway analysis. X1 = 2.680 Divided flow occurs for the next two upstream cross sections. However, these flows are effective due to upstream inflow at X1 = 2.883. X1 = 3.291 Divided flow occurs for the next two upstream cross sections. However, these flows are effective due to upstream inflow at X1 = 3.602. X1 = 3.702 Divided flow occurs for the next two upstream cross sections. However, these flows are effective due to upstream inflow at X1 = 4.101. X1 = 5.430 to X1 = 5.460 Bullard Wash flows under a seven-span bridge at I-10. X1 = 5.727 Divided flow occurs for the next two upstream cross sections. However, these flows are effective due to upstream inflow at X1 = 5.960. X1 = 6.674 Divided flow occurs for at this cross section. However, this flow is effective due to upstream inflow at X1 = 6.877. X1 = 6.864 Roosevelt Irrigation District Canal. Flow will weir over the canal and go over a small siphon at this point. Effective flow limits are imposed for the next four upstream cross sections by use of a 6.1 on the QT card. X1 = 7.045 Any WSEL extension is due to the limiting elevation at the left overbank. Divided flow occurs for the next four upstream cross sections. X1 = 8.636 Divided flow occurs for the next three upstream cross sections. However, these flows are effective due to upstream inflow of X1 = 8.965. (Continued)

STUDY DOCUMENTATION ABSTRACT - Bullard Wash (Wash 10)

ADDITIONAL STUDY INFORMATION

ITEM	DESCRIPTION / DISCUSSION
4E UNIQUE CONDITIONS AND PROBLEMS (Continued)	X1 = 9.641 This Q has been reduced by the same amount that exceeded the capacity of the channel at the upstream reach from X1 = 10.269 to X1 = 10.639. That exceeded flow will return at X1 = 9.544. X1 = 9.898 This Q has been reduced by the same amount that exceeded the capacity of the channel at the upstream reach from X1 = 10.269 to X1 = 10.639. That exceeded flow will return at X1 = 9.544. X1 = 10.197 End detailed floodplain and floodway analysis. X1 = 10.269 Begin approximate floodplain delineation upstream to Northern Avenue. This Q has been reduced to the capacity of the channel plus a maximum of 1 foot over the limiting elevation at the right overbank from X1 = 10.493 to X1 = 10.639. Exceeded flow will return at X1 = 9.544. X1 = 10.493 Any WSEL extension from X1 = 10.493 to X1 = 10.639 is due to the limiting elevation at the right overbank. X1 = 12.150 Any WSEL extension from X1 = 12.150 to X1 = 12.534 is due to the limiting elevation at the left overbank. X1 = 12.633 This Q has been reduced to the capacity of the channel plus a maximum of 1 foot over the limiting elevation at the left overbank. Exceeded flow will return at X1 = 12.534. Any WSEL extension at X1 = 12.633 to X1 = 13.161 is due to the limiting elevation at the left overbank. X1 = 13.248 Divided flow occurs over the next three upstream cross sections. However, these flows are effective due to upstream inflow at X1 = 13.556. X1 = 13.556 Divided flow occurs for the next four upstream cross sections due to sheet flow situation in this region. X1 = 14.023 End approximate delineation at Northern Avenue.

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: City of Goodyear, Maricopa County - Unincorporated Areas

COUNTY: Maricopa | STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: Bullard Wash (Wash 10) | RUN DATE: 02/17/92 14:47:31

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		0.000		
		0.047		
		0.121		
		0.201		
		0.292		
		0.384		
		0.488		
		0.531		
		0.616		
		0.668		
		0.776		
		0.868		
		0.964		
		1.081		
		1.153		
		1.236		
		1.317		
		1.378		
		1.435		
		1.474		
		1.517		
		1.566		
		1.634		
		1.680		
		1.745		
		1.823		
		1.893		
		1.941		
		1.988		

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: City of Goodyear, Maricopa County - Unincorporated Areas

COUNTY: Maricopa | STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: Bullard Wash (Wash 10) | RUN DATE: 02/17/92 14:47:31

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		2.058		
		2.185		
		2.297		
		2.371		
		2.435		
		2.536		
		2.680		
		2.771		
		2.883		
		2.977		
		3.070		
		3.167		
		3.291		
		3.376		
		3.491		
		3.602		
		3.702		
		3.841		
		3.978		
		4.101		
		4.237		
		4.356		
		4.496		
		4.625		
		4.701		
		4.858		
		5.009		
		5.153		
		5.282		

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: City of Goodyear, Maricopa County - Unincorporated Areas

COUNTY: Maricopa

STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: Bullard Wash (Wash 10)

RUN DATE: 02/17/92 14:47:31

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		5.430		
		5.460		
		5.563		
		5.727		
		5.840		
		5.960		
		6.086		
		6.217		
		6.320		
		6.414		
		6.509		
		6.627		
		6.674		
		6.864		
		6.877		
		7.045		
		7.124		
		7.267		
		7.407		
		7.552		
		7.670		
		7.799		
		7.924		
		7.977		
		7.983		
		8.069		
		8.169		
		8.292		
		8.364		

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: City of Goodyear, Maricopa County - Unincorporated Areas

COUNTY: Maricopa | STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: Bullard Wash (Wash 10) | RUN DATE: 02/17/92 14:47:31

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		8.468		
		8.544		
		8.636		
		8.726		
		8.848		
		8.965		
		9.034		
		9.095		
		9.100		
		9.189		
		9.292		
		9.396		
		9.493		
		9.544		
		9.641		
		9.741		
		9.807		
		9.898		
		9.994		
		10.108		
		10.197		
		10.269		
		10.328		
		10.419		
		10.493		
		10.587		
		10.639		
		10.709		
		10.804		

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: City of Goodyear, Maricopa County - Unincorporated Areas

COUNTY: Maricopa

STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: Bullard Wash (Wash 10)

RUN DATE: 02/17/92 14:47:31

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		10.889		
		10.946		
		10.995		
		11.067		
		11.147		
		11.228		
		11.306		
		11.416		
		11.510		
		11.580		
		11.676		
		11.775		
		11.867		
		11.970		
		12.064		
		12.150		
		12.244		
		12.345		
		12.439		
		12.534		
		12.633		
		12.700		
		12.758		
		12.867		
		13.044		
		13.161		
		13.248		
		13.349		
		13.427		

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: City of Goodyear, Maricopa County - Unincorporated Areas

COUNTY: Maricopa | STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: Bullard Wash (Wash 10) | RUN DATE: 02/17/92 14:47:31

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		13.556		
		13.667		
		13.782		
		13.902		
		14.023		

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY [ ] RESTUDY [X] LOMR [ ] OTHER [ ]
SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	Town of Surprise and Maricopa County, Unincorporated Areas
1B	COMMUNITY NUMBER	040037, 040053
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	
1F	STUDY CONTRACTOR CONTACT (S) ADDRESS PHONE	The WLB Group, Inc. Jeff Erickson or Mark Gavan 333 East Osborn Road, Suite 380 Phoenix, Arizona 85012 (602) 279-1016
1G	TECH. REVIEWER (FEMA) PHONE	Michael Baker Jr., Inc. Contact: Michelle Monde (703) 960-8800
1H	FEMA REGIONAL REVIEWER PHONE	N/A
1I	STATE REVIEWER PHONE	N/A
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Contact: Greg Rodzenko (602) 506-1501
1K	RIVER OR STREAM NAME	AT&SF Railroad Channel (Wash 12)
1L	REACH DESCRIPTION	FIRM Panel Numbers 1605, 1610, and 1165 - Wash begins at a bridge crossing under the AT&SF RR just west of the Agua Fria River bridge and continues upstream to the northwest along the north side of the AT&SF RR to the limit of study at Greenway Road. Mouth - Approximately the SE Corner of Section 12, T3N, R1W Head - Approximately S 1/4 Corner of Section 2, T3N, R1W
1M	STUDY TYPE	Detailed Analysis - Riverine
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	El Mirage, Calderwood Butte 7.5 min.
2B	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89

STUDY DOCUMENTATION ABSTRACT - AT&SF Railroad Channel (Wash 12)		
SECTION 3: HYDROLOGY		
3A	MODEL OR METHOD USED (including vendor and version description)	HEC-1 Flood Hydrograph Package, Version 4.0 from McTrans Center
3B	STORM DURATION	24-Hour
3C	HYETOGRAPH TYPE	SCS Type II
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	Gage data is not compiled sufficiently in this area for calibration of model. Q's were compared to a number of previous studies to make sure the computed discharges were reasonable.
3F	RAINFALL AMOUNTS AND REFERENCE	4.03 in. - NOAA Atlas 2, Volume VIII
3G	UNIQUE CONDITIONS AND PROBLEMS	X1 = 0.000 to X1 = 0.335 Discharge equals Q at CP158A. Q = 577 CFS X1 = 0.438 to X1 = 1.598 Discharge equals Q at CP158B. Q = 483 CFS See following report, Section 3: Hydrologic Analysis, for a description of conditions and unique problems encountered throughout the watershed.
3H	COORDINATION OF Q'S (agency, date, comments)	Flood Control District of Maricopa County - July 9, 1991 Hydrology accepted - ongoing review and comments were incorporated throughout the study.
SECTION 4: HYDRAULICS		
4A	MODEL OR METHOD USED (including vendor and version description)	HEC-2 Water Surface Profiles, Version 4.6.0, February 1991, from McTrans Center
4B	REGIME	Subcritical
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	Initially method 10.4 was used then the floodway was smoothed using method 9.1.
4E	UNIQUE CONDITIONS AND PROBLEMS	Both floodplain and floodway match into existing 100-year delineation on the Agua Fria River, computed by Jerry R. Jones and Associates, 2-6-89, at approximately cross section 1.085 and 0.231 respectively. No other unique problems or conditions exist on this channel. Restudy was performed because of better topographic mapping, improved hydrologic results incorporating new Maricopa County methodology.

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: Town of Surprise and Maricopa County, Unincorporated Areas

COUNTY: Maricopa | STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: AT&SF Railroad Channel (Wash 12) | RUN DATE: 02/19/92 13:19:02

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		0.000		
		0.063		
		0.136		
		0.231		
		0.335		
		0.438		
		0.545		
		0.661		
		0.771		
		0.892		
		0.992		
		1.085		
		1.189		
		1.294		
		1.394		
		1.489		
		1.598		

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY [ ] RESTUDY [X] LOMR [ ] OTHER [ ]
SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	Maricopa County, Unincorporated Areas, Town of El Mirage, Town of Surprise
1B	COMMUNITY NUMBER	040037, 040041, 040053
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	
1F	STUDY CONTRACTOR CONTACT (S) ADDRESS PHONE	The WLB Group, Inc. Jeff Erickson or Mark Gavan 333 East Osborn Road, Suite 380 Phoenix, Arizona 85012 (602) 279-1016
1G	TECH. REVIEWER (FEMA) PHONE	Michael Baker Jr., Inc. Contact: Michelle Monde (703) 960-8800
1H	FEMA REGIONAL REVIEWER PHONE	N/A
1I	STATE REVIEWER PHONE	N/A
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Contact: Greg Rodzenko (602) 506-1501
1K	RIVER OR STREAM NAME	Lower El Mirage Wash (Wash 13)
1L	REACH DESCRIPTION	FIRM Panel Numbers 1165 and 1605 - Begins at the Agua Fria River and continues upstream northwest to the limit of study at the AT&SF RR spur. Mouth - Latitude 33° 39' 60" Longitude 112° 18' 50" Head - Latitude 33° 36' 30" Longitude 112° 20' 30"
1M	STUDY TYPE	Detailed Analysis - Riverine
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	El Mirage 7.5 min.
2B	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89

STUDY DOCUMENTATION ABSTRACT - Lower El Mirage Wash (Wash 13)		
SECTION 3: HYDROLOGY		
3A	MODEL OR METHOD USED (including vendor and version description)	HEC-1 Flood Hydrograph Package, Version 4.0 from McTrans Center
3B	STORM DURATION	24-Hour
3C	HYETOGRAPH TYPE	SCS Type II
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	Gage data is not compiled sufficiently in this area for calibration of model. Q's were compared to a number of previous studies to make sure the computed discharges were reasonable.
3F	RAINFALL AMOUNTS AND REFERENCE	4.03 in. - NOAA Atlas 2, Volume VIII
3G	UNIQUE CONDITIONS AND PROBLEMS	X1 = 0.000 to X1 = 0.791 Discharge equals Q at CP173. Q = 1753 CFS X1 = 0.889 to X1 = 1.056 Discharge equals Q at CP172. Q = 1768 CFS (Continued)
3H	COORDINATION OF Q'S (agency, date, comments)	Flood Control District of Maricopa County - July 9, 1991 Hydrology accepted - ongoing review and comments were incorporated throughout the study.
SECTION 4: HYDRAULICS		
4A	MODEL OR METHOD USED (including vendor and version description)	HEC-2 Water Surface Profiles, Version 4.6.0, February 1991, from McTrans Center
4B	REGIME	Subcritical
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	Initially method 10.4 was used then the floodway was smoothed using method 9.1.
4E	UNIQUE CONDITIONS AND PROBLEMS	Match floodplain and floodway into Agua Fria River delineations at cross sections 0.386 and 0.153 respectively. Entire cross section is effective flow for the next two upstream cross sections due to upstream inflow at X1 = 0.153. X1 = 0.000 to X1 = 0.696 Wash flows through Pueblo El Mirage Golf Course in this reach. X1 = 0.985 to X1 = 1.251 Wash flows through a series of agricultural tanks in this reach. (Continued)

STUDY DOCUMENTATION ABSTRACT - Lower El Mirage Wash (Wash 13)	
ADDITIONAL STUDY INFORMATION	
ITEM	DESCRIPTION / DISCUSSION
3G UNIQUE CONDITIONS AND PROBLEMS (Continued)	X1 = 1.118 to X1 = 1.251 Discharge equals Q at CP157. Q = 1771 CFS X1 = 1.348 to X1 = 2.104 Discharge equals Q at intermediate concentration point 2I157. Q = 1258 CFS X1 = 2.208 to X1 = 2.571 Discharge equals Q at CP154. Q = 845 CFS See following report, Section 3: Hydrologic Analysis, for a description of conditions and unique problems encountered throughout the watershed.
4E UNIQUE CONDITIONS AND PROBLEMS (Continued)	X1 = 1.716 Entire flow is effective due to upstream inflow at X1 = 1.817. X1 = 2.284 A divided flow will occur due to overtopping of the main channel bank into the lower overbank. Flow is effective. X1 = 2.571 Limit of detailed study at the AT&SF RR spur. Restudy was performed because of better topographic mapping, improved hydrologic results incorporating new Maricopa County methodlogy, and the request to extend the limits of the previous study.

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: City of El Mirage and Maricopa County, Unincorporated Areas

COUNTY: Maricopa | STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: Lower El Mirage Wash (Wash 13) | RUN DATE: 02/19/92 13:28:08

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		0.000		
		0.076		
		0.153		
		0.186		
		0.259		
		0.386		
		0.485		
		0.581		
		0.696		
		0.791		
		0.889		
		0.985		
		1.056		
		1.118		
		1.166		
		1.251		
		1.348		
		1.423		
		1.527		
		1.622		
		1.716		
		1.817		
		1.921		
		2.009		
		2.104		
		2.208		
		2.284		
		2.350		
		2.469		

KEY TO CROSS-SECTION LABELING				
COMMUNITY NAME: City of El Mirage and Maricopa County, Unincorporated Areas			Page 2 of 2	
COUNTY: Maricopa		STATE: Arizona		
PREPARED BY: The WLB Group, Inc.				
STREAM NAME: Lower El Mirage Wash (Wash 13)			RUN DATE: 02/19/92 13:28:08	
FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		2.571		

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY | | RESTUDY |X| LOMR | | OTHER | |
SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	City of El Mirage and Maricopa County, Unincorporated Areas, and Town of Surprise
1B	COMMUNITY NUMBER	040037, 040041, 040053
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	
1F	STUDY CONTRACTOR CONTACT (S) ADDRESS PHONE	The WLB Group, Inc. Jeff Erickson or Mark Gavan 333 East Osborn Road, Suite 380 Phoenix, Arizona 85012 (602) 279-1016
1G	TECH. REVIEWER (FEMA) PHONE	Michael Baker Jr., Inc. Contact: Michelle Monde (703) 960-8800
1H	FEMA REGIONAL REVIEWER PHONE	N/A
1I	STATE REVIEWER PHONE	N/A
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Contact: Greg Rodzenko (602) 506-1501
1K	RIVER OR STREAM NAME	Lower El Mirage Wash Tributary (Wash 13A)
1L	REACH DESCRIPTION	FIRM Panel Numbers 1165 and 1605 - Wash begins at the confluence with Lower El Mirage Wash and continues upstream north and northwest to the limit of study at the intersection of Litchfield Road and Greenway Road. Mouth - Latitude 33° 35' 43" Longitude 112° 19' 33" Head - Latitude 33° 38' 23" Longitude 112° 21' 31"
1M	STUDY TYPE	Detailed Analysis - Riverine
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	El Mirage 7.5 min.
2B	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89

STUDY DOCUMENTATION ABSTRACT - Lower El Mirage Wash Tributary (Wash 13A)		
SECTION 3: HYDROLOGY		
3A	MODEL OR METHOD USED (including vendor and version description)	HEC-1 Flood Hydrograph Package, Version 4.0 from McTrans Center
3B	STORM DURATION	24-Hour
3C	HYETOGRAPH TYPE	SCS Type II
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	Gage data is not compiled sufficiently in this area for calibration of model. Q's were compared to a number of previous studies to make sure the computed discharges were reasonable.
3F	RAINFALL AMOUNTS AND REFERENCE	4.03 in. - NOAA Atlas 2, Volume VIII
3G	UNIQUE CONDITIONS AND PROBLEMS	X1 = 0.000 Discharge equals Q at CP157. Q = 1771 CFS X1 = 0.045 to X1 = 0.960 Discharge equals routed flow R156 plus 40% of the hydrograph at subwatershed 157. Q = 792 + .4(946) = 1170 CFS (Continued)
3H	COORDINATION OF Q'S (agency, date, comments)	Flood Control District of Maricopa County - July 9, 1991 Hydrology accepted - ongoing review and comments were incorporated throughout the study.
SECTION 4: HYDRAULICS		
4A	MODEL OR METHOD USED (including vendor and version description)	HEC-2 Water Surface Profiles, Version 4.6.0, February 1991, from McTrans Center
4B	REGIME	Subcritical
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	Initially method 10.4 was used then the floodway was smoothed using method 9.1.
4E	UNIQUE CONDITIONS AND PROBLEMS	Beginning WSEL = 1119.34 is taken from the confluence with Lower El Mirage Wash at X1 = 1.259. X1 = 1.363 Cross section at AT&SF RR spur. (Continued)

STUDY DOCUMENTATION ABSTRACT - Lower El Mirage Wash Tributary (Wash 13A)

ADDITIONAL STUDY INFORMATION

ITEM	DESCRIPTION / DISCUSSION
3G UNIQUE CONDITIONS AND PROBLEMS (Continued)	X1 = 1.054 to X1 = 1.317 Discharge equals Q at CP156. Q = 829 CFS X1 = 1.363 to X1 = 1.774 Discharge equals Q at CP139. Q = 843 CFS X1 = 1.884 to X1 = 2.260 Discharge equals diverted flow from (subwatershed 126 plus Q at CP139) divided by 2. Q = (685 + 843) ÷ 2 = 764 CFS X1 = 2.302 to X1 = 2.497 Discharge equals Q at CP126. Q = 856 CFS X1 = 2.615 to X1 = 2.889 Discharge equals routed diversion from subwatershed 125 plus 60% of the hydrograph at subwatershed 126. Q = 433 +.6(562) = 770 CFS X1 = 2.986 to X1 = 3.257 Discharge equals routed diversion from subwatershed 125 plus 20% of the hydrograph at subwatershed 126. Q = 433 + .2(562) = 545 CFS See following report, Section 3: Hydrologic Analysis, for a description of conditions and unique problems encountered throughout the watershed.
4E UNIQUE CONDITIONS AND PROBLEMS (Continued)	X1 = 2.302 to X1 = 2.497 Wash flows through an agricultural tank in this reach. X1 = 3.257 Limit of detailed study at intersection of Greenway Road and Litchfield Road. Restudy was performed because of better topographic mapping, improved hydrologic results incorporating new Maricopa County Methodology, and the request to extend the limits of the previous study.

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: City of El Mirage, Town of Surprise and Maricopa County, Unincorporated Areas

COUNTY: Maricopa | STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: Lower El Mirage Wash Tributary (Wash 13A) | RUN DATE: 02/19/92 13:50:39

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		0.000		
		0.045		
		0.110		
		0.174		
		0.263		
		0.354		
		0.453		
		0.549		
		0.614		
		0.705		
		0.778		
		0.888		
		0.960		
		1.054		
		1.137		
		1.232		
		1.317		
		1.363		
		1.452		
		1.563		
		1.670		
		1.774		
		1.884		
		1.976		
		2.054		
		2.135		
		2.221		
		2.260		
		2.302		

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: City of El Mirage, Town of Surprise and Maricopa County, Unincorporated Areas

COUNTY: Maricopa | STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: Lower El Mirage Wash Tributary (Wash 13A) | RUN DATE: 02/19/92 13:50:39

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		2.399		
		2.497		
		2.615		
		2.709		
		2.796		
		2.889		
		2.986		
		3.088		
		3.177		
		3.257		

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY |X| RESTUDY | | LOMR | | OTHER | |
SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	Town of Buckeye and Maricopa County, Unincorporated Areas
1B	COMMUNITY NUMBER	040037, 040039
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	
1F	STUDY CONTRACTOR CONTACT (S) ADDRESS PHONE	The WLB Group, Inc. Jeff Erickson or Mark Gavan 333 East Osborn Road, Suite 380 Phoenix, Arizona 85012 (602) 279-1016
1G	TECH. REVIEWER (FEMA) PHONE	Michael Baker Jr., Inc. Contact: Michelle Monde (703) 960-8800
1H	FEMA REGIONAL REVIEWER PHONE	N/A
1I	STATE REVIEWER PHONE	N/A
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Contact: Greg Rodzenko (602) 506-1501
1K	RIVER OR STREAM NAME	Interstate 10, Jackrabbit Trail to Tuthill Road (Wash 14-2)
1L	REACH DESCRIPTION	FIRM Panel Number 2055 - Wash begins at Jackrabbit Trail and continues west along the north side of I-10 to Tuthill Road Extended. Mouth - 600' S of NE Corner of Section 5, T1N, R2W Head - 600' S of NW Corner of Section 5, T1N, R2W
1M	STUDY TYPE	Detailed Analysis - Riverine
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	Perryville 7.5 min.
2B	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89

STUDY DOCUMENTATION ABSTRACT - Interstate 10, Jackrabbit Trail to Tuthill Road (Wash 14-2)		
SECTION 3: HYDROLOGY		
3A	MODEL OR METHOD USED (including vendor and version description)	HEC-1 Flood Hydrograph Package, Version 4.0 from McTrans Center
3B	STORM DURATION	24-Hour
3C	HYETOGRAPH TYPE	SCS Type II
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	Gage data is not compiled sufficiently in this area for calibration of model. Q's were compared to a number of previous studies to make sure the computed discharges were reasonable.
3F	RAINFALL AMOUNTS AND REFERENCE	4.03 in. - NOAA Atlas 2, Volume VIII
3G	UNIQUE CONDITIONS AND PROBLEMS	X1 = 0.000 to X1 = 0.197 Discharge equals Q at subwatershed 46 divided by 2. Q = 651 ÷ 2 = 325 CFS X1 = 0.288 to X1 = 0.477 Discharge equals Q at CP46-1. Q = 316 CFS X1 = 0.501 to X1 = 0.650 Discharge equals Q at CP45. Q = 1030 CFS X1 = 0.743 to X1 = 0.837 Discharge equals Q at CP45-1 after diversion. Q = 1104 CFS X1 = 0.931 Discharge equals Q at CP45-1 before diversion. Q = 1440 CFS See following report, Section 3: Hydrologic Analysis, for a description of conditions and unique problems encountered throughout the watershed.
3H	COORDINATION OF Q'S (agency, date, comments)	Flood Control District of Maricopa County - July 9, 1991 Hydrology accepted - ongoing review and comments were incorporated throughout the study.
SECTION 4: HYDRAULICS		
4A	MODEL OR METHOD USED (including vendor and version description)	HEC-2 Water Surface Profiles, Version 4.6.0, February 1991, from McTrans Center
4B	REGIME	Subcritical
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	Initially method 10.4 was used then the floodway was smoothed using method 9.1.
4E	UNIQUE CONDITIONS AND PROBLEMS	Match floodplain at floodway into Jackrabbit Trail Wash floodplain and floodway. No other unique conditions or problems exist in this reach.

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: Town of Buckeye and Maricopa County, Unincorporated Areas — Page 1 of 1

COUNTY: Maricopa | STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: Interstate 10 - Jackrabbit Trail to Tuthill Road (Wash 14-2) | RUN DATE: 02/19/92 14:02:56

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		0.000		
		0.044		
		0.106		
		0.197		
		0.288		
		0.383		
		0.477		
		0.501		
		0.554		
		0.650		
		0.743		
		0.837		
		0.931		

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY |X| RESTUDY | | LOMR | | OTHER | |
SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	Town of Buckeye and Maricopa County, Unincorporated Areas
1B	COMMUNITY NUMBER	040037, 040039
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	
1F	STUDY CONTRACTOR CONTACT (S) ADDRESS PHONE	The WLB Group, Inc. Jeff Erickson or Mark Gavan 333 East Osborn Road, Suite 380 Phoenix, Arizona 85012 (602) 279-1016
1G	TECH. REVIEWER (FEMA) PHONE	Michael Baker Jr., Inc. Contact: Michelle Monde (703) 960-8800
1H	FEMA REGIONAL REVIEWER PHONE	N/A
1I	STATE REVIEWER PHONE	N/A
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Contact: Greg Rodzenko (602) 506-1501
1K	RIVER OR STREAM NAME	Interstate 10 - Perryville Road to Jackrabbit Trail (Wash 14-3)
1L	REACH DESCRIPTION	FIRM Panel Number 2055 - Wash begins at Perryville Road along the north side of I-10 and continues upstream west along the north side of I-10 to Jackrabbit Trail. Begin - Approximately 1000' S of NE Corner Section 4, T1N, R2W End - 600' S of NW Corner of Section 4, T1N, R2W
1M	STUDY TYPE	Approximate Study as directed by Flood Control District of Maricopa County
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	Perryville 7.5 min.
2B	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89

STUDY DOCUMENTATION ABSTRACT - Interstate 10 - Perryville Road to Jackrabbit Trail (Wash 14-3)		
SECTION 3: HYDROLOGY		
3A	MODEL OR METHOD USED (including vendor and version description)	HEC-1 Flood Hydrograph Package, Version 4.0 from McTrans Center
3B	STORM DURATION	24-Hour
3C	HYETOGRAPH TYPE	SCS Type II
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	Gage data is not compiled sufficiently in this area for calibration of model. Q's were compared to a number of previous studies to make sure the computed discharges were reasonable.
3F	RAINFALL AMOUNTS AND REFERENCE	4.03 in. - NOAA Atlas 2, Volume VIII
3G	UNIQUE CONDITIONS AND PROBLEMS	X1 = 0.000 to X1 = 0.092 Discharge equals Q at subwatershed 274 divided by 2 plus diversion at 273. Q = 329 ÷ 2 + 119 = 583 CFS X1 = 0.186 to X1 = 0.338 Discharge equals Q at diversion 273. Q = 419 CFS X1 = 0.370 Discharge equals Q at CP273. Q = 1407 CFS X1 = 0.447 to X1 = 0.636 Discharge equals Q at subwatershed 273 divided by 2. Q = 671 ÷ 2 = 335 CFS X1 = 0.729 to X1 = 0.822 Discharge equals Q at subwatershed 273 divided by 4. Q = 671 ÷ 4 = 168 CFS X1 = 0.915 to X1 = 0.968 Discharge equals Q at subwatershed 273 divided by 8. Q = 671 ÷ 8 = 84 CFS See following report, Section 3: Hydrologic Analysis, for a description of conditions and unique problems encountered throughout the watershed.
3H	COORDINATION OF Q'S (agency, date, comments)	Flood Control District of Maricopa County - July 9, 1991 Hydrology accepted - ongoing review and comments were incorporated throughout the study.
SECTION 4: HYDRAULICS		
4A	MODEL OR METHOD USED (including vendor and version description)	HEC-2 Water Surface Profiles, Version 4.6.0, February 1991, from McTrans Center
4B	REGIME	Subcritical
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	Approximate study, no floodway was calculated. Approximate floodplain documented by HEC-2 run.
4E	UNIQUE CONDITIONS AND PROBLEMS	X1 = 0.338 to X1 = 0.447 Match approximate floodplain into floodplain for 191st Avenue Wash through this reach. No other unique problems or conditions exist in this reach.

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: Town of Buckeye and Maricopa County, Unincorporated Areas

COUNTY: Maricopa | STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: Interstate 10 - Perryville Road to Jackrabbit Trail (Wash 14-3) | RUN DATE: 02/19/92 14:18:20

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		0.000		
		0.092		
		0.186		
		0.280		
		0.338		
		0.370		
		0.447		
		0.541		
		0.636		
		0.729		
		0.822		
		0.915		
		0.968		

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY |X| RESTUDY | | LOMR | | OTHER | |
SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	City of Goodyear
1B	COMMUNITY NUMBER	040046
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	
1F	STUDY CONTRACTOR CONTACT (S) ADDRESS PHONE	The WLB Group, Inc. Jeff Erickson or Mark Gavan 333 East Osborn Road, Suite 380 Phoenix, Arizona 85012 (602) 279-1016
1G	TECH. REVIEWER (FEMA) PHONE	Michael Baker Jr., Inc. Contact: Michelle Monde (703) 960-8800
1H	FEMA REGIONAL REVIEWER PHONE	N/A
1I	STATE REVIEWER PHONE	N/A
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Contact: Greg Rodzenko (602) 506-1501
1K	RIVER OR STREAM NAME	Interstate 10 - RID Canal Crossing West to Cotton Lane (Wash 14-6)
1L	REACH DESCRIPTION	FIRM Panel Number 2060 - Wash begins at the RID Canal Crossing at I-10 and continues upstream along the north side of I-10 to Cotton Lane. Begin - Approximately 1100' S of N1/4 Corner Section 1, T1N, R2W End - Approximately 1100' S of NW Corner of Section 1, T1N, R2W
1M	STUDY TYPE	Approximate Study as directed by Flood Control District of Maricopa County
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	Perryville 7.5 min.
2B	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89

STUDY DOCUMENTATION ABSTRACT - Interstate 10 - RID Canal Crossing West to Cotton Lane (Wash 14-6)		
SECTION 3: HYDROLOGY		
3A	MODEL OR METHOD USED (including vendor and version description)	HEC-1 Flood Hydrograph Package, Version 4.0 from McTrans Center
3B	STORM DURATION	24-Hour
3C	HYETOGRAPH TYPE	SCS Type II
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	Gage data is not compiled sufficiently in this area for calibration of model. Q's were compared to a number of previous studies to make sure the computed discharges were reasonable.
3F	RAINFALL AMOUNTS AND REFERENCE	4.03 in. - NOAA Atlas 2, Volume VIII
3G	UNIQUE CONDITIONS AND PROBLEMS	X1 = 0.000 to X1 = 0.455 Discharge equals Q at D280. Q = 896 CFS See following report, Section 3: Hydrologic Analysis, for a description of conditions and unique problems encountered throughout the watershed.
3H	COORDINATION OF Q'S (agency, date, comments)	Flood Control District of Maricopa County - July 9, 1991 Hydrology accepted - ongoing review and comments were incorporated throughout the study.
SECTION 4: HYDRAULICS		
4A	MODEL OR METHOD USED (including vendor and version description)	HEC-2 Water Surface Profiles, Version 4.6.0, February 1991, from McTrans Center
4B	REGIME	Subcritical
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	No floodway was calculated, approximate study. Approximate floodplain documented by HEC-2 run.
4E	UNIQUE CONDITIONS AND PROBLEMS	Match approximate floodplain delineation into ponding WSEL behind I-10 and the RID Canal.

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: City of Goodyear — Page 1 of 1

COUNTY: Maricopa — STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: Interstate 10 - RID Canal Crossing West to Cotton Lane (Wash 14-6) — RUN DATE: 02/19/92 15:35:43

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		0.000		
		0.094		
		0.190		
		0.286		
		0.381		
		0.455		

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY |X| RESTUDY | | LOMR | | OTHER | |
SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	Town of Buckeye, Maricopa County, Unincorporated Areas
1B	COMMUNITY NUMBER	040037, 040039
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	
1F	STUDY CONTRACTOR CONTACT (S) ADDRESS PHONE	The WLB Group, Inc. Jeff Erickson or Mark Gavan 333 East Osborn Road, Suite 380 Phoenix, Arizona 85012 (602) 279-1016
1G	TECH. REVIEWER (FEMA) PHONE	Michael Baker Jr., Inc. Contact: Michelle Monde (703) 960-8800
1H	FEMA REGIONAL REVIEWER PHONE	N/A
1I	STATE REVIEWER PHONE	N/A
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Contact: Greg Rodzenko (602) 506-1501
1K	RIVER OR STREAM NAME	Interstate 10 - Tuthill Dike to Approx. 1 1/2 Miles West Along The North Side of I-10
1L	REACH DESCRIPTION	FIRM Panel Numbers 2050 and 2055 - Begin delineations at Tuthill Dike Road on the north side of I-10 and continue delineations 1 1/2 miles to the west along the north side of I-10. Begin - Approximately 700' S of the NE corner of Section 6, T1N, R2W End - Approximately 1200' S of the Center of Section 2, T1N, R3W
1M	STUDY TYPE	Approximate Study on Ponding Areas Connected by Approximate Delineation Between Ponding Areas
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	Perryville, Valencia 7.5 min.
2B	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89

STUDY DOCUMENTATION ABSTRACT - I-10 to Approx. 1 1/2 Miles West Along The North Side of I-10		
SECTION 3: HYDROLOGY		
3A	MODEL OR METHOD USED (including vendor and version description)	HEC-1 Flood Hydrograph Package, Version 4.0 from McTrans Center
3B	STORM DURATION	24-Hour
3C	HYETOGRAPH TYPE	SCS Type II
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	Gage data is not compiled sufficiently in this area for calibration of model. Q's were compared to a number of previous studies to make sure the computed discharges were reasonable.
3F	RAINFALL AMOUNTS AND REFERENCE	4.03 in. - NOAA Atlas 2, Volume VIII
3G	UNIQUE CONDITIONS AND PROBLEMS	See following report, Section 3: Hydrologic Analysis, for a description of conditions and unique problems encountered throughout the watershed.
3H	COORDINATION OF Q'S (agency, date, comments)	Flood Control District of Maricopa County - July 9, 1991 Hydrology accepted - ongoing review and comments were incorporated throughout the study.
SECTION 4: HYDRAULICS		
4A	MODEL OR METHOD USED (including vendor and version description)	Ponding areas are defined by Stage Storage Discharge tables within the HEC-1 Model. These tables were computed by hand using culvert discharge nomographs and stage storage relationships computed from the topographic mapping.
4B	REGIME	Subcritical
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	No floodways were calculated in this region.
4E	UNIQUE CONDITIONS AND PROBLEMS	Ponding areas occur behind Interstate 10 (I-10) with each associated culvert crossing at I-10. Small dikes help to confine the flow to these culverts. Once these dikes are overtopped, flows will continue to the east along I-10 to the next ponding area. Approximate delineations were calculated using Manning's Equation for normal depth flow to connect between the ponding areas. Discharges for these calculations were taken from the HEC-1 model.

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY |X| RESTUDY | | LOMR | | OTHER | |
SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	Town of Goodyear and Maricopa County, Unincorporated Areas
1B	COMMUNITY NUMBER	040037, 040046
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	
1F	STUDY CONTRACTOR CONTACT (S) ADDRESS PHONE	The WLB Group, Inc. Jeff Erickson or Mark Gavan 333 East Osborn Road, Suite 380 Phoenix, Arizona 85012 (602) 279-1016
1G	TECH. REVIEWER (FEMA) PHONE	Michael Baker Jr., Inc. Contact: Michelle Monde (703) 960-8800
1H	FEMA REGIONAL REVIEWER PHONE	N/A
1I	STATE REVIEWER PHONE	N/A
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Contact: Greg Rodzenko (602) 506-1501
1K	RIVER OR STREAM NAME	Interstate 10 (I-10) - Citrus Road to Perryville Road
1L	REACH DESCRIPTION	FIRM Panel Number 2055 - Delineations for ponding areas and connecting conveyance corridors begin at Citrus Road and head upstream to the west along the north side of I-10 to Perryville Road. Begin - Approximately 1000' S of NE corner Section 3, T1N, R2W End - Approximately 900' S of NW corner Section 3, T1N, R2W
1M	STUDY TYPE	Approximate Study on Ponding Areas and Approximate Study for Connecting Conveyance Corridors
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	Perryville 7.5 min.
2B	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89

STUDY DOCUMENTATION ABSTRACT - I-10 - Citrus Road to Perryville Road		
SECTION 3: HYDROLOGY		
3A	MODEL OR METHOD USED (including vendor and version description)	HEC-1 Flood Hydrograph Package, Version 4.0 from McTrans Center
3B	STORM DURATION	24-Hour
3C	HYETOGRAPH TYPE	SCS Type II
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	Gage data is not compiled sufficiently in this area for calibration of model. Q's were compared to a number of previous studies to make sure the computed discharges were reasonable.
3F	RAINFALL AMOUNTS AND REFERENCE	4.03 in. - NOAA Atlas 2, Volume VIII
3G	UNIQUE CONDITIONS AND PROBLEMS	See following report, Section 3: Hydrologic Analysis, for a description of conditions and unique problems encountered throughout the watershed.
3H	COORDINATION OF Q'S (agency, date, comments)	Flood Control District of Maricopa County - July 9, 1991 Hydrology accepted - ongoing review and comments were incorporated throughout the study.
SECTION 4: HYDRAULICS		
4A	MODEL OR METHOD USED (including vendor and version description)	Ponding WSEL's were taken from the HEC-1 computer model from the Stage-Storage-Discharge tables and normal depth calculations were used to delineate approximate floodplains and were then connected between the known ponding WSEL's. Stage-Storage-Discharge tables were computed from culvert nomographs and stage-storage relationships were computed from the topographic mapping.
4B	REGIME	Subcritical
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	No floodways were calculated in this reach.
4E	UNIQUE CONDITIONS AND PROBLEMS	Discharges for the normal depth calculations were computed from the HEC-1 model results at pertinent points of concentration and were then prorated upstream to a definite separation of watershed areas or to the next upstream point of concentration. Approximate channel configuration data was taken from 1" = 400' scale topographic mapping.

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY |X| RESTUDY | | LOMR | | OTHER | |
SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	City of Goodyear
1B	COMMUNITY NUMBER	040046
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	
1F	STUDY CONTRACTOR CONTACT (S) ADDRESS PHONE	The WLB Group, Inc. Jeff Erickson or Mark Gavan 333 East Osborn Road, Suite 380 Phoenix, Arizona 85012 (602) 279-1016
1G	TECH. REVIEWER (FEMA) PHONE	Michael Baker Jr., Inc. Contact: Michelle Monde (703) 960-8800
1H	FEMA REGIONAL REVIEWER PHONE	N/A
1I	STATE REVIEWER PHONE	N/A
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Contact: Greg Rodzenko (602) 506-1501
1K	RIVER OR STREAM NAME	Interstate 10 (I-10) - Cotton Lane to Citrus Road
1L	REACH DESCRIPTION	FIRM Panel Numbers 2055 and 2060 - Delineations begin at Cotton Lane on the north side of I-10 and continue upstream to the west to Citrus Road. Begin - Approximately 1000' S of the NE corner of Section 2, T1N, R2W End - Approximately 1000' S of the NE corner of Section 2, T1N, R2W
1M	STUDY TYPE	Approximate Analysis on Ponding Areas and Approximate Study for Connecting Conveyance Corridors
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	Perryville 7.5 min.
2B	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89

STUDY DOCUMENTATION ABSTRACT - I-10 - Cotton Lane to Citrus Road		
SECTION 3: HYDROLOGY		
3A	MODEL OR METHOD USED (including vendor and version description)	HEC-1 Flood Hydrograph Package, Version 4.0 from McTrans Center
3B	STORM DURATION	24-Hour
3C	HYETOGRAPH TYPE	SCS Type II
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	Gage data is not compiled sufficiently in this area for calibration of model. Q's were compared to a number of previous studies to make sure the computed discharges were reasonable.
3F	RAINFALL AMOUNTS AND REFERENCE	4.03 in. - NOAA Atlas 2, Volume VIII
3G	UNIQUE CONDITIONS AND PROBLEMS	See following report, Section 3: Hydrologic Analysis, for a description of conditions and unique problems encountered throughout the watershed.
3H	COORDINATION OF Q'S (agency, date, comments)	Flood Control District of Maricopa County - July 9, 1991 Hydrology accepted - ongoing review and comments were incorporated throughout the study.
SECTION 4: HYDRAULICS		
4A	MODEL OR METHOD USED (including vendor and version description)	Ponding WSEL's were taken from the HEC-1 computer model from the Stage-Storage-Discharge tables and normal depth calculations were used to delineate approximate floodplains and were then connected between the known ponding WSEL's. Stage-Storage-Discharge tables were computed from culvert nomographs and stage-storage relationships were computed from the topographic mapping.
4B	REGIME	Subcritical
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	No floodways were calculated in this reach.
4E	UNIQUE CONDITIONS AND PROBLEMS	Discharges for the normal depth calculations were computed from the HEC-1 model results at pertinent points of concentration and were then prorated upstream to a definite separation of watershed areas or to the next upstream point of concentration. Approximate channel configuration data was taken from 1" = 400' scale topographic mapping.

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY |X| RESTUDY | | LOMR | | OTHER | |
SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	City of Goodyear
1B	COMMUNITY NUMBER	040046
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	
1F	STUDY CONTRACTOR CONTACT (S) ADDRESS PHONE	The WLB Group, Inc. Jeff Erickson or Mark Gavan 333 East Osborn Road, Suite 380 Phoenix, Arizona 85012 (602) 279-1016
1G	TECH. REVIEWER (FEMA) PHONE	Michael Baker Jr., Inc. Contact: Michelle Monde (703) 960-8800
1H	FEMA REGIONAL REVIEWER PHONE	N/A
1I	STATE REVIEWER PHONE	N/A
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Contact: Greg Rodzenko (602) 506-1501
1K	RIVER OR STREAM NAME	Interstate 10 (I-10) - Estrella Parkway to Sarival Avenue
1L	REACH DESCRIPTION	FIRM Panel Number 2060 - Delineations begin at Estrella Parkway on the north side of I-10 and continue upstream to the west to Sarival Avenue. Begin - Approximately 1000' S of NE corner of Section 6, T1N, R1W End - Approximately 1000' S of NW corner of Section 6, T1N, R1W
1M	STUDY TYPE	Detailed Analysis on Ponding Areas and Approximate Study for Connecting Conveyance Corridors
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	Perryville 7.5 min.
2B	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY |X| RESTUDY | | LOMR | | OTHER | |
SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	City of Goodyear
1B	COMMUNITY NUMBER	040046
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	
1F	STUDY CONTRACTOR CONTACT (S) ADDRESS PHONE	The WLB Group, Inc. Jeff Erickson or Mark Gavan 333 East Osborn Road, Suite 380 Phoenix, Arizona 85012 (602) 279-1016
1G	TECH. REVIEWER (FEMA) PHONE	Michael Baker Jr., Inc. Contact: Michelle Monde (703) 960-8800
1H	FEMA REGIONAL REVIEWER PHONE	N/A
1I	STATE REVIEWER PHONE	N/A
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Contact: Greg Rodzenko (602) 506-1501
1K	RIVER OR STREAM NAME	Interstate 10 (I-10) - Bullard Wash to Estrella Parkway
1L	REACH DESCRIPTION	FIRM Panel Number 2060 - Delineations begin at Bullard Wash on the north side of I-10 and continues west upstream to Estrella Parkway, Section 5, T1N, R1W. Begin - Approximately 1000' S of N 1/4 corner of Section 5, T1N, R1W End - Approximately 1000' S of NW corner of Section 5, T1N, R1W
1M	STUDY TYPE	Approximate Study
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	Perryville 7.5 min.
2B	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89

STUDY DOCUMENTATION ABSTRACT - I-10 - Bullard Wash to Estrella Parkway		
SECTION 3: HYDROLOGY		
3A	MODEL OR METHOD USED (including vendor and version description)	HEC-1 Flood Hydrograph Package, Version 4.0 from McTrans Center
3B	STORM DURATION	24-Hour
3C	HYETOGRAPH TYPE	SCS Type II
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	Gage data is not compiled sufficiently in this area for calibration of model. Q's were compared to a number of previous studies to make sure the computed discharges were reasonable.
3F	RAINFALL AMOUNTS AND REFERENCE	4.03 in. - NOAA Atlas 2, Volume VIII
3G	UNIQUE CONDITIONS AND PROBLEMS	See following report, Section 3: Hydrologic Analysis, for a description of conditions and unique problems encountered throughout the watershed.
3H	COORDINATION OF Q'S (agency, date, comments)	Flood Control District of Maricopa County - July 9, 1991 Hydrology accepted - ongoing review and comments were incorporated throughout the study.
SECTION 4: HYDRAULICS		
4A	MODEL OR METHOD USED (including vendor and version description)	Ponding WSEL for Bullard Wash was taken from the HEC-1 hydrology model and the HEC-2 model for Bullard Wash was used to confirm this WSEL. Normal depth calculations were used to calculate an approximate floodplain to the west and was also matched into the Bullard Wash detailed delineation. Approximate channel configuration data was taken from 1" = 400' topographic mapping.
4B	REGIME	Subcritical
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	No floodways were calculated as this was an approximate delineation.
4E	UNIQUE CONDITIONS AND PROBLEMS	Discharges for the normal depth calculations were computed from the HEC-1 model results at pertinent points of concentration.

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY |X| RESTUDY | | LOMR | | OTHER | |
SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	City of Goodyear
1B	COMMUNITY NUMBER	040046
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	
1F	STUDY CONTRACTOR CONTACT (S) ADDRESS PHONE	The WLB Group, Inc. Jeff Erickson or Mark Gavan 333 East Osborn Road, Suite 380 Phoenix, Arizona 85012 (602) 279-1016
1G	TECH. REVIEWER (FEMA) PHONE	Michael Baker Jr., Inc. Contact: Michelle Monde (703) 960-8800
1H	FEMA REGIONAL REVIEWER PHONE	N/A
1I	STATE REVIEWER PHONE	N/A
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Contact: Greg Rodzenko (602) 506-1501
1K	RIVER OR STREAM NAME	Interstate 10 (I-10) - Detention Basin Delineations Between Dysart Road and Bullard Avenue
1L	REACH DESCRIPTION	FIRM Panel Number 2080 - Ponding water surface elevation delineations begin on the north side of I-10 at Dysart Road and continue upstream to approximately Bullard Avenue. Begin - Approximately 2400' S of NE corner of Section 3, T1N, R1W End - Approximately 1300' E of Bullard Avenue in Section 4, T1N, R1W
1M	STUDY TYPE	Detailed Ponding Water Surface Elevations
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	Tolleson 7.5 min.
2B	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89

STUDY DOCUMENTATION ABSTRACT - I-10 Between Dysart Road and Bullard Avenue		
SECTION 3: HYDROLOGY		
3A	MODEL OR METHOD USED (including vendor and version description)	HEC-1 Flood Hydrograph Package, Version 4.0 from McTrans Center
3B	STORM DURATION	24-Hour
3C	HYETOGRAPH TYPE	SCS Type II
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	Gage data is not compiled sufficiently in this area for calibration of model. Q's were compared to a number of previous studies to make sure the computed discharges were reasonable.
3F	RAINFALL AMOUNTS AND REFERENCE	4.03 in. - NOAA Atlas 2, Volume VIII
3G	UNIQUE CONDITIONS AND PROBLEMS	See following report, Section 3: Hydrologic Analysis, for a description of conditions and unique problems encountered throughout the watershed.
3H	COORDINATION OF Q'S (agency, date, comments)	Flood Control District of Maricopa County - July 9, 1991 Hydrology accepted - ongoing review and comments were incorporated throughout the study.
SECTION 4: HYDRAULICS		
4A	MODEL OR METHOD USED (including vendor and version description)	The HEC-1 model was used to compute stage storage discharge relationships for each of the detention basins behind I-10 in this area. A backwater analysis was then computed through the 48" storm drain outlet to compute an actual WSEL in the detention basins. This is documented in the report.
4B	REGIME	Subcritical
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	No floodways were calculated in this area.
4E	UNIQUE CONDITIONS AND PROBLEMS	To compute the final 100-year WSEL in the detention basins, a backwater analysis was performed by hand through the 48" storm drain that outlets downstream into the Agua Fria River. A total head loss was calculated based on friction slope and junction losses in the storm drain. This headloss was then added to the downstream WSEL in the Agua Fria River to compute the actual 100-year ponding water surface elevation in the detention basins. Since the 4 I-10 detention basins are in series, assume the WSEL of downstream basin is the controlling WSEL for all the basins, even though timing is slightly different for the peaks in each basin. The HEC-1 model cannot accurately model this situation.

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY |X| RESTUDY | | LOMR | | OTHER | |
SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	Maricopa County, Unincorporated Areas
1B	COMMUNITY NUMBER	040037
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	
1F	STUDY CONTRACTOR CONTACT (S) ADDRESS PHONE	The WLB Group, Inc. Jeff Erickson or Mark Gavan 333 East Osborn Road, Suite 380 Phoenix, Arizona 85012 (602) 279-1016
1G	TECH. REVIEWER (FEMA) PHONE	Michael Baker Jr., Inc. Contact: Michelle Monde (703) 960-8800
1H	FEMA REGIONAL REVIEWER PHONE	N/A
1I	STATE REVIEWER PHONE	N/A
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Contact: Greg Rodzenko (602) 506-1501
1K	RIVER OR STREAM NAME	Dysart Drain (Wash 17)
1L	REACH DESCRIPTION	FIRM Panel Numbers 1600 and 1615 - Drain begins on the west side of the Agua Fria River, 1/2 mile north of Glendale Avenue, and continues west along the north boundary of Luke Air Force Base to the limit of study at Reems Road and Northern Avenue. Mouth - Latitude 33° 32' 37" Longitude 112° 18' 56" Head - Latitude 33° 33' 07" Longitude 112° 23' 34"
1M	STUDY TYPE	Approximate study as directed by Flood Control District of Maricopa County
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	El Mirage, Waddell 7.5 min.
2B	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89

STUDY DOCUMENTATION ABSTRACT - Dysart Drain (Wash 17)		
SECTION 3: HYDROLOGY		
3A	MODEL OR METHOD USED (including vendor and version description)	HEC-1 Flood Hydrograph Package, Version 4.0 from McTrans Center
3B	STORM DURATION	24-Hour
3C	HYETOGRAPH TYPE	SCS Type II
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	Gage data is not compiled sufficiently in this area for calibration of model. Q's were compared to a number of previous studies to make sure the computed discharges were reasonable.
3F	RAINFALL AMOUNTS AND REFERENCE	4.03 in. - NOAA Atlas 2, Volume VIII
3G	UNIQUE CONDITIONS AND PROBLEMS	Discharges from the Dysart Drain are taken from the HEC-1 model. These include many diversions which occur across the top of the Drain as the capacity of the channel is exceeded. These diverts were verified with a HEC-2 model and then plugged back into a new HEC-2 run to calculate an approximate floodplain. X1 = 0.000 to X1 = 0.350 Q = 1722 CFS (Continued)
3H	COORDINATION OF Q'S (agency, date, comments)	Flood Control District of Maricopa County - July 9, 1991 Hydrology accepted - ongoing review and comments were incorporated throughout the study.
SECTION 4: HYDRAULICS		
4A	MODEL OR METHOD USED (including vendor and version description)	HEC-2 Water Surface Profiles, Version 4.6.0, February 1991, from McTrans Center
4B	REGIME	Subcritical
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	No floodway was calculated, approximate study. Approximate floodplain documented by HEC-2 run.
4E	UNIQUE CONDITIONS AND PROBLEMS	Begin backwater analysis at normal depth and match approximate floodplain into existing Agua Fria River floodplain at elevation 1059.4. (Continued)

STUDY DOCUMENTATION ABSTRACT - Dysart Drain (Wash 17)

ADDITIONAL STUDY INFORMATION

ITEM	DESCRIPTION / DISCUSSION
3G UNIQUE CONDITIONS AND PROBLEMS (Continued)	X1 = 0.441 to X1 = 1.192 Q = 565 CFS X1 = 1.312 to X1 = 2.153 Q = 345 CFS X1 = 1.937 to X1 = 2.153 Flows break out to the south over Dysart Drain in this area. Approxiately 600 CFS is diverted south. X1 = 2.174 to X1 = 2.504 Q = 945 CFS X1 = 2.614 to X1 = 2.794 Q = 509 CFS X1 = 2.804 to X1 = 3.414 Q = 859 CFS Flows break out to the south over Dysart Drain in this area. Approximately 2050 CFS is diverted south onto Luke Air Force Base. X1 = 3.507 to X1 = 4.334 Q = 812 CFS X1 = 4.070 to X1 = 4.465 Breakout to the south in this area. Approximately 1536 CFS is diverted south. X1 = 4.399 to X1 = 4.565 Q = 2347 CFS See following report, Section 3: Hydrologic Analysis, for a description of conditions and unique problems encountered throughout the watershed.

STUDY DOCUMENTATION ABSTRACT - Dysart Drain (Wash 17)	
ADDITIONAL STUDY INFORMATION	
ITEM	DESCRIPTION / DISCUSSION
4E UNIQUE CONDITIONS AND PROBLEMS (Continued)	X1 = 0.350 Ponding occurs in the left overbank area for the next two upstream cross sections. Flows are assumed noneffective in this reach. X1 = 1.533 Ponding occurs in the left overbank area for the next nine upstream cross sections. Flows are assumed noneffective outside the expansion and contraction limits. Extended cross sections from X1 = 1.533 to X1 = 1.937 are confined by a wall on the south bank of Dysart Drain, therefore the approximate floodplain is limited at that point. X1 = 1.937 to X1 = 2.153 Flows break out to the south over Dysart Drain in this reach. Approximately 600 cfs is diverted south. Extended cross sections in this area indicate channel capacity is exceeded. X1 = 2.834 to X1 = 3.317 Flows break out to the south over Dysart Drain in this reach. Approximately 2050 cfs is diverted onto Luke Air Force Base. Extended cross sections in this area indicate channel capacity is exceeded. X1 = 4.070 to X1 = 4.465 Flows break out to the south over Dysart Drain in this reach. Approximately 1536 cfs is diverted south. Extended cross sections in this area reflect overtopping of Northern Avenue. X1 = 4.565 - Limit of Approximate Study Note: Due to the complex nature of the break outs along this reach, an approximate study was performed and is documented by a HEC-2 analysis.

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: Maricopa County, Unincorporated Areas

COUNTY: Maricopa | STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: Dysart Drain (Wash 17) | RUN DATE: 11/15/91 06:18:21

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		0.000		
		0.019		
		0.077		
		0.153		
		0.187		
		0.203		
		0.267		
		0.350		
		0.441		
		0.530		
		0.631		
		0.731		
		0.841		
		0.938		
		0.942		
		0.970		
		1.079		
		1.184		
		1.192		
		1.312		
		1.422		
		1.533		
		1.643		
		1.747		
		1.849		
		1.937		
		1.988		
		2.070		
		2.153		
		2.174		

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: Maricopa County, Unincorporated Areas

COUNTY: Maricopa | STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: Dysart Drain (Wash 17) | RUN DATE: 11/15/91 06:18:21

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		2.203		
		2.228		
		2.256		
		2.337		
		2.411		
		2.454		
		2.459		
		2.504		
		2.614		
		2.642		
		2.656		
		2.672		
		2.794		
		2.804		
		2.834		
		2.916		
		3.021		
		3.116		
		3.218		
		3.317		
		3.414		
		3.507		
		3.602		
		3.663		
		3.729		
		3.839		
		3.871		
		3.894		
		3.916		
		3.951		

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: Maricopa County, Unincorporated Areas — Page 3 of 3

COUNTY: Maricopa | STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: Dysart Drain (Wash 17) | RUN DATE: 11/15/91 06:18:21

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		3.974		
		3.978		
		4.070		
		4.166		
		4.212		
		4.216		
		4.268		
		4.334		
		4.399		
		4.454		
		4.465		
		4.482		
		4.565		

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY |X| RESTUDY | | LOMR | | OTHER | |
SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	Maricopa County, Unincorporated Areas
1B	COMMUNITY NUMBER	040037
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	
1F	STUDY CONTRACTOR CONTACT (S) ADDRESS PHONE	The WLB Group, Inc. Jeff Erickson or Mark Gavan 333 East Osborn Road, Suite 380 Phoenix, Arizona 85012 (602) 279-1016
1G	TECH. REVIEWER (FEMA) PHONE	Michael Baker Jr., Inc. Contact: Michelle Monde (703) 960-8800
1H	FEMA REGIONAL REVIEWER PHONE	N/A
1I	STATE REVIEWER PHONE	N/A
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Contact: Greg Rodzenko (602) 506-1501
1K	RIVER OR STREAM NAME	AT&SF Railroad Wash - Northern Avenue to 1/2 Mile North of Olive Avenue (Wash 18)
1L	REACH DESCRIPTION	FIRM Panel Numbers 1605 and 1615 - Wash begins approximately 1/4 mile west of Litchfield Road on Northern Avenue and continues upstream north along the west side of the AT&SF RR spur to 1/2 mile north of Olive Avenue. Begin - South 1/4 Corner, Section 33, T3N, R1W End - Center Section 28, T3N, R1W
1M	STUDY TYPE	Approximate Study as directed by Flood Control District of Maricopa County
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	El Mirage 7.5 min.
2B	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89

STUDY DOCUMENTATION ABSTRACT - AT&SF Railroad Wash - Northern Avenue to 1/2 Mile North of Olive Avenue (Wash 18)		
SECTION 3: HYDROLOGY		
3A	MODEL OR METHOD USED (including vendor and version description)	HEC-1 Flood Hydrograph Package, Version 4.0 from McTrans Center
3B	STORM DURATION	24-Hour
3C	HYETOGRAPH TYPE	SCS Type II
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	Gage data is not compiled sufficiently in this area for calibration of model. Q's were compared to a number of previous studies to make sure the computed discharges were reasonable.
3F	RAINFALL AMOUNTS AND REFERENCE	4.03 in. - NOAA Atlas 2, Volume VIII
3G	UNIQUE CONDITIONS AND PROBLEMS	X1 = 0.000 Discharge equals Q at CP195. Q = 2559 CFS X1 = 0.104 to X1 = 0.592 Discharge equals Q at 1I195 plus routed diversion from subwatershed 181. Q = 1482 + 288 = 1770 CFS (Continued)
3H	COORDINATION OF Q'S (agency, date, comments)	Flood Control District of Maricopa County - July 9, 1991 Hydrology accepted - ongoing review and comments were incorporated throughout the study.
SECTION 4: HYDRAULICS		
4A	MODEL OR METHOD USED (including vendor and version description)	HEC-2 Water Surface Profiles, Version 4.6.0, February 1991, from McTrans Center
4B	REGIME	Subcritical
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	No floodway was calculated, approximate study. Approximate floodplain documented by HEC-2 run.
4E	UNIQUE CONDITIONS AND PROBLEMS	Match approximate floodplain delineation into approximate floodplain delineation from Dysart Drain. Extended WSEL's within this reach indicate the AT&SF Railroad will be overtopped as that is the controlling grade. Break out flows will continue south and then east in a ditch on the east side of the Railroad. X1 = 0.943 A 5.3 foot drop in invert elevation from the upstream cross section is due to a drop structure located just upstream of the culvert entrance.

STUDY DOCUMENTATION ABSTRACT - AT&SF Railroad Wash - Northern Avenue to 1/2 Mile North of Olive Avenue (Wash 18)	
ADDITIONAL STUDY INFORMATION	
ITEM	DESCRIPTION / DISCUSSION
3G UNIQUE CONDITIONS AND PROBLEMS (Continued)	X1 = 0.685 to X1 = 0.840 Q equals 20% of the routed diversion from subwatershed 180 plus 20% of the hydrograph at subwatershed 195 plus the routed diversion from subwatershed 181. Q = .2(1474) + .2(256) + 288 = 634 CFS X1 = 0.928 to X1 = 1.047 Discharge equals Q at CP181. Q = 292 CFS X1 = 1.151 Discharge equals 80% of the hydrograph at subwatershed 181. Q = .8(283) = 226 CFS X1 = 1.256 to X1 = 1.353 Discharge equals 50% of the hydrograph at subwatershed 181. Q = .5(283) = 142 CFS X1 = 1.410 to X1 = 1.468 Discharge equals 10% of the hydrograph at subwatershed 181. Q = .1(283) = 28 CFS See following report, Section 3: Hydrologic Analysis, for a description of conditions and unique problems encountered throughout the watershed.

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: Maricopa County, Unincorporated Areas

COUNTY: Maricopa | STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: AT&SF Railroad Wash - Northern Avenue to 1/2 Mile North of Olive Avenue (Wash 18) | RUN DATE: 02/19/92 15:39:36

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		0.000		
		0.104		
		0.187		
		0.308		
		0.390		
		0.496		
		0.592		
		0.685		
		0.760		
		0.840		
		0.928		
		0.943		
		0.948		
		1.047		
		1.151		
		1.256		
		1.353		
		1.410		
		1.468		

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY |X| RESTUDY | | LOMR | | OTHER | |
SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	Maricopa County, Unincorporated Areas
1B	COMMUNITY NUMBER	040037
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	
1F	STUDY CONTRACTOR CONTACT (S) ADDRESS PHONE	The WLB Group, Inc. Jeff Erickson or Mark Gavan 333 East Osborn Road, Suite 380 Phoenix, Arizona 85012 (602) 279-1016
1G	TECH. REVIEWER (FEMA) PHONE	Michael Baker Jr., Inc. Contact: Michelle Monde (703) 960-8800
1H	FEMA REGIONAL REVIEWER PHONE	N/A
1I	STATE REVIEWER PHONE	N/A
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Contact: Greg Rodzenko (602) 506-1501
1K	RIVER OR STREAM NAME	AT&SF Railroad Wash - 1/2 Mile West to 1/2 Mile East of Litchfield Road, 1/2 Mile North of Olive Avenue (Wash 19)
1L	REACH DESCRIPTION	FIRM Panel Numbers 1605 and 1615 - Wash begins at the center of Section 28, T3N, R1W and continues upstream east to approximately the center of Section 27, T3N, R1W. Begin - Center Section 28, T3N, R1W End - Center Section 27, T3W, R1W
1M	STUDY TYPE	Approximate Study as directed by Flood Control District of Maricopa County
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	El Mirage 7.5 min.
2B	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89

STUDY DOCUMENTATION ABSTRACT - AT&SF Railroad Wash - 1/2 Mile West to 1/2 Mile East of Litchfield Road, 1/2 Mile North of Olive Avenue (Wash 19)		
SECTION 3: HYDROLOGY		
3A	MODEL OR METHOD USED (including vendor and version description)	HEC-1 Flood Hydrograph Package, Version 4.0 from McTrans Center
3B	STORM DURATION	24-Hour
3C	HYETOGRAPH TYPE	SCS Type II
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	Gage data is not compiled sufficiently in this area for calibration of model. Q's were compared to a number of previous studies to make sure the computed discharges were reasonable.
3F	RAINFALL AMOUNTS AND REFERENCE	4.03 in. - NOAA Atlas 2, Volume VIII
3G	UNIQUE CONDITIONS AND PROBLEMS	Discharges of the first profile are as derived from the 100-year, 24-hour HEC-1 model. Discharges of the second profile are the capacities which limit the water surface elevation extension over the Railroad to no more than one foot and are used for an approximate floodplain delineation. This was deemed to be acceptable to calculate the approximate floodplain delineation on this particular Railroad as instructed by the Flood Control District of Maricopa County. See following report, Section 3: Hydrologic Analysis, for a description of conditions and unique problems encountered throughout the watershed.
3H	COORDINATION OF Q'S (agency, date, comments)	Flood Control District of Maricopa County - July 9, 1991 Hydrology accepted - ongoing review and comments were incorporated throughout the study.
SECTION 4: HYDRAULICS		
4A	MODEL OR METHOD USED (including vendor and version description)	HEC-2 Water Surface Profiles, Version 4.6.0, February 1991, from McTrans Center
4B	REGIME	Subcritical
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	No floodway was calculated, approximate study. Approximate floodplain documented by HEC-2 run.
4E	UNIQUE CONDITIONS AND PROBLEMS	Discharges of the first profile are as derived from the 100-year, 24-hour HEC-1 model. Discharges in the second profile are the capacities which limit the WSEL extension over the AT&SF Railroad to no more than 1 foot and are used for an approximate floodplain delineation. Breakout flows over the Railroad, along the length of the Railroad, will continue overland to the south and east as sheet flow.

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: Maricopa County, Unincorporated Areas — Page 1 of 1

COUNTY: Maricopa | STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: AT&SF Railroad Wash - 1/2 Mile West to 1/2 Mile East of Litchfield Road, 1/2 Mile North of Olive Avenue (Wash 19) | RUN DATE: 02/19/92 15:39:36

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		0.000		
		0.102		
		0.208		
		0.295		
		0.405		
		0.502		
		0.581		
		0.693		

STUDY DOCUMENTATION ABSTRACT - AT&SF Railroad Wash - Approximately 1/2 Mile West of Litchfield Road and 1/2 Mile South of Peoria Avenue to 3/4 Mile North of Cactus Road (Wash 20)		
SECTION 3: HYDROLOGY		
3A	MODEL OR METHOD USED (including vendor and version description)	HEC-1 Flood Hydrograph Package, Version 4.0 from McTrans Center
3B	STORM DURATION	24-Hour
3C	HYETOGRAPH TYPE	SCS Type II
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	Gage data is not compiled sufficiently in this area for calibration of model. Q's were compared to a number of previous studies to make sure the computed discharges were reasonable.
3F	RAINFALL AMOUNTS AND REFERENCE	4.03 in. - NOAA Atlas 2, Volume VIII
3G	UNIQUE CONDITIONS AND PROBLEMS	Discharges of the first profile are as derived from the 100-year, 24-hour HEC-1 model. Discharges of the second profile are the capacities which limit the water surface elevation extension over the Railroad to no more than one foot and are used for an approximate floodplain delineation. This was deemed to be acceptable to calculate the approximate floodplain delineation on this particular Railroad as instructed by the Flood Control District of Maricopa County. See following report, Section 3: Hydrologic Analysis, for a description of conditions and unique problems encountered throughout the watershed.
3H	COORDINATION OF Q'S (agency, date, comments)	Flood Control District of Maricopa County - July 9, 1991 Hydrology accepted - ongoing review and comments were incorporated throughout the study.
SECTION 4: HYDRAULICS		
4A	MODEL OR METHOD USED (including vendor and version description)	HEC-2 Water Surface Profiles, Version 4.6.0, February 1991, from McTrans Center
4B	REGIME	Subcritical
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	No floodway was calculated, approximate study. Approximate floodplain documented by HEC-2 run.
4E	UNIQUE CONDITIONS AND PROBLEMS	Discharges of the first profile are as derived from the 100-year, 24-hour HEC-1 model. Discharges in the second profile of the capacities which limit the WSEL extension over the AT&SF Railroad to no more than 1 foot and are used for an approximate floodplain delineation. Breakout flows over the Railroad, along the length of the Railroad, will continue overland to the southeast as sheet flow.

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY |X| RESTUDY | | LOMR | | OTHER | |
SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	Maricopa County, Unincorporated Areas, Town of Surprise
1B	COMMUNITY NUMBER	040037, 040053
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	
1F	STUDY CONTRACTOR CONTACT (S) ADDRESS PHONE	The WLB Group, Inc. Jeff Erickson or Mark Gavan 333 East Osborn Road, Suite 380 Phoenix, Arizona 85012 (602) 279-1016
1G	TECH. REVIEWER (FEMA) PHONE	Michael Baker Jr., Inc. Contact: Michelle Monde (703) 960-8800
1H	FEMA REGIONAL REVIEWER PHONE	N/A
1I	STATE REVIEWER PHONE	N/A
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Contact: Greg Rodzenko (602) 506-1501
1K	RIVER OR STREAM NAME	AT&SF Railroad Wash - Approximately 1/2 Mile West of Litchfield Road and 1/2 Mile South of Peoria Avenue to 3/4 Mile North of Cactus Road (Wash 20)
1L	REACH DESCRIPTION	FIRM Panel Number 1605 - Wash begins at approximately the center of Section 27, T3N, R1W and continues north upstream along the west side of the AT&SF RR to approximately the center of Section 15, T3N, R1W. Begin - Center Section 27, T3N, R1W End - Center Section 15, T3N, R1W
1M	STUDY TYPE	Approximate Study as directed by Flood Control District of Maricopa County
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	El Mirage 7.5 min.
2B	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: Maricopa County, Unincorporated Areas, Town of Surprise

COUNTY: Maricopa | STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: AT&SF Railroad Wash - Approximately 1/2 Mile West of Litchfield Road and 1/2 Mile South of Peoria Avenue to 3/4 Mile North of Cactus Road (Wash 20)

RUN DATE: 02/19/92 15:49:33

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		0.000		
		0.087		
		0.182		
		0.267		
		0.339		
		0.396		
		0.477		
		0.545		
		0.629		
		0.705		
		0.790		
		0.867		
		0.949		
		1.028		
		1.114		
		1.208		
		1.291		
		1.412		
		1.471		
		1.550		
		1.632		
		1.704		
		1.779		
		1.853		
		1.904		
		1.978		
		2.054		
		2.111		

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY |X| RESTUDY | | LOMR | | OTHER | |
SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	Maricopa County, Unincorporated Areas
1B	COMMUNITY NUMBER	040037
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	
1F	STUDY CONTRACTOR CONTACT (S) ADDRESS PHONE	The WLB Group, Inc. Jeff Erickson or Mark Gavan 333 East Osborn Road, Suite 380 Phoenix, Arizona 85012 (602) 279-1016
1G	TECH. REVIEWER (FEMA) PHONE	Michael Baker Jr., Inc. Contact: Michelle Monde (703) 960-8800
1H	FEMA REGIONAL REVIEWER PHONE	N/A
1I	STATE REVIEWER PHONE	N/A
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Contact: Greg Rodzenko (602) 506-1501
1K	RIVER OR STREAM NAME	Litchfield Wash (Wash 21)
1L	REACH DESCRIPTION	FIRM Panel Number 1615 - Wash begins at the Litchfield Park Detention Facility and heads upstream to the northwest to the limit of study at Litchfield Road. Mouth - Latitude 33° 31' 11" Longitude 112° 21' 05" Head - Latitude 33° 31' 59" Longitude 112° 23' 34"
1M	STUDY TYPE	Detailed Analysis - Riverine
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	El Mirage 7.5 min.
2B	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89

STUDY DOCUMENTATION ABSTRACT - Litchfield Wash (Wash 21)		
SECTION 3: HYDROLOGY		
3A	MODEL OR METHOD USED (including vendor and version description)	HEC-1 Flood Hydrograph Package, Version 4.0 from McTrans Center
3B	STORM DURATION	24-Hour
3C	HYETOGRAPH TYPE	SCS Type II
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	Gage data is not compiled sufficiently in this area for calibration of model. Q's were compared to a number of previous studies to make sure the computed discharges were reasonable.
3F	RAINFALL AMOUNTS AND REFERENCE	4.03 in. - NOAA Atlas 2, Volume VIII
3G	UNIQUE CONDITIONS AND PROBLEMS	Discharges are as derived from the 100-year, 24-hour HEC-1 model. X1 = 0.000 to X1 = 0.165 Discharge equals Q at intermediate concentration point 1I225. Q = 520 CFS X1 = 0.238 to X1 = 0.496 Discharge equals 2/3 Q at intermediate concentration point 1I225. Q = 2/3(520) = 347 CFS X1 = 0.597 to X1 = 0.775 Discharge equals 1/2 Q at intermediate concentration point 1I225. Q = .5(520) = 260 CFS X1 = 0.856 to X1 = 1.080 Discharge equals 15% of Q at intermediate concentration point 1I225. Q = .15(520) = 78 CFS See following report, Section 3: Hydrologic Analysis, for a description of conditions and unique problems encountered throughout the watershed.
3H	COORDINATION OF Q'S (agency, date, comments)	Flood Control District of Maricopa County - July 9, 1991 Hydrology accepted - ongoing review and comments were incorporated throughout the study.
SECTION 4: HYDRAULICS		
4A	MODEL OR METHOD USED (including vendor and version description)	HEC-2 Water Surface Profiles, Version 4.6.0, February 1991, from McTrans Center
4B	REGIME	Subcritical
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	Initially method 10.4 was used, then the floodway was smoothed using method 9.1.
4E	UNIQUE CONDITIONS AND PROBLEMS	Cross sections 0.000 to 0.496 are taken from the Litchfield Detention facility plans and actually model the detention basin. Floodplain and floodway limits are matched into the WSEL of the detention facility as computed in the HEC-1 model. No other unique conditions or problems exist on this reach.

KEY TO CROSS-SECTION LABELING

COMMUNITY NAME: Maricopa County, Unincorporated Areas — Page 1 of 1

COUNTY: Maricopa | STATE: Arizona

PREPARED BY: The WLB Group, Inc.

STREAM NAME: Litchfield Wash (Wash 21) | RUN DATE: 02/19/92 16:11:21

FIELD SURVEY SECTION NO.	XS LETTER-DRAFT FIS	COMPUTER STATIONING	XS LETTER - FINAL FIS	EPA REACH NO.
		0.000		
		0.085		
		0.165		
		0.238		
		0.319		
		0.414		
		0.477		
		0.496		
		0.597		
		0.684		
		0.775		
		0.856		
		0.938		
		1.019		
		1.080		

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY |X| RESTUDY | | LOMR | | OTHER | |
SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	City of Avondale, Maricopa County - Unincorporated Areas
1B	COMMUNITY NUMBER	040037, 040038
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	
1F	STUDY CONTRACTOR CONTACT (S) ADDRESS PHONE	The WLB Group, Inc. Jeff Erickson or Mark Gavan 333 East Osborn Road, Suite 380 Phoenix, Arizona 85012 (602) 279-1016
1G	TECH. REVIEWER (FEMA) PHONE	Michael Baker Jr., Inc. Contact: Michelle Monde (703) 960-8800
1H	FEMA REGIONAL REVIEWER PHONE	N/A
1I	STATE REVIEWER PHONE	N/A
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Contact: Greg Rodzenko (602) 506-1501
1K	RIVER OR STREAM NAME	Ponding Areas Behind the West Side of The Agua Fria River Dike
1L	REACH DESCRIPTION	FIRM Panel Numbers 2015, 2080 and 2090 - Delineations begin at Lower Buckeye Road and continue north along the west side of the Agua Fria River Dike to Indian School Road beginning at approximately the southeast corner of Section 15, T1N, R1W, and ending at approximately the south quarter corner of Section 24, T2N, R1W. Begin - Approximately the SE corner of Section 15, T1N, R1W End - Approximagely the S 1/4 corner of Section 24, T2N, R1W
1M	STUDY TYPE	Detailed Analysis of Ponding Areas
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	Tolleson 7.5 min.
2B	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89

STUDY DOCUMENTATION ABSTRACT - Ponding Areas Behind the West Side of The Agua Fria River Dike		
SECTION 3: HYDROLOGY		
3A	MODEL OR METHOD USED (including vendor and version description)	HEC-1 Flood Hydrograph Package, Version 4.0 from McTrans Center
3B	STORM DURATION	24-Hour
3C	HYETOGRAPH TYPE	SCS Type II
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	Gage data is not compiled sufficiently in this area for calibration of model. Q's were compared to a number of previous studies to make sure the computed discharges were reasonable.
3F	RAINFALL AMOUNTS AND REFERENCE	4.03 in. - NOAA Atlas 2, Volume VIII
3G	UNIQUE CONDITIONS AND PROBLEMS	See following report, Section 3: Hydrologic Analysis, for a description of conditions and unique problems encountered throughout the watershed.
3H	COORDINATION OF Q'S (agency, date, comments)	Flood Control District of Maricopa County - July 9, 1991 Hydrology accepted - ongoing review and comments were incorporated throughout the study.
SECTION 4: HYDRAULICS		
4A	MODEL OR METHOD USED (including vendor and version description)	Stage-Storage-Discharge tables are utilized within the HEC-1 model to compute WSEL's.
4B	REGIME	N/A
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	No floodways were calculated in this reach.
4E	UNIQUE CONDITIONS AND PROBLEMS	Culvert nomograph charts and weir flow equations were utilized along with stage storage relationships developed from 1" = 400' topographic mapping to model the ponding areas behind the Agua Fria River Dike within the HEC-1 model. These relationships were developed where applicable when a pipe drain flows into the Agua Fria River through the dike based upon a 10-year WSEL in the Agua Fria River while a 100-year storm event occurs to the west of the Agua Fria Dike. Otherwise, WSEL's are computed based on culvert nomograph charts and/or weir flow calculations that will convey flows south across or underneath major roads.

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY | | RESTUDY |X| LOMR | | OTHER | |
SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	Maricopa County - Unincorporated Areas, Town of Litchfield Park
1B	COMMUNITY NUMBER	040037, 040128
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	
1F	STUDY CONTRACTOR CONTACT (S) ADDRESS PHONE	The WLB Group, Inc. Jeff Erickson or Mark Gavan 333 East Osborn Road, Suite 380 Phoenix, Arizona 85012 (602) 279-1016
1G	TECH. REVIEWER (FEMA) PHONE	Michael Baker Jr., Inc. Contact: Michelle Monde (703) 960-8800
1H	FEMA REGIONAL REVIEWER PHONE	N/A
1I	STATE REVIEWER PHONE	N/A
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Contact: Greg Rodzenko (602) 506-1501
1K	RIVER OR STREAM NAME	Approximate Ponding Areas Behind Airline Canal
1L	REACH DESCRIPTION	FIRM Panel Numbers 1615 and 2080 - Begin approximate delineations at approximately the southwest corner of Section 21, T2N, R1W, and continue upstream east and northeast to just east of the west quarter corner of Section 12, T2N, R1W. Begin - Approximately the SW corner of Section 21, T2N, R1W End - Approximately E of the W 1/4 corner of Section 12, T2N, R1W
1M	STUDY TYPE	Approximate Study
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	El Mirage, Tolleson 7.5 min.
2B	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89

STUDY DOCUMENTATION ABSTRACT - Approximate Ponding Areas Behind Airline Canal		
SECTION 3: HYDROLOGY		
3A	MODEL OR METHOD USED (including vendor and version description)	HEC-1 Flood Hydrograph Package, Version 4.0 from McTrans Center
3B	STORM DURATION	24-Hour
3C	HYETOGRAPH TYPE	SCS Type II
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	Gage data is not compiled sufficiently in this area for calibration of model. Q's were compared to a number of previous studies to make sure the computed discharges were reasonable.
3F	RAINFALL AMOUNTS AND REFERENCE	4.03 in. - NOAA Atlas 2, Volume VIII
3G	UNIQUE CONDITIONS AND PROBLEMS	See following report, Section 3: Hydrologic Analysis, for a description of conditions and unique problems encountered throughout the watershed.
3H	COORDINATION OF Q'S (agency, date, comments)	Flood Control District of Maricopa County - July 9, 1991 Hydrology accepted - ongoing review and comments were incorporated throughout the study.
SECTION 4: HYDRAULICS		
4A	MODEL OR METHOD USED (including vendor and version description)	Approximate delineations are based on nearest whole foot elevation above the top of the highest point on the Airline Canal.
4B	REGIME	Ponding
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	No floodway was calculated in this reach.
4E	UNIQUE CONDITIONS AND PROBLEMS	Ponding WSEL's were taken at the nearest whole foot elevation above the top of the highest point on the Airline Canal as shown on 1" = 400' topographic mapping. This corresponds closely to previous FIRM mapping in this area, however, it is changed slightly because of more definitive mapping. Note: After the Colter Alignment Channel has been completed, the opportunity may exist to remove or reduce some of the ponding area limits. This should be explored when actual channel construction has been completed.

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY |X| RESTUDY | | LOMR | | OTHER | |
SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	Town of Buckeye, Maricopa County - Unincorporated Areas, City of Goodyear
1B	COMMUNITY NUMBER	040037, 040039, 040046
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	
1F	STUDY CONTRACTOR CONTACT (S) ADDRESS PHONE	The WLB Group, Inc. Jeff Erickson or Mark Gavan 333 East Osborn Road, Suite 380 Phoenix, Arizona 85012 (602) 279-1016
1G	TECH. REVIEWER (FEMA) PHONE	Michael Baker Jr., Inc. Contact: Michelle Monde (703) 960-8800
1H	FEMA REGIONAL REVIEWER PHONE	N/A
1I	STATE REVIEWER PHONE	N/A
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Contact: Greg Rodzenko (602) 506-1501
1K	RIVER OR STREAM NAME	Detailed Analysis on Ponding Areas Behind Buckeye Canal and Approximate Delineation for Conveyance Corridors Where Applicable
1L	REACH DESCRIPTION	FIRM Panel Numbers 2050, 2065 and 2070 - Delineations begin at approximately the northwest corner of Section 36, T1N, R3W, and continue along the north side of the Buckeye Canal to the east where it ends at approximately the south quarter corner of Section 28, T1N, R1W. Begin - Approximately the NW corner of Section 36, T1N, R3W End - Approximately the S 1/4 corner of Section 28, T1N, R1W
1M	STUDY TYPE	Detailed Analysis of Ponding Areas and Approximate Delineations for Conveyance Corridors Where Applicable
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	Valencia, Perryville, Tolleson 7.5 min.
2B	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89

STUDY DOCUMENTATION ABSTRACT - Detailed Analysis on Ponding Areas Behind Buckeye Canal and Approximate Delineation for Conveyance Corridors Where Applicable		
SECTION 3: HYDROLOGY		
3A	MODEL OR METHOD USED (including vendor and version description)	HEC-1 Flood Hydrograph Package, Version 4.0 from McTrans Center
3B	STORM DURATION	24-Hour
3C	HYETOGRAPH TYPE	SCS Type II
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	Gage data is not compiled sufficiently in this area for calibration of model. Q's were compared to a number of previous studies to make sure the computed discharges were reasonable.
3F	RAINFALL AMOUNTS AND REFERENCE	4.03 in. - NOAA Atlas 2, Volume VIII
3G	UNIQUE CONDITIONS AND PROBLEMS	See following report, Section 3: Hydrologic Analysis, for a description of conditions and unique problems encountered throughout the watershed.
3H	COORDINATION OF Q'S (agency, date, comments)	Flood Control District of Maricopa County - July 9, 1991 Hydrology accepted - ongoing review and comments were incorporated throughout the study.
SECTION 4: HYDRAULICS		
4A	MODEL OR METHOD USED (including vendor and version description)	Stage-Storage-Discharge tables within the HEC-1 model were utilized to calculate the WSEL in the ponding areas behind the Buckeye Canal. The Normal depth method for approximate delineations was incorporated to calculate the approximate delineations for the conveyance corridors where applicable.
4B	REGIME	Subcritical
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	No floodways were calculated in this reach.
4E	UNIQUE CONDITIONS AND PROBLEMS	Stage-Storage-Discharge relationships were used to calculate the ponding WSELs behind the Buckeye Canal. Weir flow equations were used to calculate any breakouts over the top of the canal and the stage storage relations were calculated from 1" = 400' topographic mapping and plugged into the HEC-1 model. A large approximate delineation was computed between Estrella Parkway to just west of Sarival Avenue based on the large amount of flow that breaks out across Estrella Parkway from Bullard Wash.

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY |X| RESTUDY | | LOMR | | OTHER | |
SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	Maricopa County - Unincorporated Areas
1B	COMMUNITY NUMBER	040037
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	
1F	STUDY CONTRACTOR CONTACT (S) ADDRESS PHONE	The WLB Group, Inc. Jeff Erickson or Mark Gavan 333 East Osborn Road, Suite 380 Phoenix, Arizona 85012 (602) 279-1016
1G	TECH. REVIEWER (FEMA) PHONE	Michael Baker Jr., Inc. Contact: Michelle Monde (703) 960-8800
1H	FEMA REGIONAL REVIEWER PHONE	N/A
1I	STATE REVIEWER PHONE	N/A
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Contact: Greg Rodzenko (602) 506-1501
1K	RIVER OR STREAM NAME	Approximate Delineations of Breakouts South over Dysart Drain
1L	REACH DESCRIPTION	FIRM Panel Numbers 1600 and 1615 - Approximate delineations of the break outs south over Dysart Drain go through Luke Air Force Base and connect back into Bullard Wash. This is approximately in the area of Sections 3, 4, 5, 8, 9, 10, and 17 of T2N, R1W.
1M	STUDY TYPE	Approximate Study
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	El Mirage 7.5 min.
2B	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89

STUDY DOCUMENTATION ABSTRACT - Approximate Delineations of Breakouts South over Dysart Drain		
SECTION 3: HYDROLOGY		
3A	MODEL OR METHOD USED (including vendor and version description)	HEC-1 Flood Hydrograph Package, Version 4.0 from McTrans Center
3B	STORM DURATION	24-Hour
3C	HYETOGRAPH TYPE	SCS Type II
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	Gage data is not compiled sufficiently in this area for calibration of model. Q's were compared to a number of previous studies to make sure the computed discharges were reasonable.
3F	RAINFALL AMOUNTS AND REFERENCE	4.03 in. - NOAA Atlas 2, Volume VIII
3G	UNIQUE CONDITIONS AND PROBLEMS	See following report, Section 3: Hydrologic Analysis, for a description of conditions and unique problems encountered throughout the watershed.
3H	COORDINATION OF Q'S (agency, date, comments)	Flood Control District of Maricopa County - July 9, 1991 Hydrology accepted - ongoing review and comments were incorporated throughout the study.
SECTION 4: HYDRAULICS		
4A	MODEL OR METHOD USED (including vendor and version description)	Hand calculations utilizing normal depth criteria.
4B	REGIME	Subcritical
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	No floodways were calculated in this reach.
4E	UNIQUE CONDITIONS AND PROBLEMS	The approximate delineations for the break outs south over Dysart Drain occur on Luke Air Force Base which has areas of highly populated housing, ponding areas, and large undefined flow paths. Approximate delineations were computed using discharges from the HEC-1 model, ponding WSEL, and normal depth techniques through the Base south of the break outs. These approximate delineations join together and will connect back into Bullard Wash south of Luke Air Force Base.

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY |X| RESTUDY | | LOMR | | OTHER | |
SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	Maricopa County - Unincorporated Areas
1B	COMMUNITY NUMBER	040037
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	
1F	STUDY CONTRACTOR CONTACT (S) ADDRESS PHONE	The WLB Group, Inc. Jeff Erickson or Mark Gavan 333 East Osborn Road, Suite 380 Phoenix, Arizona 85012 (602) 279-1016
1G	TECH. REVIEWER (FEMA) PHONE	Michael Baker Jr., Inc. Contact: Michelle Monde (703) 960-8800
1H	FEMA REGIONAL REVIEWER PHONE	N/A
1I	STATE REVIEWER PHONE	N/A
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Contact: Greg Rodzenko (602) 506-1501
1K	RIVER OR STREAM NAME	Litchfield Park Detention Facility
1L	REACH DESCRIPTION	FIRM Panel Number 1615 - Detention facility is located in Section 15, T2N, R1W, Maricopa County, Arizona.
1M	STUDY TYPE	Detailed Analysis of Ponding Area
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	El Mirage 7.5 min.
2B	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89

STUDY DOCUMENTATION ABSTRACT - Litchfield Park Detention Facility		
SECTION 3: HYDROLOGY		
3A	MODEL OR METHOD USED (including vendor and version description)	HEC-1 Flood Hydrograph Package, Version 4.0 from McTrans Center
3B	STORM DURATION	24-Hour
3C	HYETOGRAPH TYPE	SCS Type II
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	Gage data is not compiled sufficiently in this area for calibration of model. Q's were compared to a number of previous studies to make sure the computed discharges were reasonable.
3F	RAINFALL AMOUNTS AND REFERENCE	4.03 in. - NOAA Atlas 2, Volume VIII
3G	UNIQUE CONDITIONS AND PROBLEMS	The ponding WSEL was calculated by use of Stage-Storage-Discharge relationships in the HEC-1 model. See following report, Section 3: Hydrologic Analysis, for a description of conditions and unique problems encountered throughout the watershed.
3H	COORDINATION OF Q'S (agency, date, comments)	Flood Control District of Maricopa County - July 9, 1991 Hydrology accepted - ongoing review and comments were incorporated throughout the study.
SECTION 4: HYDRAULICS		
4A	MODEL OR METHOD USED (including vendor and version description)	Hand calculations were performed for Stage-Storage Discharge tables and plugged into HEC-1 model.
4B	REGIME	N/A
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	No floodway was calculated, ponding area.
4E	UNIQUE CONDITIONS AND PROBLEMS	A combination of weir flow calculations and culvert outflow calculations were incorporated within the HEC-1 level pool routing routine and Stage-Storage relationships were calculated from the 1" = 400' topographic mapping.

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY |X| RESTUDY | | LOMR | | OTHER | |
SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	Maricopa County - Unincorporated Areas
1B	COMMUNITY NUMBER	040037
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	
1F	STUDY CONTRACTOR CONTACT (S) ADDRESS PHONE	The WLB Group, Inc. Jeff Erickson or Mark Gavan 333 East Osborn Road, Suite 380 Phoenix, Arizona 85012 (602) 279-1016
1G	TECH. REVIEWER (FEMA) PHONE	Michael Baker Jr., Inc. Contact: Michelle Monde (703) 960-8800
1H	FEMA REGIONAL REVIEWER PHONE	N/A
1I	STATE REVIEWER PHONE	N/A
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Contact: Greg Rodzenko (602) 506-1501
1K	RIVER OR STREAM NAME	Reems Road - Northern Avenue to Beardsley Road
1L	REACH DESCRIPTION	FIRM Panel Numbers 1145 and 1600 - Approximate delineation begins at Northern Avenue and continues north along Reems Road alignment to Beardsley Road. Begin - SW corner of Section 32, T3N, R1W End - NW corner of Section 29 T4N, R1W
1M	STUDY TYPE	Approximate Study as directed by the Flood Control District of Maricopa County
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	Waddell, McMicken Dam 7.5 min.
2B	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89

STUDY DOCUMENTATION ABSTRACT - Reems Road - Northern Avenue to Beardsley Road		
SECTION 3: HYDROLOGY		
3A	MODEL OR METHOD USED (including vendor and version description)	HEC-1 Flood Hydrograph Package, Version 4.0 from McTrans Center
3B	STORM DURATION	24-Hour
3C	HYETOGRAPH TYPE	SCS Type II
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	Gage data is not compiled sufficiently in this area for calibration of model. Q's were compared to a number of previous studies to make sure the computed discharges were reasonable.
3F	RAINFALL AMOUNTS AND REFERENCE	4.03 in. - NOAA Atlas 2, Volume VIII
3G	UNIQUE CONDITIONS AND PROBLEMS	Diversions were taken at major mile intersections if they occured, otherwise no other problems existed.
3H	COORDINATION OF Q'S (agency, date, comments)	Flood Control District of Maricopa County - July 9, 1991 Hydrology accepted - ongoing review and comments were incorporated throughout the study.
SECTION 4: HYDRAULICS		
4A	MODEL OR METHOD USED (including vendor and version description)	Normal depth method to approximate floodplain delineation. Also used controlling elevation on the left bank.
4B	REGIME	Subcritical
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	No floodway was calculated, approximate delineation.
4E	UNIQUE CONDITIONS AND PROBLEMS	Reems Road is an inverted crown and flows are conveyed downstream on it. An approximate delineation was based on the top of left bank controlling elevation and a few normal depth calculations were computed along the length of the delineation to confirm this. Diverts occur at some of the major mile intersection points and these were modeled by the HEC-1 model. Documentation for the normal depth calculation are provided with this submittal.

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY |X| RESTUDY | | LOMR | | OTHER | |
SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	Town of Buckeye, City of Goodyear, City of Avondale, and Maricopa County, Unincorporated Areas
1B	COMMUNITY NUMBER	040037, 040038, 040039, 040046
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	
1F	STUDY CONTRACTOR CONTACT (S) ADDRESS PHONE	The WLB Group, Inc. Jeff Erickson or Mark Gavan 333 East Osborn Road, Suite 380 Phoenix, Arizona 85012 (602) 279-1016
1G	TECH. REVIEWER (FEMA) PHONE	Michael Baker Jr., Inc. Contact: Michelle Monde (703) 960-8800
1H	FEMA REGIONAL REVIEWER PHONE	N/A
1I	STATE REVIEWER PHONE	N/A
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Contact: Greg Rodzenko (602) 506-1501
1K	RIVER OR STREAM NAME	Roosevelt Irrigation District Canal Ponding Areas
1L	REACH DESCRIPTION	FIRM Panel Numbers 2050, 2055, 2060, 2065 and 2080 - Begin at Dean Road at approximately the southwest corner of Section 13, T1N, R3W, and continue upstream along the north side of the canal to the Agua Fria River at approximately the midsection of Section 25, T2N, R1W. Begin - Approximately the SW corner of Section 13, T1N, R3W End - Approximately the middle of Section 26, T2N, R1W
1M	STUDY TYPE	Detailed Analysis of Ponding Areas
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	Valencia, Perryville, Tolleson 7.5 min.
2B	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89

STUDY DOCUMENTATION ABSTRACT - Roosevelt Irrigation District Canal Ponding Areas		
SECTION 3: HYDROLOGY		
3A	MODEL OR METHOD USED (including vendor and version description)	HEC-1 Flood Hydrograph Package, Version 4.0 from McTrans Center
3B	STORM DURATION	24-Hour
3C	HYETOGRAPH TYPE	SCS Type II
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	Gage data is not compiled sufficiently in this area for calibration of model. Q's were compared to a number of previous studies to make sure the computed discharges were reasonable.
3F	RAINFALL AMOUNTS AND REFERENCE	4.03 in. - NOAA Atlas 2, Volume VIII
3G	UNIQUE CONDITIONS AND PROBLEMS	See following report, Section 3: Hydrologic Analysis, for a description of conditions and unique problems encountered throughout the watershed.
3H	COORDINATION OF Q'S (agency, date, comments)	Flood Control District of Maricopa County - July 9, 1991 Hydrology accepted - ongoing review and comments were incorporated throughout the study.
SECTION 4: HYDRAULICS		
4A	MODEL OR METHOD USED (including vendor and version description)	Stage-Storage-Discharge tables were utilized within the HEC-1 model to compute 100-year ponding WSEL's behind the Roosevelt District Irrigation Canal. Calculations for weir flow over the top of the canal were calculated by hand along with use of 1" = 400' scale topographic mapping to compute the storage behind the canal.
4B	REGIME	N/A
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	No floodways were calculated in this area.
4E	UNIQUE CONDITIONS AND PROBLEMS	Ponding areas behind the Roosevelt Irrigation District Canal occur throughout the watershed as the Canal runs the width of this particular drainage area. Numerous weir flow calculations were incorporated to calculate the flow over the top of the canal. These were then incorporated into the HEC-1 model to come up with the final 100-year WSEL.

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY |X| RESTUDY | | LOMR | | OTHER | |
SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	Town of Buckeye, Maricopa County - Unincorporated Areas, City of Goodyear, City of Avondale
1B	COMMUNITY NUMBER	040037, 040038, 040039, 040046
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	
1F	STUDY CONTRACTOR CONTACT (S) ADDRESS PHONE	The WLB Group, Inc. Jeff Erickson or Mark Gavan 333 East Osborn Road, Suite 380 Phoenix, Arizona 85012 (602) 279-1016
1G	TECH. REVIEWER (FEMA) PHONE	Michael Baker Jr., Inc. Contact: Michelle Monde (703) 960-8800
1H	FEMA REGIONAL REVIEWER PHONE	N/A
1I	STATE REVIEWER PHONE	N/A
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Contact: Greg Rodzenko (602) 506-1501
1K	RIVER OR STREAM NAME	*Ponding Behind the Southern Pacific Railroad (S.P.R.R.)*
1L	REACH DESCRIPTION	FIRM Panel Numbers 2050, 2065, 2070, 2090 - Begins at approximately the southwest corner of Section 25, T1N, R3W, and continues to the east-northeast to approximately the south quarter corner of Section 11, T1N, R1W. Begin - Approximately the SW corner of Section 25, T1N, R3W End - Approximately the S 1/4 corner of Section 11, T1N, R1W
1M	STUDY TYPE	Detailed Analysis of Ponding Areas and Approximate Floodplain Delineations for Conveyance Corridors Behind S.P.R.R.
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	Valencia, Perryville, Tolleson 7.5 min.
2B	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89

STUDY DOCUMENTATION ABSTRACT - Ponding Behind the Southern Pacific Railroad		
SECTION 3: HYDROLOGY		
3A	MODEL OR METHOD USED (including vendor and version description)	HEC-1 Flood Hydrograph Package, Version 4.0 from McTrans Center
3B	STORM DURATION	24-Hour
3C	HYETOGRAPH TYPE	SCS Type II
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	Gage data is not compiled sufficiently in this area for calibration of model. Q's were compared to a number of previous studies to make sure the computed discharges were reasonable.
3F	RAINFALL AMOUNTS AND REFERENCE	4.03 in. - NOAA Atlas 2, Volume VIII
3G	UNIQUE CONDITIONS AND PROBLEMS	See following report, Section 3: Hydrologic Analysis, for a description of conditions and unique problems encountered throughout the watershed.
3H	COORDINATION OF Q'S (agency, date, comments)	Flood Control District of Maricopa County - July 9, 1991 Hydrology accepted - ongoing review and comments were incorporated throughout the study.
SECTION 4: HYDRAULICS		
4A	MODEL OR METHOD USED (including vendor and version description)	The HEC-1 model was used with Stage-Storage-Discharge routines to compute WSELs behind the Southern Pacific Railroad. Use of culvert nomographs, weir flow calculations, and 1" = 400' topographic mapping to calculate the storage areas was incorporated to compute the WSEL's. The normal depth method was incorporated to calculate approximate floodplains behind the Southern Pacific Railroad between Dean Road and Airport Road and between Citrus Road and Cotton Lane.
4B	REGIME	Subcritical
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	No floodways were calculated in this area.
4E	UNIQUE CONDITIONS AND PROBLEMS	Some of the ponding areas behind the Southern Pacific Railroad have 2 or 3 culvert locations along a mile reach. These culvert capacities were combined together to compute one Stage-Storage-Discharge table and was then incorporated in the HEC-1 model. Although invert elevations may differ somewhat between the culverts, the overall ponding WSEL behind the RR would act as a single pond, therefore, affecting the culverts equally. The ponding area behind the Southern Pacific Railroad that is coincident with Bullard Wash, was modeled by HEC-2 approximate delineations because of the complexity of the area. This area is included in the Bullard Wash HEC-2 analysis.

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY |X| RESTUDY | | LOMR | | OTHER | |
SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	Maricopa County - Unincorporated Areas
1B	COMMUNITY NUMBER	040037
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	
1F	STUDY CONTRACTOR CONTACT (S) ADDRESS PHONE	The WLB Group, Inc. Jeff Erickson or Mark Gavan 333 East Osborn Road, Suite 380 Phoenix, Arizona 85012 (602) 279-1016
1G	TECH. REVIEWER (FEMA) PHONE	Michael Baker Jr., Inc. Contact: Michelle Monde (703) 960-8800
1H	FEMA REGIONAL REVIEWER PHONE	N/A
1I	STATE REVIEWER PHONE	N/A
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Contact: Greg Rodzenko (602) 506-1501
1K	RIVER OR STREAM NAME	White Tanks Flood Retarding Structure #3
1L	REACH DESCRIPTION	FIRM Panel Number 1600 - Sections 4, 5, 8 and 9, T2N, R2W, Maricopa County, Arizona.
1M	STUDY TYPE	Approximate Analysis of Ponding Area as directed by FCDMC.
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	Waddell 7.5 min.
2B	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89

STUDY DOCUMENTATION ABSTRACT - White Tanks Flood Retarding Structure #3		
SECTION 3: HYDROLOGY		
3A	MODEL OR METHOD USED (including vendor and version description)	HEC-1 Flood Hydrograph Package, Version 4.0 from McTrans Center
3B	STORM DURATION	24-Hour
3C	HYETOGRAPH TYPE	SCS Type II
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	Gage data is not compiled sufficiently in this area for calibration of model. Q's were compared to a number of previous studies to make sure the computed discharges were reasonable.
3F	RAINFALL AMOUNTS AND REFERENCE	4.03 in. - NOAA Atlas 2, Volume VIII
3G	UNIQUE CONDITIONS AND PROBLEMS	The ponding WSEL was calculated by use of Stage-Storage-Discharge relationships in the HEC-1 model. See following report, Section 3: Hydrologic Analysis, for a description of conditions and unique problems encountered throughout the watershed.
3H	COORDINATION OF Q'S (agency, date, comments)	Flood Control District of Maricopa County - July 9, 1991 Hydrology accepted - ongoing review and comments were incorporated throughout the study.
SECTION 4: HYDRAULICS		
4A	MODEL OR METHOD USED (including vendor and version description)	Hand calculations were performed for Stage-Storage Discharge tables and plugged into HEC-1 model.
4B	REGIME	N/A
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	No floodway was calculated, ponding area.
4E	UNIQUE CONDITIONS AND PROBLEMS	Stage-Storage relationships were calculated from 1" = 400' topographic mapping and plugged into the HEC-1 model to compute 100-year WSEL. No flow goes over the spillway during the 100-year event.

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY |X| RESTUDY | | LOMR | | OTHER | |
SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	Maricopa County - Unincorporated Areas
1B	COMMUNITY NUMBER	040037
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	
1F	STUDY CONTRACTOR CONTACT (S) ADDRESS PHONE	The WLB Group, Inc. Jeff Erickson or Mark Gavan 333 East Osborn Road, Suite 380 Phoenix, Arizona 85012 (602) 279-1016
1G	TECH. REVIEWER (FEMA) PHONE	Michael Baker Jr., Inc. Contact: Michelle Monde (703) 960-8800
1H	FEMA REGIONAL REVIEWER PHONE	N/A
1I	STATE REVIEWER PHONE	N/A
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Contact: Greg Rodzenko (602) 506-1501
1K	RIVER OR STREAM NAME	White Tanks Flood Retarding Structure #4
1L	REACH DESCRIPTION	FIRM Panel Number 2055 - Sections 5 and 6, T1N, R2W, Maricopa County, Arizona.
1M	STUDY TYPE	Approximate Analysis of Ponding Area as Directed by FCDMC.
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	Perryville 7.5 min.
2B	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE	Topographic mapping developed for White Tanks/Agua Fria ADMS by: Cooper Aerial and Western Air Maps, Inc. 1" = 400' 12-22-89

STUDY DOCUMENTATION ABSTRACT - White Tanks Flood Retarding Structure #4		
SECTION 3: HYDROLOGY		
3A	MODEL OR METHOD USED (including vendor and version description)	HEC-1 Flood Hydrograph Package, Version 4.0 from McTrans Center
3B	STORM DURATION	24-Hour
3C	HYETOGRAPH TYPE	SCS Type II
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	Gage data is not compiled sufficiently in this area for calibration of model. Q's were compared to a number of previous studies to make sure the computed discharges were reasonable.
3F	RAINFALL AMOUNTS AND REFERENCE	4.03 in. - NOAA Atlas 2, Volume VIII
3G	UNIQUE CONDITIONS AND PROBLEMS	The ponding WSEL was calculated by use of Stage-Storage-Discharge relationships in the HEC-1 model. See following report, Section 3: Hydrologic Analysis, for a description of conditions and unique problems encountered throughout the watershed.
3H	COORDINATION OF Q'S (agency, date, comments)	Flood Control District of Maricopa County - July 9, 1991 Hydrology accepted - ongoing review and comments were incorporated throughout the study.
SECTION 4: HYDRAULICS		
4A	MODEL OR METHOD USED (including vendor and version description)	Hand calculations were performed for Stage-Storage Discharge tables and plugged into HEC-1 model.
4B	REGIME	N/A
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	No floodway was calculated, ponding area.
4E	UNIQUE CONDITIONS AND PROBLEMS	Stage-Storage relationships were calculated from 1" = 400' topographic mapping and plugged into the HEC-1 model to compute 100-year WSEL. No flow goes over the spillway during the 100-year event.