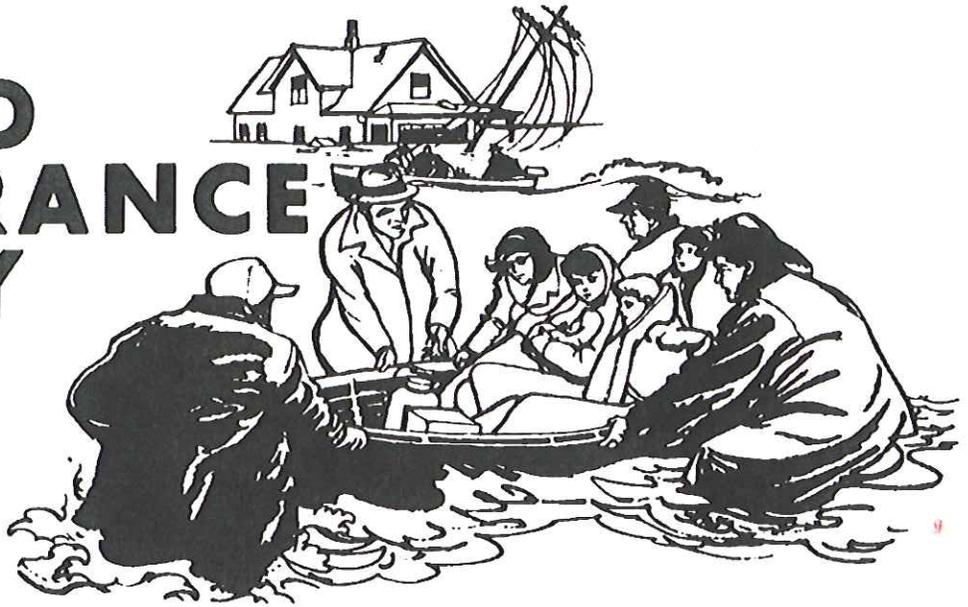
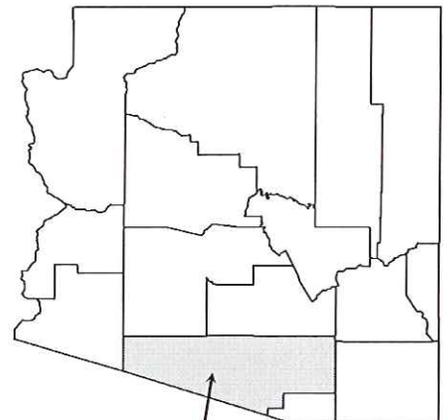


FLOOD INSURANCE STUDY

VOLUME 2 OF 5



PIMA COUNTY, ARIZONA AND INCORPORATED AREAS



COMMUNITY NAME
MARANA, TOWN OF
ORO VALLEY, TOWN OF
PIMA COUNTY
(UNINCORPORATED AREAS)
SAHUARITA, TOWN OF
SOUTH TUCSON, CITY OF
TUCSON, CITY OF

COMMUNITY NUMBER
040118
040109
040073
040137
040075
040076

Pima County

Preliminary

REVISED:
AUG 12 2011



Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
04019CV002B

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

Part or all of this FIS may be revised and republished at any time. In addition, part of this FIS may be revised by the Letter of Map Revision process, which does not involve republication or redistribution of the FIS. It is, therefore, the responsibility of the user to consult with community officials and to check the community repository to obtain the most current FIS components.

This Preliminary revised Flood Insurance Study contains only profiles and floodway data tables added or revised as part of the restudy. These profiles are presented in a reduced scale to minimize reproduction costs. All profiles will be included and printed at full scale in the final published report.

Initial Countywide FIS Effective Date: February 8, 1999

Revised Countywide FIS Date: June 16, 2011 – to update corporate limits, to change Base Flood Elevations and Special Flood Hazard Areas, to update map format, to add roads and road names, and to incorporate previously issued Letters of Map Revision.

TBD – to incorporate the Agua Caliente Wash Physical Map Revision case number 09-09-2642P

TABLE OF CONTENTS – Volume 1 – TBD

	<u>Page</u>
1.0 <u>INTRODUCTION</u>	1
1.1 Purpose of Study	1
1.2 Authority and Acknowledgments	1
1.3 Coordination	7
2.0 <u>AREA STUDIED</u>	8
2.1 Scope of Study	8
2.2 Community Description	16
2.3 Principal Flood Problems	19
2.4 Flood Protection Measures	30
3.0 <u>ENGINEERING METHODS</u>	36
3.1 Hydrologic Analyses	36
3.2 Hydraulic Analyses	52
3.3 Vertical Datum	72
3.4 Behind-Levee Analysis	74
4.0 <u>FLOODPLAIN MANAGEMENT APPLICATIONS</u>	77
4.1 Floodplain Boundaries	77
4.2 Floodways	82
5.0 <u>INSURANCE APPLICATIONS</u>	86
6.0 <u>FLOOD INSURANCE RATE MAP</u>	88
7.0 <u>OTHER STUDIES</u>	88
8.0 <u>LOCATION OF DATA</u>	94
9.0 <u>BIBLIOGRAPHY AND REFERENCES</u>	94
10.0 <u>REVISION SECTION</u>	103
10.1 First Revision (TBD)	103

TABLE OF CONTENTS – Volume 1 – continued – TBD

	<u>Page</u>
<u>FIGURES</u>	
Figure 1 - Floodway Schematic	86

<u>TABLES</u>	
Table 1 - Initial and Final CCO Meetings	7-8
Table 2 – Flooding Sources Studied by Detailed Methods	9
Table 3 – Flooding Source Studied by Approximate Methods	10
Table 4 – Letters of Map Correction	10-16
Table 5 – History of Flooding	19-21
Table 6 - Summary of Discharges	43-52
Table 7 - Manning's "n" Values	70-71
Table 9 – Panel Number Changes	89-90
Table 10 - Community Map History	91-92

TABLE OF CONTENTS – Volume 2 – TBD

Table 8 - Floodway Data	1-55
-------------------------	------

TABLE OF CONTENTS – Volume 3 – TBD

<u>EXHIBITS</u>	
Exhibit 1 - Flood Profiles	
"A" Wash	Panel 01P
Agua Caliente Wash	Panels 02P-07P
Airport Wash	Panels 08P-10P
Ajo Wash	Panel 11P
Alamo Wash	Panels 12P-13P
Anklam Wash	Panel 14P
Arcadia Wash	Panels 15P-17P
Arroyo Chico East	Panels 18P
Arroyo Chico Upstream	Panels 19P-20P
Big Wash	Panels 21P-27P
Blanco Wash	Panels 28P-29P

TABLE OF CONTENTS – Volume 3 – continued – TBD

EXHIBITS – continued

Exhibit 1 - Flood Profiles - continued	
Agua Caliente Split Flow	Panel 30P
Agua Caliente Spur Flow	Panel 30(a)P
Bronx Wash	Panels 31P-34P
Camino de Oeste Wash	Panels 35P-42P
Canada del Oro Wash	Panels 43P-58P
Cemetery Wash	Panels 59P-60P
Christmas Wash	Panels 61P-64P
Citation Wash	Panels 65P-66P
Citrus Wash	Panel 67P
Columbus Wash/Midway Wash	Panels 68P-73P
Columbus Wash Overflow	Panel 74P
Deer Trail Wash	Panels 75P-76P
El Rio Wash	Panels 77P-79P
El Vado Wash	Panels 80P-81P
Esperero Wash	Panels 82P-88P
Este Wash	Panels 89P-94P
Flowing Wells Wash/Navajo Wash	Panels 95P-101P

TABLE OF CONTENTS – Volume 4 – June 16, 2011

EXHIBITS - continued

Exhibit 1 - Flood Profiles - continued	
Gibson Arroyo	Panels 102P-105P
Greasewood Wash	Panels 106P-107P
Hidden Hill Wash	Panels 108P-110P
High School Wash	Panels 111P-114P
Julian Wash	Panels 115P-117P
Kinneson Wash	Panel 118P
Los Robles Wash	Panels 119P-120P
Old West Branch Santa Cruz River	Panels 121P-123P
Pantano Wash	Panels 124P-141P
Pantano Wash (Without Consideration of Levee)	Panels 142P-143P
Pima Wash	Panels 144P-155P
Pusch Wash	Panels 156P-157P
Pusch Wash, East Fork	Panel 158P
Pusch Wash, West Fork	Panel 159P
Railroad Wash	Panels 160P-163P
Rillito Creek	Panels 164P-168P
Rincon Creek	Panels 169P-177P
Robb Wash	Panels 178P-180P
Rodeo Wash	Panels 181P-183P
Rollercoaster Wash	Panel 184P
Rollercoaster Wash South Drainage	Panel 185P
Rolling Hills Wash	Panels 186P-190P
Sabino Creek	Panels 191P-194P
Sahuara Wash	Panel 195P
San Juan Wash	Panels 196P-197P
Santa Clara Wash	Panel 198P

TABLE OF CONTENTS – Volume 5 – June 16, 2011

EXHIBITS - continued

Exhibit 1 - Flood Profiles - continued

Santa Cruz River	Panels 199P-216P
Santa Cruz River Above Pima Mine Road	Panels 217P-234P
Santa Cruz River Tributary West Branch	Panel 235P
Silvercroft Wash	Panels 236P-238P
Tanque Verde Creek	Panels 239P-249P
Tucson Arroyo/Arroyo Chico	Panels 250P-254P
Unnamed Tributary to Rollercoaster Wash	Panel 255P
Unnamed Wash	Panel 256P
Van Buren Wash	Panels 257P-258P
Ventana Canyon Wash	Panels 259P-272P
West Branch Brawley Wash	Panels 273P-274P
Wild Burro Wash	Panels 275P-276P
Wilson Wash	Panels 277P-280P

Exhibit 2 - Flood Insurance Rate Map Index
Flood Insurance Rate Map

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Agua Caliente Wash								
A	1,261	544	1,328	5.4	2563.3	2563.3	2563.8	0.5
B	2,425	561	1,364	5.3	2571.3	2571.3	2571.9	0.6
C	3,579	321	948	7.6	2581.5	2581.5	2582.3	0.8
D	4,293	705	1,829	3.9	2585.5	2585.5	2586.4	0.9
E	5,124	291	966	7.4	2590.9	2590.9	2591.1	0.2
F	5,124	353	741	9.7	2592.3	2592.3	2592.3	0.0
G	5,961	705	1,808	5.8	2,596.9	2596.9	2597.2	0.3
H	6,869	245	873	12.1	2,600.7	2600.7	2601.2	0.5
I	7,093	264	1,410	7.5	2,606.4	2606.4	2606.4	0.0
J	7,295	181	1,742	6.1	2,608.8	2608.8	2608.8	0.0
K	8,581	362	1,317	8.0	2,610.0	2610.0	2610.0	0.0
L	9,190	507	1,760	8.8	2,613.8	2613.8	2613.8	0.0
M	10,233	892	1,588	6.6	2,620.2	2620.2	2620.2	0.0
N	10,645	1,284	1,229	8.6	2,621.3	2621.3	2621.3	0.0
O	12,536	444	1,917	6.8	2,633.5	2633.5	2634.4	0.9
P	12,871	386	1,803	7.2	2,635.7	2635.7	2636.5	0.8
Q	13,761	279	1,618	8.0	2,640.6	2640.6	2641.6	1.0
R	14,612	339	1,757	7.4	2,644.9	2644.9	2645.7	0.8
S	15,205	382	1,637	7.9	2,648.5	2648.5	2648.8	0.3
T	15,628	428	1,619	8.0	2,650.5	2650.5	2650.6	0.1
U	15,823	447	1,548	8.4	2,651.8	2651.8	2651.9	0.1
V	16,158	412	1,679	7.7	2,654.2	2654.2	2654.2	0.0
W	17,677	500	2,030	6.4	2,661.7	2661.7	2662.1	0.4
X	18,676	447	1,730	7.5	2,668.4	2,668.4	2,668.8	0.4
Y	19,909	455	1,768	7.4	2,676.0	2,676.0	2,676.0	0.0
Z	21,014	500	1,673	7.8	2,681.9	2681.9	2682.1	0.2

¹Feet above confluence with Tanque Verde Creek

TABLE 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

**PIMA COUNTY, AZ
AND INCORPORATED AREAS**

FLOODWAY DATA

AGUA CALIENTE WASH

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Agua Caliente Wash (continued)								
AA	22,460	317	1,183	10.1	2,689.9	2689.9	2689.9	0.0
AB	22,764	216	1,098	10.9	2,694.1	2694.1	2694.3	0.2
AC	23,735	194	1,220	9.8	2699.7	2699.7	2700.4	0.7
AD	24,182	193	1,012	11.9	2703.2	2703.2	2703.2	0.0
AE	24,402	209	1,445	8.3	2706.1	2706.1	2706.2	0.1
AF	24,642	195	1,090	11.0	2707.6	2707.6	2708.0	0.4
AG	24,912	184	1,136	10.6	2711.0	2711.0	2711.4	0.4
AH	25,315	166	1,056	11.4	2714.2	2714.2	2714.7	0.5
AI	26,301	248	1,372	8.8	2,725.0	2725.0	2725.8	0.8
AJ	26,679	347	1,717	7.0	2,729.7	2729.7	2729.7	0.0
AK	26,865	342	1,158	10.4	2,731.0	2731.0	2731.0	0.0
AL	27,739	343	1,411	8.5	2,740.8	2740.8	2740.9	0.1
AM	27,960	361	1,235	9.7	2,742.7	2742.7	2742.8	0.1
AN	28,571	325	1,135	10.6	2,751.5	2751.5	2751.5	0.0
AO	29,199	279	1,083	11.1	2,762.8	2762.8	2762.8	0.0
AP	29,694	186	1,109	10.8	2,769.6	2769.6	2769.7	0.1
AQ	29,883	152	931	12.9	2,771.3	2771.3	2771.3	0.0
AR	30,556	168	1,113	10.8	2,782.7	2782.7	2782.7	0.0
AS	30,614	172	935	12.8	2,782.8	2782.8	2782.8	0.0
AT	30,872	120	820	14.6	2,789.6	2789.6	2789.9	0.3
AU	31,015	142	862	13.9	2,792.6	2792.6	2792.6	0.0
AV	31,165	99	784	15.3	2,794.3	2794.3	2794.4	0.1
AW	31,223	118	1,003	12.0	2,796.6	2796.6	2796.6	0.0
AX	31,414	178	949	12.6	2,798.5	2798.5	2798.5	0.0
AY	31,657	204	975	12.3	2,805.1	2805.1	2805.2	0.1

¹Feet above confluence with Tanque Verde Creek

TABLE 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

**PIMA COUNTY, AZ
AND INCORPORATED AREAS**

FLOODWAY DATA

AGUA CALIENTE WASH

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Agua Caliente Split Flow								
A	1,426	516	1,917	3.0	2582.7	2582.7	2583.7	1.0
B	2,214	418	1,141	5.1	2585.9	2585.9	2586.1	0.2
C	2,509	371	1,037	5.6	2588.3	2588.3	2588.6	0.3
D	3,599	347	771	4.4	2593.4	2593.4	2594.1	0.7

¹Feet above confluence with Tanque Verde Creek, just upstream of Houghton Road

TABLE 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

**PIMA COUNTY, AZ
AND INCORPORATED AREAS**

FLOODWAY DATA

AGUA CALIENTE SPLIT FLOW