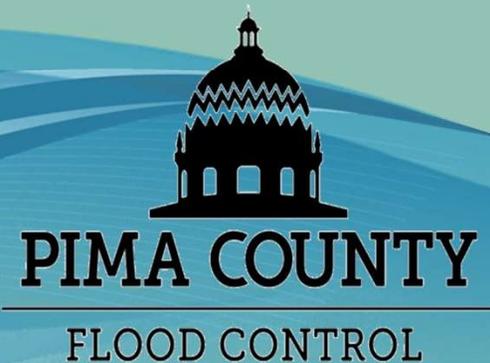


Alamo Wash Basin Management Study Update

Open House #3
April 17, 2019



Welcome

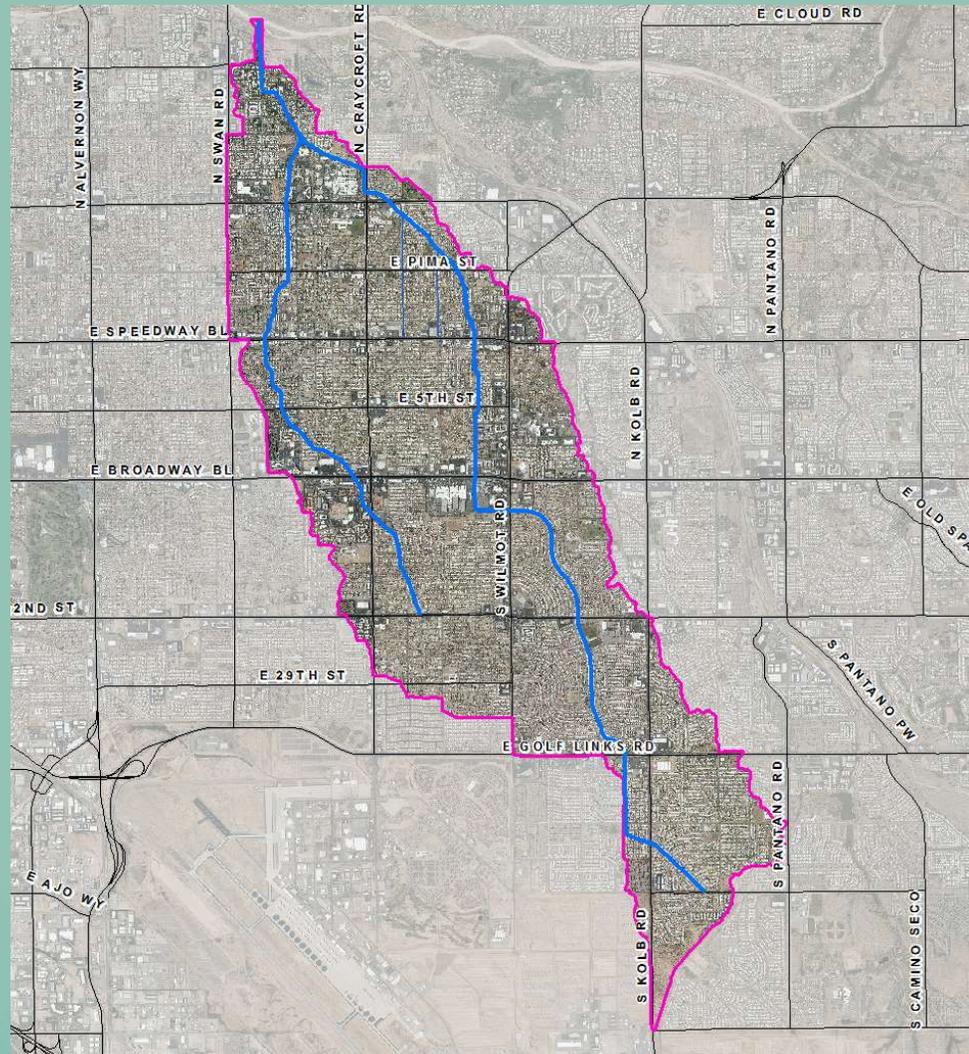
- Agenda
 - ❖ Welcome and Introductions
 - ❖ Study Area and Project Purpose
 - ❖ Project Status Update/Timeline
 - ❖ City and County Interaction
 - ❖ Alternatives Analysis
 - ❖ Basin-wide Recommendations
 - ❖ Adjourn to Work Stations for Questions



PIMA COUNTY
FLOOD CONTROL

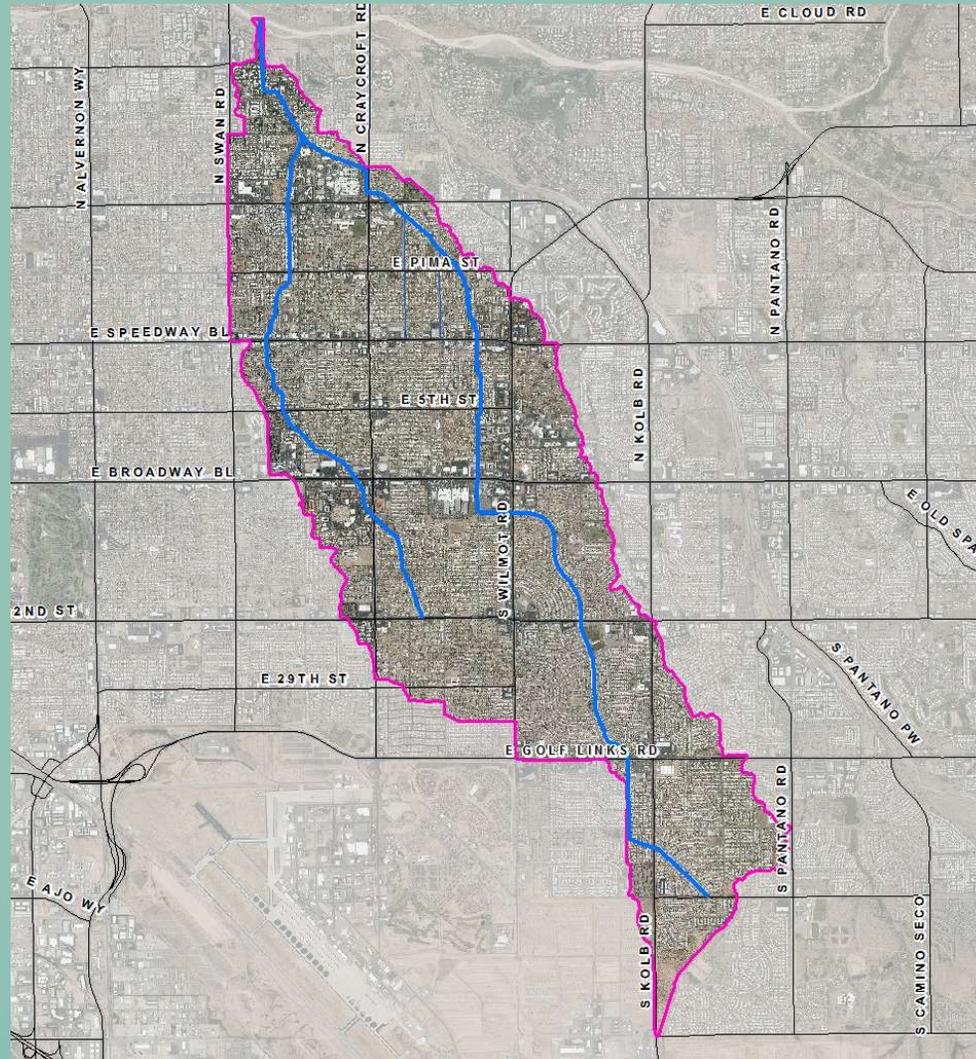
Study Area

- 10.4 Square miles
- Alamo Wash
- Arcadia Wash
- Sahuara Wash
- Van Buren Wash



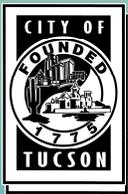
Project Purpose

- Identify flood hazard areas
- Identify flood hazard problems
- Identify cost effective solutions
- Improve public safety
- Create development guidance
- Provide a balanced approach to manage the watershed



Fred Felix, P.E.

- City/County collaboration
- Recommendations to City Council on best basin-wide practices
- Revised hydrology to replace TSMS data for the watershed
- Information to be used for planning and permit assessments



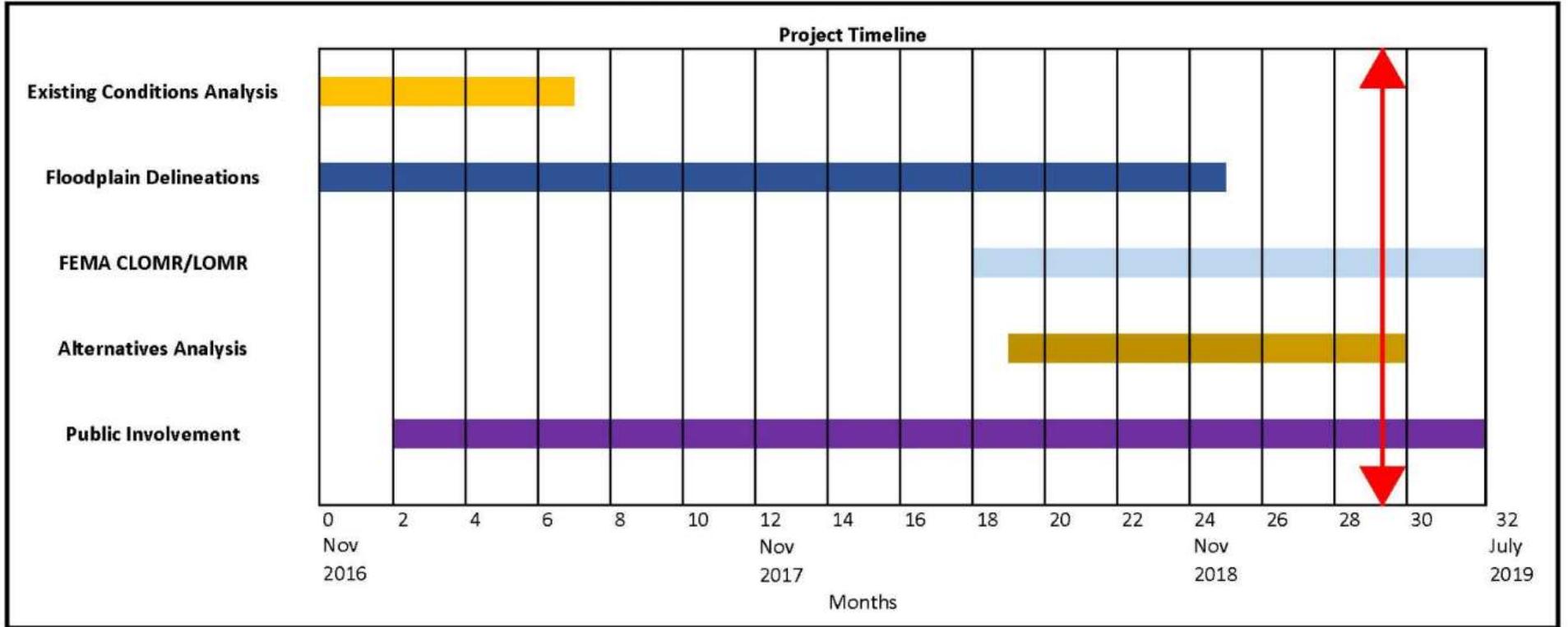
Project Status Update

- Existing Conditions Data Collection and Review – Complete & report on RFCD website
- Revised discharge values approved by FEMA
- Local Flood Mapping –Complete
- FEMA Letter of Map Revision (LOMR) – Application being finalized
- Site Specific Alternatives Analysis - Complete
- Basin-wide recommendations to be presented to the City of Tucson



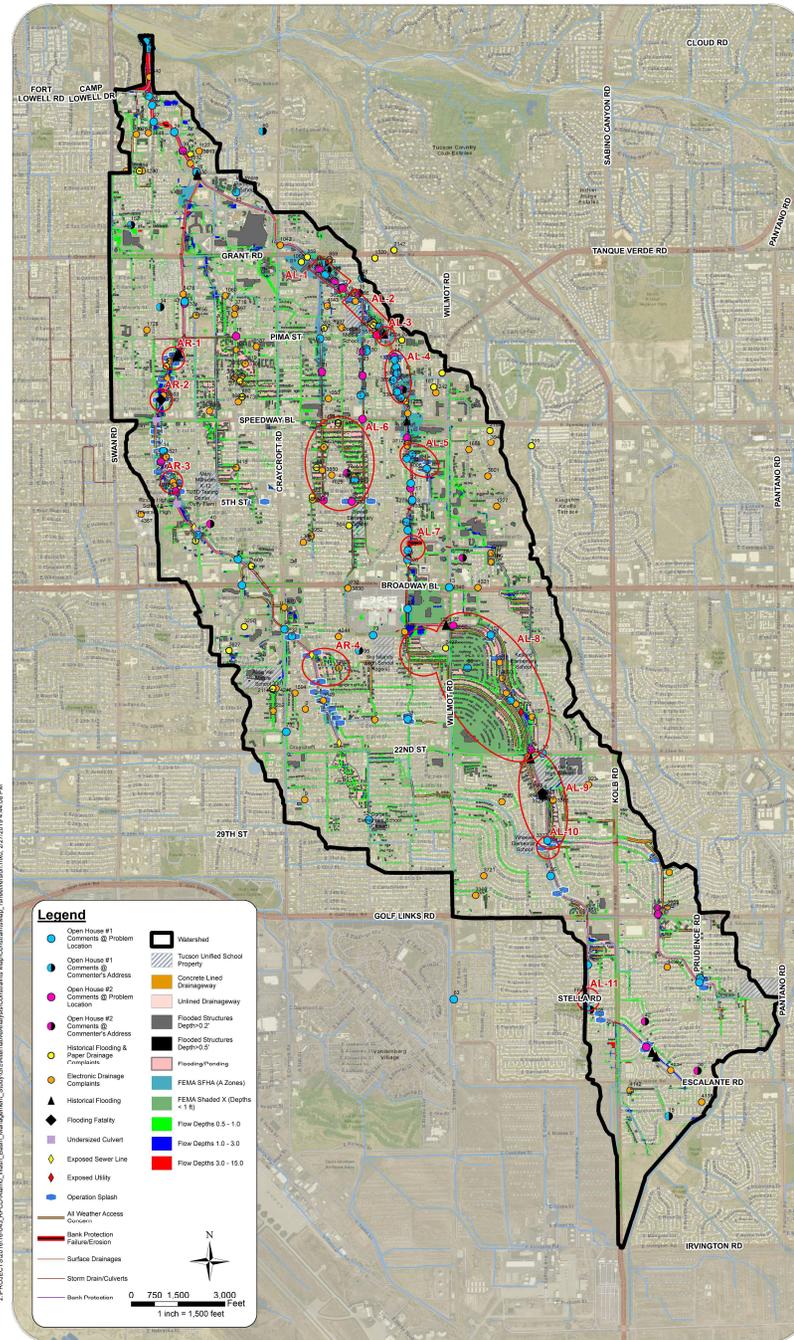
Project Timeline

ALAMO WASH BASIN MANAGEMENT PLAN



Constraints Map

- Shows all constraints encountered during the study
- Examples of constraints
 - Public comments
 - Flooding hazards
 - Swift water rescues
 - Fatalities
 - Erosion
 - Affected structures
 - All weather access
- Used to help identify the top 15 problem areas
 - 44 Alternatives assessed



ALAMO WASH EXISTING CONSTRAINTS MAP
ALAMO WASH - BASIN MANAGEMENT PLAN

PROJECT NO: 16-143
DRAWING NAME: Constraints Map



Alternative Scoring Weighted by Open House Comments

Alamo Wash Basin Management Study

Open House #2
 Dodge Middle School, 5831 E. Pima Street
 Monday, October 23, 2017
 FEEDBACK FORM

The next step will be to develop a plan for cost-effective solutions to reduce or manage flooding in the project area. In addition to the technical evaluation, we would like your input on rating criteria. See below.

Rank the following criteria as 1-6, with **1 being the most important consideration** and **6 being the least important consideration**. No duplication of numbers, please.

SAFETY
 MAINTENANCE
 REDUCED FLOODING
 COST-EFFECTIVE
 ROADWAY ACCESS DURING FLOOD EVENTS
 ENVIRONMENTAL PRESERVATION/RESTORATION

If you have comments or questions, please share them below and return this form to the sign-in or comment tables before leaving. You may also return it by email or mail. Thank you!

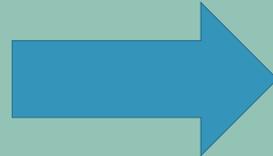
Optional:

NAME: _____

ADDRESS: _____

PHONE: _____ EMAIL: _____

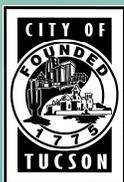
Return to: Nanette Pageau, 100 N. Stone Avenue, #450, Tucson, AZ 85701, or Nanette@kanepr.com



Alamo Wash BMP Individual Problem Area Evaluation Table				
Problem Area : #	(Existing problem statement)			
Alternative Evaluation Categories	Alternative No. 1	Alternative No. 2	Alternative No. 3	Alternative No. 4
	Evaluation Rating: 6=Exceptional, 4=Very Good, 3=Satisfactory, 2=Marginal, 1=Unsatisfactory			
PUBLIC SAFETY - Ranking Weight (24%)				
Evaluation Criteria Examples: • Mitigates Life-threatening Flood Hazards • Promotes Public Awareness of Flooding Hazard • Restricts Vehicular & Pedestrian Access to Potentially Hazardous Infrastructure • Mitigates Hazards of Exposed Utilities	Evaluation Rating (1-5)	Evaluation Rating (1-5)	Evaluation Rating (1-5)	Evaluation Rating (1-5)
INFRASTRUCTURE & MAINTENANCE - Ranking Weight (18%)				
Evaluation Criteria Examples: • Repairs Serious Public Infrastructure Deficiencies • Improves Channel Conveyance/Stability/Erosion Protection • Reduces Downstream Peak Discharges and/or Runoff Volumes • Improves Maintenance Feasibility • Minimizes Maintenance Needs and Intensive Maintenance Practices • Uses Existing Right-of-Way or Other Public Lands • Project Identified/Designed in Other Study • Minimizes Major Utility Conflicts	Evaluation Rating (1-5)	Evaluation Rating (1-5)	Evaluation Rating (1-5)	Evaluation Rating (1-5)
HABITABLE STRUCTURE FLOODING - Ranking Weight (23%)				
Evaluation Criteria Examples: • Reduces Flood Risk to Buildings - Prevents less than 3 Buildings from Flooding (lowest score) - Prevents between 3 - 5 Buildings from Flooding (higher score) - Prevents more than 5 Buildings from Flooding (highest score) • Reduces Flood Risk to Buildings in FEMA Floodplain (higher score)	Evaluation Rating (1-5)	Evaluation Rating (1-5)	Evaluation Rating (1-5)	Evaluation Rating (1-5)
ROADWAY ACCESS DURING FLOOD EVENTS - Ranking Weight (19%)				
Evaluation Criteria Examples: • Provides All-weather Access • Improves Emergency Response • Reduces Disruptions to Normal Traffic, Public Transit & School Bus Operations	Evaluation Rating (1-5)	Evaluation Rating (1-5)	Evaluation Rating (1-5)	Evaluation Rating (1-5)
ENVIRONMENT-RECREATION COMMUNITY - Ranking Weight (16%)				
Evaluation Criteria Examples: • Preserves Natural Areas • Provides Environmental Enhancement or Recreational Opportunities • Promotes Beneficial Use of Stormwater for Wildlife & Human Habitat • Maximizes Community Connectivity, Access and Use of Multi-modal Transportation • Minimizes Disruptions to Operations/Commerce During Construction • Addresses Previous Drainage Complaints/Public Comments • Is Compatible with a Known Public Improvement Program or Neighborhood Initiative	Evaluation Rating (1-5)	Evaluation Rating (1-5)	Evaluation Rating (1-5)	Evaluation Rating (1-5)

March 1, 2019

CMG DRAINAGE ENGINEERING, INC.



44 Alternatives were Scored

Alamo Wash BMP Alternative Scoring Summary
April 17, 2019

Number	Problem Area ID	Alternative Evaluation Categories	Public Safety	Infrastructure & Maintenance	Habitable Structure Flooding	Roadway Access During Flood Events	Environment-Recreation-Community	Total Weighted Avg Scores	Score-Only Rank	Estimated Cost	Cost / Score	Cost Rank	Combined (Score Rank * Cost Rank)	Final Rank
			0.24	0.18	0.23	0.19	0.16	1.00						
1	AL-1	Alternative 1: Rainbow Vista Estates Drainageway and street improvements	0.87	0.67	0.90	0.56	0.45	3.45	10	\$314,799	\$91,284	22	220	14
2	AL-1	Alternative 2: Alamo channel reconstruction from Grant Rd to Seneca St	0.96	0.73	0.97	0.60	0.51	3.77	5	\$2,223,183	\$589,146	41	205	12
3	AL-1	Alternative 3: Automatic gate closures at Seneca St	0.59	0.29	0.34	0.32	0.32	1.86	33	\$99,487	\$53,510	16	528	36
4	AL-1	Alternative 4: Enhanced signage at Seneca St	0.44	0.25	0.27	0.28	0.27	1.51	44	\$63,877	\$42,411	8	352	23
5	AL-2	Alternative 1: Close Waverly St at Alamo Wash and install culvert at Van Buren Channel	1.09	0.46	0.46	0.75	0.49	3.24	13	\$363,252	\$111,982	24	312	21
6	AL-2	Alternative 2: Install culvert at Sahuara	1.03	0.57	0.62	0.79	0.47	3.48	9	\$849,519	\$244,277	35	315	22
7	AL-2	Alternative 3: Automatic gate closures at Waverly St and Sahuara Ave	0.60	0.32	0.31	0.30	0.37	1.90	29	\$198,974	\$104,841	23	667	38
8	AL-2	Alternative 4: Enhanced signage at Waverly St and Sahuara Ave	0.50	0.29	0.25	0.27	0.35	1.65	41	\$127,754	\$77,427	20	820	42
9	AL-3	Alternative 1: Alamo channel reconstruction downstream of Pima St	0.86	0.68	0.87	0.41	0.48	3.30	11	\$553,848	\$168,015	33	363	25
10	AL-3	Alternative 2: Install energy dissipators on downstream side of Pima St bridge	0.58	0.53	0.49	0.33	0.37	2.29	22	\$174,701	\$76,146	19	418	28
11	AL-4	Alternative 1: Alamo channel stabilization from Lee St to Bellevue St	0.77	0.53	0.61	0.42	0.57	2.90	19	\$1,022,155	\$352,902	39	741	41
12	AL-5	Alternative 1: Install culvert at Rosewood St and stormdrains on Rook Ave/Rosewood St	1.06	0.69	0.99	0.80	0.55	4.09	4	\$1,366,245	\$333,870	38	152	8
13	AL-5	Alternative 2: Automatic gate closures at Rosewood St	0.58	0.72	0.33	0.32	0.39	2.34	21	\$99,487	\$42,488	9	189	9
14	AL-5	Alternative 3: Enhanced signage at Rosewood St	0.48	0.31	0.28	0.29	0.34	1.70	39	\$63,877	\$37,508	5	195	10
15	AL-6	Alternative 1: Detention basin at Sewell Elem and storm drain along Sahuara Ave	0.99	0.73	1.04	0.72	0.64	4.13	3	\$2,979,935	\$721,767	43	129	6
16	AL-6	Alternative 2: Storm drain along Van Buren Ave	0.81	0.63	0.99	0.72	0.46	3.60	7	\$2,956,106	\$821,630	44	308	19
17	AL-7	Alternative 1: Bank stabilization	0.77	0.63	0.63	0.37	0.61	3.00	18	\$1,308,515	\$436,012	40	720	39
18	AL-8	Alternative 1: Detention basin at Palo Verde High School	1.12	0.82	1.03	0.76	0.68	4.41	1	\$2,783,854	\$631,833	42	42	2
19	AL-8	Alternative 2: Automatic gate closures at Yale Dr, Malvern St, and Koralee Dr	0.61	0.29	0.32	0.29	0.35	1.86	32	\$298,461	\$160,348	32	1024	43
20	AL-8	Alternative 3: Enhanced signage at Yale Dr, Malvern St, and Koralee Dr	0.50	0.25	0.26	0.26	0.31	1.58	42	\$191,631	\$121,604	27	1134	44
21	AL-9	Alternative 1: Channel improvements along Alamo Trib 2	0.93	0.68	1.01	0.62	0.52	3.77	6	\$644,960	\$171,198	34	204	11
22	AL-9	Alternative 2: Install culvert at Calle Betelgeux and storm drain along Avenida Planeta	1.12	0.73	1.09	0.89	0.45	4.28	2	\$1,079,219	\$252,429	36	72	4
23	AL-9	Alternative 3: Automatic gate closures at Calle Betelgeux	0.61	0.35	0.32	0.30	0.31	1.89	30	\$99,487	\$52,602	14	420	29
24	AL-9	Alternative 4: Enhanced signage at Calle Betelgeux	0.53	0.32	0.28	0.28	0.28	1.68	40	\$63,877	\$37,932	6	240	15
25	AL-10	Alternative 1: Install culvert at Calle Marte	0.98	0.62	0.48	0.79	0.42	3.29	12	\$457,758	\$139,266	30	360	24
26	AL-10	Alternative 2: Automatic gate closures at Calle Marte	0.70	0.30	0.34	0.29	0.33	1.97	28	\$99,487	\$50,580	13	364	26
27	AL-10	Alternative 3: Enhanced signage at Calle Marte	0.52	0.26	0.25	0.26	0.28	1.57	43	\$63,877	\$40,587	7	301	18
28	AL-11	Alternative 1: Install culvert at Stella Rd	1.06	0.66	0.60	0.82	0.41	3.54	8	\$402,794	\$113,698	26	208	13
29	AL-11	Alternative 2: Automatic gate closures at Stella Rd	0.72	0.38	0.29	0.29	0.35	2.04	25	\$99,487	\$48,800	11	275	17
30	AL-11	Alternative 3: Enhanced signage at Stella Rd	0.54	0.31	0.28	0.28	0.33	1.74	37	\$63,877	\$36,683	3	111	5
31	AR-1	Alternative 1: Install culvert at Lee St/Santa Rosa Ave	0.94	0.60	0.48	0.76	0.39	3.17	14	\$808,657	\$254,775	37	518	35
32	AR-1	Alternative 2: Close Santa Rosa Ave at Arcadia Wash	0.98	0.60	0.43	0.51	0.50	3.01	17	\$402,855	\$133,691	29	493	32
33	AR-1	Alternative 3: Automatic gate closures at Lee St/Santa Rosa Ave	0.68	0.29	0.27	0.29	0.28	1.81	35	\$149,231	\$82,238	21	735	40
34	AR-1	Alternative 4: Enhanced signage at Lee St/Santa Rosa Ave	0.58	0.33	0.28	0.27	0.30	1.77	36	\$95,816	\$54,287	17	612	37
35	AR-2	Alternative 1: Install culvert at Bellevue St	0.88	0.54	0.46	0.76	0.42	3.06	16	\$486,925	\$159,334	31	496	33
36	AR-2	Alternative 2: Automatic gate closures at Bellevue St	0.74	0.36	0.31	0.33	0.43	2.16	24	\$99,487	\$46,087	10	240	16
37	AR-2	Alternative 3: Enhanced signage at Bellevue St	0.61	0.35	0.28	0.32	0.43	1.98	27	\$63,877	\$32,337	1	27	1
38	AR-3	Alternative 1: Close 4th St at Arcadia Wash	0.86	0.53	0.41	0.37	0.45	2.62	20	\$294,376	\$112,300	25	500	34
39	AR-3	Alternative 2: Automatic gate closures at 4th St	0.70	0.32	0.31	0.32	0.36	2.01	26	\$99,487	\$49,398	12	312	20
40	AR-3	Alternative 3: Enhanced signage at 4th St	0.58	0.30	0.25	0.27	0.33	1.72	38	\$63,877	\$37,181	4	152	7
41	AR-4	Alternative 1: Install culvert at N Wilshire Dr	0.91	0.55	0.41	0.86	0.42	3.16	15	\$389,128	\$123,324	28	420	30
42	AR-4	Alternative 2: Grade Control Structure	0.62	0.56	0.32	0.29	0.36	2.16	23	\$162,410	\$75,051	18	414	27
43	AR-4	Alternative 3: Automatic gate closures at N Wilshire Dr	0.74	0.28	0.29	0.27	0.30	1.87	31	\$99,487	\$53,259	15	465	31
44	AR-4	Alternative 4: Enhanced signage at N Wilshire Dr	0.66	0.32	0.26	0.30	0.31	1.85	34	\$63,877	\$34,454	2	68	3

Red box = Top Ranked Alternative from Each of 15 Problem Areas (Column 1)

Green box = Top 1 - 10 Ranked Alternatives
Yellow box = 11 - 20 Ranked Alternatives
Orange box = 21 - 44 Ranked Alternatives

Alternatives Evaluated Include

- Culverts
- Green Infrastructure- Including Curb Cuts
- Detention Basins
- Storm Drains
- Bank Protection
- Improved Road Hazard Signage
- Road Closures

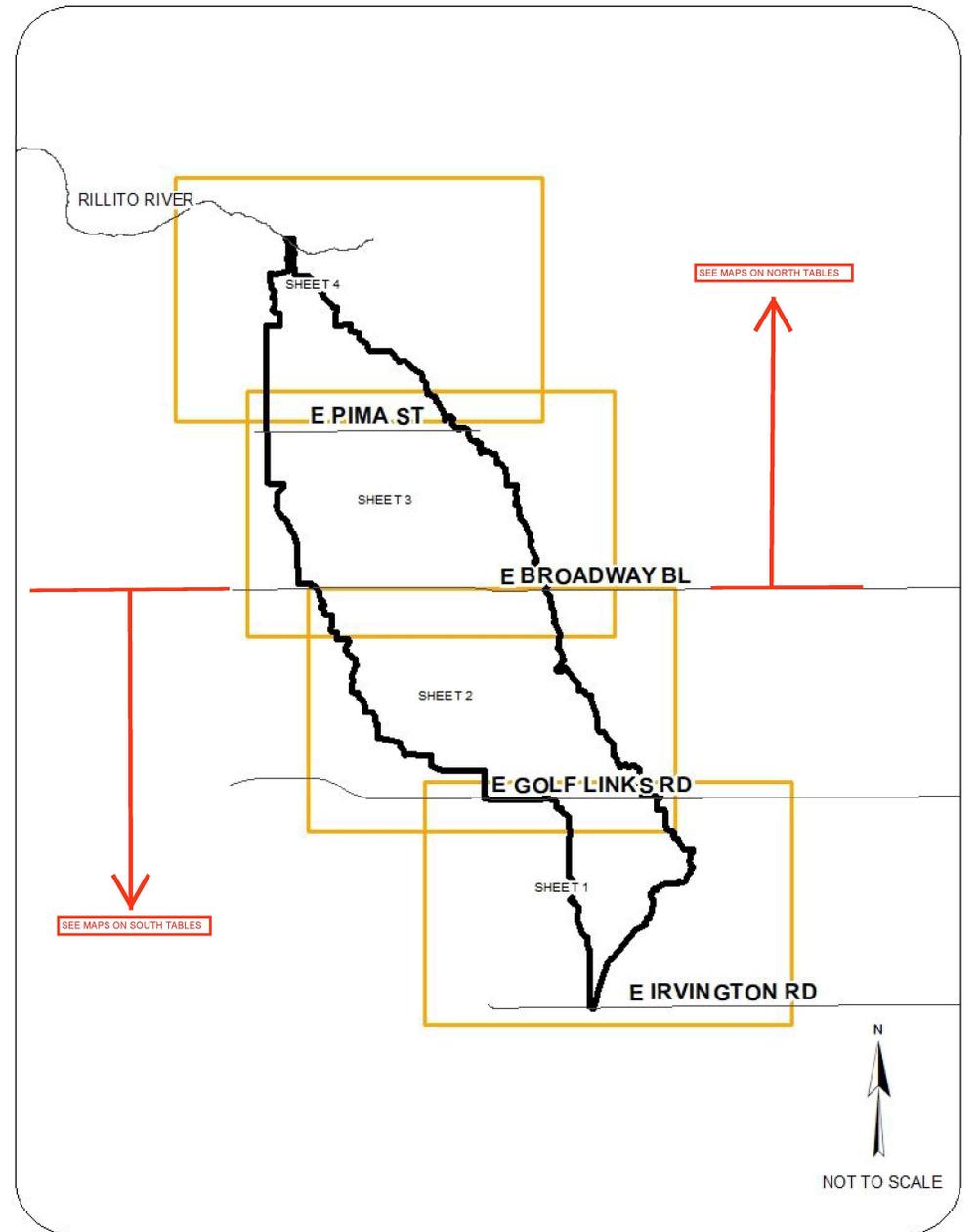


Basin-wide Recommendations

- Policy Recommendations
- Safety Enhancements
- Maintenance Strategies
- Public Awareness
- Environment/Recreation/Community

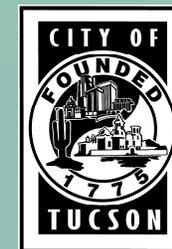


Problem Areas Map Sheet Locations



Alamo Wash Basin Management Study

Terry Hendricks, Project Manager
Pima County Regional Flood Control District
201 N. Stone Ave, 9th Floor
Tucson, Arizona 85701-1207
(520) 724-4600
Email: Terry.Hendricks@Pima.gov



Thank You!



PIMA COUNTY
FLOOD CONTROL