
Alvernon Way / Swan Road Realignment Study

DRAFT
Final Report

Prepared by:



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1. INTRODUCTION

PURPOSE AND NEED

Pima County has undertaken an alignment study to plan for the realignment of Alvernon Way and Swan Road south of Valencia Road in Tucson, Arizona. The primary need for these realignments is due to the planned airport expansion at Tucson International Airport (TIA). As part of the TIA expansion, the airport is planning to construct a third parallel runway located east of the existing runways. The 11,000-foot long runway would run diagonally (NW to SE) and extend through the existing Alvernon Way roadway and terminate near the vicinity of existing Swan Road. Due to the required runway protection zones at each end of the runway, any realignment of Swan Road would need to be east of the existing roadway. Associated with this realignment, Hughes Access Road would also need to remain connected to Alvernon Way or Swan Road to provide continued access to Raytheon Missile Systems. The project area is shown in **Exhibit 1-1**.

In addition to the planned airport runway, the realignment of Alvernon Way has been identified in the Pima County Major Streets and Routes Plan (MSSRP). The need for an improved north/south corridor has been identified in the Pima Association of Governments (PAG) Southeast Area Arterial Study, and the PAG State Transportation System Mobility and Regional Circulation Needs Feasibility Study (Loop Study). Both PAG reports forecast a marked increase in development within the southern PAG metropolitan area which results in the need for additional arterial capacity. Due to the location of the Tucson International Airport and Davis Monthan Air Force Base, north-south arterials between Nogales Highway and Kolb Road are limited to Alvernon Way, Swan Road, and Wilmot Road.

The purpose of this report is to compare various alignment alternatives for the realignment on the basis of access, cost, right-of-way, and floodplain impacts.

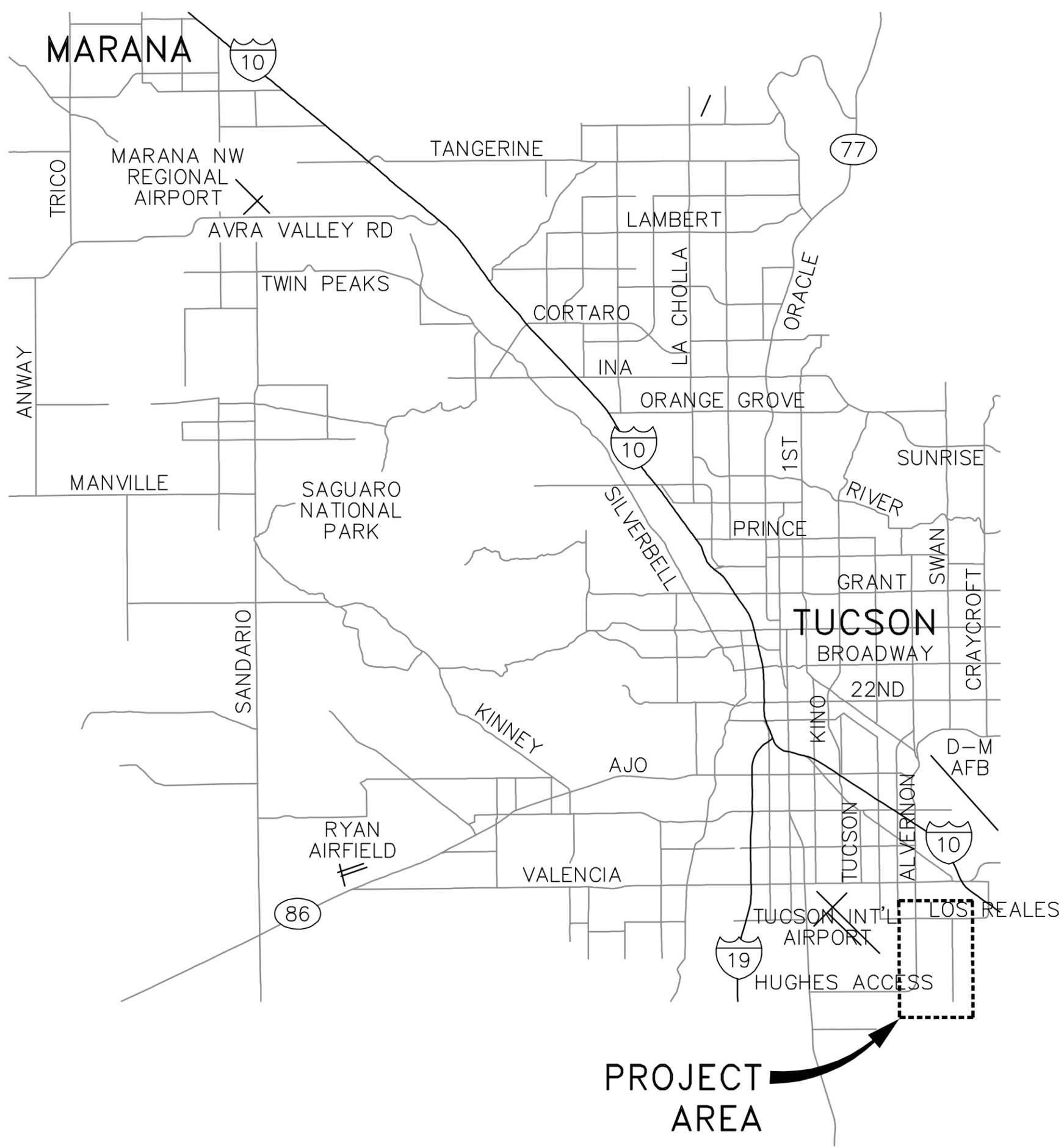
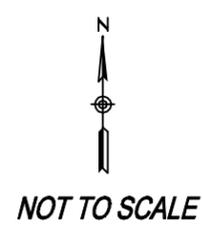
DESCRIPTION OF THE STUDY AREA

The area in which the alignment alternatives were developed is roughly bounded by Craycroft Road to the east, Alvernon Way to the west, Los Reales Road to the north, and Old Vail Connection Road to the south. Much of the study area is current vacant though there are several large land uses that create sizable obstacles to roadway alignments. These include the City of Tucson Los Reales Landfill, the United Sports Arizona Race Park, and the Granite Construction Swan Road Plant which mines and processes sand, gravel, asphalt. In addition to the Granite Construction facilities which are located on the east side of Swan Road, there are several other operations located between Alvernon Way and Swan Road that obtain access from both roadways. Access via Alvernon Way is currently on property owned by Tucson Airport Authority. These operations are currently signed as Sierra Mining and Crushing Company and CalMat of Arizona.

In addition, Raytheon Missile Systems, employing 10,000 persons at its Airport site, uses Alvernon Way and Hughes Access Road to provide access to its main entrances on the Raytheon South Access Road. This gated entry, open 24 hours a day, is the main truck route for the site, and serves 6600 cars per day.

The Tucson International Airport is a major land owner in the study area.

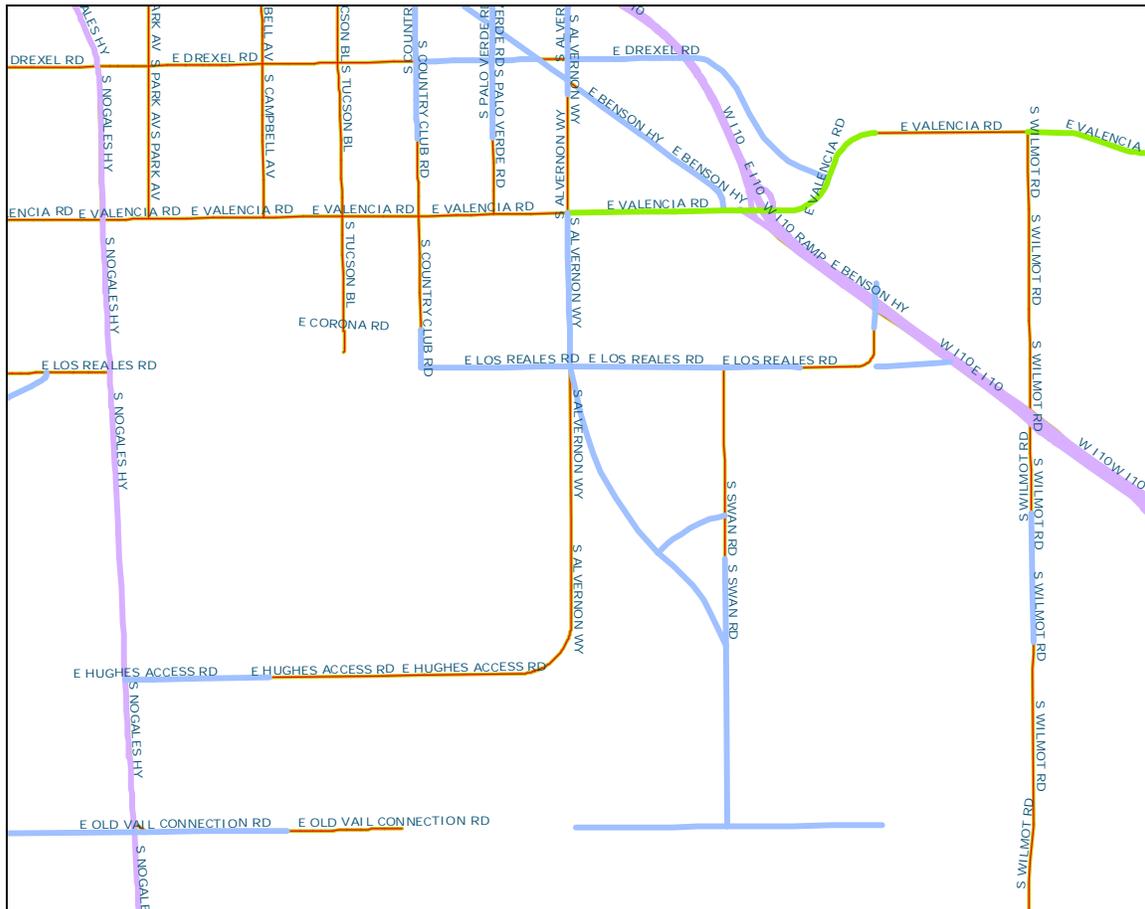
Vicinity Map



BACKGROUND INFORMATION

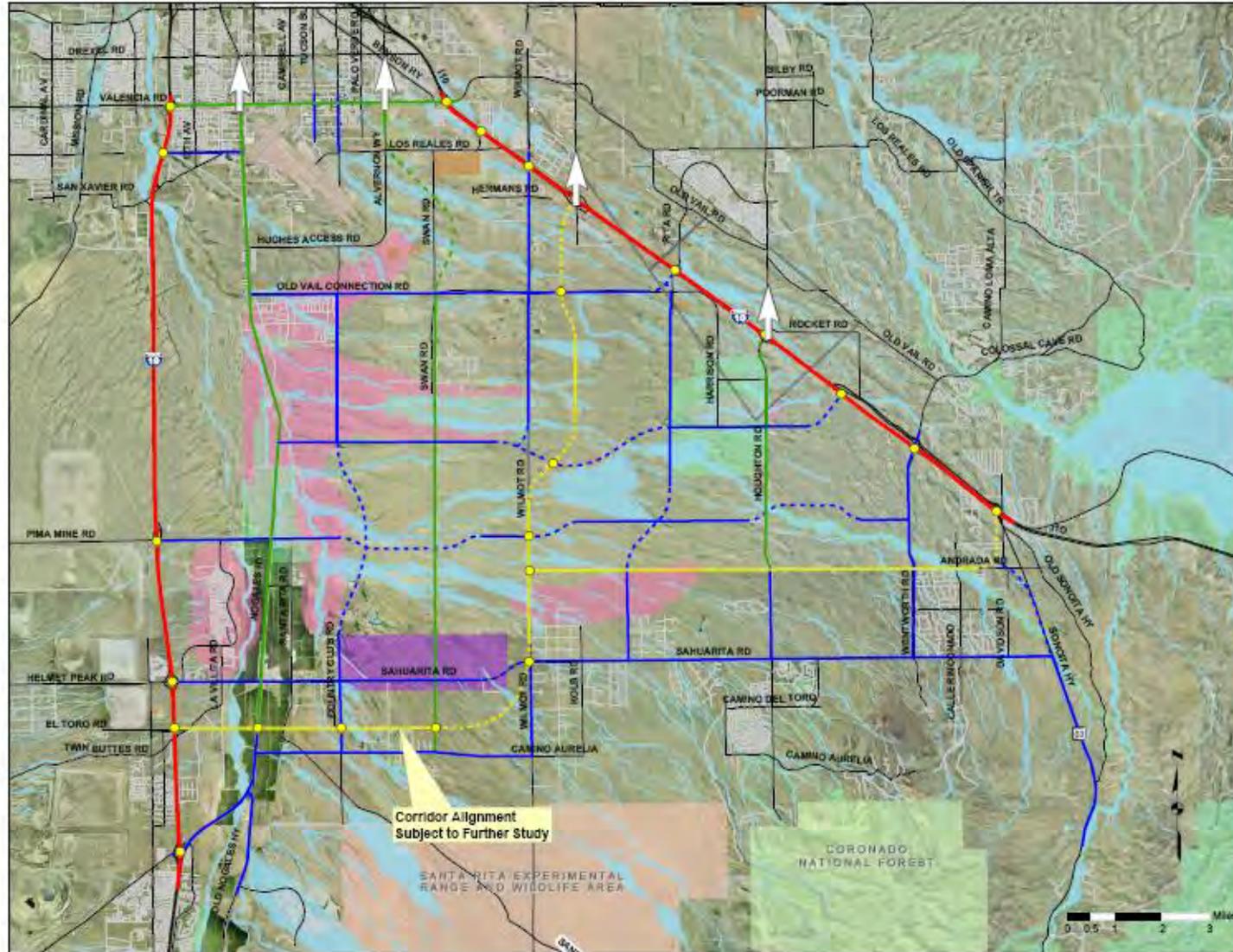
Pima County in the 1980s or earlier determined that Alvernon Way and Swan Road could be impacted by expansion of the Tucson airport to the east. Staff proposed, and the Board of Supervisors approved, an amendment to the Major Street and Scenic Routes Plan showing Alvernon Way realigned to Swan Road south of Los Reales Road. A detailed alignment was not determined at that time, but a 150-foot right-of-way was established for the new alignment (see **Exhibit 1-2** below).

EXHIBIT 1-2 ALVERNON WAY REALIGNMENT



In 2002, recognizing that roadway infrastructure in the southeast area of Tucson would not accommodate future anticipated population growth and development, Pima Association of Governments initiated the Southeast Area Arterial Study to analyze future roadway needs in the southeast area of Tucson. The study area was roughly bounded by I-19 to the west, Valencia Road to the north, State Route 83 to the east and the Santa Rita Mountains and Coronado National Forest to the south. The study developed a new traffic circulation and access framework for future planning and updated the PAG travel demand model. The study recommended a major streets and routes plan for the southeast area including a realignment of Swan Road that extended to Sahuarita Road (see **Exhibit 1-3**).

EXHIBIT 1-3 SOUTHEAST AREA ARTERIAL STUDY RECOMMENDED MAJOR STREETS AND ROUTES PLAN



Corridor Alignment
Subject to Further Study



**Exhibit 10:
Recommended
Major Streets
and Routes Plan**

Legend

- Linkages to Existing Urban Areas
- Service Interchange
- Existing Freeway
- Existing Roadway
- Riparian Habitat
- Existing Landfill
- Resource Conservation
- Cultural Area
- Bomb Range
- Airport Layout
- DMARS Approach-Departure

Conceptual Alignments

- Parkway (300-foot ROW)
- Parkway (150-foot ROW)
- Arterial (150-foot ROW)

Alignments to be determined

- Parkway (300-foot ROW)
- Parkway (150-foot ROW)
- Arterial (150-foot ROW)

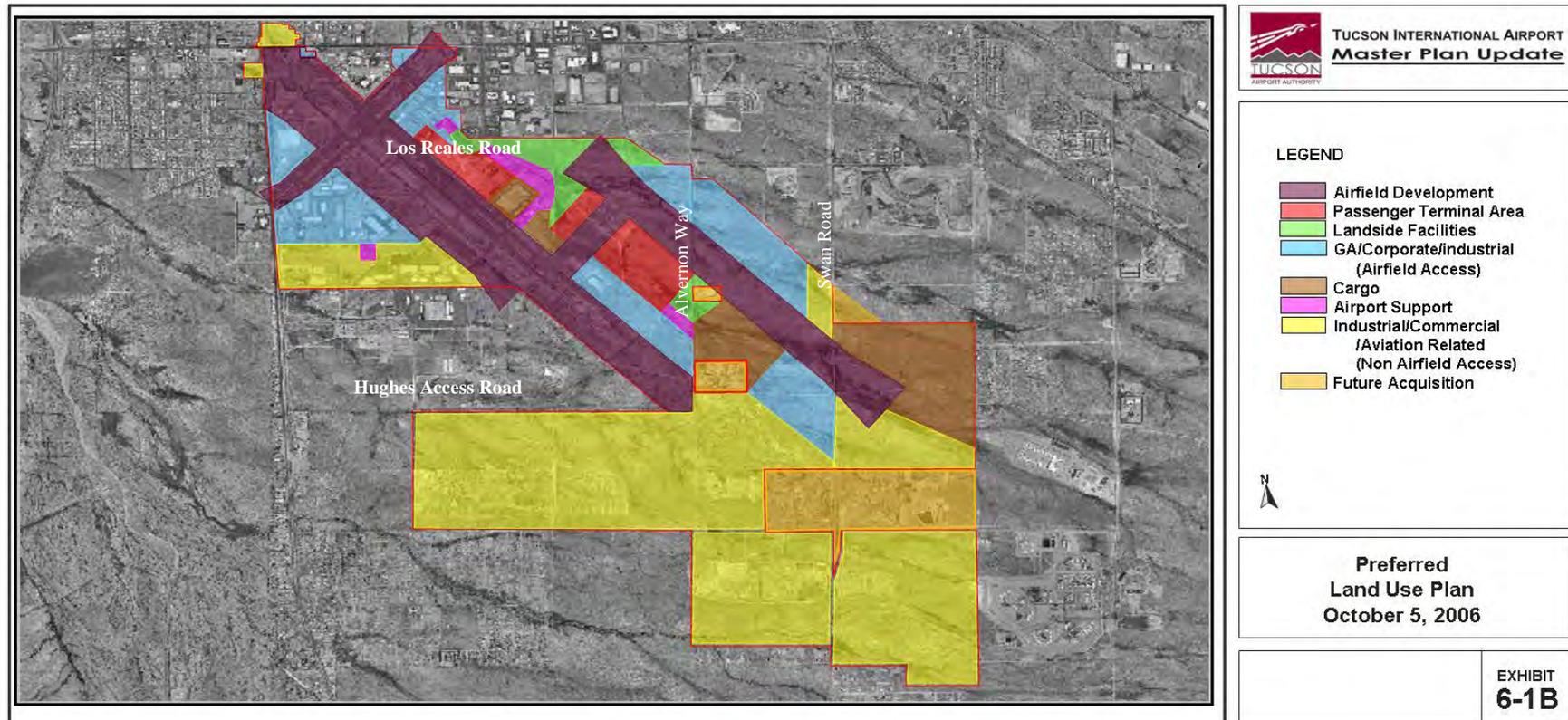
June 2006 



Beginning in 2004, developers under the name South Wilmot Land Investors, LLC began to acquire large parcels of land at the end of Swan Road south of the Old Vail Connection Road and began master planning for the Swan Southlands project. Swan Road is a key roadway to provide future access to this project. A development agreement with Pima County stipulates that the developer will widen and improve portions of Swan Road to accommodate the anticipated traffic that would be generated by the Swan Southlands development.

In 2005, the Tucson International Airport updated its Master Plan which identified short and long-term development projects necessary to accommodate projected aviation needs over the next 20 years. The Master Plan Update recommended that a third parallel runway be constructed to accommodate future demand, but did not stipulate when this would occur. The plan shows the new runway located east and north of the existing runway, cutting across both Alvernon Way and Swan Road and ostensibly closing both roadways (see **Exhibit 1-4**). The plan also shows portions of Swan Road to be acquired by the airport authority and future ground cargo operations located adjacent to and east of the present Swan Road alignment. Potential impacts to Alvernon Way and Swan Road were not addressed in the plan, but Pima County Department of Transportation staff is discussing realignment plans with TIA staff as a part of this study.

EXHIBIT 1-4 AIRPORT LAND USE PLAN



2. EXISTING CONDITIONS – OPPORTUNITIES AND CONSTRAINTS

2.1 ROADWAY AND TRAFFIC CONDITIONS

2.1.1 Roadway Facilities

Most of the public roadways within the study area are the responsibility of Pima County Department of Transportation and a few are within the jurisdictional boundaries of the City of Tucson. There are several unimproved rural roads that are not maintained by any jurisdiction and typically do not meet local design, construction, and maintenance standards.

Pima County maintains a Major Streets and Scenic Routes Plan (MSSRP) that defines major streets and scenic routes and public right-of-way widths. The MSSRP is used to establish rights-of-way for arterials and collector roads and to determine setbacks for land development located adjacent to these roads. Portions of Alvernon Way, Swan Road, Los Reales Road, Hughes Access Road and Old Vail Connection Road are designated major routes on the Pima County Major Streets and Scenic Routes Plan. Portions of those roadways located within the City of Tucson are designated as arterials on the City Major Streets and Routes Map.

2.1.2 Regional Connectivity

Exhibit 2-1 shows the existing arterial road network of the study area and includes a summary of existing daily traffic volumes in the study area. Swan Road is the only north-south roadway that provides access south of the study area, and Alvernon Way is the only north-south roadway that provides access north to the interstate system in central Tucson. Alvernon Way carries a higher volume of traffic than Swan Road and is used by traffic destined for Raytheon Missile Systems. Swan Road carries relatively low traffic volumes and provides access to the Los Reales Landfill, Granite Construction Swan Road Plant, several industrial businesses, and approximately fifty residential lots located south of Old Vail Connection Road. Los Reales Road, Hughes Access Road and Old Vail Connection Road all provide limited east-west access through and beyond the study area.

Alvernon Way connects to Interstate 10 via a dedicated traffic interchange located approximately 2.5 miles north of Los Reales Road. The I-10/Alvernon Way interchange is a partial diamond interchange which accommodates all movements except for the westbound on-ramp. It is spaced approximately 0.6 miles east of the Palo Verde/I-10 interchange and approximately 2 miles west of the I-10/Valencia Road interchange. Valencia Road connects Alvernon Way to Interstate 19 via an interchange located approximately 4.5 miles west of Alvernon Way. Alvernon Way also continues north into central Tucson and provides direct connections to Golf Links Road and Aviation Parkway.

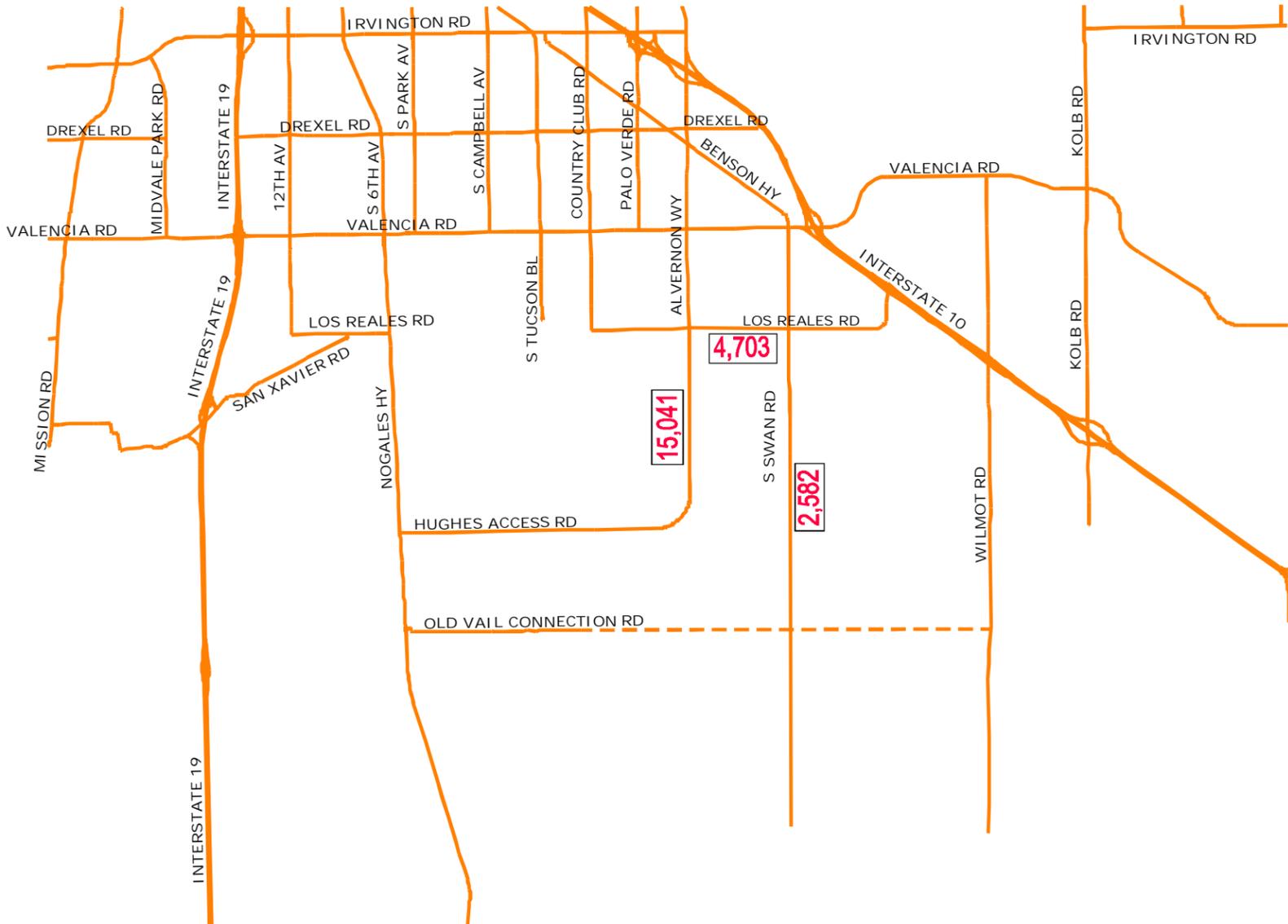
Alvernon Way provides access to one of the main entrances to Raytheon Missile Systems on Hughes Access Road. This access is important for providing safe transport of sensitive munitions, material deliveries from I-10, connections to other Raytheon campuses such as the University of Arizona Science and Technology Park, and employees who live east of the main Raytheon campus.

Opportunities and Constraints - Traffic Volumes



NOT TO SCALE

Existing Traffic Volumes



Projected 2030 Traffic Volumes



Alvernon Way provides access to the Hughes Sand and Gravel mining operations located south and east of the 90 degree bend in Alvernon Way/Hughes Access Road. Alvernon Way also provides access, via Country Club Road, to approximately 800 residential homes located in the unsubdivided area south of Old Vail Connection Road and west of Country Club Road.

Swan Road connects indirectly to I-10 via Los Reales Road and Craycroft Road which has an interchange with I-10. The existing I-10 traffic interchange with Craycroft Road is a tight diamond interchange with one-way eastbound and westbound frontage roads extending between the interchanges. Swan Road extends north of Los Reales Road as a neighborhood collector to connect to Valencia Road and Benson Highway. Swan provides the only north-south access between Old Nogales Highway and Wilmot Road (see **Exhibit 2-2**).

2.1.3 Physical Features

The following section describes the roadways within the study area, their cross-sections and speed limits. Traffic counts were obtained from the Pima County Department of Transportation Traffic Engineering website.



Alvernon Way, north of Hughes Access Road looking north

Alvernon Way south of Los Reales Road is a County-maintained, paved 2-lane arterial road with one travel lane in each direction and no curbs, gutters or sidewalks. The posted speed limit is 55 mph. Alvernon Way is classified as an Urban Minor Arterial (Federal Highway Code) from Los Reales Road to Hughes Access Road and right-of-way width is 200 feet. Traffic volumes (Pima County, October 2006) are approximately 15,000 vehicles per day.

Hughes Access Road east of Old Nogales Highway is a paved 2-lane arterial road with one lane in each direction and no curbs, gutters or sidewalks. The posted speed limit is 55 mph. Hughes Access Road is classified as an Urban Minor Arterial (Federal Highway Code) from Nogales Highway to Alvernon Way and the right-of-way width is 200 feet. Traffic volumes (Pima County, October 2006) are approximately 15,000 vehicles per day. Right and left turn lanes occur at the south entrance to the Raytheon campus. The 1-mile section from Raytheon South Access Road to Country Club Road is under City of Tucson jurisdiction but maintained by Pima County under an intergovernmental agreement with the City.

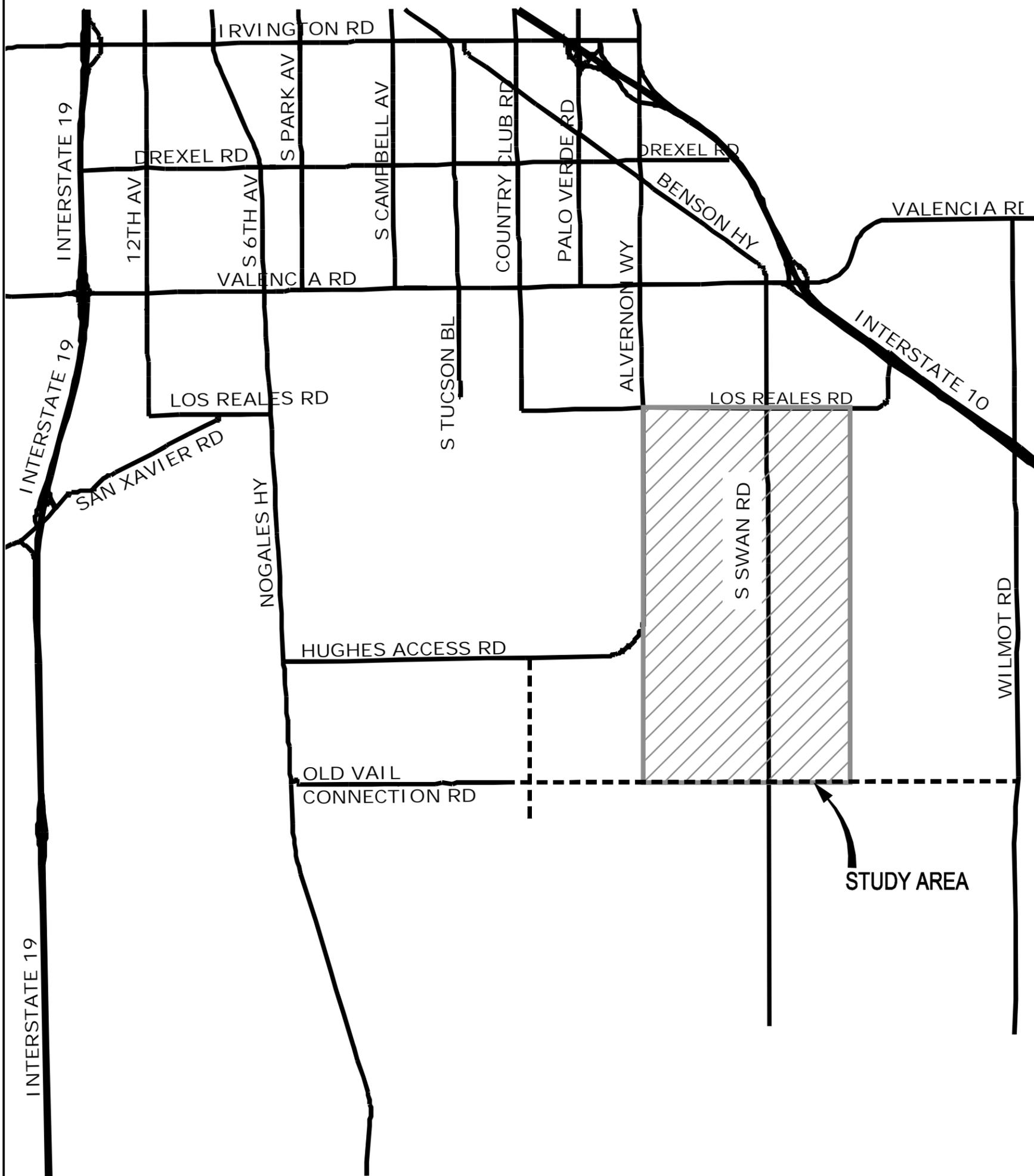
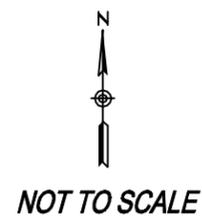


Swan Road, south of Los Reales Road, looking south

Swan Road south of Los Reales Road is a paved 2-lane arterial road with one lane in each direction and no curbs, gutters or sidewalks. The posted speed limit is 55 mph between Los Reales Road and Old Vail Road, and 50 miles per hour south of Old Vail Connection Road. The road ends in a cul-de-sac approximately 2 miles south of Old Vail Connection Road. Swan Road is classified as an Urban Collector from Los Reales to Old Vail Connection Road and right-of-way width is

100 feet. Traffic volumes (Pima County, October 2006) are approximately 2,600 vehicles per day south of Los Reales Road. A short section of Swan Road south of the Los Reales landfill falls under City jurisdiction, but is maintained by Pima County under an intergovernmental agreement with the City. Swan Road provides access to approximately 50 rural residential lots located south of Old Vail Connection Road.

Regional Connectivity



Raytheon South Access Road is a paved 2-lane road with one lane in each direction and is one of the



*Country Club Road, at Old Vail Connection Road,
looking south*

two major access points to Raytheon Defense Manufacturing Facilities. This road is guarded and restricted to public use. The entrance is under surveillance by security guards at all times. The South Access Road carries approximately 6,800 vehicles per day in both directions. This entrance operates 24 hours per day.

Country Club Road extends south from Hughes Access Road for approximately 2 miles and is maintained by the City of Tucson. The northernmost half-mile is paved and the remainder is unpaved. South of Old Vail Connection Road, the road narrows significantly, as shown in the photo at left. This road provides access to the un-

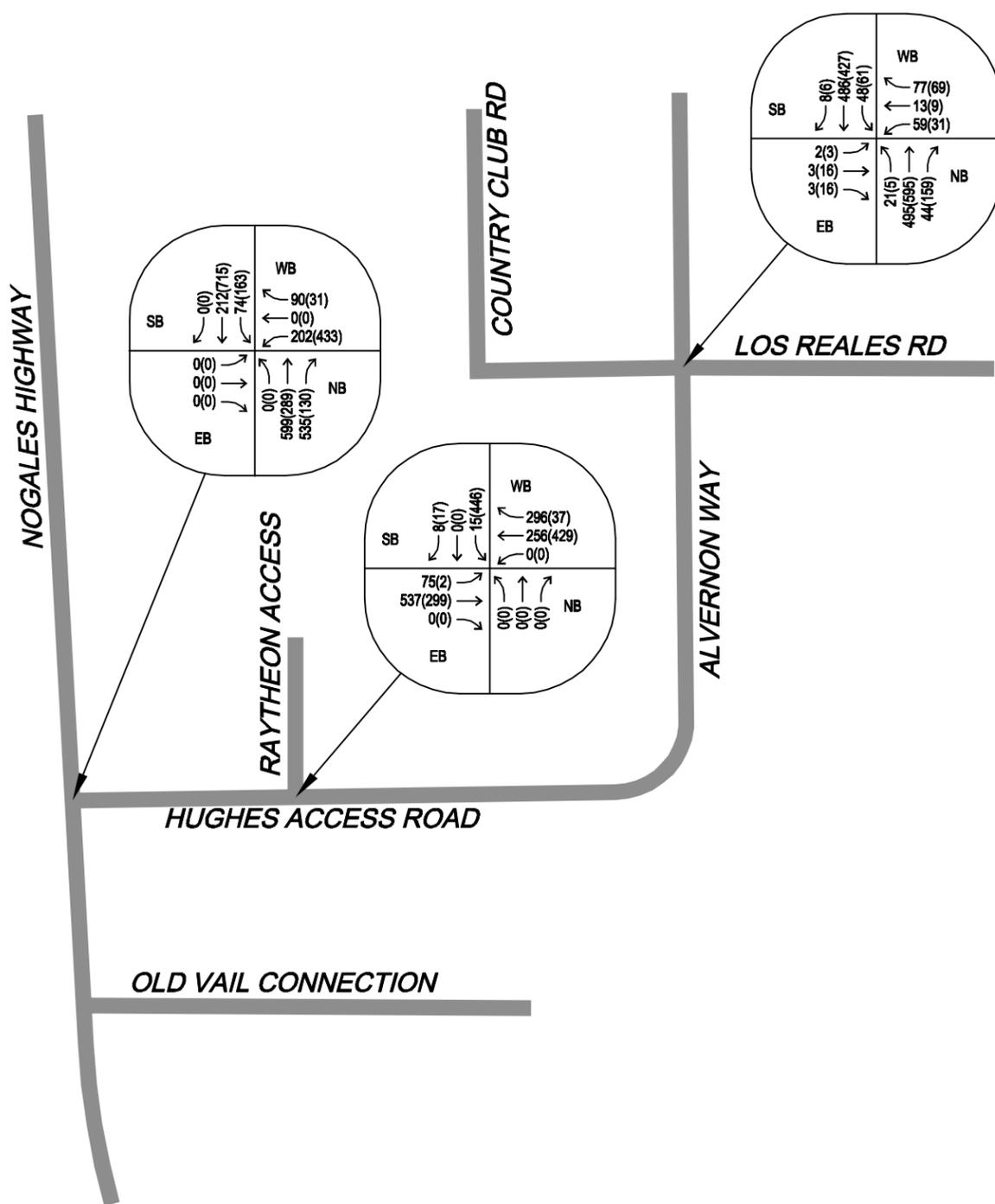
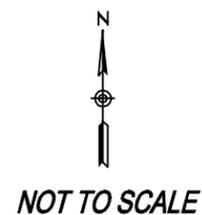
subdivided residential areas located south of Old Vail Connection Road and west of County Club Road. No traffic counts are available for this road.

2.1.4 Turning Movement Counts

Turning movement counts were collected during am and pm peak periods at the intersections of Alvernon Way and Los Reales Road, Hughes Access Road and Raytheon South Access Drive, and Hughes Access Road and Nogales Highway (see **Exhibit 2-3**). These data suggest that most of Raytheon's traffic is coming from the north and east using Alvernon Way. These data also show that not all traffic using Alvernon Way and Hughes Access Road is directly associated with Raytheon.

The turning movement counts indicate that most (80%) of the traffic arriving at the Raytheon plant in the am peak hour is arriving from the east and Alvernon Way, while only 20% is entering from the west on Hughes Access Road. Similarly, most (96%) of the traffic leaving the Raytheon plant is turning east on Hughes Access Road to Alvernon Way, while only 4% is turning west to Nogales Highway.

Existing (2007) Peak Hour Traffic Volumes



Much of the traffic (approximately 85%) travelling south on Alvernon Way, south of Los Reales Road, is coming from Alvernon Way north of Los Reales Road rather than Los Reales Road (11%). Similarly, much of the traffic turning east onto Hughes Access Road from Nogales Highway is coming from the south (88%) rather than the north (12%).

Of the traffic driving east on Hughes Access Road from Nogales Highway during the am peak period, most of the traffic (88%) is traveling east to Alvernon Way and only 12% is turning north into Raytheon. Of the traffic driving west on Hughes Access Road from Alvernon Way during the am peak period, just more than half (54%) of the traffic is turning north into Raytheon while the remainder (47%) is travelling east to Nogales Highway.

In 2007, Pima County conducted a traffic signal warrant analysis for the intersection of Hughes Access Road and the South Entrance to Raytheon Missile Systems. Raytheon employs between 10,000 and 12,000 employees and this intersection serves as one of the main entrances to the plant. Existing traffic volumes meet the minimum requirements for a traffic signal under Warrant 2: Four-Hour Warrant. The pattern of right angle crashes at this intersection also justifies a traffic signal under Warrant 7: Crash Experience. Pima County recommended that a traffic signal be installed at this location.

2.1.5 Transportation Improvement Plans and Programs

PAG 2030 Regional Transportation Plan (RTP)

The PAG Regional Transportation Plan (RTP) is the region's long term transportation vision and it identifies transportation needs today and twenty years or more into the future. The RTP recommends transportation solutions and financial strategies and guides investment of regional transportation resources in our region's roadway, bus, pedestrian, bicycle, aviation, freight and rail facilities over the next twenty to thirty years¹. The 2030 RTP lists two projects in the study area that are planned for the period 2020-2030. The first project is the far parallel runway for the Tucson International Airport. The second project is extension of Swan Road as a new four-lane roadway from Old Vail Connection Road to Valencia Road.

PAG Transportation Improvement Plan (TIP)

The PAG Transportation Improvement Plan (TIP) is a rolling five-year schedule and budget of proposed transportation improvements that seeks to optimize the use of available federal, state and local funds and resources to serve the region's multi-modal transportation needs. The TIP implements the long-range transportation (RTP). The only project listed in the 2008-2012 TIP is the widening of Valencia Road, from Alvernon Way to Kolb Road from four to six lanes with roadway design beginning in 2009.

¹ Source: Pima County Southwest Infrastructure Plan, 2007, by Curtis Lueck & Associates

Pima County Development Impact Fee Program – CIP Projects

Since 1996, Pima County has collected roadway development impact fees to help finance roadway needs created by new residential development. By law, impact fees can only be used to expand the roadway system, not maintain existing roads. Impact fees must be spent on roadway projects in proximity to the area in which they are collected. Impact fees that have been collected, but not yet spent, are programmed for specific roadway projects within each of the ten benefit areas. The Alvernon-Swan realignment is in the San Xavier benefit area. Current projects are:

San Xavier Benefit Area

Swan Road: Valencia Rd to Los Reales Rd (Complete)

Swan Road: South of Old Vail Connection Rd

Old Vail Connection Road: Nogales Hwy to Country Club Rd

Public-Private Transportation Improvements

[Development agreement with Diamond Ventures for Swan Road improvements]

2.1.6 Future Traffic Volumes

The PAG travel forecasting model projects future regional traffic volumes based on future population and employment growth assumptions. The 2030 model assumes that Alvernon Way connects to Swan Road as a four-lane roadway and predicts that this new roadway would carry approximately 46,000 vehicles per day in 2030 based on development assumptions. The model also assumes that Alvernon Way remains south of Valencia Road connecting to Hughes Access Road and continues to carry approximately 12,000 vehicles per day. If this section of Alvernon Way was closed due to airport expansion, the forecast traffic volumes would need to be reassigned to the new Alvernon/Swan roadway alignment. The PAG 2030 traffic volume forecast is shown on **Exhibit 2-1**.

2.2 LAND OWNERSHIP

Land ownership on the corridor is summarized in **Exhibit 2-4**. The exhibit shows parcel boundaries, ownership and parcel numbers. Within the study area, large property owners include the Tucson International Airport, the City of Tucson, Granite Construction, and Cemex Construction. As previously described, there are several existing land uses in the area including the City of Tucson Los Reales Landfill, the United Sports Arizona Race Park, and the Granite Construction Swan Road Plant. These key land uses are shown on an aerial map in **Exhibit 2-5**. In addition, there are several other mining and processing operations located between Alvernon Way and Swan Road. The remaining vacant land is largely owned by the Tucson Airport Authority, the City of Tucson, and the State of Arizona.

2.2.1 Active Land Development

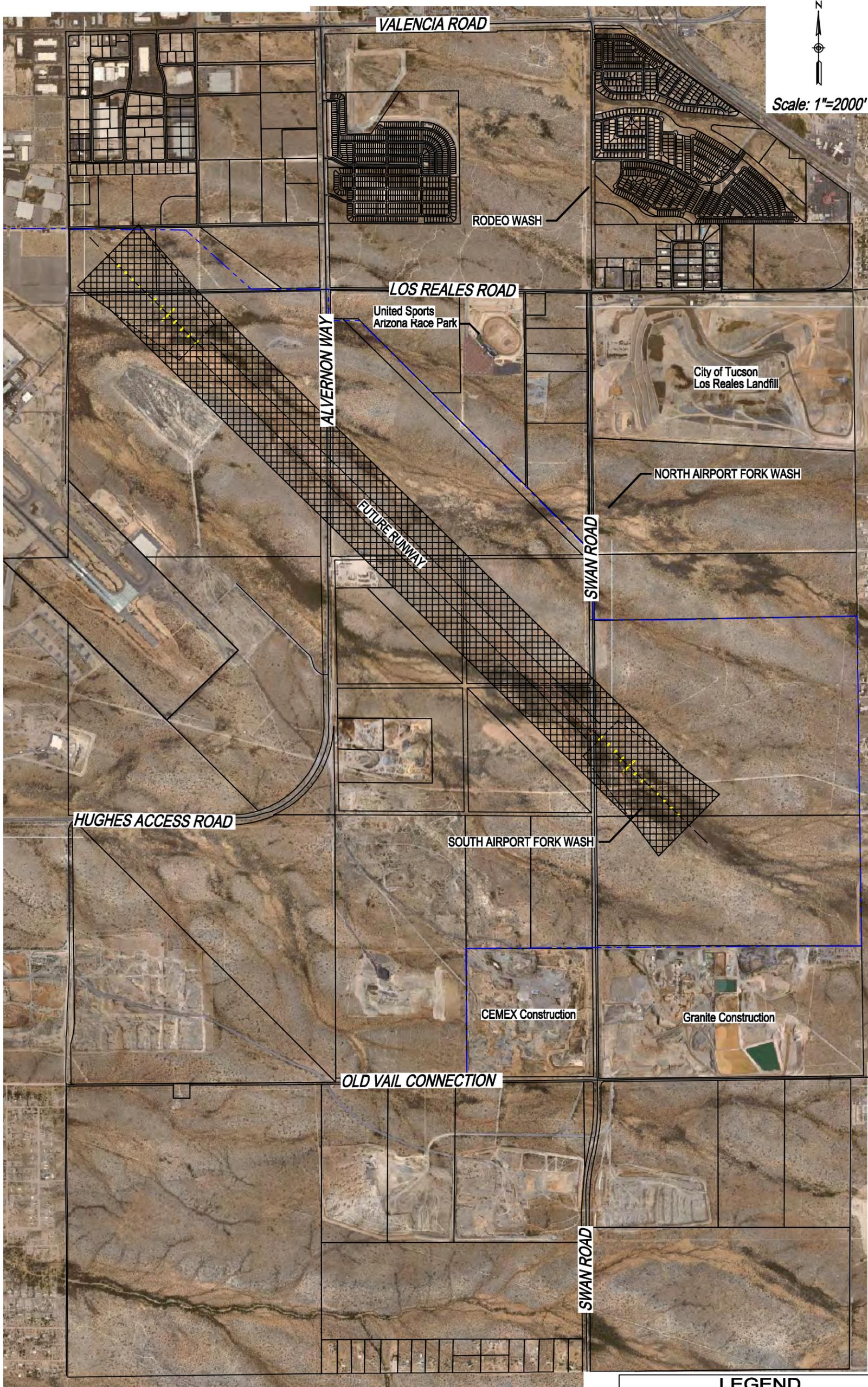
The majority of the privately owned land is located on the north side of Los Reales near Alvernon Way and along the west side of Swan Road south of Los Reales. According to the Pima County Comprehensive Land Use Plan, all the privately held property within the study area is zoned Urban Industrial. To determine if any development activity has occurred on these parcels, information was obtained from Pima County Development Services and Planning and Zoning staff. According to interviews and research, the following activities have occurred:

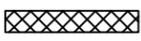
- Sonoran Business Park – Parcel 140-41-133A
- Erler Development – Parcel 140-44-002A
- Swan Industrial Park – Parcel 140-44-0010

These properties are shown in **Exhibit 2-4**.

The City of Tucson property south of the existing Los Reales Landfill (at the southeast corner of Swan Road and Los Reales Road) is held primarily for the expansion of the Los Reales Landfill to the south.

Aerial Base Map of Study Area



LEGEND	
	Future Runway
	Existing (2006) Roadway Network

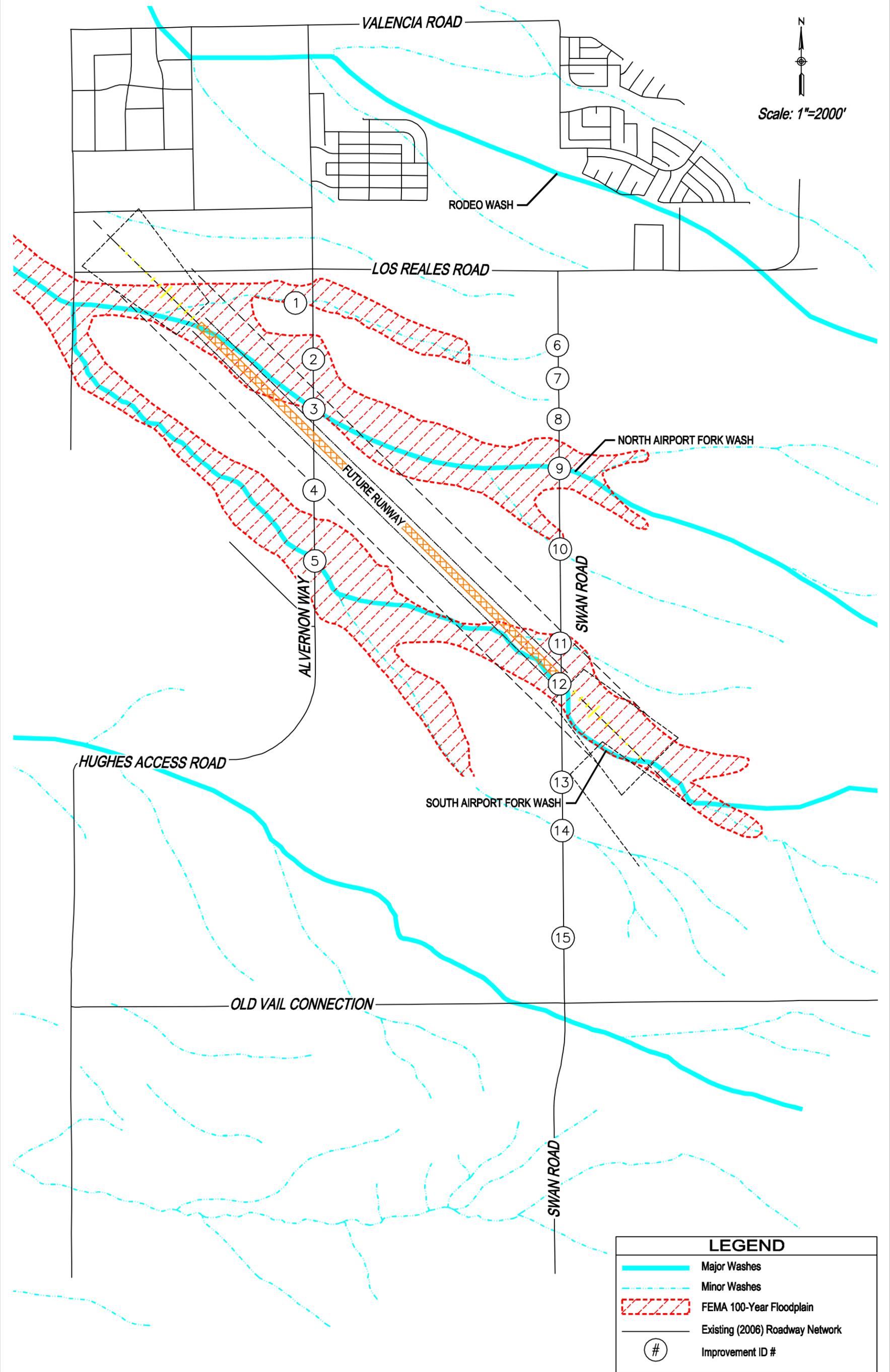
2.3 FLOODPLAINS AND WASHES

The project study area roadways cross the Airport Wash, Hughes Wash, and Rodeo Wash watersheds. The FEMA 100-Year Floodplain boundaries are shown in **Exhibit 2-6**. All alignments will cross the south and north fork of the Airport Wash, which both have FEMA 100-year floodplains. **Exhibit 2-7** provides information on the name, type of drainage structure at the wash crossing and wash discharge (if available) in the study area.

EXHIBIT 2-7 – MAJOR WASH CROSSINGS IN THE STUDY AREA

Improvement ID #	Name	Drainage Structures	Discharge (cubic feet per second)
Alvernon Way Wash Crossings			
1	Tributary to North Fork Airport Wash	box culvert	671
2	North Fork Airport Wash	culvert	Not available
3	North Fork Airport Wash	box culvert	1871
4	Unnamed	culvert	Not available
5	South Fork Airport Wash	box culvert	3260
Swan Road Wash Crossings			
6	Tributary to North Fork Airport Wash	4-48" corrugated metal pipes	Not available
7	Tributary to North Fork Airport Wash	1-48" corrugated metal pipes	Not available
8	Tributary to North Fork Airport Wash	14-72"x44" Arch corrugated metal pipes	Not available
9	North Fork Airport Wash	15-72"x44" Arch corrugated metal pipes	1900
10	Tributary to North Fork Airport Wash	3-72"x44" Arch corrugated metal pipes	Not available
11	Tributary to South Fork Airport Wash	15-72"x44" Arch corrugated metal pipes	359
12	South Fork Airport Wash	15-72"x44" Arch corrugated metal pipes	3249
13	Unnamed	2-36" corrugated metal pipes	Not available
14	Tributary to South Fork Airport Wash	7-72"x44" Arch corrugated metal pipes	674
15	Unnamed	1-36" corrugated metal pipes	Not available

Floodplains and Washes



Scale: 1"=2000'

LEGEND	
	Major Washes
	Minor Washes
	FEMA 100-Year Floodplain
	Existing (2006) Roadway Network
	Improvement ID #

2.4 ENVIRONMENTAL CONDITIONS

An environmental screening of the study area was performed using the questionnaire format presented in the *Pima County Roadway Design Manual, December 2003*. This questionnaire is intended to provide early information about the intended effects of the project on the surrounding natural, physical, and cultural environment. The environmental screening questionnaire for this project is provided in **Appendix A**, and is summarized in this section as follows:

1) **Cultural Resources** – A search was made of the AZSITE Database, which is a consolidated informational network of recorded archaeological sites, historic properties, districts, and inventory surveys within the state of Arizona. It is designed to reduce the amount of research time required for class 1 surveys and to provide a database for research projects. Cultural resource screening included a review of State Historic Preservation Office files regarding properties listed on or eligible for the National Register of Historic Places. Database searches did not reveal any historic structures or known cultural sites within the project limits, but the project area has not been fully surveyed for these resources.

2) **Hazardous Materials** - Database searches were performed using the Arizona Department of Environmental Quality databases. No hazardous materials were revealed within the project limits. It should be noted that some potential hazardous material generators are located outside of the project limit. If new right-of-way is required, a Phase I ESA Report (Innocent landowner defense) will be needed to determine the existence of contaminated land and any required remediation.

3) **Clean Water Act Permitting** - A review of the aerial mapping determined that several drainages will be crossed with a new alignment. It is assumed that some form of impact will occur to these potential Waters of the United States for culverts or bridge crossings; therefore a Nationwide Permit #14 for Linear Transportation Projects may be required for this project.

There are two main permitting processes that the U.S. Army Corps of Engineers (Corps) use to document compliance with the Clean Water Act; these two process are called 1) Nationwide Permits (NWP) and 2) Individual Permits (IP). The NWP program was established by the Corp to reduce processing time of the Corps for projects that historically are known not to cause too much environmental impacts. Under the NWP program, project constituents must document how their project is in compliance with the standard general conditions of the permit before they will be issued a permit.

Impact thresholds for Nationwide Permit 14 are:

- 0 to 0.1 acre impact – A formal permit application submittal to the Corps of Engineers is typically not required, however there is an obligation to keep in their files (and share with the Corps if asked) how they are in compliance with the conditions of the program.
- 0.1 to 0.49 acre impact - a Pre-construction notification (PCN) that is required if impacting more than a 0.1 of an acre to Waters of the U.S.
- Greater than 0.49 acre impact - an Individual Permit will be required.

The Corps can request a full permit submittal on any project, no matter how small the impacts, if there is strong public opposition to the project, or if impacts to threatened or endangered species (Endangered Species Act) may be involved, or if cultural resources might be impacted by project components (National Historic Preservation Act). NWP typically take 4-6 months to obtain.

An **Individual Permit (IP)** is required for linear transportation projects that impact more than 0.49 acres of Waters of the U.S. This is a much more lengthy process to document compliance with the Clean Water Act and will require several supporting technical reports to be prepared. These reports include: a NEPA –EA analysis, a alternative analysis report, a mitigation and monitoring report, as well as a public notice and possible public hearing if strong opposition is documented during the public comment period. Individual permits typically take 9 months to 1 year to obtain but can exceed 18 months on occasion due to opposition to the project.

4) **Biological Resources** – Databases for federal, state and county sensitive species were reviewed to determine the biological resources within the corridors. Initially, a review of Federally listed Threatened and Endangered species for Pima County were reviewed using the United States Fish and Wildlife Service database. Next, the Arizona Game and Fish Department online search tool was used to determine state sensitive species in Pima County. A summary of Arizona Game and Fish Department Sensitive Species that may occur in the project area are provided in **Exhibit 2-7**. Thirdly, the Pima County Priority Vulnerable Species list (part of the Sonoran Desert Conservation Plan) was reviewed to determine further sensitive species specific to Pima County. These species are summarized in **Exhibit 2-8**.

EXHIBIT 2-7 – ARIZONA GAME AND FISH DEPARTMENT SENSITIVE SPECIES LIST THAT MAY OCCUR WITHIN THE ALVERNON SWAN ROAD RE-ALIGNMENT STUDY AREA IN PIMA COUNTY, ARIZONA

Common Name	Species
Birds	
Western Yellow-Billed Cuckoo	<i>Coccyzus americanus occidentalis</i>
Plant	
Pima pineapple cactus	<i>Coryphantha scheeria var robustispina</i>
Reptile	
Great plains narrow-mouthed toad	<i>Gastrophryne olivacea</i>

Source: Arizona Game and Fish Department

EXHIBIT 2-8 – SPECIES LISTED IN THE PIMA COUNTY PRIORITY VULNERABLE SPECIES DOCUMENT THAT MAY OCCUR WITHIN THE ALVERNON SWAN RE-ALIGNMENT STUDY AREA

Common Name	Species Name
Whiptail lizard	<i>Cnemidophorus burti</i>
Bell's vireo	<i>Vireo bellii</i>
Desert box turtle	<i>Terrapene ornata luteola</i>
Rufous-winged sparrow	<i>Aimophila carpalis</i>
Tumamoc globeberry	<i>Tumamoca macdougalii</i>

Source: Sonoran Desert Conservation Plan

2.5 UTILITIES

Utility information was obtained via a request for information from utility companies within the study roadway network. A summary of utility information that was obtained is summarized in **Exhibit 2- 9**. Copies of the response letters are provided in the **Appendix**.

There are extensive electric utility lines in the study area. On Swan Road, south of Los Reales Road, there is a 138kV, 3-circuit transmission line on the west side of Swan Road, and a 14kV power line on the east side of the corridor, which extends approximately 0.46 miles south of Los Reales Road.



View of Swan Road, south of Los Reales Road, looking south. This views shows the 138,000 power lines on the west side of the road, and the 14,000 volt power lines on the east side of the road

There is a 14kV power line on Los Reales Road, which extends approximately 0.26 miles west of Swan Road, and turns south to service the Tucson Raceway property.

On Alvernon Way, south of Los Reales Road, there is 46kV, 2-circuit power lines on the east and west sides of the road, which continues to Hughes Access Road. There is also a 14kV power line on the east side of Alvernon Way, which terminates south of the connection with Hughes Access Road.



View of Swan Road, south of Los Reales Road, looking north. This view shows the gas pipeline indicators (yellow poles)

Based on visual inspection, there is a gas pipeline that crosses Swan Road, approximately 0.29 miles south of Los Reales Road. The pipeline is shown by the yellow poles in the picture above.

Information from Southwest Gas indicated that there is a 4" high pressure steel main along Los Reales Road, a 2" steel service and regulator station at 8101 S. Alvernon Way, and an easement on the southeast corner of Alvernon Way and Hughes Access Road.

Response from Qwest communications indicated that Qwest has mostly aerial facilities and some buried facilities within the study area.

**EXHIBIT 2-9 – SUMMARY OF UTILITIES ON THE CORRIDOR, BASED ON RESPONSES FROM
UTILITY COMPANIES**

Utility Company	Response Regarding Utilities on the Corridor	Comments
Southwest Gas	<ul style="list-style-type: none"> • 4" high pressure steel main along Los Reales Road • 2" steel service and regulator station at 8101 S. Alvernon Way • Easement on the southeast corner of Alvernon Way and Hughes Access Road 	Southwest Gas requires a minimum separation of two feet from HP feeders and any proposed structures and a minimum of 1-foot separation from distribution facilities and proposed structures.
Qwest	<ul style="list-style-type: none"> • Qwest has mostly aerial facilities and a small amount of buried facilities within the study area. • It is likely that removal of these facilities will be required 	Placing conduit and manholes within and through the proposed ROW or a public utility easement will be potentially required.
City of Tucson Water Department	<ul style="list-style-type: none"> • Referred request to the mapping / GIS section 	
Tucson Electric Power	<ul style="list-style-type: none"> • TEP has transmission and distribution lines in the project area • TEP facility maps were provided showing the locations of overhead electric • TEP power lines will need to be relocated to a location outside of any glide path designations 	See maps that are included as an attachment to the report.

3. IDENTIFICATION OF ALTERNATIVE ALIGNMENTS

The Alvernon / Swan alignment alternatives were developed to provide an alternative access due to the planned construction of a new airport runway that will require the shifting of the existing Alvernon Way alignment between Los Reales Road and Old Vail Road.

The alternatives were developed by a process that included the following steps:

- Identifying design criteria.
- Identifying design constraints in placing a road near the planned TIA runway.
- Developing roadway alignments to avoid right-of-way impacts to the extent possible.
- Placing the roadway to provide developable parcels to the extent possible.
- Identifying other constraints, such as drainage and right-of-way constraints and avoiding them to the extent possible.

Preliminary alignment alternatives were developed and discussed with Pima County, and feedback from the preliminary review resulted in the development of three Alvernon Way / Swan Road alternative alignments. A no-build alternative was not considered due to the fact that the planned construction of the runway will require shifting Alvernon Way.

3.1 DESIGN CRITERIA

3.1.1 Roadway Design Criteria

The development of alternatives was based on the following design criteria:

Facility Type: 4-lane divided urban arterial

Right-of-way width: 150 feet

Design Speed: 60 mph (arterial facility)

Other design criteria are provided in **Appendix C**.

3.1.2 Airport Design Criteria

Special criteria were used in order to avoid conflicts with the planned airport runway. These constraints were obtained from guidelines for determining obstructions contained in the *Code of Federal Regulations, Title 14, Part 77 (Objects Affecting Navigable Airspace)*. The roadway was also located outside of the Building Restriction Line, which is a Federal Aviation Administration defined distance from the runway centerline.

3.2 DESCRIPTION OF ALIGNMENT ALTERNATIVES

The Alvernon Way / Swan Road realignment alternatives are graphically depicted on **Exhibits 3-1** through **3-6**.

General Network Information

All of the draft alternatives show a new t-intersection with Hughes Access Road. This connection is provided since Hughes Access Road is a primary access road to Raytheon Missile Systems and also serves as a hazardous materials route for trucks carrying explosives, hazardous materials, and air liquid shipments to Raytheon.

Alignment Alternatives

The alternative alignments for Alvernon / Swan realignment are described as follows:

Alternative A – Swan Road Continuity Alignment with No Alvernon Way

In this alternative, shown in **Exhibit 3-1**, Swan Road remains the principal roadway and curves to the east in order to avoid the planned future runway extension. Alvernon Way would be closed in the vicinity of the runway extension, however fragmented segments of Alvernon Way remain adjacent to Los Reales Road and Hughes Access Road to provide access to properties in these areas.

Alternative B- Swan Road Continuity Alignment with an Alvernon Way Connection

This alternative, shown in **Exhibit 3-2**, is similar to Alternative A with the addition of Alvernon Way connecting to Swan Road between Los Reales Road and the North Airport Fork Wash. The new t-intersection would be approximately 1,600 feet south of Los Reales Road, and located to minimize impacts to parcels.

Alternative C- Alvernon Way Continuity Alignment with a Northern Swan Road Connection

In this alternative, shown in **Exhibit 3-3**, Alvernon Way extends east, aligned relatively parallel to the future planned runway, and maximizes use of a City of Tucson utility easement. The road transitions to existing Swan Road south of the runway extension. Swan Road, south of Los Reales Road, would be realigned to the west to form a t-intersection at Alvernon Way north of the Airport Fork Wash.

Alternative D- Alvernon Way Continuity Alignment with a Southern Swan Road Connection

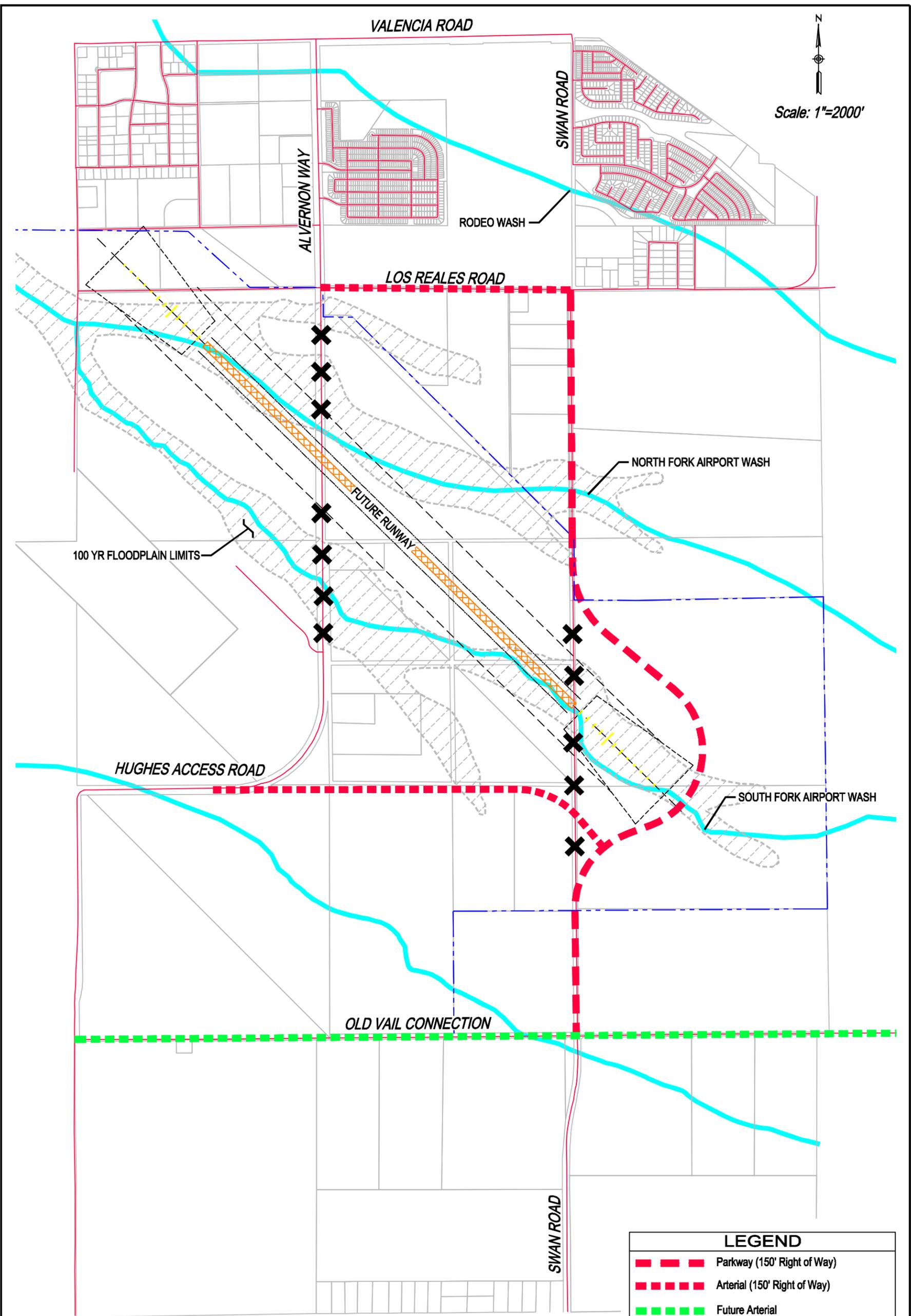
This alternative, shown in **Exhibit 3-4**, also aligns parallel to the planned runway but lies further south than Alternative C. Swan Road, south of Los Reales Road, would be realigned to the west to form a t-intersection at Alvernon Way south of the Airport Fork Wash.

Alternative E- Alvernon Way Continuity Alignment for Alternative Runway Location

This alternative, shown in **Exhibit 3-5**, aligns parallel but further north of the runway to accommodate a larger range of alternative runway locations. This alternative was developed in response to correspondence from the Tucson Airport Authority indicating that more flexibility in the runway location should be assumed.

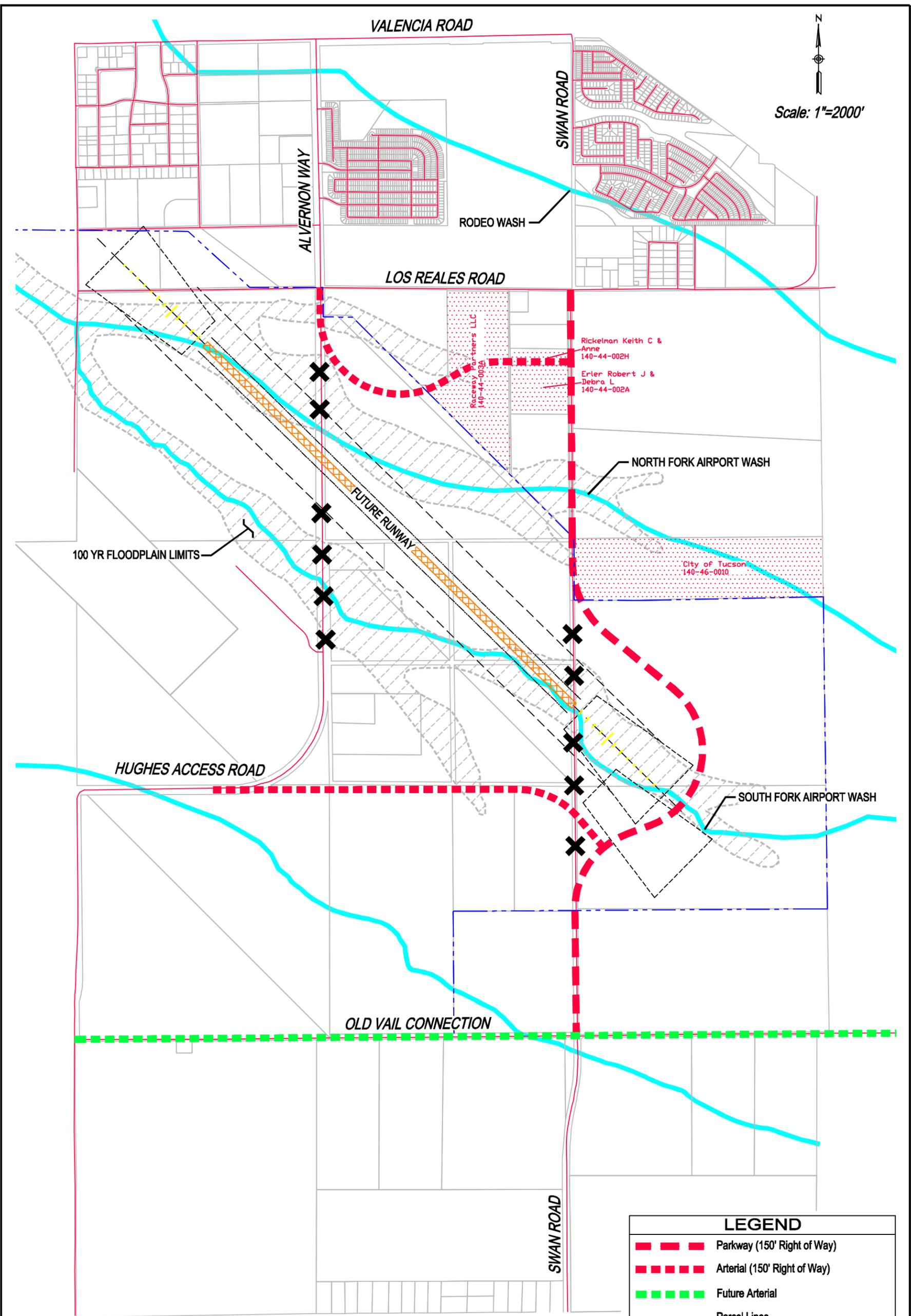
Alternative F- Alvernon Way Tunnel

This alternative, shown in **Exhibit 3-6**, is a tunnel on Alvernon Way under the runway. It involves a curvilinear alignment of Alvernon Way in order to align the tunnel with a 90 degree angle to the proposed runway.



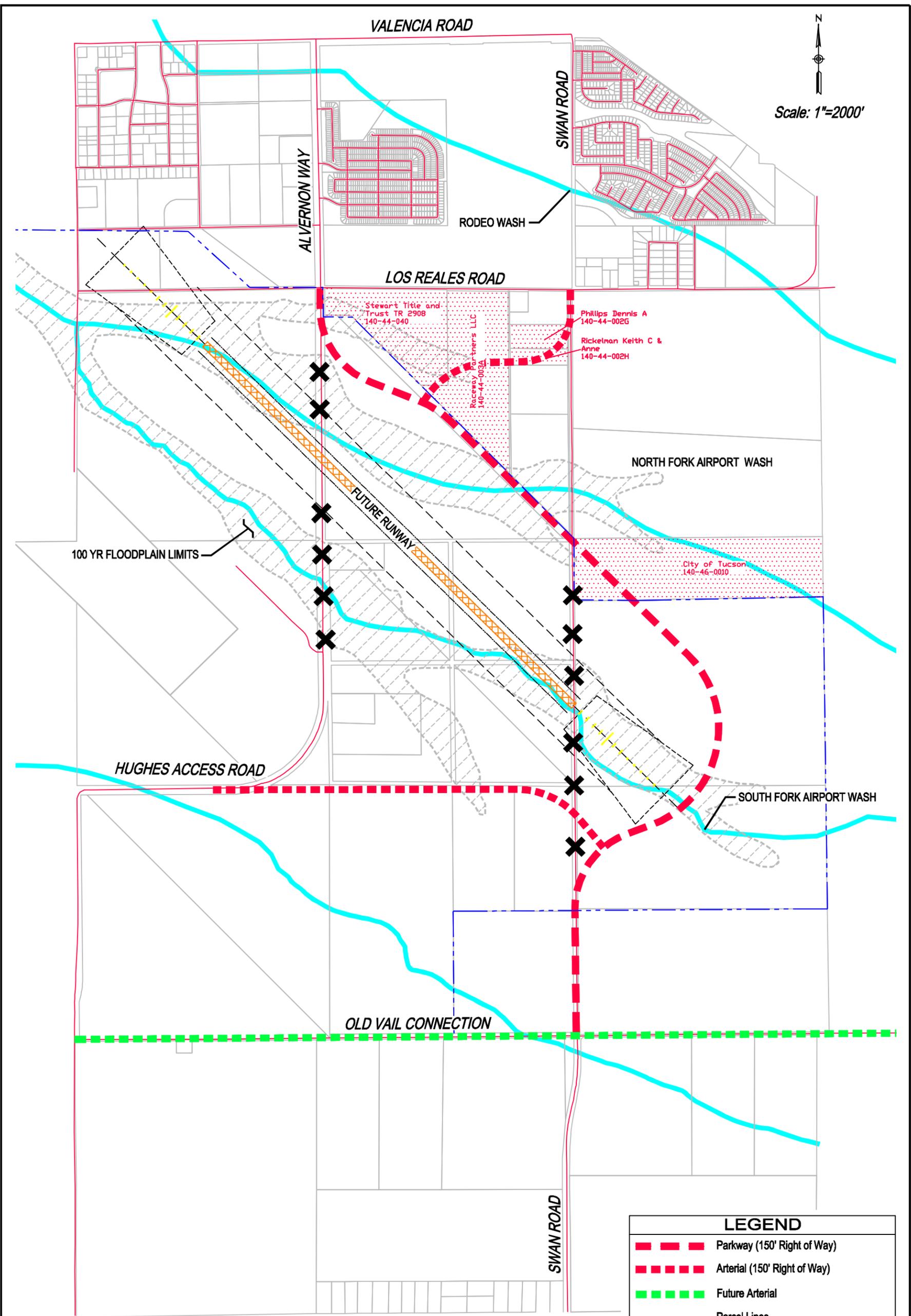
ALTERNATIVE A
Swan Road Continuity Alignment with No Alvernon Way

LEGEND	
	Parkway (150' Right of Way)
	Arterial (150' Right of Way)
	Future Arterial
	Parcel Lines
	Airport Property Boundary
	Major Washes
	Existing (2006) Roadway Network
	Roadway Abandonment Marking



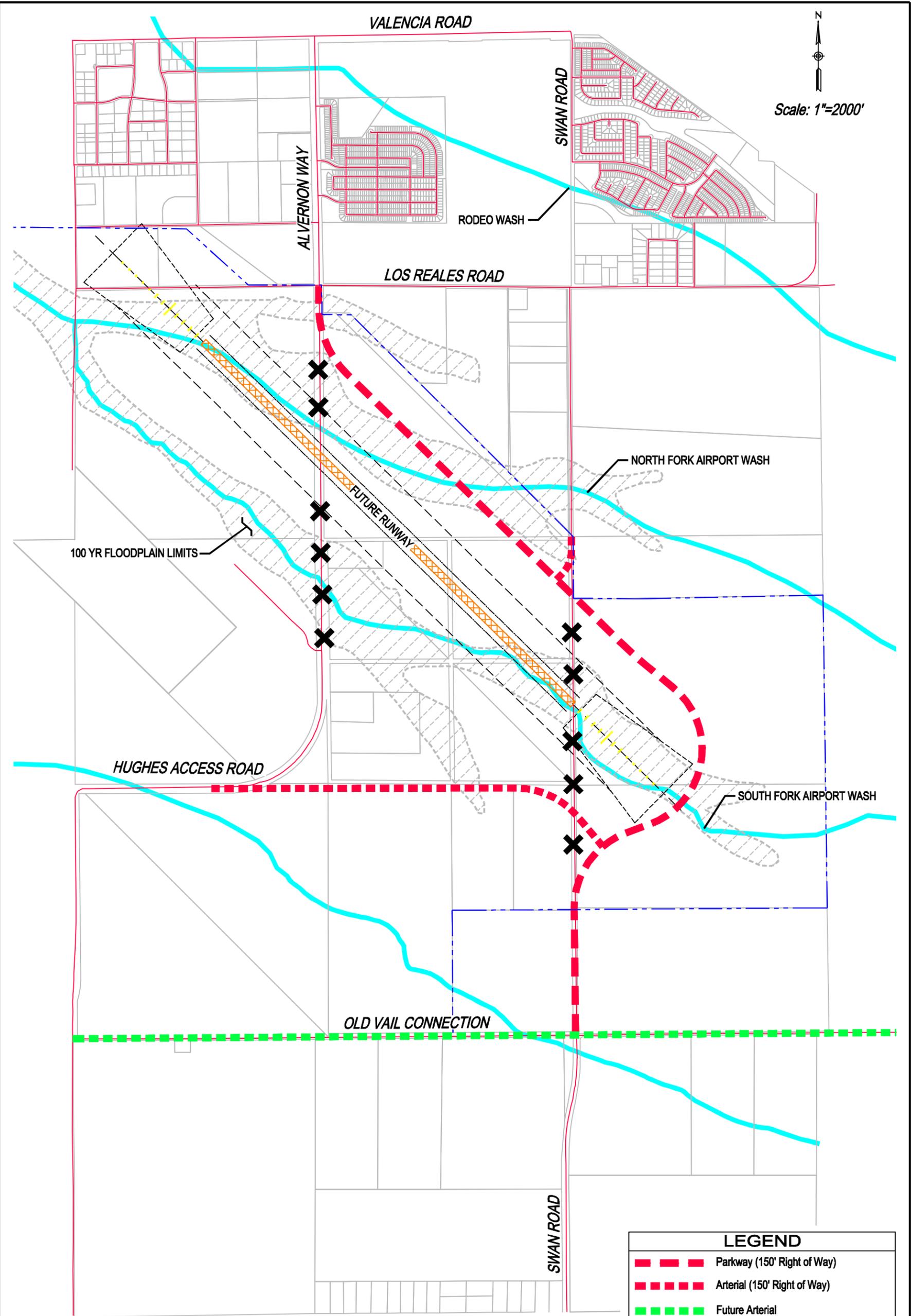
ALTERNATIVE B
Swan Road Continuity Alignment with an Alvernon Way Connection

LEGEND	
	Parkway (150' Right of Way)
	Arterial (150' Right of Way)
	Future Arterial
	Parcel Lines
	Airport Property Boundary
	Major Washes
	Existing (2006) Roadway Network
	Roadway Abandonment Marking
	ROW Impacts



ALTERNATIVE C
Alvernon Way Continuity Alignment with a Northern Swan Road Connection

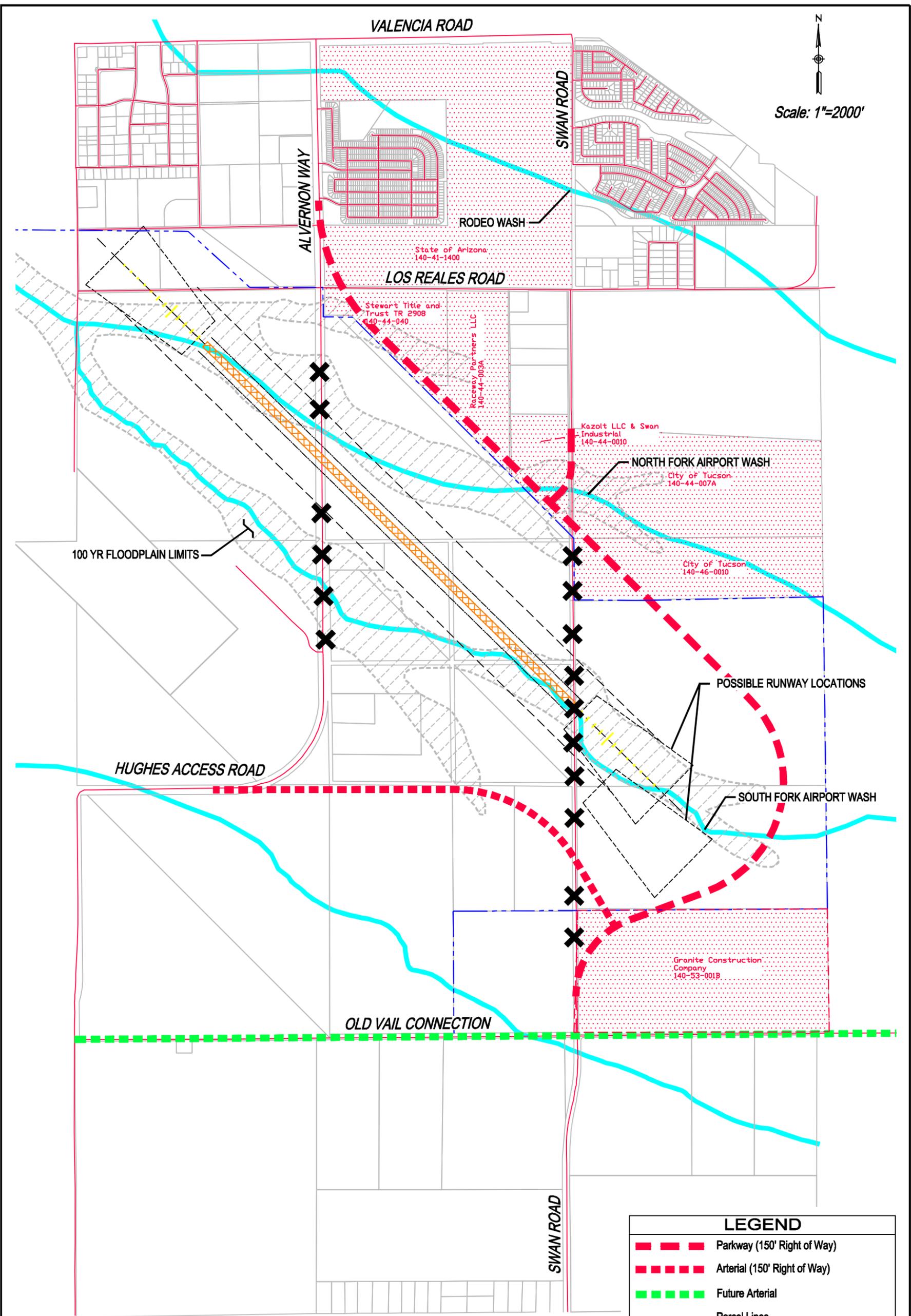
LEGEND	
	Parkway (150' Right of Way)
	Arterial (150' Right of Way)
	Future Arterial
	Parcel Lines
	Airport Property Boundary
	Major Washes
	Existing (2006) Roadway Network
	Roadway Abandonment Marking
	ROW Impacts



Scale: 1"=2000'

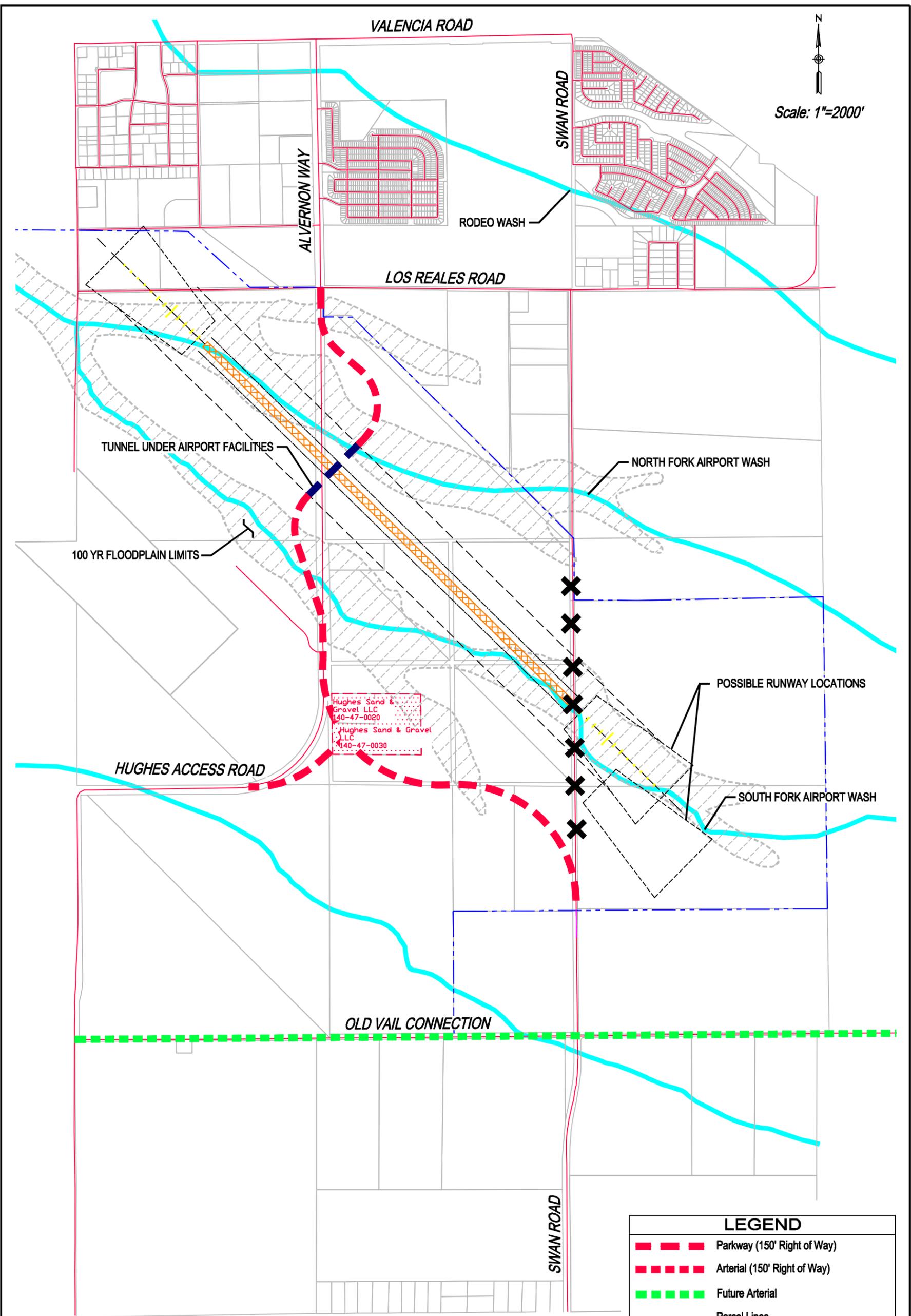
LEGEND	
	Parkway (150' Right of Way)
	Arterial (150' Right of Way)
	Future Arterial
	Parcel Lines
	Airport Property Boundary
	Major Washes
	Existing (2006) Roadway Network
	Roadway Abandonment Marking

ALTERNATIVE D
Alvernon Way Continuity Alignment with a Southern Swan Road Connection



ALTERNATIVE E
Alvernon Way Continuity Alignment for
Alternate Runway Location

LEGEND	
	Parkway (150' Right of Way)
	Arterial (150' Right of Way)
	Future Arterial
	Parcel Lines
	Airport Property Boundary
	Major Washes
	Existing (2006) Roadway Network
	Roadway Abandonment Marking
	ROW Impacts



ALTERNATIVE F
Alvernon Way Tunnel

LEGEND	
	Parkway (150' Right of Way)
	Arterial (150' Right of Way)
	Future Arterial
	Parcel Lines
	Airport Property Boundary
	Major Washes
	Existing (2006) Roadway Network
	Roadway Abandonment Marking
	ROW Impacts

4. COMPARATIVE IMPACT ASSESSMENT AND ANALYSIS

This section describes the impact assessment process, which considered the following assessment criteria:

- Traffic and Access impacts
- Right-of-way impacts
- Floodplain / drainage impacts
- Potential environmental impacts
- Utility impacts
- Planning level construction costs

These assessment criteria are described in more detail in **Exhibit 4-1** below:

EXHIBIT 4-1 – ASSESSMENT CRITERIA

Category	What is Being Assessed?
Traffic and Access Impacts	What is the impact of the alternatives on traffic flow? How much "out of direction" travel is created?
Right-of-Way / Land Ownership Impacts	What are general right-of-way impacts? What are the impacts of the alternatives on planned developments?
Floodplain / Drainage Impacts	Would the alternative impact wash crossings in the project area? How close is the alternative to the FEMA 100-year floodplain boundary?
Environmental Impacts	What are potential environmental impacts?
Utility Impacts	What utilities may be impacted by the project?
Planning Level Construction Costs	What is the planning level construction cost? This cost does not include right-of-way cost.

4.1 TRAFFIC IMPACTS

All of the alternatives except the tunnel alternative (Alternative F) will cause more circuitous travel for the traffic currently using Alvernon Way to reach Hughes Access Road. **Exhibit 4-2** summarizes out-of-direction travel from the intersection of Alvernon Way / Los Reales Road to Hughes Access Road at Alvernon Way. The distance between these two locations is 2.3 miles. As summarized in **Exhibit 4-2**, Alternative E has the most out-of-direction travel, comprising 3.6 additional miles, and Alternative F, the tunnel alternative, has the least out-of-direction travel, resulting in an additional 0.19 miles of travel. The other alternatives vary between 2 and 3 miles of out of direction travel, in one direction.

The impacts of the out-of-direction local travel resulting from Alternatives A through E may be lessened by improving the Franco Wash crossing at Old Vail Connection Road, so that residents in this area will have all weather access to Nogales Highway.



EXHIBIT 4-2 RELATIVE REGIONAL TRAFFIC IMPACTS

Alternative	Out-of- Direction Travel Miles	Relative Level of Traffic Impacts (1 =Least, 6 =Most)	Comments
Alternative A	2.01	2	
Alternative B	3.04	5	Alvernon Way connection to Swan Road is spaced only 1600 feet south of Los Reales Road, which may cause non-optimal signal spacing if traffic signals are required on Swan Road.
Alternative C	2.54	4	
Alternative D	2.42	3	
Alternative E	3.60	6	
Alternative F	0.19	1	

It should be noted that there is a potential for new access to the Tucson International Airport if the new roadway alignment is located closer to the planned runway. This could serve as additional airport access or could provide opportunities for development related to the airport.

4.2 RIGHT-OF WAY / LAND OWNERSHIP IMPACTS

All of the build alternatives for the Alvernon / Swan realignment will require 150 feet of right-of-way (ROW) to construct. All of the alternatives involve right-of-way impacts. The right-of-way on Alvernon Way, south of Los Reales Road, is 200 feet. The right-of-way on Los Reales Road, between Alvernon Way and Swan Road varies between 60 and 100 feet. The right-of-way on Swan Road, south of Los Reales Road is 100 feet. All of the alternatives impact Tucson Airport Authority property. The right-of-way requirements for a four-lane divided urban cross section can vary between 150 and 300 feet.

Alternative A, has right-of-way impacts to Swan Road, Los Reales Road, and within the Tucson Airport Authority property. Specific parcel impacts can vary, depending on the specific alignment of this alternative. However, because of the potential for between 5 and 14 parcels to be impacted, in addition to the Tucson Airport Authority right-of-way impacts, this alternative was ranked as having the highest potential impacts.

Alternative B which uses Swan Road right-of-way for a significant length, has right-of-way impacts to Swan Road and within the Tucson Airport Authority property. This alignment also impacts 4 parcels. This alignment bisects the Tucson Raceway parcel (140-44-003A), but avoids impacts to the developed, northern section of the parcel. The Alvernon Way realignment, near Swan Road, is located between two parcels (140-44-002H and a parcel with active land development, 140-44-002A) and may have some impact on both of these parcels, which cannot be determined at this level of analysis. There are impacts on the Swan Road realignment to a City of Tucson parcel (140-46-0010).

Alternatives C bisects 5 parcels (140-44-002G, 140-44-002H, 140-44-003A, 140-44-040, 140-46-0010) in addition to Tucson Airport Authority parcels. One of these parcels is the Tucson Raceway parcel, but similar to Alternative B, this alternative avoids impacts to the developed, northern section of the parcel. There are also right-of-way impacts to Swan Road, as the road transitions to the Swan Road alignment at both the north and south ends of the alternative.

Alternative D has right-of-way impacts within the Tucson Airport Authority property. There are also right-of-way impacts to Swan Road, at the south end of the alternative.

Alternative E, which extends the realignment of Alvernon Way further east, impacts 7 parcels in addition to the Tucson Airport Authority property. These parcels are:

- 140-41-1400
- 140-44-040
- 140-44-003A
- 140-44-0010
- 140-44-007A
- 140-46-0010
- 140-53-001B

The property impacts include impacts to 1 parcel with active land development plans (140-44-0010). This alternative may also impact access to the Granite Construction company driveway (parcel number

140-53-001B). This alignment also has some right-of-way impacts to Swan Road, as the alternative transitions to Swan Road at the south end of the alignment.

Alternative F, the tunnel alternative, bisects 2 parcels, in addition to Tucson Airport Authority property. These parcels are both owned by Hughes Sand and Gravel (parcel numbers 140-47-0020 and 140-47-0030).

A comparison of right-of-way impacts can be summarized in **Exhibit 4-3** as follows:

EXHIBIT 4-3 – RELATIVE RIGHT-OF-WAY IMPACTS

Alternative	Relative Level of Right-of-Way Impacts (1 =Least ROW impacts, 6 =Most ROW Impacts)
Alternative A	6
Alternative B	3
Alternative C	4
Alternative D	1
Alternative E	5
Alternative F	2

4.3 FLOODPLAIN / DRAINAGE IMPACTS

The project study area is located within the Airport Wash, Hughes Wash, and Rodeo Wash watersheds. All the roadway alignments will require large structures in order for the roadway to be considered all weather roads, to cross the South Airport Fork Wash. A review of the aerial mapping determined that several drainages will be crossed with a new alignment. All alignments will cross the South and North Airport Fork Washes, which both have FEMA 100-year floodplains. Alternative A, however, has minimal impacts on the North Airport Fork Wash.

It is assumed that some form of impact will occur to these potential Waters of the U.S. for culverts or bridge crossing; therefore a nationwide permit #14 may be required. If impacts to an individual 404 resource are more than 0.5 acres, then an Individual Permit will be required.

The alternatives were assessed in relation to one another based on the number of wash crossings, and whether the alternative crossed the wash at an angle, which would likely require more drainage structures. **Exhibit 4-4** summarizes these impacts.

EXHIBIT 4-4 - RELATIVE WASH IMPACTS

Alternative	Relative Level of Wash Impacts (1 =Least , 6=Most wash and floodplain Impacts)	Comments
Alternative A	1	Impacts on North Fork Airport Wash. Impacts South Fork Airport Wash and tributary
Alternative B	2	Impacts South Fork Airport Wash and tributary. Alvernon connection impacts North Fork Airport Wash tributary
Alternative C	3	Impacts North Fork Airport Wash and tributary at an angle, therefore a relatively larger drainage structures would be required. Also impacts South Fork Airport Wash and tributary
Alternative D	5	Impacts North Airport Fork Wash and tributary at an angle, therefore a relatively larger drainage structures would be required. Also impacts South Fork Airport Wash and tributary
Alternative E	4	Impacts North Fork Airport Wash at an angle, therefore a relatively larger drainage structures would be required. Also impacts South Fork Airport Wash and tributary
Alternative F	6	Impacts North and South Airport Fork Washes at an angle, therefore relatively larger drainage structures would be required. Hughes Access Road connection impacts tributary to South Fork Airport Wash

4.4 ENVIRONMENTAL IMPACTS

As stated in previously (Chapter 2), there are several environmental categories that will need further analysis once project components are better defined. Some of these items may require additional coordination with agencies to secure a permit prior to construction activities. In particular, the use of federal funds, or impacts to federal lands would require a federal NEPA review process.

In general, more surveys will need to be conducted to determine the potential for impacts to biological resources, cultural resources, and hazardous materials.

Species that need to be surveyed in the study area are:

- Western Yellow-billed Cuckoo
- Pima pineapple cactus
- Great plains narrow-mouthed toad
- Whiptail lizard
- Bell's vireo
- Desert box turtle
- Rufous-winged sparrow
- Tumamoc globeberry

Based on the need for additional survey work in many of the environmental categories, none of the alternatives rank relatively higher or lower to each other. Therefore, for the purposes of the assessment, all of the alternatives were scored as a “3”. These are summarized in **Exhibit 4-5**.

EXHIBIT 4-5 – RELATIVE ENVIRONMENTAL IMPACTS

Alternative	Relative Level of Environmental Impacts (1 =Least , 6 =Most environmental impacts)
Alternative A	3
Alternative B	3
Alternative C	3
Alternative D	3
Alternative E	3
Alternative F	3

4.5 UTILITY IMPACTS

The assessment of utility impacts was assessed based on the responses to the utility letter sent early in the project to utility providers in the area. As a limited response was received to the request, further research is required in this area during a future design concept phase. Based in the responses, a key utility impact is the power lines that are located on the west side of Swan Road.

Because of the limited response to the utility requests, alternatives were rated similarly in this category although the impacts need to be assessed further in a design concept phase.

Alternative A has the potential to impact the 46 kV and 14 kV power lines near Hughes Access Road and has the 138 kV power line on the west side of Swan Road, near Hughes Access Road.

Alternative B has the potential to impact the 46 kV and 14 kV power lines near Hughes Access Road. The extension of Alvernon Way to Swan Road may impact the 46 kV and 14 kV power lines on Alvernon Way, the 14 kV power lines to the Tucson Raceway, and the 138 kV power line on Swan Road. The 138 kV power line may also be impacted by the Hughes Access Road relocation to Swan Road. This alternative also has the potential to impact the gas line which crosses Swan Road.

Alternative C has similar potential impacts to those described for Alternative B above.

Alternative D has the potential to impact the 46 kV and 14 kV power lines near Hughes Access Road. The extension of Alvernon Way to Swan Road may impact the 46 kV and 14 kV power lines on Alvernon Way, and the 138 kV power line on Swan Road. The 138 kV power line may also be impacted by the Hughes Access Road relocation to Swan Road.

Alternative E has similar impacts to those described for Alternative D above.

Alternative F has the potential to cross the 46 kV and 14 kV power lines on Alvernon Way at a number of locations, depending on the specific alignment chosen. There is also the potential to impact a 138 kV power line on Swan Road.

EXHIBIT 4-6 – RELATIVE UTILITY IMPACTS

Alternative	Relative Level of Utility Impacts (1 =Least , 6 =Most utility impacts)
Alternative A	3
Alternative B	3
Alternative C	3
Alternative D	3
Alternative E	3
Alternative F	3

4.6 COSTS

A summary of planning level costs by alternative is provided in **Exhibit 4-4**. The exhibit also shows the miles of new roadway needed for each alternative. A planning level cost per mile was developed for alternatives A through E, and was applied to the length of new roadway required. In this way, costs are comparable between alternatives. Cost estimates do not include right-of-way costs, or utility relocation costs, or drainage costs. Alternative F, the tunnel alternative, is the most expensive alternative, because of the cost of the tunnel structure, and infrastructure improvements associated with the tunnel. Alternative D is the least expensive alternative. The cost estimates are provided in more detail in **Appendix C**.

EXHIBIT 4-4 – RELATIVE PROJECT COSTS

Alternative	Miles of New Roadway Needed (Assume 4-Lane divided roadway)	Estimated Cost (\$ Million)	Relative Cost (1 =Least Cost, 6=Most Expensive)
A – Swan Road Continuity Alignment with No Alvernon Way	6.12 miles: Swan Road: 3.45 Los Reales Road: 1.01 Hughes Access Road: 1.66	\$29.5	2
B- Swan Road Continuity Alignment with an Alvernon Way Connection to Swan	6.43 miles: Swan Road: 3.45 Hughes Access Road: 1.66 Alvernon Way: 1.32	\$30.7	3
C - Alvernon Way Continuity Alignment with a Northern Swan Road Connection (options provided for Swan and Alvernon realignments)	6.69 miles: Swan Road: 0.84 miles Hughes Access Road: 1.66 Alvernon Way: 4.19 miles	\$31.7	4
D – Alvernon Way Continuity Alignment with a southern Swan Road Connection	5.72 miles: Swan Road: 0.19 Hughes Access Road: 1.66 Alvernon Way: 3.87	\$27.9	1
E-Alvernon Way Continuity Alignment for Alternate Runway Location	6.59 miles: Swan Road: 0.33 Hughes Access Road: 1.88 Alvernon Way: 4.38	\$32.5	5
F – Alvernon Tunnel	3.31 miles: Alvernon Way: 3.31 (including 0.28 mile (1500 foot) tunnel.	\$76.1	6

5. CONCLUSIONS AND RECOMMENDATIONS

A summary of the relative rankings of each project alternative in the assessment areas discussed above are summarized in **Exhibit 5-1**. The alternatives were evaluated relative to each other, with the highest score (6) given to the alternative that was the worst (e.g. had the highest level of impacts) in comparison to the other alternatives.

EXHIBIT 5-1 – SUMMARY OF IMPACT SCORING BY ALTERNATIVE

Category	Alternative					
	A Swan Road Continuity Alignment with no Alvernon Way	B Swan Road Continuity Alignment with and Alvernon Way Connection	C Alvernon Way Continuity Alignment with a Northern Swan Road Alignment	D Alvernon Way Continuity Alignment with a Southern Swan Road Connection	E Alvernon Way Continuity Alignment for Alternate Runway Location	F Alvernon Way Tunnel
Traffic Impacts	2	5	4	3	6	1
Right-of-Way / Active Land Development Impacts	6	3	4	1	5	2
Floodplain / Drainage Impacts	1	2	3	5	4	6
Environmental Impacts	3	3	3	3	3	3
Utility Impacts	3	3	3	3	3	3
Planning Level Costs	2	3	4	1	5	6
Total Score	17	19	21	16	26	21

1 = the least impacts, 5 =most impacts (e.g. the worst for that category). Note that costs are rated on a 1 through 6 scale, since there are 6 alternatives

The analysis indicates that Alternatives A (Swan Continuity Alignment with no Alvernon Way connection) and Alternative D (Alvernon Way Continuity Alignment with a Southern Swan Road Connection) rank better in comparison to the other alternatives. However, both of these alternatives will result in out of direction travel for local residents and Raytheon employees and it may not accommodate the full range of Airport runway alternatives that was accommodated by Alternative E. The impacts of the out-of-direction local travel may be lessened by improving the Franco Wash crossing at Old Vail Connection Road, so that residents in this area will have all weather access to Old



Nogales Highway. At the design concept level of analysis, a consideration will be to upgrade Old Vail Connection Road to provide additional access in this area.

The analysis indicates that Alternative F, the tunnel alternative, will provide a better level of local and regional traffic circulation, although at a much higher cost. It will avoid increases in out-of-direction travel for residents in the vicinity of the study area.

Further research, through development of a design concept report, is needed to further define specific impacts, particularly in the areas of environmental, utility, and right-of-way impacts.

APPENDIX A

ENVIRONMENTAL SCREENING QUESTIONNAIRE

INTRODUCTORY INFORMATION

Project Identification

- Project Name: Alvernon Way / Swan Road Realignment Study
- Pima County Project Manager: Jonathan Crowe

Project Location and Limits

- Location of project within Pima County: South of I-10
- Limits of project:
From north end to south end: Los Reales Road (N) to Old Vail Road (S)
From side to side: Alvernon Way to east of Swan Road

Funding Source

- Funding source anticipated for use in construction project?
County funding: Yes No
Federal funding: Yes No
Other: Airport Funding
Source: Federal Funding

Primary Project Purpose

- Primary purpose of project: Realign Alvernon Way to Swan Road
Modernize roadway (e.g., resurface, restore, rehabilitate, reconstruct, add shoulders, or add auxiliary lanes): Yes No
Increase capacity: Yes No
Add bicycle lanes: Yes No
Improve safety: Yes No
Other: Relocate existing roadway system

Existing Conditions within Project Limits

- Roadway specifications? (Alvernon Way at Los Reales)
Right-of-way: 200 feet (Alvernon Way)
Pavement width: 35 feet (Alvernon Way)
Number of through lanes in each direction:
 - Number of turning lanes? 1
Right-turn lanes: _____
Left-Turn Lanes: 1
Number of signalized intersections: _____
Number of unsignalized intersections: 1
- Existing parking (e.g., on-street)? Yes _____ No
- Existing bicycle lanes: Yes No



- Existing sidewalk: Yes ___ No
- Existing transit stop: Yes ___ No

Other:

Note: If no existing roadway, describe site conditions (e.g. undeveloped land, etc)

Source:

Project Components

Anticipated specifications of the project?

Amount of additional right-of-way to be acquired:

Under 1 acre ___ 1-5 acres ___ 5-10 acres ___ Over 10 acres ___ To be Determined

Change in the vertical or horizontal alignment Yes No ___

New alignment: Yes No ___

Pavement width to be added:

Number of through lanes to be added: 2

Number of turn lanes to be added: ___ To Be Determined

Right-turn lanes ___

Left-turn lanes ___

Any associated parking (e.g., on-street): Yes No

Bicycle lanes to be added: Yes No ___

Sidewalk to be added: Yes ___ No ___ To Be Determined

Landscape to be Added: Yes ___ No ___ To Be Determined

Number of intersections to be signalized: ___ To Be Determined

•Other:

Source: Project Scope

Phasing

Is the project:

A portion or phase of a unified development plan? Yes No ___

One of a series of projects that may result in a cumulative set of environmental impacts on an identifiable area?

Yes ___ No ___

Source: Pima Association of Governments 2030 Regional Transportation Plan

Traffic

- Existing average daily traffic (ADT) in the project area?

Street: Alvernon Way ADT: 15,041

Street: Swan Road ADT: 2,582

Street: _____ ADT: _____

Street: _____ ADT: _____

Street: _____ ADT: _____

Other : _____ ADT: _____

- Projected ADT in the project area for the build year?

Street: Realigned Alvernon Way / Swan Road ADT: 46,400

Street: _____ ADT: _____

Street: _____ ADT: _____

Street: _____ ADT: _____



Other: _____ ADT: _____

Source:

Land Uses

• Existing adjacent land uses? Check all that apply and circle primary uses.

Commercial (e.g. retail businesses, service businesses): Yes ___ No

Institutional (e.g., schools, hospitals, social services agencies): Yes ___ No

Existing adjacent land uses? Check all that apply

Commercial (e.g., retail businesses, service

Residential (e.g. single family houses, apartments, townhouses): Yes ___ No ___

Industrial (e.g. light industry, heavy industry): Yes No ___

Recreational (e.g. parks, sports fields): Yes No ___

Other: landfill, Tucson International Airport, materials, undeveloped land, native desert

Source: Visual inspection, Aerials Express 2007

ENVIRONMENTAL CATEGORIES

Drainage

Will any storm water drain from the project discharge into detention or retention basins on site?

Yes ___ No

Source:

Section 401/404

• Are any culverts likely to be installed, replace, or extended? Yes No ___

• Are there any bridges being upgraded, extended, or replaced? Yes No ___

Is there any bank protection required in the construction of this project? Yes No ___

Are there any wetlands within the project area? Yes ___ No

Are there any riparian areas within the project vicinity? Yes No ___

Is it anticipated that there will be any discharge of dredged or filled materials into “waters of the United States”? Yes No ___

Source: Aerials Express 2007, NWI maps

Floodplain

• Is the project area within a 100-year floodplain delineated on the Federal Emergency Management Agency Flood Insurance Rate Map? Yes ___ No If “yes,” will the project substantially modify the topography of the floodplain either by placement or removal of materials within the floodplain?

Source: FEMA Flood Maps 04019C2850 Panel 2850 of 4700 <http://msc.fema.gov/webapp/WCS>

Biological Resources

• Are there listed threatened, endangered, proposed, and /or candidate species likely to be found in the project vicinity? Yes No ___

• Are listed special status species likely to be found in the project vicinity? Yes No ___

• Are protected native plants likely to be found in the project vicinity? Yes No ___

• Are construction activities anticipated to remove/disturb any vegetation? Yes No ___

• Is the project within the Conservation Land System? Yes ___ No

• Is the project along a designated Scenic Route? Yes ___ No

Air Quality

- Is the project in an:

Attainment area? Yes No

Nonattainment area? Yes No If “yes,” what are the pollutants of concern?

Maintenance area? Yes No If “yes,” what are the pollutants of concern?

Source: ADOT azdot.gov/EEG-common/documents/files/air_and_noise/

Noise

- Are there sensitive noise receptors in the area? Yes No If “yes,” identify type of noise receptors and briefly describe:

Residences: ____

Schools: ____

Hospitals: ____

Churches: ____

Parks: ____

Other: ____

- When the project is completed and used as anticipated, is it likely to contribute to any exceedances of noise quality standards. Yes No

Source:

Utilities

- Will the construction include any utility involvement? Yes No If “yes”, what kind of work is anticipated? To be determined

Utility relocation: ____

Temporary disconnection of service: ____

Utility replacement: ____

Hazardous Materials

- Is it likely that any hazardous wastes or hazardous substances in the past have been generated, treated, stored, released, discarded or disposed of on site or are any such wastes now accumulated on site? Y N Don't know

- Have any test borings been performed? Yes No If “yes”, were any wastes discovered on the premises in the course of the test borings or excavation work for the project?

Yes No

Source: Molly Collins, City of Tucson working in collaboration with AZDEQ

Historic Preservation

- Are there any cultural resources (archaeological or historic) in the vicinity of the project that are listed on or eligible for the National Register of Historic Places?

Yes No

- Are any of these sites considered “Priority Cultural Resources”? Yes No

- If the answer is “yes,” to either or both the questions above, please list the resource(s)/site(s):

- Of those properties listed or eligible, are any located near enough to the project to be affected by the project location, construction, or anticipated future traffic? Yes ___ No If “yes,” please specify the properties and very briefly describe the anticipated effect.
- Are there any structures likely to be 50 years old or older within or adjacent to the project area? Yes ___ No If “yes,” please list addresses below:
Source: AZSITE CR database and SHPO files

Visual Impact

Is the project likely to affect noticeably the views from adjacent properties?

Yes ___ No If “yes”, briefly describe:

Is the project likely to cause a noticeable change in the foreground, middle-ground, or background views from the road? Yes ___ No

Source: Visual Inspection

Neighborhood/Social Impact

• Is there likely to be any commercial or residential displacement due to the construction of this project?

Yes No ___

• Are there likely to be any temporary changes in:

Business access: Yes No ___

Parking: Yes ___ No

Other:

• Are there likely to be any permanent changes in:

Traffic service: Yes No ___

Traffic circulation: Yes No ___

Parking: Yes ___ No

Other:

Is the project likely to affect continuity in neighborhoods in the vicinity? Yes No ___

Source: Visual Inspection

LOCAL JURISDICTION/AGENCY COORDINATION

• Are there local jurisdictions and governmental agencies with whom coordination is anticipated or has begun? Yes No ___ If “yes,” who are they?

City of South Tucson ___

City of Tucson

Oro Valley ___

Pascua Yaqui Tribe ___

Tohono O’odham Nation ___

Town of Marana ___

Town of Sahuarita ___

Arizona Department of Environmental Quality

Arizona Department of Transportation ___

Arizona Game and Fish Department

Arizona State Land Department

U.S. Army Corps of Engineers

U.S. Bureau of Land Management ____
U.S. Environmental Protection Agency ____
U.S. Federal Highway Administration ____
U.S. Fish and Wildlife Service
Other _____

Source:

- Note any issues for coordination that have been identified to date:
- Briefly describe coordination efforts planned or underway:

PUBLIC INVOLVEMENT

- Has a Public Involvement Plan been developed for the project? Yes ____ No
- Has a Citizen Advisory Committee been formed, or is one being formed? Yes ____ No
- Have any public meetings been scheduled? Yes ____ No If "yes", have any meetings been held to date?
- Has any information useful to project development been identified through any public interaction to date? Yes ____ No If "yes", briefly describe: Meetings with stakeholders, e.g. Raytheon, City of Tucson

Is there any known controversy over this project to date? Yes ____ No If "yes", briefly describe:

Source:

PERMITS

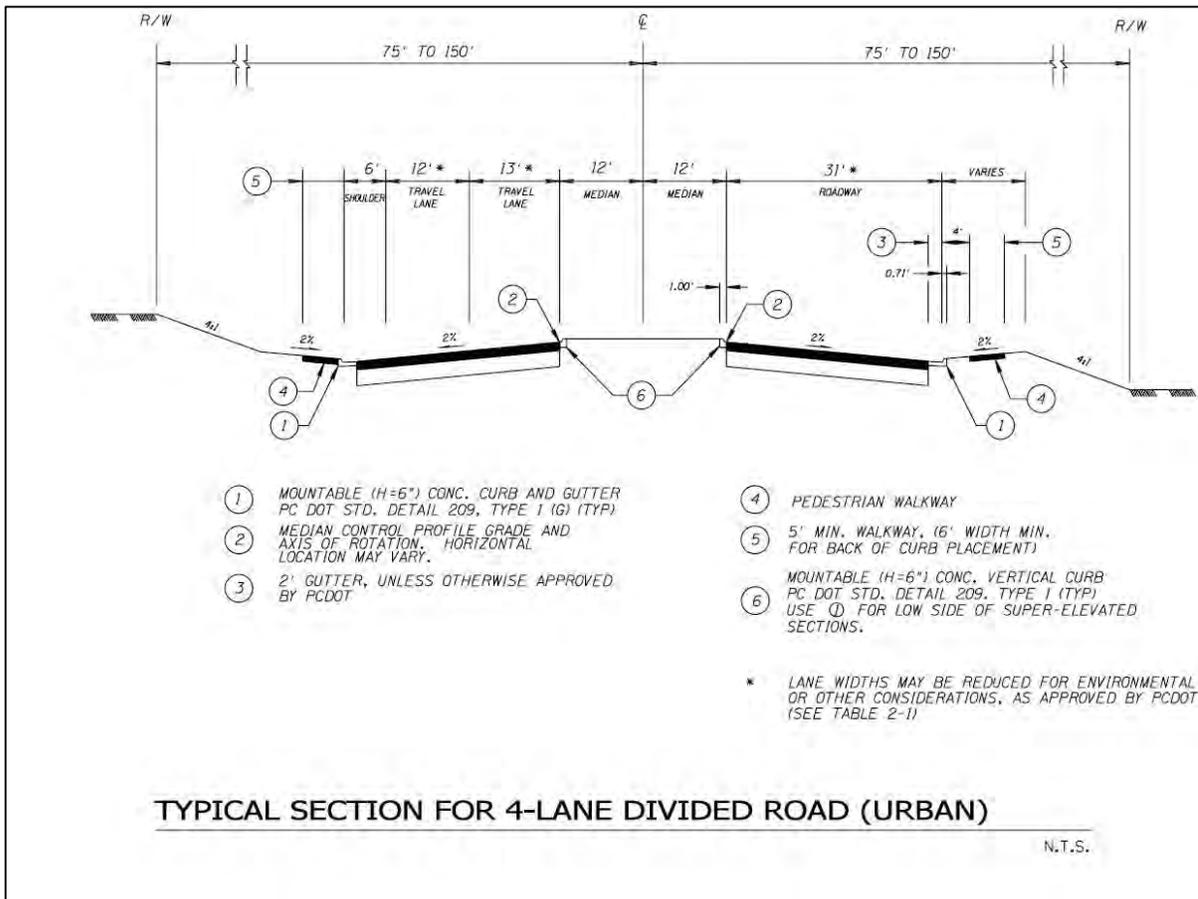
- Anticipated permits and/or approvals? To be determined
- 404 Permit: ____
- 401 Certification: ____
- Sole Source Aquifer: ____
- State Historic Preservation Officer (SHPO) clearance: ____
- Nonpoint Pollutant Discharge Elimination System (NPDES): ____
- Other

Completed by: Mark Turner, Senior Environmental Scientist, Kimley-Horn and Associates, Inc.

Date: 11-7-2007

APPENDIX B

TYPICAL CROSS SECTION



APPENDIX C - DESIGN CRITERIA AND COST ESTIMATES

ALVERNON WAY – SWAN ROAD REALIGNMENT KHA JOB No. 098022015

DESIGN YEAR TBD

Cross section Standard Typical Section for 4-lane divided roadway, Figure 2-7, Pima County Department of Transportation Standard Typical Section. This typical section is provided in the Appendix, and includes 6 foot shoulders, four travel lanes (two are 12 wide, two are 13 feet wide), and one 24 foot mountable curbed median.

DESIGN SPEED 60 mph (45mph posted)

MAINLINE DESIGN VEHICLE WB-50 Intermediate Semi-trailer
SIDE ROAD DESIGN VEHICLE SU Single Unit Commercial Truck

ROADWAY TYPICAL SECTION **PCDOT Standard Figure 2-7**

CLEAR ZONE

MAINLINE CLEARZONE	TBD
MAINLINE RECOVERY AREA	TBD
SIDE ROAD CLEARZONE	10' minimum (AASHTO 2004 p 319,387)
SIDE ROAD RECOVERY AREA	TBD

SLOPES

Mainline	Min 4:1, 6:1 or Flatter Desirable (RDG chap. 3)
-----------------	---

HORIZONTAL ALIGNMENT

	Mainline
MIN RADIUS W/ NORMAL CROWN	10,000'
MIN RADIUS W/ MAX SUPERELEVATION	1500'
RUNOFF @ 4% (2 LANES ROTATED)	160'
MAX SUPERELEVATION	0.04'/ft (or 4%)
MIN LENGTH OF CURVE	TBD

VERTICAL ALIGNMENT

	Mainline
MAX GRADIENT	3% (AASHTO 2004, p 446 – Level 50mph)
MIN GRADIENT	0.5%, to allow for drainage (per PCDOT request 11/13/2007)
MIN VERTICAL CURVE LENGTH	TBD
MAX VERTICAL CURVE LENGTH	Crest VC: TBD' (AASHTO, pg 272) K (max)=151 Sag VC: TBD' (AASHTO, pg 277) K (max)=136 Calculated using L=KA, A=6 % max downgrade to max upgrade.
SIGHT DISTANCE	Stopping Sight Distance: 570' (AASHTO, pg 112)

**PIMA COUNTY
SWAN TO ALVERNON ALIGNMENT STUDY
CONSTRUCTION COST ESTIMATE**



Project No : **Alternative B**
Proj Manager : **Mary Rodin**

Alvernon Way to Swan Road
Project Location : **Realignment Study**
Project Description : **Roadway Realignment**
Bid Advertisement Date : **01/01/10**

ITEM No.	ITEM DESCRIPTION	UNIT	Study		
			DATE	UNIT PRICE	AMOUNT
			04/18/08		
			QUANTITY		
2030301	ROADWAY EXCAVATION	CU.YD.		\$14.00	\$0.00
2010011	CLEARING AND GRUBBING	ACRE	94	\$7,000.00	\$659,000.00
2030401	DRAINAGE EXCAVATION	CU.YD.		\$10.00	\$0.00
2030901	BORROW	CU.YD.	138,375	\$15.00	\$2,075,625.00
2020025	REMOVAL OF CONCRETE SIDEWALKS, DRIVEWAYS AND SLABS	SQ.FT.		\$5.00	\$0.00
2020029	REMOVAL OF ASPHALTIC CONCRETE PAVEMENT	SQ.YD.		\$10,000.00	\$0.00
2020048	REMOVAL OF STRUCTURE (	EACH			
2020053	REMOVE (	EACH		\$300.00	\$0.00
	TOTAL, ITEM 200				\$2,733,625.00
3030022	AGGREGATE BASE, CLASS 2	CU.YD.	36,820	\$5.00	\$1,288,700.00
4090003	ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL)	TON	49,095	98.00	\$4,811,310.00
	TOTAL, ITEMS 300 & 400				\$6,100,010.00
5010011	PIPE, CORRUGATED METAL, 24"	L.F.T.		\$120.00	\$0.00
5010025	PIPE, CORRUGATED METAL, 36"	L.F.T.		\$165.00	\$0.00
5010030	PIPE, CORRUGATED METAL, 42"	L.F.T.		\$190.00	\$0.00
5041596	DRAINAGE STRUCTURE (HEADWALL)	EACH		\$2,000.00	\$0.00
	TOTAL, ITEM 500				\$0.00
6018101	REINFORCED CONCRETE BOX CULVERT (	L.SUM	1	\$665,700.00	\$665,700.00
6018102	REINFORCED CONCRETE BOX CULVERT (	L.SUM	1	\$610,500.00	\$610,500.00
6018103	REINFORCED CONCRETE BOX CULVERT (	L.SUM	3	\$312,000.00	\$936,000.00
	TOTAL, ITEM 600				\$2,212,200.00
	TOTAL, ITEM 701				\$0.00
6080101	MISCELLANEOUS WORK (SIGNS)	L.SUM	1	\$15,000.00	\$15,000.00
7041501	PAVEMENT MARKINGS	L.SUM	1	\$5,000.00	\$5,000.00
	TOTAL, ITEM 703 - 709				\$20,000.00
7330630	REMOVE TRAFFIC SIGNALS	L.SUM		\$6,000.00	\$0.00
7320420	PULL BOX (NO. 7)	EACH		\$400.00	\$0.00
7360300	ROADWAY LIGHTING AT INTERSECTIONS	L.SUM	4	\$100,000.00	\$400,000.00
7330408	TRAFFIC SIGNALS AND INTERCOM	L.SUM	1	\$250,000.00	\$250,000.00
	TOTAL, ITEM 730				\$650,000.00
8050003	SEEDING (CLASS B)	ACRE		1,500.00	\$0.00
	TOTAL, ITEM 800				\$0.00
9080201	CONCRETE SIDEWALK (C-05.20)	SQ.FT.	339,650	4.00	\$1,358,600.00
9080081	CONCRETE CURB AND GUTTER (C-05.10) (TYPE G)	L.F.T.	67,930	30.00	\$2,037,900.00
9080109	CONCRETE SINGLE CURB (	L.F.T.	67,930	20.00	\$1,358,600.00
9080296	CONCRETE SIDEWALK RAMP (	EACH		750.00	\$0.00
9080298	CONCRETE SIDEWALK RAMP (	EACH		750.00	\$0.00
9130051	RIPRAP (DUMPED) (	CU.YD.		115.00	\$0.00
	TOTAL, ITEM 900				\$4,755,100.00
	ROADWAY TOTAL:				\$16,470,935.00

	RCB CULVERT STA.	#N/A	TOTAL:	\$0.00

	RCB CULVERT STA.	#N/A	TOTAL:	\$0.00

	RCB CULVERT STA.	#N/A	TOTAL:	\$0.00

CONSTRUCTION COST SUBTOTAL			\$16,470,935.00
Miscellaneous Work		10%	\$1,647,093.50
SUBTOTAL			\$18,118,028.50
Maintenance/Protection of Traffic (7.5%)		7.5%	\$1,358,852.14
Water Supply / Dust Palliative (2%)		2.0%	\$362,360.57
Mobilization (8%)		8.0%	\$1,449,442.28
Erosion Control (2%)		2.0%	\$362,360.57
Quality Control (2%)		2.0%	\$362,360.57
Construction Survey / Layout (2%)		2.0%	\$362,360.57
Contingencies		10.0%	\$1,811,802.85
ROADWAY / STRUCTURES SUBTOTAL			\$24,187,568.05
Design Engineering @	12%		\$2,902,508.17
Construction Engineering @	15%		\$3,628,135.21
Pavement Smoothness (\$7,500 per lane mile)			
AC Quality Incentive at \$1.50 per ton			
Flagging Services (Uniformed Officer)			
TOTAL COST			\$ 30,718,211.42
PROGRAMMED AMOUNT			\$ -
DIFFERENTIAL			30,718,211.42

Project No : Alternative C

Proj Manager : Mary Rodin

Project Location : Alvernon Way to Swan Road
Project Description : Realignment Study
Roadway Realignment
Bid Advertisement Date : 01/01/10

ITEM No.	ITEM DESCRIPTION	UNIT	Study		
			DATE: 04/18/08	QUANTITY	UNIT PRICE	AMOUNT
2030301	ROADWAY EXCAVATION	CU.YD.		\$14.00	\$0.00
2010011	CLEARING AND GRUBBING	ACRE	97	\$7,000.00	\$679,000.00
2030401	DRAINAGE EXCAVATION	CU.YD.		\$10.00	\$0.00
2030901	BORROW	CU.YD.	142,775	\$15.00	\$2,141,625.00
2020025	REMOVAL OF CONCRETE SIDEWALKS, DRIVEWAYS AND SLABS	SQ.FT.		\$5.00	\$0.00
2020029	REMOVAL OF ASPHALTIC CONCRETE PAVEMENT	SQ.YD.		\$10,000.00	\$0.00
2020048	REMOVAL OF STRUCTURE (	EACH			
2020053	REMOVE (	EACH		\$300.00	\$0.00
TOTAL, ITEM 200					\$2,820,625.00
3030022	AGGREGATE BASE, CLASS 2	CU.YD.	37,990	35.00	\$1,329,650.00
4090003	ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL)	TON	50,655	98.00	\$4,964,190.00
TOTAL, ITEMS 300 & 400					\$6,293,840.00
5010011	PIPE, CORRUGATED METAL, 24"	L.F.T.		\$120.00	\$0.00
5010025	PIPE, CORRUGATED METAL, 36"	L.F.T.		\$165.00	\$0.00
5010030	PIPE, CORRUGATED METAL, 42"	L.F.T.		\$190.00	\$0.00
5041996	DRAINAGE STRUCTURE (HEADWALL)	EACH		\$2,000.00	\$0.00
TOTAL, ITEM 500					\$0.00
6018101	REINFORCED CONCRETE BOX CULVERT (	L.SUM	1	\$665,700.00	\$665,700.00
6018102	REINFORCED CONCRETE BOX CULVERT (	L.SUM	1	\$610,500.00	\$610,500.00
6018103	REINFORCED CONCRETE BOX CULVERT (	L.SUM	3	\$312,000.00	\$936,000.00
TOTAL, ITEM 600					\$2,212,200.00
TOTAL, ITEM 701					\$0.00
6080101	MISCELLANEOUS WORK (SIGNS)	L.SUM	1	\$15,000.00	\$15,000.00
7041501	PAVEMENT MARKINGS	L.SUM	1	\$5,000.00	\$5,000.00
TOTAL, ITEM 703 - 709					\$20,000.00
7330630	REMOVE TRAFFIC SIGNALS	L.SUM		\$6,000.00	\$0.00
7320420	PULL BOX (NO. 7)	EACH		\$400.00	\$0.00
7360300	ROADWAY LIGHTING AT INTERSECTIONS	L.SUM	5	\$100,000.00	\$500,000.00
7330408	TRAFFIC SIGNALS AND INTERCOM	L.SUM	1	\$250,000.00	\$250,000.00
TOTAL, ITEM 730					\$750,000.00
8050003	SEEDING (CLASS II)	ACRE		1,500.00	\$0.00
TOTAL, ITEM 800					\$0.00
9080201	CONCRETE SIDEWALK (C-05.20)	SQ.FT.	350,450	4.00	\$1,401,800.00
9080081	CONCRETE CURB AND GUTTER (C-05.10) (TYPE G)	L.F.T.	70,090	30.00	\$2,102,700.00
9080109	CONCRETE SINGLE CURB (	L.F.T.	70,090	20.00	\$1,401,800.00
9080296	CONCRETE SIDEWALK RAMP (	EACH		750.00	\$0.00
9080298	CONCRETE SIDEWALK RAMP (	EACH		750.00	\$0.00
9130051	RIPRAP (DUMPED) (	CU.YD.		115.00	\$0.00
TOTAL, ITEM 900					\$4,906,300.00
ROADWAY TOTAL:					\$17,002,965.00

	RCB CULVERT STA.	#/A	TOTAL:		\$0.00

	RCB CULVERT STA.	#/A	TOTAL:		\$0.00

	RCB CULVERT STA.	#/A	TOTAL:		\$0.00

CONSTRUCTION COST SUBTOTAL				\$17,002,965.00
Miscellaneous Work		10%		\$1,700,296.50
SUBTOTAL				\$18,703,261.50
Maintenance/Protection of Traffic (7.5%)		7.5%		\$1,402,744.61
Water Supply / Dust Palliative (2%)		2.0%		\$374,065.23
Mobilization (8%)		8.0%		\$1,496,260.92
Erosion Control (2%)		2.0%		\$374,065.23
Quality Control (2%)		2.0%		\$374,065.23
Construction Survey / Layout (2%)		2.0%		\$374,065.23
Contingencies		10.0%		\$1,870,326.15
ROADWAY / STRUCTURES SUBTOTAL				\$24,968,854.10
	Design Engineering @	12%		\$2,996,262.49
	Construction Engineering @	15%		\$3,745,328.12
Pavement Smoothness (\$7,500 per lane mile)				
AC Quality Incentive at \$1.50 per ton				
Flagging Services (Uniformed Officer)				
TOTAL COST				\$ 31,710,444.71
PROGRAMMED AMOUNT				\$ -
DIFFERENTIAL				31,710,444.71

**PIMA COUNTY
SWAN TO ALVERNON ALIGNMENT STUDY
CONSTRUCTION COST ESTIMATE**



Project No : Alternative F
Proj Manager : Mary Rodin

Project Location : Alvernon Way to Swan Road Realignment Study
Project Description : Roadway Realignment
Bid Advertisement Date : 01/01/10

ITEM No.	ITEM DESCRIPTION	UNIT	Study		
			DATE:	04/18/08	
			QUANTITY	UNIT PRICE	AMOUNT
2030301	ROADWAY EXCAVATION	CU.YD.		\$14.00	\$0.00
2010011	CLEARING AND GRUBBING	ACRE	44	\$7,000.00	\$308,000.00
2030401	DRAINAGE EXCAVATION	CU.YD.		\$10.00	\$0.00
2030901	BORROW	CU.YD.	65,150	\$15.00	\$977,250.00
2020025	REMOVAL OF CONCRETE SIDEWALKS, DRIVEWAYS AND SLABS	SQ.FT.		\$5.00	\$0.00
2020029	REMOVAL OF ASPHALTIC CONCRETE PAVEMENT	SQ.YD.		\$10,000.00	\$0.00
2020048	REMOVAL OF STRUCTURE (	EACH			\$0.00
2020053	REMOVE (	EACH		\$300.00	\$0.00
TOTAL, ITEM 200					\$1,285,250.00
3030022	AGGREGATE BASE, CLASS 2	CU.YD.	17,340	35.00	\$606,900.00
4090003	ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL)	TON	23,115	98.00	\$2,265,270.00
TOTAL, ITEMS 300 & 400					\$2,872,170.00
500	600' CUT AND COVER TUNNEL SYSTEM, COMPLETE SEE LAST LINE	L.SUM	1		\$0.00
TOTAL, ITEM 500					\$0.00
6018101	REINFORCED CONCRETE BOX CULVERT (	L.SUM	1	\$665,700.00	\$665,700.00
6018102	REINFORCED CONCRETE BOX CULVERT (	L.SUM	1	\$610,500.00	\$610,500.00
6018103	REINFORCED CONCRETE BOX CULVERT (	L.SUM	2	\$312,000.00	\$624,000.00
TOTAL, ITEM 600					\$1,900,200.00
TOTAL, ITEM 701					\$0.00
6080101	MISCELLANEOUS WORK (SIGNS)	L.SUM	1	\$15,000.00	\$15,000.00
7041501	PAVEMENT MARKINGS	L.SUM	1	\$5,000.00	\$5,000.00
TOTAL, ITEM 703 - 709					\$20,000.00
7330630	REMOVE TRAFFIC SIGNALS	L.SUM		\$6,000.00	\$0.00
7320420	PULL BOX (NO. 7)	EACH		\$400.00	\$0.00
7360300	ROADWAY LIGHTING AT INTERSECTIONS	L.SUM	1	\$100,000.00	\$100,000.00
7330408	TRAFFIC SIGNALS AND INTERCOM	L.SUM	1	\$250,000.00	\$250,000.00
TOTAL, ITEM 730					\$350,000.00
8050003	SEEDING (CLASS II)	ACRE		1,500.00	\$0.00
TOTAL, ITEM 800					\$0.00
9080201	CONCRETE SIDEWALK (C-05.20)	SQ.FT.	159,920	4.00	\$639,680.00
9080081	CONCRETE CURB AND GUTTER (C-05.10) (TYPE G)	L.F.T.	31,984	30.00	\$959,520.00
9080109	CONCRETE SINGLE CURB (	L.F.T.	31,984	20.00	\$639,680.00
9080298	CONCRETE SIDEWALK RAMP (	EACH		750.00	\$0.00
9080298	CONCRETE SIDEWALK RAMP (	EACH		750.00	\$0.00
9130051	RIPRAP (DUMPED) (	CU.YD.		115.00	\$0.00
TOTAL, ITEM 900					\$2,238,880.00
ROADWAY TOTAL:					\$8,666,500.00

RCB CULVERT STA	#/NA	TOTAL:		
				\$0.00
				\$0.00
				\$0.00
				\$0.00

CONSTRUCTION COST SUBTOTAL			\$8,666,500.00
Miscellaneous Work	10%		\$866,650.00
SUBTOTAL			\$9,533,150.00
Maintenance/Protection of Traffic (7.5%)	7.5%		\$714,986.25
Water Supply / Dust Palliative (2%)	2.0%		\$190,663.00
Mobilization (8%)	8.0%		\$762,652.00
Erosion Control (2%)	2.0%		\$190,663.00
Quality Control (2%)	2.0%		\$190,663.00
Construction Survey / Layout (2%)	2.0%		\$190,663.00
Contingencies	10.0%		\$953,315.00
ROADWAY / STRUCTURES SUBTOTAL			\$12,726,755.25
Design Engineering @	12%		\$1,527,210.63
Construction Engineering @	15%		\$1,909,013.29
1500' CUT AND COVER TUNNEL SYSTEM, COMPLETE			\$60,000,000.00
TOTAL COST			\$76,162,979.17
PROGRAMMED AMOUNT DIFFERENTIAL			\$ -
			76,162,979.17

APPENDIX D

Responses to Utility Information Request Letter

Tucson Electric Power Company

4350 East Irvington Road, Mailstop DB101
Tucson, Arizona 85714

Cynthia A. Garcia
Resource Management Team

Ofc: (520) 918-8246
Fax: (520) 917-8790

January 3, 2008

Mr. Rick Solis, P.E.
Kimley-Horn and Associates, Inc.
2210 E. Fort Lowell Rd., Suite 200
Tucson, AZ 85719

SUBJECT: Alvernon Way Realignment Study

Dear Mr. Solis:

We have received your request for information regarding all existing and proposed utilities within the subject project area and offer the following comments:

- TEP has transmission and distribution lines in conflict with the proposed runway extension.
- Attached please find TEP facility maps showing the locations of overhead electric.
- These TEP power lines will need to be relocated to a location outside any glide path designations.
- These new locations will require a new TEP right-of-way and will be billable.

Please maintain drivable access to TEP poles, equipment and facilities. The relocation of TEP facilities such as feeder, sub-transmission and transmission lines is limited to TEP's off-peak season, October through April. TEP poles will remain in place until all other joint-use participants have transferred facilities from TEP poles. Pole bracing may be necessary, depending upon your prime contractor's construction sequence. For the latest TEP Electric Service Requirements and Construction Standards please visit our web site at <http://www.tep.com/business/construction/ServReqBook.asp>.

Please notify your contractor to contact Blue Stake for the location of existing overhead and underground electric facilities and to comply with Arizona Blue Stake law regarding safe approach distances to electrical facilities. Please contact Blue Stake a minimum of 10 working days in advance to request overhead protection. Overhead protection is billable to the contractor if TEP has prior rights to the location of its facilities. It is the contractor's responsibility to protect TEP facilities. If damages occur, the total cost to repair those facilities will be billable to the contractor.

If you have any questions, please contact me at 918-8246.

Sincerely,



Cynthia A. Garcia
Project Manager
Public Improvement

Enclosures

cc: Gary Gaulin, TEP Designer



Qwest Corporation
Larry J. Lewis
333 E Wetmore Rd 3rd Floor
Tucson 292-8255
520-292-5630 fax
Larry.Lewis@qwest.com

January 4, 2008

Kimley-Horn & Associates, Inc.
2210 E Fort Lowell Rd
Suite 200
Tucson, AZ 85719
C/O Rick Solis, P.E.

RE: Utility Information Request- Alvernon Way Realignment Study (TIA Runway Extension)

Dear Mr Solis:

Regarding the above referenced Pima County Road Project, I've reviewed the maps you enclosed with your letter. Qwest has mostly aerial facilities & a small amount of buried facilities within the identified area. It does seem likely removal of these facilities will be required. In that event Qwest can occupy the new proposed Public ROW or place its new replacement facilities within a PUE paralleling the proposed ROW. Qwest's current & future needs most likely will be satisfied by placing conduit & manholes within & through the proposed ROW or PUE. If there are overhead electric or TV facilities, a Joint Trench could be considered. Abandonment of the existing public ROW will be necessary and a formal request must be made to Qwest.

If there are any removals & replacements required of existing Qwest facilities, Qwest will seek reimbursement from Pima County for the total cost of these modifications. This reimbursement is predicated on the continuing legal actions before the courts regarding Qwest's Prior Rights.

Thank you for the opportunity to learn of the project & for allowing Qwest to share its future & current needs with you. When additional plans are available or when the final design is selected, please don't hesitate to send them to Qwest for review.

Sincerely,



Larry J. Lewis
Sr. Design Engineer

cc. John Settembre, Donna Wilson, Wendell Nelson



CITY OF
TUCSON
TUCSON WATER
DEPARTMENT

Kimley-Horn and Associates, Inc
2210 E. Fort Lowell Road, Suite 200
Tucson, Arizona 85719-2460

December 24, 2007

Attention: Rick Solis, PE

Subject: **Alvernon Way Realignment Study**

Dear Mr Solis:

Thank you for your request for information on the existing City of Tucson Water Department facilities in the vicinity of the Pima County DOT's Alvernon Way Realignment Study project.

Your request has been forwarded to the Mapping/GIS section. If you have any questions about the existing water system, please call Mr. Rick Meyer of the Mapping/GIS section at 791-2631.

Your request has also been forwarded to the System Planning and Evaluation Section. If you have any questions on future water systems, please call Mr. Sandy Elder of the System Planning and Evaluation Section at 791-4718.

When you have plotted the existing water facilities on the project plans, return them to the Modifications Unit for review. Any subsequent review for water system modifications should also be submitted to the Modifications Unit for review.

Sincerely,

Tony Tineo, PE
City of Tucson, Water Department
Modifications Unit Supervisor

TT:DM \N:\ Alvernon Way Realignment Study \ 01137-3908 lt1.doc

cc: Pat Eisenberg, PE, City of Tucson, Water Department, Water Administrator for Engineering
Edward Lopez, PE, City of Tucson, Water Department, Distribution Design Section Supervisor
Rick Meyer, City of Tucson Water Department, Mapping/GIS (w/ attachment)
Sandy Elder, City of Tucson Water Department, System Planning and Evaluation Section (w/ attachment)
Robert Johnson, PE, PCDOT
John Crow, PCDOT
File





SOUTHWEST GAS CORPORATION

February 13, 2008

Kimley-Horn and Associates, Inc.
Attn: Rick Solis, P.E.
2210 E. Fort Lowell Road, Suite 200
Tucson, AZ 85719

**Subject: Alvernon Way Realignment Study
Plan No. I-2007-023
DMJM Harris Project No. 60026275**

Dear Mr. Solis:

The preliminary notification plans for the above referenced project have been reviewed by Southwest Gas Corporation (SWG). SWG has a 4" high pressure steel main along Los Reales Road that will be in conflict with the proposed runway area. Also, a 2" steel service and regulator station at 8101 S. Alvernon Way will also be in conflict with the proposed runway area.

SWG has an easement on the southeast corner of Alvernon Way and Hughes Access Road which has been enclosed for your reference. SWG requests to be informed as the project moves forward to further investigate potential conflicts and complete a more thorough review of this project.

All information is provided for reference use only and Blue Stake is suggested for best accuracy. Please be aware that SWG requires a minimum separation of two feet from HP feeders and any proposed structures and a minimum one foot separation from distribution facilities and any proposed structures.

If you have any questions or require any additional information, please contact me at (520) 794-6217.

Sincerely,

Shari R. Olsen, P.E.
Distribution Engineer
Southern Arizona Division

Enc: SWG easement

3401 East Gas Road / Tucson, Arizona 85714-1994
P.O. Box 26500 / Tucson, Arizona 85726-6500 / (520) 889-5600
www.swgas.com

MAPPED

No. 54609

STATE OF ARIZONA }
COUNTY OF PIMA } ss.

I hereby certify that the within instrument was filed for record in Pima County, State of Arizona.

Book 2295 Page 270

Witness my hand and Official Seal.

ARINA SULLINGER
County Recorder

Date: Request of: 1964 JUL 20 AM 9 29
TUCSON GAS, ELECTRIC LIGHT & POWER CO.

Indexed	Paged	Blotted
99		

By *John H. Haugh*
Deputy: Fee: 1.75

PHOTOSTAT

Natural Gas Line
Right-Of-Way Easement

MISCELLANEOUS

This easement, made this 8 day of July, 1964, by and between
PIMA PORK PRODUCERS, INC.

party/parties of the first part, and TUCSON GAS & ELECTRIC COMPANY, a corporation, party of the second part:

WITNESSETH: That the party/parties of the first part, for and in consideration of the sum of One Dollar lawful money, and other valuable considerations, receipt whereof is hereby acknowledged, has/have granted and conveyed, and by these presents do/does grant and convey unto the said party of the second part, its successors and assigns, a right-of-way easement in, on, through, over and across the following described lands, located in Pima County, Arizona, for the purpose of constructing, operating, and maintaining a gas distribution line or system thereon:

Lot _____ Block _____ subdivision, according to the map or plat thereof of record in Book _____, Page _____, of maps and plats, Pima County Recorder's Office.

- A strip of land 10 feet in width, located adjacent to the south boundary of the El Paso Natural Gas Company, Right-of-Way; also a strip of land described as the west ten feet of:
- a. S1/2 of the NW1/4 of SW1/4
 - b. N1/2 of the SW1/4 SW1/4

Section 27, T. 15.S., R. 14. E. G. & S. R. B. & M. Pima County, Arizona.

Together with the right to attach meters, regulators, and all other matters and things convenient or expedient in the construction, operation or maintenance of a gas line or system, and to enter upon said premises at all times, to survey, construct, repair, operate, control and use said line or system; to remove objects or obstacles therefrom, or to remove the whole or any part of said line or system at the discretion of said party of the second part.

TO HAVE AND TO HOLD the same unto the said party of the second part, its successors and assigns forever.

In WITNESS WHEREOF, the said party/parties of the first part has/have hereunto executed this easement the day and year first above written.

Pima Pork Producers, Inc.
by *John H. Haugh*
Pres.

STATE OF ARIZONA }
COUNTY OF PIMA } ss.

This instrument was acknowledged before me, the undersigned notary public, by
John H. Haugh, President, Pima Pork Producers, Inc.

the 8 day of July, 1964

My Commission Expires Aug 12, 1966

Joseph R. Wadd
Notary Public

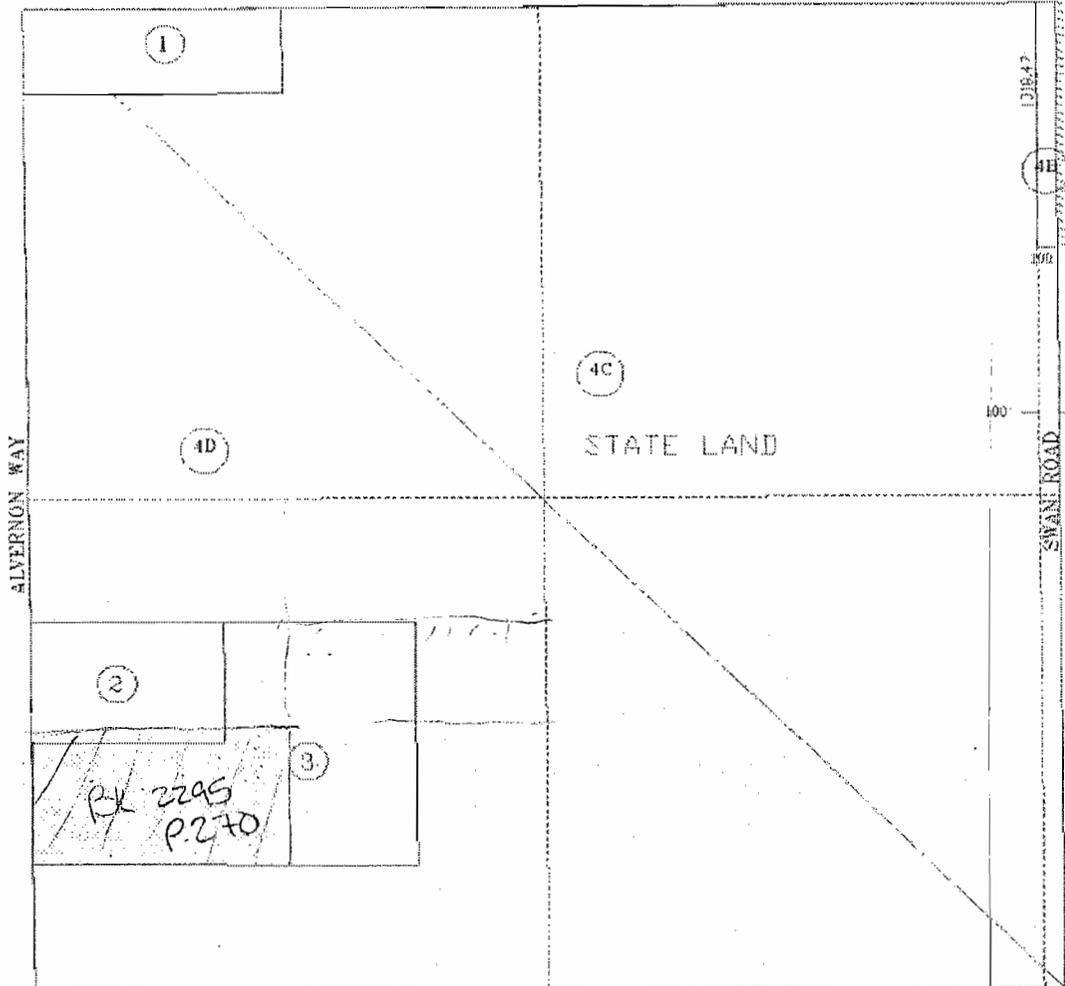
ASSESSOR'S RECORD MAP

140-47

SECTION 27, TOWNSHIP 15 SOUTH, RANGE 14 EAST

AREA-CODE
1200

FORMERLY
139-01



C.O.T.
PROJECT

CITY OF TUCSON

pima
county
assessor

2002-2
NT15S14E27- 07/28/04 NL

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