Tucson Mountains Watercourse Studies:
Technical Data Notebook for Hydrologic and Hydraulic Mapping of the Unnamed Wash 10,
Pima County Arizona.

FEMA FIRM Panel 04019C-1655L and 1665L

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Approved by

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PIMA COUNTY
FLOOD CONTROL

Section 1 Introduction 4
1.1 Propose 4
1.2 Project Authority 4
1.3 Project Location 4
1.4 Hydrologic and Hydraulic Methods 5
1.5 Acknowledgment 5
1.5 Study Results 5
Section 2 Local Government Abstract 9
2.1 Project Contact Information 9
2.2 General Information 9
2.3 Survey and Mapping Information 9
2.4 Hydrology 10
2.5 Hydraulics 10
Section 3 Survey and Mapping Information 10
3.1 Digital Projection Information 10
3.2 Field Survey Information 10
3.3 Mapping 11
Section 4 Hydrology 11
4.1 Method Description 11
4.2 Parameter Estimation 13
4.2.1 Drainage Area Boundaries 13
4.2.2 Watershed Work Maps 13
4.2.3 Gage Data 13
4.2.4 Spatial Parameters 13
4.2.5 Precipitation 13
4.2.6 Physical Parameters 13
4.3 Issues Encountered During the Study 14
4.3.1 Special Problems and Solutions 14
4.3.2 Modeling Warning and Error Messages 14
4.4 Calibration 14
4.5 Final Results 14
4.5.1 Hydrologic Analysis Results 14
4.5.2 Verification of results 15
Section 5 Hydraulics 15
5.1 Method Description 15
5.2 Work Study Maps 16
5.3 Parameter Estimation 16
5.3.1 Roughness Coefficients 16
5.3.2 Expansion and Contraction Coefficients 16
5.4 Cross-Section Description 16
5.5 Modeling Consideration 16
5.5.1 Hydraulic Jump and Drop Analysis 16
5.5.2. Bridges and Culverts 16

5.5.3 Levees and Dikes 16
5.5.4 Non-Levee Embankments 16
5.5.5 Island and Flow Splits 17
5.5.5 Ineffective Flow Areas 17
5.6 Floodway Modeling 17
5.7 Problems Encountered 17
5.7.1 Special Problems and Solutions 17
5.7.2 Model Warnings and Errors 17
5.8 Calibration 17
5.9 Final Results 17
5.9.1 Hydraulic Analysis Results 17
5.9.2 Verification of Results 18
Section 6 Erosion and Sediment Transport 18
Section 7 Draft FIS Report Data 18
7.1 Summary of Discharges 18
7.2 Floodway Data 18
7.3 Annotated Flood Insurance Rate Map 18
7.4 Flood Profiles 18

List of Tables

Table 1 Methods used for a PC-Hydro analysis 14
Table 2 Watershed Characteristics 14
Table 3 Summary of the Hydrologic Analysis 14

List of Figures

Figure 1.1 Study Limits 6
Figure 1.2 Watershed Map 7
Figure 1.3 Soil Classification 8
Figure 4.1 Flow Chart of Mapping Process 12

Appendix A: References
Appendix B: FEMA MT-2 Forms, General Documentation and Correspondence
Appendix C: Survey Field Notes
Appendix D: Hydrologic Analysis, Supporting Documents
Appendix E: Hydraulic Analysis, Supporting Documents
Appendix F: Erosion Analysis, Supporting Documents

Exhibit

Exhibit 1 100-yr floodplain limit for the Tucson Mountain Unnamed Wash 10

Section 1 Introduction

1.1 Purpose

The objective of this Technical Data Notebook (TDN) is to provide 100-yr peak discharges at Concentration Points (CPs) for the Tucson Mountain Unnamed Wash 10, 100-yr floodplain boundary and erosion hazard information, using the most up-to-date topographic, hydrologic, and hydraulic data.

This TDN was prepared in accordance with the "Instructions for Organizing and Submitting Technical Documentation for Flood Studies" prepared by the Arizona Department of Water Resources, Flood Mitigation Section (Arizona State Standard, SSA 1-97) and FEMA Guidelines. This is a local study and has not been submitted to FEMA.

1.2 Project Authority

The State of Arizona has delegated the responsibility to each county flood control district to delineate or require the delineation of floodplains and to regulate development within floodplains (ARS § 48-3609):

This study has been prepared by the Pima County Regional Flood Control District (RFCD):

Pima County Regional Flood Control District
97 East Congress, Tucson, AZ 85701

The project was prepared by:

Akitsu Kimoto, Principal Hydrologist
Pima County Regional Flood Control District
97 East Congress, Tucson, AZ 85701

1.3 Project Location

The study was performed to provide drainage information for the Tucson Mountain Unnamed Wash 10 (TM_Un10). The site includes Sections 01, 02, 10, 11, 14 and 15 of Township 13 South, Range 12 East, Pima County, Arizona. The entire watershed of the TM_Un10 is in FEMA Zone X, as shown on the current Flood Insurance Rate Map (FIRM) number 04019C-1655L and 1665 L.

The study area for the TM_Un10 is from Silverbell Rd. to approximately 2,500 feet southwest of Sunset Rd. (Fig.1.1). The study watershed is 1.08 square miles and was divided into eight sub-basins (Fig.1.2).

1.4 Hydrologic and Hydraulic Methods

A hydrologic analysis was performed to estimate regulatory discharge rates at CP A to CP G using PC-Hydro Version 5.4.2 (PC-Hydro). The parameters for PC-Hydro, such as soil, vegetation, slope, flow path length and roughness were selected in accordance with the PC-Hydro User Guide (Arroyo Engineering, 2007). The proposed regulatory discharges are flow rates that have a 1-percent chance of being equaled or exceeded each year ("100-year" discharge rates). A hydraulic analysis was performed to determine a 100-yr floodplain boundary using HEC-GeoRAS, Version 10 (HEC-GeoRAS) and HEC-RAS Version 4.1 (HEC-RAS).

1.5 Acknowledgment

This study relied on assistance from RFCD GIS staff, who were integral to the development of the models and maps.

1.6 Study Results

The 100-yr discharges were calculated for the TM_Un10. Subbasin boundaries and corresponding CPs are illustrated in Figure 1.2. Hydrologic characteristics for the studied subbasins are presented in Table 2. Calculated discharges are summarized in Table 3. The calculated discharges are compared with the USGS Regional Regression Equation (Table 4). The comparison shows that the peak discharges calculated in this study are reasonable. This study found some homes at risk for flooding during the 100-yr flood.

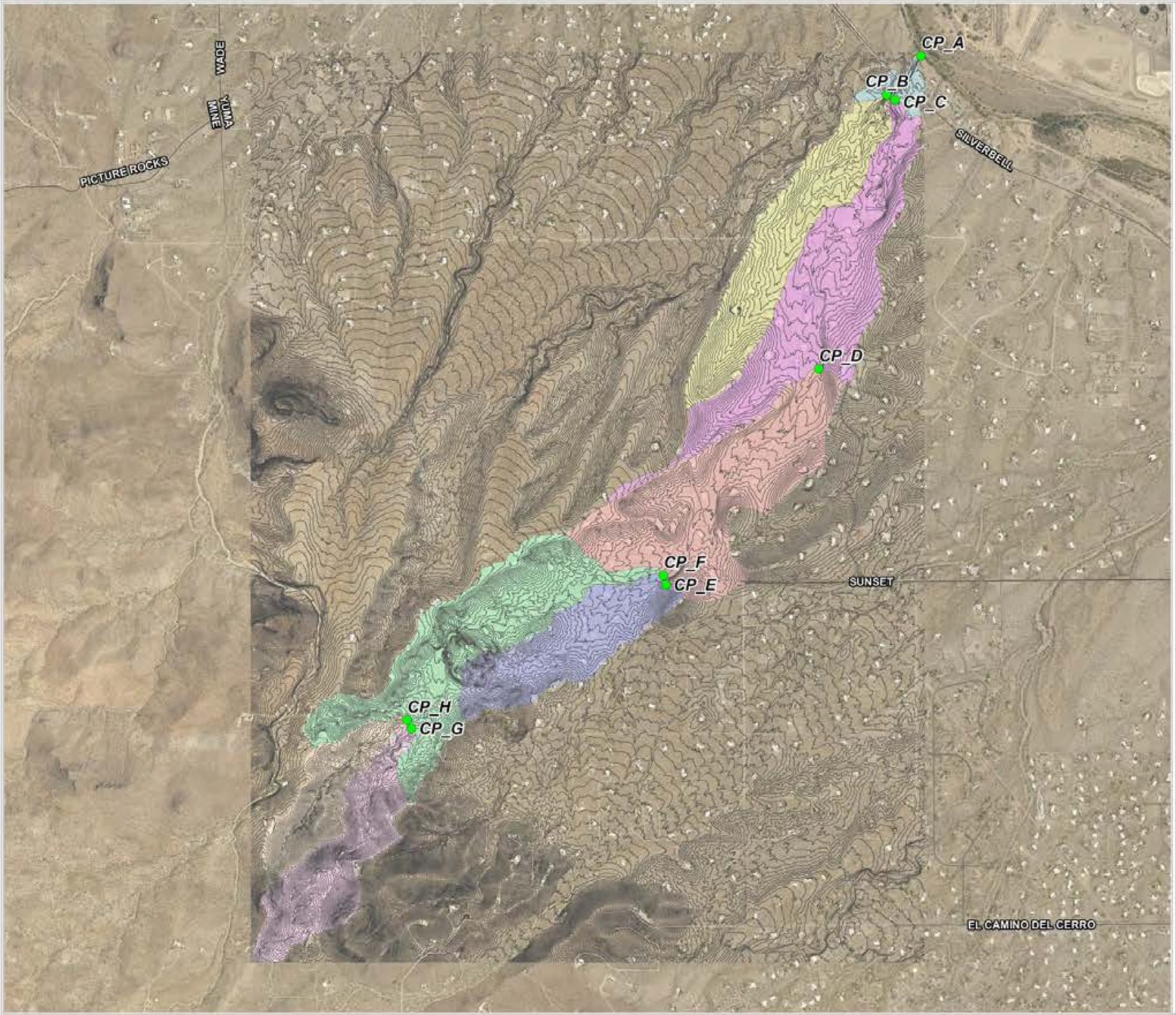

Figure 1.1
Watershed Map
unnamed 10 Wash

Discharge Point

Contour 5ft

Sub_Name

- Un_10 A
- Un_10 B
- Un_10 C
- Un_10 D
- Un_10 E
- Un_10 F
- Un_10 G
- Un_10 H

Aerial : 2010 Pictometry
Topo: 2008 Pima Association of Governments
Datum: NAVD 1988

Pima County Index Map

Index Map Scale 1:3,250,000

The information depicted on this display is the result of digital analysis performed on a variety of databases provided and maintained by several governmental agencies. The accuracy of the information presented is limited to the collective accuracy of these databases on the date of the analysis. The Pima County Regional Flood Control Department makes no claims regarding the accuracy of the information depicted herein.

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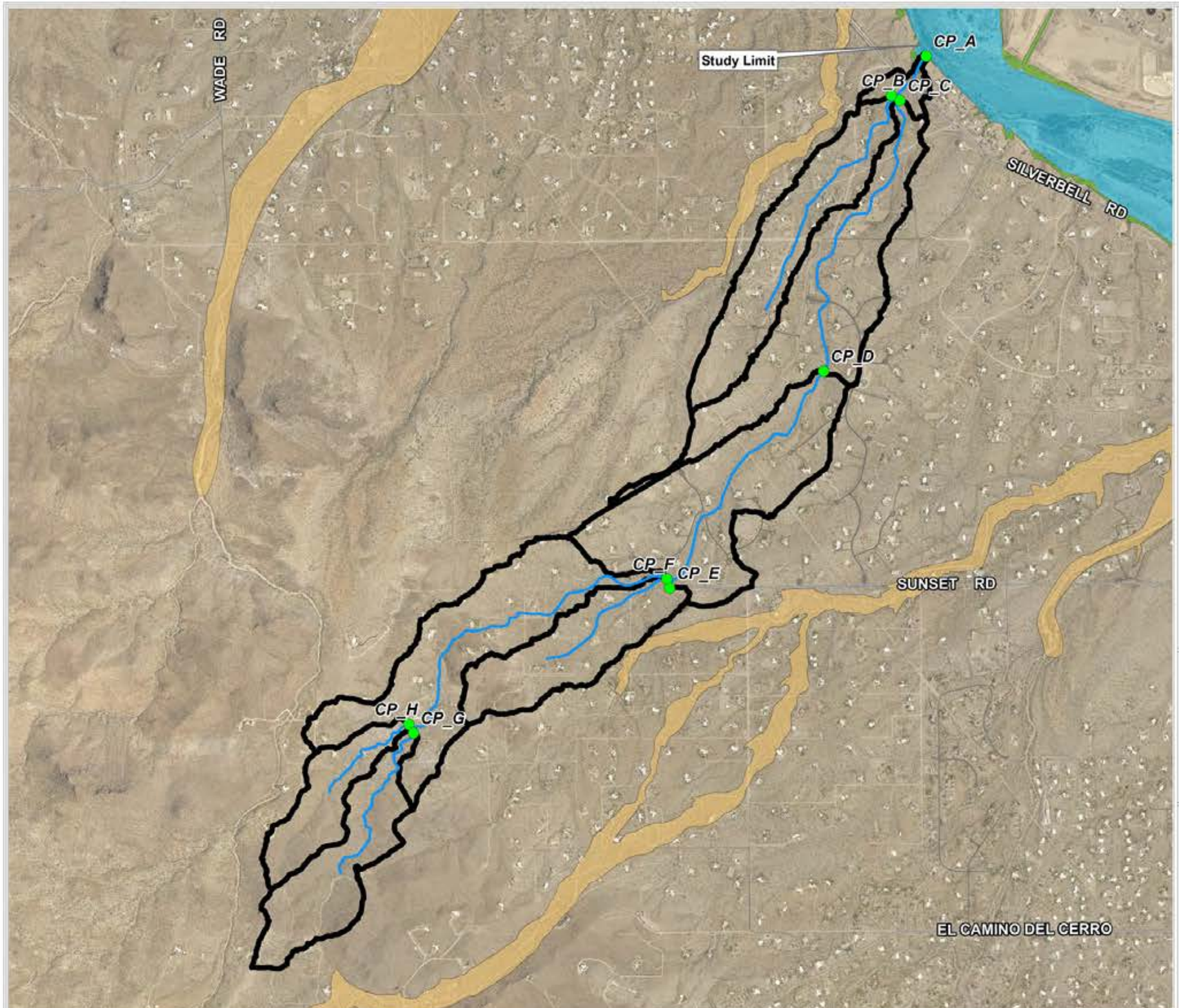


Figure 1.2
Study Limit
Unnamed 10 Wash

Discharge Point
River

Subbasins

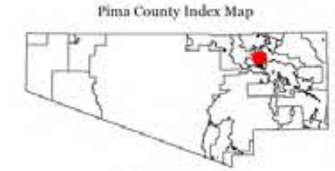
Subbasins

Existing FEMA Floodplain

ZONE A
ZONE AE
ZONE X - SHADED

Aerial : 2010 Pictometry

Pima County Index Map



Index Map Scale 1:3,250,000

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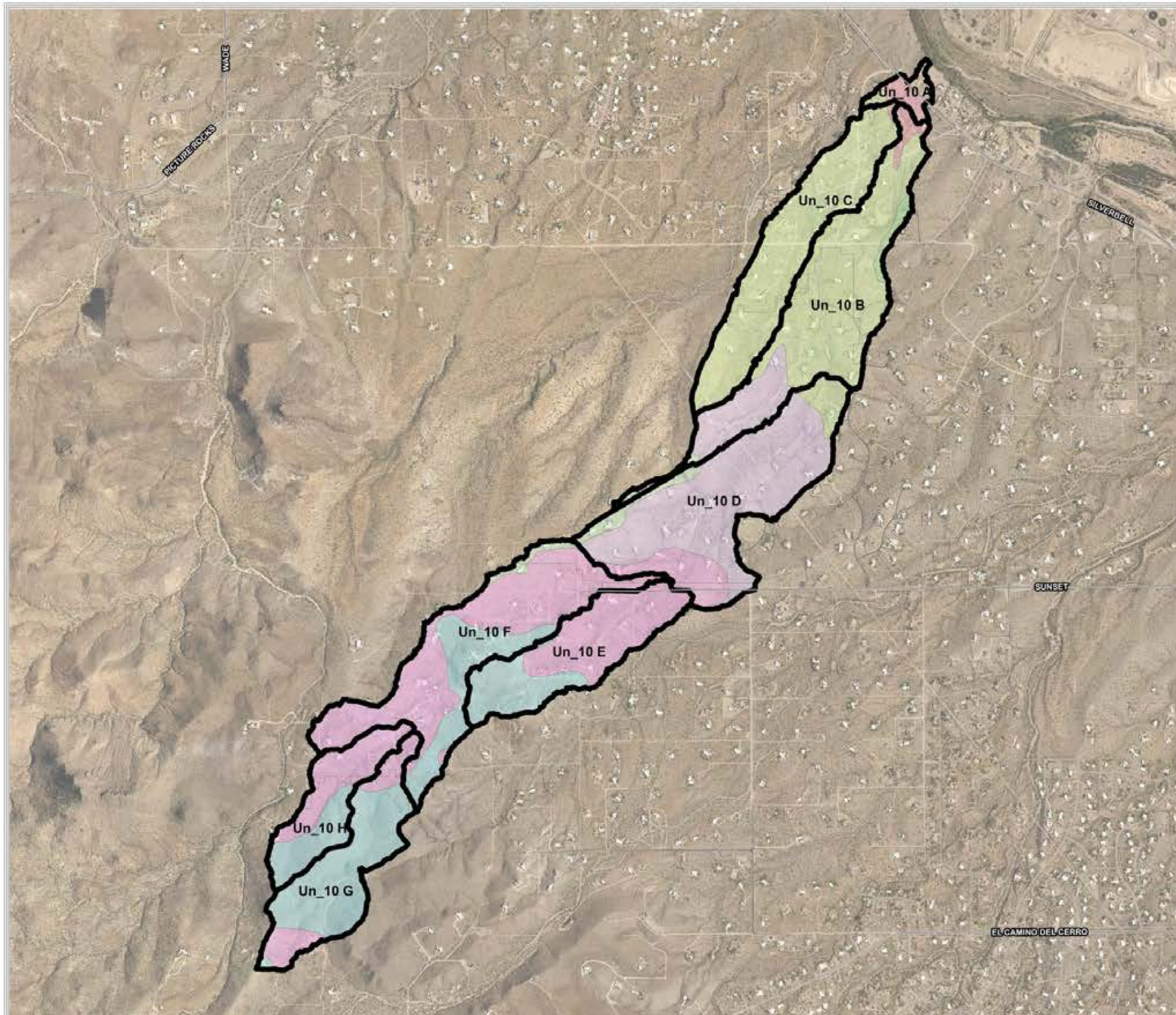
Figure 1.3
Soil Classification
Unnamed 10 Wash



Major

Subbasins

Soil Classification

- Soil Group: A (100%), RIVERWASH
- Soil Group: B (100%), PINALENO VERY COBBLY SANDY LOAM, 1 TO 8 PERCENT SLOPES
- Soil Group: B (100%), PINALENO-STAGECOACH COMPLEX, 5 TO 16 PERCENT SLOPES
- Soil Group: B (100%), RILLITO GRAVELLY SANDY LOAM, 0 TO 8 PERCENT SLOPES
- Soil Group: B (100%), STAGECOACH-SAHUARITA ASSOCIATION, 1 TO 8 PERCENT SLOPES
- Soil Group: B (82%) C (18%),PINALENO-STAGECOACH-PALOS VERDES COMPLEX, 10-35 PERCENT SLOPE
- Soil Group: C (100%), ROUGH BROKEN LAND
- Soil Group: C (47%) D (53%), PANTANO-GRANOLITE COMPLEX, 5 - 25 PERCENT SLOPE
- Soil Group: D (100%), ANKLAM-CELLAR-ROCK OUTCROP COMPLEX, 15 - 55 PERCENT SLOPES
- Soil Group: D (100%), CAVE SOILS AND URBAN LAND, 0 TO 8 PERCENT SLOPES

Aerial : Pictometry 2014

Pima County Index Map

Index Map Scale 1:5,250,000

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Section 2 Local Government Abstract

2.1 Project Contact Information

Contact Information:
Akitsu Kimoto
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97 E. Congress, Tucson, AZ 85705
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Local Technical Reviewer:
Terry Hendricks
Pima County Regional Flood Control District
97E Congress, Tucson, AZ 85705
Terry.Hendricks@pima.gov

Date Study Submitted: _____

Date Study Approved: _____

2.2 General Information

Community: Pima County Regional Flood Control
County: Pima County
River or Stream Name: Tucson Mountain Unnamed Wash 10
Reach Description: Wash in Catalina Foothills
Study Type: Hydrology and Hydraulics study of a Riverine System
Purpose of the Study: To provide regulatory discharges and map floodplain boundaries
Summary of Hydrology and Hydraulic Methods:
Brief Summary Description of the Study Results:
Acknowledgements:

2.3 Survey and Mapping Information

Digital Projection Information: NAD 1983 HARN State Plane Arizona Central
USGS Quad Sheets if available:
Mapping for Hydrologic Study: LiDAR based on 2008 flight used to derive 5-ft contour interval maps using ArcGIS 10.0, , PAG 2011 orthophotos
Mapping for Hydraulic Study: LiDAR based on 2008 flight used to derive a DEM (5-ft cell size) for use with HEC-GeoRAS, PAG 2011 orthophotos

2.4 Hydrology

Model or Method Used: PC-Hydro Version 5.4.2
Storm Duration: Based on 1-hr Rainfall Depth
Hydrograph Type: NA
Frequencies Determined: 100 yr
List of Gages used in Frequency Analysis or Calibration: None
Rainfall Amounts and Reference: NOAA 14 Upper 90% Confidence Interval
Unique Conditions and Problems: None
Coordination of Q's: Comparison with a USGS Regression Equation

2.5 Hydraulics

Model or Method Used: HEC-GeoRAS, Version 10 (HEC-GeoRAS) and HEC-RAS Version 4.1 (HEC-RAS)
Regime: Modeled as subcritical
Frequencies for which Profiles were computed: 100 yr
Method of Floodway Calculation: Floodway Not Determined in this Study
Unique Conditions and Problems: None

2.6 Erosion, Sediment Transport and Geomorphic Analysis

Summary of Method: NA
Issues Encountered During Study: NA
Summary of Findings: NA

2.7 Additional Study Information

None

Section 3 Survey and Mapping Information

3.1 Digital Projection Information

The data below are included in this TDN (see "GIS" folder)
Projection: State Plane, Arizona Central Zone
Horizontal Datum: NAD 83 HARN
Vertical Datum: NAVD 88
Units: International Feet
Aerial Photo: PAG 2011 Orthophotos
Contour: 5 feet interval
Topographic Data: 5-ft DEM

3.2 Field Survey Information

A survey was not necessary for this study.

3.3 Mapping

A Digital Elevation Model (DEM) derived from 2008 Light Detection and Ranging (LiDAR) data was used for the HEC-RAS analysis. The contour interval of the topographic map is 2 feet.

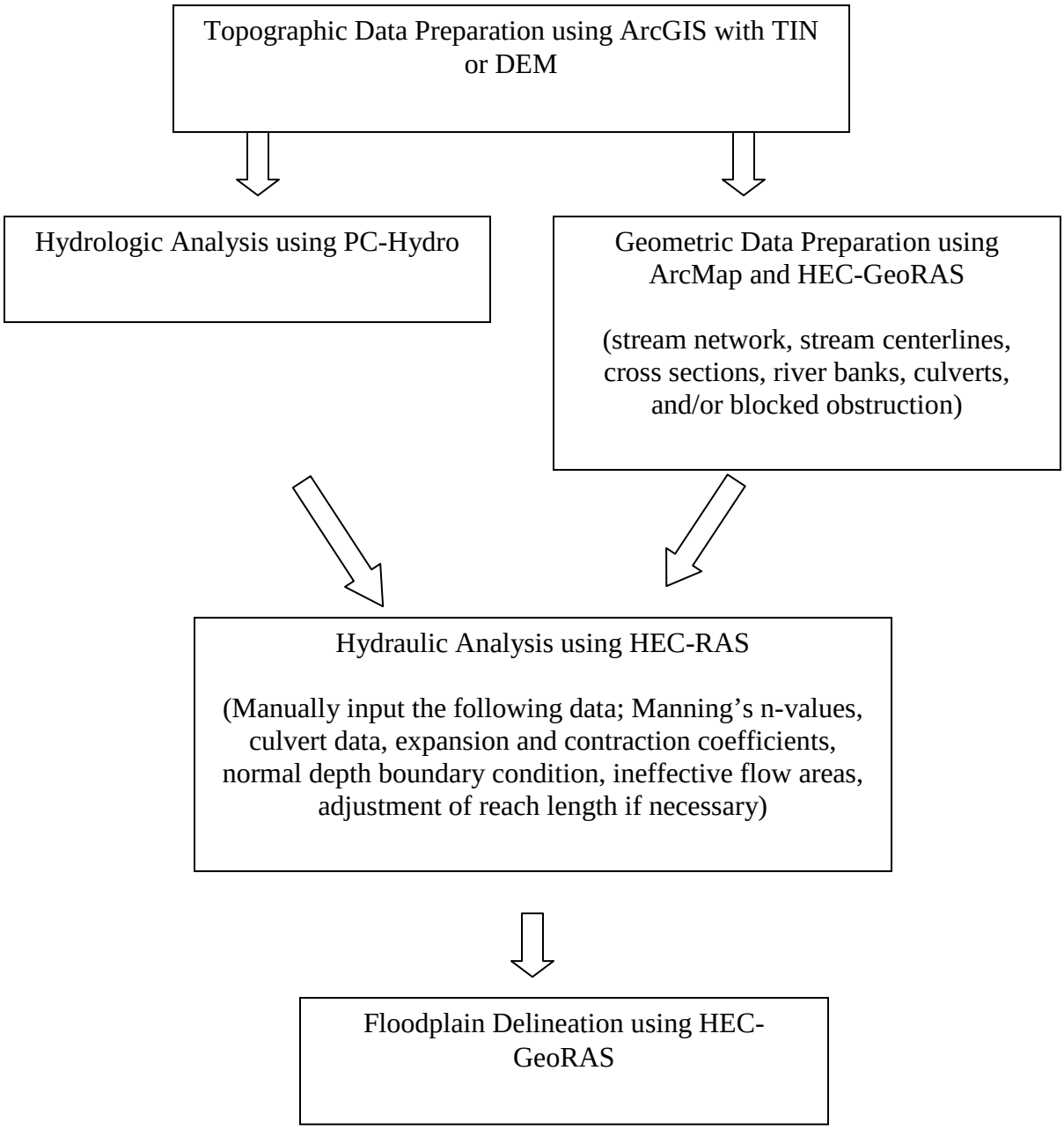
Following data are included in this TDN (see "GIS" folder):
Aerial Photo: PAG 2011 Orthophotos
Contour: 2 feet interval
Topographic Data: 5-ft DEM

Section 4 Hydrology

4.1 Method Description

Hydrologic analysis was performed using PC-Hydro Version 5.4.3 (PC-Hydro). The PC-Hydro uses a semi-empirical method, which is similar to the Rational Formula. The method is unique to Pima County. Pima County has been using the Pima County Hydrology Procedures (PC-Hydro method) for over 30 years for a floodplain management. The PC-Hydro method has been accepted by FEMA for prediction of 100-yr peak discharges in Pima County (i.e. Friendly Village LOMR, Case # 08-09-0473P). The PC-Hydro method produces conservative discharge on smaller watersheds and PC-Hydro is the accepted method for watersheds less than one square mile in Pima County Regional Flood Control District Technical Policy 018 (Tech-018, Appendix A). The PC-Hydro model requires the parameters regarding rainfall, topography, soil, and vegetation to determine peak discharge. Those parameters were determined following the PC-Hydro User Guide (Arroyo Engineering, 2007). The PC-Hydro output is included in Appendix D.

Figure 4.1 Flow Chart of Mapping Process



4.2 Parameter Estimation

4.2.1 Drainage Area Boundaries

TM_Un10 Wash watershed is mostly located southwest of Silverbell Rd. The upstream study limits is approximately 2500 feet southwest of Sunset Rd., while the downstream limit is Silverbell Rd. (Fig.1.1). The entire study watershed is 1.08 square mile. The study watershed was divided into eight sub-basins (Fig.1.2).

4.2.2 Watershed Work Maps

A watershed work map is included in Exhibit 1. The work map includes subbasin boundaries, concentration points, flow center lines and cross sections with station numbers and water surface elevations. Soil group boundaries are shown for the drainage area in Figure 1.3. Concentration points were named using the Prefix TM_Un for the Tucson Mountain Unnamed Wash 10 followed by a letter assigned to each concentration point.

4.2.3 Gage Data

No gage data were used in this TDN.

4.2.4 Spatial Parameters

No spatial parameters were used in this TDN.

4.2.5 Precipitation

The NOAA 14 Atlas 90% upper confidence rainfall data was used. No area reduction factor was applied.

4.2.6 Physical Parameters

The methods used in this study are summarized in Table 1. The PC-Hydro model calculates runoff coefficients using an adjusted Curve Number (CN) method, which has been developed based on the results of the USDA-ARS research. This procedure assumes that high intensity, short duration storms result in raindrop impacts causing the surface of soils to seal up, resulting in reducing infiltration (Caliche Effect). The CN in the PC-Hydro model increases with increasing rainfall depth and intensity. The detail of the method is described in PC-Hydro User Guide (Arroyo Engineering, 2007).

Table 1 Methods used for a PC-Hydro analysis

	Selected Method
Rainfall Depth	NOAA 14, upper 90% Confidence Interval
Rainfall Loss	Adjusted SCS Curve number
Time of Concentration	Pima County Hydrology Procedure

Table 2 Watershed Characteristics

CP Name	Area (Acre)	Impervious Area (%)	Vegetation Cover (%)
CP A	1.08	10	30
CP B	0.92	10	30
CP C	0.14	10	30
CP D	0.72	10	30
CP E	0.11	10	30
CP F	0.39	10	30
CP G	0.11	10	30
CP H	0.07	5	30

4.3 Issues Encountered During the Study

4.3.1 Special Problems and Solutions

There were no problems with the hydrologic modeling.

4.3.2 Modeling Warning and Error Messages

None

4.4 Calibration

No calibration was conducted in this study.

4.5 Final Results

4.5.1 Hydrologic Analysis Results

The 100-year peak discharges at CPs A, B, C, D, E, F, G and H were determined using the PC-Hydro. The result is summarized Table 3.

Table 3 Summary of the Hydrologic Analysis

CP Name	Location	Area (sq mile)	Q100 PC-Hydro(cfs)	Q100 RRE (cfs)
CP A	Confluence of the Santa Cruz River	1.08	1514	1325
CP B	~280 ft southwest of Silverbell Rd.	0.92	1356	1191
CP C	~280 ft southwest of Silverbell Rd.	0.14	319	286
CP D	~470 ft east of Abington Rd.	0.72	1329	1002
CP E	~80 ft north of Sunset Rd.	0.11	387	232
CP F	~80 ft north of Sunset Rd.	0.39	930	640
CP G	Sunset Rd.	0.11	393	238
CP H	Sunset Rd.	0.07	269	159

RRE: USGS Regression Equation 13

4.5.2 Verification of results

The estimated peak discharges at CPs were also compared with the peak discharge obtained from USGS Regression Equation 13 (Thomas et al., 1997) (Table 3). The comparison showed that the PC-Hydro-derived peak discharge is higher than the one derived from the Regression Equation.

Section 5 Hydraulics

5.1 Method Description

Steady flow analysis with HEC-RAS, Version 4.1 was performed to delineate a 100-year floodplain of the TM_Un 10. Normal depth was used as a downstream boundary condition. Parameters for the hydraulic analysis were selected following the District Tech Policy 019.

The physical attributes of the wash were digitized in ArcGIS using the HEC-GeoRAS extension and exported to HEC-RAS to create geospatially referenced geometric data (cross section, reach profile). Other parameters for the steady-state analysis, such as Manning's n-values, expansion and contraction coefficients, boundary condition, and ineffective flow areas were manually input into HEC-RAS. Normal-depth with a slope of 0.021 was assumed for the downstream boundary condition. Water surface elevation at a cross section of the Unnamed Wash 10 (stations# 787.0228 for the reach C, station# 10118.55 for the reach E, and station# 15515.92 for the reach H) was used to determine the downstream condition of the reaches C, E, and H. Known water surface elevations were used for the downstream boundary conditions for the reaches C, E and H. The

hydraulic data obtained from HEC-RAS were imported into HEC-GeoRAS to delineate a floodplain boundary for the TM_Un 10.

5.2 Work Study Maps

A work study map is shown in Exhibit 1.

5.3 Parameter Estimation

5.3.1 Roughness Coefficients

Manning's n values were determined by a combination of a site visit and 2010 PAG aerial photo. Manning's n value of 0.065 was assigned for the overbank with desert brush along the TM_Un 10. The value of 0.035-0.04 was assigned to a channel.

5.3.2 Expansion and Contraction Coefficients

The expansion coefficient of 0.30 and contraction coefficient of 0.10 were used for the entire study reach.

5.4 Cross-Section Description

A 5-foot interval contour map was used to select the location of cross sections. Cross-section locations were determined primarily based on the channel topography. The cross-section lines were drawn to be perpendicular to flow paths in HEC-GeoRAS. The locations of cross sections and channels used for this study are shown in Exhibit 1.

5.5 Modeling Consideration

5.5.1 Hydraulic Jump and Drop Analysis

No hydraulic, drop analyses or adjustment of the floodplain was conducted in this study.

5.5.2. Bridges and Culverts

None.

5.5.3 Levees and Dikes

There are no levees or dikes located within the study limit.

5.5.4 Non-Levee Embankments

None.

5.5.5 Island and Flow Splits

There were no islands or flow splits modeled.

5.5.5 Ineffective Flow Areas

Ineffective flow option was modeled in the HEC-RAS model. In general these ineffective flow areas were disconnected overbank areas that would not convey flow to the next downstream cross-section.

5.6 Floodway Modeling

No floodway modeling was performed in this study.

5.7 Problems Encountered

5.7.1 Special Problems and Solutions

Flow is not contained at the right bank of the cross section 3536.258. A lateral structure was used to estimate the volume of flow overtopping the right bank.

5.7.2 Model Warnings and Errors

No errors occurred. The following warning messages occurred:

Divided flow
Energy loss greater than 1.0
Energy equation could not be balanced and defaulted to critical.
Cross-section extended vertically.
Multiple critical depths calculated.
Conveyance ratio is less than 0.7 or greater than 1.4.

5.8 Calibration

The model was not calibrated in this study.

5.9 Final Results

5.9.1 Hydraulic Analysis Results

The HEC-RAS model is included in Appendix E.

5.9.2 Verification of Results

The proposed floodplain limit tends to follow the existing floodplain limit. The results suggest that the proposed floodplain limit is reasonable based on the topography.

Section 6 Erosion and Sediment Transport

No erosion or sediment transport analysis was conducted in this study.

Section 7 Draft FIS Report Data

7.1 Summary of Discharges

Peak discharges at seven CPs were used for the hydraulic analysis in this study. The estimated regulatory discharge rates are summarized in Table 3.

7.2 Floodway Data

Not applicable.

7.3 Annotated Flood Insurance Rate Map

Not applicable.

7.4 Flood Profiles

Flood profiles are included in the HEC-RAS model in Appendix E.

Appendix A: References

A.1 Data Collection Summary

Aldridge, B. and J. Garrett. 1973. Roughness Coefficients for Stream Channels in Arizona. US Department of the Interior Geological Survey. Tucson, AZ.

Arizona Department of Water Resources, Flood Mitigation Section
"Instruction for Organization and Submitting Technical Document for Flood Studies" SSA1-97, November 1997

Arizona Department of Water Resources, Flood Mitigation Section
"Requirements for Flood Study Technical Documentation" SS1-97, November 1997

Arroyo Engineering. 2007. PC-Hydro User Guide. Pima County Regional Flood Control District

City of Tucson (COT), Department of Transportation, 1989. Standards Manual for Drainage Design and Floodplain Management in Tucson, Arizona. Revised in 1998.

National Weather Service. 1984. Depth-Area Ratios in the Semi-Arid Southwest United States, NOAA Technical Memorandum NWS Hydro-40

Phillips, J., and S. Tadayon. 2006. Selection of Manning's roughness coefficient for natural and constructed vegetated and non-vegetated channels, and vegetation maintenance plan guidelines for vegetated channels in central Arizona: U.S. Geological Survey Scientific Investigations Report 2006–5108, 41 p.

Phillips, J., and T. Ingersoll. 1998. Verification of Roughness Coefficients for Selected Natural and Constructed Stream Channels in Arizona. U.S. Geological Survey Professional Paper 1584.

Pima County Regional Flood Control District
"Pima County Mapguide Map", 2008

U.S. Army Corps of Engineers (COE). 1998. HEC-1 Flood Hydrograph Package, Users Manual, CPD-1A, Hydraulic Engineering Center, Davis, CA.

U.S. Army Corps of Engineers (COE). 2001. HEC-RAS, River Analysis System, Hydraulic
Reference Manual, CPD-69, Hydraulic Engineering Center, Davis, CA.

U.S. Army Corps of Engineers (COE). 2003. Geospatial Hydrologic Modeling Extension HEC-GeoHMS, (v 1.1) CPD-77, Hydraulic Engineering Center, Davis, CA.

U.S. Army Corps of Engineers (COE). 2006. HEC-HMS, Hydrologic Modeling System User's Manual, (v. 3.1.0) CPD-74A, Hydraulic Engineering Center, Davis, CA.

U.S. Department of Agriculture Natural Resources Conservation Service (NRCS), 1986. Urban Hydrology for Small Watersheds, Technical Release 55. Washington, DC.

A 2. Referenced Documents

Arroyo Engineering. 2007. *PC-Hydro User Guide*. Pima County Regional Flood Control District

Eychaner, J.H., 1984. Estimation of magnitude and frequency of floods in Pima County, Arizona, with comparisons of alternative methods: U.S. Geological Survey Water-Resources Investigations Report 84-4142, 69 p.

Haan, C.T., Barfield, B.J., Hayes, J.C. 1994. Design Hydrology and Sedimentology for Small Catchments, Academic Press.

Thomas, B.E., H.W. Hjalmarson, and S.D. Waltemeyer. 1997. Methods for Estimating Magnitude and Frequency of Floods in the Southwestern United States. USGS Water Supply Paper 2433. 195 p.

U.S. Department of Agriculture Natural Resources Conservation Service (NRCS), 1986. Urban Hydrology for Small Watersheds, Technical Release 55. Washington, DC.

Appendix B General Documentation and Correspondence

There is no additional documentation or correspondence for this study.

Appendix C: Survey Field Notes

There are no survey field notes for this study.

Appendix D: Hydrologic Analysis Supporting Documentation

Models, spreadsheets and supporting information are provided digitally on the TDN disk.

HYDROLOGIC DATA SHEET FOR PIMA COUNTY FLOOD PEAK PROCEDURE

Pima County Regional Flood Control District

FLOOD CONTROL

Client: RFCD

Prepared by: AK

Project Name: TM-Un10

Date: 3/24/2015

Concentration Point: A

Job #:

Watershed Area: 1.1 sm

Watershed Type: Suburban-Foothills

Watercourse Data By Reach

Reach No.	Height (Hi)	Length (Li)	Slope (Si)	Basin Factor (Nb)
1	50.7	166	0.3054	.034
2	94.2	1,409	0.0669	.034
3	73.9	2,115	0.0350	.034
4	39.6	1,218	0.0325	.034
5	29.4	1,371	0.0214	.032
6	36.4	486	0.0749	.032
7	69.9	3,447	0.0203	.032
8	24.4	1,524	0.0160	.032
9	44.7	2,557	0.0175	.032
10	33.1	2,176	0.0152	.032
11	57.4	2,496	0.0230	.032
12	19.4	753	0.0258	.032

Length of Watercourse (Lc): 19,718 feet

Mean Slope: 0.0232

Length to Cen. of Gravity (Lca): 9,859 feet

Weighted Basin Fac.: 0.032

Veg. Cover Type(s): Desert Brush

Veg. Cover Density: 30 %

RETURN PERIOD: 100-years

Rainfall Depths: NOAA Atlas 14 (90% UCL) @ Latitude: 32.3090 Longitude: -111.0940

Duration:	5-min	10-min	15-min	30-min	60-min	2-hr	3-hr	6-hr	12-hr	24-hr
Point Values (in)	0.83	1.26	1.56	2.10	2.60	2.90	3.04	3.31	3.55	4.68
Areal Values (in)	0.83	1.26	1.56	2.10	2.60	2.90	3.04	3.31	3.55	4.68

Soils Data

Soil Type	Percent	Curve # (CN)	Adj. Curve # (CN*)	Runoff Coef. (C)
B	48	82.	86.24	0.516
C	17	87.	89.92	0.621
D	36	90.	92.27	0.696
Imp.	10	99.	99.	0.955

Weighted Runoff Coef. (Cw): 0.633

Time of Concentration: 39.5 min

Rainfall Intensity (i) @ Tc: 3.43 in/hr

Runoff Supply Rate (q) @ Tc: 2.17 in/hr

PEAK DISCHARGE: 1,514 cfs

PC-Hydro, Ver 5.4.3

HYDROLOGIC DATA SHEET FOR PIMA COUNTY FLOOD PEAK PROCEDURE

Pima County Regional Flood Control District

Client: RFCD

Prepared by: AK

Project Name: TM-Un10

Date: 3/24/2015

Concentration Point: B

Job #:

Watershed Area: 0.9 sm

Watershed Type: Suburban-Foothills

Watercourse Data By Reach

Reach No.	Height (Hi)	Length (Li)	Slope (Si)	Basin Factor (Nb)
1	50.7	166	0.3054	.034
2	94.2	1,409	0.0669	.034
3	73.9	2,115	0.0350	.034
4	39.6	1,218	0.0325	.034
5	29.4	1,371	0.0214	.032
6	36.4	486	0.0749	.032
7	69.9	3,447	0.0203	.032
8	24.4	1,524	0.0160	.032
9	44.7	2,557	0.0175	.032
10	33.1	2,176	0.0152	.032
11	57.4	2,496	0.0230	.032

Length of Watercourse (Lc): 18,965 feet

Mean Slope: 0.0231

Length to Cen. of Gravity (Lca): 9,482 feet

Weighted Basin Fac.: 0.033

Veg. Cover Type(s): Desert Brush

Veg. Cover Density: 30 %

RETURN PERIOD: 100-years

Rainfall Depths: NOAA Atlas 14 (90% UCL) @ Latitude: 32.3090 Longitude: -111.0940

Duration:	5-min	10-min	15-min	30-min	60-min	2-hr	3-hr	6-hr	12-hr	24-hr
Point Values (in)	0.83	1.26	1.56	2.10	2.60	2.90	3.04	3.31	3.55	4.68
Areal Values (in)	0.83	1.26	1.56	2.10	2.60	2.90	3.04	3.31	3.55	4.68

Soils Data

Soil Type	Percent	Curve # (CN)	Adj. Curve # (CN*)	Runoff Coef. (C)
B	39	82.	86.24	0.516
C	20	87.	89.92	0.621
D	42	90.	92.27	0.696
Imp.	10	99.	99.	0.955

Weighted Runoff Coef. (Cw): 0.646

Time of Concentration: 37.9 min

Rainfall Intensity (i) @ Tc: 3.53 in/hr

Runoff Supply Rate (q) @ Tc: 2.28 in/hr

PEAK DISCHARGE: 1,356 cfs

PC-Hydro, Ver 5.4.3

HYDROLOGIC DATA SHEET FOR PIMA COUNTY FLOOD PEAK PROCEDURE

Pima County Regional Flood Control District

Client: RFCD

Prepared by: AK

Project Name: TM-Un10

Date: 3/24/2015

Concentration Point: C

Job #:

Watershed Area: 0.1 sm

Watershed Type: Suburban-Foothills

Watercourse Data By Reach

Reach No.	Height (Hi)	Length (Li)	Slope (Si)	Basin Factor (Nb)
1	88.6	1,063	0.0833	.032
2	60.5	2,529	0.0239	.032
3	50.8	2,347	0.0216	.032

Length of Watercourse (Lc): 5,939 feet

Mean Slope: 0.0272

Length to Cen. of Gravity (Lca): 2,969 feet

Weighted Basin Fac.: 0.032

Veg. Cover Type(s): Desert Brush

Veg. Cover Density: 30 %

RETURN PERIOD: 100-years

Rainfall Depths: NOAA Atlas 14 (90% UCL) @ Latitude: 32.3240 Longitude: -111.0860

Duration:	5-min	10-min	15-min	30-min	60-min	2-hr	3-hr	6-hr	12-hr	24-hr
Point Values (in)	0.82	1.26	1.56	2.10	2.60	2.88	3.02	3.29	3.52	4.66
Areal Values (in)	0.82	1.26	1.56	2.10	2.60	2.88	3.02	3.29	3.52	4.66

Soils Data

Soil Type	Percent	Curve # (CN)	Adj. Curve # (CN*)	Runoff Coef. (C)
B	100	82.	86.24	0.516
C	0	87.	89.92	0.621
D	0	90.	92.27	0.696
Imp.	10	99.	99.	0.955

Weighted Runoff Coef. (Cw): 0.560

Time of Concentration: 14.7 min

Rainfall Intensity (i) @ Tc: 6.30 in/hr

Runoff Supply Rate (q) @ Tc: 3.53 in/hr

PEAK DISCHARGE: 319 cfs

PC-Hydro, Ver 5.4 3

HYDROLOGIC DATA SHEET FOR PIMA COUNTY FLOOD PEAK PROCEDURE

Pima County Regional Flood Control District

Client: RFCD

Prepared by: AK

Project Name: TM-Un10

Date: 3/24/2015

Concentration Point: D

Job #:

Watershed Area: 0.7 sm

Watershed Type: Suburban-Foothills

Watercourse Data By Reach

Reach No.	Height (Hi)	Length (Li)	Slope (Si)	Basin Factor (Nb)
1	50.7	166	0.3054	.034
2	94.2	1,409	0.0669	.034
3	73.9	2,115	0.0350	.034
4	39.6	1,218	0.0325	.034
5	29.4	1,371	0.0214	.032
6	36.4	486	0.0749	.032
7	69.9	3,447	0.0203	.032
8	24.4	1,524	0.0160	.032
9	44.7	2,557	0.0175	.032

Length of Watercourse (Lc): 14,293 feet

Mean Slope: 0.0249

Length to Cen. of Gravity (Lca): 7,147 feet

Weighted Basin Fac.: 0.033

Veg. Cover Type(s): Desert Brush

Veg. Cover Density: 30 %

RETURN PERIOD: 100-years

Rainfall Depths: NOAA Atlas 14 (90% UCL) @ Latitude: 32.3070 Longitude: -111.0980

Duration:	5-min	10-min	15-min	30-min	60-min	2-hr	3-hr	6-hr	12-hr	24-hr
Point Values (in)	0.83	1.26	1.56	2.10	2.60	2.89	3.04	3.31	3.55	4.73
Areal Values (in)	0.83	1.26	1.56	2.10	2.60	2.89	3.04	3.31	3.55	4.73

Soils Data

Soil Type	Percent	Curve # (CN)	Adj. Curve # (CN*)	Runoff Coef. (C)
B	23	82.	86.24	0.516
C	24	87.	89.92	0.621
D	53	90.	92.27	0.696
Imp.	10	99.	99.	0.955

Weighted Runoff Coef. (Cw): 0.668

Time of Concentration: 28.5 min

Rainfall Intensity (i) @ Tc: 4.31 in/hr

Runoff Supply Rate (q) @ Tc: 2.88 in/hr

PEAK DISCHARGE: 1,329 cfs

PC-Hydro, Ver 5.4 3

HYDROLOGIC DATA SHEET FOR PIMA COUNTY FLOOD PEAK PROCEDURE

Pima County Regional Flood Control District

Client: RFCD

Prepared by: AK

Project Name: TM-Un10

Date: 3/24/2015

Concentration Point: E

Job #:

Watershed Area: 0.1 sm

Watershed Type: Suburban-Foothills

Watercourse Data By Reach

Reach No.	Height (Hi)	Length (Li)	Slope (Si)	Basin Factor (Nb)
1	83.8	406	0.2064	.032
2	48.1	605	0.0795	.032
3	39.4	1,305	0.0302	.032
4	36.1	1,761	0.0205	.032

Length of Watercourse (Lc): 4,077 feet

Mean Slope: 0.0318

Length to Cen. of Gravity (Lca): 2,039 feet

Weighted Basin Fac.: 0.032

Veg. Cover Type(s): Desert Brush

Veg. Cover Density: 30 %

RETURN PERIOD: 100-years

Rainfall Depths: NOAA Atlas 14 (90% UCL) @ Latitude: 32.3060 Longitude: -111.0970

Duration:	5-min	10-min	15-min	30-min	60-min	2-hr	3-hr	6-hr	12-hr	24-hr
Point Values (in)	0.83	1.26	1.56	2.10	2.60	2.89	3.04	3.31	3.55	4.73
Areal Values (in)	0.83	1.26	1.56	2.10	2.60	2.89	3.04	3.31	3.55	4.73

Soils Data

Soil Type	Percent	Curve # (CN)	Adj. Curve # (CN*)	Runoff Coef. (C)
B	0	82.	86.24	0.516
C	30	87.	89.92	0.621
D	70	90.	92.27	0.696
Imp.	10	99.	99.	0.955

Weighted Runoff Coef. (Cw): 0.702

Time of Concentration: 9.2 min

Rainfall Intensity (i) @ Tc: 7.76 in/hr

Runoff Supply Rate (q) @ Tc: 5.45 in/hr

PEAK DISCHARGE: 387 cfs

PC-Hydro, Ver 5.4.3

HYDROLOGIC DATA SHEET FOR PIMA COUNTY FLOOD PEAK PROCEDURE

Pima County Regional Flood Control District

FLOOD CONTROL

Client: RFCD

Prepared by: AK

Project Name: TM-Un10

Date: 3/24/2015

Concentration Point: F

Job #:

Watershed Area: 0.4 sm

Watershed Type: Suburban-Foothills

Watercourse Data By Reach

Reach No.	Height (Hi)	Length (Li)	Slope (Si)	Basin Factor (Nb)
1	50.7	166	0.3054	.034
2	94.2	1,409	0.0669	.034
3	73.9	2,115	0.0350	.034
4	39.6	1,218	0.0325	.034
5	29.4	1,371	0.0214	.032
6	36.4	486	0.0749	.032
7	69.9	3,447	0.0203	.032

Length of Watercourse (Lc): 10,212 feet

Mean Slope: 0.0298

Length to Cen. of Gravity (Lca): 5,106 feet

Weighted Basin Fac.: 0.033

Veg. Cover Type(s): Desert Brush

Veg. Cover Density: 30 %

RETURN PERIOD: 100-years

Rainfall Depths: NOAA Atlas 14 (90% UCL) @ Latitude: 32.3040 Longitude: -111.1040

Duration:	5-min	10-min	15-min	30-min	60-min	2-hr	3-hr	6-hr	12-hr	24-hr
Point Values (in)	0.83	1.27	1.57	2.12	2.62	2.91	3.06	3.33	3.58	4.71
Areal Values (in)	0.83	1.27	1.57	2.12	2.62	2.91	3.06	3.33	3.58	4.71

Soils Data

Soil Type	Percent	Curve # (CN)	Adj. Curve # (CN*)	Runoff Coef. (C)
B	2	82.	86.29	0.520
C	25	87.	89.96	0.624
D	73	90.	92.3	0.699
Imp.	10	99.	99.	0.955

Weighted Runoff Coef. (Cw): 0.705

Time of Concentration: 19.7 min

Rainfall Intensity (i) @ Tc: 5.30 in/hr

Runoff Supply Rate (q) @ Tc: 3.74 in/hr

PEAK DISCHARGE: 930 cfs

PC-Hydro, Ver 5.4.3

HYDROLOGIC DATA SHEET FOR PIMA COUNTY FLOOD PEAK PROCEDURE

Pima County Regional Flood Control District

Client: RFCD

Prepared by: AK

Project Name: TM-Un10

Date: 3/24/2015

Concentration Point: G

Job #:

Watershed Area: 0.1 sm

Watershed Type: Suburban-Foothills

Watercourse Data By Reach

Reach No.	Height (Hi)	Length (Li)	Slope (Si)	Basin Factor (Nb)
1	50.7	166	0.3050	.034
2	94.2	1,409	0.0669	.034
3	73.9	2,115	0.0350	.034
4	39.6	1,218	0.0325	.034

Length of Watercourse (Lc): 4,908 feet

Mean Slope: 0.0425

Length to Cen. of Gravity (Lca): 2,454 feet

Weighted Basin Fac.: 0.034

Veg. Cover Type(s): Desert Brush

Veg. Cover Density: 30 %

RETURN PERIOD: 100-years

Rainfall Depths: NOAA Atlas 14 (90% UCL) @ Latitude: 32.2970 Longitude: -111.1080

Duration:	5-min	10-min	15-min	30-min	60-min	2-hr	3-hr	6-hr	12-hr	24-hr
Point Values (in)	0.83	1.27	1.57	2.12	2.62	2.91	3.06	3.34	3.59	4.75
Areal Values (in)	0.83	1.27	1.57	2.12	2.62	2.91	3.06	3.34	3.59	4.75

Soils Data

Soil Type	Percent	Curve # (CN)	Adj. Curve # (CN*)	Runoff Coef. (C)
B	0	82.	86.29	0.520
C	11	87.	89.96	0.624
D	89	90.	92.3	0.699
Imp.	5	99.	99.	0.955

Weighted Runoff Coef. (Cw): 0.704

Time of Concentration: 9.8 min

Rainfall Intensity (i) @ Tc: 7.67 in/hr

Runoff Supply Rate (q) @ Tc: 5.40 in/hr

PEAK DISCHARGE: 393 cfs

PC-Hydro, Ver 5.4.3

HYDROLOGIC DATA SHEET FOR PIMA COUNTY FLOOD PEAK PROCEDURE

Pima County Regional Flood Control District

Client: RFCD

Prepared by: AK

Project Name: TM-Un10

Date: 3/24/2015

Concentration Point: H

Job #:

Watershed Area: 0.1 sm

Watershed Type: Suburban-Foothills

Watercourse Data By Reach

Reach No.	Height (Hi)	Length (Li)	Slope (Si)	Basin Factor (Nb)
1	112.8	345	0.3270	.034
2	77.1	1,233	0.0625	.034
3	40.2	966	0.0416	.034
4	29.6	890	0.0333	.034

Length of Watercourse (Lc): 3,434 feet

Mean Slope: 0.0514

Length to Cen. of Gravity (Lca): 1,717 feet

Weighted Basin Fac.: 0.034

Veg. Cover Type(s): Desert Brush

Veg. Cover Density: 30 %

RETURN PERIOD: 100-years

Rainfall Depths: NOAA Atlas 14 (90% UCL) @ Lattude: 32.2990 Longitude: -111.1090

Duration:	5-min	10-min	15-min	30-min	60-min	2-hr	3-hr	6-hr	12-hr	24-hr
Point Values (in)	0.83	1.27	1.57	2.12	2.62	2.91	3.06	3.34	3.59	4.75
Areal Values (in)	0.83	1.27	1.57	2.12	2.62	2.91	3.06	3.34	3.59	4.75

Soils Data

Soil Type	Percent	Curve # (CN)	Adj. Curve # (CN*)	Runoff Coef. (C)
B	0	.	.	0.000
C	27	87.	89.96	0.624
D	73	90.	92.3	0.699
Imp.	5	99.	99.	0.955

Weighted Runoff Coef. (Cw): 0.693

Time of Concentration: 7.1 min

Rainfall Intensity (i) @ Tc: 8.60 in/hr

Runoff Supply Rate (q) @ Tc: 5.96 in/hr

PEAK DISCHARGE: 269 cfs

PC-Hydro, Ver 5.4.3

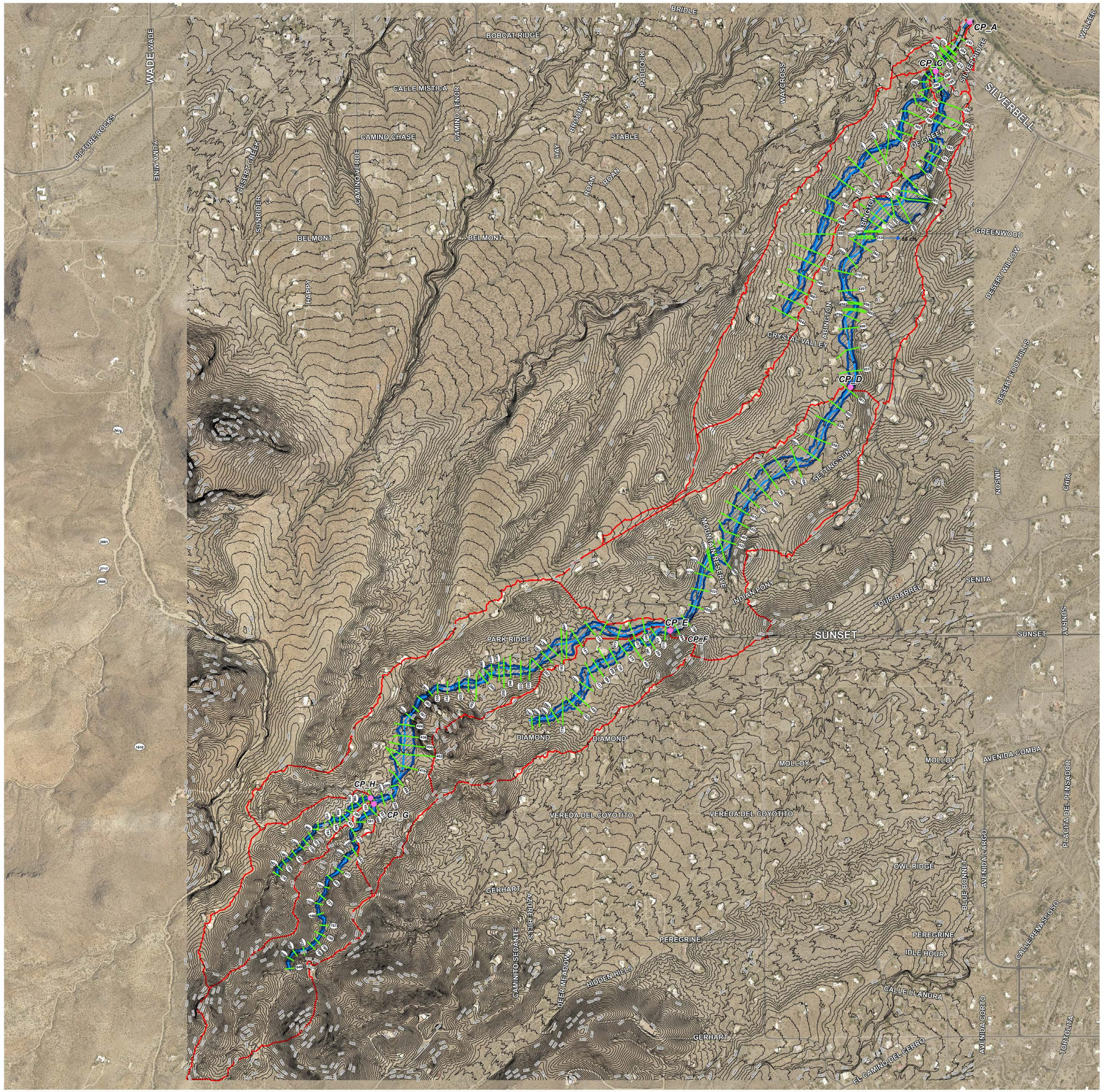
Appendix E: Hydraulic Analysis

Models, spreadsheets and supporting information are provided digitally on the TDN disk.

Appendix F: Erosion and Sediment Transport Analysis Supporting Documentation

There is no erosion and sediment transport analysis with this study.

Exhibit 1
100-year Floodplain with cross sections Unnamed 10 Wash



Discharge Points

Cross Sections

Contour 5ft

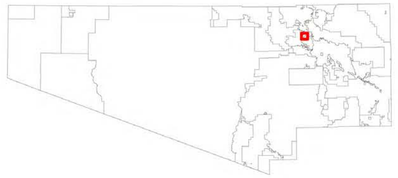
River

Subbasins

Unnamed 10 Wash 100-yr Floodplain

Aerial : 2014 Pictometry Aerial Imagery
Topo: 2008 Pima Association of Governments
Datum: NAVD 1988

Pima County Index Map



Index Map Scale 1:1,500,000

The information depicted on this display is the result of digital analyses performed on a variety of databases provided and maintained by several governmental agencies. The accuracy of the information presented is limited to the collective accuracy of these databases on the date of the analysis. The Pima County Department of Transportation Technical Services Division makes no claims regarding the accuracy of the information depicted herein.

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N
W E
S

0 250 500 1,000 Feet

PIMA COUNTY

Pima County Regional Flood Control
97 East Congress Street - 3rd Floor
Tucson. Arizona 85701-1207
(520)243-1800 - FAX (520)243-1821
http://www.rfcd.pima.gov

5/2015

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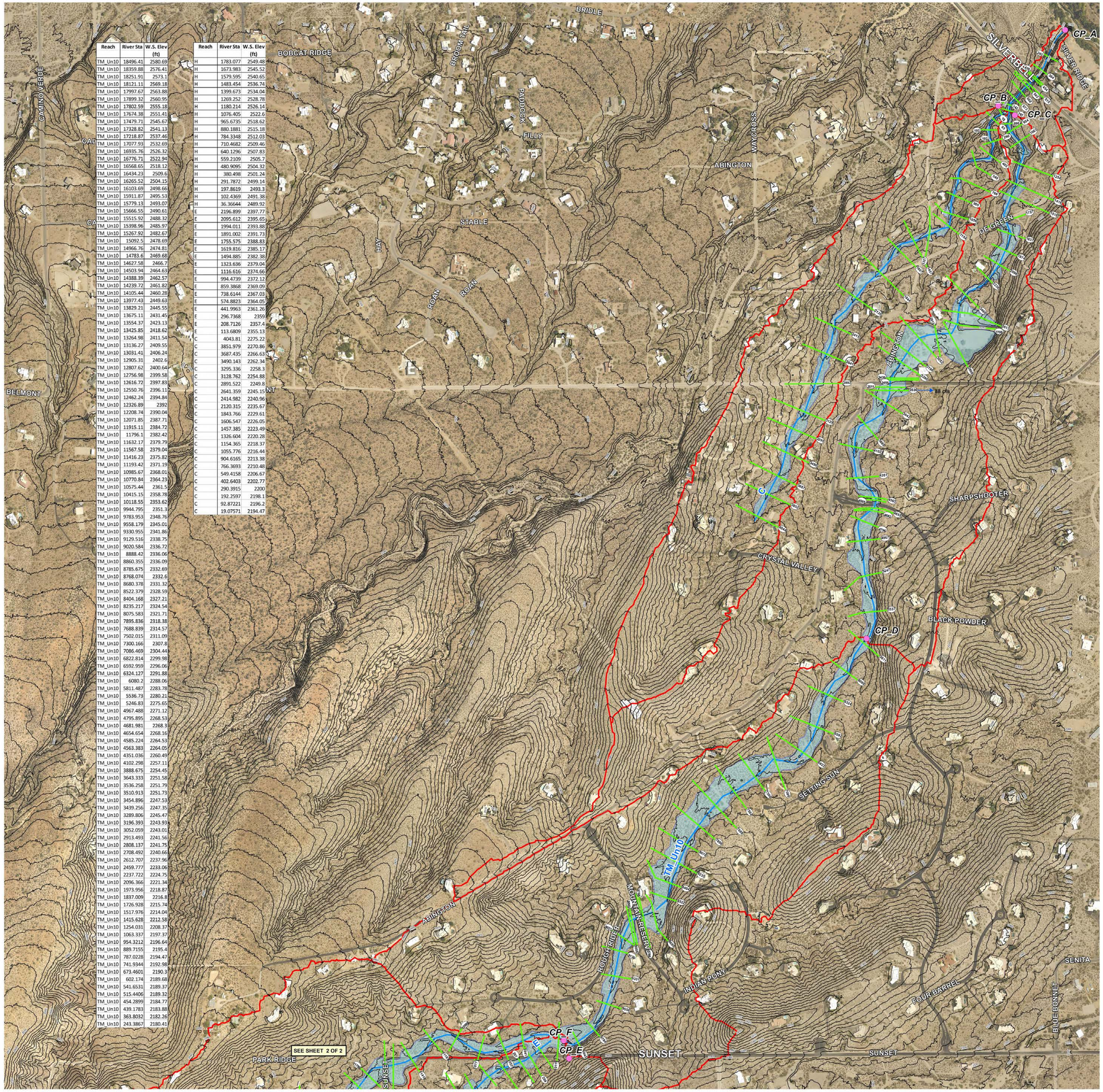
Exhibit 1
100-year Floodplain with cross sections Unnamed 10 Wash
Sheet 1 of 2



Reach	River Sta	W.S. Elev (ft)
TM_Un10	18496.41	2580.69
TM_Un10	18359.88	2576.41
TM_Un10	18251.91	2573.1
TM_Un10	18121.11	2569.18
TM_Un10	17997.67	2563.88
TM_Un10	17899.32	2560.95
TM_Un10	17802.59	2555.18
TM_Un10	17674.38	2551.41
TM_Un10	17479.71	2545.67
TM_Un10	17328.82	2541.13
TM_Un10	17218.87	2537.46
TM_Un10	17077.93	2532.69
TM_Un10	16935.76	2526.32
TM_Un10	16776.71	2522.94
TM_Un10	16568.65	2518.12
TM_Un10	16434.23	2509.6
TM_Un10	16265.52	2504.15
TM_Un10	16103.69	2498.66
TM_Un10	15911.87	2495.53
TM_Un10	15779.13	2493.07
TM_Un10	15666.55	2490.61
TM_Un10	15515.92	2488.32
TM_Un10	15398.96	2485.97
TM_Un10	15267.92	2482.67
TM_Un10	15092.5	2478.69
TM_Un10	14966.76	2474.81
TM_Un10	14783.6	2469.68
TM_Un10	14627.58	2466.7
TM_Un10	14503.94	2464.63
TM_Un10	14388.39	2462.57
TM_Un10	14239.72	2461.82
TM_Un10	14105.44	2460.28
TM_Un10	13977.43	2449.63
TM_Un10	13829.21	2445.55
TM_Un10	13675.11	2431.45
TM_Un10	13554.37	2423.13
TM_Un10	13425.85	2418.62
TM_Un10	13264.98	2411.54
TM_Un10	13136.27	2409.55
TM_Un10	13031.41	2406.24
TM_Un10	12905.31	2402.6
TM_Un10	12807.62	2400.64
TM_Un10	12756.98	2399.58
TM_Un10	12616.72	2397.83
TM_Un10	12550.76	2396.11
TM_Un10	12462.24	2394.84
TM_Un10	12326.89	2392
TM_Un10	12208.74	2390.04
TM_Un10	12071.85	2387.71
TM_Un10	11915.11	2384.72
TM_Un10	11796.1	2382.42
TM_Un10	11632.17	2379.79
TM_Un10	11567.58	2379.04
TM_Un10	11416.23	2375.82
TM_Un10	11193.42	2371.19
TM_Un10	10985.67	2368.01
TM_Un10	10770.84	2364.23
TM_Un10	10575.44	2361.5
TM_Un10	10415.15	2358.78
TM_Un10	10118.55	2353.62
TM_Un10	9944.795	2351.3
TM_Un10	9783.953	2348.76
TM_Un10	9558.179	2345.01
TM_Un10	9330.955	2341.86
TM_Un10	9129.516	2338.75
TM_Un10	9020.584	2336.72
TM_Un10	8888.42	2336.06
TM_Un10	8860.355	2336.09
TM_Un10	8785.675	2332.69
TM_Un10	8768.074	2332.6
TM_Un10	8680.378	2331.32
TM_Un10	8522.379	2328.59
TM_Un10	8404.168	2327.21
TM_Un10	8235.217	2324.54
TM_Un10	8075.583	2321.71
TM_Un10	7895.836	2318.38
TM_Un10	7688.839	2314.57
TM_Un10	7502.015	2311.09
TM_Un10	7300.166	2307.8
TM_Un10	7086.469	2304.44
TM_Un10	6822.814	2299.98
TM_Un10	6592.959	2296.06
TM_Un10	6324.127	2291.88
TM_Un10	6080.2	2288.06
TM_Un10	5811.487	2283.78
TM_Un10	5536.73	2280.21
TM_Un10	5246.83	2275.65
TM_Un10	4967.488	2271.12
TM_Un10	4795.895	2268.53
TM_Un10	4681.981	2268.3
TM_Un10	4654.654	2268.16
TM_Un10	4585.224	2264.53
TM_Un10	4563.383	2264.05
TM_Un10	4351.036	2260.49
TM_Un10	4102.298	2257.11
TM_Un10	3888.675	2254.45
TM_Un10	3643.333	2251.58
TM_Un10	3536.258	2251.79
TM_Un10	3510.913	2251.73
TM_Un10	3454.896	2247.53
TM_Un10	3439.256	2247.35
TM_Un10	3289.806	2245.47
TM_Un10	3196.393	2243.93
TM_Un10	3052.059	2243.01
TM_Un10	2913.493	2241.56
TM_Un10	2808.137	2241.75
TM_Un10	2708.492	2240.66
TM_Un10	2612.707	2237.96
TM_Un10	2459.777	2233.06
TM_Un10	2237.722	2224.75
TM_Un10	2096.366	2221.34
TM_Un10	1973.956	2218.87
TM_Un10	1837.009	2216.8
TM_Un10	1726.928	2215.74
TM_Un10	1517.976	2214.04
TM_Un10	1415.628	2212.58
TM_Un10	1254.031	2208.37
TM_Un10	1063.337	2197.37
TM_Un10	954.3212	2196.64
TM_Un10	889.7155	2195.4
TM_Un10	787.0228	2194.47
TM_Un10	741.9344	2192.98
TM_Un10	673.4601	2190.3
TM_Un10	602.174	2189.68
TM_Un10	541.6531	2189.37
TM_Un10	515.4406	2189.32
TM_Un10	454.2899	2184.77
TM_Un10	439.1783	2183.88
TM_Un10	363.8032	2182.26
TM_Un10	243.3867	2180.41

Reach	River Sta	W.S. Elev (ft)
H	1783.077	2549.48
H	1673.983	2545.52
H	1579.595	2540.65
H	1483.454	2536.74
H	1399.673	2534.04
H	1269.252	2528.78
H	1180.214	2526.14
H	1076.405	2522.6
H	965.6735	2518.62
H	880.1881	2515.18
H	784.3348	2512.03
H	710.4682	2509.46
H	640.1296	2507.83
H	559.2109	2505.7
H	480.9095	2504.32
H	380.498	2501.24
H	291.7872	2499.14
H	197.8619	2493.3
H	102.4369	2491.38
H	36.36644	2489.92
E	2196.899	2397.77
E	2095.612	2395.65
E	1994.011	2393.88
E	1891.002	2391.73
E	1755.575	2388.83
E	1619.816	2385.17
E	1494.885	2382.38
E	1323.636	2379.04
E	1116.616	2374.66
E	994.4739	2372.12
E	859.3868	2369.09
E	738.6144	2367.03
E	574.8823	2364.05
E	441.9963	2361.26
E	296.7368	2359
E	208.7126	2357.4
E	113.6809	2355.13
C	4043.81	2275.22
C	3851.979	2270.86
C	3687.435	2266.63
C	3490.143	2262.34
C	3295.336	2258.3
C	3128.762	2254.88
C	2891.522	2249.8
C	2641.359	2245.15
C	2414.982	2240.96
C	2120.315	2235.67
C	1843.766	2229.61
C	1606.547	2226.05
C	1457.385	2223.49
C	1326.604	2220.28
C	1154.365	2218.37
C	1055.776	2216.44
C	904.6165	2213.38
C	766.3693	2210.48
C	549.4158	2206.67
C	402.6403	2202.77
C	290.3915	2200
C	192.2597	2198.1
C	92.87221	2196.2
C	19.07571	2194.47

Discharge Points

Cross Sections

Contour 5ft

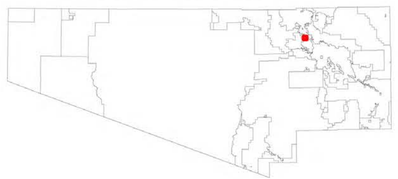
River

Subbasins

100-yr Floodplain

Aerial : 2014 Pictometry Aerial Imagery
Topo: 2008 Pima Association of Governments
Datum: NAVD 1988

Pima County Index Map



Index Map Scale 1:1,500,000

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PIMA COUNTY

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Tucson, Arizona 85701-1207
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http://www.rfcd.pima.gov

0 150 300 600 Feet

5/2015

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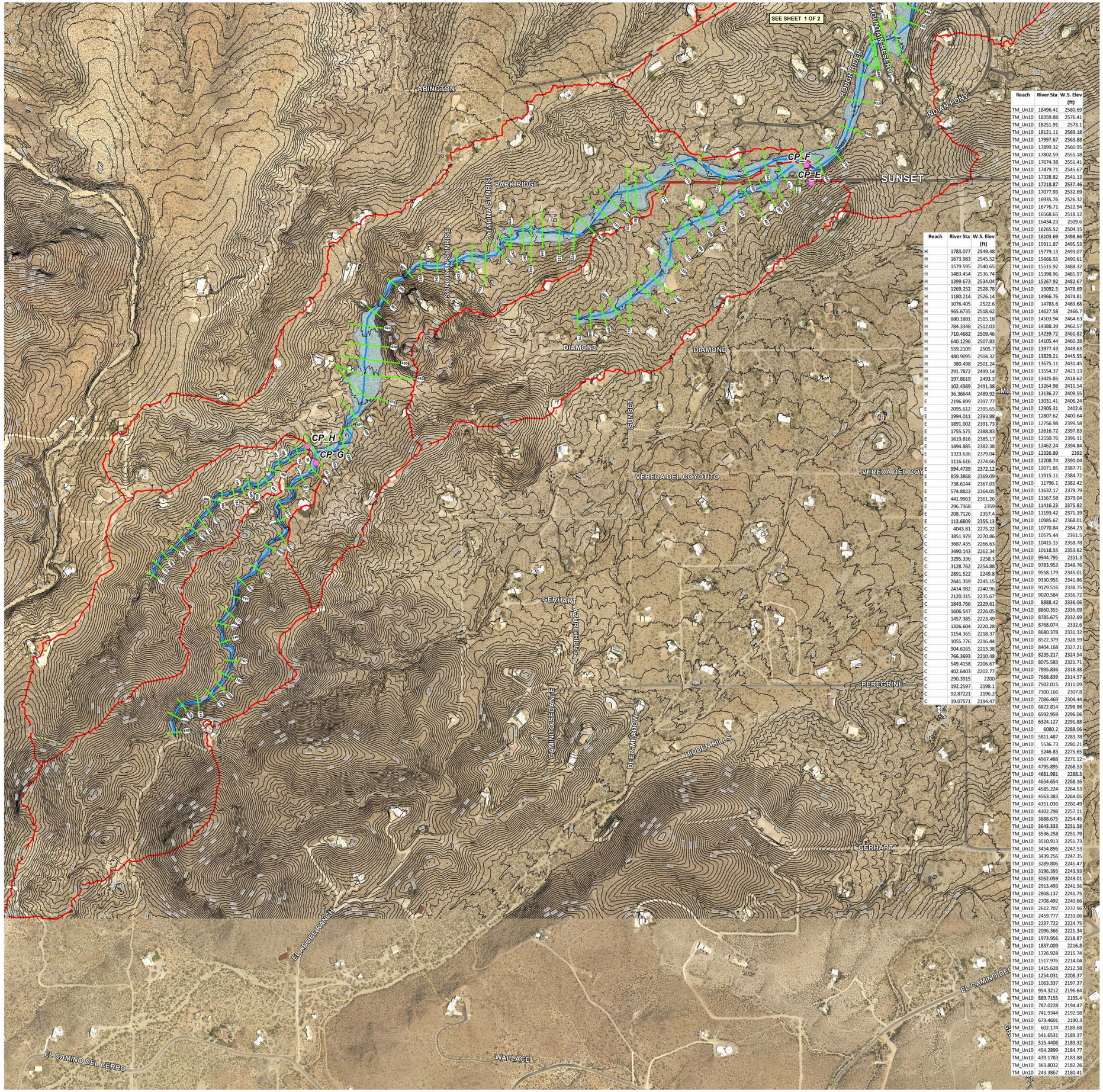
Exhibit 1
100-year Floodplain with cross sections Unnamed 10 Wash
Sheet 2 of 2



Reach	River Sta	W.S. Elev (ft)
TM_Un10	18496.41	2580.69
TM_Un10	18359.88	2576.41
TM_Un10	18251.91	2573.1
TM_Un10	18121.11	2569.18
TM_Un10	17997.67	2563.88
TM_Un10	17899.32	2560.95
TM_Un10	17802.59	2555.18
TM_Un10	17674.38	2551.41
TM_Un10	17479.71	2545.67
TM_Un10	17328.82	2541.13
TM_Un10	17218.87	2537.46
TM_Un10	17077.93	2532.69
TM_Un10	16935.76	2526.32
TM_Un10	16776.71	2522.94
TM_Un10	16568.65	2518.12
TM_Un10	16434.23	2509.6
TM_Un10	16265.52	2504.15
TM_Un10	16103.69	2498.66
TM_Un10	15911.87	2495.53
TM_Un10	15779.13	2493.07
TM_Un10	15666.55	2490.61
TM_Un10	15515.92	2488.32
TM_Un10	15398.96	2485.97
TM_Un10	15267.92	2482.67
TM_Un10	15092.5	2478.69
TM_Un10	14966.76	2474.81
TM_Un10	14783.6	2469.68
TM_Un10	14627.58	2466.7
TM_Un10	14503.94	2464.63
TM_Un10	14388.39	2462.57
TM_Un10	14239.72	2461.82
TM_Un10	14105.44	2460.28
TM_Un10	13977.43	2449.63
TM_Un10	13829.21	2445.55
TM_Un10	13675.11	2431.45
TM_Un10	13554.37	2423.13
TM_Un10	13425.85	2418.62
TM_Un10	13264.98	2411.54
TM_Un10	13136.27	2409.55
TM_Un10	13031.41	2406.24
TM_Un10	12905.31	2402.6
TM_Un10	12807.62	2400.64
TM_Un10	12756.98	2399.58
TM_Un10	12616.72	2397.83
TM_Un10	12550.76	2396.11
TM_Un10	12462.24	2394.84
TM_Un10	12326.89	2392
TM_Un10	12208.74	2390.04
TM_Un10	12071.85	2387.71
TM_Un10	11915.11	2384.72
TM_Un10	11796.1	2382.42
TM_Un10	11632.17	2379.79
TM_Un10	11567.58	2379.04
TM_Un10	11416.23	2375.82
TM_Un10	11193.42	2371.19
TM_Un10	10985.67	2368.01
TM_Un10	10770.84	2364.23
TM_Un10	10575.44	2361.5
TM_Un10	10415.15	2358.78
TM_Un10	10118.55	2353.62
TM_Un10	9944.795	2351.3
TM_Un10	9783.953	2348.76
TM_Un10	9558.179	2345.01
TM_Un10	9330.955	2341.86
TM_Un10	9129.516	2338.75
TM_Un10	9020.584	2336.72
TM_Un10	8888.42	2336.06
TM_Un10	8860.355	2336.09
TM_Un10	8785.675	2332.69
TM_Un10	8768.074	2332.6
TM_Un10	8680.378	2331.32
TM_Un10	8522.379	2328.59
TM_Un10	8404.168	2327.21
TM_Un10	8235.217	2324.54
TM_Un10	8075.583	2321.71
TM_Un10	7895.836	2318.38
TM_Un10	7688.839	2314.57
TM_Un10	7502.015	2311.09
TM_Un10	7300.166	2307.8
TM_Un10	7086.469	2304.44
TM_Un10	6822.814	2299.98
TM_Un10	6592.959	2296.06
TM_Un10	6324.127	2291.88
TM_Un10	6080.2	2288.06
TM_Un10	5811.487	2283.78
TM_Un10	5536.73	2280.21
TM_Un10	5246.83	2275.65
TM_Un10	4967.488	2271.12
TM_Un10	4795.895	2268.53
TM_Un10	4681.981	2268.3
TM_Un10	4654.654	2268.16
TM_Un10	4585.224	2264.53
TM_Un10	4563.383	2264.05
TM_Un10	4351.036	2260.49
TM_Un10	4102.298	2257.11
TM_Un10	3888.675	2254.45
TM_Un10	3643.333	2251.58
TM_Un10	3536.258	2251.79
TM_Un10	3510.913	2251.73
TM_Un10	3454.896	2247.53
TM_Un10	3439.256	2247.35
TM_Un10	3289.806	2245.47
TM_Un10	3196.393	2243.93
TM_Un10	3052.059	2243.01
TM_Un10	2913.493	2241.56
TM_Un10	2808.137	2241.75
TM_Un10	2708.492	2240.66
TM_Un10	2612.707	2237.96
TM_Un10	2459.777	2233.06
TM_Un10	2237.722	2224.75
TM_Un10	2096.366	2221.34
TM_Un10	1973.956	2218.87
TM_Un10	1837.009	2216.8
TM_Un10	1726.928	2215.74
TM_Un10	1517.976	2214.04
TM_Un10	1415.628	2212.58
TM_Un10	1254.031	2208.37
TM_Un10	1063.337	2197.37
TM_Un10	954.3212	2196.64
TM_Un10	889.7155	2195.4
TM_Un10	787.0228	2194.47
TM_Un10	741.9344	2192.98
TM_Un10	673.4601	2190.3
TM_Un10	602.174	2189.68
TM_Un10	541.6531	2189.37
TM_Un10	515.4406	2189.32
TM_Un10	454.2899	2184.77
TM_Un10	439.1783	2183.88
TM_Un10	363.8032	2182.26
TM_Un10	243.3867	2180.41

Reach	River Sta	W.S. Elev (ft)
H	1783.077	2549.48
H	1673.983	2545.52
H	1579.595	2540.65
H	1483.454	2536.74
H	1399.673	2534.04
H	1269.252	2528.78
H	1180.214	2526.14
H	1076.405	2522.6
H	965.6735	2518.62
H	880.1881	2515.18
H	784.3348	2512.03
H	710.4682	2509.46
H	640.1296	2507.83
H	559.2109	2505.7
H	480.9095	2504.32
H	380.498	2501.24
H	291.7872	2499.14
H	197.8619	2493.3
H	102.4369	2491.38
H	36.36644	2489.92
E	2196.899	2397.77
E	2095.612	2395.65
E	1994.011	2393.88
E	1891.002	2391.73
E	1755.575	2388.83
E	1619.816	2385.17
E	1494.885	2382.38
E	1323.636	2379.04
E	1116.616	2374.66
E	994.4739	2372.12
E	859.3868	2369.09
E	738.6144	2367.03
E	574.8823	2364.05
E	441.9963	2361.26
E	296.7368	2359
E	208.7126	2357.4
E	113.6809	2355.13
C	4043.81	2275.22
C	3851.979	2270.86
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C	3128.762	2254.88
C	2891.522	2249.8
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C	1326.604	2220.28
C	1154.365	2218.37
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C	290.3915	2200
C	192.2597	2198.1
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C	19.07571	2194.47

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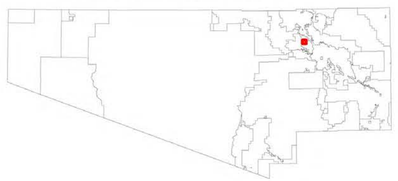
100-yr Floodplain

Aerial : 2014 Pictometry Aerial Imagery
Topo: 2008 Pima Association of Governments
Datum: NAVD 1988

Pima County Index Map



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