

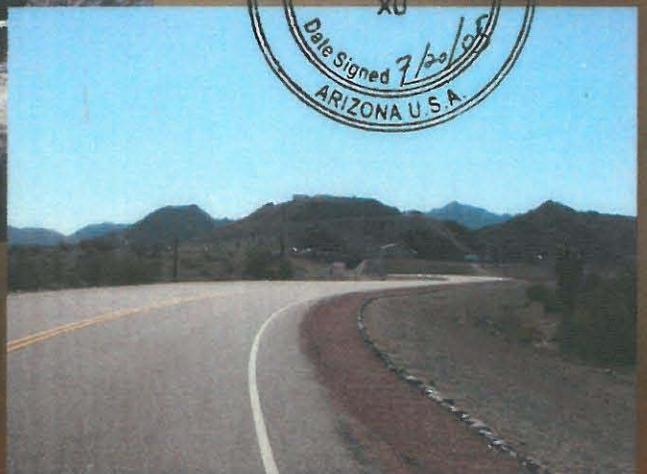
# Final Woolsey FPD Candidate Assessment Report



Prepared for:



Flood Control District  
of Maricopa County



Project Engineering  
Consultants, Ltd.

July 2005

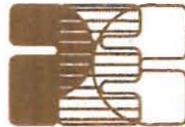
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# 1 PROJECT PURPOSE AND NEED

## 1.1 PROJECT PURPOSE

This Candidate Assessment Report (CAR) documents the existing and planned conditions concerning drainage in the northern portion of the Woolsey Flood Protection District (WFPD), Maricopa County, Arizona using any information available. The WFPD is located in the southwest portion of Maricopa County south of Buckeye along State Route 85 (SR85). The WFPD requested participation by the Flood Control District of Maricopa County (District) in providing drainage documentation and future improvements that will mitigate flooding in the vicinity. In order to assess this request Project Engineering Consultants, Ltd. under contract with the District prepared this report. The report summarizes the existing information identified during this effort relating to land use, existing hydrology/hydraulics reports, existing topographic mapping, as-built plans for existing drainage infrastructure, planned drainage infrastructure, FEMA flood hazard Boundary Maps, and other information which may be pertinent to the drainage features in the area.

### *1.1.1 Project Need*

The project area is an area that is under strong development pressure. The site is very rural with many acres of agriculture but was recently annexed by the Town of Buckeye (Buckeye). Several large projects exist in the area and more are in the planning and construction stages. The WFPD has managed the drainage within the District area for many years and is concerned how the new development will impact the area drainage and conveyance systems. Additionally the WFPD is concerned if the coordination among different agencies and entities is sufficient to ensure coordinated drainage facilities as development occurs.

### *1.1.2 Project Participation*

Anticipated participation for this report included the following agencies, municipalities, and groups designated as Stakeholders:

- Flood Control District of Maricopa County (District)
- Woolsey Flood Protection District (WFPD)
- Arizona Department of Transportation (ADOT)
  - State Route 85 (SR85)
- Maricopa County Department of Transportation
  - Old US 80, Patterson Road, and Woods Road.
- Allied Waste
  - Southwest Regional Landfill (SWRL)
- Arizona Department of Corrections (ADOC)
  - Lewis Prison (Lewis)
  - Southwest Regional Juvenile Corrections Complex (SWRJCC)
- City of Phoenix (COP)
  - SR85 Landfill

- Town of Buckeye (Buckeye)
- Bureau of Land Management (BLM)
  - Sonoran Desert National Monument
- Salt River Project (SRP)
  - High Voltage Power Lines
- El Paso Natural Gas (EPNG)
  - Gas Line
- Arizona Game and Fish Department

Requests for drainage information and participation in this report were made to each of these agencies. Information was provided in paper, digital, and pdf format. Appendix A presents this information. Some of the Stakeholders have facilities in the area with no drainage amenities. These include the Arizona Game and Fish, the BLM, SRP, and EPNG. Other information was collected in site visits or on maps without plans or maps.

### Interagency Coordination

Stakeholder meetings were held in conjunction with this project. Letters were sent to each of the stakeholders requesting information regarding the drainage facilities or features used, perpetuated, or developed by the stakeholder. Discussions at the meeting and the information provided by the stakeholders were used to develop this report. A copy of the letter, contact information, meeting minutes, and a document log is provided in the appendix to this report. The following paragraphs in this section provide a brief narrative of information provided by the stakeholders.

The District provided information and resources for the study area. Among the information provided includes GIS data and various reports and studies developed for the study area. District engineers also participated in field trips to the study area and provided their personal knowledge regarding the area.

The WFPD provided maps of the washes used for conveyance through the area and some ADWR flood study maps.

ADOT has provided plans and reports for SR85 in the area of the study. The plans have been scanned to pdf and will accompany this report.

Allied Waste has provided plans for their landfill including the drainage system.

ADOC provided digital format plans for the SWRJCC and a master plan for the Lewis Prison.

The City of Phoenix provided plans and reports for the future SR85 Landfill scheduled to begin construction in 2005 and begin operations sometime in 2006.

### Special Interest Groups

No special interest groups have been involved with the study.

## Public Involvement

No public involvement was undertaken for this report. However, coordination and communication with project Stakeholders as outlined in the previous section was undertaken and Stakeholder meetings were conducted.

## 1.2 PROJECT OVERVIEW AND HISTORY

### *1.2.1 Project Overview*

The WFPD has requested a study to examine the northern portion of their area that is experiencing development pressure. The purpose of this report is to:

- develop a list of known flooding problems impacting the area,
- collect or document all available pertinent drainage data,
- document the information collected,
- make recommendations for future studies, and
- to document or establish the need and necessity for any flood control projects.

### *1.2.2 Project Location*

The project area is in the southwest portion of Maricopa County south of the Gila River, and north of the Town of Gila Bend. The area includes of Sections in Township 1 South and 2 South, and Ranges 5 and 6 East of the Salt Gila Baseline and Meridian, Maricopa County, Arizona. The area is bounded by the new Sonoran Desert National Monument on the east and the Gila River on the west, by the WFPD Boundary or approximately Komatke Road on the North and Woods Road on the south (Figure 1).

### *1.2.3 Project History*

The WFPD submitted a letter the District requesting an Area Drainage Master Plan/Study in May 2001. In a follow-up letter dated July 18, 2002 the WFPD requested the District to authorize and fund the completion of a Candidate Assessment Report (CAR) of the northern area of the Woolsey District, and urged that the project should begin as soon as possible.

The CAR Request indicated that the WFPD desired an inventory of the many studies completed or underway in the area along with a review of the documents and a proper review of the work, and an assessment of what is lacking within the study area. The letter also indicates that the WFPD is concerned with the overall implications of several large individual developments.

The letter indicates that the District has not conducted any studies in the area for nearly 10 years and with the new development underway it is now necessary to reevaluate the area's drainage.

#### 1.2.4 Project Authorization

This project was placed in the CAR program following a request from the WFPD to evaluate the area for participation in projects that may mitigate the flooding problems in the area. The Flood Control District of Maricopa County authorized the CAR to determine whether there is sufficient information available to evaluate the proposal. The authorization includes the gathering of pertinent data and the presentation of the data in the form of a report. The CAR was stopped in March of 2003 to allow ADOT consultants to finish the drainage design for SR85. With that design nearing completion the District re-opened the project in March of 2005 under an "On Call" contract. This report represents the completion of that effort.

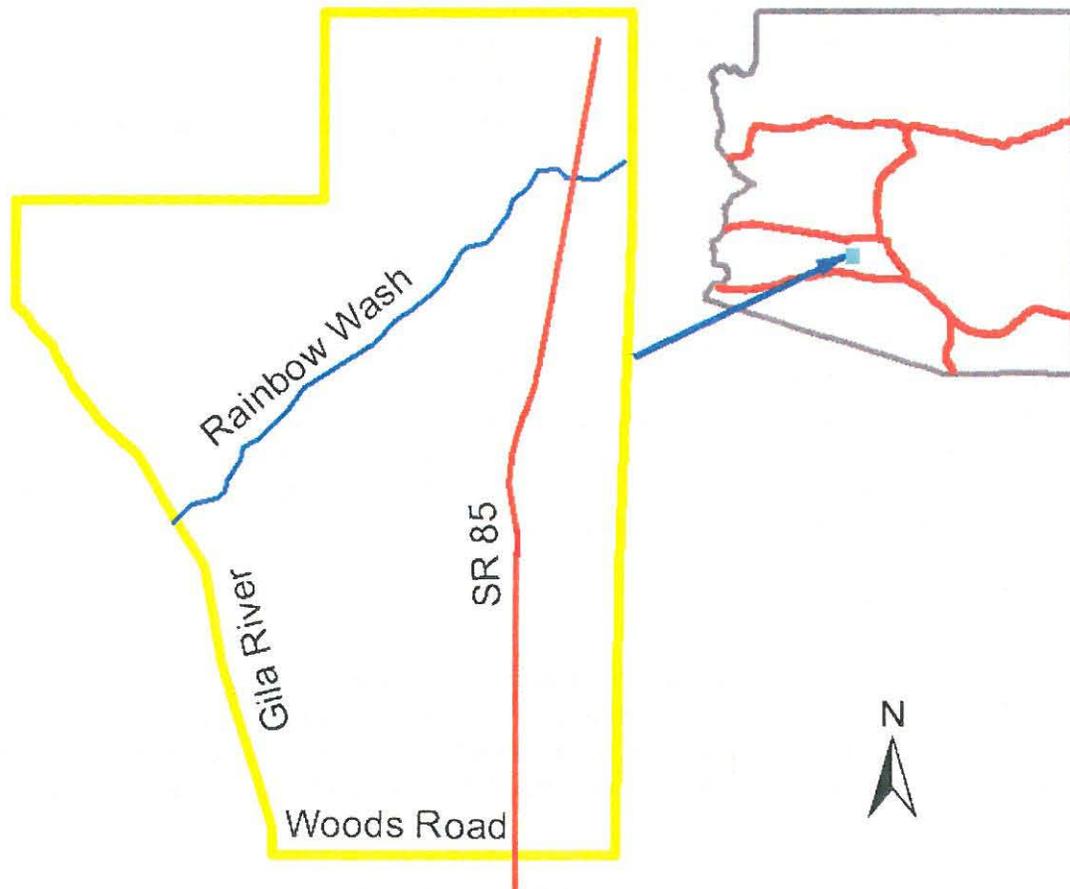


Figure 1 Project Location

## 2 EXISTING CONDITION AND PROPOSED DRAINAGE FEATURES

### 2.1 HYDROLOGY AND HYDRAULICS

#### 2.1.1 Watershed Description

The watershed affecting the study area is larger than the study area itself. Previous studies (*Preliminary Drainage Report – Revised, SR 85 Landfill Buckeye, Arizona* by URS Corporation, 2003, and *Gila Bend Canal Floodplain Delineation Study Gillespie Dam to Gila Bend* by Donahue and Associates, 1991) indicate that the watershed includes the study area and extends to the east into the surrounding mountains.

The watershed is characterized by broad, gently sloping alluvial valleys and basins punctuated by steep discontinuous mountain ranges that generally trend southeast to northwest (URS, 2003). The slopes range up to a maximum 15% in the Maricopa Mountains and Buckeye Hills, and generally decrease approaching west toward SR 85. One percent or gentler slopes are dominant in the western and southern regions. The slope in Little Rainbow Valley ranges approximately one to five percent. Agricultural areas are virtually flat (Donahue and Associates, 1991).

Much of the undeveloped watershed is drained by small channels that converge and diverge in a braided network. There are only a few well-defined channels other than the major wash in the area - Rainbow Wash. This wash particularly has formed a significant channel of large capacity as it approaches SR 85 and the Gila Bend Canal. In other areas, channels continue to be braided and distributory in nature even as they pass to the west of SR 85 arriving at the canal berm and cross-drainage structure (Donahue and Associate, 1991).

The Maricopa Mountains are typically granite. Alluvial soils derived from them are generally grained. Three major soil group associations are found in the watershed all of which are hyperthermic arid. The soils are typical of watersheds with mean annual temperature of more than 72 degrees Fahrenheit and rainfall less than 10 inches. The soils groups include the Torrifluvents, the Gunsight-Rillito-Pinal, and the Lithic-Camborthids-Rock outcrop. Most of the soils have characteristics of silty loam, with moderate runoff potential and high permeability (Donahue and Associate, 1991).

Most of the watershed area west of the SR 85 and north of the El Paso Natural Gas Line is undeveloped desert or mountainous landscape. The area between Gila River and SR 85 and south of the gas line is mainly agricultural land use. Land use for the study area is discussed in a separate section.

#### 2.1.2 Existing Development Drainage reports

Most of the current study area has been studied in the past 15 years. Premier Engineering prepared a summary of the previous studies in its report *SR 85 – General Plan Patterson*

*Road to Gila River* (2002), and J2 Engineering and Environmental Design (2004) updated the information in *Final Drainage Report Patterson Road* (2004). There are other studies that have been performed for this area. Several new studies have replaced the old studies. This report documents the history of these studies as far as possible.

#### 1 Inventory Report on Woolsey Flood Protection District

Arizona Department of Water Resources prepared this report in March 1990. This inventory report documented existing conditions, perceived problems, previous studies, future studies, watershed delineations and characteristic, precipitation, discharge records, district plan and right of way etc. Much of the information in this report has been used in newer studies and reports.

#### 2 Gila Bend Canal Floodplain Delineation Study

Donohue and Associates prepared this report for the Flood Control District of Maricopa County (FCDMC) in November 1991. This report documented offsite flows within its project limits and was the basis for the hydrologic design performed by BRW. BRW revised this report by further subdividing basins and computing the 50-year event.

#### 3 Southwest Regional (Landfill) Facility Preliminary Drainage Report

SCS Engineers prepared this report for FCDMC in January 1995. The report documented the existing and proposed drainage conditions for the Southwest Regional (Landfill) Facility and included a storm water management plan that identified pre- and post-construction flows for onsite and offsite.

#### 4 Drainage Report for the Southwest Regional Facility, Buckeye Arizona

SCS Engineers prepared this report for the FCDMC in September 1995. The report documented the existing and proposed drainage conditions for the Southwest Regional (Landfill) Facility and included a storm water management plan that identified pre- and post-construction flows for onsite and offsite. According to the SCS report, the operators of the landfill generally did not construct offsite drainage improvements.

#### 5 Infrastructure Master Plan for ASPC Lewis & Southwest Regional Juvenile Corrections Complex

Evans, Kuhn and Associates prepared this report for the Arizona Department of Administration (ADOA) in August 1997. The report documented the site improvements for the Lewis Prison and the Southwest Regional Juvenile Corrections Complex and included a storm water management plan that identified pre- and post-construction for onsite and offsite flows.

#### 6 Initial Drainage Report SR 85: Gila Bend to I-10

BRW, Inc. prepared this report for ADOT in November 1999. This report identified peak discharges for both major and minor drainage structures located along SR 85. The report determined peak flow rates for the existing hydrologic conditions. Culvert hydraulic calculations were performed to determine the adequacy of existing culverts. BRW, Inc. also prepared a Design Concept Report (DCR) for the proposed improvements to SR 85 entitled *Initial Location/Design Concept Report (SR 85 Gila Bend to I-10)* in June 2000.

## 7 FEMA Studies

The Federal Emergency Management Agency (FEMA) published the current Flood Insurance Rate Map (FIRM) in July 2001. This FIRM encompasses much of the WFPD CAR project site. Flooding in the area is denoted as Zone X. Zone X is defined as "Areas of 500-year flood; areas of 100-year flood with an average depth of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood." FEMA FIRM also shows the AE zones along Rainbow Wash and Gila River, and AO zones along the east bank of Gila Bend Canal.

## 8 Lewis Prison to Gila River Initial Drainage Report

Premier Engineering prepared this report for ADOT in October 2001. The purpose of this report was to document the engineering analyses utilized for the design of drainage facilities for SR 85 - Lewis Prison to Gila River (milepost 137.5 to milepost 147.2). Generally, the existing roadway horizontal alignment will be utilized as part of the proposed improvements. Ultimately, frontage roads will be constructed along a portion of this segment of SR 85.

## 9 SR 85-Lewis Prison T.I. Final Drainage Report

Premier Engineering prepared this report for ADOT in June 2002. The purpose of this report was to document the engineering analyses utilized for the design of drainage facilities for SR 85 - Lewis Prison TI (milepost 137.0 to milepost 139.5). The project constructed a grade-separated traffic interchange at Lewis Prison.

## 10 SR 85 – General Plan Patterson Road to Gila River – Drainage Report

Premier Engineering prepared this report for ADOT in July 2002. The purpose of this report was to document the engineering analyses utilized for the design of drainage facilities for SR 85 – Patterson Road to Gila River (milepost 137.0 to milepost 147.2). Generally, the existing roadway horizontal alignment will be utilized as part of the proposed improvements. Ultimately, frontage roads will be constructed along a portion of this segment of SR 85. This is an update of the previous *Lewis Prison to Gila River Initial Drainage Report* (2001).

## 11 SR 85 Landfill Engineering Report

URS Corporation prepared this report for the City of Phoenix in September 2003. This project site is located southwest of Patterson Road. The purpose of this report was to document the design and operation of the landfill. Flow from the north of Patterson Road will cross through culverts under the road and will reach the landfill project limits. The Perimeter Channels direct storm water from the landfill cap and upstream watersheds around the northern perimeter of the landfill to the Gila Bend Canal overchute.

#### 12 SR 85 Segment 5 MP 139.0 to 143.5 Draft Final Drainage Report

Parsons Brinkerhoff (PB) prepared this report for ADOT in September 2004. The proposed improvements include cross culvert extensions, new CMPs and reinforced concrete box culverts, a 70-ft wide roadside collector channel, a 6200-ft long 125-ft wide conveyance channel to Rainbow Wash, and a new bridge at Rainbow Wash. The report documents the procedures, methodologies, criteria, and computations utilized in the hydrologic and hydraulic analyses and design of the proposed off-site and on-site drainage facilities for the project.

#### 13 Final Drainage Report Patterson Road

J2 Engineering and Environmental Design prepared this report for the City of Phoenix in October 2004. The purpose of this report is to present drainage improvement recommendations in support of the proposed roadway improvements on Patterson Road between SR 85 and the landfill. The report indicates that the level of service of the drainage facilities for Patterson Road is less than that required for the landfill. The proposed drainage improvements consist of 3 CMP culverts (30" equivalent arch pipes) at three wash crossings.

#### 14 Final Drainage Report Project 7 MP 130.17 to 137.00 Gila Bend – Buckeye Highway SR 85

The Arizona Department of Transportation Roadway Design Section prepared this report for ADOT in January 2005. SR 85 Project 7 MP 130.71 to MP 137 is one of several projects designed to upgrade SR 85 from Gila Bend to Buckeye. This report documents the analysis and design of all drainage structures, channels and appurtenances within the project.

#### *2.1.3 Existing Hydrologic/Hydraulic Models*

Most projects listed in the previous section include hydrologic and/or hydraulic models. The WFPD CAR attempted to collect copies of as many these reports as possible. This data will be placed in the Flood Control District of Maricopa County library. Plans for development in the area, either as-built or proposed, were also collected to the extent possible. These will also be placed in the library. A document collection log is included in Appendix A of this report.

#### 2.1.4 Existing and Proposed Facilities

There are four principal existing and proposed state, county and municipal facilities of hydrologic importance within the WFPD CAR area. Exhibits 2 and 3 present the existing and planned drainage features respectively. The following paragraphs are a summary of the reports or plans. No independent analyses were performed to verify the claims in the reports or to verify construction per the plans.

Maricopa County Southwest Regional (Landfill) Facility is a regional solid waste disposal facility. It is located south of Rainbow Wash and east of SR 85. It occupies 283 acres of land, of which 188 acres is permitted for solid waste disposal. The remainder of the site is occupied with ancillary facilities, storm water management structures, recycling operations, and firebreak and buffer zones around the perimeter. The storm water control system consists of: 1) off-site storm water control channels (within and along the property boundary) followed by a 25-ft-high landfill perimeter berm that provides protection for storm events larger than the recommended design storm, 2) on-site storm water control channels designed to route storm water run-off to retention facilities, 3) two retention basins to retain on-site storm water flows resulting from a 25-yr 24-hr storm event, 4) culverts under the facility entrance to pass SR 85 eastern drainage easement capacity, and 5) placement of riprap or other erosion-control measures as needed (SCS Engineers, 1995).

Lewis Prison and the Southwest Regional Juvenile Correction Complex are facilities of the Arizona Department of Administration (Corrections). The facilities are located along SR 85 south of Rainbow Wash and the Southwest Regional Landfill. The juvenile corrections complex is on the east side of SR 85 and Lewis Prison on the west. The prison consists of 6 units and juvenile corrections complex consists of 2 units. Each unit contains retention basins, storm drain, and water and sewer service. The storm drain was designed to handle the runoff from the 10-year storm. The basins and storm drain system were designed so that the post development runoff rates would not exceed pre-development runoff rates. Off-site runoff affects the site from the southeast, and flows are routed around each complex through drainage channels that were sized to convey a minimum of the runoff from the 100-year frequency storm (Evans, Kuhn and Associates, 1997).

The proposed SR 85 Landfill is a newly planned waste management and disposal facility of the City of Phoenix, which is expected to be operational in 2005-2006. The landfill site is located approximately 17 miles south of I-10, approximately 1 mile west of SR 85 and immediately south of Patterson Road. The Gila Bend Canal bounds the site to the west. The landfill site encompassed 2652 acres of land, in which about 2050 acres will be permitted for solid waste disposal. The remainder of the site will be occupied with ancillary facilities, storm water management structures, buffer zones around the perimeter, and a 160-acre retention area at the south end of the site. The perimeter channels and the retention basin are designed to convey the 100-yr 24-hr on-site and off-site flows around the landfill and ensure that no adverse impacts will be resulted to adjacent floodplains (URS, 2003).

### 2.1.5 Other Drainage Facilities

The earthen berm (and channel) located north (upstream) of Patterson Road and east of the farm fields is assumed to have been built to protect those fields from off-site flooding. The berm was utilized as the watershed boundary in *Patterson Road Final Drainage Report* (J2 Engineering and Environmental Design, 2004). The berm does not appear to be engineered and during large storm events (greater than 10-year), it is possible that the berm will be breached or washed out. J2 report indicates that the natural channel contributing to the berm is incised. Storm water runoff from smaller return intervals (10-year or less) would be diverted by the berm.

Another farm field protection berm and channel is located east of SR 85 (and east of the fallow farm fields) and north of Woods Road. This 2-mile levee runs southwest-northeast. It intercepts the westward runoff from the mountains and directs it to the southwest. The runoff will flow under SR 85 and continues west to the Gila Bend Canal. At this location, the new ADOT plans call for an improved crossing including a proposed 5-barrel 10' by 5' RCBC.

### 2.1.6 Channel Descriptions

#### Natural Washes

Natural washes and drainage channels in the study area usually contain no running water. They are ephemeral in nature and only flow during rainfall-runoff events. These channels are characterized by sandy or gravelly bottoms relatively steep side slopes lined with desert shrubs and trees. As these channels approach farm fields or developed areas, they are typically directed into channels, berms, or basins.

#### WFPD Washes

The paragraphs below describe washes that have been designated by the Woolsey Flood Protection District as perpetual drainage ways to convey storm water runoff and tail water from the farming area to the Gila River. This information was provided by WFPD.



Upstream



Downstream

Figure 2 Gillespie Wash Cross Section Photos at Old Highway 80

Gillespie Wash intersects the Old Highway 80 and Gila Bend Canal at Paloma Siphon No. 1 and runs southwesterly to Gila River (Figure 2). The channel is visible, but the capacity is unknown.



Upstream



Downstream

Figure 3 Badley Wash Cross Section Photos at Old Highway 80

Badley Wash intersects Gila Bend Canal at Paloma Siphon No. 3, and runs southwesterly across the Old Highway 80 to Gila River (Figure 3). The channel is visible, but the capacity is unknown.



Figure 4 Rainbow Wash Cross Section Photo at Old Highway 80

Rainbow Wash intersects Gila Bend Canal at Paloma Siphon No. 4 (immediately north of Patterson Road), and runs southwesterly to Gila River (Figure 4). The remnants of a washed out bridge at this location are still visible. Its 100-year water surface elevation can be found in the FEMA floodplain FIRM panel.



Upstream



Downstream

Figure 5 Turner Drain Cross Section Photos at Old Highway 80

Turner Drain is located several hundred feet south of abandoned storage bins just east of the Gila Bend Canal (Figure 5). The drain crosses the Gila Bend Canal via the pipes under the canal. It is then open and crosses the Old Highway 80, and continues west to the Gila River. The drain collects runoff and tail water east of the canal. These areas are within the boundaries of the proposed SR 85 Landfill site. After the construction of the landfill the drain may not be functional or necessary.



Figure 6 Layton Wash Cross Section Photos at Old Highway 80

Layton Wash intersects Gila Bend Canal at Paloma Siphon No. 5 (Figure 6). This canal overchute is near the outfall of the proposed SR 85 Landfill perimeter channel and detention basin. The overchute will receive flow from three sources: the South and West Channels around the proposed SR 85 Landfill, and natural watershed south of the landfill site. The wash runs west to Gila River from the overchute.



Figure 7 Woods Road Wash Cross Section Photos

Woods Road Wash intersects Gila Bend Canal immediately north of Woods Road (Figure 7). It crosses the canal via a 36" CMP. The runoff flows west across the Old Highway 80 to Gila River. Its capacity is unknown.

#### Proposed SR 85 Landfill Channels

URS designed perimeter channels around the proposed SR 85 Landfill in 2003. The purpose of the perimeter channels is to convey storm water (100-year) around the landfill. The East Channel 1 (designed peak discharge 1780 cfs) starts at the northeast corner of the landfill and flows south along the eastern boundary of the landfill. East Channel 1 runs into the East Channel 2 (designed peak discharge 3700 cfs). This channel is

excavated against grade and at significant depth for most of its length, and discharges into the South Basin. The South Channel (controlled peak discharge 2000 cfs) is the outlet channel of the South Retention Basin. It flows west along the southern boundary of the landfill into the Gila Bend Canal Overchute floodplain. The North Channel 1 (designed peak discharge 1060 cfs) starts at the northeast corner of the landfill, and flows westward along the northern boundary of the landfill. The North Channel 1 runs into the North Channel 2 (designed peak discharge 1430 cfs). The North Channel 2 flows west along the northern boundary of the landfill. The North Channel 2 runs into the West Channel (designed peak discharge 1430 cfs). The channel flows south into the Gila Bend Channel Overchute floodplain. This channel will be constructed above existing grade, and will be created by berms that are up to 7 ft high. The Southern Retention Basin (105 acre-feet below the outlet weir, and additional temporary storage above the weir and within the detention pool is approximately 245 acre-feet) will serve to attenuate peak flows and velocities in to the Gila Bend Canal Overchute floodplain (Layton Wash/Paloma Siphon No. 5), and store any increase in runoff volume caused by the development of the landfill property.

## 2.2 INFRASTRUCTURE

### 2.2.1 *Roadways and Culverts*

SR 85 is a principal rural arterial highway on the National Highway System. It serves as a major corridor linking Phoenix with the Towns of Buckeye, Gila Bend and Yuma. The corridor is used heavily by both commercial and non-commercial vehicles. It remains the only non-interstate portion of the route between Phoenix and San Diego (PB, 2004). The segment of SR 85 in this study area is roughly from MP 134 to MP 142.

The ongoing drainage improvements of SR 85 in the study area include cross culvert extensions, new CMPs, new RCBCs, a 70-ft wide roadside (East Channel, east side of SR 85) collector channel, a 125-ft wide channel (West Channel) to Rainbow Wash, and a new bridge at Rainbow Wash. The design frequency for cross culverts on SR 85 is the 50-year event.

The roadside collector channel (PB, 2004) extends from the north end of the Southwest Juvenile Corrections Complex to the north for a distance of approximately 5000 ft, and is intended to intercept flow from individual washes as well as sheet flow and convey these flows to the north, where they will pass under SR 85 in a proposed 5-barrel 10' by 6' RCBC near the south end of the Southwest Regional Landfill. From the RCBC the flow is conveyed west in a new channel to Rainbow Wash. This new West Channel (PB 2004) is approximately 6000 ft long. The east Channel is designed to carry the difference between the 50-year inflow from the east and the capacity of the extended cross culverts. Additionally, BRW identified that the landfill embankment intercepts runoff from the east, and concentrates the flow at SR 85. The flow then over tops SR 85 and continues on a path northwest towards Rainbow Wash. Exhibit 1 presents the known and potential flooding areas. The West Channel is intended to carry the flows diverted by the landfill as well as flows collected in the East Channel to Rainbow Wash. The west channel is

designed to carry the 50-year flow of 2350 cfs with freeboard per the ADOT Roadway Design Guidelines and the 100-year flow within the channel right-of-way.

Another proposed drainage channel is located on the northeast side of Woods Road TI. This channel is employed to redirect runoff that was previously tributary to the existing culvert at northbound station 5868+36. Because of the proposed Woods Road TI, the flow passed by this culvert can no longer continue in its present path, but must be redirected and combined with flow reaching the adjacent culvert at northbound station 5865+57. A temporary retention basin is proposed between this channel and the proposed northbound mainline to capture flow that is missed by the Woods Road channel. It is proposed at the location of a future ramp, therefore it would be eliminated if the grade separated TI is ever built (ADOT, 2005).

Patterson Road is currently under the jurisdiction of Maricopa County Department of Transportation. However, the City of Phoenix is in the process of constructing a landfill immediately south of Patterson Road. Patterson Road will serve as the primary access for the landfill. Three washes cross Patterson Road on the east of the proposed landfill (Exhibit 1). The planned Patterson Road improvement will elevate the roadway and install three culverts (10-year capacity) at these wash crossings (J2, 2004).

Woods Road is not elevated. Many small washes cross Woods Road from north to south. Flooding hazard exists between the Old Highway 80 and SR 85 (Exhibit 1).

There are many dips along the Old Highway 80 from Woods Road to Gillespie Wash crossing. Woods Road Wash, Layton Wash, Turner Drain, Rainbow Wash, Badley Wash and Gillespie Wash will flood the Old Highway 80 at the crossings when conveying flows to the Gila River (Exhibit 1).

A 5-barrel box culvert is located on the Lewis Prison access road at a wash crossing. This box culvert has significant capability to convey the storm water from the east side of SR 85 to the downstream wash. The storm water will flow along the levee (north of Patterson Road) to Rainbow Wash. After the construction of the roadside channel east of SR 85 and the West Channel north of the prison, the peak flow toward this culvert may reduce (Exhibit 2).

### *2.2.2 Bridges*

In addition to the existing 90-ft long bridge across Rainbow Wash on the proposed northbound SR 85 roadway, a new 20-ft long bridge is proposed along the southbound ramp over rainbow Wash. The new bridge is designed for the 50-year event with 3 feet of freeboard per ADOT Roadway Design Guide. This provides nearly 2 feet of freeboard for the 100-year event as well. In the existing condition, 100-year flows approaching SR 85 from the east overtop SR 85 at a sag location approximately 1400 feet south of the existing Rainbow Wash Bridge (Exhibit 1). In the proposed condition (PB, 2004), the future Riggs Road turnout and the east frontage roads will confine the 100-year

floodplain to areas north of the sag, where the existing SR 85 roadway is higher and will not be overtopped in the 100-year event.

## 2.3 SOCIOECONOMIC ENVIRONMENT

### 2.3.1 *Jurisdiction and Ownership*

Exhibit 4 presents the land ownership map. A majority of the land is private owned land, most of which is agricultural. The second largest land owner is the City of Phoenix for the SR 85 Landfill site. The third largest landowner is the Arizona Department of Administration where the correctional facilities are located.

### 2.3.2 *Land Use*

Most of the area is either agricultural or vacant/desert lands. This will remain even when the SR 85 Landfill is in operation. Figure 8 shows land use according to the GIS data provided by the County Assessors Office. From site visits it is obvious the land use map contains old information. The recent aerial provided by the flood control district is a better depiction of land use.

### 2.3.3 *Zoning*

A portion of the area has been annexed into the Town of Buckeye. The town will determine zoning for the area. None is known at the present time.

### 2.3.4 *Population*

Inmates at the Lewis and juvenile facilities make up the majority of the permanent residents. A few scattered farm houses are located in the study area. The non-inmate population is minor.

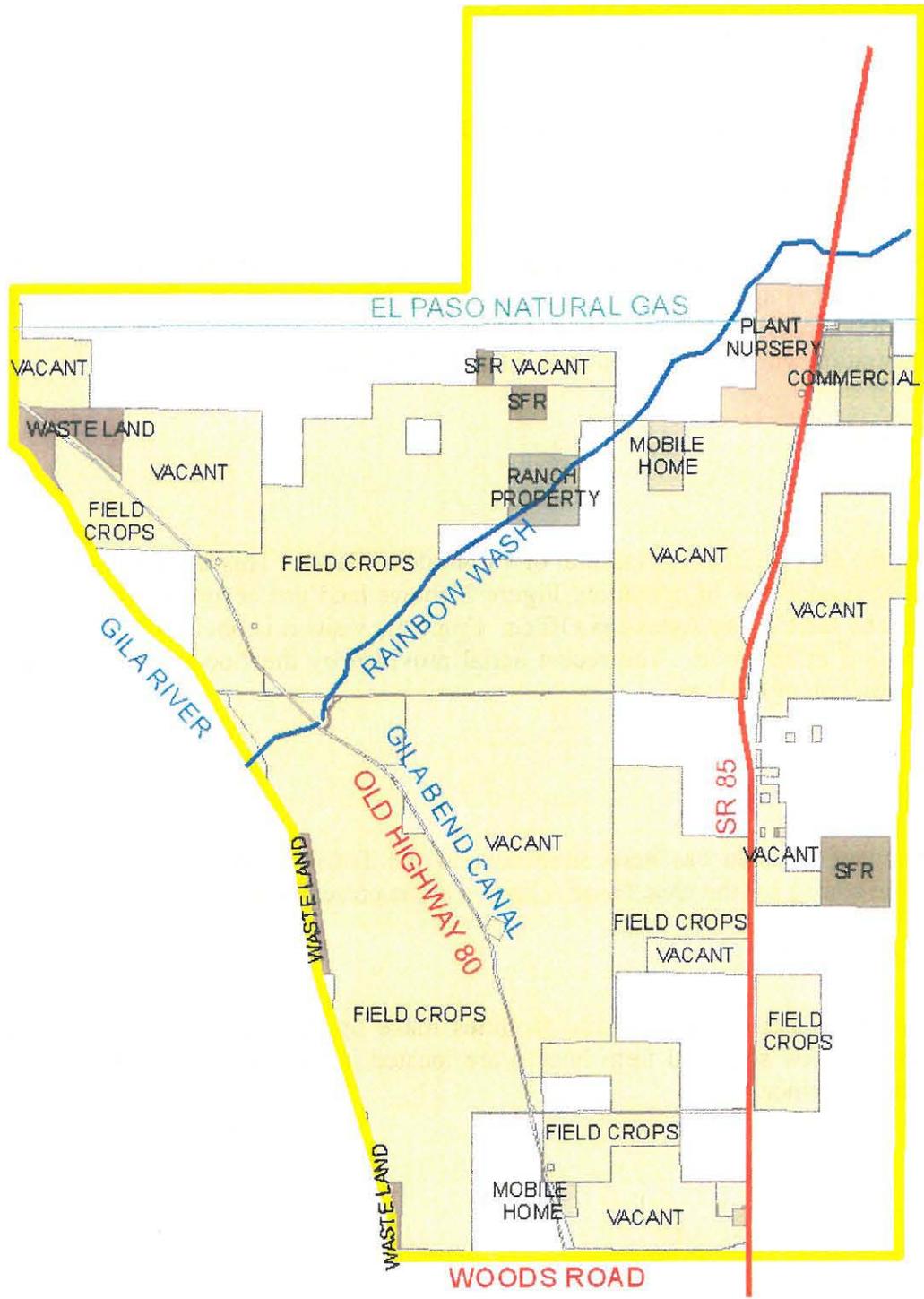


Figure 8 Land Use Map

### 3 RECOMMENDATIONS FOR FUTURE STUDIES

The study area of the WFPD is undergoing strong growth. There are existing developments and ongoing developments that have a great impact on the local drainage systems. The developments are generally large and the impacts of drainage on the facilities have been studied. However, the impact of the facilities on the area drainage systems has not been completely studied. An Area Drainage Master Study would facilitate learning what impact the developments have had on the on the area.

Hydrologic analysis has been completed for most of the area. Areas not covered by these analyses are typically in areas where there is no development or planned development. The existing analyses documented in this report use various methodologies and philosophies and were not intended to be used as an overarching impact analysis. Future development and land use in the WFPD area would be well served by a study and plan to coordinate the drainage efforts though out the area.

It is recommended that the area be programmed for an Area Drainage Master Study (ADMS) for this area quickly so that an Area Drainage Master Plan (ADMP) using the FCDMC standards and practices can be implemented. In the District's current plan the Woolsey area is shown to be in a study area named Gillespie ADMS. The study area for the Gillespie ADMS is about 300 square miles and includes both the Woolsey area and Gila Bend. These areas are undergoing rapid growth and would benefit from the development of a drainage plan.

It is also recommended that some consideration be given to develop studies to delineate the area washes using the District's A-Zone delineation approach. This would allow for A-Zone floodplain delineations that will protect drainage conveyances using approximate method studies and provide regulators with some latitude while working with developers within the area. A-Zone delineations could be prepared in the areas of undeveloped desert as well as the WFPD Washes designated flood control features.

#### **4 APPENDICES**

- A Drainage Document Collection List
- B Phone Log and Phone Book
- C Meeting Minutes
- D Composite of Floodplain Maps for WFPD Study Area
- E Exhibit 1 Known and Potential Flooding Areas
- F Exhibit 2 Existing Drainage Features
- G Exhibit 3 Planned Drainage Features
- H Exhibit 4 Land Ownership Map

Appendix A Drainage Document Collection List

Report, Map, or Document	Produced By	DATE	Location
SR 85 - Lewis Prison T.I. Drainage report (2)	Premier	Jun-02	PEC
SR 85 - General Plan Patterson Road to Gila River	Premier	Jul-02	PEC
Initial Drainage Report SR 85 Gila Bend to I-10 Gila Bend to Buckeye Highway	BRW	Nov-99	PEC
Claims of the Woods against State of Arizona	Frenemore Craig Law Office		PEC
Photos showing flood and damage	Department of Administration		PEC
USGS DEMs - 10m resolution	USGS		PEC
USGS topo map	USGS		PEC
Confirmation of the absence of gas lines for Woolsey area	Southwest Gas		PEC
FEMA map	FCD		PEC
Mr Sid images	FCD		PEC
Soil data	FCD		PEC
DTM data	FCD		PEC
Parcel data	FCD		PEC
Other FCD data	FCD		PEC
APS facility map	APS		PEC
Southwest regional facility preliminary drainage report	SCS	Jan-95	PEC
Drainage Report for the Southwest Regional Facility; Buckeye, Arizona (2)	SCS	Sep-95	PEC
Surface water management plan	SEC Donohue	Jan-93	PEC
N value determination report, Rainbow Wash FIS	Simons Li	1992	FCDMC Engineering Division Main Library
Rainbow Wash FIS, Gila River through SR85 hydraulics report	Simons Li	1994	FCDMC Engineering Division Main Library
Reconnaissance level flood mitigation study of the AZ hazardous waste facility (rainbow Valley area)	Anderson-Nichols	1983	In FCD Library
Conceptual drainage report for rainbow valley topsoil and landfill	Stanley	1993	In FCD Library
Special provisions for SR85 bridge channel maintainance	FCD	1985	In FCD Library
Gila Bend FIS, Photographs: concentration points	ADWR	1991	In FCD Library
Gila Bend - Buckeye Highway Gila River Bridges, Hydraulic report	ADOT	1991	In FCD Library
Plan and profile of proposed state highway (SR85) Gila River Bridge #1274	ADOT	1993	In FCD Library
Initial alternative development report, SR85 corridor study	BRW, Logan Simpson	1994	In FCD Library
Initial location/design concept report SR85, Gila Bend to I-10	BRW, Logan Simpson	2000	In FCD Library
Inventory Report on Woolsey Flood Protection District	ADWR Flood Management Section	Mar-90	PEC
Gila Bend Canal Floodplain Delineation Study - Hydrology Report	FCD - Donohue	Nov-91	PEC
Gila Bend Canal Floodplain Delineation Study - Hydraulic Analysis & FD Report	FCD - Donohue	Nov-91	PEC
Southwest Regional Landfill Design and Operations Report	Donohue	Feb-92	PEC
Woolsey FPD Siphon and Wash Maps	WFPD		PEC
ADWR Flood Study Work Maps	WFPD		PEC
Parcel Data from the County Assesors Office	Maricopa County Assessor		PEC
Infrastructure Master Plan For ASPC Lewis & SW Regional Juvenile Correcions Complex	Evans, Kuhn & Associates, INC.	Aug-97	PEC
Southwest Regional Juvenile Corrections Complex General Drawings	EKA and others	Feb-97	PEC
Final Drainage Report Project 7 MP 130.71 to MP 137.00 Highway SR 85 and Plans	ADOT	Jan-05	PEC
Final Drainage Report Patterson Road	J2 Engineering	Oct-04	PEC
Hydrogeologic Report City of Phoenix SR 85 Landfill Buckeye, Arizona	URS	Aug-03	PEC
Preliminary Drainage Report - Revised SR 85 Landfill Buckeye, Arizona and Plans for Cell 1 Phase1	URS	Jul-03	PEC
SR 85 Segment 5 MP 139.0 to 143.5 Draft Final Drainage Report and Plans	PB	Sep-04	PEC
SR 85 Landfill Entrance Facility Plans	JRMA and BAS	Apr-05	PEC
1964 Aerials	FCD		PEC
ADOT Plans - Lewis prison TI PDF Files and Hard Copy	Premier	Jun-02	PEC
Buckeye Quadrangle 7.5 min Topographic Maps TIF Files	USGS		PEC

Report, Map, or Document	Produced By	DATE	Location
SR 85 Landfill Study Photo Map	URS	Feb-03	PEC
No Gas in Area Fax	Southwest Gas	Mar-03	PEC
SR 85 Design Concept Study Figure 16	ADOT	Mar-00	PEC
SR 85 Landfill Site Fact Sheet	City of Phoenix	Feb-03	PEC
Preliminary Drainage Plans for the Southwest Regional Facility Sheets 1,4,5	SCS	Jan-95	PEC
SR 85 Landfill Cell 1 - Phase 1 Excavation and Lining	URS	Mar-05	PEC
Retention/Detention Basin Map	Arrington Watkins, EKA	Feb-97	PEC
Patterson Road Improvements	AZTEC	Feb-05	PEC

Appendix B Phone Log and Phone Book

## Phone Log

DATE	TIME	CONTACT	ORGANIZATION	COMMENT
2/3/03	11:15	Dennis Crandall	ADOT	SR85 drainage report: diverted to Parsons Brinckerhoff
2/3/03	15:15	Javier Guana	Parsons Brinckhoff	BTW and Premier SR85 hydrology reports
2/4/03	10:00	Tony	Parsons Brinckhoff	pick up BTW and Premier reports
2/5/03	8:30	Tony	Parsons Brinckhoff	return BTW and Premier reports
2/20/03	15:30	Ron Serio	City of Phoenix	CoP is very new to this area. Ron promised to call URS for more flood/drainage information and call back.
2/21/03	15:40	Ron Serio	City of Phoenix	URS may have something ready in 4 weeks. Nothing for now.
2/28/03	9:00	Michael Rank	Dept. of Administration	Hydro/flood information available for Lewis Prison area
2/28/03	10:00	Tony Cabrera	Entranco	left message for drainage study report for SR85 TI
3/3/03	13:00	Karen Urban	Entranco	request hydrological study information for SR85 TI
3/4/03	14:00	Karen Urban	Entranco	Hydrology study and plan for Lewis Prison interchange
3/6/03	8:30	Christ Dimetroplos	ADOT	left message for hydrological study information to the north of Lewis Prison
3/6/03	16:00	Qwest	Qwest	Fax request for buried facility maps
3/6/03	16:30	APS	APS	Fax request for buried facility maps
3/7/03	8:30	Tony Zelenak	Dept. of Corrections	left message for storm drain/sewer line as-builts for Lewis Prison
3/7/03	8:40	Marcus Watanabe	Southwest Gas	request gas line map
3/7/03	10:40	Ms.	Qwest	They don't have information on this area and divert my request to Jim Robinson
3/7/03	11:00	Rich Peters	Qwest	left message for the request of phone line map
3/10/03	14:30	Sam Rogers	ADEQ	Hydrological study report for Southwest Regional Landfill may be available in ADEQ. ADEQ records management will confirm the availability.
3/10/03	16:00	Russ Heisinger	Assessor's Office	authorize the release of parcel data
4/1/03		Russ Heisinger	Assessor's Office	Limits for the parcel data
4/2/03		Russ Heisinger	Assessor's Office	Pick up the parcel data
4/1/05	16:00	Doug Nelson	Woolsey Dist. Counsel	Discussed Kick-off Mtg.
4/26/05		Various	Kick-off meeting	See Kickoff Meeting Notes
5/4/05		Pat Cruse	Juvenile Detention Facility	Ask for more plans - drainage
5/4/05		Evelyn Ma	ADOT	Requested plans for SR 85
5/18/05		Mike Quinn	Arrington Watkins Architects	Requested Lewis Prison As Builts
5/19/05		Jim Spring	Morrison Maierle, Inc.	Left message requesting Lewis Prison As Builts
5/20/05		Jim Spring	Morrison Maierle, Inc.	Spoke about Lewis Prison As-builts
5/20/05		Rick Hogen	Lewis Prison Plant Manager	Left message requesting Lewis Prison As Builts
7/19/05	AM	Doug Nelson	Woolsey Dist. Counsel	Discussed Final Report

## Phone Book

Last	First	Affiliation	Position	Phone	Email
Crandall,	Dennis	Roadway Eng Group, ADOT	Chief Drainage Eng	602-712-7197	dcrandall@dot.state.az.us
		City Solid Info Line		602-534-3333	garbage@ci.phoenix.az.us
Guana,	Javier	Parsons Brinckerhoff		602-248-3007	
Serio,	Ron	City of Phoenix	Eng, Solid waste	602-534-1420	
Long,	Ron	Town of Buckeye	Dir, Public Works	623-386-2487	rlong@buckeyeaz.org
Kohl,	John	Administrative Services, ADOC	Administrater, Facility	602-225-4226	ADMIN- ROUTER@adc.state.az.us
Alvarez,	Manual	Public Works, Buckeye		623-386-2487	malvarez@buckeyeaz.org
Ringwald,	Bruce	ADOA		602-542-6051	
Smith,	Scott	ADOA		602-542-1500	
Rank,	Michael	ADOA		602-542-1983	
		APS		602-371-7098	
		Qwest		480-831-4946	
Peters,	Rich	Qwest		520-836-1997	
Dimetropolos	Christ	ADOT	Project management	602-712-8456	
Cabrera,	Tony	Entranco		602-889-7008	
Urban,	Karen	Entranco		602-889-7098	
Watanabe,	Marcus	Southwest Gas		602-484-5345	
Watters,	Peggy	Solid Waste Section, ADEQ	Manager	602-771-4117	
Rogers,	Sam	ADEQ	Hydrologist	602-771-4670	
Heisinger,	Russ	Assessor's Office	GIS Manager	602-372-1627	rheising@mail.maricopa.gov
Heaton	Mike	Project Engineering Consultants, Ltd.	Project Manager	602-906-1901	<a href="mailto:mike@pecaz.com">mike@pecaz.com</a>
Xu	Ying	Project Engineering Consultants, Ltd.	Project Engineer	602-906-1901	<a href="mailto:ying@pecaz.com">ying@pecaz.com</a>
Jones	Greg				
Shotal	Debbi				
Nelson	Douglas	Douglas C. Nelson P.C.	Attorney at Law	602-395-1612	<a href="mailto:DougCNelson@cox.net">DougCNelson@cox.net</a>
Bowers	Garth	Shaw*EMCON/OWT, Inc.	Project Engineer	520-792-2800	<a href="mailto:garth.bowers@shawgrip.com">garth.bowers@shawgrip.com</a>
Henning	Bruce	City of Phoenix	Project Engineer	602-256-5621	<a href="mailto:bruce.henning@phoenix.gov">bruce.henning@phoenix.gov</a>
Czemiski	Greg	Allied Waste	Environmental Manager	602-442-5985	<a href="mailto:greg.czemiski@awin.com">greg.czemiski@awin.com</a>
Cruse	Pat	ADOJC	Facilities Administrator	602-542-7055	<a href="mailto:pcruse@azdjc.gov">pcruse@azdjc.gov</a>
Ma	Evelyn				
Spring	Jim	Morrison Maierle, Inc		480-517-5800	
Rank	Mike	McCarthy Contractors (Lewis)			
Hogen	Rick				
Quinn	Mike				



## Buckeye Meeting Minutes

Project Name: Woolsey Candidate Assessment Report (WCAR)

Town of Buckeye & City of Phoenix Land Fill Project Information Gathering Meeting

Held at: At the Town of Buckeye Police Conference Room

Date: Friday, January 05, 2001

Attendance List Attached

Greg Jones began the meeting by explaining that the project is to obtain the existing information concerning the drainage within the northern portions of the Woolsey Flood Protection District (WFPD) that included the area north of Woods Road. The WFPD had requested that the Flood Control District of Maricopa County (FCDMC) authorize and fund the Woolsey Candidate Assessment Report (WCAR). The WFPD had made this request in preceding years. Mr. Jones responded to questions by Mr. Downing (Badley Center Engineer) and Mr. Scoutten (Town of Buckeye) concerning the project, its background, purpose of the study and the deliverables. Mr. Jones indicated that it was not the intent of this study to do any engineering analysis, it was not to develop any new hydrology, nor was it the intent of this study to delay any projects.

It was explained that the purpose of the meeting was request pertinent information from the Town of Buckeye and the City of Phoenix Landfill Project team. The town also invited Mr. Downing who represents Badley Center, a development along SR85. A list of requested items was handed out to each attendee to provide to PEC. The following list of items are the items discussed that relate to the WCAR.

- There have been many studies done in this area, is there a need for a new study? District has completed a Gila Bend Canal floodplain study and a Rainbow Wash Flood Study. These previous studies were for FIS purposes. Other private development work may also have studies. The purpose of this study is to identify what has been studied and by what methodology. One of the outcomes from this study could be the need for additional studies to determine the extent of drainage issues. The results of this report will not affect any hydrologic design currently underway.
- Woolsey FPD may be older than the FCDMC and has regulatory authority
- Badley Center is a proposed development along the west side of SR-85. The development upstream (east side of SR-85) has changed the flow patterns under and across SR-85. ADOT is planning on installing two box culverts under SR-85 and a channel along the east side of the roadway. ADOT may change the flow patterns again. ADOT is only providing a 50-year system, not a 100-year system and is planning on using the existing prison drainage system as their outlet. The prison system may not be adequate for these flows and may need to be lengthened to provide an appropriate outlet.
- The existing Southwest Regional Landfill and the two prison facilities have changed the natural drainage patterns. The culvert under the entrance to the landfill is undersized and causes runoff to flow over SR-85 into an existing tree farm. Before the landfill was developed, runoff in excess of the culvert capacities

was routed to the north along the east side of SR-85 and now it crosses the roadway.

- Landfill was built in the mid 90's. 'SCS Engineers' designed the landfill and ADEQ may have a copy of the drainage report for the landfill.
- The SR-85 project is at a 30% design level. It will be several months before it is completed. Chris Dimitropolis is the ADOT Project Manager for the Buckeye to Gila Bend Segments. They have progress meetings that FCDMC should attend. The next meeting is at the Gila Bend City Hall in about two weeks. Mr. Downing will provide FCDMC an email for the next meeting. The final designer for project segment 5 is Parsons-Brinkerhoff. The final designer for project segment 6 is Parsons Technologies.
- Need to include in the study report the History and formation of the Woolsey FPD. Also need to state in report the basis for the determination of designated conveyances and are there legal easements on those conveyances.
- The proposed COP landfill will affect the existing floodplain along the Casa Grand Canal. The plan is to collect flows on the upstream side of the landfill and convey them to the south to a detention basin and then discharge back to the existing designated floodplain to the south. A CLOMR/LOMR process will have to be obtained. The FCDMC is the floodplain manager for the Town of Buckeye so they would be the local reviewing authority. A Floodplain use permit would be required. PEC will need the Proposed COP landfill information to include in the report. COP landfill is now in for review and will be available in about a month.
- Mr. Jones re-assured the entire meeting participants that all the information gathered would be shared with the Town of Buckeye and the City of Phoenix. They in turn could share the information as deemed appropriate.
- Mr. Jones requested that the Town of Buckeye provide the FCDMC a letter requesting their review of landfill project because it is in the Town of Buckeye limits and outside unincorporated Maricopa County.

Attendees:

Name	Company	Phone	E-Mail
Mike Heaton	PEC	602-906-1901	<a href="mailto:mheaton@pecaz.com">mheaton@pecaz.com</a>
Steve Miller	PEC	602-906-1901	<a href="mailto:smiller@pecaz.com">smiller@pecaz.com</a>
Jim Downing	Badley Center	928-819-3647	<a href="mailto:downingjd@aol.com">downingjd@aol.com</a>
Mark Leonard	City of Phoenix	602-256-5662	<a href="mailto:mark.leonard@phoenix.gov">mark.leonard@phoenix.gov</a>
Ron Serio	City of Phoenix	602-534-1420	<a href="mailto:ron.serio@phoenix.gov">ron.serio@phoenix.gov</a>
Greg Jones	Flood Control District	602-506-5537	<a href="mailto:glj@mail.maricopa.gov">glj@mail.maricopa.gov</a>
Todd Ringsmuth	URS	602-371-1100	<a href="mailto:todd_ringsmuth@urscorp.com">todd_ringsmuth@urscorp.com</a>
Pascal Hinnen	URS	602-648-2455	<a href="mailto:pascal-hinnen@urscorp.com">pascal-hinnen@urscorp.com</a>
Woody Scoutten	Town of Buckeye	602-993-5686	<a href="mailto:woody_scoutten@msn.com">woody_scoutten@msn.com</a>
Joe Blanton	Town of Buckeye	623-386-4691	<a href="mailto:jblanton@buckeyeaz.org">jblanton@buckeyeaz.org</a>

## Doug Nelson Meeting Minutes

Project Name: Woolsey Candidate Assessment Report (WCAR)  
Woolsey Flood Protection District Information Gathering Meeting  
Held at: Flood Control AC/DC Conference Room  
Date: Thursday, March 06, 2001  
Attendance List Attached

Greg Jones began the meeting by explaining that the project is to obtain the existing information concerning the drainage within of the Woolsey Candidate Assessment Report Study Area (CAR). The CAR is essentially the portion of the Woolsey Flood Protection District (WFPD) north of Woods Road. Mr. Jones explained that the Flood Control District of Maricopa County (FCD) decided to put the Woolsey CAR on hold until FCDMC had reviewed ADOT's completed drainage analysis work on the SR85 for the roadway segment though the study area. Mr. Jones said that ADOT had estimated the report would be ready in two to three weeks. He will be drafting a letter as a formal notice to PEC.

Mr. Jones stated that the meetings original intent was to obtain information from the WFPD regarding drainage and flooding in the area. He suggested that we not waste the time and finish the meeting and go over the information the Mr. Nelson had brought to the meeting.

Mr. Doug Nelson provided PEC with reports and mapping as shown on the attached transmittal document. Other items discussed are listed below:

- Copy of Figure 16 From SR 85 Design Concept Study – “Proposed Project Limits and Priorities”. The Woolsey CAR study area includes Projects 5, 6, 7, and 2, the new Lewis Prison Interchange.
- Flood Protection Alternatives – Schematic Plan for the Lewis Prison and SW Regional Landfill. Mr. Nelson explained that this concept was developed by BRW at the request of ADOT to bring together the parties and solve the problem. He said it was never implemented.
- A copy of Cotton Center USGS map showing various washes as designated by the Woolsey FPD as drainage conveyances through the districts.
- A two-page document describing the designated wash names and locations as shown on the USGS map.
- Mr. Nelson also pointed out that several ADOT documents and reports are available at ACE Reprographics and can be copied. Two mentioned were the Initial Location Design for SR 85 and SR 85 Drainage Report.

Mr. Nelson said that the WFPD has many pictures showing flooding in the area of their district. Mr. Miller requested that the pictures be provided to PEC to include in the CAR. He said there were too many and we probably did not want them. Mr. Miller and Mr. Jones both asked that Mr. Nelson provide for inclusion.

Mr. Nelson told us he believed that the Casa Grand Canal was built in the 1880's and there had been studies that show there were many Hohokam sites. There had been an upgrade to the canal in the early 1900's. The Gillespie Dam was also built in that same time period.

Mr. Nelson also suggested we look at the 404 permits for ADOT's planned roadway improvement on SR 85. Mr. Miller said they would not provide any useful information. Mr. Nelson said they would at least provide the location of crossings. Mr. Heaton said the plans would also show this.

Mr. Jones initiated a discussion concerning the Woolsey District's authority for the regulation of the washes. Mr. Nelson said they have no fee title lands or easements to do this. They have the authority similar to a homeowner association to maintain or to require landowners to maintain the conveyances. Mr. Nelson stated that the authority comes from Title 48 of the ARS.

Attendees:

Name	Company	Phone	E-Mail
Greg Jones	Flood Control District	602-506-5537	<a href="mailto:glj@mail.maricopa.gov">glj@mail.maricopa.gov</a>
Steve Miller	PEC	602-906-1901	<a href="mailto:smiller@pecaz.com">smiller@pecaz.com</a>
Mike Heaton	PEC	602-906-1901	<a href="mailto:mheaton@pecaz.com">mheaton@pecaz.com</a>
Valerie Szwick	Flood Control District	602-506-1501	<a href="mailto:vas@mail.maricopa.gov">vas@mail.maricopa.gov</a>
Russ Miracle	Flood Control District	602-506-1501	<a href="mailto:rlm@mail.maricopa.gov">rlm@mail.maricopa.gov</a>
Doug Nelson	Woolsey Flood Protection District	602-395-1612	<a href="mailto:dcn@netwrx.net">dcn@netwrx.net</a>

Letter to Stakeholders

RE: Woolsey Flood Protection District Candidate Assessment Report

Dear \_\_\_\_\_,

Project Engineering Consultants, Ltd. is under contract with the Flood Control District of Maricopa County to provide services for the Woolsey Flood Protection District (FPD) Candidate Assessment Report (CAR). In moving forward to meet the purpose of this CAR we are eager to obtain all of the available information that may have an impact on drainage conditions in the northern portion of the Woolsey Flood Protection District. The items include:

- Hydrology Reports, maps or studies
- Drainage Reports, maps or studies
- Maintenance Records & Resident Complaint records
- Historical flooding data (photos, videos, newspaper articles, memos, etc.)
- Plans or as-builts for existing storm drains
- Plans or as-builts for existing flood structures (dikes, channels, detention/retention basins, etc.)
- Major utilities (sewer or water trunk lines)
- Major irrigation facilities (main canals and laterals)

It would be best if this information could be provided in digital form (pdf or GIS). However hard copies are also acceptable.

This study has only a short window until completion. The sooner we can obtain the data, the more complete the CAR will be for the final submittal.

We appreciate your help in this matter. If you have any questions, please contact PEC using any of the methods listed below:

*Project Engineering Consultants, Ltd.  
2310 W. Mission Lane; Suite #4  
Phoenix, AZ 85021-2812  
Phone - 602-906-1901  
Fax - 602-906-3080*

Or by e-mail:

Mike Heaton – [mike@pecaz.com](mailto:mike@pecaz.com)

Ying Xu – [ying@pecaz.com](mailto:ying@pecaz.com)

[www.pecaz.com](http://www.pecaz.com)

Sincerely,

Maricopa County Flood Control District

## Site Visit Memo

Project Name: Woolsey FPD Candidate Assessment Report (CAR)

Date: 3/30/05

On Wednesday March 30, 2005 PEC and FCD personnel performed a site visit to the Woolsey FPD CAR project Site. In attendance were Debbi Shortal from the FCD and Ying Xu and Mike Heaton from PEC. The following items are notes from the visit:

- We noted that the project site begins near Mile Post 142 on State Route 85. This MP is located several hundred feet north of Rainbow wash.
- Drove west on EPNG road through an existing tree farm.
- Stopped at Rainbow Wash and took a few pictures. It appeared that there had been no significant recent flow in Rainbow Wash.
- North of the gas line road several hundred feet is a high voltage power line. We drove to a power pole and determined the facility is owned by SRP.
- We then drove to the Lewis Prison Complex to look at drainage features. We spoke to the guard and told him of our purpose. We took pictures of the entry driveway cross culverts.
- We then crossed to the east side SR 85 and took picture of some of the culverts on the new ADOT Lewis Prison Interchange.
- Went and photoed the entrance to the Southwest Regional Juvenile Detention Facility
- Drove to road just south of MP 135 and followed it east to the Gila Bend Canal.
- We followed the Gila Bend Canal on the O&M road to Layton Wash where we stopped and took photos.
- We then followed the Old Highway 80 to the crossing of Rainbow Wash. It was noted that several washes crossed the road (Old Highway 80) from the east to the west with no drainage or conveyance structures. A bridge had been across Rainbow Wash but was washed out many years ago and the roadway was reconstructed around the bridge.
- We then drove to Gillespie Dam and noted some recent construction activity in the river bottom. It was likely related to the Gila Bend Canal Operations.
- We returned to Patterson Road and made a stop at the Bioflora headquarters. There was no one present to talk to, but we found some publicity literature and reviewed it.
- Drove thru some Ag fields north of Bioflora Headquarters and followed along Rainbow Wash back to Old Highway 80.
- We followed Old Highway 80 to Woods Road and back to SR 85.

## Kick-off Meeting Minutes

Project Name: Woolsey Candidate Assessment Report (WCAR)

Woolsey Flood Protection District

Held at: Flood Control McMicken Conference Room

Date: 4/26/05

### Attendees:

Name	Company	Phone	E-Mail
Greg Jones Project Manager	Flood Control District	602-506-5537	<a href="mailto:glj@mail.maricopa.gov">glj@mail.maricopa.gov</a>
Mike Heaton Project Manager	PEC	602-906-1901	<a href="mailto:mike@pecaz.com">mike@pecaz.com</a>
Ying Xu Project Engineer	PEC	602-906-1901	<a href="mailto:ying@pecaz.com">ying@pecaz.com</a>
Doug Nelson Attorney	Woolsey Flood Protection District	602-395-1612	<a href="mailto:dougnelson@cox.net">dougnelson@cox.net</a>
Bruce Henning Deputy Public Works Director	City of Phoenix PW	602-256-5621	<a href="mailto:bruce.henning@phoenix.gov">bruce.henning@phoenix.gov</a>
Greg Czerniski Environmental Manager	Allied Waste	602-442-5985	<a href="mailto:greg.czerniski@awin.com">greg.czerniski@awin.com</a>
Garth Bowers Consultant to Allied Waste	Shaw EMCON/OWT	520-792-2800 ex. 212	<a href="mailto:garth.bowers@shawgrp.com">garth.bowers@shawgrp.com</a>
Pat Cruse Facilities Administrator	AZ Juvenile Corrections	602-542-7055	<a href="mailto:pcruse@azdjic.gov">pcruse@azdjic.gov</a>

### Invited But Not Attend:

Name	Company	Phone	E-Mail
Evelyn Ma Statewide Project Management	Arizona Department of Transportation	602 712-6660	<a href="mailto:EMa@azdot.gov">EMa@azdot.gov</a>
Carroll Reynolds Town Manager	Town of Buckeye	623 386-4691	<a href="mailto:creynolds@buckeyeaz.org">creynolds@buckeyeaz.org</a>
Ivan Bartos Warden	Department of Corrections, Lewis Prison	623 386-6160	<a href="mailto:ibartos@azcorrections.gov">ibartos@azcorrections.gov</a>
Elaine Y. Zielinski	Bureau of Land Management, Arizona State Office		
Michael Burnett Vice President	Allied Waste Industries, SW Regional Landfill	480 627-2785	
Hassan Mushtaq Floodplain Manager	City of Phoenix	602 262-4026	<a href="mailto:Hasan.Mushtaq@phoenix.gov">Hasan.Mushtaq@phoenix.gov</a>

The meeting began shortly after 3:00 pm and ended at approximately 4:00pm. The following items were discussed at the meeting:

- Mr. Heaton welcomed those in attendance and thanked them for their time.

- Mr. Greg Jones thanked everyone for their cooperation and said that any interested party could receive a copy of the final report.
- Mr. Heaton explained the purpose of the study is generally to collect all drainage information possible in the area and compile it into a report and into exhibits. The report and exhibits are the deliverables.
- Mr. Heaton explained that the most difficult portion of the project will be to determine locations of existing or historic flooding. There are no papers or news archives in the area. Information from this group will and others familiar with the area are critical.
- Flooding problems noted by those at the meeting were at the highway near the Allied Waste Landfill. Speculations was that silt had been deposited in the outfall channel and caused storm water flows to discharge in places that it was not designed to go.
- It was suggested that McDOT may be a stake holder in this process since they have roads that they maintain in the area.
- Flooding is a problem at the crossings of Old Highway 80 where the washes discharge from the farms and canal.
- The Lewis prison had done two rounds of drainage design. The first was found to be inadequate and a new design was determined and upgrades made.
- The Allied Waste group is revising the concept for their storm water protection and has been trying to coordinate with ADOT and Getting information from ADOT has been difficult. PEC had been provided with ADOT drainage reports for the study area but had not reviewed them. The landfill is planning to use the ADOT crossing and has had some contact but no confirmation as to the culvert design flow rate.
- A channel had been proposed to convey flows from the roadway near the Allied Waste landfill to Rainbow Wash south of the tree farm. This could not be confirmed since they did not have a copy of the report.
- Contacts for the SR 85 design is ADOT consultants Parsons Brinkerhoff. Doug Lamont and Gary Sun were the particular contacts.
- ADOT has been coordinating work on Rainbow Wash with FEMA directly. This is not typical and usually the District is involved. Perhaps Valerie Swick had some insight into these discussions.
- The architect for the Lewis Complex is Mike Quinn with Arrington Watkins 602-279-4373. He was also the architect for the Juvenile Complex.
- The Lewis Prison plant maintenance or plant manager is Rick Hodgins 626-386-6160.
- Documents were provided by those present at the meeting. These documents include:
  - City of Phoenix SR85 Landfill – Revised Preliminary Drainage Report – July 2003
  - Hydrogeologic Report City of Phoenix SR 85 Landfill Buckeye, Arizona – August 2003.
  - 100% Design Drawings for City of Phoenix S.R. 85 Landfill Cell 1 – Phase 1 Excavation and Lining – March 2005.
  - City of Phoenix State Route 85 Landfill Entrance Facility – April 2005.
  - City of Phoenix Final Drainage Report Patterson Road – November 2004

- City of Phoenix Patterson Road Improvements – February 2005.
- Aerial Photo Southwest Regional Facility.
- Drainage Report for the Southwest Regional Facility – September 6, 1995.

## The Second Stakeholder Meeting Minutes

Project Name: Woolsey Candidate Assessment Report (WCAR)

Woolsey Flood Protection District

Held at: Flood Control Conference Room

Date: 6/29/05

Attendees:

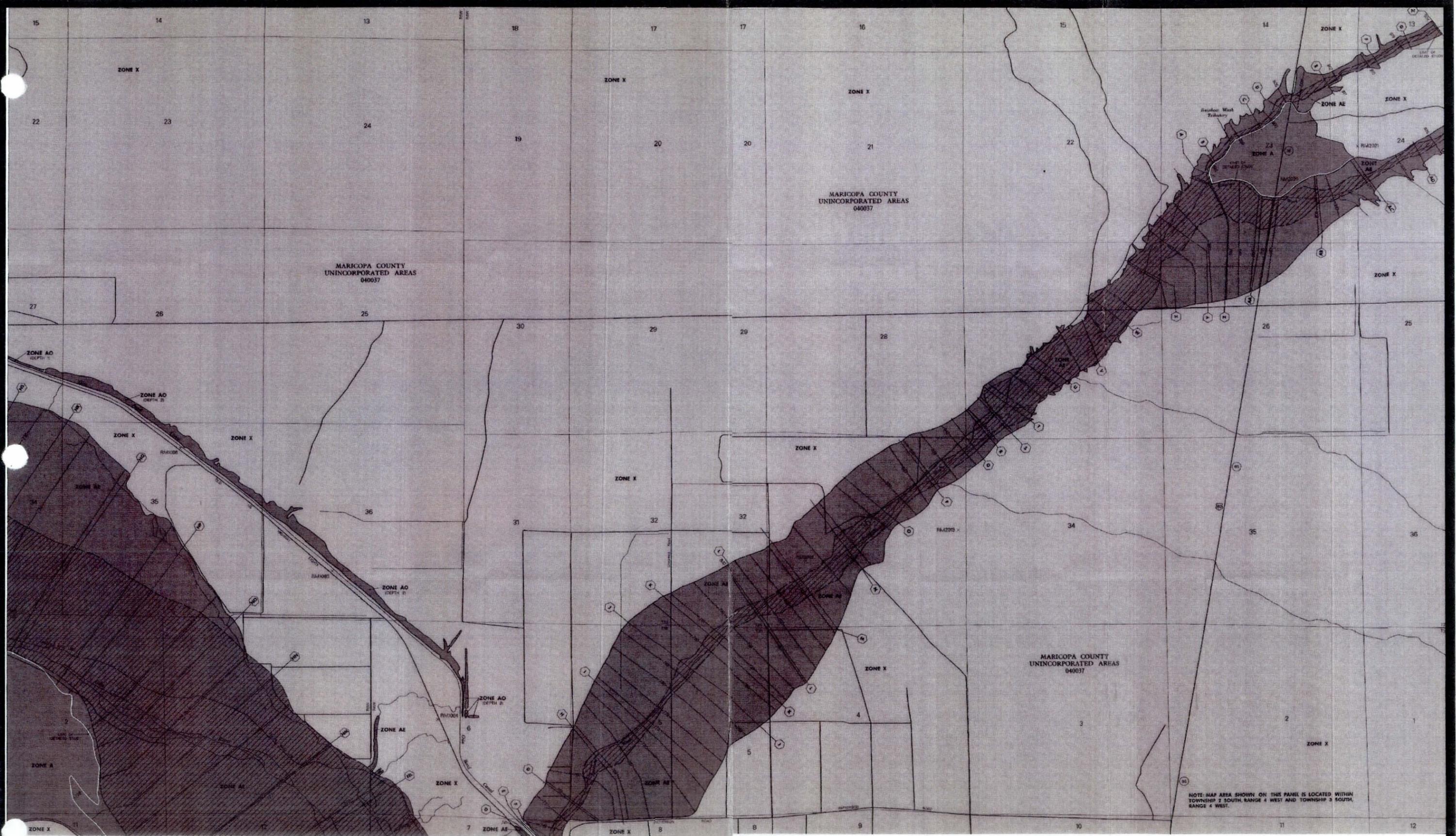
Name	Company	Phone	E-Mail
Greg Jones Project Manager	Flood Control District	602-506-5537	<a href="mailto:glj@mail.maricopa.gov">glj@mail.maricopa.gov</a>
Debbi Shortal	Flood Control District	602-506-1034	
Doug Hauth	Flood Control District	602-506-6762	
Mike Heaton Project Manager	PEC	602-906-1901	<a href="mailto:mike@pecaz.com">mike@pecaz.com</a>
Ying Xu Project Engineer	PEC	602-906-1901	<a href="mailto:ying@pecaz.com">ying@pecaz.com</a>
Doug Nelson Attorney	Woolsey Flood Protection District	602-395-1612	<a href="mailto:dougnelson@cox.net">dougnelson@cox.net</a>
Bruce Henning Deputy Public Works Director	City of Phoenix PW	602-256-5621	<a href="mailto:bruce.henning@phoenix.gov">bruce.henning@phoenix.gov</a>
Doug Sawyer Environmental Manager	Allied Waste	602-908-0225	<a href="mailto:doug.sawyer@awin.com">doug.sawyer@awin.com</a>

The meeting began shortly after 2:00 pm and ended at approximately 3:00pm. The following items were discussed at the meeting:

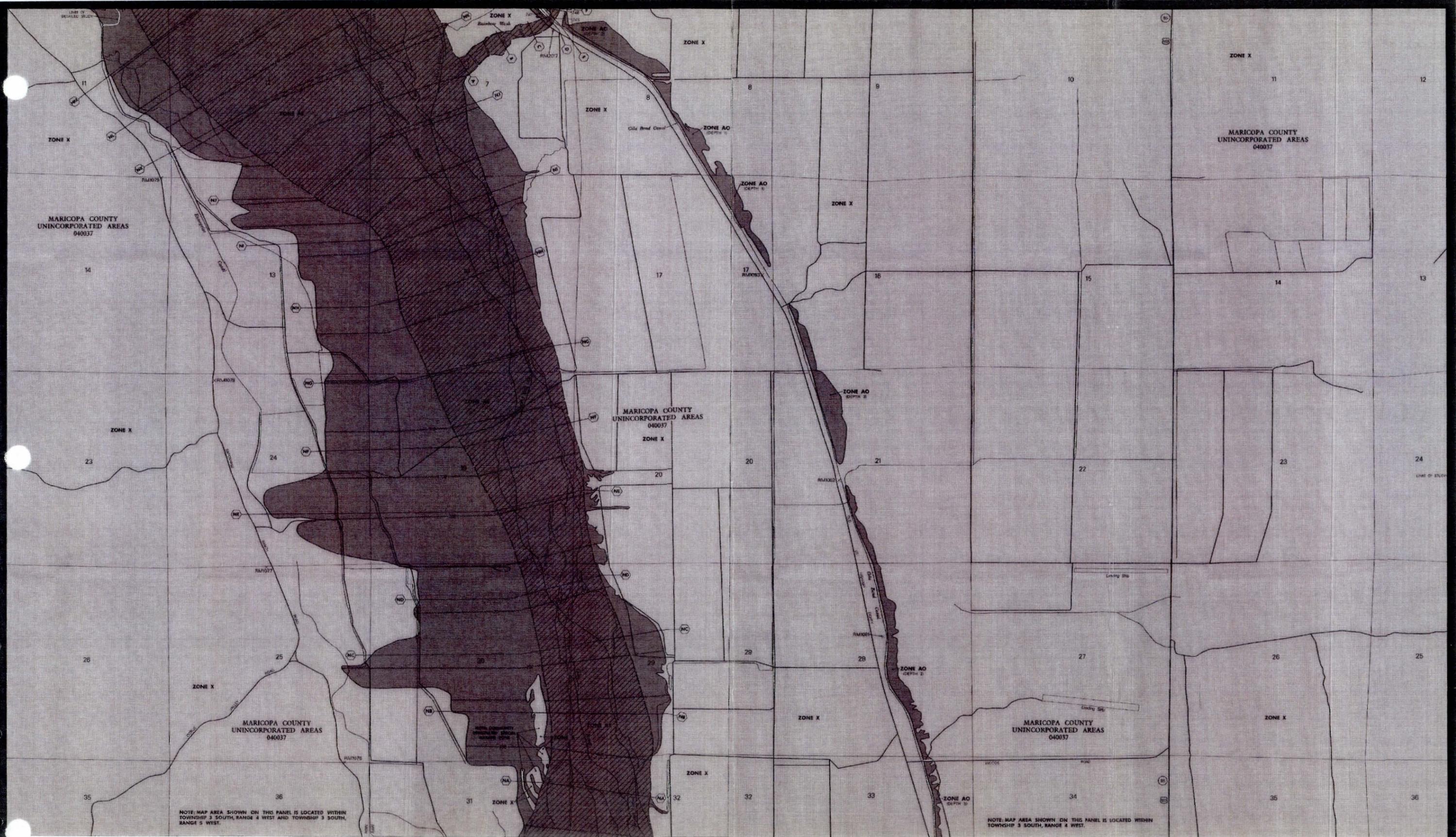
- Mr. Heaton welcomed those in attendance and thanked them for their time.
- Mr. Heaton showed the Exhibits and gave a show explanation
- Mr. Greg Jones was delayed at another meeting, but joined soon after we started.
- Mr. Jones provided copies of the Preliminary Report to the attendees.
- Mr. Nelson asked about the next step in the process.
- Mr. Jones explained the district's CIP process and the potential timeline and costs.
- Mr. Nelson pointed out that Badly Wash was misspelled
- Mr. Nelson also requested that a date column be added to the Document Log
- Comments are due back to the District or me by July 15<sup>th</sup>

I will send email to remind about the comments on or about the 11<sup>th</sup>.

Appendix D Composite of Floodplain Maps for WFPD Study Area



Composite of Floodplain Maps for WFPD Study Area  
 North Half  
 NTS

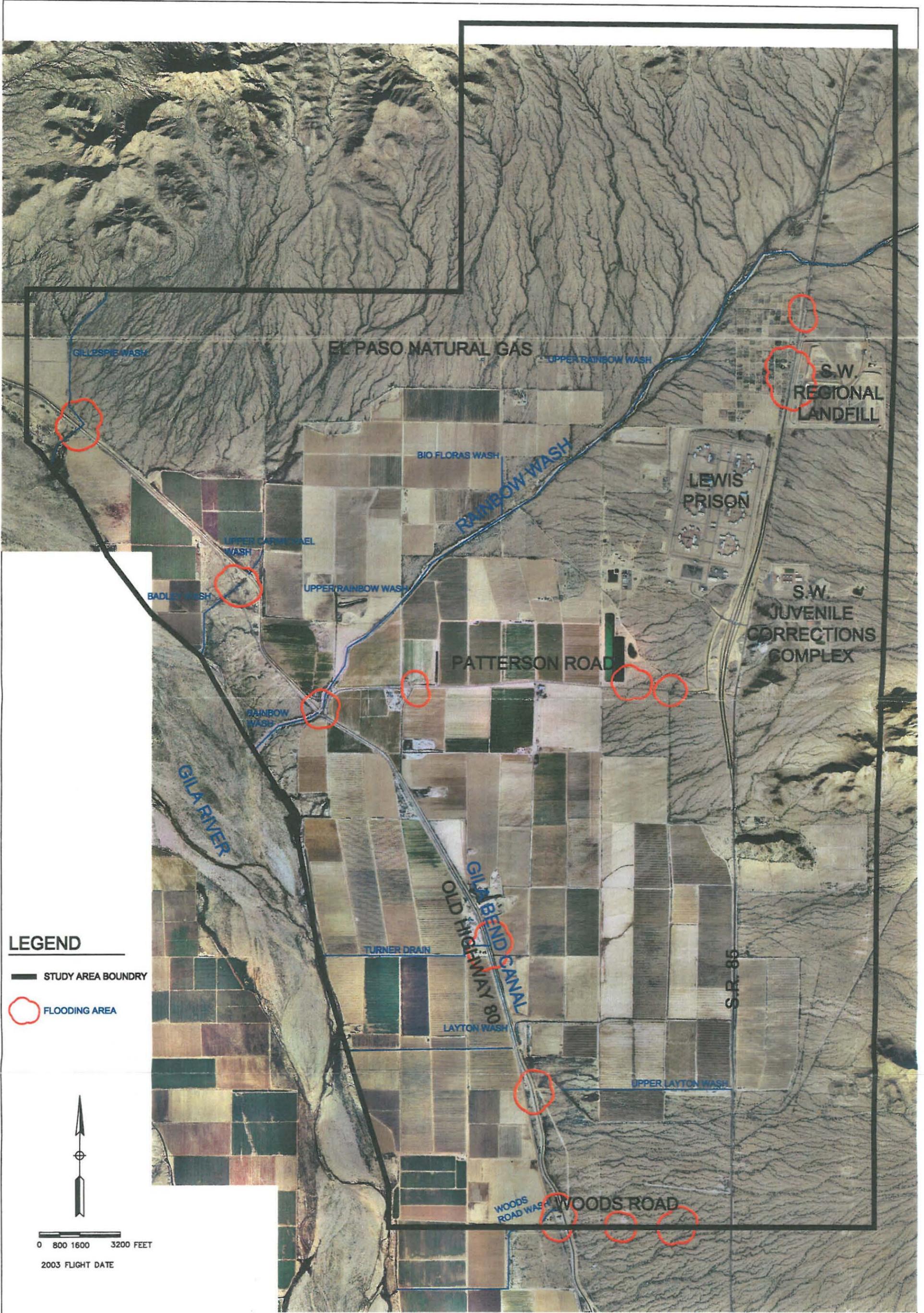


NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 3 SOUTH, RANGE 4 WEST AND TOWNSHIP 3 SOUTH, RANGE 5 WEST.

NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 3 SOUTH, RANGE 4 WEST.

Composite of Floodplain Maps for WFPD Study Area  
 South Half  
 NTS

Appendix E Exhibit 1 Known and Potential Flooding Areas



**LEGEND**

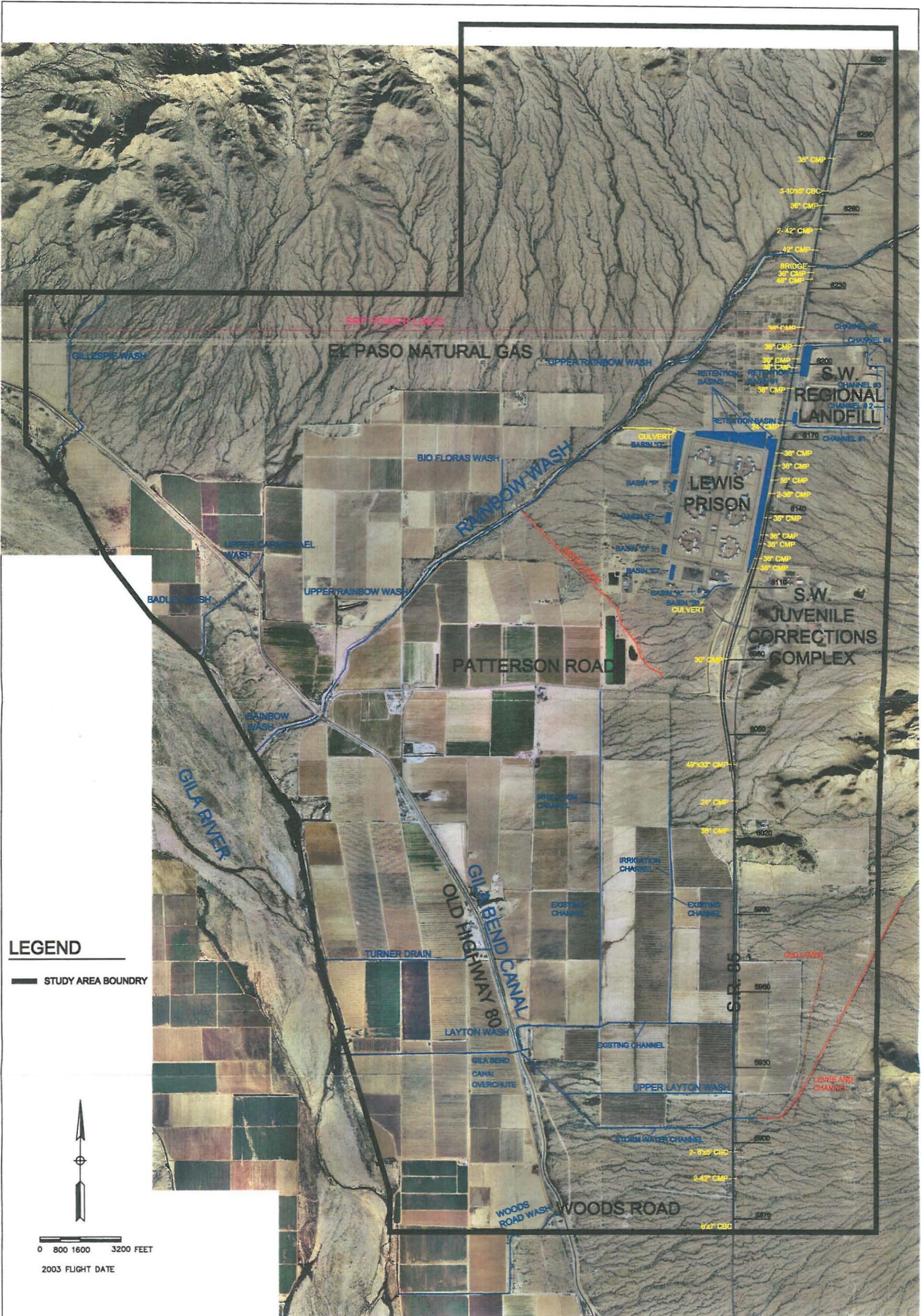
-  STUDY AREA BOUNDARY
-  FLOODING AREA



0 800 1600 3200 FEET

2003 FLIGHT DATE

Appendix F Exhibit 2 Existing Drainage Features



**LEGEND**

— STUDY AREA BOUNDARY

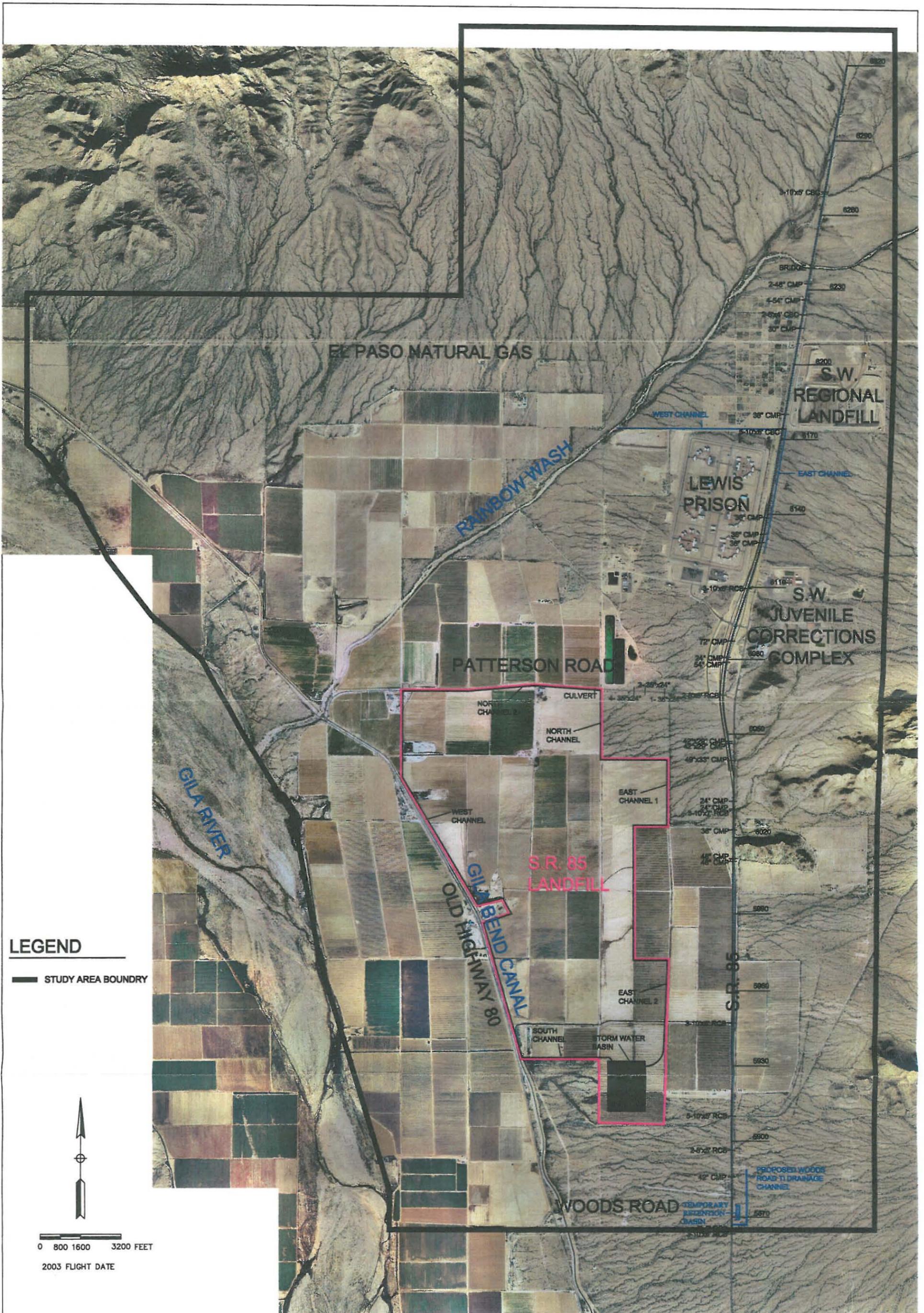


0 800 1600 3200 FEET

2003 FLIGHT DATE

**EXHIBIT 2  
WOOLSEY CANDIDATE ASSESSMENT REPORT  
EXISTING DRAINAGE FEATURES**

Appendix G Exhibit 3 Planned Drainage Features



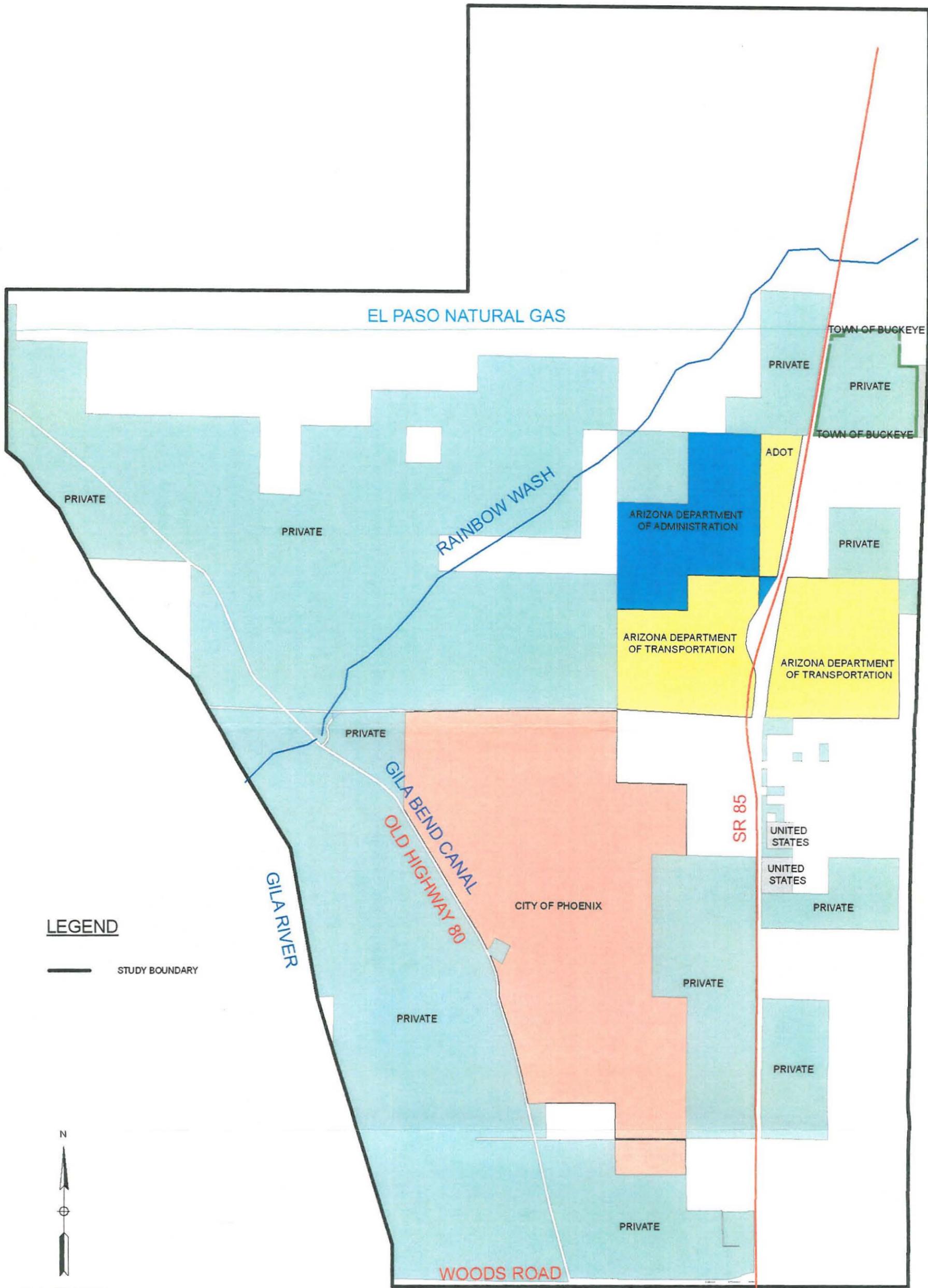
**LEGEND**

— STUDY AREA BOUNDARY



0 800 1600 3200 FEET  
2003 FLIGHT DATE

Appendix H Exhibit 4 Land Ownership Map



**LEGEND**

— STUDY BOUNDARY

N



0 800 1600 3200 FEET

2003 FLIGHT DATE

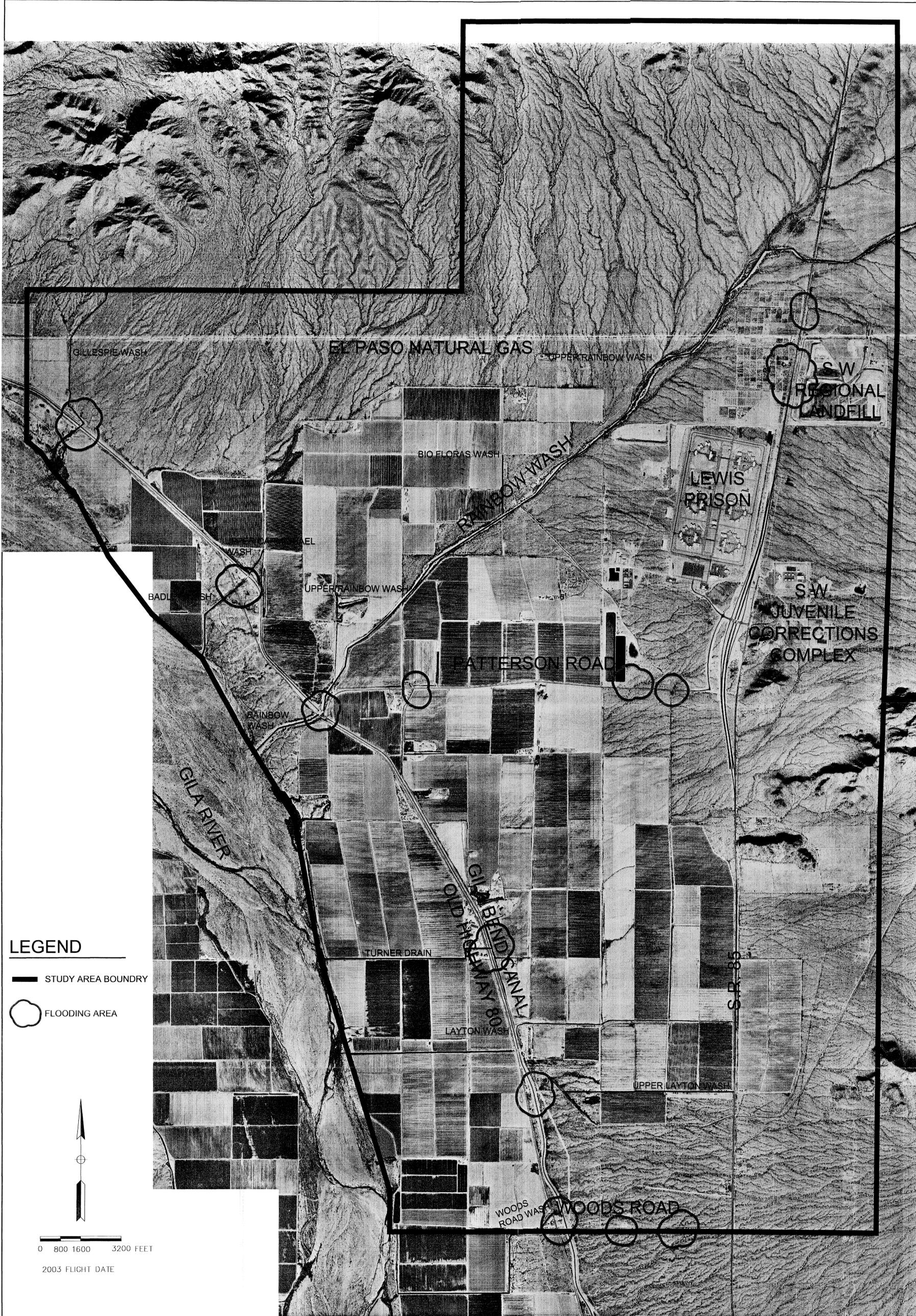


FLOOD CONTROL DISTRICT  
OF MARICOPA COUNTY

**EXHIBIT 4**  
**WOOLSEY CANDIDATE ASSESSMENT REPORT**  
**LAND OWNERSHIP MAP**



PROJECT ENGINEERING CONSULTANTS, LTD.  
2310 W. MISSION LANE, STE. 4 PHOENIX, AZ 85021  
PHONE (602) 906-1901



**LEGEND**

-  STUDY AREA BOUNDARY
-  FLOODING AREA

0 800 1600 3200 FEET  
2003 FLIGHT DATE

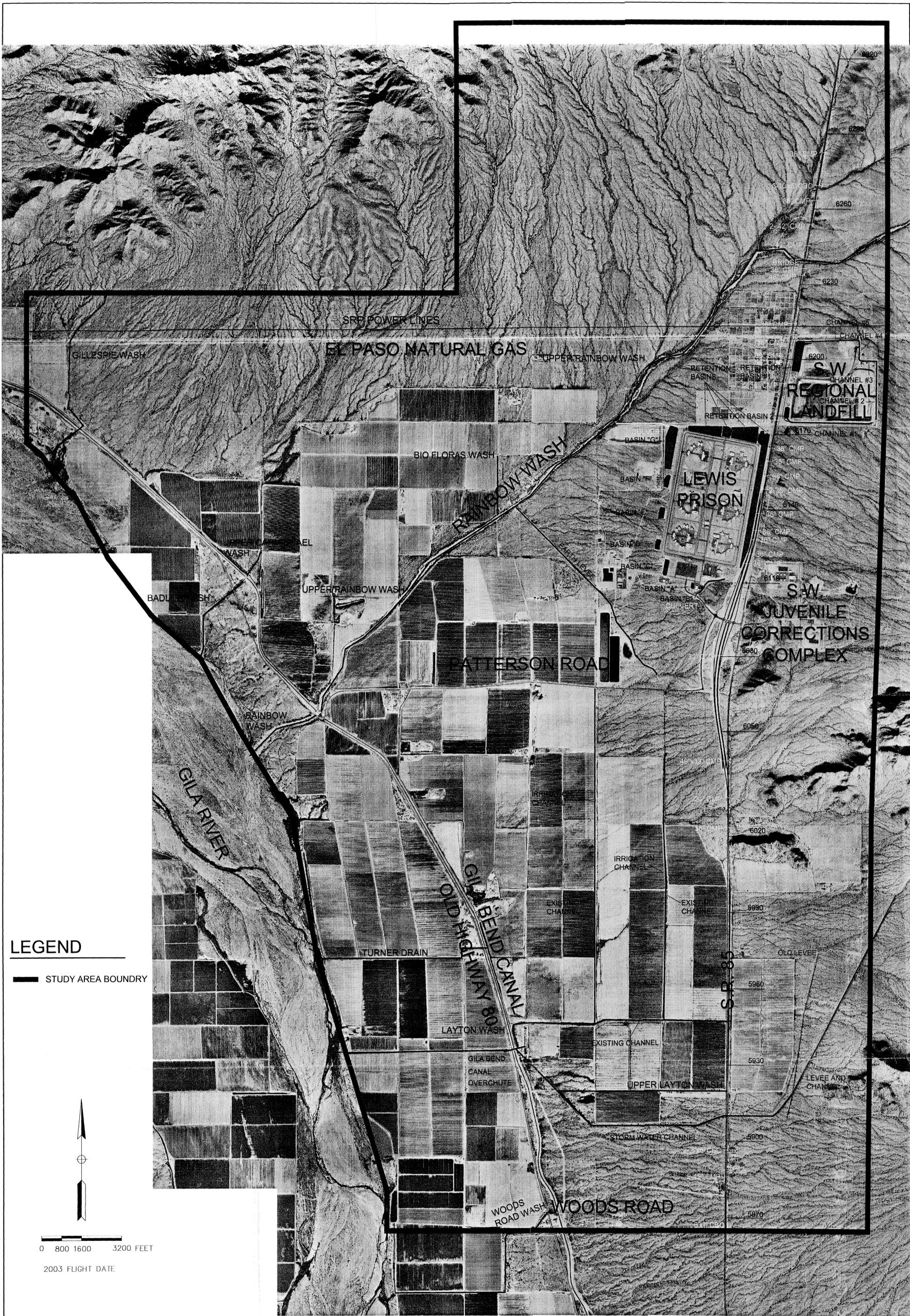


FLOOD CONTROL DISTRICT  
OF MARICOPA COUNTY

**EXHIBIT 1  
WOOLSEY CANDIDATE ASSESSMENT REPORT  
HISTORICAL FLOODING AREAS**



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**LEGEND**

— STUDY AREA BOUNDARY

0 800 1600 3200 FEET

2003 FLIGHT DATE

**EXHIBIT 2**

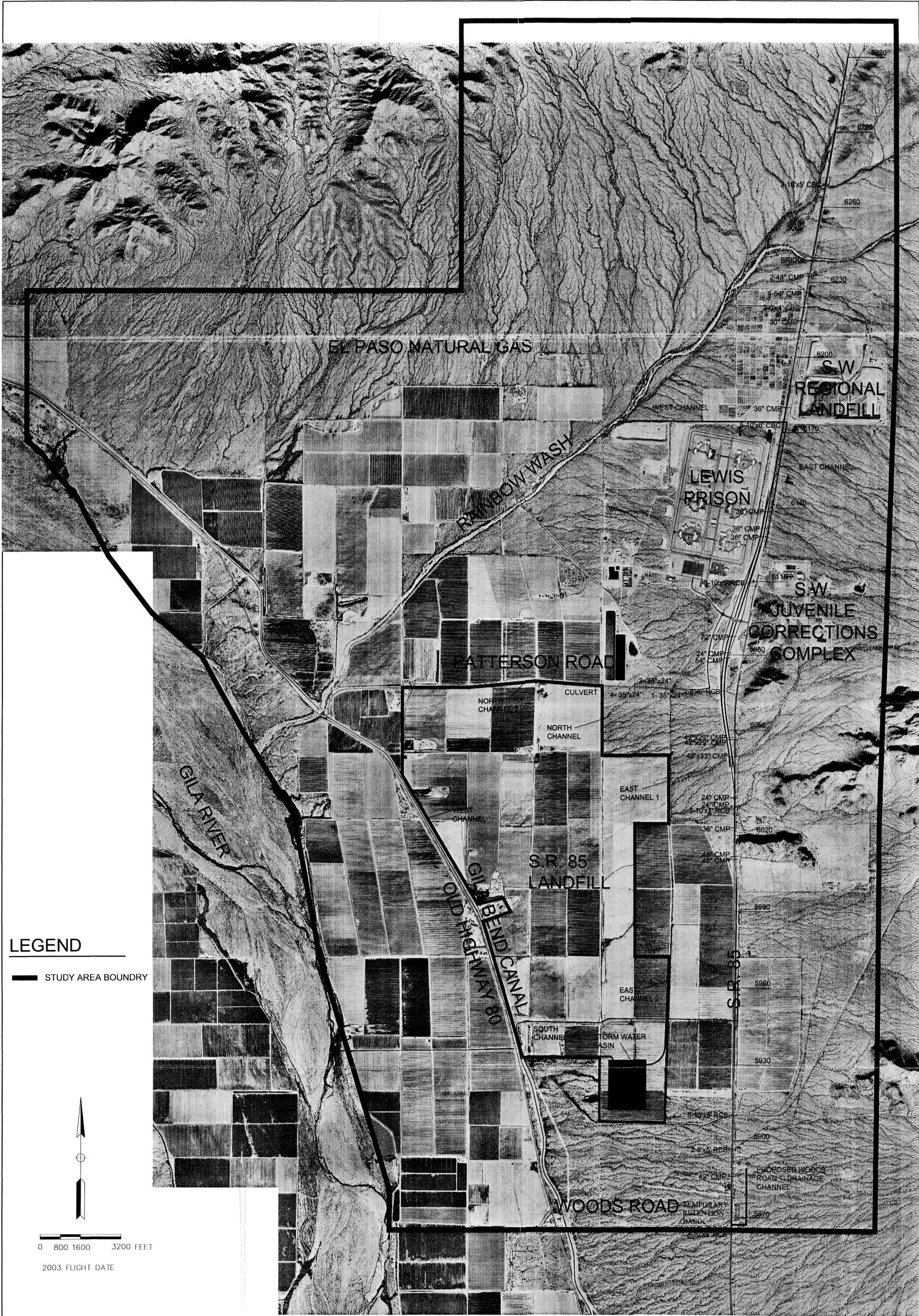
**WOOLSEY CANDIDATE ASSESSMENT REPORT  
EXISTING DRAINAGE FEATURES**



FLOOD CONTROL DISTRICT  
OF MARICOPA COUNTY

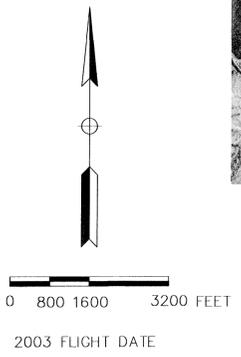


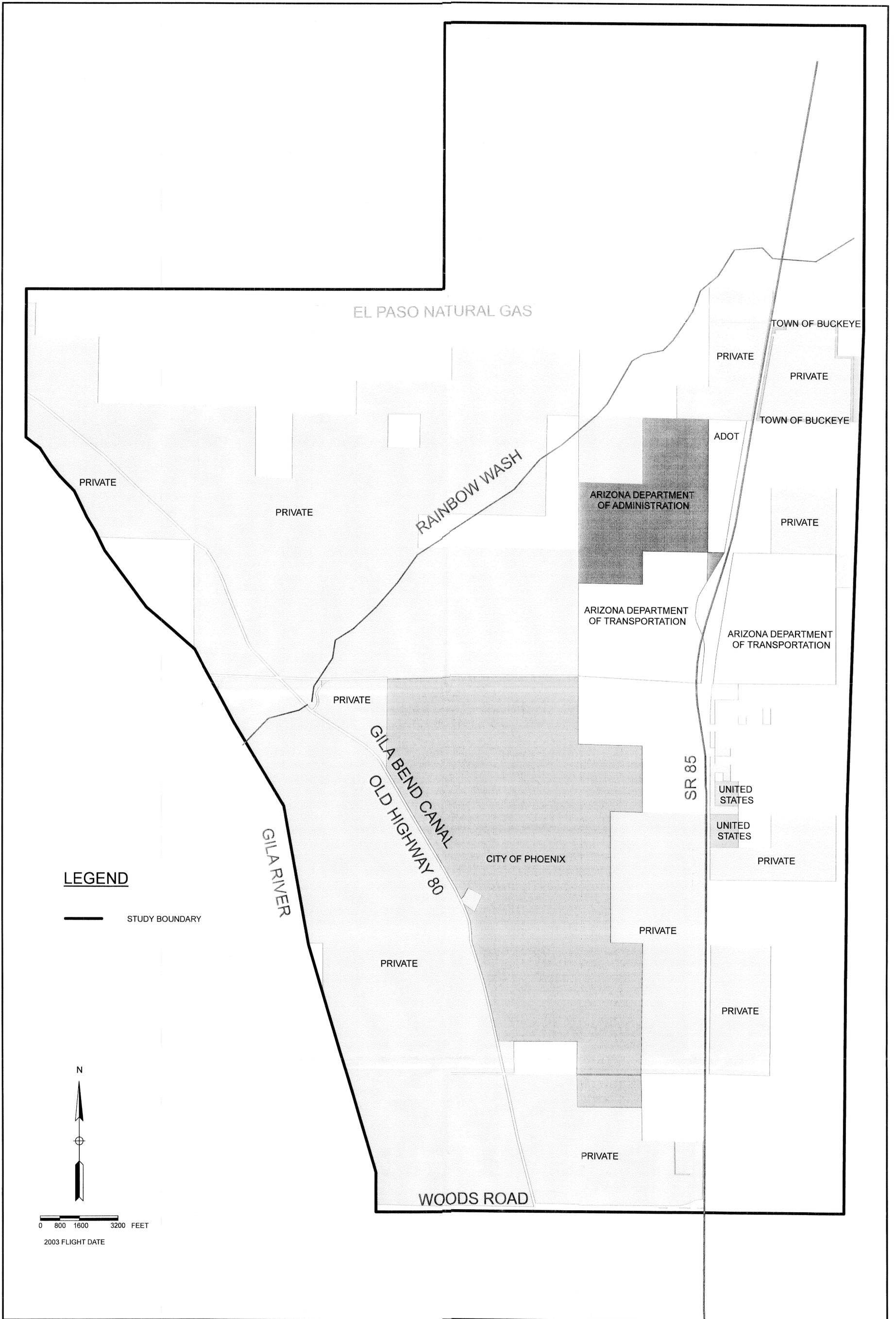
PROJECT ENGINEERING CONSULTANTS, LTD.  
2310 W. MISSION LANE, STE. 4 PHOENIX, AZ 85021  
PHONE (602) 906-1901



**LEGEND**

— STUDY AREA BOUNDARY





**LEGEND**

— STUDY BOUNDARY



0 800 1600 3200 FEET

2003 FLIGHT DATE



FLOOD CONTROL DISTRICT  
OF MARICOPA COUNTY

**EXHIBIT 4**  
**WOOLSEY CANDIDATE ASSESSMENT REPORT**  
**LAND OWNERSHIP MAP**



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PHONE (602) 906-1901