FINAL
ENVIRONMENTAL IMPACT STATEMENT
JUNE 1994

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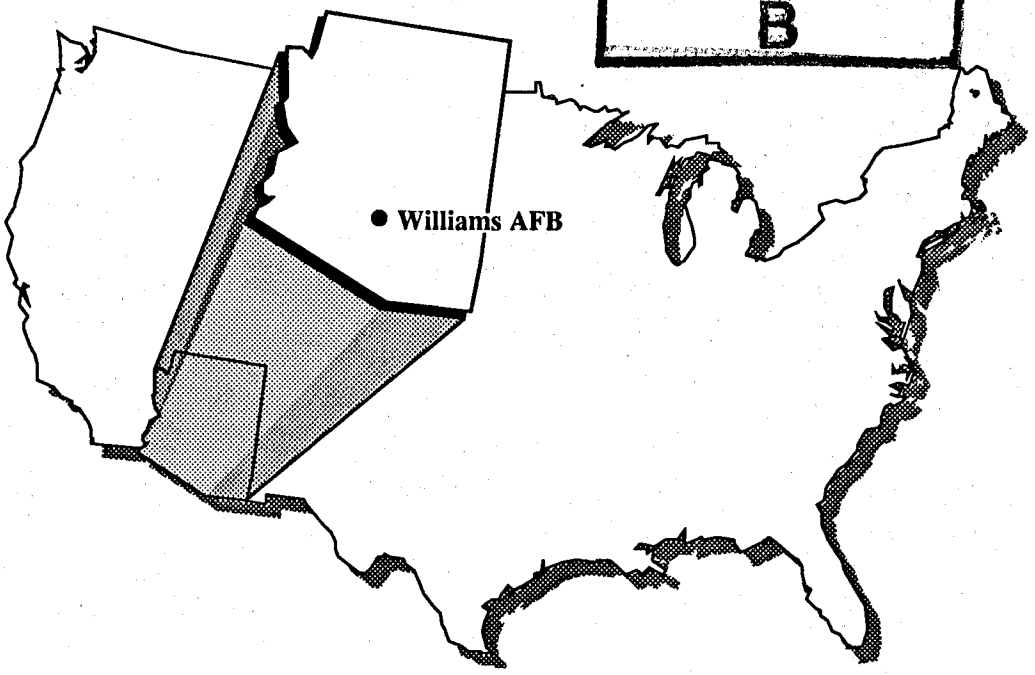

DISPOSAL AND REUSE OF
WILLIAMS AIR FORCE BASE, ARIZONA

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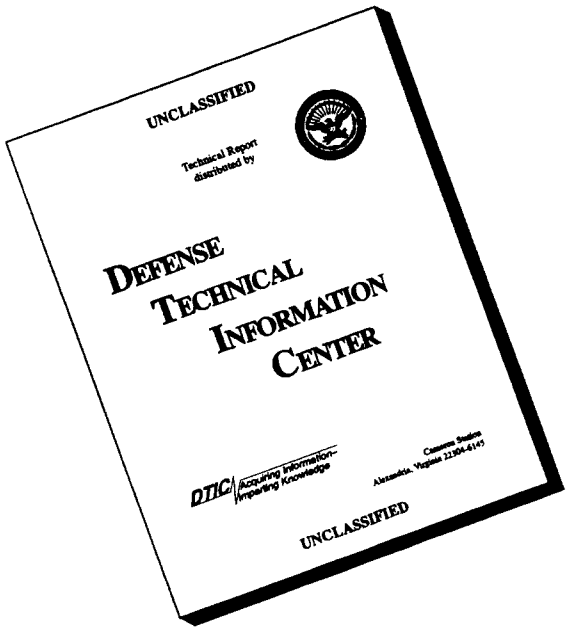

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13. ABSTRACT (*Maximum 200 Words*)

Pursuant to the Defense Base Closure and Realignment Act of 1990, Williams AFB was closed on September 30, 1993. This EIS, prepared in accordance with the National Environmental Policy Act, analyzes the potential environmental impacts of disposal of the base. Although disposal will have few direct effects, future use by others will create indirect effects. The document includes analyses of potential impacts of a range of reasonable foreseeable reuses on the local land use and aesthetics, transportation, utilities, hazardous materials/wastes, geology and soils, water resources, air quality, noise, biological resources, and cultural resources. Potential environmental impacts are increased noise levels, traffic, and emissions of air pollutants over baseline conditions. Redevelopment could cause wind and water erosion, and would require preventive measures. Wetland acreage could be lost due to implementation of reuse alternatives. If impact avoidance is not viable, mitigation by replacement, restoration, or enhancement is possible. Cultural resources could be impacted by conveying the property to a non-federal entity and by ground disturbance. Preservation covenants within disposal documents could eliminate or reduce these effects to a non-adverse level. Because the Air Force is disposing of the property, some of the mitigation measures are beyond Air Force control. Remediation of Installation Restoration Program sites will continue to be the responsibility of the Air Force.

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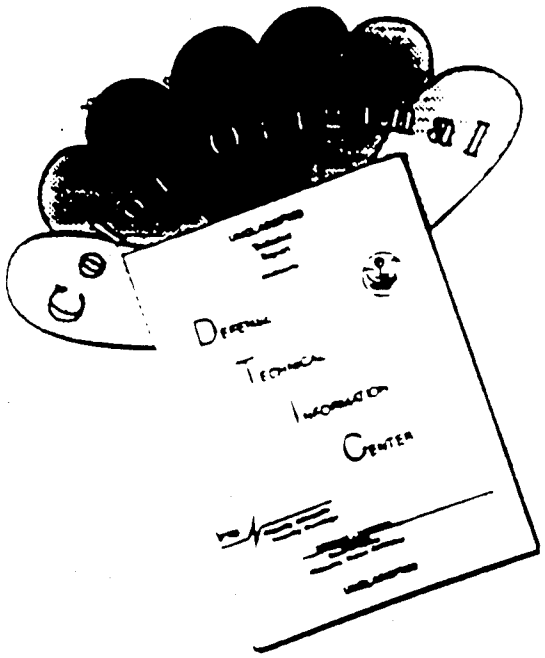

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FINAL

ENVIRONMENTAL IMPACT STATEMENT

DISPOSAL AND REUSE OF WILLIAMS AIR FORCE BASE, ARIZONA

JUNE 1994

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FINAL ENVIRONMENTAL IMPACT STATEMENT
DISPOSAL AND REUSE OF WILLIAMS AIR FORCE BASE, ARIZONA

a. Lead Agency: U.S. Air Force.

b. Cooperating Agency: Federal Aviation Administration.

c. Proposed Action: Disposal and Reuse of Williams Air Force Base (AFB), Mesa, Arizona.

d. Inquiries on this document should be directed to: Lt. Col. Gary Baumgartel, Chief of Environmental Planning Division, AFCEE/EC, 8106 Chennault Road, Brooks Air Force Base, Texas, 78235-5318, (210) 536-3869.

e. Designation: Final Environmental Impact Statement (FEIS).

f. Abstract: Pursuant to the Defense Base Closure and Realignment Act of 1990 (Public Law 101-510, Title XXIX), Williams AFB was closed on September 30, 1993. This EIS has been prepared in accordance with the National Environmental Policy Act to analyze the potential environmental consequences of the disposal of the base. Although disposal will have few, if any, direct effects, future use by others will create indirect effects. The document, therefore, includes analyses of the potential impacts that a range of reasonably foreseeable alternative reuses may have on the local community, including land use and aesthetics, transportation, utilities, hazardous materials/wastes, geology and soils, water resources, air quality, noise, biological resources, and cultural resources. Potential environmental impacts are increased noise levels, traffic, and emissions of air pollutants over closure baseline conditions. Redevelopment could result in wind and water erosion, and would require enactment of preventive measures. Potential wetland acreage could be lost due to implementation of the reuse alternatives. If avoidance of impacts is not viable, mitigation in the form of replacement, restoration, or enhancement is possible. Cultural resources could be impacted by conveyance of the property to a non-federal entity as well as by ground disturbance. Preservation covenants within disposal documents could eliminate or reduce these effects to a non-adverse level. Because the Air Force is disposing of the property, some of the mitigation measures are beyond the control of the Air Force. Remediation of Installation Restoration Program sites is and will continue to be the responsibility of the Air Force.

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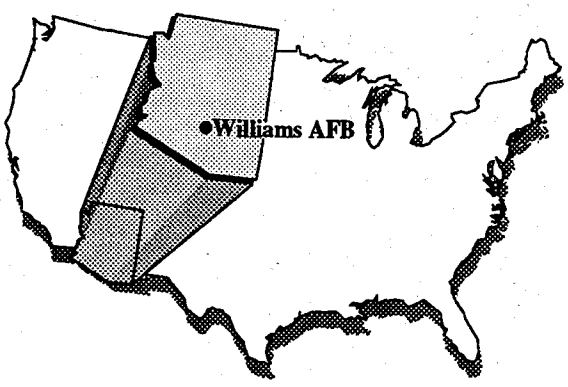


SUMMARY

SUMMARY

PURPOSE AND NEED

Williams Air Force Base (AFB), Arizona, was one of the bases recommended by the 1991 Defense Base Closure and Realignment Commission for closure. The Commission's recommendations were accepted by the President and submitted to Congress on July 12, 1991. As Congress did not disapprove the recommendations in the time given under the Defense Base Closure and Realignment Act (DBCRA) of 1990 (Public Law 101-510, Title XXIX), the recommendations became law. Williams AFB was closed on September 30, 1993.

The Air Force is required to comply with the National Environmental Policy Act (NEPA) in the implementation of the base disposal and reuse. The Air Force must now make a series of interrelated decisions concerning the disposition of base property. In support of these decisions, this environmental impact statement (EIS) has been prepared to provide information on the potential impacts resulting from disposal and proposed reuse of the base property. The Federal Aviation Administration (FAA) is a cooperating agency in the preparation of this EIS, who will make decisions on its own and assist the Air Force in making related decisions concerning Williams AFB property. Several alternative reuse concepts are studied to identify the range of potential direct and indirect environmental consequences of disposal.

After completion and consideration of this EIS, the Air Force will prepare decision documents stating what property is excess and surplus, and the terms and conditions under which the dispositions will be made. These decisions may affect the environment by influencing the nature of the future use of the property.

ALTERNATIVES INCLUDING THE PROPOSED ACTION

The land to be disposed by the Air Force comprises approximately 4,042 acres, including the airfield and areas used for aviation support, industrial, institutional (medical and education), commercial, residential, and public/recreation land uses, as well as vacant land dispersed throughout the base.

For the purpose of evaluating potential environmental impacts resulting from the incident reuse of this land, the Air Force has based its Proposed Action on the community's reuse plan, prepared by the Williams AFB Economic Reuse Advisory Board, which is a comprehensive reuse plan based around a

combined general aviation/commercial airport and a satellite university campus. The primary land use components of the Proposed Action include a combined general aviation/commercial service airfield and aviation support facilities, reusing and expanding the existing airfield on the base. Expansion of the airfield would require acquisition of 25 acres of land located adjacent to the southeast corner of the base which would be used to extend the easternmost runway and attendant runway protection zone. An 8,800-foot portion of existing Runway 12R/30L would be converted to general aviation use and Runway 12L/30R would be lengthened to 10,500 feet to accommodate commercial passenger service aircraft. Runway 12C/30C would initially remain in use but would later be decommissioned and converted into a parallel taxiway; the full precision instrument landing system (ILS) associated with Runway 12C/30C would then be relocated to Runway 12L/30R. In addition to the airfield and aviation support uses, a large education component would reuse most of the existing buildings on the western half of the base. Education land uses would include a satellite university campus, aviation college, research facilities, and retention of an existing elementary school. Other lower profile uses supplementing the activities on the base under the Proposed Action would include commercial uses to serve the airport and education components, industrial uses (located near the airfield and aviation support areas in the northeastern and extreme southwestern corners of the base), and retention of the golf course. While the impact analyses presented in this EIS consider the relocation of the Arizona Air National Guard (ANG) 161st Air Refueling Group (AREFG) from current basing at Phoenix Sky Harbor International Airport to Williams AFB, the latest information indicates that this is not likely to occur within the 20-year study period considered in this EIS. Consideration of this relocation in impacts analysis represents a conservative assumption within a reasonable range of alternatives for reuse of the Williams AFB airfield.

The following alternatives to the Proposed Action are being considered:

- The General Aviation and Education Alternative would combine a general aviation airport facility and industrial uses with an educational component including a satellite college campus, aviation college, research and training activities. The general aviation airfield would reuse 9,250 feet from existing Runway 12C/30C, which has a present length of 10,200 feet. This runway would also be equipped to accommodate precision and non-precision instrument landings. General industrial areas are proposed for the north end of the runway outside the runway protection zone and on the west side of the runway. The Institutional (Education) component would include a major university campus, a vocational/technical aviation training center, a research laboratory, a satellite government center, and a student medical center. The residential component would include construction of 4,475 new dwelling units. Areas of medium- and high-density residential uses would occupy the

northeast corner of the base, the southwest corner of the base, and along both sides of the Pecos Road extension.

- The Commercial Aviation and Education Alternative would combine a commercial service and air cargo airfield, general aviation training facilities, and aviation support uses with a satellite college campus. This alternative proposes commercial aviation uses and aviation training uses with the greatest intensity, involving acquisition of 71 acres of off-base land along the northern and southeastern boundaries to accommodate runway extensions and runway protection zones. Under this alternative, Runway 12L/30R would be lengthened from 9,300 feet to 12,500 feet, and Runway 12R/30L would be maintained at its existing length of 10,400 feet. As with the Proposed Action, Runway 12C/30C would initially remain in use but would later be decommissioned and converted into a parallel taxiway, at which time the ILS would be relocated to Runway 12L/30R. Industrial and commercial areas would be located in the northeast corner and in the southwest corner of the base. The Institutional (Education) component would include a satellite college campus, a research laboratory, and retention of an existing elementary school. Other activities on the base under the Commercial Aviation and Education Alternative would include retention of the existing hospital facilities and the golf course.

- Redevelopment of the base for non-aviation purposes is identified as the Education and Planned Community Alternative. This alternative would combine a large education component (satellite college campus, research, and training facilities) and a "new town" planned community, including a retirement village. The planned community would include schools, commercial, and medium- and high-density residential land uses. The education component, located to the west of the existing flight line, would reuse most of the existing buildings within the central area of the base, as well as all on-base housing. This area would include such uses as a major university campus or four-year state college, a research laboratory, a satellite government service center, and a student medical center. Existing recreational facilities would be retained. Medium- and high-density residential uses would consume nearly half of the existing base property and constitute the largest single land use under this alternative.

- Other land use concepts have been identified for discrete facilities or areas of the base. These include reuse plans which typically involve only a portion of the property available for

disposal and, therefore, could be implemented in conjunction with one another and/or with the Proposed Action or any of the other alternatives under consideration.

- The No-Action Alternative would leave the base in caretaker status under federal control.

SCOPE OF STUDY

The Notice of Intent to prepare an EIS for the disposal and reuse of Williams AFB was published in the Federal Register on October 9, 1991. Issues related to the disposal and reuse of Williams AFB were identified during an ensuing scoping period. A public scoping meeting was held on November 7, 1991 in the Mesa Convention Center, Mesa, Arizona. The comments and concerns expressed at this meeting and in written correspondence received by the Air Force, as well as information from other sources, were used to determine the scope and direction of studies and analyses required to accomplish this EIS.

This EIS discusses the potential environmental impacts associated with the Proposed Action and reasonable alternatives. In order to establish the context in which these environmental impacts may occur, potential changes in population and employment, land use and aesthetics, transportation, and community and public utility services are discussed as reuse-related influencing factors. Issues related to current and future management of hazardous materials and wastes are also discussed. Potential impacts to the physical and natural environment are evaluated for soils and geology, water resources, air quality, noise, biological resources, and cultural resources. These impacts may occur as a direct result of disposal and reuse actions or as an indirect result of changes to the local communities.

The baseline against which the Proposed Action and alternatives are analyzed consists of the conditions projected at base closure in 1993. Although the baseline assumes a closed base, a reference to preclosure conditions is provided in several sections (e.g., air quality and noise) to allow a comparative analysis over time. This will assist the Air Force decision maker and other agencies that may be making decisions relating to reuse of Williams AFB in understanding potential long-term trends in comparison to historic conditions when the installation was active.

The Air Force is also preparing a separate Socioeconomic Impact Analysis Study on the economic impacts expected in the region as a result of the closure, disposal, and reuse of Williams AFB. That document, although not required by NEPA, will assist the local community in planning for the transition of the base from military to civilian use.

SUMMARY OF ENVIRONMENTAL IMPACTS

This EIS considers environmental impacts of the Air Force's disposal of the installation and portrays a variety of potential land uses to cover reasonable future uses of the property and facilities by others. Several alternative scenarios, including the community's proposed plan, were used to group reasonable land uses and to examine the environmental effects of likely reuse of Williams AFB.

Environmental impacts of the Proposed Action and reasonable alternatives are briefly described below. Influencing factors include projections of the reuse activities that would likely influence the biophysical environment, including acres of disturbance, socioeconomic factors, and infrastructure demands, and are summarized in Table S-1. The employment and population trends are depicted in Figures S-1 and S-2. Changes to the level of service (LOS) designation for each road segment analyzed are presented in Table S-2. Impacts of the Proposed Action and alternatives over the 20-year study period are summarized in Table S-3.

Mitigations and Pollution Prevention. Options for mitigating potential environmental impacts that might result from the Air Force disposing of property or from the implementation of the Proposed Action or alternatives by property recipients are presented and discussed. Since most potential environmental impacts would result directly from the reuse by others, the Air Force would not typically be responsible for implementing such mitigations. Full responsibility for these suggested mitigations, therefore, would be borne primarily by future property recipients or local governmental agencies. Mitigation suggestions, where appropriate, are listed in terms of their potential effectiveness if implemented for affected resource areas and are summarized along with the environmental impacts of the Proposed Action and alternatives in Table S-3.

PROPOSED ACTION

Local Community. Redevelopment of base property under the Proposed Action would result in an increase in employment in the region of influence (ROI). The Phoenix Metropolitan Statistical Area (MSA), coincident with Maricopa County, is considered the ROI for purposes of describing and analyzing employment and population effects. The key area communities that were analyzed in detail were the cities of Chandler, Mesa, Phoenix, and Tempe, the towns of Gilbert and Queen Creek, and in Pinal County, the City of Apache Junction. Within the ROI, approximately 18,632 direct jobs and 24,699 secondary jobs are projected by the year 2013 as a result of the Proposed Action. Total ROI employment would reach approximately 2,131,757 by 2013. Population in the ROI, as a result of the Proposed Action, would increase by approximately 45,932 by 2013 resulting in a total ROI population of 3,748,303. This last figure reflects both the impacts of

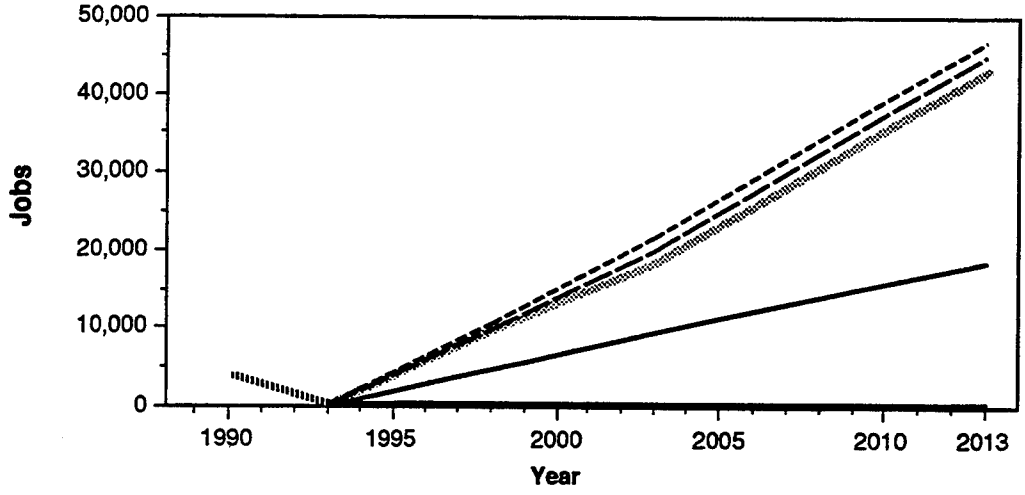
Table S-1. Summary of Reuse-Related Influencing Factors

Factor	Proposed Action			General Aviation and Education Alternative			Commercial Aviation and Education Alternative			Education and Planned Community Alternative			No-Action* Alternative
	1998	2003	2013	1998	2003	2013	1998	2003	2013	1998	2003	2013	
Acres of Disturbance (by phase)	2,757	130	483	1,872	398	782	2,784	145	513	1,654	1,064	477	No Change
Aircraft Operations (annual)	34,250	44,400	88,250	60,640	84,600	157,300	235,400	250,900	281,300	-0-	-0-	-0-	-0-
Direct Employment	4,247	7,856	18,632	4,063	8,723	19,428	3,979	8,309	19,153	2,299	5,005	11,502	82
Secondary Employment	5,982	10,894	24,699	6,290	12,982	27,290	5,908	11,728	25,868	2,516	4,251	6,929	30
Population Increase	10,716	19,753	45,932	10,660	23,349	50,750	10,347	21,148	47,717	4,849	9,832	20,777	No Change
Traffic (average daily trips one-way)	24,400	46,600	131,000	18,900	54,400	119,000	23,700	57,000	157,000	27,400	90,800	189,800	No Change
Increase in Water Demand (MGD)	0.98	1.80	4.19	0.97	2.13	4.63	0.88	1.84	4.24	0.44	0.90	1.90	No Change
Increase in Wastewater Production (MGD)	0.43	0.78	1.82	0.42	0.93	2.01	0.38	0.80	1.84	0.19	0.39	0.82	No Change
Increase in Solid Waste (tons/year)	12,900	23,800	55,200	12,800	28,200	61,000	12,400	25,500	57,400	5,800	11,900	25,000	No Change
Increase in Electricity Demand (MWH/day)	192	344	768	191	407	849	185	368	798	87	171	348	No Change
Increase in Natural Gas Demand (therms/day)	4,200	7,600	17,000	4,200	9,000	18,800	4,100	8,100	17,700	1,900	3,800	7,700	No Change

Notes: MGD = Million Gallons/Day.
MWH = Megawatt-Hours.
*No-Action Alternative summarizes influencing factors relative to the closure baseline conditions.

ALTERNATIVE	1993	1998	2003	2013
Proposed Action	112	10,229	18,750	43,331
General Aviation and Education	112	10,353	21,705	46,718
Commercial Aviation and Education	112	9,887	20,037	45,021
Education and Planned Community	112	4,815	9,256	18,431
No-Action	112	112	112	112

Reuse-Related Employment Effects



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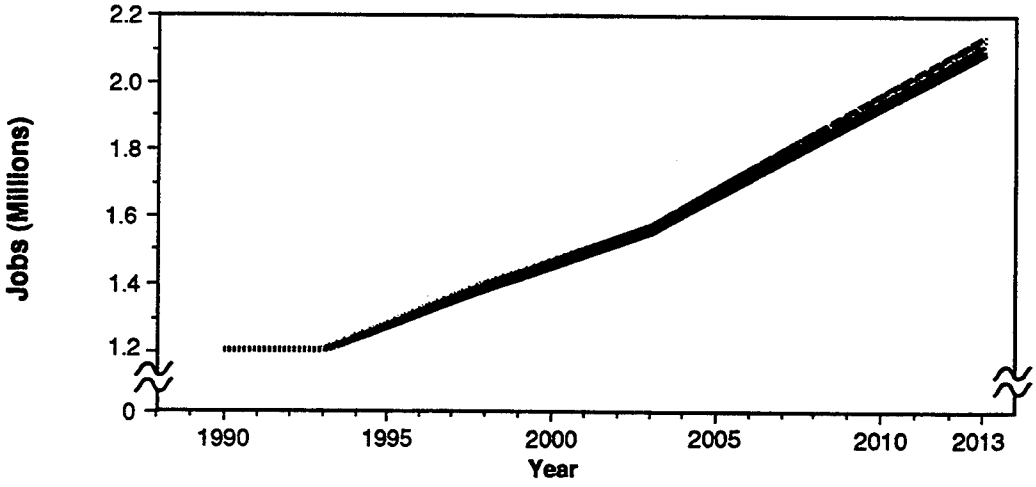


Total ROI Employment Including Reuse Effects

EXPLANATION

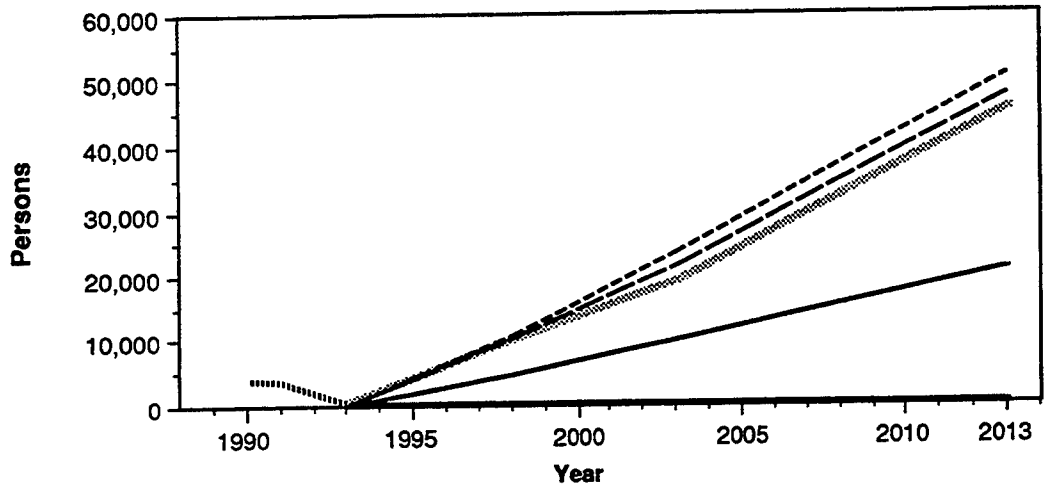
- No-Action/Post-Closure
- Proposed Action
- General Aviation and Education
- Commercial Aviation and Education
- Education and Planned Community
- Preclosure

ROI Reuse-Related Employment Effects

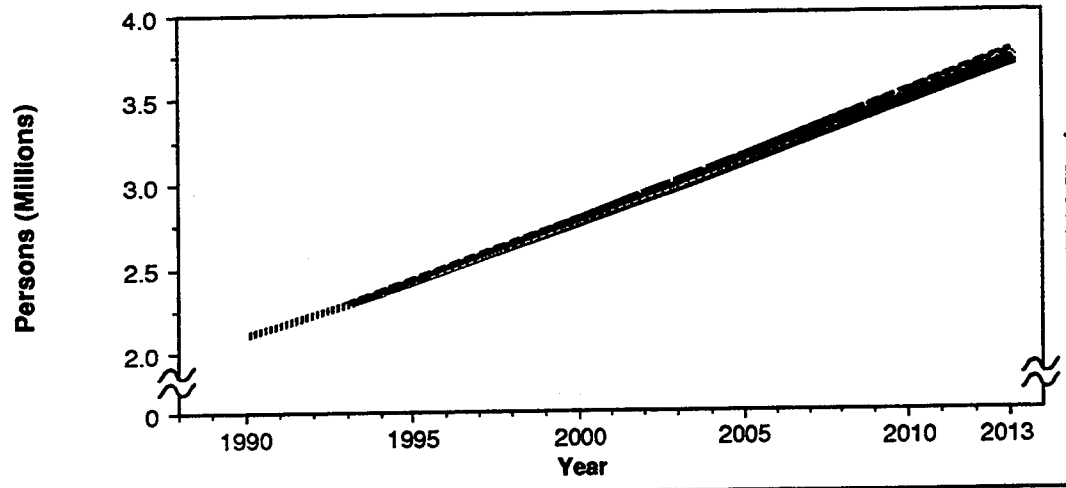
Figure S-1

ALTERNATIVE	1993	1998	2003	2013
Proposed Action	0	10,716	19,753	45,932
General Aviation and Education	0	10,660	23,349	50,750
Commercial Aviation and Education	0	10,347	21,148	47,717
Education and Planned Community	0	4,849	9,832	20,777
No-Action	0	0	0	0

Reuse-Related Population Effects



Reuse-Related Population Effects



Total ROI Population Including Reuse Effects

EXPLANATION

- No-Action/Post-Closure
- Proposed Action
- General Aviation and Education
- Commercial Aviation and Education
- Education and Planned Community
- Preclosure

ROI Reuse-Related Population Effects

Figure S-2

Table S-2. Level of Service Designations* for Local and Regional Roads Under the Proposed Action and Reuse Alternatives

	Proposed Action			General Aviation and Education			Commercial Aviation and Education			Education and Planned Community		
	1998	2003	2013	1998	2003	2013	1998	2003	2013	1998	2003	2013
Rittenhouse Road Between Power Road and Sossaman Road	A	A	D	A	A	D	A	A	D	A	A	D
Williams Field Road Between Recker Road and Power Road	A	A	A	A	A	A	A	A	A	A	B	F
Williams Field Road (Widened) Between Recker Road and Power Road	—	—	—	—	—	—	-	-	-	A	B	C
Power Road Between Ray Road and Warner Road	B	D	F	C	F	F	C	E	F	B	D	F
Power Road (Widened) Between Ray Road and Warner Road	B	D	E	C	A	B	C	E	C	B	D	D
Ellsworth Road Between Warner Road and Elliot Road	A	A	C	A	A	E	A	A	E	A	A	F
Ellsworth Road (Widened) Between Warner Road and Elliot Road	—	—	—	—	—	—	—	—	—	A	A	A
Elliot Road Between Power Road and Sossaman Road	A	A	C	A	A	C	A	A	C	A	A	C
Germann Road East of Ellsworth Road	A	A	C	A	A	C	A	A	C	A	A	C
U.S. 89 Between Ellsworth Road and Meridian Road	E	F	F	E	F	F	E	F	F	E	F	F
U.S. 89 (Widened) Between Ellsworth Road and Meridian Road	E	C	E	E	C	E	E	C	E	E	D	D
U.S. 60 Between Price Road and Dobson Road	F	F	F	F	F	F	F	F	F	F	F	F
U.S. 60 (Widened) Between Price Road and Dobson Road	D	D	D	D	D	D	D	D	D	D	D	E

*Table 3.2-2 provides a description of level of service (LOS) designations.

Table S-3. Summary of Environmental Impacts and Mitigation from the Proposed Action and Reuse Alternatives
Page 1 of 16

Resource Category	Proposed Action	General Aviation and Education Alternative	Commercial Aviation and Education Alternative	Education and Planned Community Alternative	No-Action Alternative
Local Community					
• Land Use and Aesthetics	IMPACT: Maricopa County and the adjacent towns and cities would experience development pressures to intensify development on rural and under-developed lands in the vicinity of the base.	Maricopa County and the adjacent towns and cities would experience development pressures to intensify development on rural and under-developed lands in the vicinity of the base. Proposed residential areas could conflict with planned future industrial uses on off-base land, as well as proposed adjacent industrial uses on-base.	Operation of a major airport would exert more intensive development pressures on surrounding off-base lands than that of the Proposed Action. Extension of runway protection zones to off-base properties could conflict with the proposed right-of-way for the future San Tan Freeway.	Maricopa County and the adjacent towns and cities would experience development pressures to intensify development on rural and under-developed lands in the vicinity of the base. Residential and new town uses would conflict with planned industrial areas designated for off-base lands by the City of Mesa.	No impact.
	MITIGATION: Reuse Proponent/Agencies: Rezone surrounding properties and annex within Municipal Planning Areas. Revise General Plan for Queen Creek.	Reuse Proponent/Agencies: Rezone surrounding properties and annex within Municipal Planning Areas. Revise General Plan for Queen Creek. Buffer residential areas from future adjacent industrial uses either through the general plan to provide a gradual transition of uses, or through zoning through open space buffers and design and performance standards.	Reuse Proponent/Agencies: Rezone surrounding properties and annex within Municipal Planning Areas. Revise General Plan for Queen Creek. Adjust proposed right-of-way for future San Tan Freeway.	Reuse Proponent/Agencies: Rezone surrounding properties and annex within Municipal Planning Areas. Revise General Plan for Queen Creek. Substantially revise the General Plan for Mesa to reduce large tracts of industrially planned properties.	No mitigation necessary.

Table S-3. Summary of Environmental Impacts and Mitigation from the Proposed Action and Reuse Alternatives
Page 2 of 16

Resource Category	Proposed Action	General Aviation and Education Alternative	Commercial Aviation and Education Alternative	Education and Planned Community Alternative	No-Action Alternative
• Land Use and Aesthetics (Continued)	IMPACT: New noise contours and accident potential hazard areas would not coincide with existing airport overlay districts on off-base lands.	New noise contours and accident potential hazard areas would not coincide with existing airport overlay districts on off-base lands.	New noise contours and accident potential hazard areas would not coincide with existing airport overlay districts on off-base lands. Noise contours on the base would conflict with portions of the commercial land use area proposed for hotel development in the northeast corner of the base.	Absence of noise contours and potential hazard areas would not coincide with existing airport overlay districts.	No impact.
	MITIGATION: Reuse Proponent/Agencies: Revise existing airport overlay districts to accommodate new noise contours and hazard areas.	Reuse Proponent/Agencies: Revise existing airport overlay districts to accommodate new noise contours and hazard areas.	Reuse Proponent/Agencies: Revise existing airport overlay districts to accommodate new noise contours and hazard areas. Proposed hotel development in the northeast corner of the base may require discretionary permit approvals and noise reduction measures.	Reuse Proponent/Agencies: Remove airport overlay districts.	No mitigation necessary.
	IMPACT: Proposed recreational open space and educational reuse would conflict with the existing Landfill, Liquid Fuels Storage Area, and the capped portion of the Southwest Drainage System.	Proposed recreational open space and educational reuse would conflict with the existing Landfill, Liquid Fuels Storage Area, and the capped portion of the Southwest Drainage System.	Proposed recreational open space and educational reuse would conflict with the existing Landfill, Liquid Fuels Storage Area, and the capped portion of the Southwest Drainage System.	Proposed recreational open space and educational reuse would conflict with the existing Landfill, Liquid Fuels Storage Area, and the capped portion of the Southwest Drainage System.	No impact.

Table S-3. Summary of Environmental Impacts and Mitigation from the Proposed Action and Reuse Alternatives
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Resource Category	Proposed Action	General Aviation and Education Alternative	Commercial Aviation and Education Alternative	Education and Planned Community Alternative	No-Action Alternative
• Land Use and Aesthetics (Continued)	MITIGATION: Air Force: Construction of a soil cover, emplacement of an engineered cap, excavation and removal, or retention by the Air Force could mitigate reuse conflicts with the Landfill. Portions of the Liquid Fuels Storage Area may require restricted use while remediation takes place. The capped portion of the Southwest Drainage System may also require restricted use while investigation and remediation, if necessary, are completed. Reuse Proponent/Agencies: Follow recommended land use restrictions.	Air Force: Construction of a soil cover, emplacement of an engineered cap, excavation and removal, or retention by the Air Force could mitigate reuse conflicts with the Landfill. Portions of the Liquid Fuels Storage Area may require restricted use while remediation takes place. The capped portion of the Southwest Drainage System may also require restricted use while investigation and remediation, if necessary, are completed. Reuse Proponent/Agencies: Follow recommended land use restrictions.	Air Force: Construction of a soil cover, emplacement of an engineered cap, excavation and removal, or retention by the Air Force could mitigate reuse conflicts with the Landfill. Portions of the Liquid Fuels Storage Area may require restricted use while remediation takes place. The capped portion of the Southwest Drainage System may also require restricted use while investigation and remediation, if necessary, are completed. Reuse Proponent/Agencies: Follow recommended land use restrictions.	Air Force: Construction of a soil cover, emplacement of an engineered cap, excavation and removal, or retention by the Air Force could mitigate reuse conflicts with the Landfill. Portions of the Liquid Fuels Storage Area may require restricted use while remediation takes place. The capped portion of the Southwest Drainage System may also require restricted use while investigation and remediation, if necessary, are completed. Reuse Proponent/Agencies: Follow recommended land use restrictions.	Air Force: Site remediation will proceed under the Installation restoration Program.
	IMPACT: Proposed uses could have adverse impacts on archaeological resource areas.	Proposed uses could have adverse impacts on archaeological resource areas.	Proposed uses could have adverse impacts on archaeological resource areas.	Proposed uses could have adverse impacts on archaeological resource areas.	No impact.
	MITIGATION: Reuse Proponent/Agencies: Avoid ground disturbing activities in sensitive areas or fully document cultural materials prior to development.	Reuse Proponent/Agencies: Avoid ground disturbing activities in sensitive areas or fully document cultural materials prior to development.	Reuse Proponent/Agencies: Avoid ground disturbing activities in sensitive areas or fully document cultural materials prior to development.	Reuse Proponent/Agencies: Avoid ground disturbing activities in sensitive areas or fully document cultural materials prior to development.	Air Force: Provide security to maintain integrity of resources.

Table S-3. Summary of Environmental Impacts and Mitigation from the Proposed Action and Reuse Alternatives

Resource Category	Proposed Action	General Aviation and Education Alternative	Commercial Aviation and Education Alternative	Education and Planned Community Alternative	No-Action Alternative
• Land Use and Aesthetics (Continued)	IMPACT: Proposed uses could have adverse impacts on traditional resources; the Air Force is consulting with concerned Native American tribal groups and communities to identify potential impacts.	Proposed uses could have adverse impacts on traditional resources; the Air Force is consulting with concerned Native American tribal groups and communities to identify potential impacts.	Proposed uses could have adverse impacts on traditional resources; the Air Force is consulting with concerned Native American tribal groups and communities to identify potential impacts.	Proposed uses could have adverse impacts on traditional resources; the Air Force is consulting with concerned Native American tribal groups and communities to identify potential impacts.	The Air Force is consulting with concerned Native American tribal groups and communities to identify potential impacts.
	MITIGATION: Reuse Proponent/Agencies: Avoid ground disturbing activities in sensitive areas; other mitigations may be developed once impacts are defined.	Reuse Proponent/Agencies: Avoid ground disturbing activities in sensitive areas; other mitigations may be developed once impacts are defined.	Reuse Proponent/Agencies: Avoid ground disturbing activities in sensitive areas; other mitigations may be developed once impacts are defined.	Reuse Proponent/Agencies: Avoid ground disturbing activities in sensitive areas; other mitigations may be developed once impacts are defined.	Air Force: Provide security to maintain integrity of resources. Other mitigations will be developed once impacts are defined.
	IMPACT: Potential demolition of five historic structures could occur due to incompatibility with proposed uses.	Potential demolition of five historic structures could occur due to incompatibility with proposed uses.	Potential demolition of four historic structures could occur due to incompatibility with proposed uses.	Potential demolition of 12 historic structures could occur due to incompatibility with proposed uses.	Integrity of 14 historic structures could deteriorate unless adequate maintenance is provided.
	MITIGATION: Reuse Proponent/Agencies: Reevaluation of land uses to avoid demolition; relocation; or full documentation prior to demolition.	Reuse Proponent/Agencies: Reevaluation of land uses to avoid demolition; relocation; or full documentation prior to demolition.	Reuse Proponent/Agencies: Reevaluation of land uses to avoid demolition; relocation; or full documentation prior to demolition.	Reuse Proponent/Agencies: Reevaluation of land uses to avoid demolition; relocation; or full documentation prior to demolition.	Air Force: Provide maintenance to prevent deterioration of historic structures.
	IMPACT: Adverse visual effects to surrounding properties could occur with construction of industrial and commercial areas in the northeast corner of the base.	Adverse visual effects to surrounding properties could occur with construction of industrial and commercial areas in the northeast corner of the base. Residential uses may be subject to adverse visual effects adjacent to the existing landfill.	Adverse visual effects to surrounding properties could occur with construction of industrial and commercial areas in the northeast corner of the base.	Education uses may be subject to adverse visual effects adjacent to the existing landfill.	No impact.

Table S-3. Summary of Environmental Impacts and Mitigation from the Proposed Action and Reuse Alternatives
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Resource Category	Proposed Action	General Aviation and Education Alternative	Commercial Aviation and Education Alternative	Education and Planned Community Alternative	No-Action Alternative
• Land Use and Aesthetics (Continued)	MITIGATION: Reuse Proponent/Agencies: Implementation of height restrictions, architectural design standards, and landscape requirements by the City of Mesa.	Reuse Proponent/Agencies: Implementation of height restrictions, architectural design standards, and landscape requirements by the City of Mesa.	Reuse Proponent/Agencies: Implementation of height restrictions, architectural design standards, and landscape requirements by the City of Mesa.	Reuse Proponent/Agencies: Implementation of height restrictions, architectural design standards, and landscape requirements by the City of Mesa.	No mitigation necessary.
• Transportation	IMPACTS: Access to land uses provided by new arterial network.	Access to land uses provided by new arterial network.	Access to land uses provided by new arterial network.	Access to land uses provided by new arterial network.	No added roadways required.
	131,000 daily vehicle trips (one-way) generated.	119,000 daily vehicle trips (one-way) generated.	157,000 daily vehicle trips (one-way) generated.	189,800 daily vehicle trips (one-way) generated.	No daily vehicle trips generated.
	Increased capacity needed for Power Rd., U.S. 89, and U.S. 60.	Increased capacity needed for Power Rd., U.S. 89, and U.S. 60.	Increased capacity needed for Power Rd., U.S. 89, and U.S. 60.	Increased capacity needed for Williams Field Rd., Power Rd., Ellsworth Rd., U.S. 89, and U.S. 60.	No increased capacity needed.
	MITIGATION: Reuse Proponent/Agencies: TDM measures could reduce daily vehicle trips (one-way) to 117,900.	Reuse Proponent/Agencies: TDM measures could reduce daily vehicle trips (one-way) to 107,100.	Reuse Proponent/Agencies: TDM measures could reduce daily vehicle trips (one-way) to 141,300.	Reuse Proponent/Agencies: TDM measures could reduce daily vehicle trips (one-way) to 170,000.	No TDM needed.
	IMPACT: Airspace conflict between Williams arrivals from the northwest and the instrument approach to Mesa-Falcon Field Airport.	No impacts due to airspace conflict.	Airspace conflict between Williams arrivals from the northwest and the instrument approach to Mesa-Falcon Field Airport. Additional airspace conflict between new Williams IFR non-precision approaches and Phoenix Sky Harbor International Airport arrival paths.	No airspace impacts.	No airspace impacts.

Table S-3. Summary of Environmental Impacts and Mitigation from the Proposed Action and Reuse Alternatives
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Resource Category	Proposed Action	General Aviation and Education Alternative	Commercial Aviation and Education Alternative	Education and Planned Community Alternative	No-Action Alternative
• Transportation (Continued)	MITIGATION: Reuse Proponent/Agencies: The airspace conflict is an existing condition currently mitigated via "tunnelling"; similar mitigation would be appropriate under this alternative.	No airspace mitigation necessary.	The existing airspace conflict is currently mitigated via "tunnelling"; similar mitigation would be appropriate under this alternative. The additional conflict, however, may not be mitigable.	No airspace mitigation necessary.	No airspace mitigation necessary.
• Utilities	IMPACTS:				
Water	4.19 MGD in year 2013, 4.6% increase in ROI	4.63 MGD in year 2013, 5.0% increase in ROI	4.24 MGD in year 2013, 4.6% increase in ROI	1.90 MGD in year 2013, 2.1% increase in ROI	Minimal demand. No impact on local suppliers.
Wastewater	1.82 MGD in year 2013, 4.6% increase in ROI	2.01 MGD in year 2013, 5.0% increase in ROI	1.84 MGD in year 2013, 4.6% increase in ROI	0.82 MGD in year 2013, 2.1% increase in ROI	Minimal demand. No impact on local suppliers.
Solid Waste	55,200 tons/year in year 2013, 1.2% increase in ROI	61,000 tons/year in year 2013, 1.4% increase in ROI	57,400 tons/year in year 2013, 1.3% increase in ROI	25,000 tons/year in year 2013, 0.6% increase in ROI	Minimal demand. No impact on local suppliers.
Electricity	768 MWH/day in year 2013, 1.3% increase in ROI	849 MWH/day in year 2013, 1.4% increase in ROI	798 MWH/day in year 2013, 1.3% increase in ROI	348 MWH/day in year 2013, 0.6% increase in ROI	Minimal demand. No impact on local suppliers.
Natural Gas	17,000 therms/day in year 2013, 1.3% increase in ROI	18,800 therms/day in year 2013, 1.5% increase in ROI	17,700 therms/day in year 2013, 1.4% increase in ROI	7,700 therms/day in year 2013, 0.6% increase in ROI	Minimal demand. No impact on local suppliers.
	MITIGATION: Reuse Proponent/Agencies: Siting of a new Maricopa County landfill is required and is being considered.	Reuse Proponent/Agencies: Siting of a new Maricopa County landfill is required and is being considered.	Reuse Proponent/Agencies: Siting of a new Maricopa County landfill is required and is being considered.	Reuse Proponent/Agencies: Siting of a new Maricopa County landfill is required and is being considered.	Reuse Proponent/Agencies: Siting of a new Maricopa County landfill is required and is being considered.
	City of Mesa sanitary sewer system capacity will have to be increased to handle increased demand.	City of Mesa sanitary sewer system capacity will have to be increased to handle increased demand.	City of Mesa sanitary sewer system capacity will have to be increased to handle increased demand.	City of Mesa sanitary sewer system capacity will have to be increased to handle increased demand.	City of Mesa sanitary sewer system capacity will have to be increased to handle increased demand.

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Resource Category	Proposed Action	General Aviation and Education Alternative	Commercial Aviation and Education Alternative	Education and Planned Community Alternative	No-Action Alternative
Hazardous Materials and Hazardous Waste Management					
• Hazardous Materials Management	IMPACTS: Increase in types and quantities of materials. Need for emergency response capability.	Increase in types and quantities of materials. Need for emergency response capability.	Increase in types and quantities of materials. Need for emergency response capability.	Increase in types and quantities of materials. Need for emergency response capability.	Small quantities of materials used by OL for maintenance functions.
	MITIGATION: Reuse Proponent/Agencies: Establish cooperative planning body; conform to environmental standards.	Reuse Proponent/Agencies: Establish cooperative planning body; conform to environmental standards.	Reuse Proponent/Agencies: Establish cooperative planning body; conform to environmental standards.	Reuse Proponent/Agencies: Establish cooperative planning body; conform to environmental standards.	Air Force: OL responsible for materials management and development of spill response plan.
• Hazardous Waste Management	IMPACTS: Increase in types and quantities of wastes. Need for emergency response capability.	Increase in types and quantities of wastes. Need for emergency response capability.	Increase in types and quantities of wastes. Need for emergency response capability.	Increase in types and quantities of wastes. Need for emergency response capability.	Minimal quantities of waste generated by OL as a result of maintenance activities.
	MITIGATION: Reuse Proponent/Agencies: Establish cooperative planning body; employ waste minimization practices; conform to environmental standards.	Reuse Proponent/Agencies: Establish cooperative planning body; employ waste minimization practices; conform to environmental standards; public awareness and "household collection days" for residential hazardous wastes.	Reuse Proponent/Agencies: Establish cooperative planning body; employ waste minimization practices; conform to environmental standards.	Reuse Proponent/Agencies: Establish cooperative planning body; employ waste minimization practices; conform to environmental standards; public awareness and "household collection days" for residential hazardous wastes.	Air Force: OL responsible for waste management and development of spill response plan.
• Installation Restoration Program	IMPACTS: Remediation of certain areas may delay the conveyance of some parcels and limit land uses within overlying areas.	Remediation of certain areas may delay the conveyance of some parcels and limit land uses within overlying areas.	Remediation of certain areas may delay the conveyance of some parcels and limit land use within overlying areas.	Remediation of certain areas may delay the conveyance of some parcels and limit land uses within overlying areas.	No impacts; remediation ongoing.

Table S-3. Summary of Environmental Impacts and Mitigation from the Proposed Action and Reuse Alternatives
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Resource Category	Proposed Action	General Aviation and Education Alternative	Commercial Aviation and Education Alternative	Education and Planned Community Alternative	No-Action Alternative
• Installation Restoration Program (Continued)	MITIGATION: Air Force: Address and properly close out each site. Reuse Proponent/Agencies: Follow recommended land use restrictions.	Air Force: Address and properly close out each site. Reuse Proponent/Agencies: Follow recommended land use restrictions.	Air Force: Address and properly close out each site. Reuse Proponent/Agencies: Follow recommended land use restrictions.	Air Force: Address and properly close out each site. Reuse Proponent/Agencies: Follow recommended land use restrictions.	Air Force: Address and properly close out each site.
• Storage Tanks	IMPACTS: All existing USTs to be removed prior to base disposal. Reuse activities will require new USTs. ASTs purged and conveyed for reuse.	All existing USTs to be removed prior to base disposal. Reuse activities will require new USTs. ASTs purged and conveyed for reuse.	All existing USTs to be removed prior to base disposal. Reuse activities will require new USTs. ASTs purged and conveyed for reuse.	All existing USTs to be removed prior to base disposal. Reuse activities will require new USTs. ASTs purged and conveyed for reuse.	All existing USTs to be removed. ASTs purged and maintained in caretaker status.
	MITIGATION: Air Force: Close and remove tanks in conformance with appropriate federal, state, and local regulations. Reuse Proponent/Agencies: Use acceptable leak detection methods, spill and overfill protection, cathodic protection, secondary containment for tank systems including piping, and liability insurance.	Air Force: Close and remove tanks in conformance with appropriate federal, state, and local regulations. Reuse Proponent/Agencies: Use acceptable leak detection methods, spill and overfill protection, cathodic protection, secondary containment for tank systems including piping, and liability insurance.	Air Force: Close and remove tanks in conformance with appropriate federal, state, and local regulations. Reuse Proponent/Agencies: Use acceptable leak detection methods, spill and overfill protection, cathodic protection, secondary containment for tank systems including piping, and liability insurance.	Air Force: Close and remove tanks in conformance with appropriate federal, state, and local regulations. Reuse Proponent/Agencies: Use acceptable leak detection methods, spill and overfill protection, cathodic protection, secondary containment for tank systems including piping, and liability insurance.	Air Force: Close and remove tanks in conformance with appropriate federal, state, and local regulations.
• Asbestos	IMPACTS: Friable asbestos has been removed or encapsulated; continued management of nonfriable asbestos in place.	Friable asbestos has been removed or encapsulated; continued management of nonfriable asbestos in place.	Friable asbestos has been removed or encapsulated; continued management of nonfriable asbestos in place.	Friable asbestos has been removed or encapsulated; continued management of nonfriable asbestos in place.	Friable asbestos has been removed or encapsulated; continued management of nonfriable asbestos in place.

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Resource Category	Proposed Action	General Aviation and Education Alternative	Commercial Aviation and Education Alternative	Education and Planned Community Alternative	No-Action Alternative
• Asbestos (Continued)	MITIGATION: Reuse Proponent/Agencies: Coordinate asbestos management with renovation and demolition activities; compliance with National Emissions Standards for Hazardous Air Pollutants (NESHAP) to mitigate impacts and preclude asbestos hazards.	Reuse Proponent/Agencies: Coordinate asbestos management with renovation and demolition activities; compliance with NESHAP to mitigate impacts and preclude asbestos hazards.	Reuse Proponent/Agencies: Coordinate asbestos management with renovation and demolition activities; compliance with NESHAP to mitigate impacts and preclude asbestos hazards.	Reuse Proponent/Agencies: Coordinate asbestos management with renovation and demolition activities; compliance with NESHAP to mitigate impacts and preclude asbestos hazards.	Air Force: Compliance with NESHAP; continued management of non-friable asbestos in place.
• Pesticides	IMPACTS: Landscape management may result in increased pesticide use.	Landscape management may result in increased use.	Landscape management may result in increased use.	Landscape management may result in increased use.	Minimal maintenance level use.
	MITIGATION: Reuse Proponent/Agencies: Conform to environmental standards.	Reuse Proponent/Agencies: Conform to environmental standards.	Reuse Proponent/Agencies: Conform to environmental standards.	Reuse Proponent/Agencies: Conform to environmental standards.	Air Force: Conform to environmental standards.
• Polychlorinated Biphenyls (PCBs)	IMPACTS: Known PCB-containing and PCB-contaminated equipment has been removed.	Known PCB-containing and PCB-contaminated equipment has been removed.	Known PCB-containing and PCB-contaminated equipment has been removed.	Known PCB-containing and PCB-contaminated equipment has been removed.	Known PCB-containing and PCB-contaminated equipment has been removed.
	MITIGATION: Air Force: Conduct sampling and laboratory analysis to confirm non-PCB status of 322 electrical items; remove those that test positive for PCBs > 50 ppm. Reuse Proponent/Agencies: Conduct routine inspection and maintenance.	Air Force: Conduct sampling and laboratory analysis to confirm non-PCB status of 322 electrical items; remove those that test positive for PCBs > 50 ppm. Reuse Proponent/Agencies: Conduct routine inspection and maintenance.	Air Force: Conduct sampling and laboratory analysis to confirm non-PCB status of 322 electrical items; remove those that test positive for PCBs > 50 ppm. Reuse Proponent/Agencies: Conduct routine inspection and maintenance.	Air Force: Conduct sampling and laboratory analysis to confirm non-PCB status of 322 electrical items; remove those that test positive for PCBs > 50 ppm. Reuse Proponent/Agencies: Conduct routine inspection and maintenance.	Air Force: Conduct sampling and laboratory analysis to confirm non-PCB status of 322 electrical items; remove those that test positive for PCBs > 50 ppm.

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Resource Category	Proposed Action	General Aviation and Education Alternative	Commercial Aviation and Education Alternative	Education and Planned Community Alternative	No-Action Alternative
• Radon	IMPACTS: Two buildings tested above the 95% confidence limit for a 4 pCi/L exposure. MITIGATION: Air Force and Reuse Proponent/Agencies: Additional sampling at Buildings 237 and 334 recommended; mitigation via improved ventilation if high radon levels persist.	Two buildings tested above the 95% confidence limit for a 4 pCi/L exposure. Air Force and Reuse Proponent/Agencies: Additional sampling at Buildings 237 and 334 recommended; mitigation via improved ventilation if high radon levels persist.	Two buildings tested above the 95% confidence limit for a 4 pCi/L exposure. Air Force and Reuse Proponent/Agencies: Additional sampling at Buildings 237 and 334 recommended; mitigation via improved ventilation if high radon levels persist.	Two buildings tested above the 95% confidence limit for a 4 pCi/L exposure. Air Force and Reuse Proponent/Agencies: Additional sampling at Buildings 237 and 334 recommended; mitigation via improved ventilation if high radon levels persist.	Two buildings tested above the 95% confidence limit for a 4 pCi/L exposure. No mitigation necessary; vacant buildings secured.
• Medical/Biohazardous Waste	IMPACTS: Continued operation of the hospital. MITIGATION: Reuse Proponent/Agencies: Conform to state regulations for management of medical wastes.	No hospital reuse; no impacts. No mitigation necessary.	Continued operation of the hospital. Reuse Proponent/Agencies: Conform to state regulations for management of medical wastes.	No hospital reuse; no impacts. Reuse Proponent/Agencies: Conform to state regulations for management of medical wastes.	Hospital maintained in caretaker status; no impacts. No mitigation necessary.
• Ordnance	IMPACTS: Discarded munitions may be present at the Suspected Munitions Burial Site. Lead from spent bullets may be present in soils at the Firing Range.	Discarded munitions may be present at the Suspected Munitions Burial Site. Lead from spent bullets may be present in soils at the Firing Range.	Discarded munitions may be present at the Suspected Munitions Burial Site. Lead from spent bullets may be present in soils at the Firing Range.	Discarded munitions may be present at the Suspected Munitions Burial Site. Lead from spent bullets may be present in soils at the Firing Range.	Discarded munitions may be present at the Suspected Munitions Burial Site. Lead from spent bullets may be present in soils at the Firing Range.

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Resource Category	Proposed Action	General Aviation and Education Alternative	Commercial Aviation and Education Alternative	Education and Planned Community Alternative	No-Action Alternative
• Ordnance (Continued)	MITIGATION: Air Force: Investigate the Suspected Munitions Burial Site and the Firing Range and remediate as necessary. Reuse Proponent/Agencies: Follow recommended land use restrictions, if any.	Air Force: Investigate the Suspected Munitions Burial Site and the Firing Range and remediate as necessary. Reuse Proponent/Agencies: Follow recommended land use restrictions, if any.	Air Force: Investigate the Suspected Munitions Burial Site and the Firing Range and remediate as necessary. Reuse Proponent/Agencies: Follow recommended land use restrictions, if any.	Air Force: Investigate the Suspected Munitions Burial Site and the Firing Range and remediate as necessary. Reuse Proponent/Agencies: Follow recommended land use restrictions, if any.	Air Force: Investigate the Suspected Munitions Burial Site and the Firing Range and remediate as necessary.
Natural Environment					
• Soils and Geology	IMPACTS: Increase in erosion potential and alteration of natural surface and soil conditions. (Approximately 2,600 acres of soil on-base and 25 acres of soil off-base disturbed.)	Increase in erosion potential and alteration of natural surface and soil conditions. (Approximately 2,400 acres of soil on-base disturbed.)	Increase in erosion potential and alteration of natural surface and soil conditions. (Approximately 2,900 acres of soil on-base and 71 acres of soil off-base disturbed, including 2 acres of prime farmland off-base.)	Increase in erosion potential and alteration of natural surface and soil conditions. (Approximately 2,700 acres of soil on-base disturbed.)	No increase in erosion potential or alteration of natural surface and soil conditions.
	MITIGATION: Reuse Proponent/Agencies: Mitigate through use of proper construction mitigation techniques such as protective cover and diversion dikes.	Reuse Proponent/Agencies: Mitigate through use of proper construction mitigation techniques such as protective cover and diversion dikes.	Reuse Proponent/Agencies: Mitigate through use of proper construction mitigation techniques such as protective cover and diversion dikes.	Reuse Proponent/Agencies: Mitigate through use of proper construction mitigation techniques such as protective cover and diversion dikes.	No mitigation necessary.
• Water Resources Groundwater	IMPACTS: Positive, but negligible, impact on basin overdraft situation as compared to preclosure reference.	Positive, but negligible, impact on basin overdraft situation as compared to preclosure reference.	Positive, but negligible, impact on basin overdraft situation as compared to preclosure reference.	Positive, but negligible, impact on basin overdraft situation as compared to preclosure reference.	Positive, but negligible, impact on basin overdraft situation as compared to preclosure reference.
	MITIGATION: No mitigation required. City of Mesa water supply is adequate for foreseeable demand.	No mitigation required. City of Mesa water supply is adequate for foreseeable demand.	No mitigation required. City of Mesa water supply is adequate for foreseeable demand.	No mitigation required. City of Mesa water supply is adequate for foreseeable demand.	No mitigation required. On-base supply adequate for foreseeable demand.

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Resource Category	Proposed Action	General Aviation and Education Alternative	Commercial Aviation and Education Alternative	Education and Planned Community Alternative	No-Action Alternative
Surface Water	IMPACTS: Slight net increase in annual runoff.	Slight net increase in annual runoff, but less than the Proposed Action.	Slight net increase in annual runoff, but greater than the Proposed Action.	Slight net increase in annual runoff, similar to the Proposed Action.	Positive impacts on surface water quality due to suspension of base operations.
	MITIGATION: Reuse Proponent/Agencies: Stormwater management facilities and soil erosion and sediment control.	Reuse Proponent/Agencies: Stormwater management facilities and soil erosion and sediment control.	Reuse Proponent/Agencies: Stormwater management facilities and soil erosion and sediment control.	Reuse Proponent/Agencies: Stormwater management facilities and soil erosion and sediment control.	No mitigation necessary.
• Air Quality	IMPACTS: Increase in air pollution emissions. For ozone precursor pollutants, offsetting emissions within the nonattainment area will be required to ensure that attainment of air quality standards will be met by the mandated target date. For all other pollutants, no interference with maintaining or attaining federal and state ambient air quality standards.	Increase in air pollution emissions. For ozone precursor pollutants, offsetting emissions within the nonattainment area will be required to ensure that attainment of air quality standards will be met by the mandated target date. For all other pollutants, no interference with maintaining or attaining federal and state ambient air quality standards.	Increase in air pollution emissions. For ozone precursor pollutants, offsetting emissions within the nonattainment area will be required to ensure that attainment of air quality standards will be met by the mandated target date. For all other pollutants, no interference with maintaining or attaining federal and state ambient air quality standards.	Increase in air pollution emissions. For ozone precursor pollutants, offsetting emissions within the nonattainment area will be required to ensure that attainment of air quality standards will be met by the mandated target date. For all other pollutants, no interference with maintaining or attaining federal and state ambient air quality standards.	Air pollutant emissions will be essentially eliminated. No interference with maintaining attainment status of federal and state ambient air quality standards.

Table S-3. Summary of Environmental Impacts and Mitigation from the Proposed Action and Reuse Alternatives
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Resource Category	Proposed Action	General Aviation and Education Alternative	Commercial Aviation and Education Alternative	Education and Planned Community Alternative	No-Action Alternative
• Air Quality (Continued)	MITIGATION: Reuse Proponent/Agencies: Possible mitigation of fugitive dust emissions from construction activities through watering, clearing areas on a selective basis, and treating disturbed areas as soon as possible. Efficient scheduling of heavy construction equipment use. Development of an airport shuttle system to reduce personal vehicle use. Promotion of carpools and vanpools by providing a rider matching service, preferential parking and financial incentives.	Reuse Proponent/Agencies: Possible mitigation of fugitive dust emissions from construction activities through watering, clearing areas on a selective basis, and treating disturbed areas as soon as possible. Efficient scheduling of heavy construction equipment use. Promotion of carpools and vanpools by providing a rider matching service, preferential parking and financial incentives.	Reuse Proponent/Agencies: Possible mitigation of fugitive dust emissions from construction activities through watering, clearing areas on a selective basis, and treating disturbed areas as soon as possible. Efficient scheduling of heavy construction equipment use. Development of an airport shuttle system to reduce personal vehicle use. Promotion of carpools and vanpools by providing a rider matching service, preferential parking and financial incentives.	Reuse Proponent/Agencies: Possible mitigation of fugitive dust emissions from construction activities through watering, clearing areas on a selective basis, and treating disturbed areas as soon as possible. Efficient scheduling of heavy construction equipment use. Promotion of carpools and vanpools by providing a rider matching service, preferential parking and financial incentives.	No mitigation necessary.
• Noise	IMPACTS: No residential areas would be exposed to DNL of 65 dB or higher from aircraft noise. During 2013, the area within DNL of 65 dB from aircraft noise would be 795 acres which is 16,318 acres less than the preclosure case. During 2013, there would be approximately 107 residents within DNL of 65 dB, due to traffic noise, within approximately three miles of the base.	Same as for Proposed Action, except during 2013 the area within DNL of 65 dB or higher from aircraft noise would be 332 acres, which is 16,781 acres less than the preclosure case.	During 2013 the area within DNL of 65 dB or higher from aircraft noise would be 5,024 acres which is 12,089 acres less than the preclosure case. Approximately 43 persons in residences could be affected by DNL of 65 to 70 dB from aircraft noise. In addition, proposed hotel development in the northeast corner of the base would be subject to DNL of 65 to 70 dB. Also during 2013, there would be approximately 107 residents within DNL of 65 dB, due to traffic noise, within approximately three miles of the base.	There would be no aircraft noise impacts. During 2013, there would be approximately 99 residents within DNL of 65 dB, due to traffic noise, within approximately three miles of the base.	There would be no aircraft noise impacts. During 2013, there would be approximately 96 residents within DNL of 65 dB, due to traffic noise, within approximately three miles of the base.

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Resource Category	Proposed Action	General Aviation and Education Alternative	Commercial Aviation and Education Alternative	Education and Planned Community Alternative	No-Action Alternative
• Noise (Continued)	MITIGATION: Reuse Proponent/Agencies: Land use planning and reuse development should incorporate compatibility measures and designs to minimize noise effects.	Reuse Proponent/Agencies: Land use planning and reuse development should incorporate compatibility measures and designs to minimize noise effects.	Reuse Proponent/Agencies: Land use planning and reuse development should incorporate compatibility measures and designs to minimize noise effects. Proposed hotel development may require discretionary permit approvals and noise reduction measures.	Reuse Proponent/Agencies: Land use planning and reuse development should incorporate compatibility measures and designs to minimize noise effects.	No mitigation necessary.
• Biological Resources	IMPACTS: Potential loss or alteration of approximately 3,365 acres of vegetation on-base plus 25 acres off-base. Loss of associated wildlife habitat for native species.	Potential loss or alteration of approximately 3,050 acres of vegetation on-base. Loss of associated wildlife habitat for native species.	Potential loss or alteration of approximately 3,445 acres of vegetation on-base plus 71 acres off-base. Loss of associated wildlife habitat for native species.	Potential loss or alteration of approximately 3,205 acres of vegetation on-base. Loss of associated wildlife habitat for native species.	No impact.
	MITIGATION: Reuse Proponent/Agencies: Mitigation of native plant species, wildlife habitat, and sensitive habitats lost or disturbed is determined through coordination and permitting actions with appropriate agencies.	Reuse Proponent/Agencies: Mitigation of native plant species, wildlife habitat, and sensitive habitats lost or disturbed is determined through coordination and permitting actions with appropriate agencies.	Reuse Proponent/Agencies: Mitigation of native plant species, wildlife habitat, and sensitive habitats lost or disturbed is determined through coordination and permitting actions with appropriate agencies.	Reuse Proponent/Agencies: Mitigation of native plant species, wildlife habitat, and sensitive habitats lost or disturbed is determined through coordination and permitting actions with appropriate agencies.	No mitigation necessary.
• Cultural Resources	IMPACTS: Proposed uses could have adverse impacts on 12 archaeological sites due to ground-disturbing activity.	Proposed uses could have adverse impacts on 12 archaeological sites due to ground-disturbing activity.	Proposed uses could have adverse impacts on 12 archaeological sites due to ground-disturbing activity.	Proposed uses could have adverse impacts on 12 archaeological sites due to ground-disturbing activity.	No impact on archaeological sites.

Table S-3. Summary of Environmental Impacts and Mitigation from the Proposed Action and Reuse Alternatives
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Resource Category	Proposed Action	General Aviation and Education Alternative	Commercial Aviation and Education Alternative	Education and Planned Community Alternative	No-Action Alternative
• Cultural Resources (Continued)	MITIGATION: Air Force: Convey appropriate protective covenants with the land transfer documents. Reuse Proponent/Agencies: Avoid ground disturbing activities in sensitive areas, fully document cultural materials prior to development, conform with protective covenants.	Air Force: Convey appropriate protective covenants with the land transfer documents. Reuse Proponent/Agencies: Avoid ground disturbing activities in sensitive areas, fully document cultural materials prior to development, conform with protective covenants.	Air Force: Convey appropriate protective covenants with the land transfer documents. Reuse Proponent/Agencies: Avoid ground disturbing activities in sensitive areas, fully document cultural materials prior to development, conform with protective covenants.	Air Force: Convey appropriate protective covenants with the land transfer documents. Reuse Proponent/Agencies: Avoid ground disturbing activities in sensitive areas, fully document cultural materials prior to development, conform with protective covenants.	Air Force: Maintain security to prevent looting or damage to archaeological sites.
	IMPACTS: Proposed uses could have adverse impacts on traditional resources; the Air Force is consulting with concerned Native American tribal groups and communities to identify potential impacts.	Proposed uses could have adverse impacts on traditional resources; the Air Force is consulting with concerned Native American tribal groups and communities to identify potential impacts.	Proposed uses could have adverse impacts on traditional resources; the Air Force is consulting with concerned Native American tribal groups and communities to identify potential impacts.	Proposed uses could have adverse impacts on traditional resources; the Air Force is consulting with concerned Native American tribal groups and communities to identify potential impacts.	The Air Force is consulting with concerned Native American tribal groups and communities to identify potential impacts on traditional resources.
	MITIGATION: Air Force: Continue consultations with concerned Native American tribal groups and communities to identify potential impacts and mitigation measures. Convey appropriate protective covenants with the land transfer documents. Reuse Proponent/Agencies: Conform with protective covenants.	Air Force: Continue consultations with concerned Native American tribal groups and communities to identify potential impacts and mitigation measures. Convey appropriate protective covenants with the land transfer documents. Reuse Proponent/Agencies: Conform with protective covenants.	Air Force: Continue consultations with concerned Native American tribal groups and communities to identify potential impacts and mitigation measures. Convey appropriate protective covenants with the land transfer documents. Reuse Proponent/Agencies: Conform with protective covenants.	Air Force: Continue consultations with concerned Native American tribal groups and communities to identify potential impacts and mitigation measures. Convey appropriate protective covenants with the land transfer documents. Reuse Proponent/Agencies: Conform with protective covenants.	Air Force: Continue consultations with concerned Native American tribal groups and communities to identify potential impacts and mitigation measures. Maintain security to prevent damage to traditional resources.

Table S-3. Summary of Environmental Impacts and Mitigation from the Proposed Action and Reuse Alternatives
Page 16 of 16

Resource Category	Proposed Action	General Aviation and Education Alternative	Commercial Aviation and Education Alternative	Education and Planned Community Alternative	No-Action Alternative
• Cultural Resources (Continued)	IMPACTS: Potential demolition of five historic structures that are eligible for the National Register of Historic Places (NRHP).	Potential demolition of five historic structures that are eligible for the NRHP.	Potential demolition of four historic structures that are eligible for the NRHP.	Potential demolition of 12 historic structures that are eligible for the NRHP.	Potential deterioration of 14 structures that are eligible for the NRHP.
	MITIGATION: Reuse Proponent/Agencies: Project redesign to avoid demolition of structures, relocation of structures, or full documentation of structures prior to demolition.	Reuse Proponent/Agencies: Project redesign to avoid demolition of structures, relocation of structures, or full documentation of structures prior to demolition.	Reuse Proponent/Agencies: Project redesign to avoid demolition of structures, relocation of structures, or full documentation of structures prior to demolition.	Reuse Proponent/Agencies: Project redesign to avoid demolition of structures, relocation of structures, or full documentation of structures prior to demolition.	Air Force: Maintenance and repair of structures to prevent deterioration.

the Proposed Action and non-project-related population increases. Rural, agricultural, and undeveloped lands surrounding the base would experience development pressures from intensified land uses on the base.

Land use on-base would be altered from the current pattern by changing the central core of the base to an institutional (education) use and by changing large areas of undeveloped land to aviation support and industrial land uses. The airfield portion of the base would be enlarged by the acquisition of off-base property to accommodate the lengthened runways. Existing public/recreation areas would be retained. There would not be any prime farmland affected by this alternative.

The Proposed Action incorporates plans to add several new access points to the two existing entries to the base. Two of these new points would provide direct access to the proposed San Tan Freeway. Levels of service on the surrounding road network would generally deteriorate from level A at closure to levels C through F in 2013, although Williams Field Road would remain at level A. Existing airspace conflicts with other airports within the ROI would continue under this alternative although they are not expected to worsen. Air transportation would be enhanced under the Proposed Action due to the additional capability the proposed airport facility would bring in relieving future air passenger and air cargo capacity deficiencies within the ROI. Utility consumption associated with the Proposed Action would represent a relatively small increase (less than 5 percent) in the total demand based on existing capacity and past consumption levels.

Hazardous Materials and Hazardous Waste Management. The types of hazardous materials and wastes used and generated by the Proposed Action are expected to be similar to those present during preclosure use. The quantities are expected to be greater than closure. The responsibility for managing hazardous materials and wastes would shift from a single user to multiple, independent users. This may degrade the capability of responding to hazardous materials and hazardous waste spills. The incorporation of extensive landscaping and amenities in the industrial, commercial, residential, and institutional areas is expected to result in an increase in pesticide use over closure. It is assumed that adequate management procedures would be imposed, as required by applicable laws and regulations, to ensure proper use and handling of these materials. Agricultural pesticides are not currently used and would not be used under the Proposed Action.

Reuse activities are not expected to affect the remediation of Installation Restoration Program (IRP) sites, which is proceeding according to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Disposal and reuse of some Williams AFB properties may be delayed or limited by the extent and type of contamination at IRP sites and by current and future IRP remediation activities. Based on the results of IRP

investigations, the Air Force may, where appropriate, place limits on land reuse through deed restrictions on conveyances and use restrictions on leases. Existing underground storage tanks (USTs) will be removed by the Air Force prior to disposal. No federally regulated polychlorinated biphenyl (PCB) equipment or PCB-contaminated equipment will be left on the base. Demolition or renovation of certain structures with asbestos-containing materials would be the responsibility of new owners and would be conducted in compliance with applicable regulations and the National Emissions Standards for Hazardous Air Pollutants (NESHAP).

Due to the residential land use reflected in campus residential housing associated with the Proposed Action, consideration was given to the potential for radon hazards. A survey conducted on-base revealed radon levels below the U.S. Environmental Protection Agency (EPA) threshold for mitigation in all but two structures. The base also contains a small arms firing range, aircraft gun firing buttresses, and munitions storage bunkers. The Air Force is presently evaluating the methods and extent of clean-up that may be required for these areas.

Natural Environment. Effects of the Proposed Action on the regional soils geology, and water resources would be minimal. Effects on local soils and geology would result primarily from demolition and construction activities. Groundwater resource impacts would diminish under the Proposed Action since the production wells located on the base would be closed, resulting in less regional drawdown of the groundwater basin. Air quality would generally deteriorate for most pollutants under the Proposed Action unless offsets within the ROI are identified. Since the ROI overlaps nonattainment areas for pollutants which would have higher emission rates under the Proposed Action than occurred during the preclosure (active base) reference, the future growth of the ROI could be constrained due to air quality attainment requirements imposed by state and federal regulations. The Air Force will comply with EPA's final rule regarding conformity determinations to the extent it applies to the specific proposed reuses of the base property. Where applicable, the Air Force will prepare a conformity determination, if necessary, prior to the disposal/conveyance or lease of parcels of base property. The appropriate federal and state regulatory agencies will be consulted in arriving at a final conformity determination, in accordance with Section 176(c) of the Federal Clean Air Act Amendments of 1990 (CAAA). Aircraft noise effects would be less than the preclosure reference, exposing approximately 795 acres to DNL levels of 65 decibels (dB) or greater by 2013. This contrasts to 17,113 acres exposed to this noise level under preclosure conditions. Noise exposure due to surface traffic effects will increase on some roads over the closure baseline. Effects on biological resources would result primarily from the alteration or loss of habitat, especially in areas of native vegetation. Existing archaeological and historic resources on-base considered potentially eligible for listing on the National Register of Historic Places (NRHP) could be adversely affected due to reuse

incompatibility and potential demolition or if ownership were transferred without adequate provisions for their preservation or adequate documentation of the resource. Documentation information on 14 potential historic structures was submitted to the Keeper of the National Register for an eligibility determination in March 1994. A determination is not available at this time. In March 1994, the Air Force completed a subsurface archaeological survey to determine the boundaries and eligibility status of 11 sites on Williams AFB. A final report on the findings of this survey is not expected until June 1994. The Air Force is consulting with concerned Native American tribal groups and communities to determine whether traditional resources exist on-base that may be impacted by reuse, and to identify appropriate mitigation measures.

GENERAL AVIATION AND EDUCATION ALTERNATIVE

The impacts of the General Aviation and Education Alternative would be similar to those of the Proposed Action. The primary differences are summarized in the following paragraphs. Influencing factors and environmental impacts are presented in comparative form in Tables S-1 through S-3.

Local Community. This alternative would generate 19,428 direct jobs by the year 2013, with an additional 27,290 secondary jobs. Total ROI employment would reach approximately 2,135,144 in the same year. The population in the ROI when modeled with the General Aviation and Education Alternative would increase by approximately 50,750, resulting in a total ROI population of 3,753,121. The total population figure includes non-project-related growth.

The on-base land use changes would generally be concentrated around the existing airfield and aviation support areas. The airfield portion of the base would be focused around a shortened center runway. The two outer runways would be eliminated and the area converted to aviation support activities. The main core of the base would be reused for institutional (education) activities similar to those described for the Proposed Action. The northeastern corner of the base would be developed into medium- and high-density residential and public/recreation areas. There would not be any prime farmland affected by this alternative.

The General Aviation and Education Alternative would incorporate plans to add multiple new access points to the two existing entries to the base. Two of these new points would provide direct access to the proposed San Tan Freeway. Levels of service on the surrounding road network would generally deteriorate to levels approximating those expected for the Proposed Action. Existing airspace conflicts with other airports in the ROI would continue under this alternative. Air transportation impacts would be limited to general aviation since this alternative does not include commercial

air passenger service. Utility demands would grow at rates approximating those anticipated for the Proposed Action.

Hazardous Materials and Hazardous Waste Management. The types of hazardous materials used would be similar to those used by the base prior to closure. The quantity of hazardous materials utilized under the General Aviation and Education Alternative would increase over the baseline conditions at closure, but would be less than the Proposed Action due to the lack of commercial passenger flight operations. This alternative would differ only slightly from the Proposed Action with respect to hazardous materials and hazardous waste management. IRP site remediation could cause delays in property disposal and some land use restrictions.

Natural Environment. Impacts to geology, soils, water resources, air quality, biological resources, and cultural resources would generally be greater from this alternative than reported under the closure baseline. Aircraft noise effects would be less than the preclosure (active base) reference, exposing approximately 332 acres to DNL levels of 65 dB or greater by 2013. Noise exposure due to surface traffic effects would increase on some roads over the closure baseline. Archaeological, historic, and traditional resources on the base could be adversely impacted due to activities involving ground disturbance and demolition unless arrangements for protecting these resources are incorporated into the property transfer agreements.

COMMERCIAL AVIATION AND EDUCATION ALTERNATIVE

The impacts of the Commercial Aviation and Education Alternative would generally be greater than those projected for the Proposed Action. The primary differences are summarized in the following paragraphs. Influencing factors and environmental impacts are presented in comparative form in Tables S-1 through S-3.

Local Community. This alternative would generate 19,153 direct jobs by the year 2013, with an additional 25,868 secondary jobs. Total ROI employment would reach approximately 2,133,448 in the same year. The population in the ROI when modeled with the Commercial Aviation and Education Alternative would increase by approximately 47,717 resulting in a total ROI population of 3,750,088. The total population figure includes non-project-related growth.

The on-base land use changes would be concentrated around the existing developed core and in the northeast corner of the base. The existing developed core would be reused as a college satellite campus surrounded by aviation support areas. Aviation support areas would include aviation training facilities operating at higher development intensities than those of the Proposed Action. The redevelopment effort would involve reuse of numerous existing structures in addition to construction of new facilities.

The airfield would be modified to expand and strengthen the easternmost runway while the westernmost runway would be reused at its existing length. The center runway would be closed and converted into a taxiway. Existing public/recreation areas, including the golf course, would be retained. The northeast corner of the base would be redeveloped into industrial and commercial uses. There would be approximately 2 acres of prime farmland affected by this alternative as a result of off-base land acquisitions required for runway extensions.

The Commercial Aviation and Education Alternative incorporates plans to add numerous additional access points to the two existing entries to the base. Two of these new points would provide direct access to the proposed San Tan Freeway. Levels of service on the surrounding road network would generally deteriorate to levels approximating those expected for the Proposed Action. Existing airspace conflicts with other airports in the ROI would continue under this alternative. In addition, new IFR non-precision approaches could interact with arrival paths to Phoenix Sky Harbor International Airport, creating new airspace conflicts. Air transportation impacts resemble those projected under the Proposed Action. Utility demands under the Commercial Aviation and Education Alternative are second only to the General Aviation and Education Alternative, approximating those of the Proposed Action.

Hazardous Materials And Hazardous Waste Management. The types of hazardous materials used would be similar to those used by the base prior to closure. The quantity of hazardous materials utilized under the Commercial Aviation and Education Alternative would increase over the baseline conditions at closure, and would be greater than under the Proposed Action due to the higher intensity of aviation activities. This alternative would differ only slightly from the Proposed Action with respect to hazardous materials and hazardous waste management. IRP site remediation could cause delays in property disposal and some land use restrictions.

Natural Environment. Impacts to geology, soils, water resources, air quality, biological resources, and cultural resources would be greater from this alternative than reported under the closure baseline. Aircraft noise effects would be less than the preclosure (active base) reference, exposing approximately 5,024 acres to DNL levels of 65 dB or greater by 2013. Noise exposure due to surface traffic effects would increase on some roads over the closure baseline. Archaeological, historic, and traditional resources on the base could be adversely impacted due to ground disturbance and demolition activities unless arrangements for protecting these resources are incorporated into the property transfer agreements.

EDUCATION AND PLANNED COMMUNITY ALTERNATIVE

The Education and Planned Community Alternative would replace aviation-related uses with a satellite college campus and a "new town" planned community. Therefore, there would be no impacts associated with aircraft operations. Impacts are briefly discussed below and summarized in Tables S-1 through S-3.

Local Community. This alternative would generate 11,502 direct and 6,929 secondary jobs by the year 2013. Total ROI employment would be approximately 2,106,857 in the same year. The population in the ROI when modeled with the Education and Planned Community Alternative would increase by approximately 20,777 resulting in a total ROI population of 3,723,148. The total population figure includes non-project-related growth.

The on-base land use changes would generally consist of the conversion of the airfield and the aviation support areas to medium- and high-density residential, institutional (medical and educational) and commercial uses. Existing public/recreation areas would be expanded to meet the demands of the new community. There would not be any prime farmland affected by this alternative.

The Education and Planned Community Alternative incorporates plans to add multiple new access points to the two existing entries to the base. Two of these new points would provide direct access to the proposed San Tan Freeway. Levels of service on the surrounding road network would generally deteriorate more than any of the alternatives considered even if road widening projects are undertaken. No airspace or air transportation impacts are associated with this alternative. Utility demands would grow at slower rates than any of the alternatives considered except the No-Action Alternative.

Hazardous Materials and Hazardous Waste Management. The number, types, and quantities of hazardous materials would be less than the Proposed Action and less than what was used by the base prior to closure. There would be more household use of pesticides and less fuel and hazardous materials used for industrial purposes than for the Proposed Action. The Education and Planned Community Alternative would differ slightly from the Proposed Action with respect to hazardous materials and hazardous waste management; the differences being associated with the types and quantities of materials being used. IRP site remediation could cause delays in property disposal and some land use restrictions.

Natural Environment. Impacts from this alternative on soils, geology, water resources, air quality, biological resources, and cultural resources would increase over the closure baseline. There would be no noise effects from aircraft operations, but traffic noise would increase over preclosure

conditions on some roads. Archaeological, historic, and traditional resources could be impacted due to ground disturbance and demolition unless arrangements for protecting these resources are incorporated into the property transfer agreements. Historic structures could also be impacted by removing the airfield setting in which they are currently located.

OTHER LAND USE CONCEPTS

Other land use concepts are analyzed in terms of their effects on employment, population, and the environment when combined with the Proposed Action and the other alternatives. Impacts on the local community and the environment associated with the implementation of other land use concepts are summarized in Table S-4.

Most of the independent uses which were identified involve individual buildings or small parcels of land and could be integrated with any one of the reuse plans with little impact. There are a few exceptions. The Federal Bureau of Prisons has requested transfer of 20 acres for reuse as a Federal Detention Center. The Arizona Department of Corrections (ADC) has expressed interest in utilizing any or all of the property. The ADC expressed particular interest in the base hospital and all of the base living quarters. The Arizona Department of Health Services has expressed an interest in securing the housing units, dorms, the fire station, post office, education center, child care facility, commissary, stores, and offices/clinics attached to the hospital. Each of these land use concepts would have an impact on all of the reuse alternatives considered, except the No-Action Alternative, since they involve major portions of the central core of the base already utilized in the other alternatives.

If a proposal under the McKinney Act is received, housing for the homeless could include the family housing units on the base as well as the officer's and enlisted personnel quarters. These housing units could be made available under any of the reuse alternatives.

NO-ACTION ALTERNATIVE

Local Community. The only Air Force activities associated with the No-Action Alternative would be caretaker maintenance of the base. This would generate approximately 82 direct and 30 secondary jobs. There would be no overall increase in employment or population. The presence of an essentially vacant and unused area in the middle of the community could hamper or delay redevelopment and revitalization of adjacent lands. No effects on utilities or on road, air, or railroad transportation are expected.

Hazardous Materials and Hazardous Waste Management. Small quantities of various types of hazardous materials and pesticides would be used for this alternative. All materials and waste would be managed and controlled

Table S-4. Summary of Impacts from Other Land Use Concepts
Page 1 of 2

Resource Category	Federal Bureau of Prisons	Arizona Department of Corrections	Arizona Department of Health Services
Local Community			
• Land Use and Aesthetics	Compatible with the General Aviation and Education Alternative or the Education and Planned Community Alternative.	Incompatible with all reuse alternatives in the location specified.	Compatible with Education and Planned Community Alternative.
• Transportation	Increase in vehicle trips for all reuse alternatives.	Increase in vehicle trips for the General Aviation and Education Alternative; decreases for all other alternatives.	No change in transportation demand.
• Utilities	Negligible change in utility demand.	Negligible change in utility demand.	Negligible change in utility demand.
Hazardous Materials and Hazardous Waste Management			
• Hazardous Materials	No change from use levels associated with reuse alternatives.	No change from use levels associated with reuse alternatives.	No change from use levels associated with reuse alternatives.
• Hazardous Waste	No change from use levels associated with reuse alternatives.	No change from use levels associated with reuse alternatives.	No change from use levels associated with reuse alternatives.
• Installation Restoration Program	No impact.	Possible delays due to remediation activities associated with Fire Protection Training Area No. 2.	No impact.
• Storage Tanks	No new storage tanks.	No new storage tanks.	No new storage tanks.
• Asbestos	No impact.	Continued in-place management of asbestos in facilities.	Continued in-place management of asbestos in facilities.
• Pesticides	Small quantities to be utilized for landscaping.	Small quantities to be utilized for landscaping.	Small quantities to be utilized for landscaping.

Table S-4. Summary of Impacts from Other Land Use Concepts
Page 2 of 2

Resource Category	Federal Bureau of Prisons	Arizona Department of Corrections	Arizona Department of Health Services
Hazardous Materials and Hazardous Waste Management (Continued)			
• PCBs	No impact.	No impact.	No impact.
• Radon	No impact.	Further radon testing recommended at Buildings 237 (hospital) and 334 (dormitory).	Further radon testing recommended at Buildings 237 (hospital) and 334 (dormitory).
• Medical/Biohazardous Wastes	Comparable to Proposed Action if medical facilities are constructed.	Comparable to Proposed Action if medical facilities are constructed.	Comparable to Proposed Action.
• Ordnance	No impact.	No impact.	No impact.
Natural Environment			
• Soils and Geology	Potential erosion during construction.	Potential erosion during construction.	Minimal new disturbance.
• Water Resources	Stormwater drainage system required to minimize impacts.	Stormwater drainage system required to minimize impacts.	No impact.
• Air Quality	Negligible new emissions.	Negligible new emissions.	No new emissions.
• Noise	No impact.	No impact.	No impact.
• Biological Resources	New development will have impacts similar to the Proposed Action.	Future use of undeveloped land will have impacts similar to the Proposed Action.	No impact.
• Cultural Resources	No impact.	New construction could adversely impact the Midvale archaeological site, as well as sites AZ U:10:25, 10:60, and 10:61. Potential demolition of Building 715.	Demolition/ reconstruction could adversely impact the Midvale archaeological site. Potential demolition of building 715.

by the Air Force Base Conversion Agency Operating Location (OL) team in accordance with applicable regulations. Security of IRP sites would be enhanced under this alternative. Storage tanks would be removed or maintained in place according to required standards.

SUMMARY OF PUBLIC COMMENTS

Natural Environment. This alternative would result in negligible impacts on air quality, the noise environment, and biological resources. The No-Action Alternative would not impact geological resources, soils, water resources, or cultural resources relative to baseline conditions. Adequate caretaker maintenance would preclude deterioration of historic structures, and security would be provided to protect the integrity of archaeological and traditional resources.

The Draft EIS (DEIS) for disposal and reuse of Williams AFB was made available for public review and comment in September 1993. A public hearing was held in Gilbert, Arizona on October 7, 1993 at which the Air Force presented the findings of the DEIS. Public comments received both verbally at the public meeting and in writing during the response period have been reviewed and are addressed by the Air Force in Chapter 9 of this EIS. In addition, the text of the EIS itself has been revised, as appropriate, to reflect the concerns expressed in the public comments. The responses to the comments in Chapter 9 indicate the relevant sections of the EIS that have been revised.

- Two commenters requested clarification of the potential existence of wetlands and jurisdictional waters of the United States on Williams AFB.

- Several comments requested clarification on the impacts to sensitive habitats under several of the reuse alternatives.

- Two commenters requested that the document address conformity with state air quality plans and that emissions information be exchanged with Maricopa County air quality planners.

- One commenter requested that emphasis be placed on the National Historic Preservation Act (NHPA) and the Native American Graves Protection and Repatriation Act (NAGPRA) as requirements for consultations with Native Americans.

SUMMARY OF CHANGES FROM THE DEIS TO THE FEIS

Based on more recent information or comments from the public, the following sections of the EIS have been updated or revised:

- The text of Sections 3.4.5.4, Sensitive Habitats, and 4.4.5, Biological Resources, has been changed to state that no areas on Williams AFB meet delineation criteria for jurisdictional wetlands under the 1987 Corps of Engineers Wetlands Delineation Manual. There is the potential to impact waters of the United States; however, this is a regulatory issue and jurisdiction will need to be determined by a reuse proponent prior to obtaining permits for any land disturbance.

- The estimated acreage of sensitive habitat disturbance is an approximation and represents the maximum acreage potentially disturbed. The text of Section 4.4.5, Biological Resources, and the Summary Table have been revised to note that these are maximum potential disturbances and that the actual disturbance will depend upon details of the reuse which will be implemented.

- Section 4.4.3, Air Quality, has been revised to state that the Air Force will comply with the U.S. Environmental Protection Agency's final rule regarding conformity determination to the extent that it applies to specific reuses of the base property.

- Given the nature of the proposed reuses and the potential to impact traditional cultural properties possibly including prehistoric human remains, Sections 3.4.6 and 4.4.6, Cultural Resources, have been revised to include references to NHPA and NAGPRA as requiring consultations with Native Americans as part of the EIS process.

In addition, significant developments since the DEIS was issued in September 1993 are noteworthy here, as they may ultimately have a bearing on the Record of Decision for the disposal and reuse of Williams AFB. These are discussed below.

Since the Draft EIS was issued, decisions regarding the basing status of the Arizona Air National Guard (ANG) 161st Air Refueling Group (AREFG) at Phoenix Sky Harbor International Airport make it unlikely that this ANG unit will relocate from Phoenix Sky Harbor to Williams AFB within the 20-year study period considered in this EIS. The DEIS considers the impacts of the relocation of the 161st AREFG KC-135 aircraft from current basing at Phoenix Sky Harbor to Williams AFB after 1993. Specifically, under the DEIS Proposed Action, the relocation of the 161st AREFG to Williams AFB adds an additional 1,200 annual KC-135 operations to the projected aircraft operations at the base for the period 1998-2013. The number of projected

ANG training operations at Williams AFB would remain unchanged, regardless of whether the 161st AREFG is moved there.

The Record of Decision (U.S. Department of Transportation, 1994) for the Phoenix Sky Harbor International Airport Master Plan Update Improvements FEIS (U.S. Department of Transportation, 1993) states that the use of Williams AFB by civilian air traffic to relieve forecasted air capacity deficiencies at Phoenix Sky Harbor is not viable in the near term due to the extensive improvements that would be required at Williams AFB to accommodate the critical aircraft. The DOT FEIS addresses the relocation of the ANG ground support facilities within the confines of the Phoenix Sky Harbor complex to allow for the construction of a third runway at the airport. This information and the fact that the Secretary of the Air Force has not approved the relocation of the 161st AREFG to Williams AFB makes it unlikely the 161st AREFG will relocate to Williams AFB in the foreseeable future.

The impact analyses (e.g., noise, air quality) presented in this EIS consider the relocation of the 161st AREFG to Williams AFB as a conservative assumption within a reasonable range of alternatives for reuse of the Williams AFB airfield.

Documentation information on 14 potential historic structures was submitted to the Keeper of the National Register for an eligibility determination in March 1994. A determination is not available at this time. In March 1994, the Air Force completed a subsurface archaeological survey to determine the boundaries and eligibility status of 11 sites on Williams AFB. A final report on the findings of this survey is not expected until June 1994.

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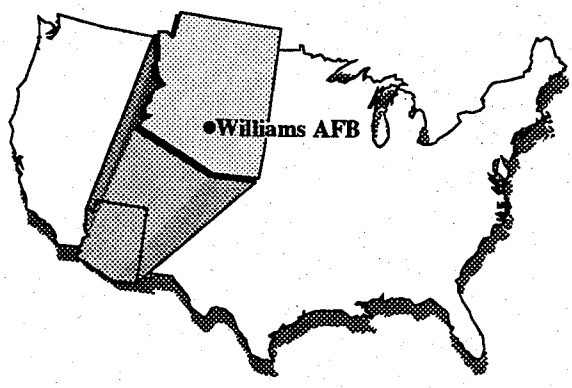

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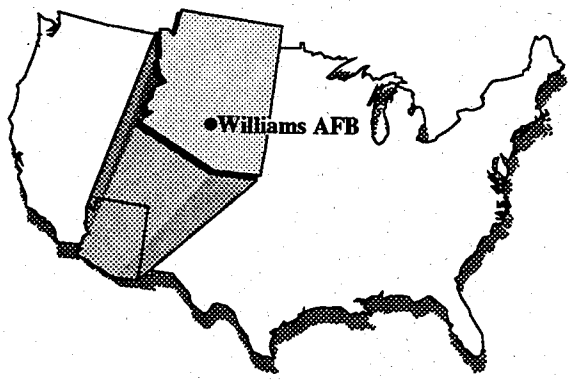

CHAPTER 1
PURPOSE AND NEED FOR ACTION

1.0 PURPOSE OF AND NEED FOR ACTION

This environmental impact statement (EIS) examines the potential impacts to the environment that may result from the disposal and reuse of Williams Air Force Base (AFB), Arizona. This document has been prepared according to the National Environmental Policy Act (NEPA) of 1969 and the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 CFR 1500-1508). Appendix A presents a glossary of terms, acronyms, and abbreviations used in this document.

1.1 PURPOSE AND NEED

Because of the changing international political scene and the resultant shift toward a reduction in defense spending, the Department of Defense (DOD) must realign and reduce its military forces pursuant to the Defense Base Closure and Realignment Act (DBCRA) of 1990 (Public Law [P.L.] 101-510, Title XXIX). DBCRA established new procedures for closing or realigning military installations in the United States.

DBCRA established an independent Defense Base Closure and Realignment Commission to review the Secretary of Defense's base closure and realignment recommendations. After reviewing these recommendations, the 1991 Commission forwarded its recommended list of base closures and realignments to the President, who accepted the recommendations and submitted them to Congress on July 12, 1991. Since Congress did not disapprove the recommendations within the time period provided under DBCRA, the recommendations became law. Williams AFB was on the Commission's list and was closed on September 30, 1993.

To fulfill the requirement of reducing defense expenditures, the Air Force plans to dispose of excess and surplus real property and facilities at Williams AFB. DBCRA requirements relating to disposal of excess and surplus property include:

- Environmental restoration of the property as soon as possible with funds made available for such restoration
- Consideration of the local community's reuse plan prior to Air Force disposal of the property
- Compliance with specific federal property disposal laws and regulations.

The Air Force action, therefore, is to dispose of Williams AFB property and facilities. Usually, this action is taken by the Administrator of General Services. However, DBCRA required the Administrator to delegate to the

Secretary of Defense the authorities to utilize excess property, dispose of surplus property, convey airport and airport-related property, and determine the availability of excess or surplus real property for wildlife conservation purposes. The Secretary of Defense has since redelegated these authorities to the respective Service Secretaries.

1.2 DECISIONS TO BE MADE

The purpose of this EIS is to support the series of interrelated decisions concerning the disposition of Williams AFB. The EIS provides the decision-maker and the public the information required to understand the future environmental consequences of potential reuse options at Williams AFB.

After completion of this EIS, the Air Force will issue a Record of Decision (ROD) on the disposal of Williams AFB. The ROD will determine the following:

- What property is excess to the needs of the DOD and what property is surplus to the needs of the United States
- The methods of disposal to be followed by the Air Force
- The terms and conditions of disposal.

The methods of disposal granted by the Federal Property and Administrative Services Act of 1949 and the Surplus Property Act of 1944 and implemented in the Federal Property Management Regulations are:

- Transfer to another federal agency
- Public benefit conveyance to an eligible entity
- Negotiated sale to a public body for a public purpose
- Competitive sale to private interests by sealed bid or auction.

Additionally, Congress authorized the Secretary of the Air Force to provide portions of Williams AFB to the State of Arizona in exchange for specified properties and mineral rights held by the State. If the Secretary of the Air Force elects to invoke the land exchange provisions of Section 2838 of the National Defense Authorization Act for Fiscal Year 1993 (P.L. 102-484), the transaction will involve an equivalent fair market value exchange.

This EIS considers the potential environmental impacts of the Air Force's disposal of Williams AFB using one or all of the above-mentioned procedures and portrays a variety of potential land uses to cover reasonable future uses of the property and facilities by others. Several alternative scenarios were used to group reasonable land uses and to examine the environmental

effects of redevelopment of Williams AFB. This methodology was employed because, although the disposal will have few, if any, direct effects, future use and control of use by others will create indirect effects. This EIS, therefore, seeks to analyze reasonable redevelopment scenarios to determine the potential indirect effects of Air Force decisions.

1.3 DISPOSAL PROCESS AND REUSE PLANNING

DBCRA requires compliance with NEPA (with some exceptions) in the implementation of the base closures and realignments. Among the issues that were excluded from NEPA compliance in DBCRA actions were:

- The selection of installations for closure or realignment
- Analysis of closure impacts.

The Air Force's goal is to dispose of Williams AFB property through transfer and/or conveyance to other government agencies, state or local governmental bodies, or private parties.

Because the parcelization and disposal methods represent legal processes and do not directly affect the environment, this EIS focuses on the environmental impacts associated with the reuse implemented by future owners. The Air Force has based its Proposed Action on plans developed by the Williams AFB Economic Reuse Advisory Board for the purpose of conducting the required environmental analysis. The Air Force also considered additional reasonable alternatives in order to provide the decision-maker with multiple options regarding ultimate property disposition. The EIS becomes the basis for a broad environmental analysis, thus ensuring that reasonably foreseeable impacts resulting from potential reuse have been identified. Subject to the terms of transfer or conveyance, the recipients of the property and the local zoning authority will ultimately determine the reuse of the property. Five alternatives have been identified: three aviation reuse proposals, one non-aviation reuse proposal, and a No-Action Alternative that would not involve reuse.

The Secretary of the Air Force has discretion in determining how the Air Force will dispose of the property. Nevertheless, the Air Force must adhere to the laws and General Services Administration (GSA) regulations in accordance with DBCRA. The services may issue additional regulations, if required, to implement their delegated authorities. Another provision of DBCRA requires each of the services to consult with the Governor, heads of local governments, or equivalent political organizations to consider any plan for the use of such property by the local community concerned. Accordingly, the Air Force is working with state and local authorities to meet this requirement.

In some cases, compliance with environmental laws may delay the Air Force's final disposal of the property while remedial actions are conducted on contaminated property. Until property can be transferred by deed, the Air Force may execute interim or long-term leases with the ultimate recipients to allow reuse to begin as quickly as possible. In these cases, the Air Force intends to dispose of leased property by converting leases to deeds at the earliest possible date.

Certain activities inherent in the development or expansion of an airport constitute federal actions that fall under the statutory and regulatory authority of the Federal Aviation Administration (FAA). The FAA generally reviews these activities through the processing and approval of an Airport Layout Plan (ALP). Goals of the ALP review system are to: (1) determine its effectiveness in achieving safe and efficient utilization of airspace, (2) assess factors affecting the movement of air traffic, and (3) establish conformance with FAA design criteria. The FAA approval action may also include other specific elements such as preparation of the Airport Certification Manual (Part 139); the Airport Security Plan (Part 107); the location, construction, or modification of an air traffic control (ATC) tower, terminal radar approach control (TRACON) facility, other navigational and visual aids, and facilities; and establishment of instrument approach procedures.

In view of its possible direct involvement with the disposal of Williams AFB, the FAA is serving as a cooperating agency in the preparation of the EIS. If surplus property is conveyed to a local agency for airport purposes, the FAA will be the federal agency that would enforce deed covenants requiring the property to be used for airport purposes. Additionally, the FAA may later provide airport improvement program grants to the airport sponsor (local agency taking title). The FAA also has special expertise and the legal responsibility to make recommendations to the Air Force for the disposal of surplus property for airport purposes. The Surplus Property Act of 1944 (50 U.S.C. Appendix 1622(g)), authorized disposal of surplus real and related personal property for airport purposes and requires that the FAA certify the property is necessary, suitable, and desirable for an airport.

The potential environmental impacts of airport development must be assessed prior to commitment of federal funding, in accordance with NEPA and FAA Order 1050.1D, *Policies and Procedures for Considering Environmental Impacts,* and FAA Order 5050.4A, *Airport Environmental Handbook.* Environmental impacts must be assessed prior to authorization of plans of local agencies for the development of the entire area in which the airport is located. Transportation projects that substantially impair significant public parks, recreation areas, wildlife refuges, or any significant historic property will not be implemented unless no prudent or feasible alternative exists and until all measures to mitigate adverse effects have been addressed.

Compliance with FAA Regulations requires the preparation of a proposed airport development plan. This EIS presents the assessment of potential environmental impacts of available plans. If a reuse proponent has developed only a conceptual plan for the airport area, the environmental impacts of that concept plan are analyzed. The FAA may then use this document to complete its NEPA requirements. This EIS also provides environmental assessment information to aid FAA decisions on funding requests for airport development projects. The new owners would be required to prepare a final ALP and submit it to the FAA, as appropriate, for approval.

1.4 ENVIRONMENTAL IMPACT ANALYSIS PROCESS

NEPA established a national policy to protect the environment and ensure that federal agencies consider the environmental effects of actions in their decision-making. The Council on Environmental Quality (CEQ) was authorized to oversee and recommend national policies to improve the quality of the environment. Subsequently, CEQ published regulations that described how NEPA should be implemented. The CEQ regulations encourage federal agencies to develop and implement procedures that address the NEPA process to avoid or minimize adverse effects on the environment. Air Force Regulation (AFR) 19-2, Environmental Impact Analysis Process (EIAP), addresses implementation of NEPA as part of the Air Force planning and decision-making process.

NEPA and AFR 19-2 provide guidance on the types of actions that require the preparation of an EIS. Once it has been determined that an EIS must be prepared, the proponent must publish a Notice of Intent (NOI) to prepare an EIS. This formal announcement signifies the beginning of the scoping period, during which the major environmental issues to be addressed in the EIS are identified. A Draft EIS (DEIS) is prepared, which includes the following:

- A statement of the purpose of and need for the action
- A description of the Proposed Action and alternatives, including the No-Action Alternative
- A description of the environment that would be affected by the Proposed Action and alternatives
- A description of the potential environmental consequences of the Proposed Action and alternatives.

The DEIS is filed with the U.S. Environmental Protection Agency (EPA), and is circulated to the interested public and government agencies for at least 45 days for review and comment. During this period, a public hearing will

be held so that the proponent can summarize the findings of the analysis and receive input from the affected public. At the end of the review period, all substantive comments received must be addressed. A Final EIS (FEIS) is then produced that contains responses to comments as well as changes to the document, if necessary.

The FEIS is filed with the U.S. EPA and distributed in the same manner as the DEIS. Once the FEIS has been available for at least 30 days, the Air Force may publish its Record of Decision (ROD) for the action.

The following describes how the Air Force has complied with NEPA requirements for public involvement in the decision-making process.

1.4.1 Scoping Process

The scoping process identifies the significant issues relevant to disposal and reuse and provides an opportunity for public involvement in the development of the EIS. The NOI (Appendix B) to prepare an EIS for disposal and reuse of Williams AFB was published in the Federal Register on October 9, 1991. Notification of public scoping was also made through local media as well as through letters to federal, state, and local agencies and officials and interested groups and individuals.

The scoping period for the disposal and reuse of Williams AFB began on October 9, 1991. A public meeting was held on November 11, 1991 at the Mesa Convention Center, Mesa, Arizona to solicit comments and concerns from the general public on the disposal and reuse of Williams AFB. Approximately 60 people attended the meeting. Representatives of the Air Force presented an overview of the meeting's objectives, agenda, and procedures, and described the process and purpose for the development of a disposal and reuse EIS. In addition to verbal comments, written comments were received during the scoping process. These comments, as well as information from public workshops conducted in Apache Junction, Gilbert, Chandler/Tempe, Queen Creek, and Mesa between March 9 and March 26, 1992, experience with similar programs, and NEPA requirements, were used to determine the scope and direction of studies/analysis to accomplish this EIS.

1.4.2 Public Comment Process

The DEIS was made available for public review and comment in September 1993. Copies of the DEIS were made available for review in local libraries and provided to those individuals and organizations requesting copies. At a public hearing held on October 7, 1993, the Air Force presented the findings of the DEIS and invited public comments. All comments were reviewed and addressed, when applicable, and have been included in their entirety in this document. Responses to comments offering new data and questions about

the presentation of data are also included. Chapter 9, Public Comments and Responses, more thoroughly describes the comment and response process.

1.5 CHANGES FROM THE DEIS TO THE FEIS

The text of this EIS has been revised, when appropriate, to reflect concerns expressed in public comments. These changes range from typographical corrections to amendments of text, tables, and figures. The responses to the comments indicate the relevant sections of the EIS that have been revised. The major comments received on the DEIS were:

- Two commenters requested clarification of the potential existence of wetlands and jurisdictional waters of the United States on Williams AFB.

- Several comments requested clarification on the impacts to sensitive habitats under several of the reuse alternatives.

- Two commenters requested that the document address conformity with state air quality plans and that emissions information be exchanged with Maricopa County air quality planners.

- One commenter requested that emphasis be placed on the National Historic Preservation Act (NHPA) and the Native American Graves Protection and Repatriation Act (NAGPRA) as requirements for consultations with Native Americans.

Based on these comments, the following sections of the EIS have been updated or revised.

- The text of Sections 3.4.5.4, Sensitive Habitats, and 4.4.5, Biological Resources, has been changed to state that no areas on Williams AFB meet delineation criteria for jurisdictional wetlands under the 1987 Corps of Engineers Wetlands Delineation Manual. There is the potential to impact waters of the United States; however, this is a regulatory issue and jurisdiction will need to be determined by a reuse proponent prior to obtaining permits for any land disturbance.

- The estimated acreage of sensitive habitat disturbance is an approximation and represents the maximum acreage potentially disturbed. The text of Section 4.4.5, Biological Resources, and the Summary Table have been revised to note that these are maximum potential disturbances and that the actual disturbance will depend upon details of the reuse which will be implemented.

- Section 4.4.3, Air Quality, has been revised to state that the Air Force will comply with the U.S. Environmental Protection

Agency's final rule regarding conformity determination to the extent that it applies to specific reuses of the base property.

- Given the nature of the proposed reuses and the potential to impact traditional cultural properties possibly including prehistoric human remains, Sections 3.4.6 and 4.4.6, Cultural Resources, have been revised to include references to NHPA and NAGPRA as requiring consultations with Native Americans as part of the EIS process.

In addition, significant developments since the DEIS was issued in September 1993 are noteworthy here, as they may ultimately have a bearing on the ROD for the disposal and reuse of Williams AFB. These are discussed below.

Since the Draft EIS was issued, decisions regarding the basing status of the Arizona Air National Guard (ANG) 161st Air Refueling Group (AREFG) at Phoenix Sky Harbor International Airport make it unlikely that this ANG unit will relocate from Phoenix Sky Harbor to Williams AFB within the 20-year study period considered in this EIS. The DEIS considers the impacts of the relocation of the 161st AREFG KC-135 aircraft from current basing at Phoenix Sky Harbor to Williams AFB after 1993. Specifically, under the DEIS Proposed Action, the relocation of the 161st AREFG to Williams AFB adds an additional 1,200 annual KC-135 operations to the projected aircraft operations at the base for the period 1998-2013. The number of projected ANG training operations at Williams AFB would remain unchanged, regardless of whether the 161st AREFG is moved there.

The Record of Decision (U.S. Department of Transportation, 1994) for the Phoenix Sky Harbor International Airport Master Plan Update Improvements FEIS (U.S. Department of Transportation, 1993) states that the use of Williams AFB by civilian air traffic to relieve forecasted air capacity deficiencies at Phoenix Sky Harbor is not viable in the near term due to the extensive improvements that would be required at Williams AFB to accommodate the critical aircraft. The DOT FEIS addresses the relocation of the ANG ground support facilities within the confines of the Phoenix Sky Harbor complex to allow for the construction of a third runway at the airport. This information and the fact that the Secretary of the Air Force has not approved the relocation of the 161st AREFG to Williams AFB makes it unlikely the 161st AREFG will relocate to Williams AFB in the foreseeable future.

The impact analyses (e.g., noise, air quality) presented in this EIS consider the relocation of the 161st AREFG to Williams AFB as a conservative assumption within a reasonable range of alternatives for reuse of the Williams AFB airfield.

Documentation information on 14 potential historic structures was submitted to the Keeper of the National Register for an eligibility determination in March 1994. A determination is not available at this time. In March 1994, the Air Force completed a subsurface archaeological survey to determine the boundaries and eligibility status of 11 sites on Williams AFB. A final report on the findings of this survey is not expected until June 1994.

1.6 ORGANIZATION OF THIS EIS

This EIS is organized into a number of chapters and appendices. Chapter 2 provides a description of the Proposed Action, alternatives to the Proposed Action, and other land use concepts that have been identified for reuse of Williams AFB property. Chapter 2 also briefly reviews alternatives eliminated from further consideration and identifies other, unrelated actions anticipated to occur in the region during the same timeframe as the reuse activities to be considered in the analysis of cumulative impacts. Finally, Chapter 2 provides a comparative summary of the effects of the Proposed Action and alternatives with respect to effects on the local community and the natural environment. Chapter 3 presents the affected environment under the baseline conditions of base closure, providing a basis for analyzing the impacts of the Proposed Action and alternatives. When needed for analytical comparisons, a preclosure reference is provided for certain resource areas. It describes a point in time at or near the closure announcement, and depicts an active base condition. The environmental analyses are presented in Chapter 4 and form the basis for the summary tables at the end of Chapter 2. Chapter 5 lists individuals and organizations consulted during the preparation of the EIS; Chapter 6 provides a list of the document's preparers; Chapter 7 contains references; and Chapter 8 contains an index. Chapter 9, Public Comments and Responses, more thoroughly describes the comment and response process.

In addition to the main text, the following appendices are included in this document:

- Appendix A - a glossary of terms, acronyms, and abbreviations used in this document
- Appendix B - the NOI to prepare this disposal/reuse EIS
- Appendix C - a list of individuals and organizations who will be sent a copy of the FEIS
- Appendix D - an Installation Restoration Program (IRP) bibliography

- Appendix E - a description of the methods used to evaluate the impacts of base reuse on resources of the local community and the environment
- Appendix F - permits held by Williams AFB
- Appendix G - Air Force policy regarding management of asbestos at bases that are closing
- Appendix H - Farmland Conversion Impact Rating (Form AD-1006)
- Appendix I - a detailed description of issues and assumptions related to noise effects
- Appendix J - cultural resources discussion
- Appendix K - an air emissions inventory for Williams AFB
- Appendix L - agency letters and certifications
- Appendix M - threatened, endangered, and other species of concern occurring on or near Williams AFB
- Appendix N - environmental impacts by land use category.

1.7 RELATED ENVIRONMENTAL DOCUMENTS

The environmental documents listed below have been or are being prepared separately and address environmental issues at Williams AFB. These documents provided supporting information for the environmental analysis.

- *Environmental Assessment, Military Operations Area (MOA) 24,* Williams AFB, Arizona, March 1991.
- *Environmental Assessment, Relocation of Air National Guard 111th Air Traffic Control Flight (ATCF) to Williams AFB,* Williams AFB, Arizona, January 1990.
- *Environmental Assessment, RWY 12 Flight Track Changes,* Williams AFB, Arizona, December 1989.
- IRP Bibliography (Appendix D).

1.8 FEDERAL PERMITS, LICENSES, AND ENTITLEMENTS

Federal permits, licenses, and entitlements that may be required of recipients of Williams AFB for purposes of redevelopment are presented in Table 1.8-1.

Table 1.8-1. Federal Permits, Licenses, and Entitlements Potentially Required for Reusers or Developers of Disposed Base Property
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Federal Permit, License, or Entitlement	Typical Activity, Facility, or Category of Persons Required to Obtain the Federal Permit, License, or Entitlement	Authority	Regulatory Agency
Title V permit under the Clean Air Act (CAA), as amended by the 1990 Clean Air Act Amendments, Title V of CAA	Any major source (source that emits more than 100 tons/year of criteria pollutant in nonattainment area for that pollutant or is otherwise defined in Title I of CAA as a major source); affected sources as defined in Title IV of CAA; sources subject to Section 111 regarding New Source Performance Standards; sources of air toxics regulated under Section 112 of CAA; sources required to have new source or modification permits under Parts C or D of Title I of CAA; and any other source designated by EPA regulations.	Title V of CAA	U.S. Environmental Protection Agency; Arizona Department of Environmental Quality - Office of Air Quality Control; Maricopa County Bureau of Air Pollution Control
National Pollutant Discharge Elimination System (NPDES) Permit (including stormwater discharges)	Discharge of pollutant from any point source into waters of the United States.	Section 402 of the Clean Water Act, 33 U.S.C. § 1342	U.S. Environmental Protection Agency; Arizona Water Quality Control Board
Section 404 (Dredge and Fill) Permit	Any project activities resulting in the discharge of dredged or fill material into bodies of water, including wetlands, within the United States.	Section 404 of the Clean Water Act, 33 U.S.C. § 1344	U.S. Department of Defense - Army Corps of Engineers, in consultation with U.S. Environmental Protection Agency
Underground Injection Control (UIC) Permit	Owners or operators of certain types of underground injection wells.	Safe Drinking Water Act, 42 U.S.C. § 300h(b); 40 CFR Part 144	U.S. Environmental Protection Agency; Arizona Department of Environmental Quality - Plan Review and Permits Section

Table 1.8-1. Federal Permits, Licenses, and Entitlements Potentially Required for Reusers or Developers of Disposed Base Property
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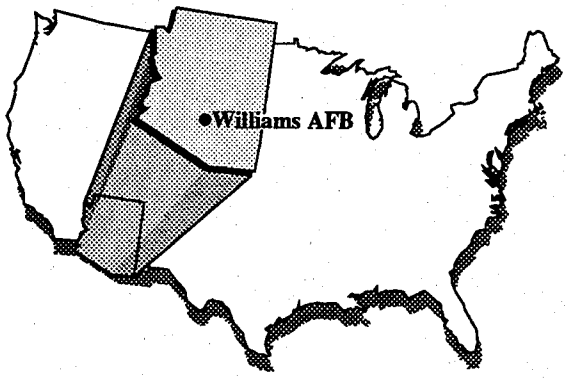
Federal Permit, License, or Entitlement	Typical Activity, Facility, or Category of Persons Required to Obtain the Federal Permit, License, or Entitlement	Authority	Regulatory Agency
Hazardous Waste Treatment, Storage, or Disposal (TSD) Facility Permit	Owners or operators of a new or existing hazardous waste TSD facility.	Resource Conservation and Recovery Act (RCRA) as amended, 42 U.S.C. § 3005; 40 CFR Part 270	U.S. Environmental Protection Agency; Arizona Department of Environmental Quality - Hazardous Waste Section
EPA Identification Number	Generators or transporters (off-site transport) of hazardous waste.	40 CFR § 262.10 (generators); 40 CFR Part 263, Subpart B (transporters)	U.S. Environmental Protection Agency
Antiquities Permit	Excavation and/or removal of archaeological resources from public lands or Native American lands and carrying out activities associated with such excavation and/or removal.	Archaeological Resource Protection Act of 1979, 16 U.S.C. § 470cc	U.S. Department of Interior - National Park Service
Endangered Species Act § 10 permit	Taking endangered or threatened wildlife species; engaging in certain commercial trade of endangered or threatened plants or removing such plants from property subject to federal jurisdiction.	Section 10 of Endangered Species Act, 16 U.S.C. § 1539; 50 CFR Part 17 Subparts C,D,F, and G	U.S. Department of Interior - Fish and Wildlife Service
Airport Operating Certificate	Operating a land airport serving any scheduled or unscheduled passenger operation of air carrier aircraft designed for more than 30 passenger seats.	Federal Aviation Act of 1958, 49 U.S.C. App. § 1432	U.S. Department of Transportation - Federal Aviation Administration



CHAPTER 2
ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 INTRODUCTION

This section describes the Proposed Action, reasonable alternatives to the Proposed Action, and the No-Action Alternative. In addition, potential federal transfers of Williams AFB properties and facilities from the Air Force are independent reuse options that are described and environmentally analyzed. Other alternatives that were identified but eliminated from further consideration are briefly described. The potential environmental impacts of the Proposed Action and alternatives are summarized in table form.

Generally, the Administrator of the GSA has authority to dispose of excess and surplus real property belonging to the federal government. With regard to closure bases, however, the DBCRA delegates the disposal authority of the Administrator of General Services to the Secretary of Defense. FPMR, which govern property disposal methods associated with base closure, allow the Secretary of Defense to dispose of closure property by transfer to another federal agency, by public benefit conveyance, by negotiated sale to state or local government, and by public sale at auction or sealed bid. These methods, or a combination of them, could be used to dispose of property at Williams AFB.

Provisions of DBCRA and FPMR require that the Air Force first notify other DOD departments that Williams AFB is scheduled for disposal. Any proposals from these departments for the transfer of Williams AFB assets are given priority consideration.

Analysis of the Proposed Action and reasonable alternatives may also address the use of facilities by homeless assistance providers. Under the provisions of FPMR, which implement the Stewart B. McKinney Homeless Assistance Act (Public Law 100-77), the Air Force must report to the Department of Housing and Urban Development (HUD) all underutilized, unutilized, and/or excess buildings and land.

Six preliminary reuse plans were developed for the base by the Williams AFB Economic Reuse Advisory Board, which was established by the State of Arizona to study the reuse potential for Williams AFB. From these six preliminary plans, one was adopted by the Board as the community's preferred reuse alternative, which is identified in this document as the Proposed Action. Of the five remaining plans, two were evaluated as alternatives to the Proposed Action. All but one of the preliminary plans, including the Proposed Action, address redevelopment focused upon a civilian airport of various sizes. In each of these plans, the primary aviation use is coupled with combinations of non-aviation uses, including a college satellite campus, industrial activities, vocational/technical training facilities, and residential developments. In addition to the aviation related plans, one

non-aviation reuse plan was developed which combines a college satellite campus and research facilities with a new residential community.

In developing the preliminary reuse plans, the Williams AFB Economic Reuse Advisory Board adopted the following goals:

- Promote new economic activity to minimize adverse impacts
- Respond to community needs
- Achieve compatibility with surrounding areas
- Protect environmental resources
- Provide for effective implementation.

Subsequent to the adoption of the Williams AFB Economic Reuse Advisory Board reuse plan, the Williams Redevelopment Partnership was formed to implement the plan. The formation of the partnership was made possible through an intergovernmental agreement between five surrounding local governments, who now constitute the member agencies. By prior agreement, an application to the FAA for a master plan for development of a public airport was filed by the Town of Gilbert while the master plan process is coordinated by the Williams Redevelopment Partnership. As part of the master plan process, changes to the original reuse plan were developed which increase the size and scale of the proposed airport. These changes are incorporated into the EIS and are analyzed as an additional alternative to the Proposed Action.

Although each of the plans offered different levels of detail, all were conceptual in nature. In order to accomplish impact analysis, a set of general assumptions was made. These assumptions include employment and population changes arising from implementation of each reuse plan, consistent land use designations for similar reuse options, proportion of ground disturbance anticipated for each land use type, transportation and utility effects of each proposal as a function of increased population growth due to redevelopment, and anticipated phasing of the various elements of each reuse plan (as measured at the closure baseline, and at the baseline plus 5, 10, and 20 years, respectively). Details regarding the generation of these assumptions are found in Appendix E, Methods of Analysis. Specific assumptions developed for individual reuse plans are identified in the discussion of each proposal within Sections 2.2 and 2.3.

The potential land acquisition identified under each alternative is described if: (1) the parcel's proposed use and/or development is expected to occur within the 20-year period covered by the analysis, (2) the area is intended to be set aside, as in the case of future airport expansion, or (3) the area is

considered a buffer zone to prevent future non-compatible land uses. Specific discussions on land acquisitions subject to environmental analysis are found within the appropriate land use category for each alternative.

Of the functions on the base, only the National Weather Service NEXRAD radar facility and the Willie VORTAC NAVAID (a navigation device) are scheduled to remain permanently after base closure and will be present under each alternative, including the No-Action Alternative and the Proposed Action. The NEXRAD station is located on a one-acre site in the southwest corner of the base. The Willie VORTAC is located between Runway 12R/30L and Runway 12C/30C.

Land use plans acknowledge existing IRP status. Plans have considered the effect of pending IRP remedial action decisions on the viability of reuse. IRP remediation at Williams AFB, in consultation with the State of Arizona and the U.S. EPA, may result in the identification of possible lease/deed restrictions, limiting the timing and type of reuse options and development to some degree (i.e., temporary lease to allow access to specific sites such as monitoring wells while the remainder of the site is developed for reuse). Development of Williams AFB would be coordinated with IRP remediation. In addition, the development of alternatives has considered compatible land use for the parcels in question.

2.2 DESCRIPTION OF PROPOSED ACTION

Section 2905(b)(2)(E) of DBCRA requires the Air Force, as part of the disposal process, to consult with the applicable state governor, heads of local governments, or equivalent political organizations for the purposes of considering any plan for the use of such property by the concerned local community. Air Force policy is to encourage timely community reuse planning by offering to use the community's plan for reuse or development of land and facilities as the Air Force's Proposed Action in the EIS.

The reuse development plans which constitute the Proposed Action and alternatives were prepared by the Williams AFB Economic Reuse Advisory Board and the Williams Redevelopment Partnership. Minor revisions have been made where necessary for the purposes of analysis. The Board was established and the reuse planning effort was initiated by Arizona Governor Fife Symington in November 1991. Board members with voting authority were appointed by the Governor, while non-voting ex-officio members were elected representatives of the local jurisdictions surrounding the base, along with congressional and senate representatives and the Governor. Local jurisdictions with ex-officio membership on the Board included: the City of Mesa, Town of Gilbert, Town of Chandler, Town of Queen Creek, City of Apache Junction, City of Tempe, City of Phoenix, and Maricopa County (EDAW et al., 1992b).

The Board contracted with a team of consultants to compile technical data and to prepare preliminary reuse plans for the Board to consider. Among the areas addressed were the following:

- Airport development concepts
- Market analysis
- Existing land use
- Utility system inventory
- Building inventory.

The results of these technical studies were compiled into six preliminary reuse plans, from which a single plan was selected as the Board's preferred reuse alternative on April 23, 1992. The Air Force has included this plan as the Proposed Action for the purpose of analyzing environmental impacts.

Subsequent to the adoption of the Board's reuse plan, the Williams Redevelopment Partnership initiated development of an airport master plan which builds upon the Proposed Action but incorporates a number of differences. The Partnership's plan is treated as an alternative to the Proposed Action and is described in Section 2.3.2.

The following types of data were provided by the Board for analysis of the Proposed Action:

- Proposed reuse options for the airfield
- Long-range development concept plans
- Generalized employment and development projections
- Acreage figures for proposed land use categories.

The following assumptions were used to expand upon the analysis:

- Anticipated building demolition/new construction activities
- Amount and location of areas disturbed by construction/demolition
- Phasing plans for reuse
- Preliminary Airport Plan
- Projected annual aircraft operations for a 20-year planning period

- Proposed airport improvements
- Employment and population projections to the year 2013
- Traffic generated by the project to the year 2013
- Utility requirement projections to the year 2013.

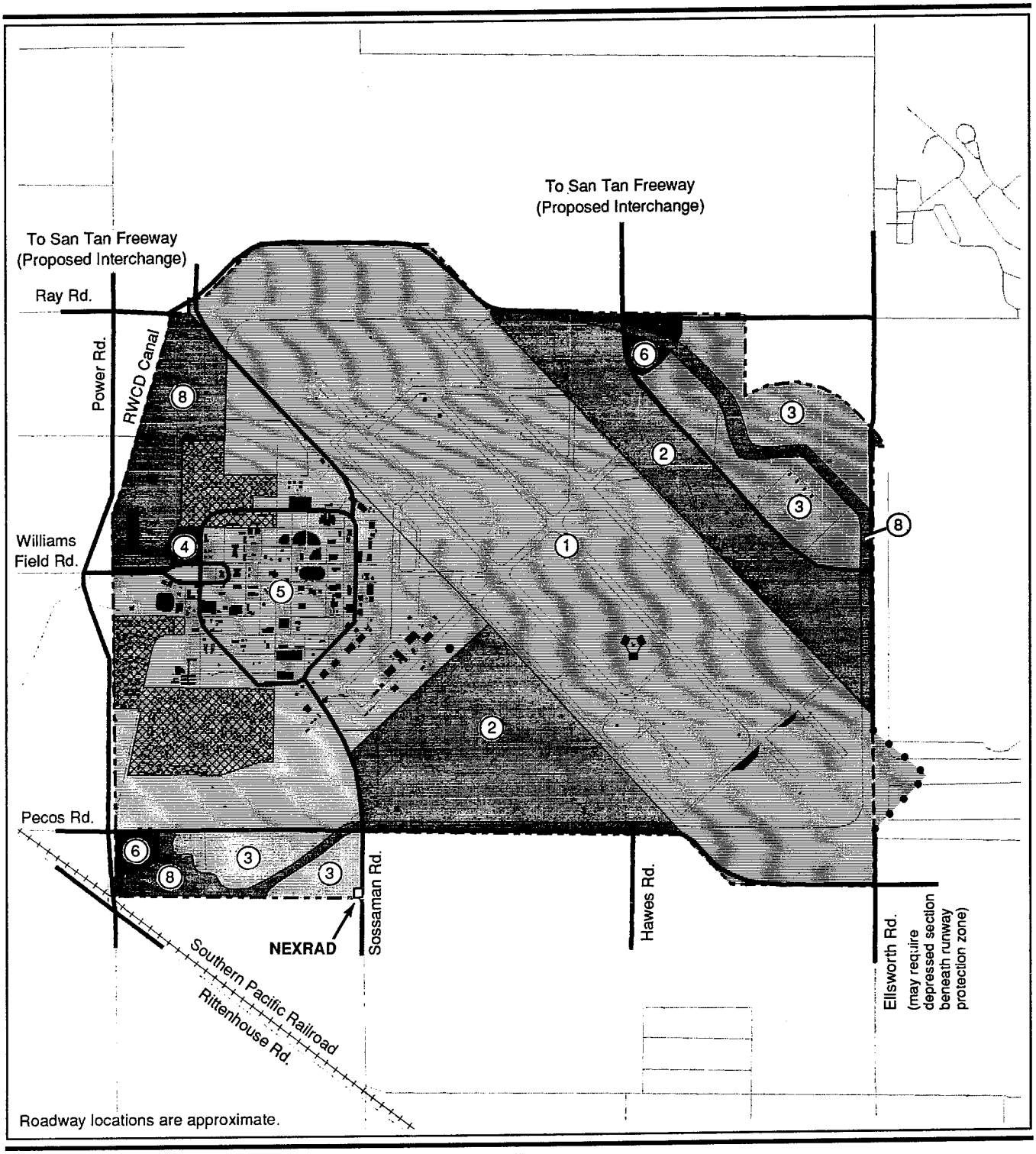
Figure 2.2-1 shows land uses under the Proposed Action. The reuse of Williams AFB would center around a combined general aviation/commercial airport, aviation training element, and a large education component accommodating a satellite university campus. The primary land use components of the Proposed Action include a combined general aviation/commercial service airfield and aviation support facilities, reusing and expanding the existing airfield on the base. Expansion of the airfield would require acquisition of 25 acres of land adjacent to the southeast corner of the base which would be used to extend the easternmost runway and attendant runway protection zone.

In addition to the airfield and aviation support uses, a large education component would reuse most of the existing buildings on the western half of the base. Education land uses would include a satellite university campus, aviation college, research facilities, and retention of an existing elementary school.

Other ancillary uses supplementing the activities on the base under the Proposed Action would include commercial uses to serve the airport and the education components, industrial uses (near the airfield and aviation support areas in the northeast corner of the airport and in the extreme southwest corner of the base), and retention of the existing golf course. The approximate acreage attributed to each land use category is shown in Table 2.2-1.

Off-base property acquisition needs are discussed in the applicable land use category descriptions, as described in detail below. The amount of development proposed, including existing facility demolition and retention and new facility construction, for each land use under the Proposed Action is provided in Table 2.2-2.

The acreages within each land use assumed to be disturbed by construction of facilities, infrastructure improvements, or other operations activities under the Proposed Action are provided in Table 2.2-3 for three phases of development.



EXPLANATION

- (1) Airfield
- (2) Aviation Support
- (3) Industrial
- (4) Institutional (Medical)
- (5) Institutional (Education)
- (6) Commercial
- (7) Residential *
- (8) Public/Recreation
- (9) Agriculture *
- (10) Vacant Land *
- (11) Military Land *
- Campus Residential Housing
- Willie VORTAC
- Base Boundary
- Off-Base Extension

0 750 1500 3000 Feet

* Not Applicable

Land Use – Proposed Action

Figure 2.2-1

Table 2.2-1. Land Use Acreage - Proposed Action

Land Use	Acreage On-Base	Acreage Off-Base
Base Property		
Airfield	1,675	25
Aviation Support	633	0
Industrial	358	0
Institutional (Education)	809	0
(Campus Residential Housing)*	204	0
Institutional (Medical)	11	0
Commercial	40	0
Residential	0	0
Public/Recreation	312	0
Subtotal	4,042	25
Air Force Retained Property	0	0
Total	4,042	25

* Housing units located in the North, West, and South Desert Village housing areas are retained as Campus Residential Housing in the Institutional (Education) land use category.

2.2.1 Airfield

The airfield land use category under the Proposed Action would comprise approximately 41 percent of the base, or 1,675 acres, with an additional 25 acres to be acquired off-base (Figure 2.2-2). Off-base acreage would be located adjacent to the southeast quadrant of the base, to lengthen the existing easternmost runway (12L/30R) and attendant runway protection zone. The airfield would ultimately have two runways to accommodate general aviation, air cargo, and passenger/commercial services. Airfield redevelopment would ultimately involve reusing an 8,800 foot portion of the westernmost runway (12R/30L) and lengthening the easternmost existing runway (12L/30R) to 10,500 feet. Runway 12C/30C would initially remain in use, but would later be decommissioned and converted into a parallel taxiway. The ILS associated with Runway 12C/30C would then be relocated to Runway 12L/30R. Additional activities requiring airfield support include facilities associated with the maintenance of all types of aircraft, aircraft manufacturing, and aviation training.

The following airfield improvements are proposed and would be constructed in accordance with the FAA Advisory Circulars and Standards:

- Shorten Runway 12R/30L from 10,400 feet to 8,800 feet, and strengthen or reconstruct it to accommodate the critical aircraft
- Lengthen Runway 12L/30R from 9,300 feet to 10,500 feet, and strengthen or reconstruct it to accommodate the critical aircraft

Table 2.2-2. Facility Development - Proposed Action

Land Use	Existing Facility Demolition	Existing Facility Retention	New Facility Construction
	(in thousands of square feet of floor space)		
Airfield	0	0	0
Aviation Support	19	3	5,208
Industrial	8	0	3,745
Institutional (Education)	673	1,183	367
(Campus Residential Housing)*	0	957	0
Institutional (Medical)	0	95	0
Commercial	1	2	430
Public/Recreation	0	11	0
Residential	0	0	0
Total	701	2,251	9,750

* Housing units located in the North, West, and South Desert Village housing areas are retained as Campus Residential Housing in the Institutional (Education) land use category.

- Relocate the full precision ILS from Runway 30C to Runway 30R. The ILS consists of a localizer antenna, glide slope antenna, approach light system, and marker beacons (middle and outer)
- Upon relocation of the ILS, decommission Runway 12C/30C and convert it into a taxiway
- Relocate the air traffic control tower and the remote tower receiver and transmitter sites
- Establish a non-precision instrument approach to Runway 12L and establish a precision instrument approach to Runway 30R
- Establish runway protection zones (RPZs) for all runways to meet FAA criteria
- Construct and/or retain taxiways and aprons sufficient to serve the commercial service and general aviation operations
- Construct a terminal building

Table 2.2-3. Acres Disturbed by Phase - Proposed Action

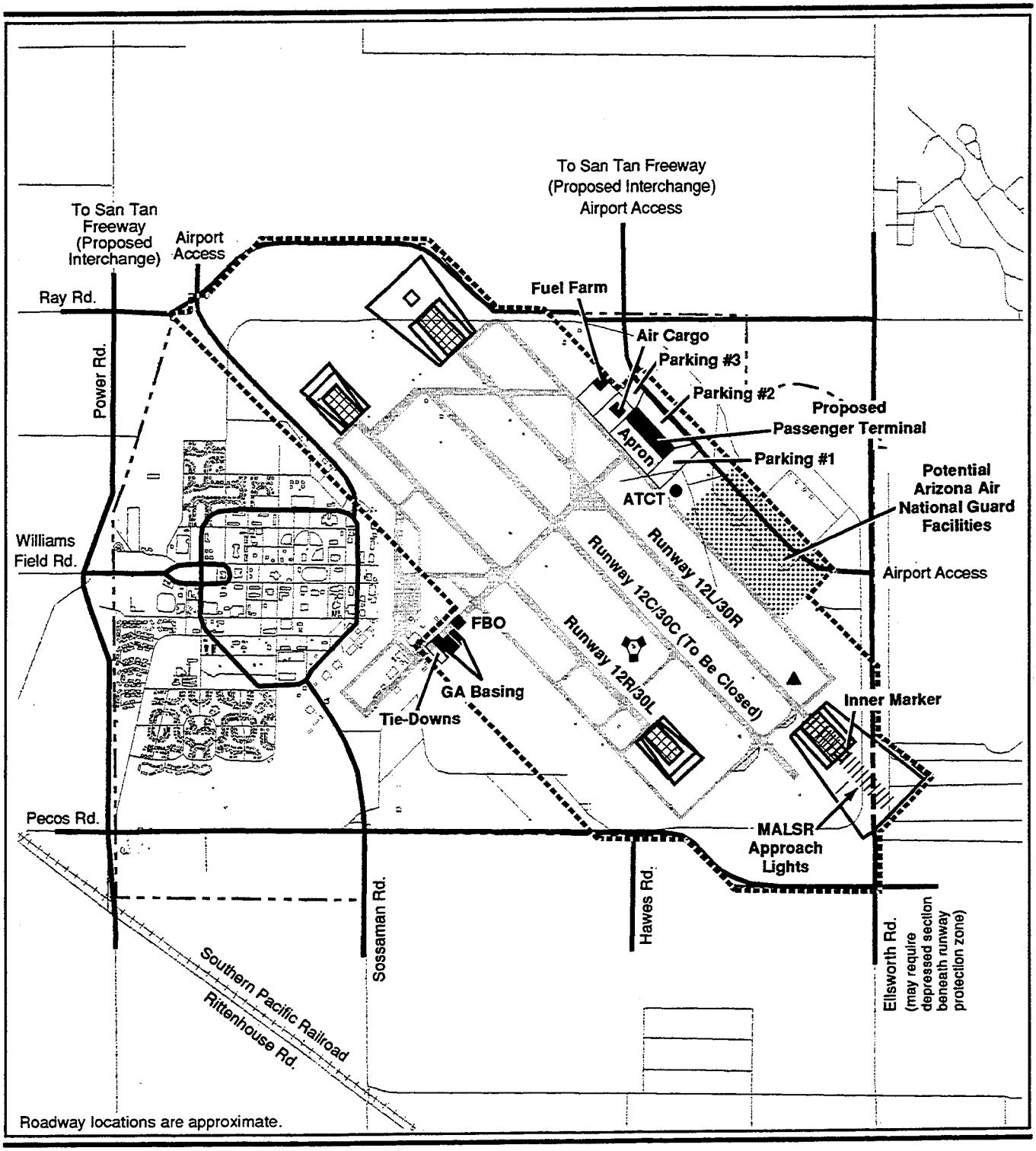
	Acres Disturbed (by phase)			
Land Use	1993-1998	1998-2003	2003-2013	Total
Airfield	1,675*	0	0	1,675*
Aviation Support	213	69	138	420
Industrial	40	52	104	196
Commercial	2	9	18	29
Residential	0	0	0	0
Institutional (Education)	410	0	113	523
(Campus Residential Housing)**	94	0	110	204
Institutional (Medical)	11	0	0	11
Public/Recreation	312	0	0	312
Total	2,757*	130	483	3,370*

* Total does not include an additional 25 acres to be acquired off-base which would be disturbed for airfield expansion.

** Housing units located in the North, West, and South Desert Village housing areas are retained as Campus Residential Housing in the Institutional (Education) land use category.

- Construct specific facilities to accommodate vehicle parking, access and/or frontage roads, and all necessary associated facilities
- Develop engineering plans to improve and repair deteriorated and/or substandard areas of airfield pavement
- Construct fuel storage and dispensing facilities for aircraft fuel.

Projected flight operations are provided in Table 2.2-4 for the years 1993, 1998, 2003, and 2013. An operation is defined as one landing or one takeoff. Projected annual operations were generated within three overall categories: air passenger, general aviation, and military training. During the planning period, 98 percent of all the projected operations would occur before 10 p.m. while 2 percent would occur during nighttime hours (10 p.m. to 7 a.m.). For the purposes of analysis, it was assumed that flights occurring between 10 p.m. and 7 a.m. would be distributed evenly between the three overall categories of flight operations.



EXPLANATION

- Airfield Pavement
- Runway Object Free Area
- Runway Protection Zone
- Runway Safety Area
- Airport Boundary
- Instrumentation Landing System (ILS) Glide Slope Site
- ILS Localizer Antenna Site
- Air Traffic Control Tower (ATCT)
- Willie VORTAC
- Base Boundary

0 750 1500 3000 Feet

Preliminary Airport Plan - Proposed Action

Figure 2.2-2

Table 2.2-4. Projected Flight Operations - Proposed Action

Year	Operations	Function	%	Fleet Mix	Annual Operations
1993	General Aviation		79	Single-engine Piston	9,000
			21	Multi-engine Piston	2,450
			0	Turboprop	0
			0	Turbojet	0
			0	Rotorcraft	0
	Military	Training	100	KC-135E**	6,000*
				Total	17,450
1998	Air Passenger	Air Carrier	0	B-757/A-320	0
			25	MD-80/MD-90	1,500
			75	B-737-300/400	4,500
		Commuter	100	BAe-146	4,000
	General Aviation		77	Single-engine Piston	13,050
			16	Multi-engine Piston	2,695
			4	Turboprop	705
			3	Turbojet	600
			0	Rotorcraft	0
	Military	Training	100	KC-135R**	7,200*
				Total	34,250
2003	Air Passenger	Air Carrier	6	B-757/A-320	850
			38	MD-80/MD-90	5,000
			56	B-737-300/400	7,300
		Commuter	100	BAe-146	1,000
	General Aviation		74	Single-engine Piston	17,100
			13	Multi-engine Piston	2,940
			6	Turboprop	1,410
			5	Turbojet	1,200
			2	Rotorcraft	400
	Military	Training	100	KC-135R**	7,200*
				Total	44,400
2013	Air Passenger	Air Carrier	16	B-757/A-320	7,020
			48	MD-80/MD-90	21,530
			36	B-737-300/400	16,380
		Commuter	100	BAe-146	1,870
	General Aviation		74	Single-engine Piston	25,200
			10	Multi-engine Piston	3,430
			8	Turboprop	2,820
			7	Turbojet	2,400
			1	Rotorcraft	400
	Military	Training	100	KC-135R**	7,200*
				Total	88,250

* Annual KC-135 operations in 1993 are itinerant. After 1993, it is assumed that the Arizona ANG 161st AREFG relocates to Williams AFB.

** KC-135E aircraft would be phased out and replaced by KC-135R aircraft by 1998.

Annual commercial/passenger service operations for the Proposed Action would include both air carrier and commuter functions with 46,800 total annual operations by the year 2013. Military operations could include Air National Guard (ANG) facilities with KC-135E operations, in the initial phases, which would be replaced by KC-135R aircraft by the year 1998. If the Air National Guard relocates to the airport, approximately 7,200 annual operations could result. General Aviation operations would include single- and multi-engine piston aircraft, turboprop, turbojet and rotorcraft operations that would total 34,250 operations by the year 2013.

Primary flight tracks (Figure 4.4-6) were developed for the Proposed Action using standard FAA Instrument Departure/Approach procedures which are based on aircraft and runway types. These differ from the existing flight tracks (Figures 3.2-14 and 3.2-15) due to distinct types of military operations and aircraft.

Any air cargo necessary for the reuse activities at the base would most likely be carried in the cargo hold of commercial service aircraft. Commercial service aircraft are assumed sufficient to handle projected demands of up to 13,500 tons of air cargo or mail at Williams AFB.

2.2.2 Aviation Support

Aviation support uses would comprise approximately 16 percent of the base, or approximately 633 acres, and would consist of administration and terminal facilities, control tower, fueling areas, tie-down space, a fire station, maintenance areas, and air cargo and delivery operations. The existing flight line facilities would be reused for the proposed education component. For the proposed general/commercial aviation airport, new support facilities would be constructed in the northeast corner of the base. Air cargo activities and manufacturing activities requiring taxiway access would be located on both sides of the airfield, and on either side of the proposed new terminal facilities.

New construction would be required for the passenger terminal, automobile parking, terminal access and circulation, aircraft parking, and aircraft basing/servicing. For the 2.39 million total commercial service enplanements projected for 2013, construction of approximately 200,000 square feet of passenger terminal facilities would be required by the year 2013. This facility is assumed to be a split level structure with the single level at the curbside and ticketing area, and with two stories in the departure lounge and landside gate areas.

Commercial aircraft apron parking is also based on FAA guidelines. Using the forecast aircraft utilization, nine jet gates and one commuter gate would accommodate the forecast level of demand. This number of gates equates to an average of seven daily departures per jet gate and three departures for

the commuter gate. These gates require sufficient aircraft apron to accommodate the aircraft during loading/unloading and taxiing procedures.

General aviation basing would include the storage facilities for the aircraft forecast to be based at Williams AFB and for itinerant aircraft which will require either T-hangar or conventional hangar storage as well as tie-down spaces. Total aircraft basing requirements would equal 5 acres.

Fixed-base operations would provide for terminal/public areas, aircraft maintenance, automobile parking, and fueling for general aviation pilots. A total area of 1.6 acres would be used for this purpose. Operation of fixed-base operations would be overseen by an Intergovernmental Agreement (IGA) group which would own the airport and all aviation support uses.

All air cargo activity is projected to occur through the commercial service activity (i.e., in the cargo hold of the air carrier aircraft). This activity still requires a central processing, sorting and distribution terminal with aircraft and truck access. For the estimated annual processing of 13,500 tons, a sorting and distribution terminal would require a sorting/office facility, truck access and space to be provided in four bays. Employee and pick-up parking for 40 automobiles would also be provided. With aircraft apron access sufficient to accommodate three aircraft and tug roads, the total requirement for this facility would be 7 acres.

The Arizona ANG could locate all or part of its aircraft from current basing at Sky Harbor International Airport to Williams AFB. However, this move has not been approved by the Secretary of the Air Force. Facilities would be located on the southeast side of the proposed airfield and would constitute approximately 100 acres.

Construction of airfield support facilities would be completed by the year 1998, or five years after base closure. Other aviation support activities would be developed over a 30-year period following base closure; approximately 67 percent of available aviation support acreage would be developed by the year 2013.

2.2.3 Industrial

Industrial uses encompassing 358 acres would comprise approximately 9 percent of the existing base. General industrial activities would be located east of the airfield in the northeast corner of the base and in the extreme southwest corner of the base, south of the extension of Pecos Road. General industrial activities in these areas would include manufacturing and assembly, and warehousing. Industrial uses represent new development on vacant base property.

2.2.4 Institutional (Medical and Education)

Institutional uses include a large component of education activities and a medical facility, comprising 1,024 acres of the base. The institutional acreage constitutes approximately 25 percent of the base.

The education component would comprise approximately 1,013 acres and would combine several different activities, including a university or state college satellite campus with campus residential housing, an aviation college, reuse of an existing elementary school, and a research campus. The proposed university satellite campus would reuse most of the existing buildings within the central core of the base as well as all existing base housing. The proposed aviation college would reuse existing flight line facilities between the central core of the base and the runways, including classroom buildings, hangars, and maintenance shops. Other education-related uses would include continued use of the existing elementary school and research functions which are currently occupied by Armstrong Laboratories. Medical activities would include continued use of the medical facilities currently occupying 11 acres at the west end of the central core of the base.

2.2.5 Commercial

Commercial uses would constitute 40 acres and would comprise approximately 1 percent of the base. Commercial uses would include hotel development in the northeast corner of the base to support surrounding industrial and airport activities. A retail commercial site would be located at the extreme southwest corner of the base at the intersection of Power Road and Pecos Road.

2.2.6 Residential

The Proposed Action does not include residential areas as a predominant use.

2.2.7 Public/Recreation

Recreational uses, and areas to be preserved as open space, would include reuse of an existing 18-hole golf course and retention of an existing landfill and drainage channels ringing the base as permanent open space. The total area devoted to recreation and areas required to be retained in open space would be 312 acres, comprising approximately 8 percent of the base.

2.2.8 Employment and Population

The Proposed Action would generate approximately 18,632 direct jobs by the year 2013, taking into account both construction and operation phase

demands. Employment effects are shown in Table 2.2-5. The projected employment would generate an estimated population increase of approximately 45,932 over the post closure estimate in the ROI by the year 2013. Population effects are shown in Table 2.2-5.

Table 2.2-5. Reuse-Related Employment and Population Effects - Proposed Action

	Closure	1998	2003	2013
Direct Employment	82	4,247	7,856	18,632
Population Increase	0	10,716	19,753	45,932

2.2.9 Transportation

The circulation network for the Proposed Action would provide for two interchanges with the planned San Tan Freeway, one from Power Road and one from an unnamed arterial which would stem from Ellsworth Road, paralleling the runway and intersecting with the extension of Ray Road, and proceeding north to the freeway. General and commercial aviation uses would have access from the unnamed arterial, as well as from Ellsworth Road and Ray Road. Education uses would utilize Power Road, traveling in a north-south direction and connecting with the extensions of Ray Road and Pecos Road. Education uses would also utilize Williams Field Road, which travels in an east-west direction into the existing main entrance to the base property.

Based on land use and employment projections, average daily vehicular traffic associated with base property would be approximately 131,000 trips (one-way) by 2013. Peak-hour traffic is estimated at 13,600 trips (one-way) in the afternoon.

2.2.10 Utilities

By 2013, the projected activities associated with the Proposed Action would generate the following ROI utility demands in excess of the projected ROI preclosure reference demand:

- Water - 4.19 million gallons per day (MGD)
- Wastewater - 1.82 MGD
- Solid Waste - 55,200 tons per year
- Electricity - 768 megawatt-hours (MWH) per day
- Natural Gas - 17,000 therms per day.

Under the Proposed Action, improvements to some utility systems would be required to provide adequate services to facilities within the ROI. These are described below:

Water Supply. Water would be provided to the base by the City of Mesa water supply and treatment system. The current base water distribution system would have to be connected to the City of Mesa system, and base water supply wells would be taken off-line.

Wastewater. Wastewater treatment services would be provided to the current base by the City of Mesa wastewater collection and treatment system. The current base wastewater collection system would have to be connected to the City of Mesa system, and the base wastewater treatment plant would be taken off-line. Capacity upgrades for the City of Mesa system are necessary by 2013 in order to handle projected demand under this alternative. The schedule for this capacity upgrade corresponds to the time frame that capacity would have to be upgraded under the No-Action Alternative.

Solid Waste. Many of the landfills in Maricopa County are currently operating at or above capacity. The need for and location of a new regional landfill are being considered by the Southwest Regional Landfill Siting Committee. Land within Pinal County has been proposed for development of the new regional landfill site which may occur between 1993 and 1995. The new landfill will serve the eastern area of Maricopa County, including the area which Williams AFB currently occupies, and parts of Pinal County (Maricopa Association of Governments, 1991a).

Electricity. Electricity is provided to the base by Salt River Project Electric. Salt River Project has indicated that there is adequate capacity to handle all future demands for the Proposed Action.

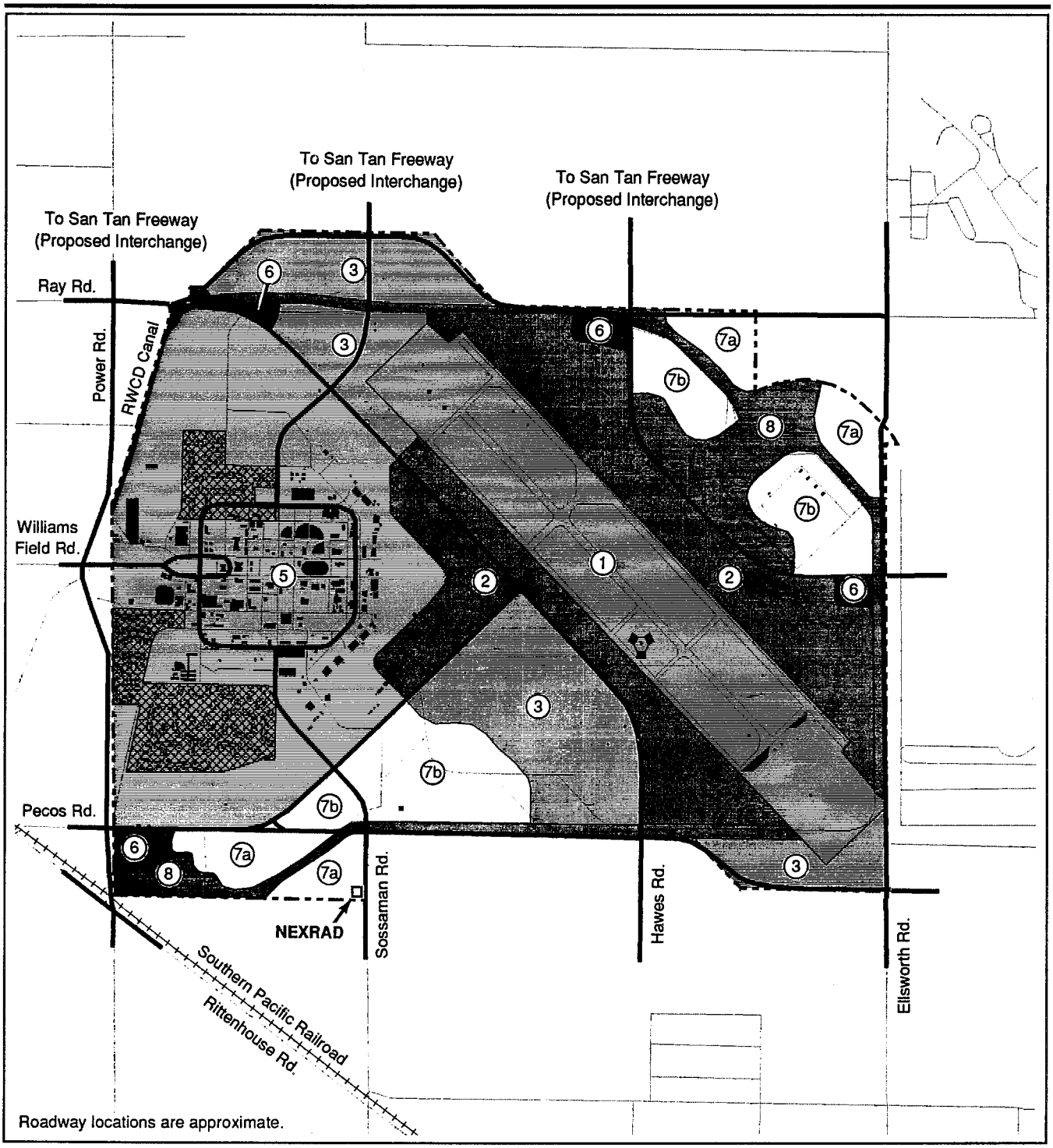
Natural Gas. Natural gas is provided to the base by Southwest Gas Company. Southwest Gas Company has indicated that there is adequate capacity to handle all future demands for the Proposed Action.

2.3 DESCRIPTION OF ALTERNATIVES

In addition to the Proposed Action, four additional reuse alternatives, including the No-Action Alternative, were developed for analysis in the EIS. These include two aviation alternatives and one non-aviation alternative.

2.3.1 General Aviation and Education Alternative

The General Aviation and Education Alternative (Figure 2.3-1) would combine a general aviation airport facility and industrial uses with a large institutional component including education, research, and training activities.



EXPLANATION

- (1) Airfield
- (2) Aviation Support
- (3) Industrial
- (4) Institutional (Medical) *
- (5) Institutional (Education)
- (6) Commercial
- (7) Residential †
- (8) Public/Recreation
- (9) Agriculture *
- (10) Vacant Land *
- (11) Military Land *
- Campus Residential Housing
- Willie VORTAC
- Base Boundary
- Off-Base Extension *

0 750 1500 3000 Feet

* Not Applicable
† 7a - Medium Density; 7b - High Density

Land Use – General Aviation and Education Alternative

Figure 2.3-1

The general aviation airport facility would reuse a single runway, with aviation support areas located on the east and west side of the airfield. General industrial activities would be located north and south of the airfield, and west of aviation support areas. Non-aviation land use is highlighted by a large educational component including the reuse of existing recreational facilities as amenities. Residential uses and public recreation/open space would occupy the northeast and southwest quadrant of the base. Approximate acreage of each land use category is shown in Table 2.3-1.

Table 2.3-1. Land Use Acreage - General Aviation and Education Alternative

Land Use	Acreage On-Base	Acreage Off-Base
Base Property		
Airfield	611	0
Aviation Support	729	0
Industrial	602	0
Institutional (Education)	953	0
(Campus Residential Housing)*	204	0
Commercial	50	0
Residential	531	0
Public/Recreation	362	0
Subtotal	4,042	0
Air Force Retained Property	0	0
Total	4,042	0

* Housing units located in the North, West, and South Desert Village housing areas are retained as Campus Residential Housing in the Institutional (Education) land use category.

The following assumptions were used to expand upon the analysis for the General Aviation and Education Alternative:

- Anticipated building demolition/new construction activities
- Amount and location of areas disturbed by construction/demolition
- Phasing plans for reuse
- Preliminary Airport Plan
- Projected annual aircraft operations for a 20-year planning period
- Proposed airport improvements
- Employment and population projections to the year 2013

- Traffic generated by the project to the year 2013
- Utility requirement projections to the year 2013.

The amount of development proposed, including existing facility demolition and retention, and new facility construction, for each land use under this alternative is provided in Table 2.3-2.

The acreages within each land use assumed to be disturbed under this alternative are provided in Table 2.3-3 for three phases of development.

2.3.1.1 Airfield. The airfield would consist of approximately 611 acres or 15 percent of the existing base, and would include the existing runways, taxiways, aprons, and runway protection zones. The general aviation airfield would reuse 9,250 feet from existing runway 12C/30C, which has a present length of 10,200 feet (EDAW et al., 1992a). This runway would also be equipped to accommodate precision instrument landings and non-precision instrument landings.

Proposed operational capabilities of the airfield would include corporate and private aviation. A summary of projected flight operations at closure, and at year 5, 10, and 20 are provided in Table 2.3-4.

Annual general aviation operations for this alternative would include single and multi-engine piston aircraft, turboprop, turbojet and rotorcraft operations that would total 157,300 operations by the year 2013. During the planning period, 98 percent of all the projected operations would occur before 10 p.m. while 2 percent would occur during nighttime hours (10 p.m. to 7 a.m.). For the purposes of analysis, it was assumed that flights occurring between 10 p.m. and 7 a.m. would be distributed evenly between the different types of aircraft.

The preliminary airport development plan (Figure 2.3-2) for civilian use of the aviation facilities at Williams AFB used the FAA Advisory Circular 150/5300-13 (Federal Aviation Administration, 1989a) in developing the layout of the characteristics (e.g., dimensions, separations, and clearances) of airfield elements to allow operation of all commercial aircraft. The following improvements of the airfield would be necessary:

- Shorten Runway 12C/30C from 10,200 feet to 9,250 feet and strengthen it to accommodate 75 percent to 100 percent of the large aircraft fleet at 90 percent useful load
- Decommission Runways 12L/30R and 12R/30L and convert them to taxiways
- Relocate the full precision ILS so it is properly situated on the end of shortened Runway 30C

Table 2.3-2. Facility Development - General Aviation and Education Alternative

Land Use	Existing Facility Demolition	Existing Facility Retention	New Facility Construction
	(in thousands of square feet of floor space)		
Airfield	0	0	0
Aviation Support	8	166	6,347
Industrial	1	0	6,294
Commercial	3	2	542
Residential	0	0	3,983
Institutional (Education)	753	1,043	367
(Campus Residential Housing)*	0	957	0
Public/Recreation	0	0	0
Total	765	2,168	17,533

* Housing units located in the North, West, and South Desert Village housing areas are retained as Campus Residential Housing in the Institutional (Education) land use category.

- Relocate the air traffic control tower and the remote tower receiver and transmitter sites
- Establish RPZs for all runways to meet FAA criteria
- Construct and/or retain taxiways and aprons sufficient to serve the general aviation operations
- Construct specific facilities to accommodate vehicle parking, access and/or frontage roads, and all necessary associated facilities
- Develop engineering plans to improve and repair deteriorated and/or substandard areas of airfield pavement
- Construct fuel storage and dispensing facilities for aircraft fuel.

2.3.1.2 Aviation Support. Aviation support uses would cover approximately 729 acres, or 18 percent of existing base land, including areas for aircraft and airport maintenance. Aviation support includes the reuse of existing aircraft hangars, aircraft maintenance operations, washracks, the control tower, and the radar facility. New construction would be required to accommodate civilian aviation activities such as T-hangars, tie downs, fixed base operations, a fuel farm, and an auto park.

Table 2.3-3. Acres Disturbed by Phase - General Aviation and Education Alternative

Land Use	Acres Disturbed (by phase) 1993-1998	1998-2003	2003-2013	Total
Airfield	611	0	0	611
Aviation Support	115	100	201	416
Industrial	68	87	175	330
Commercial	2	11	22	35
Residential	245	200	86	531
Institutional (Education)	375	0	188	563
(Campus Residential Housing)*	94	0	110	204
Institutional (Medical)	0	0	0	0
Public/Recreation	362	0	0	362
Total	1,872	398	782	3,052

*Housing units located in the North, West, and South Desert Village housing areas are retained as Campus Residential Housing in the Institutional (Education) land use category.

Construction of airfield support facilities would occur by the year 1998, or 5 years after base closure. Other aviation support activities would be developed over a 36- to 38-year period following base closure; approximately 55 percent of available aviation support acreage would be developed by the year 2013.

The Arizona ANG would conduct touch-and-go operations on the airfield as an interim use but would cease operations prior to 1998.

Operation of fixed-base operations would be overseen by an IGA group which would own the airport and all aviation support uses. The development and operations of the aviation support area would be managed in accordance with FAA regulations and applicable statutes.

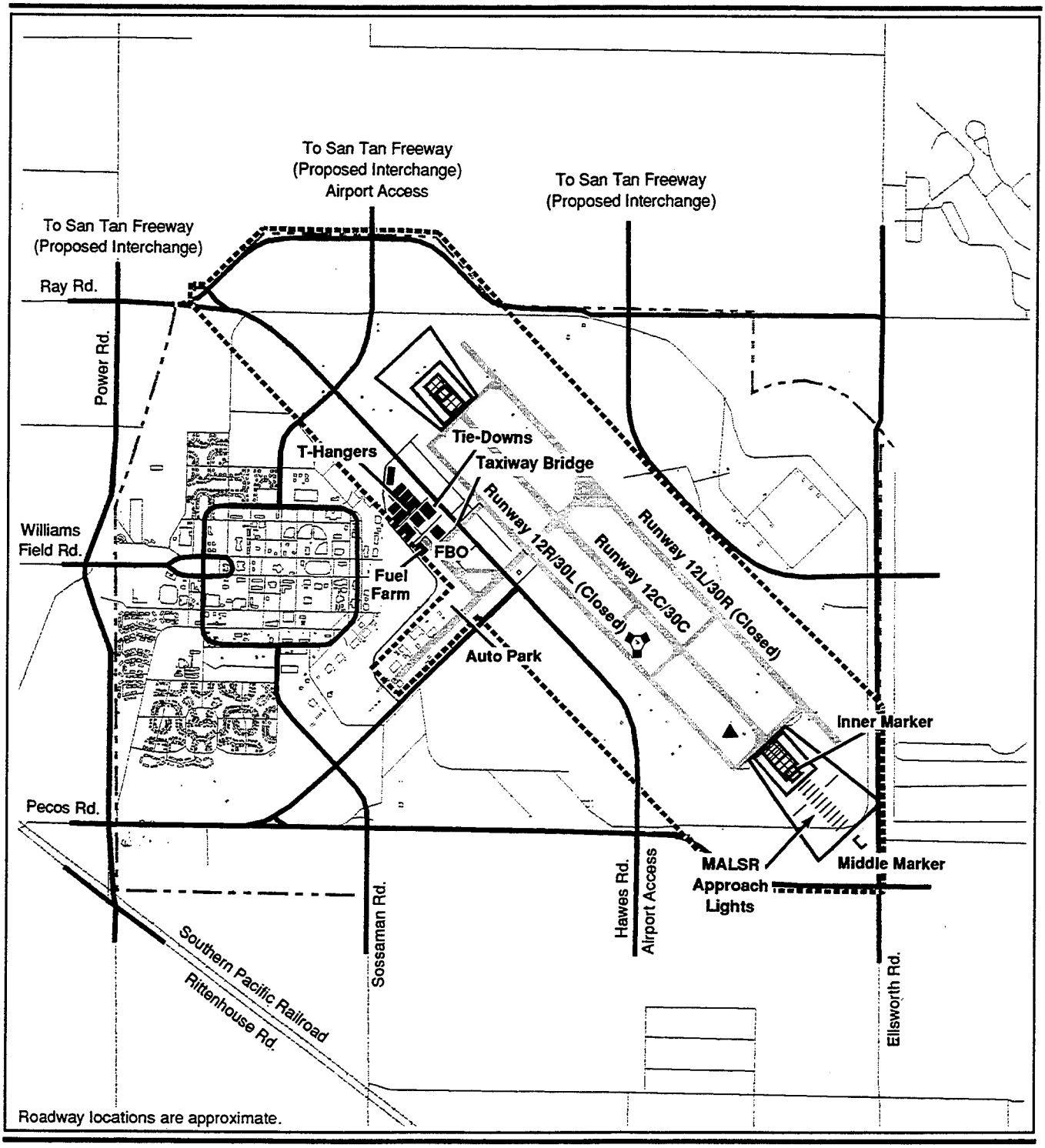
2.3.1.3 Industrial. Industrial land uses would cover approximately 602 acres or 15 percent of the base, concentrated primarily in three areas. One general industrial area is proposed for the north end of the runway outside the runway protection zone, while the other would be located on the west side of the runway, adjacent to aviation support services and industrial uses with taxiway access.

Table 2.3-4. Projected Flight Operations - General Aviation and Education Alternative

Year	Operations	Function	%	Fleet Mix	Annual Operations
1993	General Aviation		81	Single-engine Piston	26,900
			13	Multi-engine Piston	4,400
			2	Turboprop	470
			0	Turbojet	0
			1	Rotorcraft	400
			3	Other	900
	Military	Training	100	KC-135E	6,000*
				Total	39,070
1998	General Aviation		81	Single-engine Piston	49,500
			11	Multi-engine Piston	6,500
			1	Turboprop	840
			1	Turbojet	400
			2	Rotorcraft	1,200
			4	Other	2,200
				Total	60,640
2003	General Aviation		82	Single-engine Piston	69,100
			10	Multi-engine Piston	8,700
			1	Turboprop	1,200
			1	Turbojet	400
			2	Rotorcraft	1,900
			4	Other	3,300
				Total	84,600
2013	General Aviation		82	Single-engine Piston	128,600
			8	Multi-engine Piston	13,300
			3	Turboprop	4,700
			3	Turbojet	4,000
			2	Rotorcraft	2,800
			2	Other	3,900
				Total	157,300

*Under this alternative, the Arizona ANG would terminate airfield operations prior to 1998.

2.3.1.4 Institutional (Medical and Education). The education component would constitute approximately 29 percent of the existing base and would reuse most of the existing buildings outside the flight line as well as existing on-base housing for use as campus residential housing. This 1,157-acre area would include such uses as a major university campus or 4-year state college, a vocational/technical aviation training center, a research laboratory (such as the Armstrong Laboratories facility currently located on the base), and a satellite government service center. In addition, the existing elementary school would remain.



EXPLANATION

- Airfield Pavement
- Runway Object Free Area
- Runway Protection Zone
- Runway Safety Area
- Airport Boundary
- Instrumentation Landing System (ILS) Glide Slope Site
- ILS Localizer Antenna Site
- Willie VORTAC
- Base Boundary

0 750 1500 3000 Feet

Preliminary Airport Plan - General Aviation and Education Alternative

Figure 2.3-2

2.3.1.5 Commercial. A commercial area of 50 acres would occupy a small part of the base. Commercial uses would cater to nearby residential and industrial users.

2.3.1.6 Residential. The residential land use component would comprise 531 acres, or 13 percent of the existing base. Residential uses would include construction of 4,475 new dwelling units. Areas of medium- and high-density residential uses, both single- and multiple-family, would occupy the northeast corner of the base and would be buffered from the airfield by industrial buildings and landscaped/recreational open space. Additional medium- and high-density residential uses would be located in the southwest corner of the base, on the north and south side of the extension of Pecos Road.

2.3.1.7 Public/Recreation. The public/recreation land use area would include required open space for the existing landfill, in the southwest quadrant of the base, and landscape buffers for proposed medium- and high-density residential areas that would be located in the northeast corner of the base, adjacent to airfield and aviation support activities. Public/recreation land uses would contribute to a total of approximately 362 acres.

2.3.1.8 Employment and Population. The General Aviation and Education Alternative would generate approximately 19,428 direct jobs by the year 2013, taking into account both construction and operation phase demands. Employment effects are shown in Table 2.3-5. The projected employment would generate an estimated population increase of approximately 50,750 over the postclosure estimate in the ROI by the year 2013. Population effects are shown in Table 2.3-5.

Table 2.3-5. Reuse-Related Employment and Population Effects - General Aviation and Education Alternative

	Closure	1998	2003	2013
Direct Employment	82	4,063	8,723	19,428
Population Increase	0	10,660	23,349	50,750

2.3.1.9 Transportation. The road circulation network under this alternative would provide for three interchanges to the proposed San Tan Freeway: one via Power Road and the other two via proposed major arterials which would intersect with the east-west extension of Ray Road on the north side of the base. Access to airfield and industrial uses is separate from access to campus facilities, with the industrial component using Ray Road/Hawes Road and Pecos Road, and the educational component primarily using the existing base entrance at Williams Field Road. Due to the orientation of the airfield, the extension of Hawes Road would form a loop connecting to Ray

Road on the northwest corner of the base, while an unnamed arterial would form a loop intersecting with the extension of Ray Road on the north side of the base, and with Ellsworth Road on the east side.

Based on land use and employment projections, average daily vehicular traffic associated with the base property would be approximately 119,000 trips (one-way) by 2013. Peak-hour traffic is estimated at 15,000 trips (one-way) in the afternoon.

2.3.1.10 Utilities. By 2013, the projected activities associated with the General Aviation and Education Alternative would generate the following ROI utility demands in excess of the projected ROI preclosure reference demand:

- Water - 4.63 MGD
- Wastewater - 2.01 MGD
- Solid Waste - 61,000 tons per year
- Electricity - 849 MWH per day
- Natural Gas - 18,800 therms per day.

Under the General Aviation and Education Alternative, improvements to some utility systems would be required to provide adequate services to facilities within the ROI. These are described below:

Water Supply. Water would be provided to the base by the City of Mesa water supply and treatment system. The current base water distribution system would have to be connected to the City of Mesa system, and base water supply wells would be taken off-line.

Wastewater. Wastewater treatment services would be provided to the current base by the City of Mesa wastewater collection and treatment System. The current base wastewater collection system would have to be connected to the City of Mesa system, and the base wastewater treatment plant would be taken off-line. Capacity upgrades for the City of Mesa system are necessary by 2013 in order to handle projected demand under this alternative. The schedule for this capacity upgrade corresponds to the time frame that capacity would have to be upgraded under the No-Action Alternative.

Solid Waste. Many of the landfills in Maricopa County are currently operating at or above capacity. The need for and location of a new regional landfill is being considered by the Southwest Regional Landfill Siting Committee. Land within Pinal County has been proposed for development

of the new regional landfill site which may occur between 1993 and 1995. The new landfill will serve the eastern area of Maricopa County, including the area which Williams AFB currently occupies, and parts of Pinal County (Maricopa Association of Governments, 1991a).

Electricity. Electricity is provided to the base by Salt River Project Electric. Salt River Project has indicated that there is adequate capacity to handle all future demands projected for the General Aviation and Education Alternative.

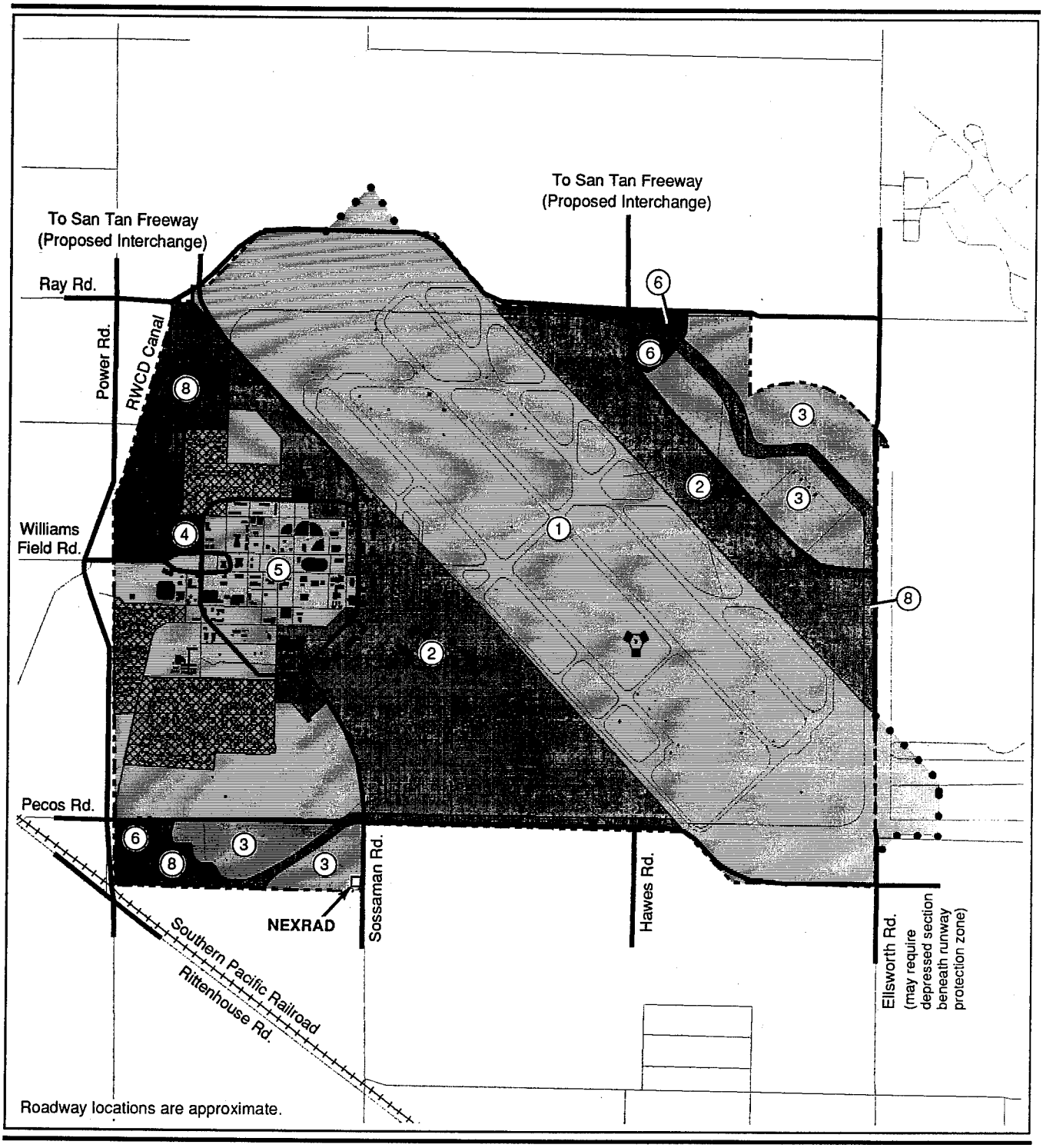
Natural Gas. Natural gas is provided to the base by Southwest Gas Company. Southwest Gas Company has indicated that there is adequate capacity to handle all future demands projected for the General Aviation and Education Alternative.

2.3.2 Commercial Aviation and Education Alternative

The Commercial Aviation and Education Alternative was developed to reflect changes to the preferred alternative (which is treated in this EIS as the Proposed Action) developed by the Williams AFB Economic Reuse Advisory Board. These changes were advanced by the Williams Redevelopment Partnership and would result in more intense uses within a larger scale airport. The Commercial Aviation and Education Alternative (Figure 2.3-3) would combine a commercial aviation airport, air cargo operations, general aviation, and aviation training facilities with a satellite college campus and industrial uses. Since the Commercial Aviation and Education Alternative was derived from the Proposed Action, several elements of the two plans are identical. However, of the three aviation-related alternative plans, this alternative proposes aviation and aviation-related uses with the greatest intensity. The plan involves acquisition of 71 acres off-base, along the northern boundary of the base and along the southeast corner of the base on the east side of Ellsworth Road. This off-base acquisition is intended to accommodate additional runway lengths and runway protection zone areas desired for an airport of this magnitude. The approximate acreage attributed to each land use category is shown in Table 2.3-6. Off-base property acquisition needs are discussed in the applicable land use category descriptions, as described in detail below.

The following assumptions were used to expand upon the analysis for the Commercial Aviation and Education Alternative:

- Anticipated building demolition/new construction activities
- Amount and location of areas disturbed by construction/ demolition
- Phasing plans for reuse



EXPLANATION

- (1) Airfield
- (2) Aviation Support
- (3) Industrial
- (4) Institutional (Medical)
- (5) Institutional (Education)
- (6) Commercial
- (7) Residential *
- (8) Public/Recreation
- (9) Agriculture *
- (10) Vacant Land *
- (11) Military Land *
- Campus Residential Housing
- Willie VORTAC
- Base Boundary
- Off-Base Extension

0 750 1500 3000 Feet

* Not Applicable

Land Use – Commercial Aviation and Education Alternative

Figure 2.3-3

Table 2.3-6. Land Use Acreage - Commercial Aviation and Education Alternative

Land Use	Acreage On-base	Acreage Off-base
Base Property		
Airfield	1,675	71
Aviation Support	962	0
Industrial	358	0
Institutional (Education)	480	0
(Campus Residential Housing)*	204	0
Institutional (Medical)	11	0
Commercial	40	0
Residential	0	0
Public/Recreation	312	0
Subtotal	0	0
Air Force Retained Property		
Total	4,042	71

* Housing units located in the North, West, and South Desert Village housing areas are retained as Campus Residential Housing in the Institutional (Education) land use category.

- Preliminary Airport Plan
- Projected annual aircraft operations for a 20-year planning period
- Proposed airport improvements
- Employee and population projections to the year 2013
- Traffic generated by the project to the year 2013
- Utility requirement projections to the year 2013.

The amount of development proposed, including existing facility demolition and retention and new facility construction, for each land use under this alternative is provided in Table 2.3-7.

The acreages within each land use assumed to be disturbed under this alternative are provided in Table 2.3-8 for three phases of development.

2.3.2.1 Airfield. The airfield land use category would comprise approximately 41 percent of the base or 1,675 acres, with an additional 71 acres acquired from off-base. The following proposed uses are depicted in the preliminary airport plan: runways, taxiways, runway protection zones, and a control tower (Figure 2.3-4). The airfield would ultimately

Table 2.3-7. Facility Development - Commercial Aviation and Education Alternative

Land Use	Existing Facility Demolition	Existing Facility Retention	New Facility Construction
	(in thousands of square feet of floor space)		
Airfield	0	0	0
Aviation Support	149	665	5,650
Industrial	8	0	3,745
Commercial	1	2	430
Residential	0	0	0
Institutional (Education)	395	577	563
(Campus Residential Housing)*	0	957	0
Institutional (Medical)	0	95	0
Public/Recreation	0	11	0
Total	553	2,307	10,388

* Housing units located in the North, West, and South Desert Village housing areas are retained as Campus Residential Housing in the Institutional (Education) land use category.

have two runways. Runway 12L/30R would be lengthened from 9,300 feet to 12,500 feet for commercial passenger (air carrier and commuter) and air cargo service, as well as for possible military training operations. Existing runway 12R/30L would be reused at its existing length of 10,400 feet as a secondary commercial service runway and for general aviation, as well as for general aviation training purposes. The weight-bearing capacity of both runways would ultimately be increased. Runway 12C/30C would initially remain in use, but would later be decommissioned and converted into a parallel taxiway. The ILS associated with Runway 12C/30C would then be relocated to Runway 12L/30R. Potential activities requiring airfield support for military training would include the possible relocation of KC-135E and KC-135R aircraft of the 161st Air Refueling Group (AREFG) of the Arizona ANG, currently based at Phoenix Sky Harbor International Airport, and F-16 training exercises by the 162nd Fighter Group, which is based at Libby Army Airfield. It is also projected that the ANG would perform helicopter operations (e.g., OH-6A aircraft) at Williams AFB.

Table 2.3-8. Acres Disturbed by Phase - Commercial Aviation and Education Alternative

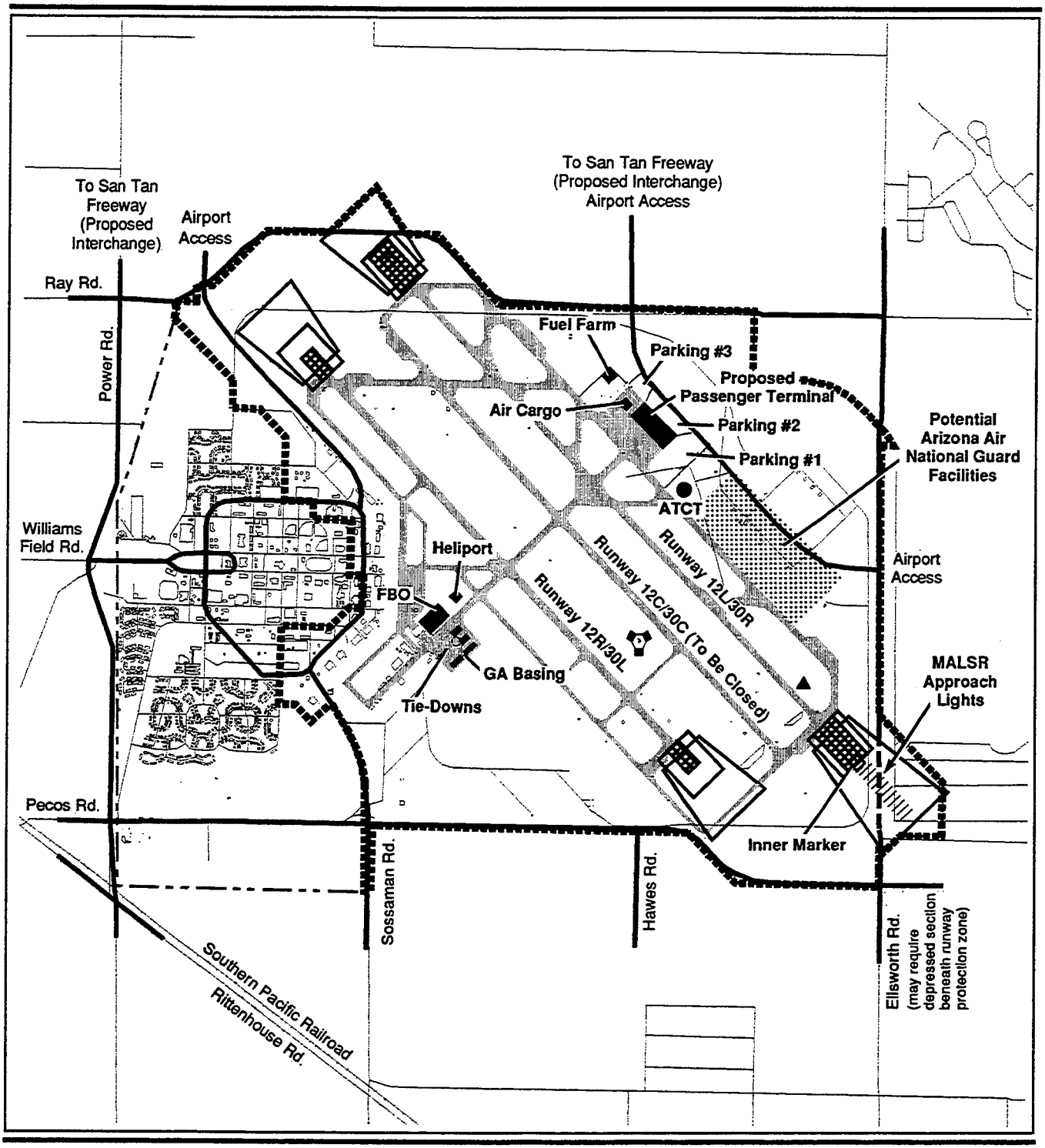
Land Use	Acres Disturbed (by phase) 1993-1998	1998-2003	2003-2013	Total
Airfield	1,675*	0	0	1,675*
Aviation Support	447	84	168	699
Industrial	40	52	104	196
Commercial	2	9	18	29
Residential	0	0	0	0
Institutional (Education)	203	0	113	316
(Campus Residential Housing)**	94	0	110	204
Institutional (Medical)	11	0	0	11
Public/Recreation	312	0	0	312
Total	2,784*	145	513	3,442*

* Total does not include an additional 71 acres to be acquired off-base which would be disturbed for airfield expansion.

** Housing units located in the North, West, and South Desert Village housing areas are retained as Campus Residential Housing in the Institutional (Education) land use category.

Projected flight operations are provided in Table 2.3-9 for the years 1993, 1998, 2003, and 2013. Projected annual operations were generated within four overall categories: air passenger, air cargo, general aviation, and military training. During the planning period, 98 percent of all projected operations would occur before 10 p.m. while 2 percent would occur during nighttime hours (10 p.m. to 7 a.m.).

Annual commercial service operations for this alternative would include both air carrier and commuter functions, with 47,500 total annual operations by the year 2013. Air cargo activities would result in a total of 4,800 operations by the year 2013. General aviation operations would include single- and multi-engine piston aircraft, turboprop, turbojet, and rotorcraft operations that would total 199,900 operations by the year 2013. Of that, approximately 160,000 would result from training activities conducted in conjunction with the proposed aviation training campus. Potential military operations would include approximately 29,100 annual operations.



EXPLANATION

- Airfield Pavement
- Runway Object Free Area
- Runway Protection Zone
- Runway Safety Area
- Airport Boundary
- Instrumentation Landing System (ILS) Glide Slope Site
- ILS Localizer Antenna Site
- Air Traffic Control Tower (ATCT)
- Willie VORTAC
- Base Boundary

0 750 1500 3000 Feet

Preliminary Airport Plan - Commercial Aviation and Education Alternative

Figure 2.3-4

The preliminary airport plan for the civilian use of the aviation facilities at Williams AFB was developed in accordance with FAA Advisory Circular 150/5300-13 (Federal Aviation Administration, 1989a) for the layout of the characteristics (e.g., dimensions, separations, and clearances) of airfield elements to allow operation of all commercial aircraft. The following improvements of the airfield would be necessary:

- Maintain Runway 12R/30L at 10,400 feet, and strengthen or reconstruct it to accommodate the critical aircraft
- Lengthen Runway 12L/30R from 9,300 feet to 12,500 feet, and strengthen or reconstruct it to accommodate the critical aircraft
- Establish civilian non-precision instrument approaches to Runways 12L, 12C, 12R, 30L, and 30R, and civilian precision approaches to Runways 30C and 30R
- Relocate the full precision ILS from Runway 30C to Runway 30R. The ILS consists of a localizer antenna, glide slope antenna, approach lighting system, and marker beacons (middle and outer)
- Upon relocation of the ILS, decommission Runway 12C/30C and convert it into a taxiway
- Relocate the air traffic control tower and the remote tower receiver and transmitter sites
- Establish RPZs for all runways to meet FAA criteria
- Construct and/or retain taxiways and aprons sufficient to serve the commercial service, air cargo, and general aviation operations
- Construct specific facilities to accommodate vehicle parking, access and/or frontage roads, and all necessary associated facilities
- Develop engineering plans to improve and repair deteriorated and/or substandard areas of airfield pavement
- Construct fuel storage and dispensing facilities for aircraft fuel.

2.3.2.2 Aviation Support. Aviation support uses would cover approximately 962 acres or 24 percent of the base, and would be located along the eastern and western sides of the airfield, extending down to the south-central boundary of the base. Aviation support areas are located in order to accommodate civilian aviation activities, such as a passenger

Table 2.3-9. Projected Flight Operations - Commercial Aviation and Education Alternative

Year	Operations	Function	%	Fleet Mix	Annual Operations
1993	General Aviation		77	Single-engine Piston	89,200
			19	Multi-engine Piston	22,000
			3	Turboprop	3,500
			1	Turbojet	1,200
			0	Rotorcraft	0
	Military*	Training	69	F-16	12,000
			17	OH-6A	3,000
			14	KC-135E**	2,400
				Total	133,300
1998	Air Passenger	Air Carrier	8	B-757/A-320	700
			12	MD-80/MD-90	1,100
			57	B-737-300/400/500	5,300
			0	B-767	0
		Commuter	5	Beech 1900	500
			18	DHC-8	1,700
	Air Cargo		50	B-727	800
			50	DC8-70	800
			0	B-747-400	0
	General Aviation		71	Single-engine Piston	138,600
			20	Multi-engine Piston	38,300
			6	Turboprop	11,800
			3	Turbojet	5,500
			1	Rotorcraft	1,200
	Military*	Training	69	F-16	20,000
			17	OH-6A	5,000
			14	KC-135R**	4,100
				Total	236,400
2003	Air Passenger	Air Carrier	9	B-757/A-320	1,900
			30	MD-80/MD-90	6,600
			46	B-737-300/400/500	10,000
			0	B-767	0
		Commuter	4	Beech 1900	900
			11	DHC-8	2,500
	Air Cargo		50	B-727	1,500
			50	DC8-70	1,500
			0	B-747-400	0
	General Aviation		63	Single-engine Piston	123,700
			19	Multi-engine Piston	38,200
			9	Turboprop	18,100
			6	Turbojet	11,400
			3	Rotorcraft	5,500
	Military*	Training	69	F-16	20,000
			17	OH-6A	5,000
			14	KC-135R**	4,100
				Total	260,900
2013	Air Passenger	Air Carrier	13	B-757/A-320	6,300
			52	MD-80/MD-90	24,800
			27	B-737-300/400/500	12,600
			2	B-767	1,000
		Commuter	2	Beech 1900	1,100
			4	DHC-8	1,700
	Air Cargo		50	B-727	2,400
			46	DC8-70	2,200
			4	B-747-400	200
	General Aviation		50	Single-engine Piston	100,300
			19	Multi-engine Piston	37,200
			17	Turboprop	33,200
			10	Turbojet	19,200
			5	Rotorcraft	10,000
	Military*	Training	69	F-16	20,000
			17	OH-6A	5,000
			14	KC-135R**	4,100
				Total	281,300

* Under this alternative, military aircraft operations are not differentiated between based and itinerant operations.

** KC-135E aircraft would be phased out and replaced by KC-135R aircraft by 1998.

terminal, terminal frontage road access, air cargo facilities, automobile parking, and aircraft basing and servicing. Other uses would include administration facilities, a control tower, fueling areas, tie-down space, a fire station, and maintenance areas.

An aviation training campus would be located on the west side of the airfield, adjacent to the proposed college satellite campus, and would reuse existing flight line facilities between the central core of the base and the runways, including classroom buildings, hangars, and maintenance shops. In addition, aviation support areas could accommodate large single-user activities, such as aviation-related manufacturing and assembly operations, major airline maintenance facilities, or express air cargo facilities. The Arizona ANG could relocate all or part of its aircraft from current basing at Phoenix Sky Harbor International Airport to Williams AFB. However, this move has not been approved by the Secretary of the Air Force.

Construction of airfield support facilities and operation of the aviation training campus would occur by the year 1998, or 5 years after base closure. Other aviation support activities would be developed over a 25-year period following base closure; approximately 73 percent of the available aviation support acreage would be developed by the year 2013. Operation of fixed-base operations would be overseen by an IGA group which would own the airport and all airfield support facilities.

2.3.2.3 Industrial. Industrial uses would constitute 358 acres or 9 percent of the existing base, and would be located east of the airfield in the northeast quadrant of the base and in the extreme southwest corner of the base, south of the extension of Pecos Road. General industrial activities in these areas would include manufacturing and assembly and warehousing. Industrial uses represent new development on vacant base property.

2.3.2.4 Institutional (Medical and Education). Institutional uses would include education activities and a medical facility, comprising 695 acres of the base. The institutional acreage constitutes approximately 17 percent of the base.

The education component would comprise approximately 684 acres and would combine a state college satellite campus with campus residential housing, reuse of an existing elementary school, and a research campus. The proposed state college satellite campus would reuse the majority of the existing buildings within the central core of the base as well as all existing base housing. Other education-related uses would include continued use of the existing elementary school and applied science research functions. Medical activities would include continued use of the medical facilities currently occupying 11 acres at the west end of the central core of the base.

2.3.2.5 Commercial. Commercial uses would constitute 40 acres and would comprise approximately 1 percent of the base. Commercial uses would include hotel development in the northeast corner of the base to support surrounding industrial and airport activities. A retail commercial site would be located at the extreme southwest corner of the base, at the intersection of Power Road and Pecos Road.

2.3.2.6 Residential. The Commercial Aviation and Education Alternative does not include residential areas as a predominant use.

2.3.2.7 Public/Recreation. Recreational uses and areas to be preserved as open space would include reuse of an existing 18-hole golf course and retention of an existing landfill and drainage channels, which border the base, as permanent open space. The total area devoted to recreation and areas required to be retained in open space would be 312 acres, comprising approximately 8 percent of the base.

2.3.2.8 Employment and Population. The Commercial Aviation and Education Alternative would generate approximately 19,153 direct jobs by the year 2013, taking into account both construction and operation phase demands. Employment effects are shown in Table 2.3-10. The projected employment would generate an estimated population increase of approximately 47,717 over the post-closure estimate in the ROI by the year 2013. Population effects are shown in Table 2.3-10.

Table 2.3-10. Reuse-Related Employment and Population Effects - Commercial Aviation and Education Alternative

	Closure	1998	2003	2013
Direct Employment	82	3,979	8,309	19,153
Population Increase	0	10,347	21,148	47,717

2.3.2.9 Transportation. The circulation network for the Commercial Aviation and Education Alternative would provide for two interchanges with the planned San Tan Freeway. The first interchange would run from Power Road, and the second would run from an unnamed arterial, stemming from Ellsworth Road, paralleling the easternmost runway and intersecting with the extension of Ray Road and proceeding north to the freeway. General and commercial aviation uses would have access from the unnamed arterial, as well as from Ellsworth Road and Ray Road. Education uses would utilize Power Road, travelling in a north-south direction and connecting with the extensions of Ray Road and Pecos Road. Education uses would also utilize Williams Field Road, which runs in an east-west direction into the existing main entrance to the base property.

Based on land use and employment projections, average daily vehicular traffic associated with the base property would be approximately 157,000

trips (one-way) by 2013. Peak-hour traffic is estimated at 18,500 trips (one-way) in the afternoon.

2.3.2.10 Utilities. By 2013, the projected activities associated with the Commercial Aviation and Education Alternative would generate the following ROI utility demands in excess of the projected ROI preclosure reference demand:

- Water - 4.24 MGD
- Wastewater - 1.84 MGD
- Solid Waste - 57,400 tons per year
- Electricity - 798 MWH per day
- Natural Gas - 17,700 therms per day.

Under the Commercial Aviation and Education Alternative, improvements to some utility systems would be required to provide adequate services to facilities within the ROI. These are described below:

Water Supply. Water would be provided to the base by the City of Mesa water supply and treatment system. The current base water distribution system would have to be connected to the City of Mesa system, and base water supply wells would be taken off-line.

Wastewater. Wastewater treatment services would be provided to the current base by the City of Mesa wastewater collection and treatment system. The current base wastewater collection system would have to be connected to the City of Mesa system, and the base wastewater treatment plant would be taken off-line. Capacity upgrades for the City of Mesa system are necessary by 2013 in order to handle projected demand under this alternative. The schedule for this capacity upgrade corresponds to the time frame that capacity would have to be upgraded under the No-Action Alternative.

Solid Waste. Many of the landfills in Maricopa County are currently operating at or above capacity. The need for and location of a new regional landfill is being considered by the Southwest Regional Landfill Siting Committee. Land within Pinal County has been proposed for development of the new regional landfill site which may occur between 1993 and 1995. The new landfill will serve the eastern area of Maricopa County, including the area which Williams AFB currently occupies, and parts of Pinal County (Maricopa Association of Governments, 1991a).

Electricity. Electricity is provided to the base by Salt River Project Electric. Salt River Project has indicated that there is adequate capacity to handle all future demands projected for the Commercial Aviation and Education Alternative.

Natural Gas. Natural gas is provided to the base by Southwest Gas Company. Southwest Gas Company has indicated that there is adequate capacity to handle all future demands projected for the Commercial Aviation and Education Alternative.

2.3.3 Education and Planned Community Alternative

The Education and Planned Community Alternative offers the only non-aviation reuse alternative under consideration in this EIS (Figure 2.3-5). This alternative would combine a large education component (education, research, and training facilities) and a "new town" planned community, including a retirement village. The planned community would include schools, commercial, and medium- and high-density residential land uses. The approximate acreage of each land use category is shown in Table 2.3-11.

The following assumptions were used to expand upon the analysis:

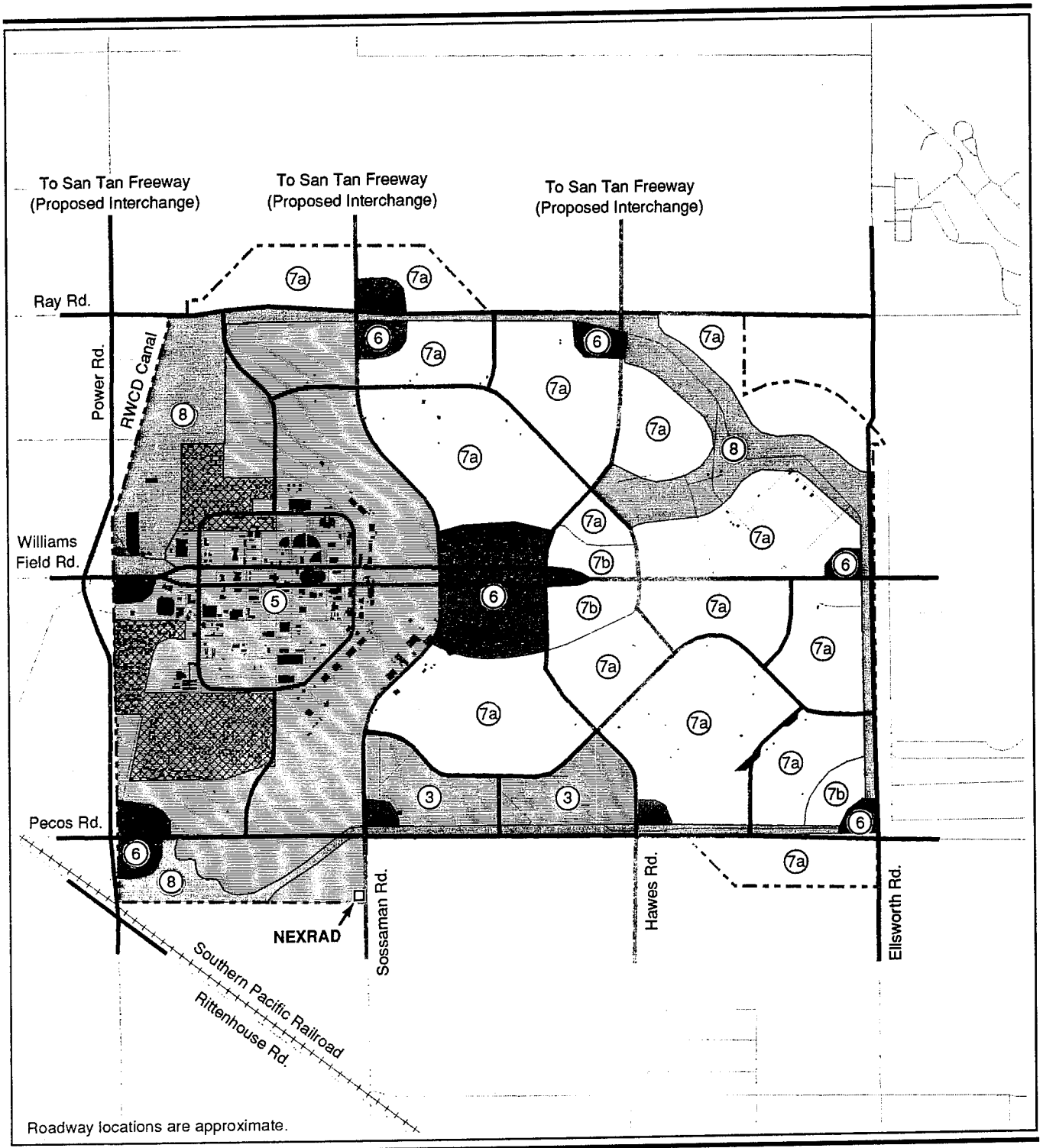
- Anticipated building demolition/new construction activities
- Amount and location of areas disturbed by construction/demolition
- Employment and population projections to the year 2013
- Traffic generated by the project to the year 2013
- Utility requirement projections to the year 2013.

The amount of development proposed, including existing facility demolition and retention and new facility construction, for each land use under this alternative is provided in Table 2.3-12.

The acreages within each land use assumed to be disturbed under this alternative are provided in Table 2.3-13 for three phases of development.

2.3.3.1 Airfield. There is no airfield component to this alternative.

2.3.3.2 Aviation Support. There are no aviation support land uses associated with this alternative.



EXPLANATION

- (1) Airfield *
- (2) Aviation Support *
- (3) Industrial
- (4) Institutional (Medical) *
- (5) Institutional (Education)
- (6) Commercial
- (7) Residential †
- (8) Public/Recreation
- (9) Agriculture *
- (10) Vacant Land *
- (11) Military Land *
- Campus Residential Housing
- Willie VORTAC *
- Base Boundary
- Off-Base Extension *

0 750 1500 3000 Feet

* Not Applicable
† 7a - Medium Density; 7b - High Density

Land Use – Education and Planned Community Alternative

Figure 2.3-5

Table 2.3-11. Land Use Acreage - Education and Planned Community Alternative

Land Use	Acreage On-base	Off-base
Base Property		
Airfield	0	0
Aviation Support	0	0
Industrial	162	0
Institutional (Education)	1,021	0
(Campus Residential Housing)*	204	0
Institutional (Medical)	0	0
Commercial	261	0
Residential	1,874	0
Public/Recreation	520	0
Subtotal	4,042	0
Air Force Retained Property	0	0
Total	4,042	0

* Housing units in the North, West, and South Desert Village housing areas are retained as Campus Residential Housing in the Institutional (Education) land use category.

2.3.3.3 Industrial. Industrial land uses would cover 162 acres or 4 percent of the existing base property located along Pecos Road between Sossaman Road and Hawes Road. Potential uses would include manufacturing and assembly and warehousing.

2.3.3.4 Institutional (Education). The education component, located to the west of Sossaman Road, would constitute approximately 1,225 acres or 30 percent of existing base property. It would involve reuse of most of the existing buildings within the central area of the base outside of the existing flight line, as well as all on-base housing. This area would include such uses as a major university campus or four-year state college, a research laboratory, and a satellite government service center. In addition, the existing elementary school would remain. Existing recreational facilities such as two swimming pools, five hard surfaced tennis courts, a surfaced four-lane running track, and six softball fields would be retained as amenities of this component.

2.3.3.5 Commercial. Commercial land uses would cover 261 acres or 6 percent of the existing base property, interspersed around the base to serve residential areas and the education component of this reuse alternative. The greatest concentration of commercial uses, situated on the center of the base, would serve as the town center for the planned community. Additional commercial areas would be located along the perimeter of the base.

Table 2.3-12. Facility Development - Education and Planned Community Alternative

Land Use	Existing Facility Demolition	Existing Facility Retention	New Facility Construction
	(in thousands of square feet of floor space)		
Airfield	0	0	0
Aviation Support	0	0	0
Industrial	0	0	1,693
Institutional (Education)	1,165	772	368
(Campus Residential Housing)*	0	957	0
Commercial	32	8	2,834
Public/Recreation	0	5	0
Residential	144	0	14,055
Total	1,341	1,742	18,950

* Housing units located in the North, West, and South Desert Village housing areas are retained as Campus Residential Housing in the Institutional (Education) land use category.

2.3.3.6 Residential. Residential uses would occupy 1,874 acres or 46 percent of the existing base property, which would involve most of the area of the base east of Sossaman Road, and would include single-family units, multifamily units, a retirement community, and community schools. A retirement community, built as a part of the medium-density residential component, would occupy the northeastern corner of the base bounded by Hawes Road and Williams Field Road. Medium-density residential uses as part of the planned community (including community schools) would constitute 1,774 acres of residential land use on the base and would be located predominately over the existing airfield and in the clear zones. High-density residential uses associated with the planned community would comprise 100 acres, also located on the airfield. High-density residential uses would be clustered around commercial areas in the center of the new town and in the southeastern corner of the base.

2.3.3.7 Public/Recreation. The public/recreation land use would cover 520 acres. Covering 13 percent of the base, public/recreation and open space would include the 125-acre 18-hole golf course in the northwest portion of the base including a buffer zone of open space along the perimeter of the base, and required open space over existing drainage areas and an existing landfill.

Table 2.3-13. Acres Disturbed by Phase - Education and Planned Community Alternative

Land Use	Acres Disturbed (by phase) 1993-1998	1998-2003	2003-2013	Total
Airfield	0	0	0	0
Aviation Support	0	0	0	0
Industrial	18	23	47	88
Commercial	12	58	116	186
Residential	800	983	91	1,874
Institutional (Education)	210	0	113	323
(Campus Residential Housing)*	94	0	110	204
Institutional (Medical)	0	0	0	0
Public/Recreation	520	0	0	520
Total	1,654	1,064	477	3,195

*Housing units located in the North, West, and South Desert Village housing areas are retained as Campus Residential Housing in the Institutional (Education) land use category.

2.3.3.8 Employment and Population. The Education and Planned Community Alternative would generate approximately 11,503 direct jobs by the year 2013, taking into account both construction and operation phase demands. Employment effects are shown in Table 2.3-14. The projected employment would generate an estimated population increase of approximately 20,777 over the post-closure estimate in the ROI by the year 2013. Population effects are shown in Table 2.3-14.

2.3.3.9 Transportation. The road circulation network under this alternative would provide for three interchanges to the proposed San Tan Freeway: one via Power Road, and the other two via proposed major arterials which would intersect the east-west extension of Ray Road on the north side of the base. Access to the education campus and residential and commercial uses in the planned community are jointly provided by Williams Field Road and Sossaman Road. The education campus would also be served by an unnamed north-south arterial joining Ray Road with Pecos Road with a loop around the core of the campus. The commercial town center is served by extensions of Sossaman Road and Hawes Road, which are proposed to form an hourglass shape with the commercial town center at the neck.

Table 2.3-14. Reuse-Related Employment and Population Effects - Education and Planned Community Alternative

	Closure	1998	2003	2013
Direct Employment	82	2,299	5,005	11,503
Population Increase	0	4,849	9,832	20,777

Based on land use and employment projections, average daily vehicular traffic associated with the base property would be approximately 189,800 trips (one-way) by 2013. Peak-hour traffic is estimated at 20,000 trips (one-way) in the afternoon.

2.3.3.10 Utilities. By 2013, the projected activities associated with the Education and Planned Community Alternative would generate the following ROI utility demands in excess of the projected ROI preclosure reference demand:

- Water - 1.90 MGD
- Wastewater - 0.82 MGD
- Solid Waste - 25,000 tons per year
- Electricity - 348 MWH per day
- Natural Gas - 7,700 therms per day.

Under the Education and Planned Community Alternative, improvements to some utility systems would be required to provide adequate services to facilities within the ROI. These are described below:

Water Supply. Water would be provided to the base by the City of Mesa water supply and treatment system. The current base water distribution system would have to be connected to the City of Mesa system, and base water supply wells would be taken off-line.

Wastewater. Wastewater treatment services would be provided to the current base by the City of Mesa wastewater collection and treatment system. The current base wastewater collection system would have to be connected to the City of Mesa system, and the base wastewater treatment plant would be taken off-line. Capacity upgrades for the City of Mesa system are necessary by 2013 in order to handle projected demand under this alternative. The schedule for this capacity upgrade corresponds to the

time frame that capacity would have to be upgraded under the No-Action Alternative.

Solid Waste. Many of the landfills in Maricopa County are currently operating at or above capacity. The need for and location of a new regional landfill is being considered by the Southwest Regional Landfill Siting Committee. Land within Pinal County has been proposed for development of the new regional landfill site which may occur between 1993 and 1995. The new landfill will serve the eastern area of Maricopa County, including the area which Williams AFB currently occupies, and parts of Pinal County (Maricopa Association of Governments, 1991a).

Electricity. Electricity is provided to the base by Salt River Project Electric. Salt River Project has indicated that there is adequate capacity to handle all future demands projected for the Education and Planned Community Alternative.

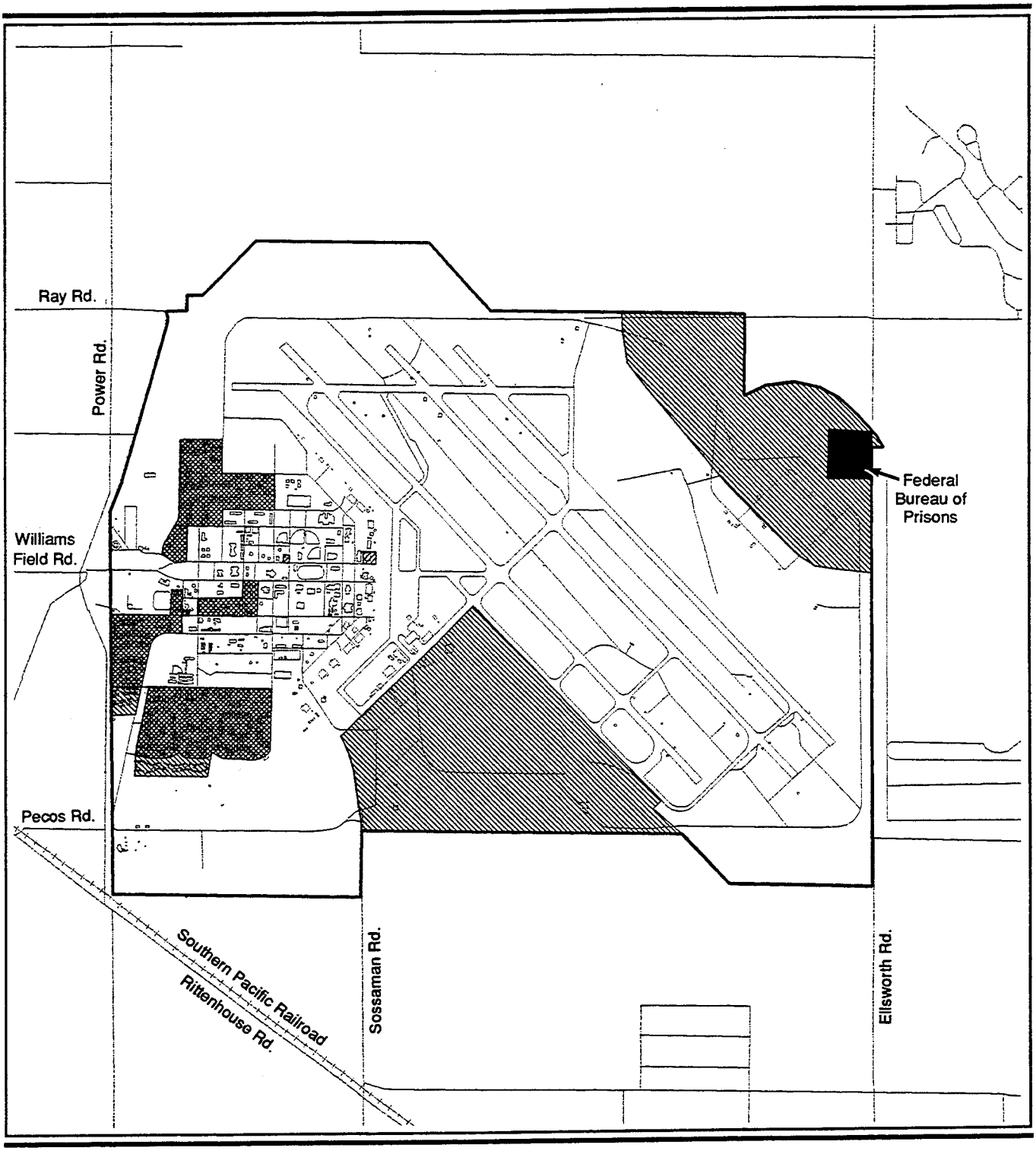
Natural Gas. Natural gas is provided to the base by Southwest Gas Company. Southwest Gas Company has indicated that there is adequate capacity to handle all future demands projected for the Education and Planned Community Alternative.

2.3.4 Other Land Use Concepts

In compliance with the Federal Property and Administrative Services Act of 1949, the Air Force solicited proposals from other federal agencies regarding their interest in acquiring any lands or facilities identified for disposal at Williams AFB. Responses included several proposals for direct federal use, as well as sponsorship of local governmental programs.

This section describes land use concepts that are not part of any integrated reuse plan, but could be initiated on an individual basis. These concepts include proposed federal transfers and conveyances to non-federal agencies and private parties. They are independent of one another and could be implemented individually, or in combination with one of the reuse alternatives. Figure 2.3-6 shows the location of each of the proposed land use concepts.

2.3.4.1 Federal Bureau of Prisons. The Federal Bureau of Prisons has expressed interest in the acquisition of 20 acres of property on-base for the construction and operation of a Federal Detention Center (Sledge, 1993). The Bureau of Prisons has tentatively selected a site within the northeast quadrant of the base adjacent to Ellsworth Road. The facility would house approximately 750 inmates awaiting trial or sentencing, and it would have a staff of approximately 250 employees that would provide 24-hour care and supervision.



EXPLANATION

- Arizona Department of Corrections
- Arizona Department of Health Services
- Both

Other Land Use Concepts

0 750 1500 3000 Feet

Figure 2.3-6

2.3.4.2 Arizona Department of Corrections (ADC). The ADC has expressed interest in utilizing any and/or all portions of Williams AFB. Generally, the areas would include the west-central area of the property for immediate use and the areas in the northeast and south-central portions for future use. The priority needs include the following areas (Lewis, 1992):

- The existing hospital facility and surrounding area for use as a statewide inmate medical center
- The Bachelor Officer Quarters, Open Mess, and Enlisted Quarters for use as a prison facility
- The North Desert Village, South Desert Village, West Desert Village, and Temporary Living Quarters for use as staff housing
- The Motor Pool and Warehouse areas for a regional motor pool/warehouse
- The northeast and south central areas for future prison sites.

2.3.4.3 Arizona Department of Health Services. The Arizona Department of Health Services/Division of Behavioral Health, the Department of Economic Security, and the Department of Commerce have expressed an interest in securing the housing units, dorms, fire station, post office, educational center, child care facility and commissary, stores, and offices/clinics attached to the hospital. The housing units would be used to provide transitional housing for homeless individuals and families; other buildings would be used as office space for the departments (Jones, 1991).

2.3.5 No-Action Alternative

The No-Action Alternative would result in the U. S. Government retaining ownership of the property after closure. The property would not be put to further use. The base would be preserved (i.e., placed in a condition intended to limit deterioration and ensure public safety). An Air Force Base Conversion Agency Operating Location (OL) would be provided to ensure that base resource protection, grounds maintenance, existing utilities operations as necessary, and building care are accomplished. No other military activities/missions would be performed on the property.

The future land uses and levels of maintenance would be as follows:

- Maintain structures to limit deterioration
- Isolate or deactivate utility distribution lines on-base
- Provide limited maintenance of roads to ensure access

- Provide limited grounds maintenance of open areas to eliminate fire, health, and safety hazards

- Maintain security for the protection of sensitive historic, traditional, and archaeological resources

- Maintain the golf course in such a manner as to facilitate economical resumption of use.

An OL has been established at Williams AFB. The responsibilities of this team include coordinating closure activities, establishing a caretaker force to maintain Air Force properties after closure, and serving as the Air Force liaison supporting community reuse. Security personnel sufficient to protect sensitive historic, traditional, and archaeological resources have been provided. For the purposes of environmental analysis of the No-Action Alternative, it was assumed that the OL would consist of approximately 82 staff, comprising 54 Air Force employees with additional contractor support comprising 28 employees (U.S. Air Force, 1992p).

The OL, as used in this document, may refer to the Air Force disposal personnel or to one of the caretaker contractors. In some cases each team may have distinct responsibilities. For example, under the No-Action Alternative, each contractor is responsible for the management and disposition of their own hazardous materials and waste. The OL will provide oversight of its agents (contractors, lessees, etc.) for compliance with environmental laws and regulations and will require its agents to comply with all federal, state, and local laws and regulations, including but not limited to hazardous waste, OSHA, CERCLA, etc.

The Air Force through its OL may, by contract or other agreement, provide for caretaker or other responsibilities of a closure base. Those caretakers are required to comply with all applicable environmental statutes and regulations, including but not limited to the handling, storage, and disposal of hazardous waste. Any reference to "OL" in this document, relating to management of closure bases, may indicate a designated "caretaker" or other contractor under agreement with the Air Force.

Under the No-Action Alternative, the base would continue to fulfill its water requirements from the same system, although the amount drawn would be significantly reduced. Nonessential water lines would be drained and shut off. The existing on-base wastewater treatment facilities would continue to provide wastewater treatment under caretaker status, but the amount would be negligible. Solid waste collection from the base would likely be reduced to a negligible level under this alternative. The existing power and space-heating systems serving Williams AFB would likely be utilized at substantially reduced levels while the base is in caretaker status. Electrical power would be required for security lighting and other essential systems,

and natural gas would probably be required during winter months to maintain minimal space heating in mothballed facilities.

2.3.6 Interim Uses

The Air Force currently has an "interim lease" program in effect. All lessees are required to comply with all applicable environmental laws pursuant to their leases. Interim uses include predisposal short-term uses of the base facilities and property. Predisposal interim uses are conducted under lease agreements with the Air Force. The terms and conditions of the lease will be arranged to ensure that the predisposal interim uses do not prejudice future disposal and reuse plans of the base. The continuation of interim uses beyond disposal would be arranged through agreements with the new property owner(s).

A zero baseline representing conditions at the point of closure is used for the environmental analysis. The interim uses that could occur prior to property disposal are not considered within this baseline.

Certain post-disposal interim use scenarios have been incorporated into the reuse alternatives. Where appropriate, impacts of these operations are reflected in the environmental analysis of pertinent resource areas.

2.4 SUGGESTED REUSE PROPOSALS

In compliance with the Federal Property and Administrative Services Act of 1949, the Air Force solicited proposals from other federal agencies through contact letters regarding the availability of property at Williams AFB. In addition, the Williams AFB Economic Reuse Advisory Board received several proposals from private entities indicating an interest in use of portions of the base for both public programs and private enterprises.

These proposals include the following:

- Arizona State University - Satellite Campus (Coor, 1992; Ronan, 1992; Pitt, 1992)
- Elementary School Facilities (Likes, 1992; Gadd, 1991)
- Arizona Air National Guard (AZ ANG) (Drinen, 1992; Bodin, 1991)
- City of Mesa - Water and Wastewater Facilities (Wong, 1992)
- Medical Facilities (Wilder, 1992; Shemberger, 1992; King, 1992; Evans, 1992; DeSilva, 1992)
- America West Airlines - Pilot Training Facilities (Earl, 1992)

- East Valley Men's Garden Club - Home Gardening Center (Sanders, 1992)
- Embry-Riddle Aeronautical University - Aerospace Physiology/Aviation Safety School (Daly, 1992)
- Lewis University - Aviation Campus (Gaffney, 1992)
- McDonnell Douglas Corporation - MD-12X Manufacturing Operation (Arizona Department of Commerce, 1991)
- Orbital Sciences Corporation (Orbital) - High Technology Satellite and U.S. Government Space Technology Launch Services (Mosier, 1992)
- SH&E - Aircraft Storage Operations (Pettigrew, 1992)
- The United Church of Christ - Community Church (Heinrich, 1992)
- The Putney School - Residential School for the Homeless and Disabled (Putney, 1991)
- U.S. Department of the Army, Corps of Engineers (Reynolds, 1992)
- Arizona State Land Department - Market New Industry (Hassell, 1992)
- Corsair Industries, Inc. and U.S. International Flight Academy - Flight Academy (Zent, 1992a; 1992b)

These proposals could be integrated into the Proposed Action or one of the reuse alternatives, or could be initiated on an individual basis. These concepts could include proposed federal transfers or conveyances to non-federal agencies and private parties.

2.5 ALTERNATIVES ELIMINATED FROM FURTHER CONSIDERATION

Other reuse alternatives developed for Williams AFB could be accommodated by the alternatives or other land use concepts described above. The following options were, therefore, considered and eliminated from detailed analysis.

Air Cargo, Education, and Industry Alternative. This reuse plan is similar to the Proposed Action in that the primary land use activities would be an air cargo airfield and a university campus. The plan is different from the Proposed Action in that the air cargo airfield consists of only one runway and would not include general aviation activities. In addition, the runway

would be located farther east of the campus than that in the Proposed Action. Secondary land uses would include residential and industrial uses (EDAW et al., 1992a). Assessment of impacts from airfield and industrial activities of this alternative would be encompassed in analysis of the more intensive impacts anticipated from the Commercial Aviation and Education Alternative. Likewise, assessment of impacts from residential activities of this alternative would be encompassed in the analysis of impacts from residential uses in the Education and Planned Community Alternative. Because expected impacts from the components of this alternative are included in an assessment of the Commercial Aviation and Education Alternative and the Education and Planned Community Alternative, it was excluded from further analysis.

Regional Aviation and Industry Alternative. This reuse plan designates the entire base for use as a civilian airport with emphasis on commercial air passenger operations with air cargo services and industrial uses. Of the six reuse plans evaluated by the Williams AFB Economic Reuse Advisory Board, this plan proposes aviation development and operations with greater intensity and eliminates educational and residential uses, and was included to define the most intense of the range of alternatives to the Proposed Action. Subsequent to the formulation of this reuse alternative, the Williams Redevelopment Partnership began preparing an FAA Airport Master Plan for civilian reuse of Williams AFB. Preliminary data presented from the master planning process indicated a level of flight operations more intense than the Regional Aviation and Industry Alternative. These data have been incorporated in the Commercial Aviation and Education Alternative, which better define the outer range of development and associated impacts. The Regional Aviation and Industry Alternative was, thus, excluded from further analysis.

Air Cargo, Industry, and Education Alternative. This reuse plan is similar to the Regional Aviation and Industry Alternative in that the air cargo airfield would have a higher level of aviation and aviation support operations over a larger area than the Proposed Action, necessitating a reduction in the size of the proposed educational land uses so that only vocational or technical training centers would be accommodated. Industrial uses would surround the proposed airfield and would comprise much of the area allocated for educational uses in the Proposed Action (EDAW et al., 1992a). However, because the Commercial Aviation and Education Alternative defines the outer range of development and associated impacts, the Air Cargo, Industry, and Education Alternative was, thus, excluded from further analysis.

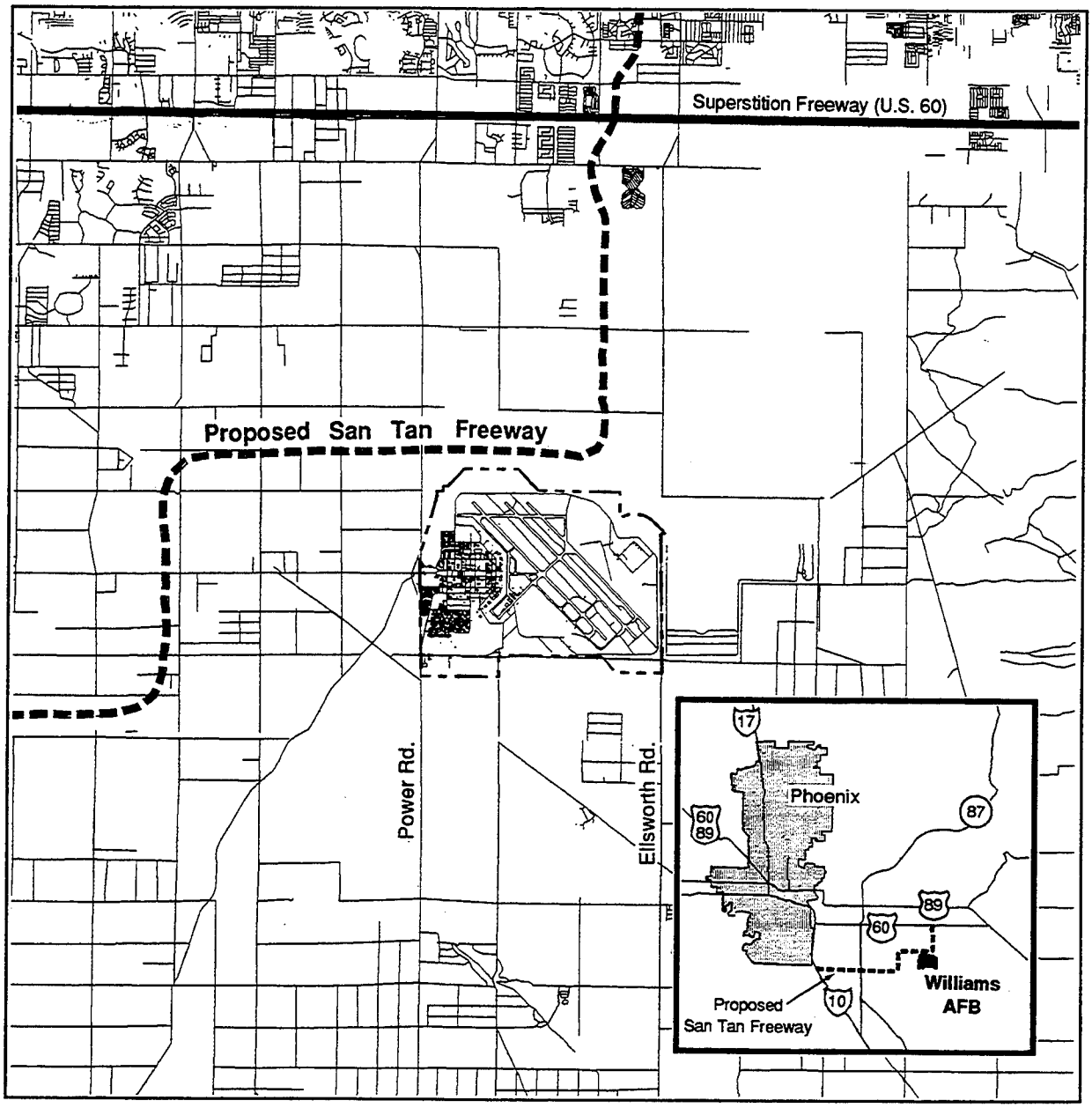
2.6 OTHER FUTURE ACTIONS IN THE REGION

One reasonably foreseeable action could be considered as contributing to a potential cumulative impact on the disposal and reuse of Williams AFB - the planned construction of the San Tan Freeway. The new freeway system

will form a loop from Interstate 10 approximately 20 miles west of Williams AFB. The freeway, which will run in an east-west direction parallel to the north side of the base approximately 2 miles north of the main gate, will be constructed in two phases originally scheduled for completion in the years 2000 and 2005. However, lack of funding has delayed construction so that the first phase will not begin until after 2006. The proposed freeway location is shown in Figure 2.6-1.

2.7 COMPARISON OF ENVIRONMENTAL IMPACTS

A summary comparison of the influencing factors and environmental impacts on each biophysical resource affected by the Proposed Action and alternatives over the 20-year study period is presented in Tables 2.7-1 and 2.7-2. Influencing factors are non-biophysical elements, such as population, employment, land use, aesthetics, public utility systems, and transportation networks that directly impact the environment. These activities have been analyzed to determine their effects on the environment. Impacts to the environment are described briefly in the summary and discussed in detail in Chapter 4. Table 2.7-3 presents influencing factors and environmental impacts of other transfers and independent land use concepts.



Proposed
San Tan Freeway

0 1/2 1 2 Miles

Figure 2.6-1

Table 2.7-1. Summary of Reuse-Related Influencing Factors

Factor	Proposed Action			General Aviation and Education Alternative			Commercial Aviation and Education Alternative			Education and Planned Community Alternative			No-Action* Alternative
	1998	2003	2013	1998	2003	2013	1998	2003	2013	1998	2003	2013	
Acres of Disturbance (by phase)	2,757	130	483	1,872	398	782	2,784	145	513	1,654	1,064	477	No Change
Aircraft Operations (annual)	34,250	44,400	88,250	60,640	84,600	157,300	235,400	250,900	281,300	-0-	-0-	-0-	-0-
Direct Employment	4,247	7,856	18,632	4,063	8,723	19,428	3,979	8,309	19,153	2,299	5,005	11,502	82
Secondary Employment	5,982	10,894	24,699	6,290	12,982	27,290	5,908	11,728	25,868	2,516	4,251	6,929	30
Population Increase	10,716	19,753	45,932	10,660	23,349	50,750	10,347	21,148	47,717	4,849	9,832	20,777	No Change
Traffic (average daily trips one-way)	24,400	46,600	131,000	18,900	54,400	119,000	23,700	57,000	157,000	27,400	90,800	189,800	No Change
Increase in Water Demand (MGD)	0.98	1.80	4.19	0.97	2.13	4.63	0.88	1.84	4.24	0.44	0.90	1.90	No Change
Increase in Wastewater Production (MGD)	0.43	0.78	1.82	0.42	0.93	2.01	0.38	0.80	1.84	0.19	0.39	0.82	No Change
Increase in Solid Waste (tons/year)	12,900	23,800	55,200	12,800	28,200	61,000	12,400	25,500	57,400	5,800	11,900	25,000	No Change
Increase in Electricity Demand (MWH/day)	192	344	768	191	407	849	185	368	798	87	171	348	No Change
Increase in Natural Gas Demand (therms/day)	4,200	7,600	17,000	4,200	9,000	18,800	4,100	8,100	17,700	1,900	3,800	7,700	No Change

Notes: MGD = Million Gallons/Day.
MWH = Megawatt-Hours.
*No-Action Alternative summarizes influencing factors relative to the closure baseline conditions.

Table 2.7-2. Summary of Environmental Impacts and Mitigation from the Proposed Action and Reuse Alternatives
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Resource Category	Proposed Action	General Aviation and Education Alternative	Commercial Aviation and Education Alternative	Education and Planned Community Alternative	No-Action Alternative
Local Community					
• Land Use and Aesthetics	IMPACT: Maricopa County and the adjacent towns and cities would experience development pressures to intensify development on rural and under-developed lands in the vicinity of the base.	Maricopa County and the adjacent towns and cities would experience development pressures to intensify development on rural and under-developed lands in the vicinity of the base. Proposed residential areas could conflict with planned future industrial uses on off-base land, as well as proposed adjacent industrial uses on-base.	Operation of a major airport would exert more intensive development pressures on surrounding off-base lands than that of the Proposed Action. Extension of runway protection zones to off-base properties could conflict with the proposed right-of-way for the future San Tan Freeway.	Maricopa County and the adjacent towns and cities would experience development pressures to intensify development on rural and under-developed lands in the vicinity of the base. Residential and new town uses would conflict with planned industrial areas designated for off-base lands by the City of Mesa.	No impact.
	MITIGATION: Reuse Proponent/Agencies: Rezone surrounding properties and annex within Municipal Planning Areas. Revise General Plan for Queen Creek.	Reuse Proponent/Agencies: Rezone surrounding properties and annex within Municipal Planning Areas. Revise General Plan for Queen Creek. Buffer residential areas from future adjacent industrial uses either through the general plan to provide a gradual transition of uses, or through zoning through open space buffers and design and performance standards.	Reuse Proponent/Agencies: Rezone surrounding properties and annex within Municipal Planning Areas. Revise General Plan for Queen Creek. Adjust proposed right-of-way for future San Tan Freeway.	Reuse Proponent/Agencies: Rezone surrounding properties and annex within Municipal Planning Areas. Revise General Plan for Queen Creek. Substantially revise the General Plan for Mesa to reduce large tracts of industrially planned properties.	No mitigation necessary.

Table 2.7-2. Summary of Environmental Impacts and Mitigation from the Proposed Action and Reuse Alternatives
Page 2 of 16

Resource Category	Proposed Action	General Aviation and Education Alternative	Commercial Aviation and Education Alternative	Education and Planned Community Alternative	No-Action Alternative
• Land Use and Aesthetics (Continued)	IMPACT: New noise contours and accident potential hazard areas would not coincide with existing airport overlay districts on off-base lands.	New noise contours and accident potential hazard areas would not coincide with existing airport overlay districts on off-base lands.	New noise contours and accident potential hazard areas would not coincide with existing airport overlay districts on off-base lands. Noise contours on the base would conflict with portions of the commercial land use area proposed for hotel development in the northeast corner of the base.	Absence of noise contours and potential hazard areas would not coincide with existing airport overlay districts.	No impact.
	MITIGATION: Reuse Proponent/Agencies: Revise existing airport overlay districts to accommodate new noise contours and hazard areas.	Reuse Proponent/Agencies: Revise existing airport overlay districts to accommodate new noise contours and hazard areas.	Reuse Proponent/Agencies: Revise existing airport overlay districts to accommodate new noise contours and hazard areas. Proposed hotel development in the northeast corner of the base may require discretionary permit approvals and noise reduction measures.	Reuse Proponent/Agencies: Remove airport overlay districts.	No mitigation necessary.
	IMPACT: Proposed recreational open space and educational reuse would conflict with the existing Landfill, Liquid Fuels Storage Area, and the capped portion of the Southwest Drainage System.	Proposed recreational open space and educational reuse would conflict with the existing Landfill, Liquid Fuels Storage Area, and the capped portion of the Southwest Drainage System.	Proposed recreational open space and educational reuse would conflict with the existing Landfill, Liquid Fuels Storage Area, and the capped portion of the Southwest Drainage System.	Proposed recreational open space and educational reuse would conflict with the existing Landfill, Liquid Fuels Storage Area, and the capped portion of the Southwest Drainage System.	No impact.

Table 2.7-2. Summary of Environmental Impacts and Mitigation from the Proposed Action and Reuse Alternatives
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Resource Category	Proposed Action	General Aviation and Education Alternative	Commercial Aviation and Education Alternative	Education and Planned Community Alternative	No-Action Alternative
• Land Use and Aesthetics (Continued)	MITIGATION: Air Force: Construction of a soil cover, emplacement of an engineered cap, excavation and removal, or retention by the Air Force could mitigate reuse conflicts with the Landfill. Portions of the Liquid Fuels Storage Area may require restricted use while remediation takes place. The capped portion of the Southwest Drainage System may also require restricted use while investigation and remediation, if necessary, are completed. Reuse Proponent/Agencies: Follow recommended land use restrictions.	Air Force: Construction of a soil cover, emplacement of an engineered cap, excavation and removal, or retention by the Air Force could mitigate reuse conflicts with the Landfill. Portions of the Liquid Fuels Storage Area may require restricted use while remediation takes place. The capped portion of the Southwest Drainage System may also require restricted use while investigation and remediation, if necessary, are completed. Reuse Proponent/Agencies: Follow recommended land use restrictions.	Air Force: Construction of a soil cover, emplacement of an engineered cap, excavation and removal, or retention by the Air Force could mitigate reuse conflicts with the Landfill. Portions of the Liquid Fuels Storage Area may require restricted use while remediation takes place. The capped portion of the Southwest Drainage System may also require restricted use while investigation and remediation, if necessary, are completed. Reuse Proponent/Agencies: Follow recommended land use restrictions.	Air Force: Construction of a soil cover, emplacement of an engineered cap, excavation and removal, or retention by the Air Force could mitigate reuse conflicts with the Landfill. Portions of the Liquid Fuels Storage Area may require restricted use while remediation takes place. The capped portion of the Southwest Drainage System may also require restricted use while investigation and remediation, if necessary, are completed. Reuse Proponent/Agencies: Follow recommended land use restrictions.	Air Force: Site remediation will proceed under the Installation restoration Program.
	IMPACT: Proposed uses could have adverse impacts on archaeological resource areas.	Proposed uses could have adverse impacts on archaeological resource areas.	Proposed uses could have adverse impacts on archaeological resource areas.	Proposed uses could have adverse impacts on archaeological resource areas.	No impact.
	MITIGATION: Reuse Proponent/Agencies: Avoid ground disturbing activities in sensitive areas or fully document cultural materials prior to development.	Reuse Proponent/Agencies: Avoid ground disturbing activities in sensitive areas or fully document cultural materials prior to development.	Reuse Proponent/Agencies: Avoid ground disturbing activities in sensitive areas or fully document cultural materials prior to development.	Reuse Proponent/Agencies: Avoid ground disturbing activities in sensitive areas or fully document cultural materials prior to development.	Air Force: Provide security to maintain integrity of resources.

Table 2.7-2. Summary of Environmental Impacts and Mitigation from the Proposed Action and Reuse Alternatives
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Resource Category	Proposed Action	General Aviation and Education Alternative	Commercial Aviation and Education Alternative	Education and Planned Community Alternative	No-Action Alternative
• Land Use and Aesthetics (Continued)	IMPACT: Proposed uses could have adverse impacts on traditional resources; the Air Force is consulting with concerned Native American tribal groups and communities to identify potential impacts.	Proposed uses could have adverse impacts on traditional resources; the Air Force is consulting with concerned Native American tribal groups and communities to identify potential impacts.	Proposed uses could have adverse impacts on traditional resources; the Air Force is consulting with concerned Native American tribal groups and communities to identify potential impacts.	Proposed uses could have adverse impacts on traditional resources; the Air Force is consulting with concerned Native American tribal groups and communities to identify potential impacts.	The Air Force is consulting with concerned Native American tribal groups and communities to identify potential impacts.
	MITIGATION: Reuse Proponent/Agencies: Avoid ground disturbing activities in sensitive areas; other mitigations may be developed once impacts are defined.	Reuse Proponent/Agencies: Avoid ground disturbing activities in sensitive areas; other mitigations may be developed once impacts are defined.	Reuse Proponent/Agencies: Avoid ground disturbing activities in sensitive areas; other mitigations may be developed once impacts are defined.	Reuse Proponent/Agencies: Avoid ground disturbing activities in sensitive areas; other mitigations may be developed once impacts are defined.	Air Force: Provide security to maintain integrity of resources. Other mitigations will be developed once impacts are defined.
	IMPACT: Potential demolition of five historic structures could occur due to incompatibility with proposed uses.	Potential demolition of five historic structures could occur due to incompatibility with proposed uses.	Potential demolition of four historic structures could occur due to incompatibility with proposed uses.	Potential demolition of 12 historic structures could occur due to incompatibility with proposed uses.	Integrity of 14 historic structures could deteriorate unless adequate maintenance is provided.
	MITIGATION: Reuse Proponent/Agencies: Reevaluation of land uses to avoid demolition; relocation; or full documentation prior to demolition.	Reuse Proponent/Agencies: Reevaluation of land uses to avoid demolition; relocation; or full documentation prior to demolition.	Reuse Proponent/Agencies: Reevaluation of land uses to avoid demolition; relocation; or full documentation prior to demolition.	Reuse Proponent/Agencies: Reevaluation of land uses to avoid demolition; relocation; or full documentation prior to demolition.	Air Force: Provide maintenance to prevent deterioration of historic structures.
	IMPACT: Adverse visual effects to surrounding properties could occur with construction of industrial and commercial areas in the northeast corner of the base.	Adverse visual effects to surrounding properties could occur with construction of industrial and commercial areas in the northeast corner of the base. Residential uses may be subject to adverse visual effects adjacent to the existing landfill.	Adverse visual effects to surrounding properties could occur with construction of industrial and commercial areas in the northeast corner of the base.	Education uses may be subject to adverse visual effects adjacent to the existing landfill.	No impact.

Table 2.7-2. Summary of Environmental Impacts and Mitigation from the Proposed Action and Reuse Alternatives
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Resource Category	Proposed Action	General Aviation and Education Alternative	Commercial Aviation and Education Alternative	Education and Planned Community Alternative	No-Action Alternative
• Land Use and Aesthetics (Continued)	MITIGATION: Reuse Proponent/Agencies: Implementation of height restrictions, architectural design standards, and landscape requirements by the City of Mesa.	Reuse Proponent/Agencies: Implementation of height restrictions, architectural design standards, and landscape requirements by the City of Mesa.	Reuse Proponent/Agencies: Implementation of height restrictions, architectural design standards, and landscape requirements by the City of Mesa.	Reuse Proponent/Agencies: Implementation of height restrictions, architectural design standards, and landscape requirements by the City of Mesa.	No mitigation necessary.
• Transportation	IMPACTS: Access to land uses provided by new arterial network.	Access to land uses provided by new arterial network.	Access to land uses provided by new arterial network.	Access to land uses provided by new arterial network.	No added roadways required.
	131,000 daily vehicle trips (one-way) generated.	119,000 daily vehicle trips (one-way) generated.	157,000 daily vehicle trips (one-way) generated.	189,800 daily vehicle trips (one-way) generated.	No daily vehicle trips generated.
	Increased capacity needed for Power Rd., U.S. 89, and U.S. 60.	Increased capacity needed for Power Rd., U.S. 89, and U.S. 60.	Increased capacity needed for Power Rd., U.S. 89, and U.S. 60.	Increased capacity needed for Williams Field Rd., Power Rd., Ellsworth Rd., U.S. 89, and U.S. 60.	No increased capacity needed.
	MITIGATION: Reuse Proponent/Agencies: TDM measures could reduce daily vehicle trips (one-way) to 117,900.	Reuse Proponent/Agencies: TDM measures could reduce daily vehicle trips (one-way) to 107,100.	Reuse Proponent/Agencies: TDM measures could reduce daily vehicle trips (one-way) to 141,300.	Reuse Proponent/Agencies: TDM measures could reduce daily vehicle trips (one-way) to 170,000.	No TDM needed.
	IMPACT: Airspace conflict between Williams arrivals from the northwest and the instrument approach to Mesa-Falcon Field Airport.	No impacts due to airspace conflict.	Airspace conflict between Williams arrivals from the northwest and the instrument approach to Mesa-Falcon Field Airport. Additional airspace conflict between new Williams IFR non-precision approaches and Phoenix Sky Harbor International Airport arrival paths.	No airspace impacts.	No airspace impacts.

Table 2.7-2. Summary of Environmental Impacts and Mitigation from the Proposed Action and Reuse Alternatives
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Resource Category	Proposed Action	General Aviation and Education Alternative	Commercial Aviation and Education Alternative	Education and Planned Community Alternative	No-Action Alternative
• Transportation (Continued)	MITIGATION: Reuse Proponent/Agencies: The airspace conflict is an existing condition currently mitigated via "tunnelling"; similar mitigation would be appropriate under this alternative.	No airspace mitigation necessary.	The existing airspace conflict is currently mitigated via "tunnelling"; similar mitigation would be appropriate under this alternative. The additional conflict, however, may not be mitigable.	No airspace mitigation necessary.	No airspace mitigation necessary.
• Utilities	IMPACTS:				
Water	4.19 MGD in year 2013, 4.6% increase in ROI	4.63 MGD in year 2013, 5.0% increase in ROI	4.24 MGD in year 2013, 4.6% increase in ROI	1.90 MGD in year 2013, 2.1% increase in ROI	Minimal demand. No impact on local suppliers.
Wastewater	1.82 MGD in year 2013, 4.6% increase in ROI	2.01 MGD in year 2013, 5.0% increase in ROI	1.84 MGD in year 2013, 4.6% increase in ROI	0.82 MGD in year 2013, 2.1% increase in ROI	Minimal demand. No impact on local suppliers.
Solid Waste	55,200 tons/year in year 2013, 1.2% increase in ROI	61,000 tons/year in year 2013, 1.4% increase in ROI	57,400 tons/year in year 2013, 1.3% increase in ROI	25,000 tons/year in year 2013, 0.6% increase in ROI	Minimal demand. No impact on local suppliers.
Electricity	768 MWH/day in year 2013, 1.3% increase in ROI	849 MWH/day in year 2013, 1.4% increase in ROI	798 MWH/day in year 2013, 1.3% increase in ROI	348 MWH/day in year 2013, 0.6% increase in ROI	Minimal demand. No impact on local suppliers.
Natural Gas	17,000 therms/day in year 2013, 1.3% increase in ROI	18,800 therms/day in year 2013, 1.5% increase in ROI	17,700 therms/day in year 2013, 1.4% increase in ROI	7,700 therms/day in year 2013, 0.6% increase in ROI	Minimal demand. No impact on local suppliers.
	MITIGATION: Reuse Proponent/Agencies: Siting of a new Maricopa County landfill is required and is being considered.	Reuse Proponent/Agencies: Siting of a new Maricopa County landfill is required and is being considered.	Reuse Proponent/Agencies: Siting of a new Maricopa County landfill is required and is being considered.	Reuse Proponent/Agencies: Siting of a new Maricopa County landfill is required and is being considered.	Reuse Proponent/Agencies: Siting of a new Maricopa County landfill is required and is being considered.
	City of Mesa sanitary sewer system capacity will have to be increased to handle increased demand.	City of Mesa sanitary sewer system capacity will have to be increased to handle increased demand.	City of Mesa sanitary sewer system capacity will have to be increased to handle increased demand.	City of Mesa sanitary sewer system capacity will have to be increased to handle increased demand.	City of Mesa sanitary sewer system capacity will have to be increased to handle increased demand.

Table 2.7-2. Summary of Environmental Impacts and Mitigation from the Proposed Action and Reuse Alternatives
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Resource Category	Proposed Action	General Aviation and Education Alternative	Commercial Aviation and Education Alternative	Education and Planned Community Alternative	No-Action Alternative
Hazardous Materials and Hazardous Waste Management					
• Hazardous Materials Management	IMPACTS: Increase in types and quantities of materials. Need for emergency response capability.	Increase in types and quantities of materials. Need for emergency response capability.	Increase in types and quantities of materials. Need for emergency response capability.	Increase in types and quantities of materials. Need for emergency response capability.	Small quantities of materials used by OL for maintenance functions.
	MITIGATION: Reuse Proponent/Agencies: Establish cooperative planning body; conform to environmental standards.	Reuse Proponent/Agencies: Establish cooperative planning body; conform to environmental standards.	Reuse Proponent/Agencies: Establish cooperative planning body; conform to environmental standards.	Reuse Proponent/Agencies: Establish cooperative planning body; conform to environmental standards.	Air Force: OL responsible for materials management and development of spill response plan.
• Hazardous Waste Management	IMPACTS: Increase in types and quantities of wastes. Need for emergency response capability.	Increase in types and quantities of wastes. Need for emergency response capability.	Increase in types and quantities of wastes. Need for emergency response capability.	Increase in types and quantities of wastes. Need for emergency response capability.	Minimal quantities of waste generated by OL as a result of maintenance activities.
	MITIGATION: Reuse Proponent/Agencies: Establish cooperative planning body; employ waste minimization practices; conform to environmental standards.	Reuse Proponent/Agencies: Establish cooperative planning body; employ waste minimization practices; conform to environmental standards; public awareness and "household collection days" for residential hazardous wastes.	Reuse Proponent/Agencies: Establish cooperative planning body; employ waste minimization practices; conform to environmental standards.	Reuse Proponent/Agencies: Establish cooperative planning body; employ waste minimization practices; conform to environmental standards; public awareness and "household collection days" for residential hazardous wastes.	Air Force: OL responsible for waste management and development of spill response plan.
• Installation Restoration Program	IMPACTS: Remediation of certain areas may delay the conveyance of some parcels and limit land uses within overlying areas.	Remediation of certain areas may delay the conveyance of some parcels and limit land uses within overlying areas.	Remediation of certain areas may delay the conveyance of some parcels and limit land use within overlying areas.	Remediation of certain areas may delay the conveyance of some parcels and limit land uses within overlying areas.	No impacts; remediation ongoing.

Table 2.7-2. Summary of Environmental Impacts and Mitigation from the Proposed Action and Reuse Alternatives
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Resource Category	Proposed Action	General Aviation and Education Alternative	Commercial Aviation and Education Alternative	Education and Planned Community Alternative	No-Action Alternative
• Installation Restoration Program (Continued)	MITIGATION: Air Force: Address and properly close out each site. Reuse Proponent/Agencies: Follow recommended land use restrictions.	Air Force: Address and properly close out each site. Reuse Proponent/Agencies: Follow recommended land use restrictions.	Air Force: Address and properly close out each site. Reuse Proponent/Agencies: Follow recommended land use restrictions.	Air Force: Address and properly close out each site. Reuse Proponent/Agencies: Follow recommended land use restrictions.	Air Force: Address and properly close out each site.
• Storage Tanks	IMPACTS: All existing USTs to be removed prior to base disposal. Reuse activities will require new USTs. ASTs purged and conveyed for reuse.	All existing USTs to be removed prior to base disposal. Reuse activities will require new USTs. ASTs purged and conveyed for reuse.	All existing USTs to be removed prior to base disposal. Reuse activities will require new USTs. ASTs purged and conveyed for reuse.	All existing USTs to be removed prior to base disposal. Reuse activities will require new USTs. ASTs purged and conveyed for reuse.	All existing USTs to be removed. ASTs purged and maintained in caretaker status.
	MITIGATION: Air Force: Close and remove tanks in conformance with appropriate federal, state, and local regulations. Reuse Proponent/Agencies: Use acceptable leak detection methods, spill and overfill protection, cathodic protection, secondary containment for tank systems including piping, and liability insurance.	Air Force: Close and remove tanks in conformance with appropriate federal, state, and local regulations. Reuse Proponent/Agencies: Use acceptable leak detection methods, spill and overfill protection, cathodic protection, secondary containment for tank systems including piping, and liability insurance.	Air Force: Close and remove tanks in conformance with appropriate federal, state, and local regulations. Reuse Proponent/Agencies: Use acceptable leak detection methods, spill and overfill protection, cathodic protection, secondary containment for tank systems including piping, and liability insurance.	Air Force: Close and remove tanks in conformance with appropriate federal, state, and local regulations. Reuse Proponent/Agencies: Use acceptable leak detection methods, spill and overfill protection, cathodic protection, secondary containment for tank systems including piping, and liability insurance.	Air Force: Close and remove tanks in conformance with appropriate federal, state, and local regulations.
• Asbestos	IMPACTS: Friable asbestos has been removed or encapsulated; continued management of nonfriable asbestos in place.	Friable asbestos has been removed or encapsulated; continued management of nonfriable asbestos in place.	Friable asbestos has been removed or encapsulated; continued management of nonfriable asbestos in place.	Friable asbestos has been removed or encapsulated; continued management of nonfriable asbestos in place.	Friable asbestos has been removed or encapsulated; continued management of nonfriable asbestos in place.

Table 2.7-2. Summary of Environmental Impacts and Mitigation from the Proposed Action and Reuse Alternatives
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Resource Category	Proposed Action	General Aviation and Education Alternative	Commercial Aviation and Education Alternative	Education and Planned Community Alternative	No-Action Alternative
• Asbestos (Continued)	MITIGATION: Reuse Proponent/Agencies: Coordinate asbestos management with renovation and demolition activities; compliance with National Emissions Standards for Hazardous Air Pollutants (NESHAP) to mitigate impacts and preclude asbestos hazards.	Reuse Proponent/Agencies: Coordinate asbestos management with renovation and demolition activities; compliance with NESHAP to mitigate impacts and preclude asbestos hazards.	Reuse Proponent/Agencies: Coordinate asbestos management with renovation and demolition activities; compliance with NESHAP to mitigate impacts and preclude asbestos hazards.	Reuse Proponent/Agencies: Coordinate asbestos management with renovation and demolition activities; compliance with NESHAP to mitigate impacts and preclude asbestos hazards.	Air Force: Compliance with NESHAP; continued management of non-friable asbestos in place.
• Pesticides	IMPACTS: Landscape management may result in increased pesticide use.	Landscape management may result in increased use.	Landscape management may result in increased use.	Landscape management may result in increased use.	Minimal maintenance level use.
	MITIGATION: Reuse Proponent/Agencies: Conform to environmental standards.	Reuse Proponent/Agencies: Conform to environmental standards.	Reuse Proponent/Agencies: Conform to environmental standards.	Reuse Proponent/Agencies: Conform to environmental standards.	Air Force: Conform to environmental standards.
• Polychlorinated Biphenyls (PCBs)	IMPACTS: Known PCB-containing and PCB-contaminated equipment has been removed.	Known PCB-containing and PCB-contaminated equipment has been removed.	Known PCB-containing and PCB-contaminated equipment has been removed.	Known PCB-containing and PCB-contaminated equipment has been removed.	Known PCB-containing and PCB-contaminated equipment has been removed.
	MITIGATION: Air Force: Conduct sampling and laboratory analysis to confirm non-PCB status of 322 electrical items; remove those that test positive for PCBs > 50 ppm. Reuse Proponent/Agencies: Conduct routine inspection and maintenance.	Air Force: Conduct sampling and laboratory analysis to confirm non-PCB status of 322 electrical items; remove those that test positive for PCBs > 50 ppm. Reuse Proponent/Agencies: Conduct routine inspection and maintenance.	Air Force: Conduct sampling and laboratory analysis to confirm non-PCB status of 322 electrical items; remove those that test positive for PCBs > 50 ppm. Reuse Proponent/Agencies: Conduct routine inspection and maintenance.	Air Force: Conduct sampling and laboratory analysis to confirm non-PCB status of 322 electrical items; remove those that test positive for PCBs > 50 ppm. Reuse Proponent/Agencies: Conduct routine inspection and maintenance.	Air Force: Conduct sampling and laboratory analysis to confirm non-PCB status of 322 electrical items; remove those that test positive for PCBs > 50 ppm.

Table 2.7-2. Summary of Environmental Impacts and Mitigation from the Proposed Action and Reuse Alternatives
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Resource Category	Proposed Action	General Aviation and Education Alternative	Commercial Aviation and Education Alternative	Education and Planned Community Alternative	No-Action Alternative
• Radon	IMPACTS: Two buildings tested above the 95% confidence limit for a 4 pCi/L exposure.	Two buildings tested above the 95% confidence limit for a 4 pCi/L exposure.	Two buildings tested above the 95% confidence limit for a 4 pCi/L exposure.	Two buildings tested above the 95% confidence limit for a 4 pCi/L exposure.	Two buildings tested above the 95% confidence limit for a 4 pCi/L exposure.
	MITIGATION: Air Force and Reuse Proponent/Agencies: Additional sampling at Buildings 237 and 334 recommended; mitigation via improved ventilation if high radon levels persist.	Air Force and Reuse Proponent/Agencies: Additional sampling at Buildings 237 and 334 recommended; mitigation via improved ventilation if high radon levels persist.	Air Force and Reuse Proponent/Agencies: Additional sampling at Buildings 237 and 334 recommended; mitigation via improved ventilation if high radon levels persist.	Air Force and Reuse Proponent/Agencies: Additional sampling at Buildings 237 and 334 recommended; mitigation via improved ventilation if high radon levels persist.	No mitigation necessary; vacant buildings secured.
• Medical/Biohazardous Waste	IMPACTS: Continued operation of the hospital.	No hospital reuse; no impacts.	Continued operation of the hospital.	No hospital reuse; no impacts.	Hospital maintained in caretaker status; no impacts.
	MITIGATION: Reuse Proponent/Agencies: Conform to state regulations for management of medical wastes.	No mitigation necessary.	Reuse Proponent/Agencies: Conform to state regulations for management of medical wastes.	Reuse Proponent/Agencies: Conform to state regulations for management of medical wastes.	No mitigation necessary.
• Ordnance	IMPACTS: Discarded munitions may be present at the Suspected Munitions Burial Site. Lead from spent bullets may be present in soils at the Firing Range.	Discarded munitions may be present at the Suspected Munitions Burial Site. Lead from spent bullets may be present in soils at the Firing Range.	Discarded munitions may be present at the Suspected Munitions Burial Site. Lead from spent bullets may be present in soils at the Firing Range.	Discarded munitions may be present at the Suspected Munitions Burial Site. Lead from spent bullets may be present in soils at the Firing Range.	Discarded munitions may be present at the Suspected Munitions Burial Site. Lead from spent bullets may be present in soils at the Firing Range.

Table 2.7-2. Summary of Environmental Impacts and Mitigation from the Proposed Action and Reuse Alternatives
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Resource Category	Proposed Action	General Aviation and Education Alternative	Commercial Aviation and Education Alternative	Education and Planned Community Alternative	No-Action Alternative
• Ordnance (Continued)	MITIGATION: Air Force: Investigate the Suspected Munitions Burial Site and the Firing Range and remediate as necessary. Reuse Proponent/Agencies: Follow recommended land use restrictions, if any.	Air Force: Investigate the Suspected Munitions Burial Site and the Firing Range and remediate as necessary. Reuse Proponent/Agencies: Follow recommended land use restrictions, if any.	Air Force: Investigate the Suspected Munitions Burial Site and the Firing Range and remediate as necessary. Reuse Proponent/Agencies: Follow recommended land use restrictions, if any.	Air Force: Investigate the Suspected Munitions Burial Site and the Firing Range and remediate as necessary. Reuse Proponent/Agencies: Follow recommended land use restrictions, if any.	Air Force: Investigate the Suspected Munitions Burial Site and the Firing Range and remediate as necessary.
Natural Environment					
• Soils and Geology	IMPACTS: Increase in erosion potential and alteration of natural surface and soil conditions. (Approximately 2,600 acres of soil on-base and 25 acres of soil off-base disturbed.)	Increase in erosion potential and alteration of natural surface and soil conditions. (Approximately 2,400 acres of soil on-base disturbed.)	Increase in erosion potential and alteration of natural surface and soil conditions. (Approximately 2,900 acres of soil on-base and 71 acres of soil off-base disturbed, including 2 acres of prime farmland off-base.)	Increase in erosion potential and alteration of natural surface and soil conditions. (Approximately 2,700 acres of soil on-base disturbed.)	No increase in erosion potential or alteration of natural surface and soil conditions.
	MITIGATION: Reuse Proponent/Agencies: Mitigate through use of proper construction mitigation techniques such as protective cover and diversion dikes.	Reuse Proponent/Agencies: Mitigate through use of proper construction mitigation techniques such as protective cover and diversion dikes.	Reuse Proponent/Agencies: Mitigate through use of proper construction mitigation techniques such as protective cover and diversion dikes.	Reuse Proponent/Agencies: Mitigate through use of proper construction mitigation techniques such as protective cover and diversion dikes.	No mitigation necessary.
• Water Resources Groundwater	IMPACTS: Positive, but negligible, impact on basin overdraft situation as compared to preclosure reference.	Positive, but negligible, impact on basin overdraft situation as compared to preclosure reference.	Positive, but negligible, impact on basin overdraft situation as compared to preclosure reference.	Positive, but negligible, impact on basin overdraft situation as compared to preclosure reference.	Positive, but negligible, impact on basin overdraft situation as compared to preclosure reference.
	MITIGATION: No mitigation required. City of Mesa water supply is adequate for foreseeable demand.	No mitigation required. City of Mesa water supply is adequate for foreseeable demand.	No mitigation required. City of Mesa water supply is adequate for foreseeable demand.	No mitigation required. City of Mesa water supply is adequate for foreseeable demand.	No mitigation required. On-base supply adequate for foreseeable demand.

Table 2.7-2. Summary of Environmental Impacts and Mitigation from the Proposed Action and Reuse Alternatives
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Resource Category	Proposed Action	General Aviation and Education Alternative	Commercial Aviation and Education Alternative	Education and Planned Community Alternative	No-Action Alternative
Surface Water	IMPACTS: Slight net increase in annual runoff.	Slight net increase in annual runoff, but less than the Proposed Action.	Slight net increase in annual runoff, but greater than the Proposed Action.	Slight net increase in annual runoff, similar to the Proposed Action.	Positive impacts on surface water quality due to suspension of base operations.
	MITIGATION: Reuse Proponent/Agencies: Stormwater management facilities and soil erosion and sediment control.	Reuse Proponent/Agencies: Stormwater management facilities and soil erosion and sediment control.	Reuse Proponent/Agencies: Stormwater management facilities and soil erosion and sediment control.	Reuse Proponent/Agencies: Stormwater management facilities and soil erosion and sediment control.	No mitigation necessary.
• Air Quality	IMPACTS: Increase in air pollution emissions. For ozone precursor pollutants, offsetting emissions within the nonattainment area will be required to ensure that attainment of air quality standards will be met by the mandated target date. For all other pollutants, no interference with maintaining or attaining federal and state ambient air quality standards.	Increase in air pollution emissions. For ozone precursor pollutants, offsetting emissions within the nonattainment area will be required to ensure that attainment of air quality standards will be met by the mandated target date. For all other pollutants, no interference with maintaining or attaining federal and state ambient air quality standards.	Increase in air pollution emissions. For ozone precursor pollutants, offsetting emissions within the nonattainment area will be required to ensure that attainment of air quality standards will be met by the mandated target date. For all other pollutants, no interference with maintaining or attaining federal and state ambient air quality standards.	Increase in air pollution emissions. For ozone precursor pollutants, offsetting emissions within the nonattainment area will be required to ensure that attainment of air quality standards will be met by the mandated target date. For all other pollutants, no interference with maintaining or attaining federal and state ambient air quality standards.	Air pollutant emissions will be essentially eliminated. No interference with maintaining attainment status of federal and state ambient air quality standards.

Table 2.7-2. Summary of Environmental Impacts and Mitigation from the Proposed Action and Reuse Alternatives
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Resource Category	Proposed Action	General Aviation and Education Alternative	Commercial Aviation and Education Alternative	Education and Planned Community Alternative	No-Action Alternative
• Air Quality (Continued)	MITIGATION: Reuse Proponent/Agencies: Possible mitigation of fugitive dust emissions from construction activities through watering, clearing areas on a selective basis, and treating disturbed areas as soon as possible. Efficient scheduling of heavy construction equipment use. Development of an airport shuttle system to reduce personal vehicle use. Promotion of carpools and vanpools by providing a rider matching service, preferential parking and financial incentives.	Reuse Proponent/Agencies: Possible mitigation of fugitive dust emissions from construction activities through watering, clearing areas on a selective basis, and treating disturbed areas as soon as possible. Efficient scheduling of heavy construction equipment use. Promotion of carpools and vanpools by providing a rider matching service, preferential parking and financial incentives.	Reuse Proponent/Agencies: Possible mitigation of fugitive dust emissions from construction activities through watering, clearing areas on a selective basis, and treating disturbed areas as soon as possible. Efficient scheduling of heavy construction equipment use. Development of an airport shuttle system to reduce personal vehicle use. Promotion of carpools and vanpools by providing a rider matching service, preferential parking and financial incentives.	Reuse Proponent/Agencies: Possible mitigation of fugitive dust emissions from construction activities through watering, clearing areas on a selective basis, and treating disturbed areas as soon as possible. Efficient scheduling of heavy construction equipment use. Promotion of carpools and vanpools by providing a rider matching service, preferential parking and financial incentives.	No mitigation necessary.
• Noise	IMPACTS: No residential areas would be exposed to DNL of 65 dB or higher from aircraft noise. During 2013, the area within DNL of 65 dB from aircraft noise would be 795 acres which is 16,318 acres less than the preclosure case. During 2013, there would be approximately 107 residents within DNL of 65 dB, due to traffic noise, within approximately three miles of the base.	Same as for Proposed Action, except during 2013 the area within DNL of 65 dB or higher from aircraft noise would be 332 acres, which is 16,781 acres less than the preclosure case.	During 2013 the area within DNL of 65 dB or higher from aircraft noise would be 5,024 acres which is 12,089 acres less than the preclosure case. Approximately 43 persons in residences could be affected by DNL of 65 to 70 dB from aircraft noise. In addition, proposed hotel development in the northeast corner of the base would be subject to DNL of 65 to 70 dB. Also during 2013, there would be approximately 107 residents within DNL of 65 dB, due to traffic noise, within approximately three miles of the base.	There would be no aircraft noise impacts. During 2013, there would be approximately 99 residents within DNL of 65 dB, due to traffic noise, within approximately three miles of the base.	There would be no aircraft noise impacts. During 2013, there would be approximately 96 residents within DNL of 65 dB, due to traffic noise, within approximately three miles of the base.

Table 2.7-2. Summary of Environmental Impacts and Mitigation from the Proposed Action and Reuse Alternatives
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Resource Category	Proposed Action	General Aviation and Education Alternative	Commercial Aviation and Education Alternative	Education and Planned Community Alternative	No-Action Alternative
• Noise (Continued)	MITIGATION: Reuse Proponent/Agencies: Land use planning and reuse development should incorporate compatibility measures and designs to minimize noise effects.	Reuse Proponent/Agencies: Land use planning and reuse development should incorporate compatibility measures and designs to minimize noise effects.	Reuse Proponent/Agencies: Land use planning and reuse development should incorporate compatibility measures and designs to minimize noise effects. Proposed hotel development may require discretionary permit approvals and noise reduction measures.	Reuse Proponent/Agencies: Land use planning and reuse development should incorporate compatibility measures and designs to minimize noise effects.	No mitigation necessary.
• Biological Resources	IMPACTS: Potential loss or alteration of approximately 3,365 acres of vegetation on-base plus 25 acres off-base. Loss of associated wildlife habitat for native species.	Potential loss or alteration of approximately 3,050 acres of vegetation on-base. Loss of associated wildlife habitat for native species.	Potential loss or alteration of approximately 3,445 acres of vegetation on-base plus 71 acres off-base. Loss of associated wildlife habitat for native species.	Potential loss or alteration of approximately 3,205 acres of vegetation on-base. Loss of associated wildlife habitat for native species.	No impact.
	MITIGATION: Reuse Proponent/Agencies: Mitigation of native plant species, wildlife habitat, and sensitive habitats lost or disturbed is determined through coordination and permitting actions with appropriate agencies.	Reuse Proponent/Agencies: Mitigation of native plant species, wildlife habitat, and sensitive habitats lost or disturbed is determined through coordination and permitting actions with appropriate agencies.	Reuse Proponent/Agencies: Mitigation of native plant species, wildlife habitat, and sensitive habitats lost or disturbed is determined through coordination and permitting actions with appropriate agencies.	Reuse Proponent/Agencies: Mitigation of native plant species, wildlife habitat, and sensitive habitats lost or disturbed is determined through coordination and permitting actions with appropriate agencies.	No mitigation necessary.
• Cultural Resources	IMPACTS: Proposed uses could have adverse impacts on 12 archaeological sites due to ground-disturbing activity.	Proposed uses could have adverse impacts on 12 archaeological sites due to ground-disturbing activity.	Proposed uses could have adverse impacts on 12 archaeological sites due to ground-disturbing activity.	Proposed uses could have adverse impacts on 12 archaeological sites due to ground-disturbing activity.	No impact on archaeological sites.

Table 2.7-2. Summary of Environmental Impacts and Mitigation from the Proposed Action and Reuse Alternatives
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Resource Category	Proposed Action	General Aviation and Education Alternative	Commercial Aviation and Education Alternative	Education and Planned Community Alternative	No-Action Alternative
• Cultural Resources (Continued)	MITIGATION: Air Force: Convey appropriate protective covenants with the land transfer documents. Reuse Proponent/Agencies: Avoid ground disturbing activities in sensitive areas, fully document cultural materials prior to development, conform with protective covenants.	Air Force: Convey appropriate protective covenants with the land transfer documents. Reuse Proponent/Agencies: Avoid ground disturbing activities in sensitive areas, fully document cultural materials prior to development, conform with protective covenants.	Air Force: Convey appropriate protective covenants with the land transfer documents. Reuse Proponent/Agencies: Avoid ground disturbing activities in sensitive areas, fully document cultural materials prior to development, conform with protective covenants.	Air Force: Convey appropriate protective covenants with the land transfer documents. Reuse Proponent/Agencies: Avoid ground disturbing activities in sensitive areas, fully document cultural materials prior to development, conform with protective covenants.	Air Force: Maintain security to prevent looting or damage to archaeological sites.
	IMPACTS: Proposed uses could have adverse impacts on traditional resources; the Air Force is consulting with concerned Native American tribal groups and communities to identify potential impacts.	Proposed uses could have adverse impacts on traditional resources; the Air Force is consulting with concerned Native American tribal groups and communities to identify potential impacts.	Proposed uses could have adverse impacts on traditional resources; the Air Force is consulting with concerned Native American tribal groups and communities to identify potential impacts.	Proposed uses could have adverse impacts on traditional resources; the Air Force is consulting with concerned Native American tribal groups and communities to identify potential impacts.	The Air Force is consulting with concerned Native American tribal groups and communities to identify potential impacts on traditional resources.
	MITIGATION: Air Force: Continue consultations with concerned Native American tribal groups and communities to identify potential impacts and mitigation measures. Convey appropriate protective covenants with the land transfer documents. Reuse Proponent/Agencies: Conform with protective covenants.	Air Force: Continue consultations with concerned Native American tribal groups and communities to identify potential impacts and mitigation measures. Convey appropriate protective covenants with the land transfer documents. Reuse Proponent/Agencies: Conform with protective covenants.	Air Force: Continue consultations with concerned Native American tribal groups and communities to identify potential impacts and mitigation measures. Convey appropriate protective covenants with the land transfer documents. Reuse Proponent/Agencies: Conform with protective covenants.	Air Force: Continue consultations with concerned Native American tribal groups and communities to identify potential impacts and mitigation measures. Convey appropriate protective covenants with the land transfer documents. Reuse Proponent/Agencies: Conform with protective covenants.	Air Force: Continue consultations with concerned Native American tribal groups and communities to identify potential impacts and mitigation measures. Maintain security to prevent damage to traditional resources.

Table 2.7-2. Summary of Environmental Impacts and Mitigation from the Proposed Action and Reuse Alternatives
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Resource Category	Proposed Action	General Aviation and Education Alternative	Commercial Aviation and Education Alternative	Education and Planned Community Alternative	No-Action Alternative
• Cultural Resources (Continued)	IMPACTS: Potential demolition of five historic structures that are eligible for the National Register of Historic Places (NRHP).	Potential demolition of five historic structures that are eligible for the NRHP.	Potential demolition of four historic structures that are eligible for the NRHP.	Potential demolition of 12 historic structures that are eligible for the NRHP.	Potential deterioration of 14 structures that are eligible for the NRHP.
	MITIGATION: Reuse Proponent/Agencies: Project redesign to avoid demolition of structures, relocation of structures, or full documentation of structures prior to demolition.	Reuse Proponent/Agencies: Project redesign to avoid demolition of structures, relocation of structures, or full documentation of structures prior to demolition.	Reuse Proponent/Agencies: Project redesign to avoid demolition of structures, relocation of structures, or full documentation of structures prior to demolition.	Reuse Proponent/Agencies: Project redesign to avoid demolition of structures, relocation of structures, or full documentation of structures prior to demolition.	Air Force: Maintenance and repair of structures to prevent deterioration.

Table 2.7-3. Summary of Impacts from Other Land Use Concepts
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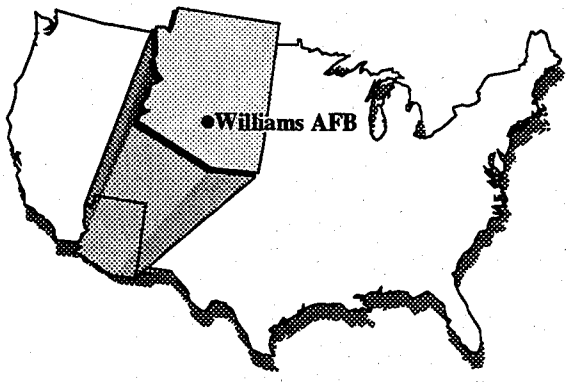
Resource Category	Federal Bureau of Prisons	Arizona Department of Corrections	Arizona Department of Health Services
Local Community			
• Land Use and Aesthetics	Compatible with the General Aviation and Education Alternative or the Education and Planned Community Alternative.	Incompatible with all reuse alternatives in the location specified.	Compatible with Education and Planned Community Alternative.
• Transportation	Increase in vehicle trips for all reuse alternatives.	Increase in vehicle trips for the General Aviation and Education Alternative; decreases for all other alternatives.	No change in transportation demand.
• Utilities	Negligible change in utility demand.	Negligible change in utility demand.	Negligible change in utility demand.
Hazardous Materials and Hazardous Waste Management			
• Hazardous Materials	No change from use levels associated with reuse alternatives.	No change from use levels associated with reuse alternatives.	No change from use levels associated with reuse alternatives.
• Hazardous Waste	No change from use levels associated with reuse alternatives.	No change from use levels associated with reuse alternatives.	No change from use levels associated with reuse alternatives.
• Installation Restoration Program	No impact.	Possible delays due to remediation activities associated with Fire Protection Training Area No. 2.	No impact.
• Storage Tanks	No new storage tanks.	No new storage tanks.	No new storage tanks.
• Asbestos	No impact.	Continued in-place management of asbestos in facilities.	Continued in-place management of asbestos in facilities.
• Pesticides	Small quantities to be utilized for landscaping.	Small quantities to be utilized for landscaping.	Small quantities to be utilized for landscaping.

Table 2.7-3. Summary of Impacts from Other Land Use Concepts
Page 2 of 2

Resource Category	Federal Bureau of Prisons	Arizona Department of Corrections	Arizona Department of Health Services
Hazardous Materials and Hazardous Waste Management (Continued)			
• PCBs	No impact.	No impact.	No impact.
• Radon	No impact.	Further radon testing recommended at Buildings 237 (hospital) and 334 (dormitory).	Further radon testing recommended at Buildings 237 (hospital) and 334 (dormitory).
• Medical/Biohazardous Wastes	Comparable to Proposed Action if medical facilities are constructed.	Comparable to Proposed Action if medical facilities are constructed.	Comparable to Proposed Action.
• Ordnance	No impact.	No impact.	No impact.
Natural Environment			
• Soils and Geology	Potential erosion during construction.	Potential erosion during construction.	Minimal new disturbance.
• Water Resources	Stormwater drainage system required to minimize impacts.	Stormwater drainage system required to minimize impacts.	No impact.
• Air Quality	Negligible new emissions.	Negligible new emissions.	No new emissions.
• Noise	No impact.	No impact.	No impact.
• Biological Resources	New development will have impacts similar to the Proposed Action.	Future use of undeveloped land will have impacts similar to the Proposed Action.	No impact.
• Cultural Resources	No impact.	New construction could adversely impact the Midvale archaeological site, as well as sites AZ U:10:25, 10:60, and 10:61. Potential demolition of Building 715.	Demolition/ reconstruction could adversely impact the Midvale archaeological site. Potential demolition of building 715.



CHAPTER 3
AFFECTED ENVIRONMENT

3.0 AFFECTED ENVIRONMENT

3.1 INTRODUCTION

This chapter describes the environmental conditions of Williams Air Force Base (AFB) and its region of influence (ROI) at the time of base closure. It provides information to serve as a baseline from which to identify and evaluate environmental changes resulting from the disposal and reuse of Williams AFB. Although the EIS focuses on the biophysical environment, some non-biophysical elements are addressed to the extent that they directly impact the environment. The non-biophysical elements (influencing factors) of population and employment, land use and aesthetics, public utility systems, and transportation networks in the region and local communities are addressed. This chapter also describes the storage, use, and management of hazardous materials found on-base, including storage tanks, asbestos, pesticides, polychlorinated biphenyls (PCBs), radon, and medical/biohazardous waste. The Installation Restoration Program (IRP) is also described. Finally, the chapter describes the pertinent natural resources of geology and soils, water resources, air quality, noise, biological resources, and cultural resources.

The ROI to be studied will be defined for each resource area affected by the Proposed Action and alternatives. The ROI determines the geographical area to be addressed as the Affected Environment. Although the base boundary may constitute the ROI limit for many resources, potential impacts associated with certain issues (e.g., air quality, noise, utility systems, and water resources) transcend these limits. ROIs are carefully delineated to produce an accurate basis for analysis regarding base disposal and reuse impacts.

The baseline conditions assumed for the purposes of analysis are the conditions projected at base closure in September 1993. Impacts associated with disposal and/or reuse activities may then be addressed by comparing projected conditions under various reuses to closure conditions. A reference to preclosure conditions is provided, where appropriate (e.g., air quality) in this document, in order to provide a comparative analysis over time. Data used to describe the preclosure reference point are that which depict conditions as close as possible to the closure announcement date. This will assist the decision-maker and agencies in understanding potential long-term impacts in comparison to conditions when the installation was active.

3.2 LOCAL COMMUNITY

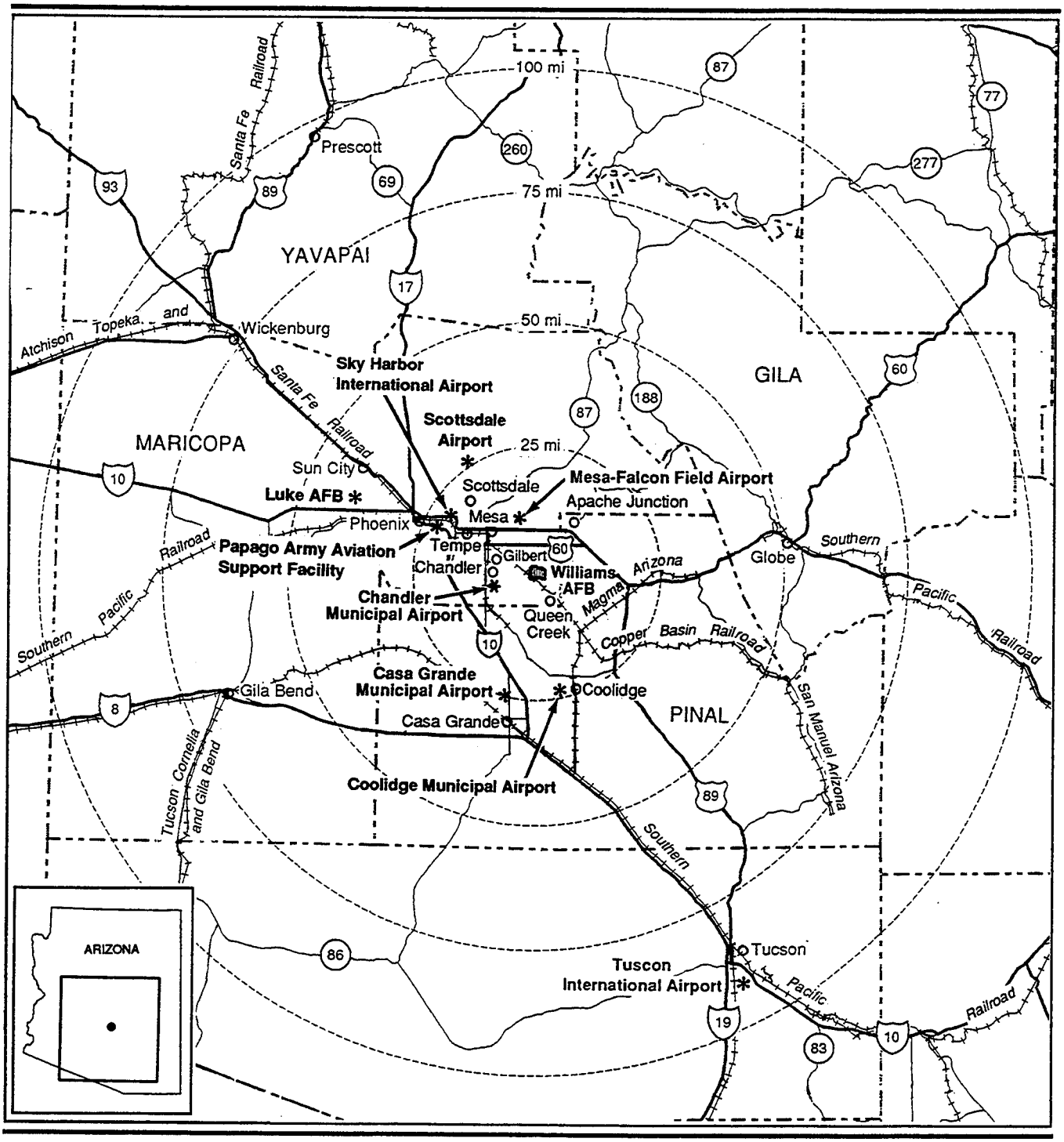
Williams AFB is located in the Salt River Basin in Mesa, Arizona (Figure 3.2-1). The base is situated in southeastern Maricopa County in a geographic subregion of the Salt River Basin known as the East Valley. This analysis utilizes census tract boundaries to approximate the geographic area known as the East Valley. The valley is oval shaped and flat except for scattered precipitous mountains rising a few hundred to as much as 1,500 feet above the valley floor (Ruffner and Bair, 1987).

Williams AFB comprises approximately 4,042 acres (Figure 3.2-2). The elevation of the base ranges from approximately 1,390 feet above mean sea level (MSL) at the base's southeastern sector to approximately 1,326 feet MSL in the western section of the base. The base is situated in the Salt River Valley, which is drained by the Salt, Gila, and Agua Fria Rivers. Slopes throughout the base are less than 1 percent, with the exception of man-made embankments, dikes, and other similar features. The primary land uses surrounding the base are agricultural in nature. Residential uses are also present.

The East Valley has a favorable climate with light winds, an average of 255 clear days each year, and a mean temperature of 70 degrees Fahrenheit. Temperatures range from very hot in the summer, with normal high temperatures ranging from 90 to 100 degrees Fahrenheit, to mild in winter, when typical high temperatures are in the 60s. In the summer, many days exceed 110 degrees Fahrenheit in the afternoon and remain above 85 degrees all night. The climate is very dry with an average annual rainfall of less than 8 inches per year throughout the valley and afternoon humidities ranging from about 30 percent in winter to only about 10 percent in June (Ruffner and Bair, 1987).

Frequent winter storms in the higher mountains of the central and northern parts of Arizona often bring heavy snowfalls. In the spring, the gradual melting of the snow serves to maintain a supply of water in the reservoirs in the East Valley. These reservoirs provide water for this extensively farmed region. Due to the dry climate, the non-irrigated vegetation consists of creosote bush, cacti, and native shrubs and grasses.

Access to the Williams AFB area is provided by several highways which serve the City of Phoenix, Arizona. Interstate 10 (I-10) is west of the base and runs south to Tucson. Interstate 17 (I-17) comes off of I-10 just south of Sky Harbor International Airport providing access to downtown Phoenix and eventually heads north to the northern part of the state. I-10 is accessible from downtown Phoenix and eventually runs west of the metropolitan area. The Superstition Freeway (U.S. 60), which runs east-west, provides service to the East Valley and Williams AFB, and is accessible from the I-10/I-17 corridor. The Superstition Freeway is north of



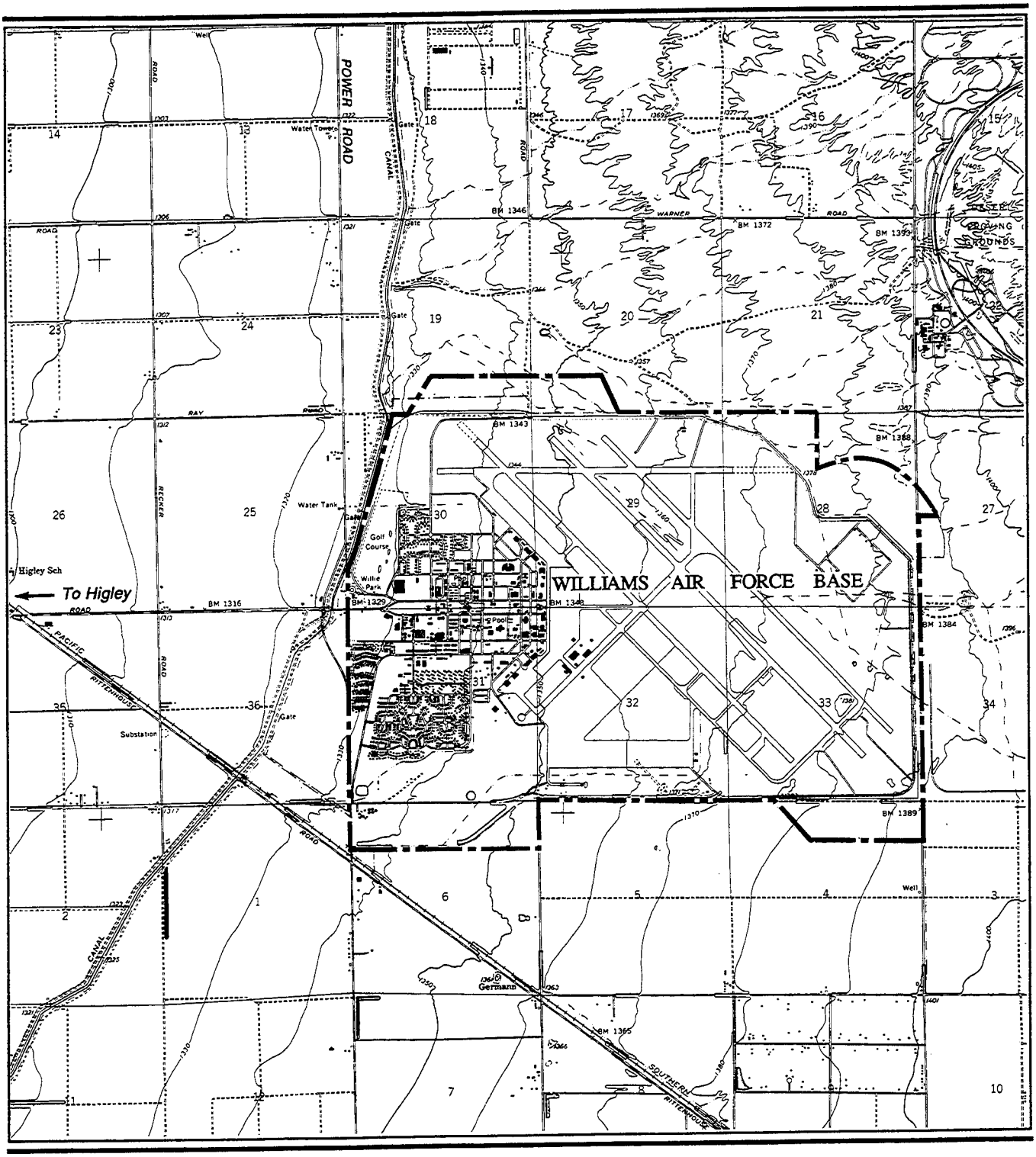
EXPLANATION

- 10 — Interstate Highway
- 60 — U.S. Highway
- 87 — State Highway
- * — Airports
- Railroads
- County Boundaries

0 25 50 Miles

Regional Map

Figure 3.2-1



EXPLANATION

Base Boundary

Williams AFB and Vicinity

0 1000 2000 4000 Feet

Figure 3.2-2

Gilbert and Chandler, and south of Tempe and Mesa. Power Road intersects the Superstition Freeway and can be taken south to Williams Field Road, which leads to the main entrance of the base.

Passenger rail service for Williams AFB is accessible in the City of Phoenix. This service connects the cities of Yuma and Tucson, Arizona, by way of Phoenix. Accessible freight rail includes, through Maricopa County, the Southern Pacific Railroad and, through Phoenix, the Atchison Topeka and Santa Fe Railroad.

Although small airports designed for recreational use and pilot training operate in the Williams AFB area, Sky Harbor International, located in south Phoenix, and Scottsdale Municipal, located in Scottsdale, are the largest commercial airports serving the region. The airports are serviced by the major airlines, with connections to most cities. Limousine/shuttle service is available between the East Valley and Sky Harbor International Airport.

Installation Background. Williams AFB was established in 1941 as an Army Air Corps Advanced Flying School. Williams AFB was alternately known as Higley Field, Mesa Air Base, and Mesa Military Airport. It was officially named Williams Field in 1942 in honor of Lieutenant Charles L. Williams, an Arizona pilot who was killed in 1927 while on a flight.

Under the 82nd Flying Training Wing of the Air Training Command, the primary mission of the base since 1942 was pilot training, with the exception of a two-year period from 1958 to 1960 when the base, under the Tactical Air Command, operated as a tactical flying training base. Williams AFB also provided pilot training to Chinese and British soldiers during World War II.

Williams AFB became the first jet pilot training base in the country in 1949. Williams AFB was also the free world's largest Undergraduate Pilot Training (UPT) base, graduating more than 26,000 pilots by the end of 1989, including the first women officers to enter UPT (graduating in 1977). Williams AFB was also the home of the first aerobatic aircraft team, the Acrojets.

3.2.1 Community Setting

Williams AFB is bordered by the towns of Gilbert to the west and southwest and Queen Creek to the south. Most of the population of the East Valley resides in the cities of Mesa, Tempe, and Chandler, and in the Town of Gilbert. The City of Phoenix lies approximately 25 miles northwest of Williams AFB and is a major metropolitan influence in the East Valley.

The Phoenix Metropolitan Statistical Area (MSA), coincident with Maricopa County, along with the City of Apache Junction in Pinal County, is

considered the ROI for purposes of describing and analyzing the impacts of disposal and reuse of Williams AFB. Because the greatest effects are expected to occur in the East Valley, located within the Phoenix MSA, several communities within the East Valley are utilized for analysis of community impacts in the EIS. The City of Phoenix is included in the analysis of impacts for housing and population due to the number of Williams AFB employees who reside there.

The population of Maricopa County was among the four fastest growing counties in Arizona during the 1980s (Arizona Department of Economic Security, 1990). The ROI increased in population from 1.5 million (1,504,175) in 1980 to 2.1 million (2,122,101) in 1990, an average annual growth rate of 3.5 percent. All East Valley communities witnessed rapid population growth during the 1980s, particularly during the last half of the decade when the Valley was the fastest growing portion of Maricopa County (Maricopa Association of Governments, 1992a). Compounded annual rates of population growth for key area communities from 1980 to 1990 were as follows:

- Chandler, 20.5 percent
- Gilbert, 17.7 percent
- Mesa, 6.6 percent
- Phoenix, 2.2 percent
- Queen Creek, 6.8 percent
- Tempe, 2.9 percent
- Apache Junction, 6.2 percent.

The population of Gilbert more than quintupled between 1980 and 1990 and led the state in percent growth of population. The population of Chandler tripled and Apache Junction nearly doubled during the same decade. The ROI is projected to continue to grow (Maricopa Association of Governments, 1992a) through 1995 to an estimated population of 2,434,900. Based on the 1990 Census, communities in the East Valley had the following populations in April 1990: Chandler 90,533, Gilbert 29,188, Mesa 288,091, Queen Creek 2,667, Tempe 141,865, and Apache Junction 18,100. The City of Phoenix, based on the 1990 Census, had a population of 983,403.

The following details the military population profile of Williams AFB:

Military Population on Williams AFB	1990	1991
Active Duty Permanent	1,495	1,680
Students	490	296
Military Dependents	4,258	3,745
Total Military-Related Population	6,243	5,721

Source: U.S. Air Force, 1990; 1991g.

The total military-related population associated with Williams AFB decreased by 522 between fiscal years 1990 and 1991. Between 1988 and 1991, the total military-related population, including all military personnel and their dependents, decreased by 3,111 persons. In 1991, an additional 21,499 military retirees resided in communities near the base, an increase of 444 from the fiscal year 1990 total of 21,055 (U.S. Air Force, 1990; 1991g).

The ROI has become less dependent on military jobs since 1970. Two factors have contributed to the decline in the ROI's share of military employment. First, civilian jobs (nonmilitary jobs which include both private and civilian jobs within federal, state, and local governments) increased substantially from 408,000 in 1970 to 1,198,000 in 1990, or an average annual gain of 9.7 percent per year (U.S. Bureau of Economic Analysis, 1992a). Second, military jobs increased only slightly from 14,000 in 1970 to just 15,000 in 1990, for an average rise of only 0.4 percent annually.

In 1990, there were an estimated 230,849 wage and salary jobs in the East Valley (Maricopa Association of Governments, 1992b). The largest employers in the East Valley (with at least 1,000 jobs at each organization) are Williams AFB, Motorola, McDonnell Douglas Helicopter, Intel, Desert Samaritan, and Garrett Fluid Systems (Maricopa Association of Governments, 1992a). A detailed analysis of socioeconomic conditions and potential impacts of the Proposed Action and alternatives is provided in the Socioeconomic Impact Analysis Study which is being prepared to assist the local community to evaluate projected impacts.

As with many facets of Maricopa County, housing growth increased dramatically during the 1980s. The most rapid housing growth in Maricopa County occurred in the East Valley. The number of housing units in southeast Maricopa County tripled between 1982 and 1991 in response to an increase in demand. Similarly, the number of units constructed in the east Mesa/Apache Junction area more than doubled over the same period (Arizona Real Estate Center, undated). The 1990 total housing vacancy rate for the ROI was 15.2 percent. The vacancy rates for owner-occupied

property ranged from 6.9 percent in Apache Junction to 2.5 percent in Chandler while the rates for Mesa and Phoenix were 4.0 and 3.6, respectively. The vacancy rates for renter-occupied property ranged from 38.5 percent in Apache Junction to 6.1 percent in Queen Creek (U.S. Bureau of the Census, 1991).

3.2.2 Land Use and Aesthetics

This section describes the land uses and aesthetics for the base property and the surrounding areas of Williams AFB at base closure. Projected land uses at closure were assumed to be similar to existing land uses in the vicinity of the base unless specific development plans project a change. The ROI includes the base property and potentially affected adjacent properties that are within the jurisdiction of the City of Mesa, the towns of Gilbert and Queen Creek, portions of Maricopa County, and portions of Pinal County.

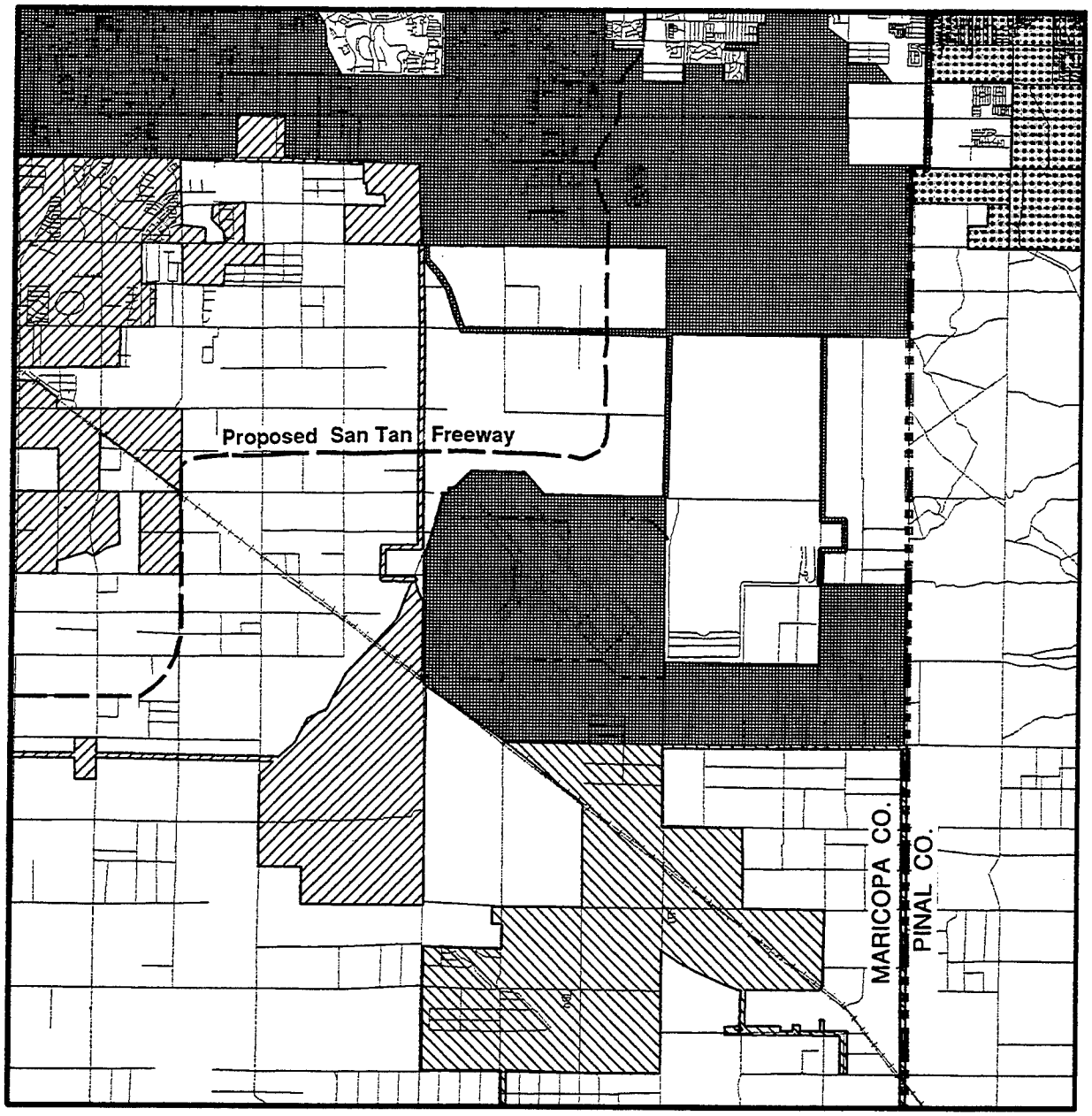
Williams AFB is owned by the U.S. Government. The base lies within the jurisdictional boundaries of the City of Mesa (Figure 3.2-3). The City of Mesa regulates planning, zoning, and subdivision control. The base is not currently subject to the jurisdictional requirements of state or local governments but would be under the jurisdiction of the City of Mesa in the event that the base is transferred to a non-federal entity.

Williams AFB adjoins the towns of Gilbert and Queen Creek. Gilbert is located to the west of Williams AFB; Queen Creek is located to the south of the base. These communities regulate planning, zoning, and subdivision control within their respective boundaries and have municipal planning area boundaries outside the town limits. Municipal Planning Area (MPA) boundaries are those areas of land that are currently under the jurisdiction of Maricopa County but are surrounded by strip annexations under the control of a designated municipality (Barnard Dunkelberg & Company and Mestre Greve Associates, 1988). Other unincorporated properties adjacent to the base are under the jurisdiction of Maricopa County, which regulates zoning and subdivision control.

3.2.2.1 Land Use

Land Use Plans and Regulations. The general plan for a jurisdiction represents the official position on long-range development and resource management. The position is expressed in goals, policies, plans, and actions regarding the physical, social, and economic environments, both now and in the long-term.

The base lies within the City of Mesa, while the towns of Gilbert and Queen Creek and Maricopa County have jurisdiction over the lands adjacent to the base (Figure 3.2-3). Each of these jurisdictions has a general plan.



EXPLANATION

- Town of Apache Junction
- Town of Gilbert
- Town of Queen Creek
- City of Mesa
- Maricopa/Pinal County
- Base Boundary
- County Boundary

0 1/2 1 2 Miles

City and Town Boundaries

Figure 3.2-3

The *Mesa General Plan* (City of Mesa, 1988), adopted in December of 1988, classifies Williams AFB under a Public/Semi-public land use category. Lands surrounding the base within the Mesa MPA are designated for general industrial, commerce park, and park/open space uses.

The *Town of Gilbert General Plan* Land Use Map (Town of Gilbert, 1986), adopted in August 1986 and revised in May 1989, shows land within the Gilbert MPA in the ROI for Williams AFB designated for industrial and commercial uses and low- to medium-density residential uses. Of particular note is an area of one-square-mile bounded by Guadalupe Road and Elliot Road to the north and south, and by Recker Road and Higley Road to the east and west, which is planned for low-density residential uses (0-2 dwellings per acre) and is located beneath the DNL 70 and 75 dB noise contours for the base. The area is within the MPA for the Town of Gilbert but is currently within unincorporated Maricopa County.

The *Town of Queen Creek General Plan, 1990-2010* (Town of Queen Creek, 1990a), adopted in September 1989 when Queen Creek was first incorporated, designates lands within the Queen Creek MPA in the ROI for Williams AFB for a wide range of activities, including low- and medium-density residences, offices, light industry, and manufacturing.

The East Mesa and Queen Creek Planning Areas of the Maricopa County Land Use Plan, which were revised in February 1992, (Maricopa County, 1992a; Maricopa County Board of Supervisors, 1992), designates lands within the ROI for industrial uses, mixed use centers, and suburban residential uses (0-2 dwellings per acre). Mixed use centers are areas earmarked for location of major employment centers with permitted uses such as offices, light industrial parks, postsecondary educational facilities, hospitals, and major medical facilities. An apparent conflict now exists between the East Mesa Planning Area and the *Town of Gilbert General Plan* regarding the one-mile-square area within the planning area of Gilbert that is designated for low- density residential uses but is designated for a combination mixed use center and suburban residential area in the East Mesa Plan.

The *Pinal County Comprehensive Plan* adopted in 1992 (Pinal County, 1992) designates land within the ROI for low-density rural community uses. More specific land uses are not yet available, however, pending completion of planning efforts within the county.

With the exception of the area previously noted within the unincorporated area of Maricopa County and the Gilbert MPA, lands that lie beneath the existing noise contours determined by the *Eastside Joint Land Use Study* (Barnard Dunkleberg and Company and Mestre Greve Associates, 1988) generally have planning classifications that would minimize land use and noise conflicts with military airfield uses at Williams AFB. If those flight

patterns and attendant noise impacts are no longer present after closure, it will not be necessary to maintain planning designations consistent with the present noise contours within the ROI. Those land use classifications will remain, however, until formally revised by the appropriate jurisdiction with regulatory authority.

Zoning. Basically, zoning provides for the division of the jurisdiction, in conformity with the general plan, into districts within which the height, open space, building coverage, density, and type of future land uses are set forth. Zoning is designated to achieve various community development goals, including base reuse plans. Figure 3.2-4 depicts the local zoning classifications in the vicinity of Williams AFB.

The land adjacent to the base is zoned primarily for residential and agricultural uses, with small components of commercial and industrial activities.

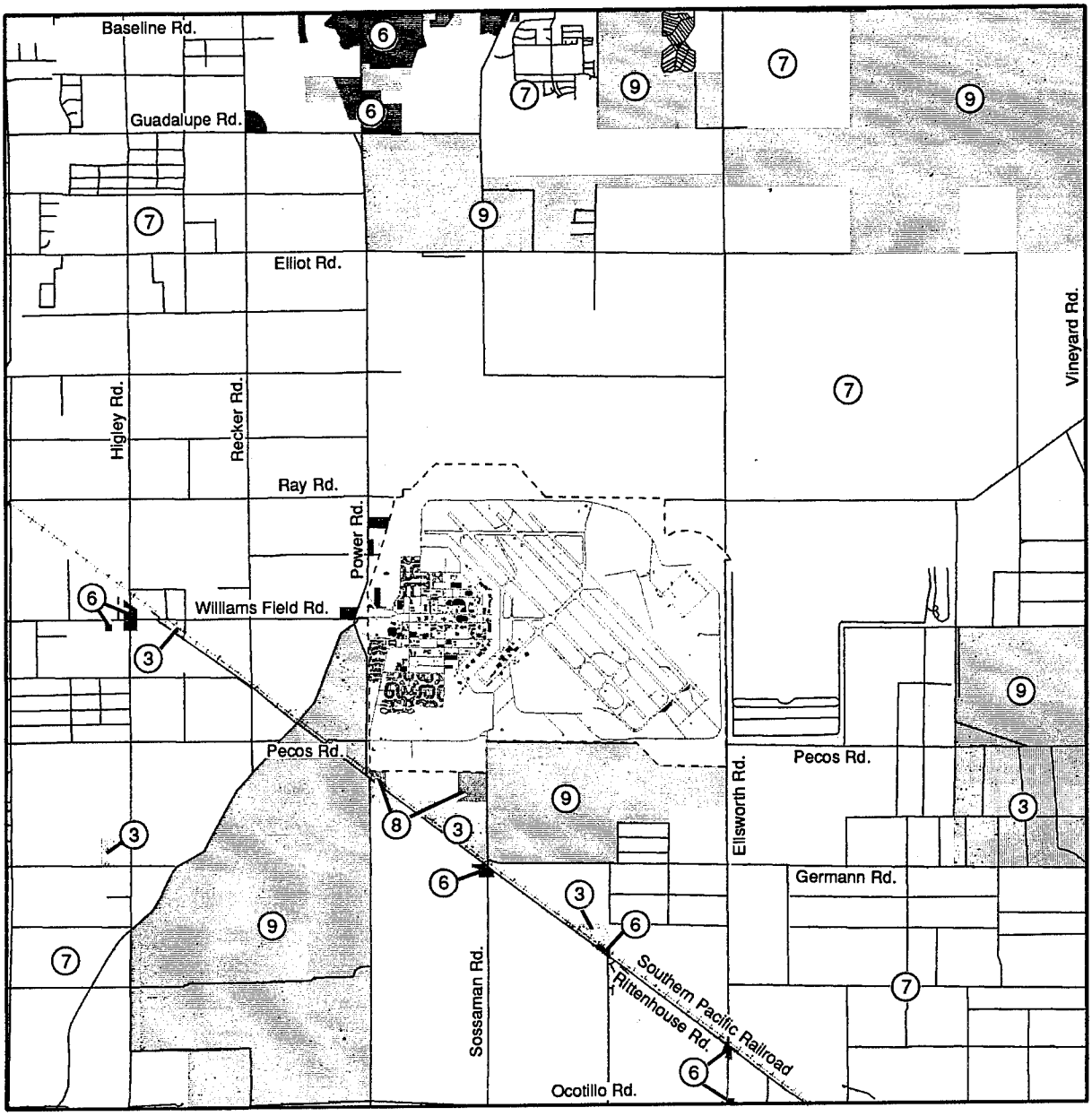
To the north of the base, the City of Mesa has zoned areas within its jurisdiction, located north of Elliot Road, for agricultural, commercial, and rural low-density residential uses. Closer to the base, rural low-density residential zoning predominates (City of Mesa, 1991a; 1991b).

To the east of the base, existing zoning for lands within unincorporated Maricopa County and unincorporated Pinal County are zoned for agriculture and low-density residential uses. In addition, one section of land east of the base on the south side of Pecos Road is zoned for industrial uses (Maricopa County, 1991, 1992b; Pinal County, 1991).

To the south of the base, areas within the jurisdiction of the City of Mesa include small areas zoned for industrial use. Areas under jurisdiction of the Town of Queen Creek and within the ROI for Williams AFB, located south of Germann Road, are zoned for low-density residential uses, with intermittent industrial and commercial parcels closer to the town center (Town of Queen Creek, 1990b; 1990c).

To the west of the base, existing zoning for lands within the jurisdiction of the Town of Gilbert, located on the west side of Power Road, is for agricultural and low- and medium-density residential uses. One additional area located on the south side of Baseline Road is zoned for commercial and high-density residential activities (Town of Gilbert, 1988; 1991).

Remaining properties within the ROI for Williams AFB, located outside a municipality and within the jurisdiction of Maricopa County, are also within an MPA for Mesa, Gilbert, or Queen Creek. Existing zoning for these remaining areas is for low-density residential uses, with pockets of industrial, commercial, and mixed uses (Maricopa County, 1991; 1992b).



EXPLANATION

- (1) Airfield *
- (2) Aviation Support *
- (3) Industrial
- (4) Institutional (Medical) *
- (5) Institutional (Educational) *
- (6) Commercial
- (7) Residential
- (8) Public/Recreation
- (9) Agriculture
- (10) Vacant Land *
- (11) Forestry *
- Not Zoned *
- ----- Base Boundary

0 3750 7500 Feet

* Not Applicable

Local Zoning

Figure 3.2-4

On-Base Land Use. Land use identifies the present land usage by various general categories. Existing (preclosure) land uses on the base property are described in this section.

Williams AFB continued to provide base support for the 82nd Flying Training Wing, which was responsible for undergraduate pilot training, until base closure. Major tenant units located on-base included the Air Force Human Resources Laboratory (AFHRL), the Air Force Office of Special Investigations (AFOSI), the Arizona Air National Guard (ANG) 111th Air Traffic Control Flight (ATCF), the Defense Commissary Agency (DCA), and the Army and Air Force Exchange Service (AAFES). In addition, the Arizona ANG 161st Air Refueling Group (AREFG) has a Host-Tenant Support Agreement with Williams AFB to perform KC-135 training exercises. The 111th ATCF is a unit of the 161st AREFG.

The base originally consisted of 2,614 acres when ownership was conveyed from the City of Mesa to the Air Force. The base has since expanded its holdings in fee through contiguous property acquisition, and acquisition of 160 acres from the Bureau of Land Management (BLM) through Public Land Order withdrawals, resulting in a total of approximately 4,042 acres. In addition, a total of 79 acres are under lease to the Air Force on two parcels located adjacent to the eastern boundary of the base. Both parcels are vacant; the northern parcel was required to maintain a blast radius surrounding an ordnance area, and the southern parcel was required to maintain portions of a clear zone and accident potential zone for Runway 12L/30R.

The base property includes the following general land uses:

Land Use	Acreage
Airfield	1,817
Aviation Support	154
Industrial	181
Institutional (Medical)	19
Institutional (Education)	21
Commercial	67
Residential	223
Public/Recreation	238
Vacant Land	1,322
Total	4,042

The land uses for Williams AFB are shown in Figure 3.2-5. The following briefly describes on-base land use categories.

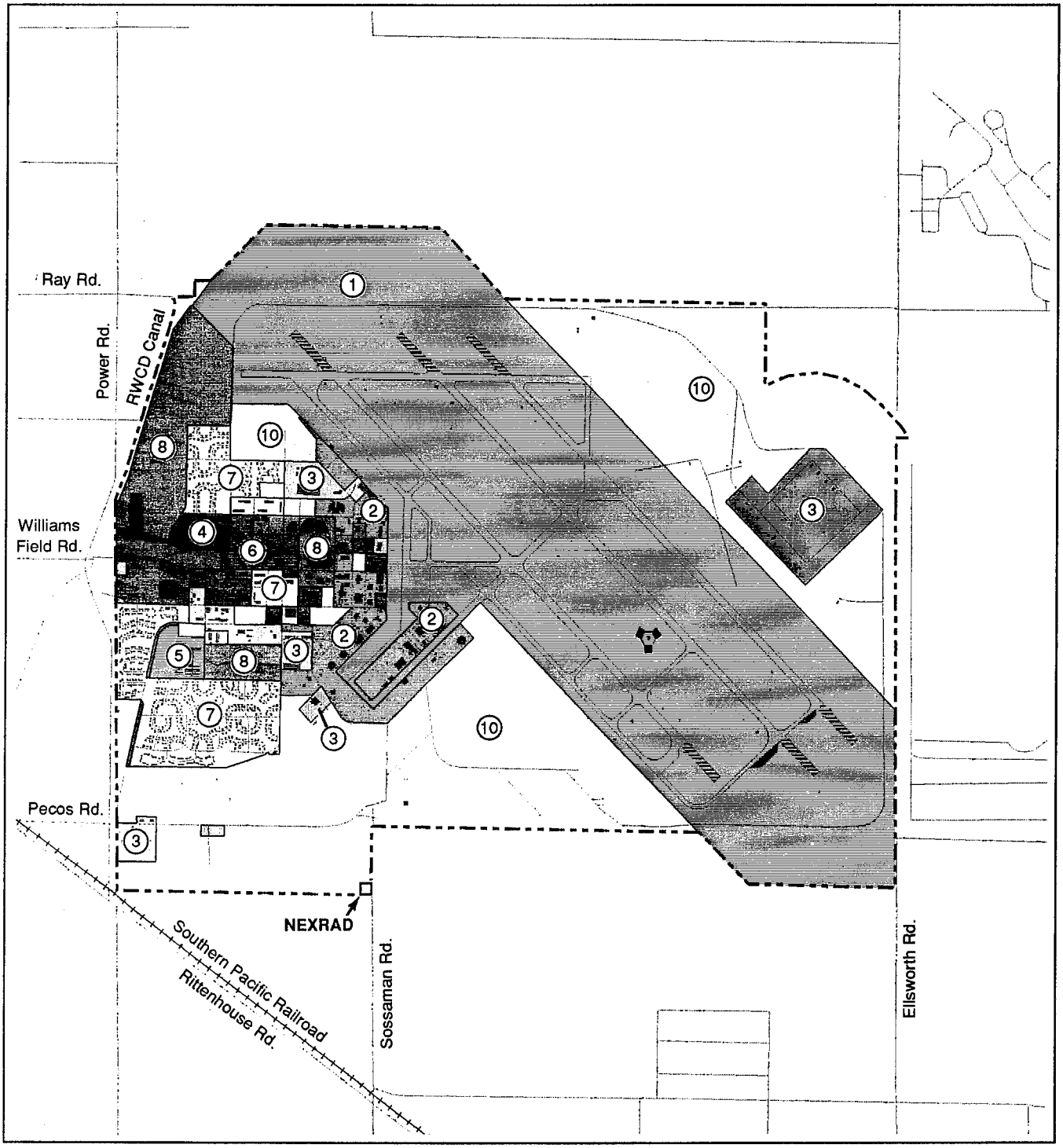
The **Airfield** land use at Williams AFB consists of three runways, associated taxiways, aprons, and air navigational facilities. The westernmost runway, 12R/30L, has a length and width of 10,400 and 150 feet, respectively. The middle runway, 12C/30C, has a length and width of 10,200 feet and 150 feet, respectively. The easternmost runway, 12L/30R, has a length and width of 9,300 and 150 feet, respectively. Overrun areas consisting of 1,000 feet of pavement are located at each end of the three runways. An instrument landing system (ILS) and a non-precision instrument landing system (TACAN) serve the middle runway (12C/30C) with the instrument approach available to runway 30C (EDAW et al., 1992b).

The **Aviation Support** areas can be divided into those uses that are flight line facilities and those that are associated with training facilities. Both functions are located around the perimeter of the runway aprons. Flight line facilities are aircraft repair and maintenance facilities; buildings include five maintenance hangars, several maintenance shops, two aircraft corrosion control facilities, a jet engine shop, an avionics shop, and a support warehouse. Other facilities include the control tower, aircraft refueling system, fuel storage tanks, trim pads, test stands, and aircraft washracks. Most of these facilities are in good to excellent condition (EDAW et al., 1992b).

Pilot training facilities for the four training squadrons consist of three training buildings which are located along the north and middle aprons, as well as a flight training classroom, a visual information learning center, and a flight simulation training center which are located back from the apron areas. These facilities are generally in good to excellent condition (EDAW et al., 1992b).

In addition to the facilities listed above, the AFHRL (also known as Armstrong Laboratories) occupies a block of ten buildings near the southern end of the middle apron, located in the block bounded by Second, D, Fourth, and B streets. It provides research and development in flight training efficiency and effectiveness. Several of these buildings are in good condition, while others are in need of renovation (EDAW et al., 1992b).

The **Industrial** area of the base is generally located to the south of the central core of the base and on the eastern side of the main base, adjacent to the flight line and apron areas. Industrial uses include warehousing, storage and distribution, and vehicle and other maintenance shops (EDAW et al., 1992b).



EXPLANATION

- (1) Airfield
- (2) Aviation Support
- (3) Industrial
- (4) Institutional (Medical)
- (5) Institutional (Education)
- (6) Commercial
- (7) Residential
- (8) Public/Recreation
- (9) Agriculture *
- (10) Vacant Land
- (11) Military Land *
- Runway Overrun
- Willie VORTAC
- Base Boundary

0 750 1500 3000 Feet

* Not Applicable

Existing On-Base Land Use

Figure 3.2-5

Institutional (Medical) facilities include the base hospital which is a 45-bed facility complete with two operating rooms, an obstetrics clinic, and a dental wing composed of seven examination rooms. The hospital is located in the northwest section of the main base area. These facilities are in good to excellent condition.

Institutional (Education) facilities include the Accommodation Elementary School which occupies 21 acres located adjacent to the South and West Desert Village Housing Areas. The school is operated by the Maricopa County School District for students who are children of active duty military personnel and employees of the base and has an enrollment of approximately 420 students (Arizona Department of Education, 1991; Whelihan, 1992).

Commercial areas are generally located in the central core area of the main base. Primary office and administrative facilities include the Consolidated Support Facility, the Wing Headquarters Building, Base Operations Building, and the Civil Engineering Administrative Facility. These buildings are generally in good condition (EDAW et al., 1992b). Retail commercial uses include the base commissary, base exchange, shoppette, and service station.

The **Residential** areas at Williams AFB include 700 single- and duplex-family housing units, 308 dormitory rooms, and 40 units of temporary lodging facilities.

The Williams AFB **family housing** (accompanied housing) areas consist of 204 acres located north, south, and west of the base's central core area. The housing consists of 700 family units that were constructed during 1952 and 1972. Specifically, the housing is composed of the North, South, and West Desert Village housing areas. The North Desert Village housing area, located to the north of the central core area, was constructed in 1952 and consists of 152 single-family homes with two, three, four, or five bedrooms. The development is in good condition. The South Desert Village housing area, located to the south of the central core area, was constructed in 1952 and is comprised of 390 homes having two, three, or four bedrooms. These units are also in good condition. The West Desert Village housing area, located just to the southwest of the central core area of the main base, was constructed in 1972. This residential development is composed of 158 two-bedroom homes with every two housing units sharing a common carport. These homes are in excellent condition (EDAW et al., 1992b).

There are 308 units of **dormitory rooms** and 40 units of **temporary lodging facilities** primarily located in the central core area, while other smaller blocks are located to the north and south of the central core of the main base. This unaccompanied housing consists of the Airman's Dormitories, Visiting Officer Quarters, Officer Quarters, and Temporary Lodging Facilities.

Generally, the Airman's Dormitories and the Visiting Officer Quarters are in good condition while the Officer Quarters and the Temporary Lodging Facilities, for enlisted personnel, are in worse condition and in need of renovation (EDAW et al., 1992b).

Public/Recreation areas include an 18-hole base golf course which is located in the northwest corner of the main base area. It is a 125-acre course with a club house, pro shop, and driving range. Other outdoor recreational facilities include two parks complete with play areas for children, two outdoor swimming pools, five tennis courts, a four-lane running track, and six softball fields. The vast majority of these recreational facilities are in good to excellent condition.

The major indoor recreational facilities include two Youth Centers, a Bowling Center, Base Gymnasium, Recreation Center, Arts and Crafts Center, and a Base Theater. These facilities are located in or near the central core area of the base. The Recreation Center and the main Youth Center are in good to excellent condition, while the majority of the remaining facilities are in need of renovation (EDAW et al., 1992b).

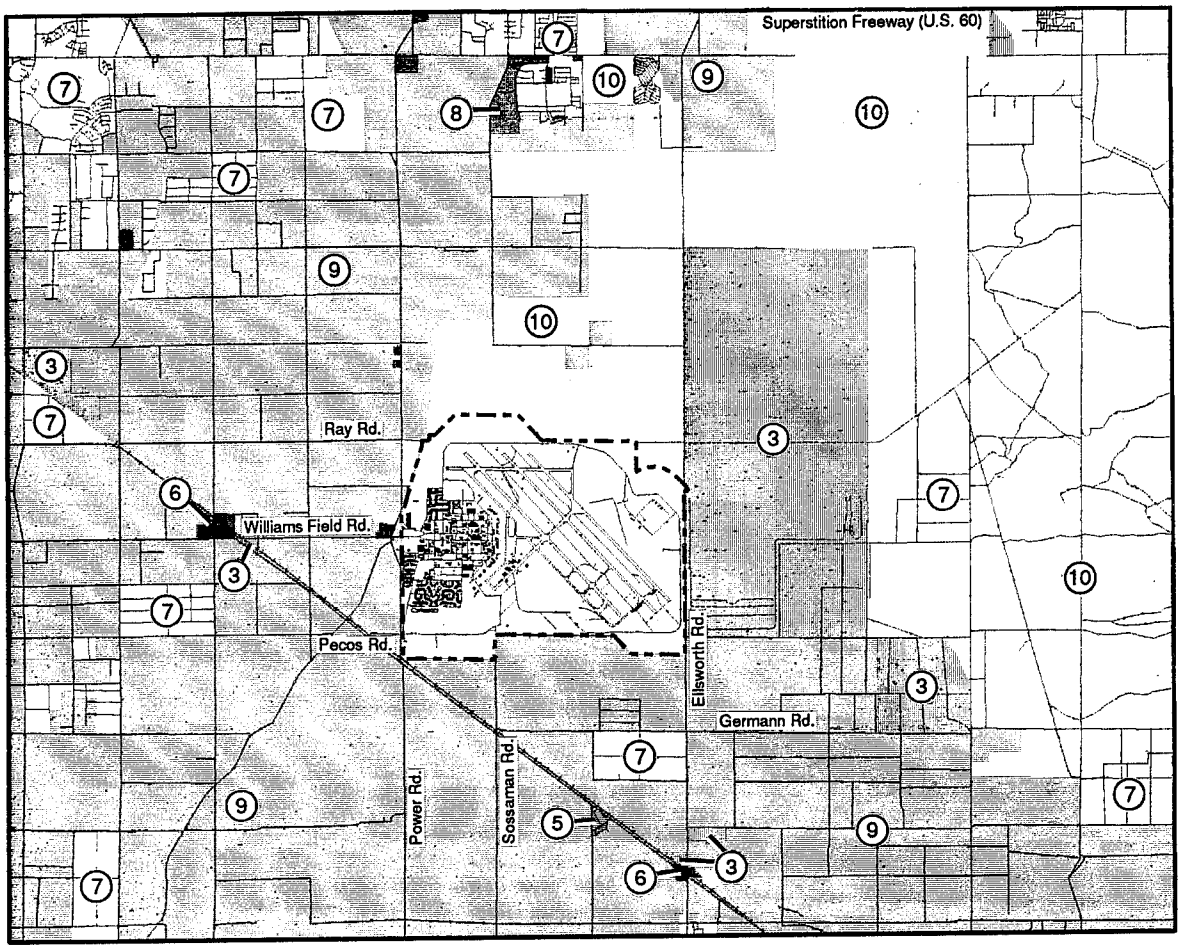
Vacant areas comprise the existing undeveloped areas at Williams AFB. These areas are located primarily in the northeast corner of the base surrounding the ordnance area and the northeast side of the airfield, and on the south side of the base below the South Desert Village Housing Area and the flight line facilities.

Adjacent Land Use. Land use may or may not conform with zoning. The existing land uses in the immediate vicinity of the base are discussed in this section.

Williams AFB is adjacent to lands within the City of Mesa to the north and south, the Town of Gilbert to the west, the Town of Queen Creek to the south, and Maricopa County lands in all directions. Figure 3.2-6 depicts land uses of the developed areas in the vicinity of Williams AFB.

The boundaries of the City of Mesa extend south of the Superstition Freeway in a patchwork configuration of parcels and annexation strips including Williams AFB. The total acreage south of the Superstition Freeway that is within the jurisdiction of the City of Mesa is approximately 24,650 acres. Existing development is sparse, consisting of scattered residences and agricultural activities.

Lands within the jurisdiction of the Town of Gilbert are located on the west side of the base (on the west side of Power Road). As with the City of Mesa, the boundaries of the Town of Gilbert comprise a patchwork of parcels and annexation strips which constitute a total of 9,620 acres within the ROI.



EXPLANATION

- (1) Airfield *
- (2) Aviation Support *
- (3) Industrial
- (4) Institutional (Medical) *
- (5) Institutional (Education)
- (6) Commercial
- (7) Residential
- (8) Public/Recreation
- (9) Agriculture
- (10) Vacant Land
- (11) Military Land *
- Base Boundary

0 1 2 Miles

* Not Applicable

Existing Off-Base Land Use

Figure 3.2-6

Properties which lie within the Town of Queen Creek are located south of the base, south of Germann Road. The town consists of 7,090 acres and is characterized by agricultural uses and low-density residential development supported by a small town center with low-rise office and commercial development and municipal buildings.

Remaining lands that are not within a municipality fall under the jurisdiction of the East Mesa and Queen Creek Planning Areas for Maricopa County. However, all of the properties within the ROI for Williams AFB that are currently under Maricopa County jurisdiction are also within an MPA for Mesa, Gilbert, or Queen Creek. Existing development is limited to low-density residential and agricultural uses, with the exception of a multifamily apartment development and strip commercial center located on the west side of Power Road opposite the base and the General Motors Proving Ground on the east side of Ellsworth Road.

The Air Force outgrants a number of leases, easements, and licenses to other agencies for use of base property. These include roadways, utilities, services, and work space in base facilities (Table 3.2-1). These outgrants are not graphically depicted as most of them pertain to areas and facilities which are either too diffuse or too small such that they could not be meaningfully resolved at the map scales in this section. However, the location of the National Weather Service's NEXRAD weather radar facility is shown on Figure 3.2-5.

Air Force Policies Affecting Adjacent Land Uses. The Air Force has developed the Air Installation Compatible Use Zone (AICUZ) program to minimize development that is incompatible with aviation operations in areas on and adjacent to military airfields. The AICUZ land use recommendations are based on (1) land uses compatible with exposure to aircraft noise and (2) safety considerations. Recommended compatible land uses are derived from data on noise contours (noise zones) and safety zones (accident potential zones [APZs]). These zones are delineated specifically for each base, using operational information derived from the base mission. Municipalities with jurisdiction over adjacent lands may zone this land in accordance with AICUZ recommendations, but they are not required to do so. An AICUZ report for Williams AFB was issued in 1984 and was revalidated in 1991 prior to the base closure announcement (U.S. Air Force, 1984; Adams, 1991). ATC Headquarters granted a permanent waiver to Williams AFB in 1992 for submitting a revised AICUZ study due to base closure (Voorhees, 1992).

AICUZ noise contours are based on standard noise ratings that are calculated from types of aircraft, number of daily aircraft operations, time of day flown, aircraft flight patterns, power settings, air speeds, altitudes, and climatic conditions (U.S. Air Force, 1984). A day-night average sound level

Table 3.2-1. Inventory of Easement Agreements, Licenses, Permits, and Leases in Effect at Base Closure

Document Number	Expiration Date	Description/Location	Responsible Party
DACA09288452	*	Install Water Pipeline (CAP)	Bureau of Reclamation
ATCWIL-289030	06/19/1994	Operate and Maintain Test Track	General Motors Corporation
DA04353ENG6038	01/17/2006	Construct and Maintain Fuel Pipeline	Southern Pacific Pipeline
DA04353ENG6847	12/19/2027	Gas Lines	Southwest Gas Corporation
DA04353ENG6852	*	Operate and Maintain Electric Trans. Line	Salt River Project
DA04353ENG6853	*	Operate and Maintain Electric Trans. Line	Salt River Project
DACA09267196	*	Maintain Ellsworth Road	Maricopa County Highway Dept.
DACA0926762	*	Constr. and Maintain Flood Control Dikes	Maricopa County FCD
DACA0926763	*	Constr. and Maintain Flood Control Dikes	Maricopa County FCD
DACA09285155	*	Constr. and Operate Flood Channel (#4)	Maricopa County FCD
DACA09287391	04/23/2012	Construct and Maintain Fuel Tank	Southern Pacific Pipeline
WIL-91-NEXRAD	12/31/2015	Constr. and Operate NEXRAD Facility	National Weather Service

*Outgrant is for an indefinite period of time.

Sources: U.S. Air Force, 1991k; Stark, 1992.

(DNL) is used to describe the noise environment. Noise contours for preclosure conditions at Williams AFB are presented and discussed in Section 3.4.4. A total of 17,114 acres were exposed to aircraft noise levels of DNL 65 decibels (dB) and above. Within the DNL 65 dB contour, 6,139 acres are in Mesa, 281 acres are in Gilbert, 139 acres are in Queen Creek, 10,555 acres are in Maricopa County. The areas of unincorporated Maricopa County, Mesa, Gilbert, and Queen Creek most affected by noise are zoned for low-density residential and agriculture uses, with small areas zoned for commercial or industrial activities.

The AICUZ delineates areas at both ends of the runway where the probability of aircraft accidents is highest, based on the locations of past aircraft accidents at various bases. The risk of accidents is so high in the area at the immediate end of the runway (known as the clear zone) that the Air Force has a program to acquire easements to preclude most land uses. Certain land use restrictions are recommended in lower risk areas, identified as APZ I and APZ II.

At Williams AFB, properties within the clear zone (CZ) are vacant and are either owned in fee by the Air Force or contain perpetual easements. Industrial, agricultural, recreation, and vacant land uses are compatible with APZ I, but residential and other high population density land uses are discouraged. Agricultural and vacant land uses are present at Williams AFB within APZ I. There are no single-family residential units within APZ I. Low intensity residential and non-residential uses (maximum of 20 percent building coverage per acre) are compatible with APZ II, in addition to those uses listed for APZ I. At Williams AFB, there are 19 single-family residential units within APZ II.

The AICUZ program applies only to military airfields. Similar criteria are established by the FAA for civilian airports. After the closure of Williams AFB, FAA criteria will apply if airport activities are continued.

Eastside Joint Land Use Study. The *Eastside Joint Land Use Study* is a noise exposure and land use compatibility study for the area around Williams AFB, which was funded jointly by the Department of Defense (DOD), the local jurisdictions, and the State of Arizona. The study, issued in 1988, attempted to accommodate the development needs of the local jurisdictions surrounding the base while preserving the military mission of Williams AFB (Barnard Dunkelberg and Company and Mestre Greve Associates, 1988). Noise contours plotted for the study included the DNL 60 dB contour while the AICUZ noise contours began with the DNL 65 dB contour. The City of Mesa, Maricopa County, Town of Queen Creek, and Pinal County revised their zoning maps and ordinances in accordance with the *Eastside Joint Land Use Study* rather than the AICUZ; however, the differences in the noise contours were not deemed significant in terms of compatible development. Williams AFB supports the *Eastside Joint Land Use Study* as

a local planning tool, while the AICUZ remains the official DOD noise descriptor (U.S. Air Force, 1991h).

Maricopa County, Pinal County, the City of Mesa, and the Town of Queen Creek govern land use restrictions for properties subject to noise and accident potential impacts through zoning. Airport noise overlay districts guide and restrict permitted land uses beneath noise contours emanating from airport land uses. Lands subject to airport noise overlay districts vary in the level of land use restrictions which are dependent upon the increase in intensity of noise impacts and proximity to the base.

Closure Baseline. Under baseline conditions, Williams AFB would be closed and military airfield operations would be terminated, removing all land use conflicts and constraints associated with the AICUZ. Land use designations contained in the zoning ordinances and general plans of affected jurisdictions presumably would remain in effect, however, until repealed or modified.

3.2.2.2 Aesthetics. Visual resources include natural and man-made features that give a particular environment its aesthetic qualities. Criteria used in the analysis of these resources include visual sensitivity, which is the degree of public interest in a visual resource and concern over adverse changes in its quality. Visual sensitivity is categorized in terms of high, medium, or low levels.

High visual sensitivity exists in areas where views are rare, unique, or in other ways special, such as in remote or pristine environments. High-sensitivity views would include landscapes that have landforms, vegetative patterns, water bodies, or rock formations of unusual or outstanding quality.

Medium visual sensitivity areas are more developed than those of high-sensitivity. Human influence is more apparent in these areas and the presence of motorized vehicles and other evidence of modern civilization is commonplace. These landscapes generally have features containing varieties in form, line, color, and texture, but tend to be more common than high visual sensitivity areas.

Low visual sensitivity areas tend to have minimal landscape features, with little change in form, line, color, and texture.

Few portions of Williams AFB are readily visible from off-base. The west side of the base, where the golf course and the main gates to the base entrance are located, are visible from Power Road. The east side of the base is visible from Ellsworth Road. Areas of medium visual sensitivity on Williams AFB include the golf course and the main avenues providing ingress and egress through the base from Williams Field Road. Views of these areas

have been enhanced through provision of a well-kept, campus-like atmosphere with mature landscaping.

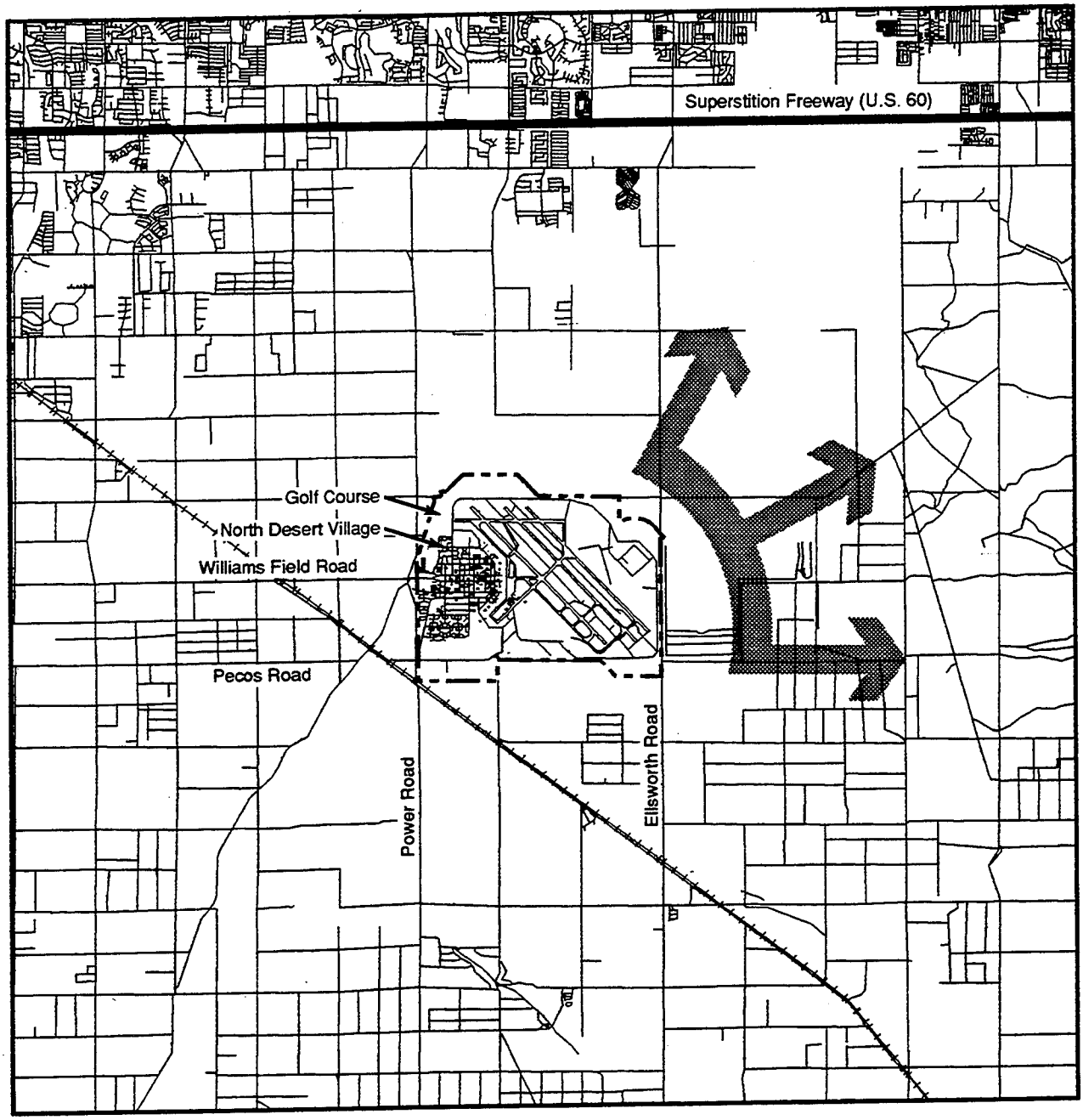
Residential areas, particularly North Desert Village, located on the east side of the golf course, also provide views with medium visual sensitivity. Open space areas surrounding the housing units create a pleasing appearance, enhanced by maintenance of mature landscaping, with many areas highlighted with drought resistant and desert landscape projects.

Lands adjacent to and surrounding the base are primarily desert areas of low visual sensitivity. However, most areas of the base are afforded excellent views of the Superstition Mountains, located northeast of the base on the east side of Apache Junction (Figure 3.2.7). Views of the Superstition Mountains are of high visual sensitivity due to its remote and pristine appearance within the desert environment.

3.2.3 Transportation

Transportation addresses roadways, airspace and air transportation, and railroads. The ROI for the transportation analysis includes the existing principal road, air, and rail networks in the Phoenix MSA with emphasis on the immediate area surrounding Williams AFB. Within this geographic area, the analysis focuses on the segments of the transportation networks that serve as direct or necessary indirect linkages to the base and those that are commonly used by Williams AFB personnel.

3.2.3.1 Roadways. The evaluation of the existing streets and highways focuses on capacity analysis, a set of procedures used to estimate the traffic-carrying ability of a street or highway. This analysis depends on the physical features of the roadway such as lane width, number of lanes, intersection control, and the volume and speed of traffic. Operational criteria are defined using levels of service (LOS). Ranges of operating conditions are defined for each type of facility and are related to amounts of traffic that can be accommodated at each level. The concept of LOS is defined as a qualitative measure describing operational conditions within a traffic stream and their perception by motorists and/or passengers. An LOS definition generally describes these conditions in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience, and safety. LOS is given a letter designation from A to F, with LOS A representing the best operating conditions and LOS F the worst. LOS is defined based on one or more operational parameters that best describe operating quality for each type of facility. The parameters selected to define LOS for each facility type are called measures of effectiveness and



EXPLANATION

- Base Boundary
- Scenic Vista, Superstition Mountains

High Visual Sensitivity Map

0 1/2 1 2 Miles

Figure 3.2-7

represent those available measures that best describe the quality of operation on each facility type.

LOS is often defined by secondary measures, the most common being a range of volume-capacity ratios. The values are useful indicators in determining the extent to which the roadway segment is used and in assessing the potential for congestion and other problems.

Traffic flow conditions usually are most congested during morning and evening peak-hours, and depend on the type of roadway, the physical characteristics of the roadway, traffic volumes, and the vehicular mix of traffic. Travel on two-lane rural highways is affected substantially by traffic in the opposing lane and by curves and hills, all of which impair a motorist's ability to pass safely. By contrast, each lane of an interstate highway (divided, with restricted access) provides a wide range of conditions and is less influenced by opposing traffic, curves, and hills. In urban or suburban settings, the capacity of signalized intersections that restrict traffic flow influences LOS more than the capacity of a roadway segment. LOS ratings presented in the remainder of this section are defined by the secondary measure of volume-capacity ratios as given in Table 3.2-2 based on the Highway Capacity Manual (HCM) except for intersection LOS which use the method described in the next paragraph (Highway Research Board, 1965; Transportation Research Board, 1985).

To establish LOS for specific intersections of concern on-base, the following method for unsignalized intersections was used according to the 1985 HCM. Hourly volumes at the intersections were determined by trip generation of on-base activities and distribution of the trips so that the principal network traffic balances. Conflicting flows were calculated for traffic movements of concern. Special attention was given to this calculation since one of the intersecting roads was always one-way. The critical gaps were determined from Table 10-2 in the HCM along with potential capacities from Figure 10-3 knowing the critical gaps and the conflicting traffic streams. After adjustments, reserve capacities were determined from the difference of capacities and volumes. Reserve capacities correspond directly to LOS.

LOS for specific intersections of concern off-base were provided by the Maricopa Association of Governments (MAG). MAG used the Transportation Research Board's Circular 212 in determining intersection LOS. This method predates the 1985 HCM. It is based on critical lane volumes and assumes a constant 15 percent left-turns (Bresnahan, 1992b).

Table 3.2-2. Road Transportation Levels of Service

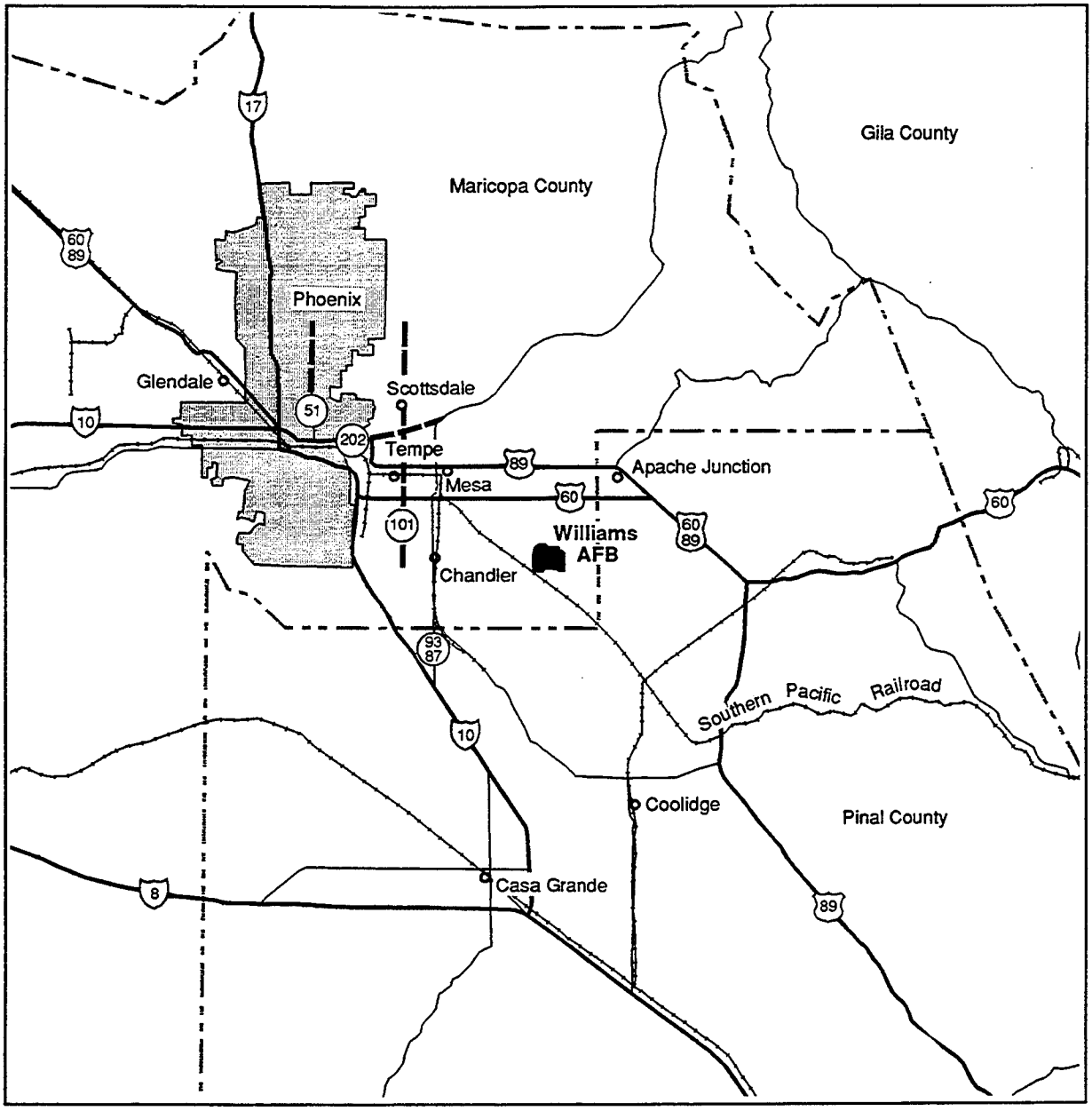
LOS	Description	Criteria (Volume/Capacity)	
		Freeway	Arterial
A	Free flow with users unaffected by presence of other users of roadway	0-0.35	0-0.60
B	Stable flow, but presence of the users in traffic stream becomes noticeable	0.36-0.54	0.61-0.70
C	Stable flow, but operation of single users becomes affected by interactions with others in traffic stream	0.55-0.77	0.71-0.80
D	High density, but stable flow; speed and freedom of movement are severely restricted; poor level of comfort and convenience	0.78-0.93	0.81-0.90
E	Unstable flow; operating conditions at capacity with reduced speeds, maneuvering difficulty, and extremely poor levels of comfort and convenience	0.94-1.00	0.91-1.00
F	Forced or breakdown flow with traffic demand exceeding capacity; unstable stop-and-go traffic	>1.00	>1.00

Sources: Highway Research Board, 1965; Transportation Research Board, 1985.

Existing roads and highways within the ROI are described at three levels: (1) regional, representing the major links within the Phoenix MSA; (2) local, representing key community roads; and (3) on-base roads.

Regional. Regional highways, representing the major links within the Phoenix MSA include: I-10, I-17, U.S. 89, State Route 87/93, U.S. 60, State Route 202, and State Route 51 (Figure 3.2-8). The average daily traffic (ADT) figures that follow were collected in June 1990 (Maricopa Association of Governments, 1991b).

- I-10 is an 8-lane expressway with a maximum ADT of 172,000 between 24th Street and 32nd Street in Phoenix. It has a peak-hour volume of 17,200 and an LOS of F.
- I-17 is a 6-lane expressway with a maximum ADT of 178,000 between Northern Avenue and Dunlop Avenue. It has a peak-hour volume of 17,800 and an LOS of F.
- U.S. 89, also known as Apache Trail, is a 6-lane arterial with a maximum ADT of 40,000 between Ellsworth Road and Meridian Road in the Mesa area. It has a peak-hour volume of 4,400 and an LOS of E.
- State Route 87/93, also known as Country Club Drive, is a 3-lane arterial with a maximum ADT of 40,000 between Baseline Road and Warner Road in the Chandler area. It has a peak-hour volume of 4,200 and an LOS of F.



EXPLANATION

- Highways
- Railroads
- County Boundaries
- Planned Roads
- (17) Interstate Highways
- (60) U.S. Highways
- (360) State Highways

0 4 8 16 Miles

Regional Transportation System

Figure 3.2-8

- U.S. 60, also known as the Superstition Freeway, is a 6-lane expressway with a maximum ADT of 127,000 between Price Road and Dobson Road in the Mesa area. It has a peak-hour volume of 12,700 and an LOS of F.
- State Route 51, also known as the Squaw Peak Freeway, is a 6-lane expressway with a maximum ADT of 57,000 between McDowell Road and Thomas Road in the Phoenix area. It has a peak-hour volume of 5,700 and an LOS of B (Maricopa County Board of Supervisors, 1992; Plumb, 1992).

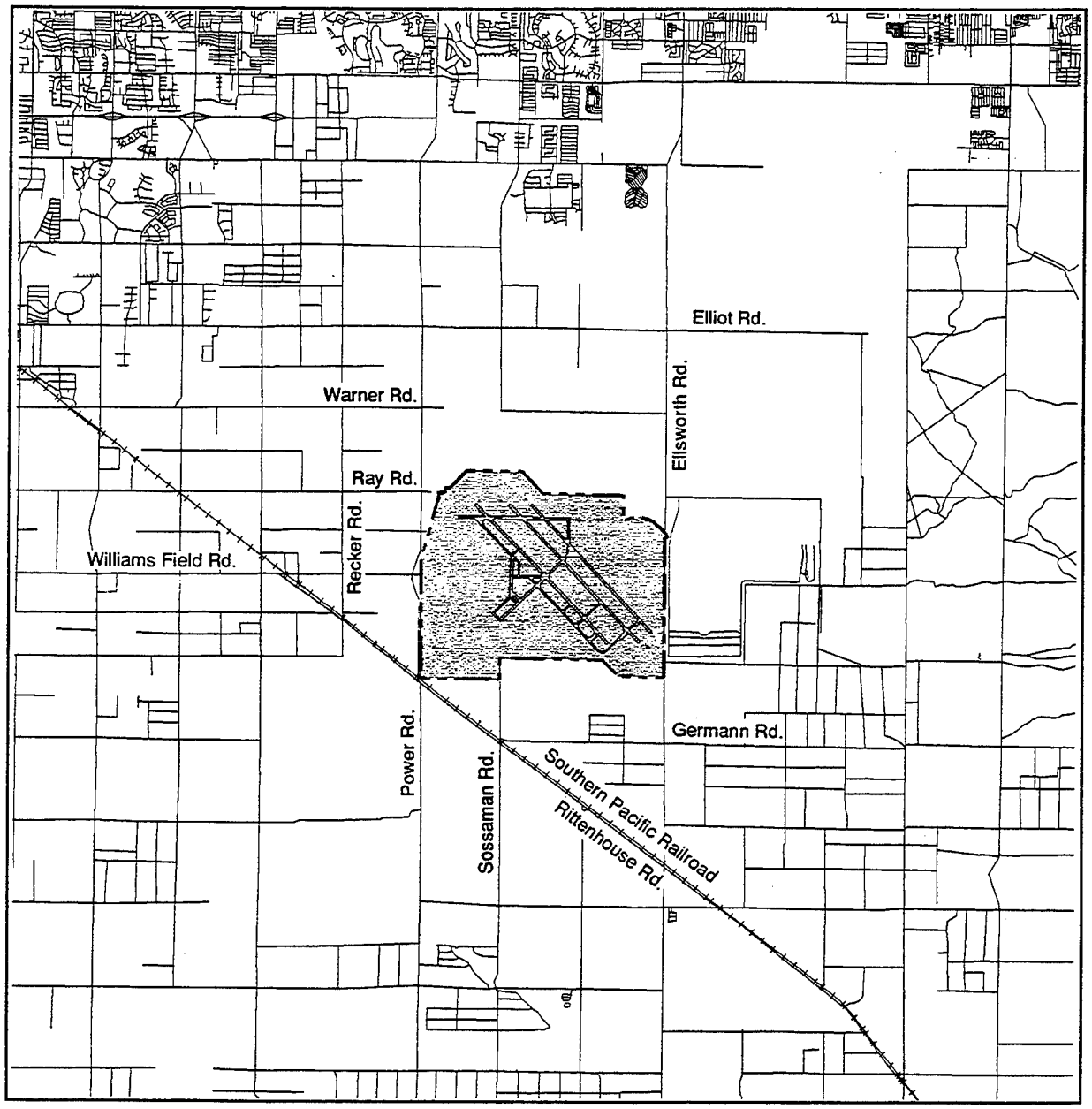
The Arizona Department of Transportation has an ambitious plan to complete the MAG's freeway recommendations. The following projects are funded from 1992 to 2006:

- State Route 202 will extend east to State Route 87 and will eventually form a loop around the southern portion of the Phoenix metropolitan area
- State Route 51 will extend north to Greenway Road
- State Route 101 will extend along a north-south axis from Greenway Road to Pecos Road and will eventually form a loop around Phoenix itself.

Between 1985 and July 1990, 19 miles of new freeway opened. Another 27 miles are under construction and 44 miles are scheduled to be under construction by 1995 (Arizona Department of Transportation, 1992).

Local. Local roads, representing key community roads, include: Rittenhouse Road, Williams Field Road, Power Road, Ellsworth Road, Elliot Road, and Germann Road (Figure 3.2-9). The ADT figures that follow were collected in 1991 and represent maximum values in the vicinity of Williams AFB.

- Rittenhouse Road is a 2-lane arterial with a maximum ADT of 4,133 between Power Road and Sossaman Road. It has a peak-hour volume of approximately 430 and an LOS of A.
- Williams Field Road is a 2-lane arterial with a maximum ADT of 4,015 between Recker Road and Power Road. It has a peak-hour volume of approximately 420 and an LOS of A.
- Power Road is a 2-lane arterial with a maximum ADT of 11,335 between Ray Road and Warner Road. It has a peak-hour volume of approximately 1,190 and an LOS of C.
- Ellsworth Road, also known as 208th Street, is a 2-lane arterial with a maximum ADT of 3,974 between Warner Road and Elliot Road. It has a peak-hour volume of approximately 420 and an LOS of A.



EXPLANATION

Railroads

Base Boundary

0 1/2 1 2 Miles

Local Transportation System

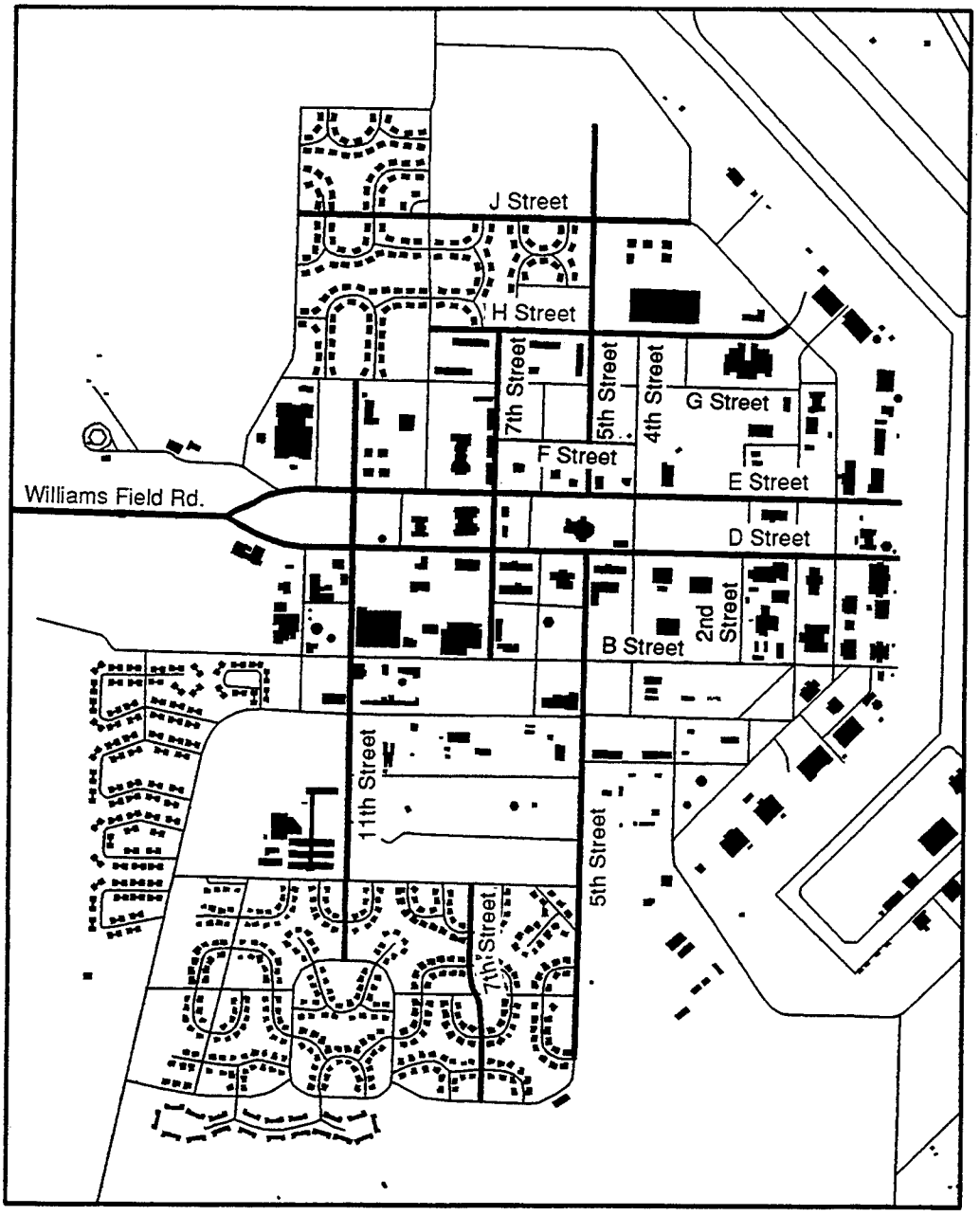
Figure 3.2-9

- Elliot Road, also known as 184th Street, is a 2-lane arterial with a maximum ADT of 3,550 between Power Road and Sossaman Road. It has a peak-hour volume of approximately 370 and an LOS of A.
- Germann Road is a 2-lane arterial with a maximum ADT of 681 east of Ellsworth Road. It has a peak-hour volume of approximately 70 and an LOS of A (Maricopa County Transportation Department, 1992).

The municipalities around Williams AFB (Queen Creek and Mesa) have roadway design standards should a road improvement or new road be constructed. The design standards are the same for both Queen Creek and Mesa and require 110-foot or 130-foot right-of-ways for arterials unless an equally efficient transportation system is adopted. If an equally efficient transportation system is adopted, a 110-foot or greater right-of-way is required where a new street is substituted for an arterial. Collector roads are generally on the half-section lines while arterials are on the section lines. Collectors relieve the traffic on arterials. The design standards state that linear commercial strips should be prohibited along arterials. Reverse fronting lots should be required along arterials to prevent driveways off of arterials. Driveways that do connect with an arterial should be spaced a minimum of 150 feet for multifamily residential areas and 275 feet for industrial office parks (Maricopa County, 1992a).

On-base. On-base roads of key importance include E Street, D Street, 5th Street, and 11th Street (Figure 3.2-10). These streets are all arterials. E Street is a 2-lane one-way street going west while D Street is a 2-lane one-way street going east; 5th Street and 11th Street are also 2-lane streets (U.S. Air Force, 1991j; 1985). ADTs for on-base roads were projected through trip generation as traffic data were not available.

- D Street is a 2-lane one-way arterial going east with a maximum projected ADT of 11,000 between 5th Street and 4th Street. It has a peak-hour volume of approximately 1,100 and an LOS of A between 5th Street and 4th Street.
- E Street is a 2-lane one-way arterial going west with a maximum projected ADT of 6,000 between 2nd Street and 4th Street. It has a peak-hour volume of approximately 600 and an LOS of A between 2nd Street and 4th Street.
- Fifth Street is a 2-lane arterial. It has a peak-hour volume north of E Street of approximately 510 with a maximum projected ADT of 5,100 and an LOS of A between E Street and F Street. South of D Street, it has a peak-hour volume of approximately 710 with a maximum projected ADT of 7,100 and an LOS of A between B Street and D Street.
- Eleventh Street is a 2-lane arterial. It has a peak-hour volume north of E Street of approximately 260 with a maximum projected ADT of 2,600



Key On-Base Roads

0 300 600 1200 Feet

Figure 3.2-10

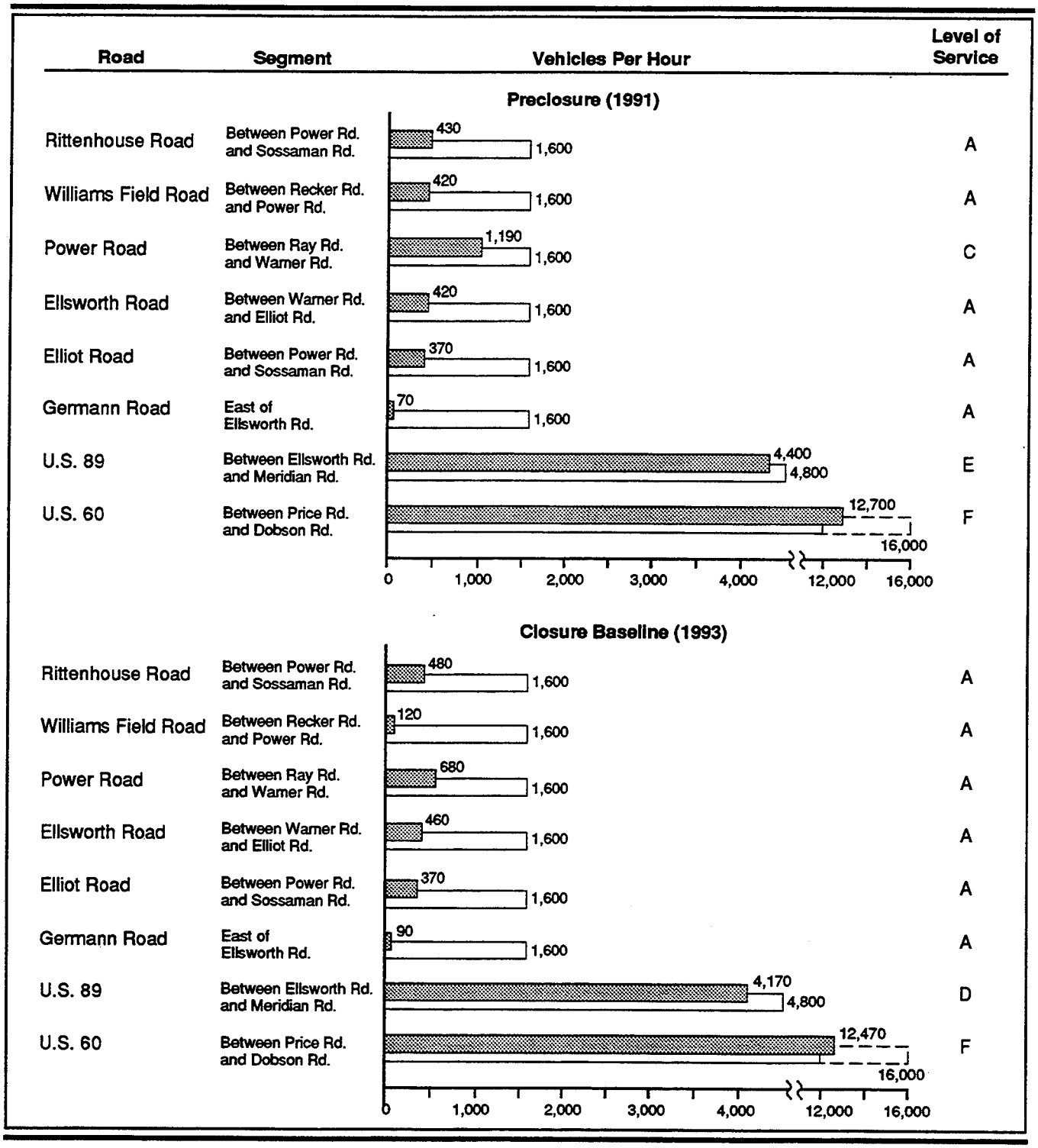
and an LOS of A between E Street and G Street. South of D Street, it has a peak-hour volume of approximately 1,200 with a maximum projected ADT of 12,000 and an LOS of C between B Street and D Street (EDAW et al., 1992b; U.S. Air Force, 1991j).

Several road improvements were planned as of June 1, 1985. Fourth Street was to be widened from D Street to H Street while 5th Street was to be widened from E Street to J Street. Fifth Street was to be extended across the gap between D and E Streets. Seventh Street was to be severed across the gap between D and E Streets. A Street between 5th Street and 7th Street was to be extended across the gap between D and E Streets. These road improvements were not implemented due to base closure.

Preclosure Reference. Preclosure (1991) peak-hour traffic volumes, capacities, and LOS on key community roadways are shown in Figure 3.2-11 while Figure 3.2-12 depicts this information for the key on-base roads. Local intersections all operate at acceptable LOS. On-base intersections all operate at acceptable LOS. The major intersections and their LOS for key community roads are as follows: Power Road and Rittenhouse Road, A; Power Road and Williams Field Road, A; Power Road and Elliot Road, A; Power Road and Main Street (U.S. 89), B-C; and Power Road and U.S. 60, F. The major intersections and their LOS for on-base roads are as follows: 5th Street and D Street, B; 5th Street and E Street, A; 11th Street and D Street, B-C; and 11th Street and E Street, B-C (Bresnahan, 1992a).

Major traffic problems occur on three freeways and one arterial road in the regional area. The regional roads operating at LOS F are I-10 between 24th Street and 32nd Street in Phoenix; I-17 between Northern Avenue and Dunlap Avenue in Phoenix; State Route 87/93, also known as Country Club Drive, between Baseline Road and Warner Road in the Chandler area; and U.S. 60, also known as the Superstition Freeway, between Price Road and Dobson Road in the Mesa area.

Williams AFB contributed 662 vehicles in the peak-hour to Power Road between Ray Road and Warner Road. This represents 56 percent of the peak-hour volume on this road. Williams AFB contributed 51 vehicles in the peak-hour to Elliot Road between Power Road and Sossaman Road. This represents 14 percent of the peak-hour volume on this road. Williams AFB contributed 306 vehicles in the peak-hour to Williams Field Road between Recker Road and Power Road. This represents 73 percent of the peak-hour volume on this road. All other roads received minimal contributions of vehicles from Williams AFB (U.S. Air Force, 1992d).

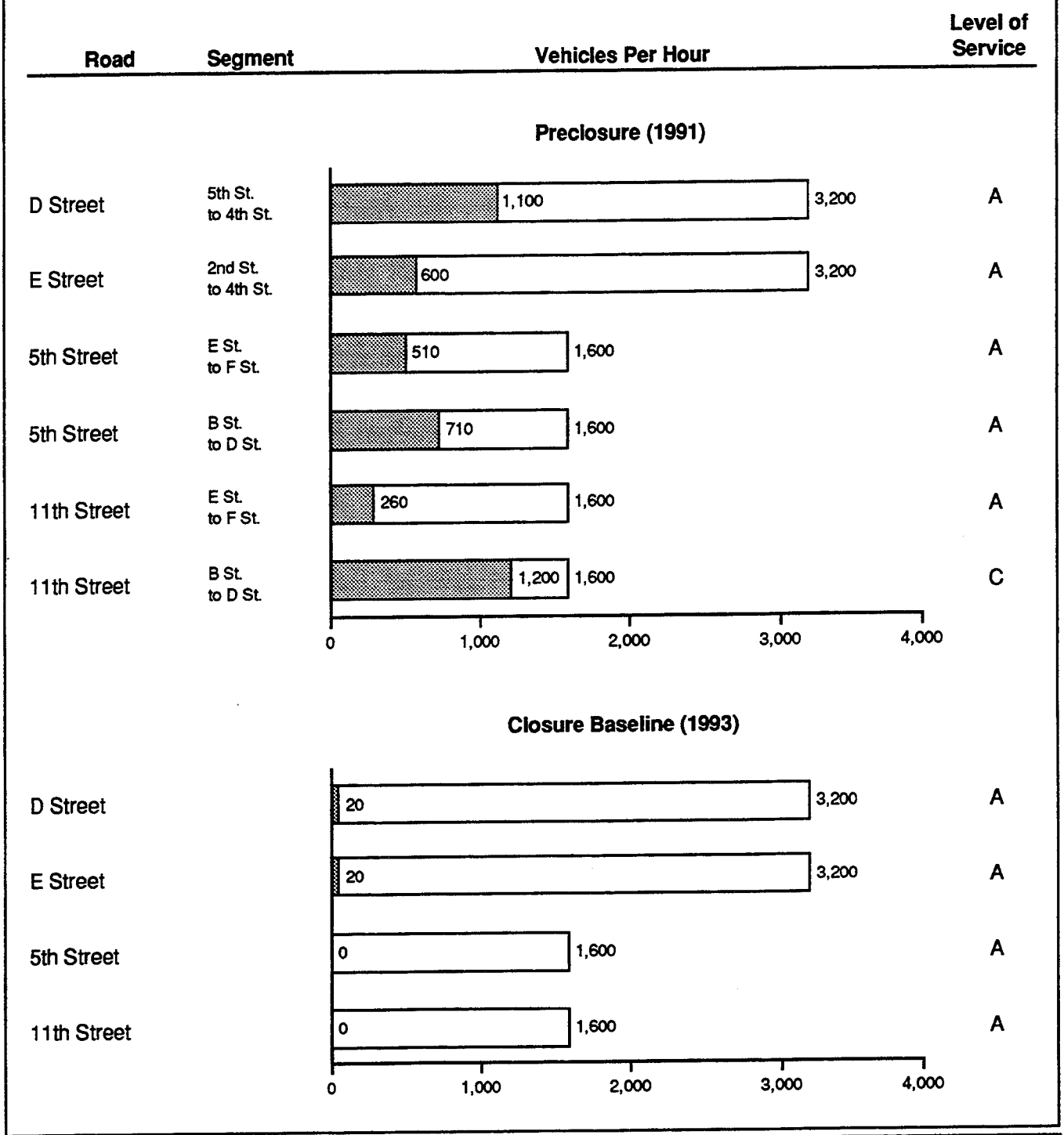


EXPLANATION

- Peak-Hour Traffic Volume (passenger cars per hour)
- Peak-Hour Traffic Capacity (passenger cars per hour)
- Future Capacity

Peak-Hour Traffic Volumes on Key Community Roads

Figure 3.2-11



EXPLANATION

Peak-Hour Traffic Volume (passenger cars per hour)

Peak-Hour Traffic Capacity (passenger cars per hour)

Peak-Hour Traffic Volumes on Key On-Base Roads

Figure 3.2-12

Closure Baseline. The time period from preclosure to closure is 2 years. This timeframe applies to the following projections.

- Rittenhouse Road traffic grows at a rate of 5.5 percent per year for a closure peak-hour volume of approximately 480. This represents a 12 percent increase in traffic on this road.
- Williams Field Road traffic grows at a rate of 1.5 percent per year and 30 percent of the traffic leaving or coming to the base is likely to use this road. Subtracting 30 percent of the traffic leaving or coming to the base in the peak-hour from the grown traffic gives a peak-hour volume of approximately 120, a 71 percent decrease in traffic on this road resulting from closure.
- Power Road traffic grows at a rate of 7.1 percent per year and 65 percent of the traffic leaving or coming to the base is likely to use this road. Subtracting 65 percent of the traffic leaving or coming to the base in the peak-hour from the grown traffic gives a peak-hour volume of approximately 680, a 43 percent decrease in traffic on this road.
- Ellsworth Road traffic grows at a rate of 4.8 percent per year for a closure peak-hour volume of approximately 460. This represents a 10 percent increase in traffic on this road.
- Elliot Road traffic grows at a rate of 6.3 percent per year and 5 percent of the traffic leaving or coming to the base is likely to use this road. Subtracting 5 percent of the traffic leaving or coming to the base in the peak-hour from the grown traffic gives a peak-hour volume of approximately 370, which is unchanged from the preclosure condition.
- Germann Road traffic grows at a rate of 14 percent per year for a closure peak-hour volume of approximately 90. This represents a 29 percent increase in traffic on this road (Bresnahan, 1992a; 1992b; Maricopa Association of Governments, 1991b).

For on-base roads, traffic decreases 100 percent on 5th and 11th streets, 97 percent on E Street, and 98 percent on D Street.

For local roads, Power Road's LOS changes from C to A upon base closure. All other LOS stay the same. For on-base roads, 11th Street south's LOS changes from C to A. All other LOS stay the same (see Figure 3.2-11 and Figure 3.2-12).

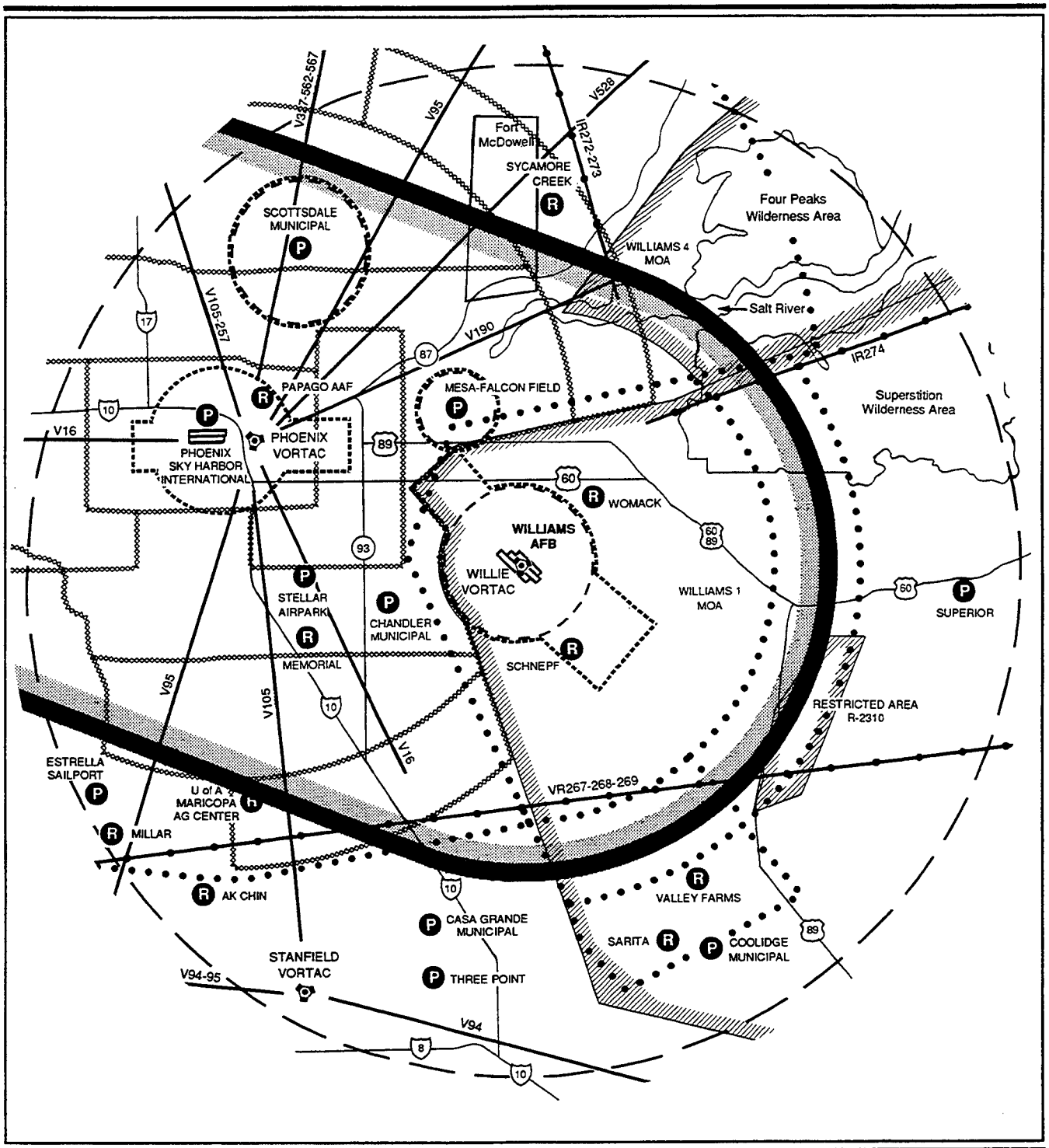
3.2.3.2 Airspace/Air Traffic. Airspace is a finite resource that can be defined vertically and horizontally, as well as temporally, when describing its use for aviation purposes. As such, it must be managed and utilized in a manner that best serves the competing needs of commercial, general, and military aviation interests. The FAA is responsible for the overall management of airspace and has established different airspace designations that are designed to protect aircraft while operating to or from an airport,

transiting enroute between airports, or operating within "special use" areas identified for defense-related purposes. Rules of flight and air traffic control (ATC) procedures have been established which govern how aircraft must operate within each type of designated airspace. All aircraft operate under either instrument flight rules (IFR) or visual flight rules (VFR). IFR aircraft operate within controlled airspace and are tracked and separated by the ATC system. Aircraft flying under VFR conditions may operate within both controlled and uncontrolled airspace, but are required to fly under a "see and be seen" concept in which pilots are responsible for their own separation from other air traffic. Airspace around the busier airports is more stringently controlled and may require that all aircraft be in contact with and monitored by an ATC agency while transiting through the area.

A given geographical region may encompass several different types of airspace that apply not only to normal IFR and VFR aircraft operations but to military flight training operations as well. Military operations areas (MOAs), restricted areas, and military training routes (MTRs) are the most common types of airspace that have been designated for defense-related activities. MOAs contain flight training operations defined as nonhazardous which do not restrict transit by VFR air traffic. When a MOA is in use, nonparticipating IFR air traffic may transit the MOA only if IFR separation can be provided by ATC. Restricted areas normally contain aerial gunnery or air-to-ground bombing activities and transit through these areas by any non-participating aircraft is generally limited while such hazardous activities are taking place. MTRs are defined airspace areas, with altitudes generally below 10,000 feet MSL, which are established for military flight operations at speeds greater than 250 knots. MTRs are designated as instrument routes (IR) or visual routes (VR).

The type and dimension of individual airspace areas established within a given region and their spatial and procedural relationships to one another are contingent upon the different aviation activities conducted in that region. When any significant change is planned for this region, such as airport expansion, a new military flight mission, etc., the FAA will reassess the airspace configuration to determine if such changes will adversely affect (1) air traffic control systems and/or facilities; (2) movement of other air traffic in the area; or (3) airspace already designated and used for other purposes (i.e., MOAs or restricted areas).

The ROI considered for the Williams AFB airspace analysis (Figure 3.2-13) consists of the area within a 30 nautical mile (NM) radius of Williams AFB



EXPLANATION

- Public Use Airport
- Restricted/Private Use Airport
- Airport Control Zones
- Airport Traffic Areas
- Military Training Routes
- Airways
- Transition Area (Floor at 700' AGL)
- Transition Area (Floor at 1200' AGL)
- Special Use Airspace Areas
- Phoenix Approach Control Area Boundary
- Phoenix Terminal Control Area Boundary

0 2.5 5 10 Nautical Miles

Airspace Region of Influence (30 NM Radius of Williams AFB)

Figure 3.2-13

that contains the airspace structure associated with the control of arrivals and departures at Williams AFB, and arrivals and departures at other nearby airports. This airspace structure is comprised of controlled airspace areas with altitude limits that range from the surface up to 19,000 feet MSL, defense-related airspace with altitude limits that range from the surface to 35,000 feet MSL, and uncontrolled airspace that extends up to the base of the Continental Control Area which begins at 14,500 feet.

Williams AFB aircraft arrivals and departures are integrated with a complex flow of aircraft operating to or from several civilian airports located within the ROI. The two key facilities which influence these traffic flows are Williams AFB and Phoenix Sky Harbor International Airport. The airspace associated with three nearby general aviation airports, Mesa-Falcon Field Airport (approximately 9 NM north of Williams AFB), Chandler Municipal Airport (approximately 7.5 NM west of Williams AFB), and Stellar Airpark (approximately 13 NM west of Williams AFB), is also significant to the ROI airspace considerations because of the extensive aircraft activity at these airports and because these airports have IFR approach capability.

The ATC structure within the ROI includes the Phoenix Terminal Control Area (TCA), segments of nine federal airways, transition areas for the Phoenix area airports and the Casa Grande Municipal Airport, and control zones and airport traffic areas (ATA) for the Williams, Sky Harbor International, Mesa-Falcon Field, and Scottsdale airports.

Terminal area air traffic control within the ROI is under the jurisdiction of the Phoenix Approach Control Area. This approach control area consists of airspace delegated to the FAA-operated terminal radar control (TRACON) facility located at Phoenix Sky Harbor International Airport by the FAA air route traffic control center (ARTCC) in Albuquerque, New Mexico. Within the ROI, the vertical limits of the approach control area range from the surface up to 19,000 feet MSL. The sector of the approach control area which overlies Williams AFB extends from the surface to 19,000 feet.

Special use airspace within the ROI includes the Williams 1 MOA, the westernmost portion of the Williams 4 MOA, and Restricted Area R-2310. Other military use airspace within the ROI include segments of four MTRs (IR 272-273, IR 274, IR 273-274, and VR 267-268-269).

The only extensive area of uncontrolled airspace within the ROI is the area within the Williams 1 MOA that lies between the eastern boundary of the

Phoenix Approach Control Area and the outer boundary of the ROI. The area encompassed by Restricted Area R-2310 is also uncontrolled airspace.

Preclosure Reference. An understanding of the ROI airspace/air traffic environment and its use under the preclosure reference is necessary to help determine its capability and capacity to assimilate future aviation activities into the National Airspace System (NAS). Because airspace management related to both civil and military flight operations is governed by a common set of regulations, procedures, and airspace policy guidance, the same basic considerations associated with existing activities at Williams AFB, such as runway alignments, traffic flows, and the mix of aircraft categories, would apply to alternative aviation reuses at Williams AFB.

Air Traffic Control. Airspace designated for air traffic operations at Williams AFB consists of a control zone, an airport traffic area, radar traffic patterns, and VFR traffic patterns. Williams AFB is also contained within a transition area that has been established in conjunction with instrument approach procedures at various airports in the Phoenix area. Figure 3.2-13 depicts each of the designated ATC airspace areas in the Williams ROI.

Within the Phoenix Approach Control Area, aircraft traffic flow procedures have been established that provide for an orderly transition between the airports located within the area and the enroute airspace system. The traffic flow procedures that are most significant to the airspace ROI are the aircraft arrival and departure routes to Williams AFB and to those airports in the region closest to Williams AFB which are currently equipped to serve both VFR and IFR aircraft operations. These airports are Phoenix Sky Harbor International Airport, Mesa-Falcon Field Airport, Chandler Municipal Airport, and Stellar Airpark.

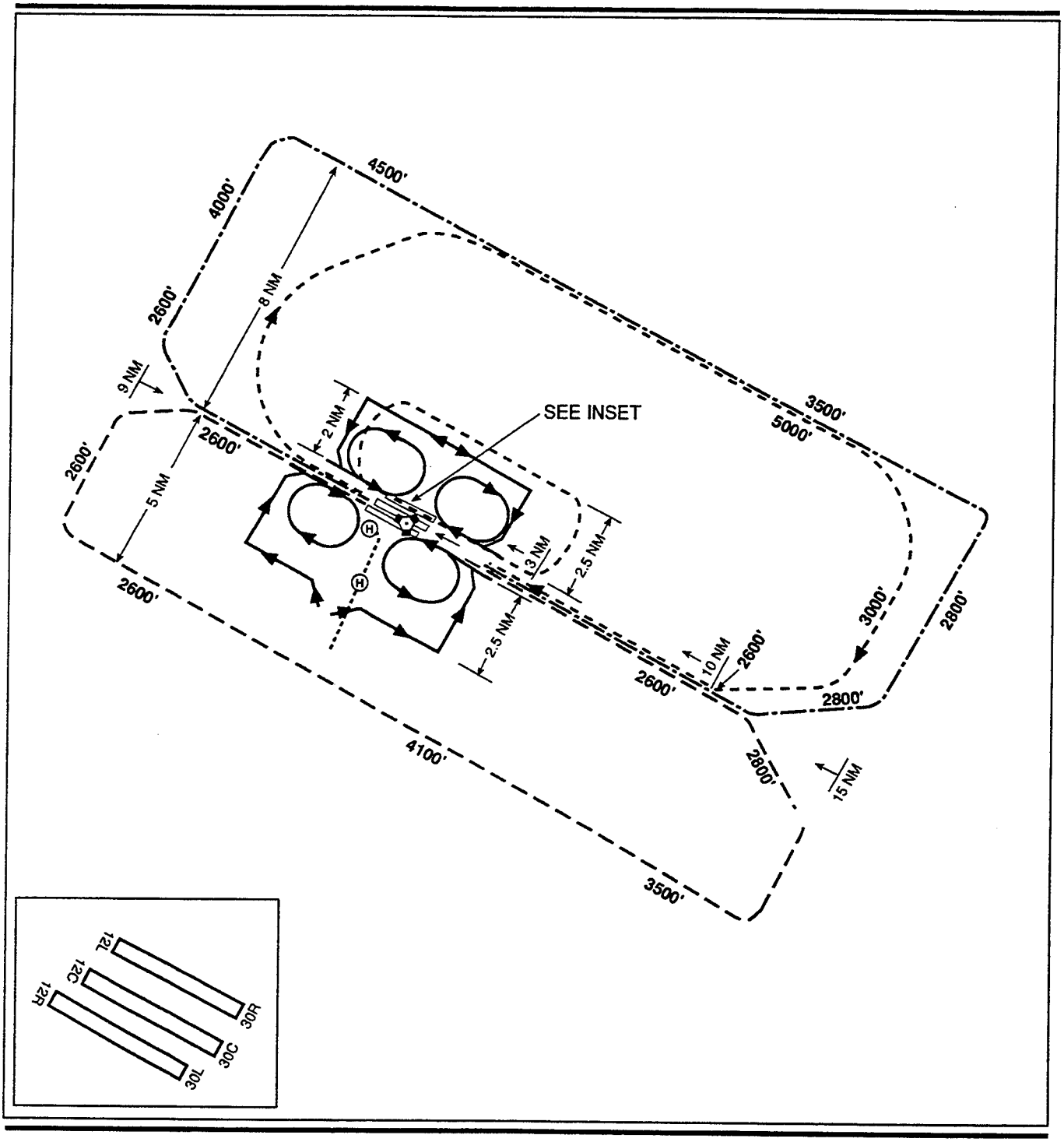
There are currently three sources of radar services available for Williams AFB air traffic. The primary radar services are provided by the Phoenix TRACON which vectors aircraft to and from the base in both visual meteorological conditions (VMC) and instrument meteorological conditions (IMC). The TRACON may also provide radar ATC services to training and transient aircraft flying within the Williams AFB radar traffic patterns. For flight training purposes only, the U.S. Air Force operates an airport surveillance radar (ASR) at Williams AFB which is used for aircraft conducting practice instrument and radar approaches to the base. This ASR is used only in VMC weather conditions. The third source of radar services is a mobile ground control approach (GCA) unit located between Runways

12R/30L and 12C/30C. The GCA, which provides both ASR and precision approach radar (PAR), is operated on a part-time basis by the 111th Air Traffic Control Flight of the Arizona Air National Guard (ANG). During periods of operation, the Phoenix TRACON delegates airspace to the GCA facility to conduct GCA radar approaches to Runway 30C. That portion of the GCA airspace which overlies Williams AFB extends from the surface to 5,000 feet MSL. The outer boundary of the GCA airspace area is located approximately 20 NM east of Williams AFB where the altitude limits extend from the surface to 7,000 feet MSL.

Traffic Patterns, Approaches and Departures. The traffic patterns, published instrument approaches, and instrument departure procedures used at Williams AFB under preclosure conditions basically represent the airspace requirements for VFR and IFR aircraft operating at the base, and transitioning between the base and the enroute airspace system. VFR aircraft normally fly direct routes to and from the base. Pilots of VFR aircraft are responsible for maintaining visual separation between aircraft. The *Williams AFB T-37 In-Flight Guide* (U.S. Air Force, 1992b) and *Williams AFB T-38 In-Flight Guide* (U.S. Air Force, 1992c) prescribe procedures by which all flights depart and recover to Williams AFB.

Figure 3.2-14 depicts Williams AFB VFR and radar traffic patterns. Aircraft landings and takeoffs at Williams AFB are controlled by the air traffic control tower (ATCT) or by the runway supervisory units located adjacent to each end of each of the three runways. With respect to the VFR traffic patterns, the launching, recovery, and multiple approaches of T-37 aircraft (prior to their deactivation at Williams AFB) occurred on runway 12R/30L. The VFR traffic pattern for Runway 12R/30L was used for smaller conventional aircraft. Runway 12L/30R served as the primary runway for T-38 flight training activities. Similarly, the T-37 radar traffic patterns were oriented to Runway 12R/30L. The radar traffic for T-38s and transient aircraft were oriented to Runway 12C/30C.

All of the published instrument approach procedures established for Williams AFB were conducted to Runway 12C/30C. The flight paths associated with the three instrument approaches are shown in Figure 3.2-15. The precision instrument landing system (ILS) procedure to Runway 30C is based on directional and glide path guidance provided by the ILS electronic navigational aid (NAVAID) located on Runway 30C. The non-precision instrument approaches to Runways 12C and 30C, which only provide directional guidance to the runway, are predicated upon the Willie VHF



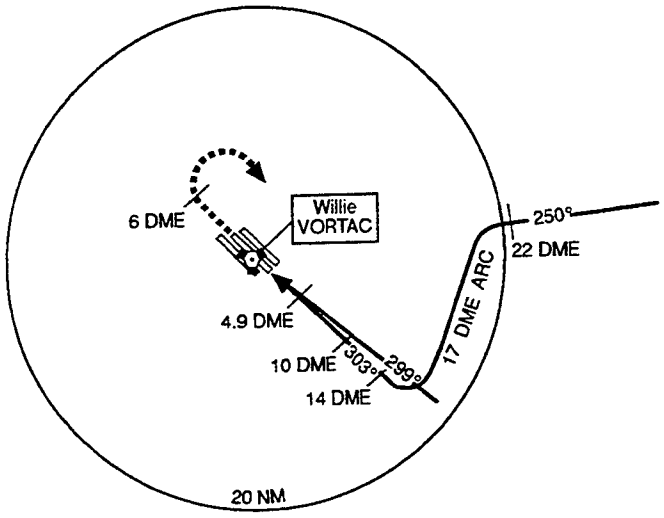
EXPLANATION

- T-37 Radar Traffic Pattern
- T-38 Radar Traffic Pattern
- KC-135 Traffic Patterns
- VFR Traffic Pattern
- Helicopter Traffic Pattern
- 2600' Altitudes (MSL)
- Willie VORTAC

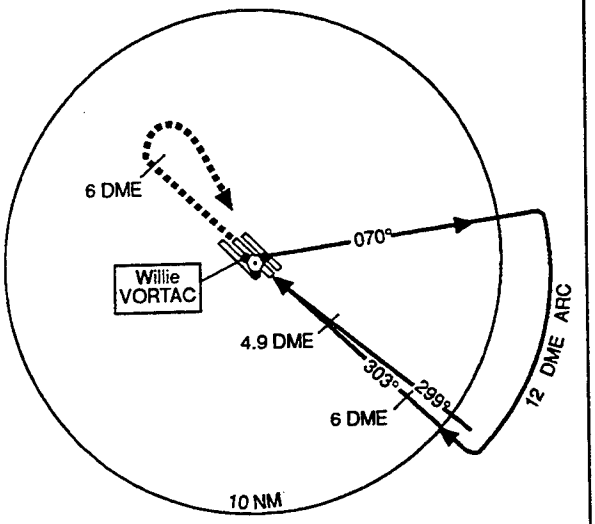
0 5 Nautical Miles

Aircraft Traffic Patterns Williams AFB, Arizona

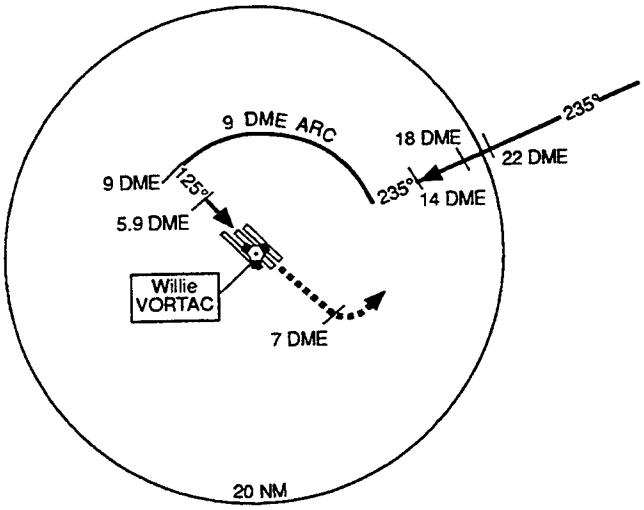
Figure 3.2-14



*** HI-VOR or TACAN or ILS RWY 30C**



VOR or ILS RWY 30C



*** HI-VOR or TACAN RWY 12C**

EXPLANATION

— Final Approach

▪▪▪▪ Missed Approach

VORTAC

* Denotes an approach procedure which provides for a direct descent from the high altitude airspace structure.

NOT TO SCALE

Instrument Approach Procedures

Figure 3.2-15

Omnirange/Tactical Air Navigation (VORTAC) electronic NAVAID located between Runways 12R/30L and 12C/30C. The VORTAC facility also includes electronic distance measuring equipment (DME) which provides a pilot with slant range distance from the aircraft to the facility.

The three published standard instrument departure (SID) procedures used at Williams AFB are illustrated in Figure 3.2-16. These procedures channel aircraft departing from the base to the enroute airspace system. Generally, the Cleator-Nine departure was used for west and northbound air traffic and the Copper-One and Kacti-One departures were used for east and southbound departures.

Figures 3.2-17 and 3.2-18 depict the primary arrival and departure flight paths for Williams AFB. These flight paths are used to transition between the base and the enroute system or the flight training areas.

Base Operations. In calendar year (CY) 1990, Williams AFB had a total of 153,930 aircraft operations (an aircraft operation is one takeoff or one landing). These operations were conducted by both transient aircraft and aircraft based at Williams AFB (Table 3.2-3).

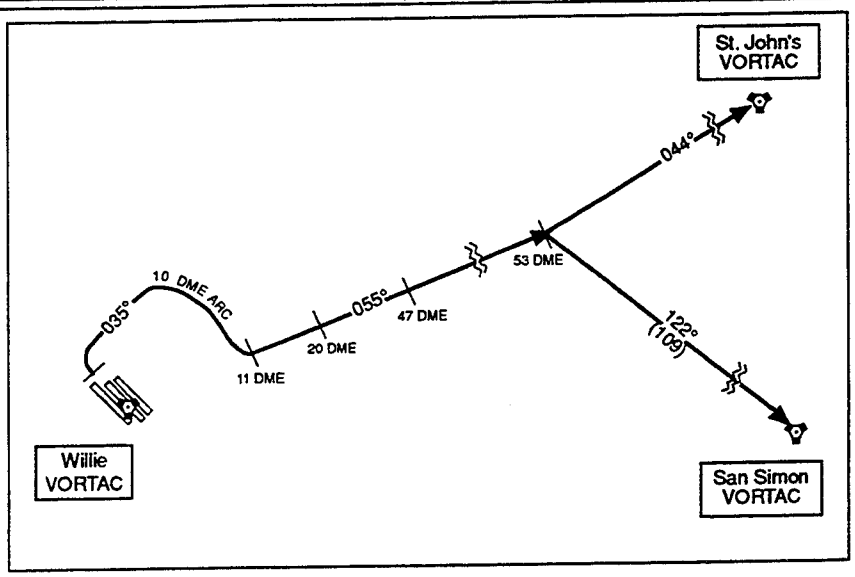
Table 3.2-3. Williams AFB Aircraft Operations*, 1990

Assignment	Type	Annual Operations
Aircraft based at Williams AFB	T-37	69,652
	T-38	84,278
Transients		Negligible
Total		153,930

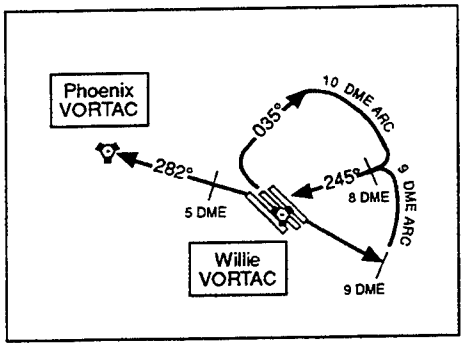
*An aircraft operation is one takeoff or one landing. All operations are daytime.

Source: U.S. Air Force, 1991i.

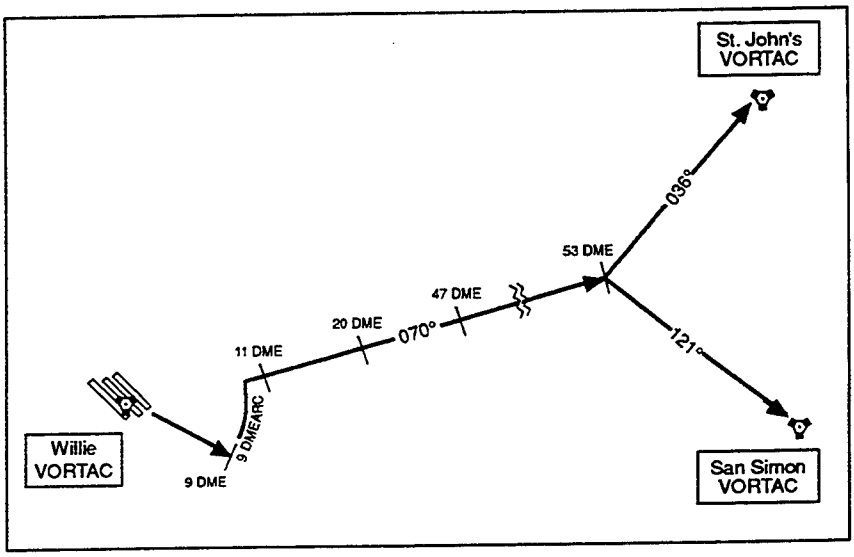
Defense-related Airspace. With respect to defense-related airspace areas, the Williams 1 MOA overlies Williams AFB. The floor of the MOA begins at an altitude of 1,000 feet AGL. The ceiling of the MOA extends up to, but not including, 18,000 feet MSL. An area 10 statute miles in diameter overlying the Coolidge Municipal Airport from the surface to, but not including, 18,000 feet MSL is excluded from the Williams 1 MOA. The MOA is active from 6:00 a.m. to 9:00 p.m., Monday through Friday.



KACTI-ONE DEPARTURE



CLEATOR-NINE DEPARTURE



COPPER-ONE DEPARTURE

EXPLANATION

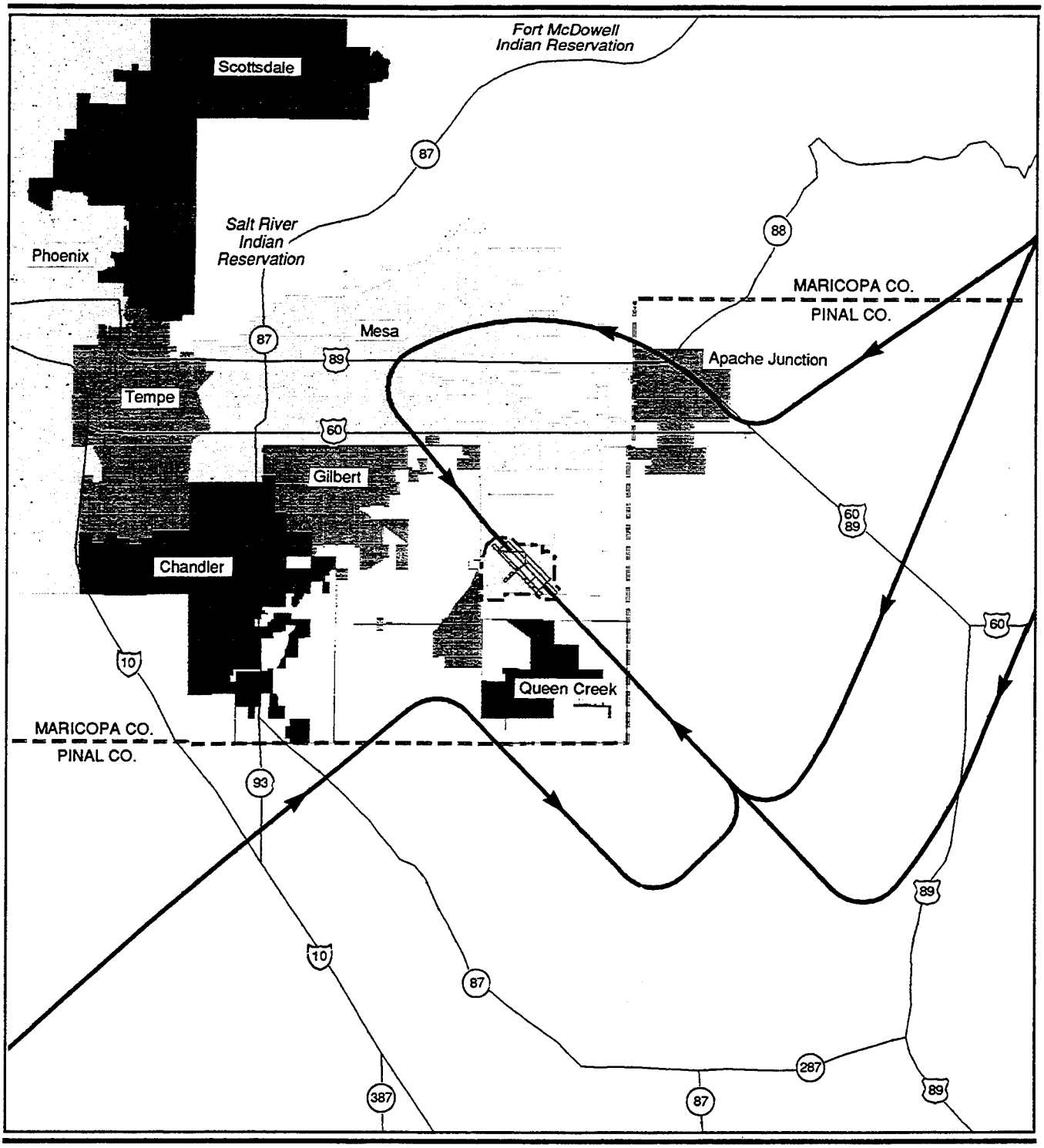
——— Departure Path

DME Distance Measuring Equipment

VORTAC

Standard Instrument Departures

Figure 3.2-16



EXPLANATION

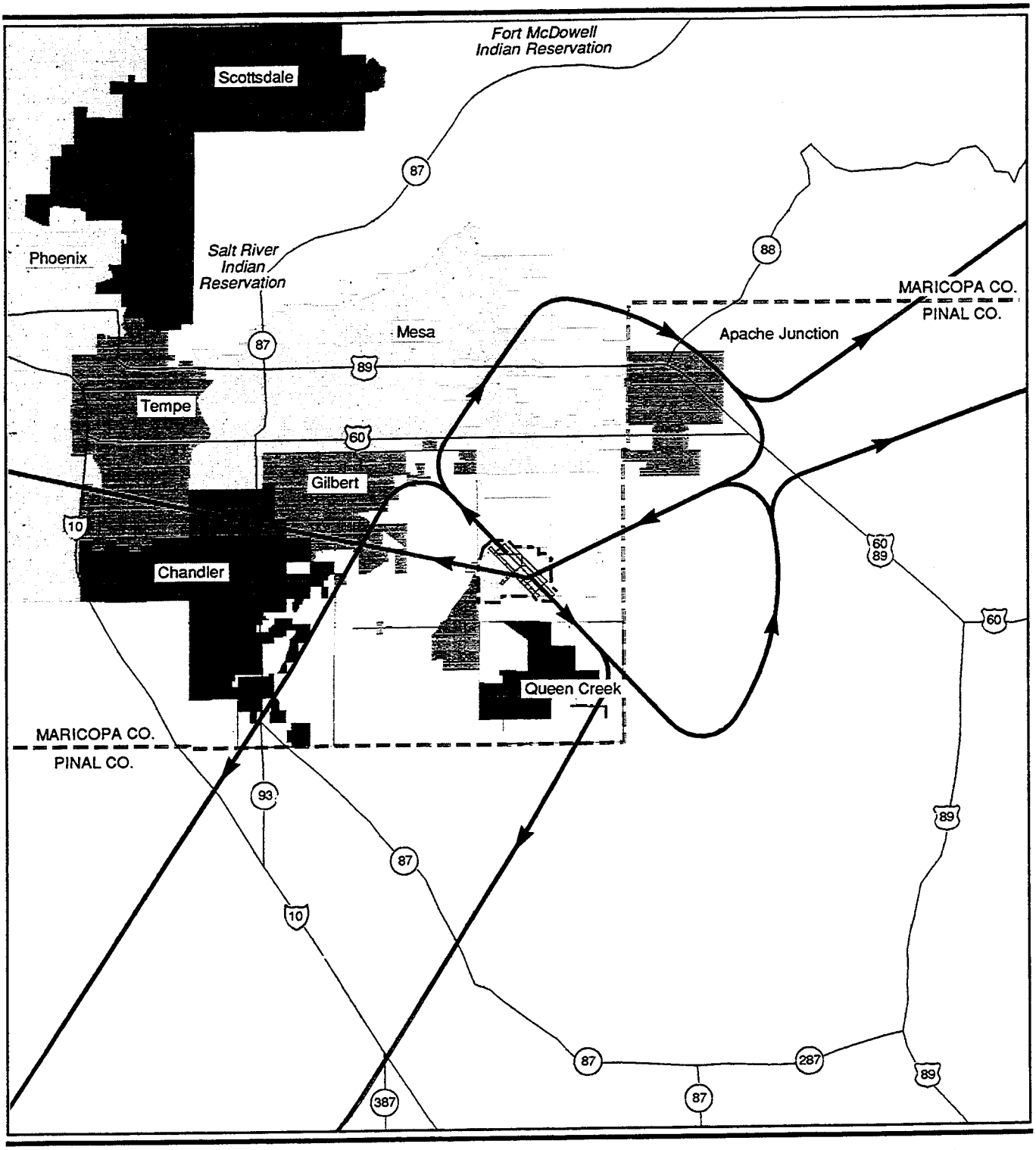
Arriving Flight Paths for Williams AFB

Base Boundary

Primary IFR Arriving Aircraft Flight Paths

0 3 6 Miles

Figure 3.2-17



EXPLANATION

Departing Flight Paths for Williams AFB

Base Boundary

Primary IFR Departing Aircraft Flight Paths

0 3 6 Miles

Figure 3.2-18

The Williams 4 MOA is located approximately 14.5 NM northeast of Williams AFB. The vertical limits of the Williams 4 MOA extend from 14,000 feet MSL up to, but not including, 18,000 feet MSL. This MOA is active from sunrise to sunset Monday through Friday and at other times as indicated by a notice to airmen (NOTAM). The 82 FTW was the scheduling agency for the Williams 1 and Williams 4 MOAs. The Albuquerque ARTCC is the controlling agency for the airspace encompassed by both MOAs.

Williams 2 MOA, 3 MOA, and 3A MOA were also used extensively for military training. These MOAs were considered to be outside of the ROI and were not analyzed further.

Restricted Area R-2310 is located approximately 16 NM southeast of Williams AFB. This restricted area is subdivided into three stratified segments. R-2310A extends from the surface to 10,000 feet MSL. R-2310B extends from 10,000 feet MSL to 17,000 feet MSL. R-2310C includes the altitudes from 17,000 feet MSL to 35,000 feet MSL. The using agency for R-2310 is the Arizona Army National Guard. The airspace lies within the Albuquerque ARTCC area of jurisdiction.

The four MTRs located within the ROI (Figure 3.2-13) include segments of IR 272-273, IR 274, IR 273-274, and VR 267-268-269. Williams AFB was the scheduling agency for all of the IR routes. Davis-Monthan AFB is the scheduling agency for each of the VR routes. Table 3.2-4 delineates the operating altitudes for each of the segments of the MTRs which transit the ROI.

Table 3.2-4. Military Training Route Operating Altitudes

Military Training Route	Lowest Altitude (feet)	Highest Altitude (feet)
IR 272-273	Surface	5,000 MSL
IR 274	Surface	700 MSL
IR 273-274	Surface	6,000 MSL
VR 267-269	Variable*	Variable*

*Within the ROI, one segment of this route must be flown at a constant altitude of 6,500 feet MSL. The remaining segment has a floor of 1,000 feet AGL and a ceiling of 1,500 feet AGL.

Source: Department of Defense, 1992.

Civil Airport Operations. There are a total of 19 civil airports and 2 military airports located within the Williams AFB ROI (Figure 3.2-13). Of the 19 civil

airports, 10 are public use airports and 9 are restricted/private use airports. FAA-operated air traffic control towers are located at Mesa-Falcon Field Airport, Sky Harbor International Airport, and Scottsdale Municipal Airport. Published instrument approach procedures are available for Chandler Municipal Airport, Mesa-Falcon Field Airport, Stellar Airpark, Phoenix Sky Harbor International Airport, Casa Grande Municipal Airport, and Scottsdale Municipal Airport. Aircraft operations at all other airports are conducted in visual weather conditions.

In VFR weather conditions, the airports within the Williams AFB ROI which may be most directly influenced by traffic pattern operations at Williams AFB are Chandler Municipal Airport, Mesa-Falcon Field Airport, Womack Airport, and Schnepf Airport. The latter two facilities are private use, low activity, VFR-only airports. Airports which may be most directly influenced by aircraft operations involving transition between Williams AFB and the enroute airspace system are Phoenix Sky Harbor International Airport, Mesa-Falcon Field Airport, Chandler Municipal Airport, and Stellar Airpark.

Closure Baseline. If all flight operations at Williams AFB are terminated, all designated air traffic control airspace areas and published instrument procedures would be canceled. The control tower, the ASR and GCA radar equipment, the visual NAVAIDS, and the air-ground communication equipment would be decommissioned. Disposition of the ILS, visual NAVAIDS and lighting systems, and communications equipment relative to either removal from the base or placement on caretaker status would depend on the status of reuse planning activities. The existing Willie VORTAC would be compatible for use as a navigational aid component of the National Airspace System and could be retained for that purpose. The current Williams AFB airspace area could be used by Phoenix Approach Control to realign approach, departure, and enroute procedures to the extent that additional efficiencies in overall traffic flows could be achieved. VFR aircraft operating from public and private airports in the area could transit the airspace around the closed airfield without concern for existing air-ground communications requirements or aircraft operations at Williams AFB.

After base closure, Williams AFB could continue to support the flight training activities of the 161st AREFG of the Arizona ANG. Should that occur, the potential exists that ATCT services would be provided to the 161st AREFG aircraft as long as they continue to operate at Williams AFB, and that existing VFR and IFR traffic pattern airspace needed for 161st arrivals, departures, and training activities would be retained. It is also possible that

the ILS equipment and the military GCA radar unit would remain in operation for the 161st flight activity.

The Williams MOA complex and each of the existing IR military training routes were established to support Air Training Command flight activities at Williams AFB. The disposition of these defense-related airspace areas will be contingent upon the needs of the military and the FAA to either retain the airspace for other military uses or to cancel these airspace areas. There is an existing proposal to reconfigure what is now the Williams 1, 2, and 3 MOAs for future military flight operations (Arizona Air National Guard, 1992). This proposal would establish two MOAs to be named the Outlaw and Jackel MOAs. The proposal would locate the lateral and vertical boundaries of the MOA to a point approximately 12.5 NM east of the base. The proposal would also cancel the existing Williams 4 MOA.

Because R-2310 and MTR VR 267-268-269 are not associated with Williams AFB flight operations they would not be affected by closure of the base.

3.2.3.3 Air Transportation. Air transportation includes passenger travel by commercial airline and charter flights, business and recreation travel by private (general) aviation, and priority package and freight delivery by commercial and air carriers.

The air transportation ROI includes a number of existing public and restricted/private use airports located within the vicinity of Williams AFB, within a range of approximately 30 NM. The major public and restricted/private use airports are discussed below (Barnard Dunkelberg & Company and Mestre Greve Associates, 1988; P&D Aviation, 1992).

Chandler Municipal Airport is some 9 NM west of Williams AFB. The airport had 190,996 operations in 1990, with 224,050 operations forecasted for the year 2005 (P&D Aviation, 1992). Its operational capacity, measured as annual service volume, is 269,000 operations (Arizona Department of Transportation, 1990). Chandler Municipal Airport currently has 235 permanently based aircraft (Arizona Department of Transportation, 1991a). The single runway is 4,400 feet in length, 75 feet in width, and is oriented 4/22.

Coolidge Municipal Airport is approximately 30 NM south/southeast of Williams AFB. An air traffic control tower at the airport serves the Air Force

in its training mission. In 1990, the airport had 7,567 civilian operations and 128,000 military operations, for a total of 135,567 operations (Arizona Department of Transportation, 1991a). The airport has two runways. Runway 17/35 is 3,740 feet in length and 75 feet in width while Runway 5/23 is 5,500 feet in length and 150 feet in width.

Phoenix Sky Harbor International Airport is approximately 20 NM west/northwest of Williams AFB. It serves as the only air carrier facility in central Arizona and is the state's busiest airport in terms of total operations, commercial operations, and passenger emplanements. Phoenix Sky Harbor International has two runways. Runway 8L/26R is 11,000 feet in length and 150 feet in width. Runway 8R/26L is 10,300 feet in length and 150 feet in width. A third runway is planned to be added between 1993 and 1998. The runway would be located approximately 800 feet south of Runway 8R/26L and would be 7,800 feet in length and 150 feet in width. The airport had 498,752 operations in 1990 (Arizona Department of Transportation, 1991a). The airport has an annual service volume of 475,000 operations and is, therefore, already in excess of its capacity. This means that, on the average, aircraft currently experience three minutes delay per operation which greatly increases airline operating expenses and decreases traveler convenience. Over 23 million passengers used Sky Harbor in 1990. Over 37 million passengers are forecast to use the facility by the year 2005 (HNTB, 1989).

Mesa-Falcon Field Airport is approximately 9 NM north of Williams AFB. The airport is equipped with an air traffic control tower and has a published non-directional beacon (NDB-C) approach. The airport had 203,685 operations in 1990, and there are 219,000 operations forecast for 2005. The airport has two runways, 3,800 feet and 5,100 feet in length, and 580 based aircraft (Arizona Department of Transportation, 1991a).

Casa Grande Municipal Airport has one runway and is approximately 22 NM southwest of Williams AFB. Its single runway is 5,200 feet in length and 100 feet in width. Lufthansa German Airlines operates pilot training facilities at several Arizona airports, the bulk of which are located at Phoenix-Goodyear Municipal Airport. However, Lufthansa pilots regularly perform a large number of training operations at Casa Grande Municipal Airport as well. This airport had 77,184 operations in 1990 and 113,500 operations are forecast for the year 2005. The airport has an annual service volume of 285,400 operations. In 1991, there were approximately 40 aircraft based at Casa Grande (Barber, 1992).

Memorial Airport is approximately 13 NM southwest of Williams AFB. Runway 12/30 is 8,500 feet in length and Runway 3/21 is 5,200 feet in length. While both runways are asphalt, years of neglect have resulted in extensive cracking and unraveling of the pavement. This condition became so dangerous that the facility was formally closed in the 1970s. The airport is still listed as closed by the Arizona Department of Transportation, but the estimated 40 based aircraft currently located there still use Memorial. It is estimated that there are 400 to 500 annual operations at the airport, a figure which has been constant since the 1980s. Currently, there are no formal plans to repair the deteriorated runways or to change the closed status of the airport (Grantham, 1993).

Stellar Airpark is approximately 13 NM west of Williams AFB. This privately-owned, publicly accessible facility has one runway, Runway 17/35, which is 4,005 feet in length and 55 feet in width. The airport had 50,650 operations in 1990 according to P&D Aviation (1992). Discussions with the airport operator indicate that in addition to the four flight instructors and eight training aircraft at the airport, there are over 35 homes with aircraft parked in private hangars that directly access the runway. These aircraft are in addition to the 94 based aircraft which are reported for the airport (Arizona Department of Transportation, 1991a). The *State Needs Technical Report* (Barnard Dunkelberg, 1990) indicates that there were 84,550 annual operations for 1990 which appears to represent the most accurate record for the baseline condition. The airport has an annual service volume of 245,000 operations.

Scottsdale Municipal Airport is approximately 23 NM northwest of Williams AFB. The airport had 265,809 operations in 1990 and 303,100 operations are forecast for the year 2005. The airport has one runway, Runway 3/21, which is 8,250 feet in length. The annual service volume of this single runway is 294,600 operations. This illustrates that the airport is operating at 90 percent of capacity. The airport currently has 413 based aircraft and two published instrument approaches.

Estrella Sailport is approximately 29 NM southwest of Williams AFB. The facility has one based aircraft but houses 41 "other" aircraft which include ultralights and gliders. These aircraft combined for 37,835 operations in 1990 (Arizona Department of Transportation, 1991a). By the year 2005, 71,500 operations are forecast. The airport has three runways which are 2,500 feet in length or less. The annual service volume of this airport is 120,000 operations.

Papago Army Aviation Support Facility is approximately 19 NM northwest of Williams AFB. In 1991, there were 4,550 operations of rotary aircraft and 582 operations of fixed wing aircraft (Ballard, 1992).

A very small reduction in travel through Sky Harbor International Airport could result from closure of Williams AFB and the loss of base personnel and dependents who use the airport. The loss of base-related air travel would be more than compensated by projected population growth in the Phoenix MSA. With regard to the base closure impacts upon the numerous general aviation airfields discussed above, the long-term impact depends heavily on the ultimate reuse selected for the base. As for short-term impacts, most area airport operators (both civilian and military) acknowledge that a sizeable number of military and civilian aircraft would want to perform training activity at Williams AFB after closure. This number is impossible to accurately estimate, but of the 1,400 civilian aircraft based at public airports within the ROI (P&D Aviation, 1992), one could expect 15 percent of these would attempt practice operations at the base. Military training could also commence a short time after closure.

3.2.3.4 Railroads. The Southern Pacific Railroad runs in a northwest-southeast direction and is located southwest of Williams AFB. The Southern Pacific Railroad traverses the southern portion of the Phoenix metropolitan area, in general.

AMTRAK currently carries 105,348 passengers per year on this line of the Southern Pacific. Three AMTRAK trains run on this line per week. Passenger capacity is primarily limited by AMTRAK equipment and Southern Pacific's schedule. Southern Pacific trains carry approximately 12,500 tons of freight per day in approximately 10 trains per day. Freight capacity is limited to about 48 trains per day. There is no rail service on-base presently (Grant, 1992; Robertson, 1992).

3.2.4 Utilities

The utility systems addressed in this analysis include facilities and infrastructure used for:

- Potable water pumping, treatment, storage, and distribution
- Wastewater collection and treatment
- Solid waste collection and disposal
- Energy generation and distribution, including the provision of electricity and natural gas.

The ROI for potable water, wastewater, and solid waste utilities includes systems serving Williams AFB and the surrounding geographic areas. The ROI for energy distribution includes the service areas of those companies which provide energy to the base and to the surrounding geographic areas. The major attributes of utility systems in the ROI are processing and distribution capacities, storage capacities, average daily consumption, peak demand, and related factors required in making a determination of adequacy of such systems to provide services in the future. Projections for each of the utilities were obtained from the utility purveyors and adjusted based on decreased base population due to base closure activities.

3.2.4.1 Water Supply

The ROI for water supply includes Williams AFB and the City of Mesa. The City of Mesa is included in the ROI solely based on the assumption that the City of Mesa water system will provide water to Williams AFB subsequent to base closure except under the No-Action Alternative. Williams AFB is the area of analysis for water supply prior to base closure. Williams AFB and the City of Mesa comprise the area of analysis subsequent to base closure. The City of Mesa and Williams AFB currently have independent water supply systems. Williams AFB owns, operates, and maintains its own wells, and no connections exist with surrounding water purveyors.

On-Base. Williams AFB uses three water supply wells (Well Nos. 5, 7, and 8). Two of these wells (Nos. 5 and 8) are located in the central core area of the base. A fourth well (No. 6) is also located in the central core area of the base, but it is not capable of producing and has been removed from the base water distribution system. All base drinking water is drawn from the three active wells (Lane, 1993a). Well No. 7 serves the munitions storage facility east of the runways. Base water consumption ranges between 450,000 gallons/day (GPD) in the winter and 2,700,000 GPD in the summer (EDAW et al., 1992b; Franzoy Corey Engineers & Architects, 1988a).

The base has an entitlement to divert 833 acre-feet/year (271,415,000 gallons/year) of water from the Central Arizona Project (CAP). The entitlement allows for a maximum withdrawal of 29,856,000 gallons/month or 691 gallons/minute over a 24-hour period. The yearly allocation from the CAP can be adjusted to 733 acre-feet/year (238,832,000 gallons/year) in dry years. The base has not used the entitlement as water has never been diverted from the CAP. In addition, an agreement between Williams AFB

and the City of Mesa to extend a City of Mesa water line bringing CAP water to the base was never executed due to the base closure announcement. Consequently, on February 1, 1993, Williams AFB sent letters to the Bureau of Reclamation and to the Central Arizona Water Conservation District stating that Williams AFB desires to relinquish its CAP entitlement (Smith, 1993a; 1993b).

One 500,000 gallon elevated storage tank, along with two ground storage tanks which total 1,036,000 gallons, currently serve the drinking water storage needs of the base. Water is distributed from these storage tanks throughout the base through a cast-iron pipe grid system (Franzoy Corey Engineers & Architects, 1988a). These storage tanks are located at the water plant complex west of the commissary. An additional 250,000 gallon ground storage tank, located near Building 1084, provides both potable water and fire protection storage (EDAW et al., 1992b; Yost and Gardner Engineers, 1988; Lane, 1993b).

Water quality on the base meets all applicable quality requirements but suffers from poor taste due to high mineral content. Additional treatment procedures would improve the taste and quality of the water (EDAW et al., 1992b).

Off-Base. The City of Mesa's water treatment and distribution system has a current capacity of 156 million gallons per day (MGD). This capacity is planned to be increased to 180 MGD in 1994 and 220 MGD in 1996. The City of Mesa has an average daily potable water consumption of 64 MGD and an average daily peak demand of 70 MGD (Arizona Department of Commerce, 1991). The City of Mesa has a CAP entitlement of 34,000 acre-feet/year (30 MGD). It uses approximately 15,000 to 16,000 acre-feet/year (13-14 MGD) of its entitlement to supplement its municipal water supply (Wisz, 1993).

Preclosure Reference. Table 3.2-5 indicates estimated water demands for Williams AFB for the years 1991 to the base closure year. Projections do not include water demand projections for other water systems in the ROI because there are currently no connections between the base and other water systems.

Closure Baseline. On-base water demand is expected to decrease as on-base population decreases. The average yearly demand for the base closure

Table 3.2-5. Estimated Utility Demand in the ROI, 1991 to Closure

Utility	FY 1991	FY 1992	FY 1993 (Closure)
Water Consumption[a] (MGD)	1.217	1.284	0.719
Wastewater Treatment[a] (MGD)	0.334	0.352	0.197
Solid Waste (thousand tons/year)	2,572.2	2,657.6	2,743.0
Electrical Consumption (MWH/day)	40,027	40,157	42,365
Natural Gas Consumption[b] (thousand therms/day)	826.2	828.9	873.5

[a] Prior to base closure, the ROI for water supply and wastewater treatment is confined to Williams AFB while the ROI for the other utilities includes the respective utility systems which serve the base.

[b] Natural gas consumption is per calendar year.

Sources: Based on Malcolm Pirnie, 1991; Maricopa Association of Governments, 1991a; Rebman, 1992a; Borrego, 1992; Cattanach, 1992; U.S. Air Force, 1992e; 1992f; 1992g.

year 1993 is depicted in Table 3.2-5. Water demand is expected to decrease to approximately 0.035 MGD at base closure.

3.2.4.2 Wastewater

The ROI for wastewater collection and treatment includes Williams AFB and the City of Mesa. The City of Mesa is included in the ROI solely based on the assumption that the Williams AFB sanitary sewer system will be connected to the City of Mesa system subsequent to base closure except under the No-Action Alternative. Williams AFB is the area of analysis for wastewater collection and treatment prior to base closure. Williams AFB and the City of Mesa comprise the area of analysis following base closure.

Williams AFB has its own wastewater treatment facility and handles all wastewater treatment occurring on the base. Wastewater is currently being used to maintain the base golf course (filling water hazards and irrigation of greens and fairways).

On-Base. The wastewater treatment facility, located at Facility 1011, employs a trickling filter. The base's current National Pollutant Discharge Elimination System (NPDES) Permit identifies the Roosevelt Water Conservation District (RWCD) Floodway (East Maricopa Floodway) and Roosevelt Irrigation District Canal (Roosevelt Water Conservation District Canal) as the treatment plant's two outfalls. Discharge to the two outfalls

has occurred approximately twice a year on average, as needed (Husbands, 1992). However, the treatment facility normally reclaims domestic and industrial wastewater, after disinfecting, for turf and landscape irrigation on the golf course. Williams AFB has submitted applications for an Aquifer Protection Permit and for a Reclaimed Wastewater Reuse Permit from the ADEQ to discharge wastewater effluent to the golf course. Sludge is currently dried and stockpiled near the treatment plant in four sludge drying beds (Malcolm Pirnie, 1991). The treatment plant also has two recently lined ponds for effluent storage and a pump station (Lane, 1992a). The treated effluent is discharged to the golf course via a pump system and two effluent lines which run along the western boundary of the base. Also, there is a small storage tank located near the golf course which is used for mixing sewage effluent and potable water for golf course irrigation. Signs on the golf course indicating that treated effluent is being used for irrigation purposes are currently in place (EDAW et al., 1992b). The NPDES permit currently limits the concentration of total suspended solids (TSS) that may be discharged and specifies that 85 percent of the TSS (in the influent) has to be removed prior to discharge. The plant effluent is normally in compliance with the TSS limit; however, because the TSS is low in influent to the plant, the plant has had trouble achieving 85 percent removal of TSS. A permit modification was sought to lower or eliminate the 85 percent reduction requirement (Husbands, 1992). The ADEQ issued a draft NPDES permit modification, pending EPA Region IX approval, in August 1992 which recommended removing the 85 percent TSS removal requirement from the Williams AFB NPDES permit (Palsma, 1992). On March 11, 1993, EPA Region IX issued a final permit modification to Williams AFB (Oda, 1993).

On January 28, 1993, Williams AFB was asked by the Roosevelt Water Conservation District to remove all base facilities from the RWCD Canal area. These facilities were used by the base to discharge wastewater effluent to the canal. The RWCD's letter stated that no current license agreement exists between Williams AFB and the RWCD to permit the use of RWCD property for discharge purposes. The license agreement expired in the September 1988 timeframe. The RWCD also provided Williams AFB with a comment letter which the RWCD submitted to U.S. EPA Region IX and to the ADEQ regarding the Williams AFB NPDES permit modification request. Among other objections, the RWCD stated in its comments that Williams AFB has no right to discharge to the canal, and the Williams NPDES permit erroneously identifies the permitted outfalls as discharging to the Roosevelt Irrigation District Canal and the Roosevelt Water Conservation District Floodway. The RWCD letter clarified that the reference to the

Roosevelt Irrigation District Canal in the Williams permit is incorrect. It is actually the Roosevelt Water Conservation District Canal. The reference to the Roosevelt Water Conservation District Floodway is also incorrect. The RWCD is not involved with the floodway as it is part of the Maricopa Flood Control District. It is officially designated the East Maricopa Floodway (Leonard, 1993a; 1993b).

On February 17, 1993, Williams AFB personnel completed a project to remove the wastewater discharge pipe from the RWCD Canal area as directed by the RWCD. Also, the manhole used to service the outfall end of the pipe was plugged with concrete, and soils disturbed during the removal of the pipe were recompacted. Williams AFB also investigated the possibility of modifying its NPDES permit to remove the RWCD Canal (Outfall 002) as a permitted outfall and to change the incorrect name reference, RWCD Floodway, to the East Maricopa Floodway. However, the ADEQ advised Williams AFB not to initiate any changes to its NPDES permit until the next scheduled permit renewal in 1994 (Smith, 1993c).

The treatment plant was originally constructed in 1942 and was renovated in 1975 with the addition of a second-stage trickling filter. The current design capacity is 1 MGD. Current operating procedures include the recirculation of large volumes of secondary effluent through primary and secondary treatment in order to drive the trickling filter distributor mechanism (EDAW et al., 1992b). In 1990, the average sewage flow from the base facilities was 341,000 GPD. The facility is normally underloaded except during storm periods when large quantities of infiltration and inflow enter the base and interconnections between the storm sewer and sanitary sewer systems increase influent to as much as 1.25 MGD (Malcolm Pirnie, 1991). However, instantaneous flows to the wastewater treatment plant have reached approximately 1,700 gallons per minute during storm events. During such storm events when infiltration and inflow would exceed the treatment plant capacity, the influent line into the treatment plant is partially or completely shut until the plant can treat the infiltrated water. The influent sewage lines have adequate capacity to store water and wastewater while the plant operates near or at capacity (Lane, 1992b; Lipscomb, 1993).

Off-Base. The City of Mesa's sanitary sewer system consists of three interconnected treatment plants with a combined capacity of 39 MGD. The system has an average daily usage of 28 MGD (Arizona Department of Commerce, 1991).

Preclosure Reference. Influent to the base wastewater treatment plant has declined considerably, as has the number of on-base personnel, since 1987 when average daily flow was estimated at 685,000 GPD. In 1988, average daily flow was 515,000 GPD, representing a 25 percent decrease from 1987. The 1990 average daily traffic flow was 341,000 GPD, which represents a 50 percent decrease from 1987. Table 3.2-5 shows the projected wastewater treatment quantities for Williams AFB. These projections do not include projections for other wastewater treatment systems within the ROI because there are currently no connections between the base wastewater treatment system and other wastewater treatment systems.

Closure Baseline. Influent to the base wastewater treatment plant is expected to decrease as on-base population decreases. Estimates of average daily flow for the years 1991 through closure were developed based on a per capita flow rate range of 75 to 112 GPD (Malcolm Pirnie, 1991). Average flow is estimated to drop to 0.010 MGD at base closure. The average flow during the base closure year 1993 is depicted in Table 3.2-5.

3.2.4.3 Solid Waste

On-Base. The ROI for solid waste collection and disposal includes all of Maricopa County. Solid waste from Williams AFB is currently disposed of in the Queen Creek Landfill, operated by Maricopa County. The 138-acre landfill (60 acres are currently in use) is located at the northeast corner of Hawes Road and Riggs Road in the Town of Queen Creek (Town of Queen Creek, 1990a). The facility is designated suitable for the disposal of regular and construction waste. Disposal of liquid waste and special waste is not permitted (Bullock, 1992).

A. J. Fowler Corporation served as the private hauler for Williams AFB through FY 1992. The private hauler collected approximately 4,680 tons from the base that year (Fowler, 1992; Williams, 1992).

Off-Base. Maricopa County currently has six active landfills: the Queen Creek Landfill described above, with capacity to remain open for the next 5 to 7 years; the New River Landfill with capacity to remain open for the next 30 years; the Gila Bend Landfill and the Hassayampa Landfill (a Superfund site because of extensive pesticide contamination), both of which will become transfer stations in approximately one year upon the opening of the

50-year capacity Southeast Regional Landfill; the Northwest Regional Landfill, which recently opened and has capacity to remain open for the next 50 years; and the Cave Creek Landfill with a capacity to remain open for the next 5 to 8 years (Bullock, 1992; Padgett, 1992).

Preclosure Reference. The need for and location of a new regional landfill is being considered by the Southeast Regional Landfill Siting Committee. Land in Pinal County is proposed for the new regional landfill site which may be located between 1993 and 1995. The new landfill will serve the eastern portion of Maricopa County, including the area which Williams AFB occupies, and parts of Pinal County (Town of Queen Creek, 1990a). Table 3.2-5 indicates solid waste disposal projections for Williams AFB and all communities using the same landfill for the years 1991 to closure.

Closure Baseline. Disposal quantities in the ROI are not expected to be affected by a decrease in on-base population. The decrease in solid waste disposal due to a decrease in on-base population is expected to be offset by an increase in solid waste by local growth in Maricopa County. Table 3.2-5 indicates solid waste disposal projected in the ROI for the base closure year.

3.2.4.4 Energy

Electricity is provided to Williams AFB and to the East Valley area by Salt River Project (SRP) Electric. Natural gas is provided to Williams AFB through the Southwest Gas distribution system.

On-Base. Williams AFB currently owns the entire on-base electric distribution system, both overhead and underground lines. SRP owns only the main feed to the base and the transformers and appurtenances within the fenced area of the substation. Power is delivered via a 69,000 V main feed from the west to the base substation located near the Civil Engineering Squadron (Building 602). The base has numerous emergency diesel generators to provide backup power during blackouts (EDAW et al., 1992b).

The base has two voltage levels. The most prevalent voltage is 12,470 V, commonly used for domestic and industrial purposes within the SRP electric service area. Some on-base locations, including the south and middle apron flight lines, are served by 4,160 V. Before closure was announced, plans and specifications had been developed to convert the base electrical system from 4,160 V to 12,470 V in order to improve system efficiency and reliability (EDAW et al., 1992b). Plans to upgrade the system were

canceled when base closure was announced. The base still uses both voltage types (Husbands, 1992). Williams AFB consumed approximately 144.4 MWH/day of electricity in 1991. Peak electrical consumption occurs in the summer, when as much as 200 MWH/day are consumed by the base (U.S. Air Force, 1992f).

Natural gas is delivered to Williams AFB through the Southwest Gas distribution system. The system is in generally good condition. Some portions of the system were constructed in the 1940s and 1950s and require periodic maintenance. The most common maintenance problems are corrosion and subsequent weakening of gas mains. The delivery system has also experienced corrosion and weakening (EDAW et al., 1992b). Williams AFB consumed approximately 3,000 therms/day (1 therm = 100,000 BTU) of natural gas in 1991. Peak natural gas consumption occurs in the winter, when as much as 6,300 therms/day are consumed by the base (U.S. Air Force, 1992g).

Off-Base. SRP Electric served 538,293 customers at Williams AFB and the East Valley area as of 1991. The company reported a FY 1991 energy usage of 40,027 MWH/day (Borrego, 1992).

Southwest Gas currently provides natural gas to Williams AFB and also serves the communities of the Phoenix metropolitan area and the East Valley. Southwest Gas delivered 301,573,056 therms to the service area in 1991, equating to a natural gas consumption rate of 826.2 thousand therms/day (Cattanach, 1992).

Preclosure Reference. Table 3.2-5 indicates projected electricity and natural gas demands for areas served by SRP Electric and Southwest Gas, respectively, for the years 1991 to the base closure year.

Closure Baseline. Table 3.2-5 indicates projected electricity and natural gas demands for areas served by SRP Electric and Southwest Gas, respectively, for the base closure year, and accounts for reductions due to base closure. Demand in the ROI is projected to increase despite base closure activities due to growth within the ROI. Base closure will have a negligible effect on projected electricity and natural gas consumption within the ROI. Therefore, no impact on the manpower requirements of either SRP or Southwest Gas is expected.

3.3 HAZARDOUS MATERIALS AND HAZARDOUS WASTE MANAGEMENT

Hazardous materials and hazardous waste management activities at Williams AFB are governed by specific environmental statutes and regulations. For the purpose of the following analysis, the term hazardous waste or hazardous materials will mean those substances defined as hazardous by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC §9601-9675, as amended, and the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act (RCRA), 42 USC §6901-6992, as amended. In general, this includes substances that, because of their quantity, concentration, or physical, chemical, or toxic characteristics, may present substantial danger to public health or welfare or the environment when released into the environment. Additionally, the U.S. EPA has granted the State of Arizona the authority to promulgate and enforce environmental regulations. The state regulations, which are at least as stringent as federal regulations, are found in the Arizona Administrative Code (A.A.C.), Title 18.

Transportation of hazardous materials is regulated by the federal Department of Transportation (DOT) regulations within Title 49 of the Code of Federal Regulations (CFR). The Arizona Department of Transportation regulates transportation of hazardous materials and hazardous wastes under A.A.C Title 18, Chapter 8, Article 2, Section 63 (R18-8-263).

Treatment and disposal of nonhazardous waste, including wastewater, is discussed in Section 3.2.4, as part of infrastructure support.

The ROI encompasses all geographic areas that are exposed to the possibility of a release of hazardous materials or hazardous wastes. The ROI for known contaminated sites is within the existing base boundaries. Specific geographic areas affected by past and current hazardous waste operations, including planned and completed remediation activities, are presented in detail in the following sections.

The preclosure reference for the purposes of this analysis was established as November 1992. This date represents operational mission conditions prior to the initiation of drawdown activities.

3.3.1 Hazardous Materials Management

Preclosure Reference. Williams AFB engaged in a variety of support operations, such as aircraft maintenance, facility maintenance, and firefighter training, that required handling and using hazardous materials. Examples of hazardous materials used include pesticides, industrial solvents, fuels (gasoline, diesel, JP-4), oils, lubricants, plating rinse waters, aircraft washing solutions, paint strippers, and caustics (U.S. Air Force, 1991d). The *Williams AFB Oil and Hazardous Substance Spill Prevention and*

Response Plan (U.S. Air Force, 1992l) addresses the discharge of pollutants and response to spills. It also identifies storage locations for hazardous materials shipped to the base and lists the individual hazardous materials stored at each facility.

Closure Baseline. After closure, the OL and its agents will be using hazardous materials. Each will be responsible for managing these materials in accordance with federal, state, and local regulations to protect their employees from occupational exposure to hazardous materials and to protect the public health of the surrounding community.

The OL or its agents will be responsible for the safe storage and handling of hazardous materials they use in conjunction with base maintenance operations, such as paint, paint thinner, solvents, corrosives, ignitables, pesticides, and miscellaneous wastes associated with vehicle and machinery maintenance (motor oils and fuels). These materials will be delivered to the base in compliance with the Hazardous Materials Transportation Act (HMTA) under 49 CFR.

If the Air Force authorizes interim use of base facilities prior to disposal and reuse, it will require that all hazardous materials be shipped, stored, and handled in compliance with appropriate regulations.

3.3.2 Hazardous Waste Management

Preclosure Reference. Normal operations at Williams AFB produced wastes defined as hazardous by RCRA, 40 CFR Part 261 and the A.A.C., R18-8-201 through R18-8-280. A variety of hazardous wastes were generated as a result of maintenance activities at Williams AFB. These include contaminated oil wastes, solvents, solvent-contaminated rags, paint wastes (paint, filters, rags), and other chemical wastes. As required by A.A.C. R18-8-262, these hazardous wastes and quantities generated were reported annually to the Arizona Department of Environmental Quality (ADEQ).

In 1982, Williams AFB submitted a RCRA Part A permit application to the U.S. EPA. Williams AFB generates hazardous wastes, but does not engage in the treatment, disposal, or storage of hazardous waste for over 90 days; the Part A application was filed as a protective measure to cover the possibility of such activities. Consequently, the ADEQ classified Williams AFB as an interim status treatment, storage, and disposal facility. Williams AFB did not submit the RCRA Part B permit application and lost interim status in November 1992 (U.S. Air Force, 1992m). Because Williams AFB is a "generator only," the loss of interim status has no regulatory impact.

Williams AFB was a large-quantity generator (i.e., the base generated greater than 1,000 kilograms (kg) of hazardous waste in a calendar month). The 82nd Civil Engineering Squadron was responsible for the management

of hazardous wastes. Hazardous wastes were stored temporarily at several satellite accumulation points (SAPs) and 90-day accumulation points (Table 3.3-1). In accordance with RCRA as implemented by 40 CFR Parts 260-270 and the A.A.C., R18-8-260 through R18-8-280, wastes were transported off the base and disposed of by a licensed contractor prior to the expiration of the temporary 90-day storage limit.

In addition to the SAPs and 90-day accumulation points, an inactive hazardous waste storage area exists at the base. This area is located adjacent to and south of Building 602. Known variously as the "Interim Hazardous Waste Storage Area," the "Hazardous Waste Holding Yard," or the "Prime Beef Yard," the area is surrounded by a 10-foot-high fence and includes a small building designated Building 766. Hazardous wastes are not known to have been stored here, but construction materials, some of which may have been hazardous, were. In addition, transformers containing PCBs awaiting off-base transport were stored in Building 766. A 1991 ADEQ inspection documented evidence of leakage from drums stored at the area, but subsequent sampling and analysis of visually contaminated soil showed that the leaked material was not a RCRA hazardous waste (Anderson, 1991). Further activity under the IRP will occur at this site, and it will be closed under CERCLA authority (Van Fleteren, 1992).

Williams AFB Plan 705, Williams AFB Oil and Hazardous Substance Spill Prevention and Response Plan (U.S. Air Force, 1992l) contains procedures for preventing spills of oil, PCBs, and hazardous substances, and provides guidance in responding to spill incidents. *The Williams AFB Contaminated and Used Petroleum Management Plan* (U.S. Air Force, 1992n) implements applicable regulations and contains directives concerning the management of contaminated and used petroleum products at Williams AFB. *The Williams AFB Hazardous Waste Management Plan* (U.S. Air Force, 1992m) (formerly Williams AFB Plan 708), is used in conjunction with Plan 705. The Hazardous Waste Management Plan is intended to provide guidance and procedures to ensure compliance with hazardous waste regulatory and pollution prevention standards.

Closure Baseline. At the time of base closure, all hazardous waste generated by base functions had been collected from all accumulation points and disposed of off-site to a permitted facility, in accordance with RCRA. Hazardous waste generated by the OL or its agents will be tracked to ensure proper identification, storage, transportation, and disposal, as well as to ensure implementation of waste minimization programs.

3.3.3 Installation Restoration Program (IRP) Sites

The IRP is a U.S. Department of Defense (DOD) program to identify, characterize, and remediate environmental contamination on its installations.

Table 3.3-1. Hazardous Waste Accumulation Points (1992)

Site	Location (Building No.)	Description
Accumulation Points (90-day storage)		
1	1088	Central Hazardous Waste Accumulation Point
2	1093	Central Hazardous Waste Accumulation Point
3	1094	Central Hazardous Waste Accumulation Point
4	1096	Central Hazardous Waste Accumulation Point
5	1097	Central Hazardous Waste Accumulation Point
Satellite Accumulation Points		
1	25	Corrosion Control Shops
2	351	Base Reproduction
3	410	Base Supply
4	491	Auto Hobby Shop
5	533	Vehicle Maintenance
6	572	Precision Measurement Equipment Lab (PMEL)
7	771	CE Paint Shop
8	1080	Wheel & Tire Shop
9	1084	Electric Shop
10	1085	Chemical Cleaning Shop
11	1085	Electroplating Shop
12	1086	Corrosion Control Paint
13	1090	Non-Destructive Inspection (NDI) Shop
14	1541	Media Blaster

Sources: U.S. Air Force, 1992l, 1992m, 1993a; Helms and Greenawalt, 1993.

Although widely accepted at the time, procedures followed prior to the mid-1970s for managing and disposing of many wastes often resulted in contamination of the environment. The program has established a process to evaluate past disposal sites, control the migration of contaminants, and control potential hazards to human health and the environment. Section 211 of the Superfund Amendments and Reauthorization Act (SARA), codified as the Defense Environmental Restoration Program (DERP), of

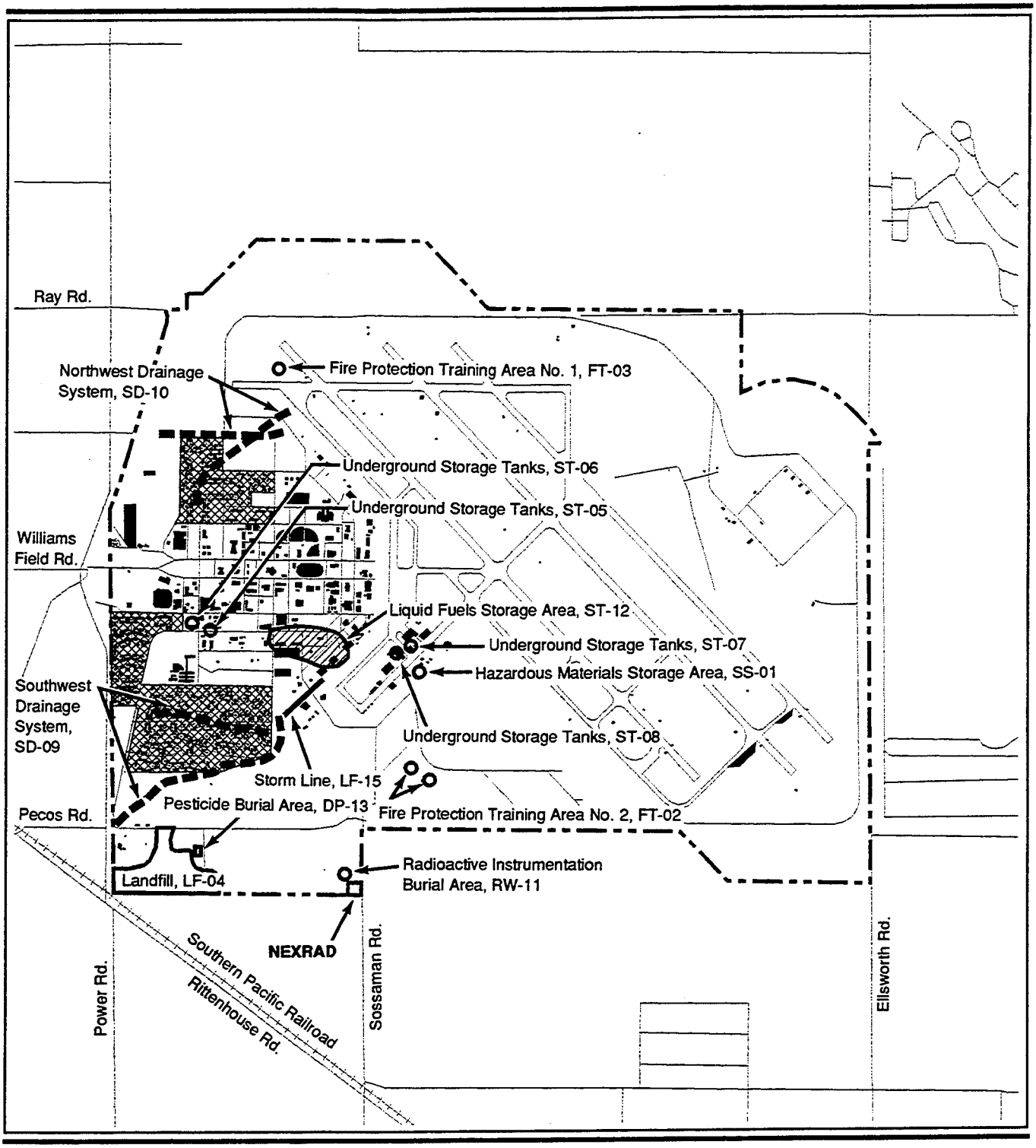
which the Air Force IRP is a subset, ensures that the DOD has the authority to conduct its own environmental restoration programs. The DOD coordinates IRP activities with the U.S. EPA and appropriate state agencies.

Prior to passage of SARA and the establishment of the National Contingency Plan (NCP) for hazardous waste sites, Air Force IRP procedures followed DOD policy guidelines mirroring U.S. EPA's Superfund program. Since SARA was passed, most federal facilities have been placed on a federal docket and the U.S. EPA has been evaluating the facilities' waste sites for possible inclusion on the National Priorities List (NPL). Williams AFB was officially listed on the NPL in November 1989 due to the presence of several hazardous waste sites (Figure 3.3-1).

In September 1990, the U.S. Air Force entered into a Federal Facilities Agreement (FFA) with U.S. EPA Region IX, the ADEQ, and the Arizona Department of Water Resources. The FFA was agreed upon to prioritize and schedule investigation and remedial actions at Williams AFB. IRP sites at Williams AFB have been divided into three operable units (Figure 3.3-2). Operable Unit 1 (OU-1) contains 12 sites including a hazardous materials storage area, two fire protection training areas, a landfill, four underground storage tank sites, two surface drainage systems, a radioactive instrumentation burial area, and a pesticide burial area (IT Corporation, 1992a). Operable Unit 2 (OU-2) is the groundwater contamination, surface soil contamination, and first 25 feet of subsurface soil contamination at the Liquid Fuels Storage Area (ST-12) (IT Corporation, 1992b). Operable Unit 3 (OU-3) includes a contaminated storm line site, a portion of a surface drainage system, and the contaminated soils at the Liquid Fuels Storage Area from a depth of 25 feet below land surface (bls) to the water table. OU-3 is also defined as the Williams AFB site-wide final remedy and will include any additional IRP sites that may be designated (U.S. Air Force et al., 1992; Laird, 1993b).

The FFA established a procedural framework and schedule of deadlines for developing, implementing, and monitoring appropriate response actions at Williams AFB in accordance with CERCLA and applicable state regulations. The agreement stipulates that any corrective actions under RCRA shall be considered and managed pursuant to CERCLA. Objectives, responsibilities, procedures, and schedules for cleanup were established in the FFA. The deadlines are binding on the Air Force subject to compliance by the other FFA parties to the agreed review periods. The parties to the FFA may request extensions for good cause; for example, identification of significant new site conditions. Table 3.3-2 contains a schedule of activities under the FFA for Williams AFB.

Ongoing activities at identified IRP sites may delay or limit some proposed land uses at or near those sites. Future land uses by the recipients on a site-specific level may be, to a certain extent, limited by the severity of



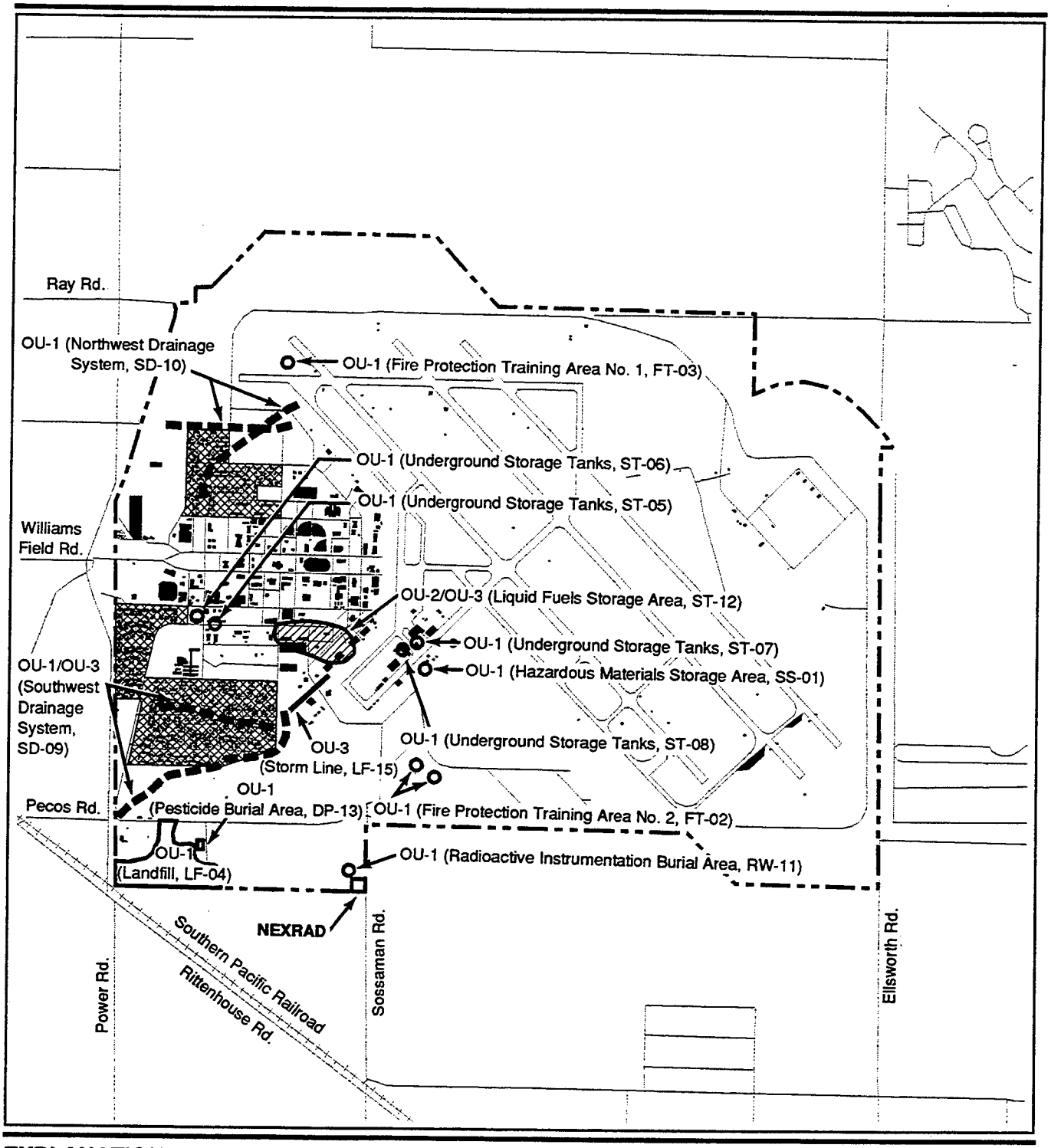
EXPLANATION

- Base Boundary
- Drainage System
- Petroleum Product Plume (Approximate Extent)
- Residential Housing

0 750 1500 3000 Feet

Installation Restoration Program Sites

Figure 3.3-1



EXPLANATION

- Base Boundary
- Drainage System
- Petroleum Product Plume (Approximate Extent)
- Residential Housing

0 750 1500 3000 Feet

Installation Restoration Program Operable Units

Figure 3.3-2

Table 3.3-2. Williams AFB Federal Facilities Agreement Comprehensive RI/FS and Operable Unit Document Delivery Schedule

Document Name	Draft Deliverable Date to FFA Members
Remedial Investigation Report, Operable Unit No. 2	June 3, 1991
Feasibility Study, Operable Unit No. 2	November 27, 1991
Proposed Plan, Operable Unit No. 2	November 27, 1991
Remedial Investigation Report, Operable Unit No. 1	August 11, 1992
Record of Decision, Operable Unit No. 2	July 2, 1992
Feasibility Study, Operable Unit No. 1	February 1, 1993
Proposed Plan, Operable Unit No. 1	February 1, 1993
Record of Decision, Operable Unit No. 1	September 1, 1993
Remedial Investigation Report, Operable Unit No. 3	March 15, 1994
Feasibility Study, Operable Unit No. 3	October 13, 1994
Proposed Plan, Operable Unit No. 3	November 10, 1994
Record of Decision, Operable Unit No. 3	June 11, 1995

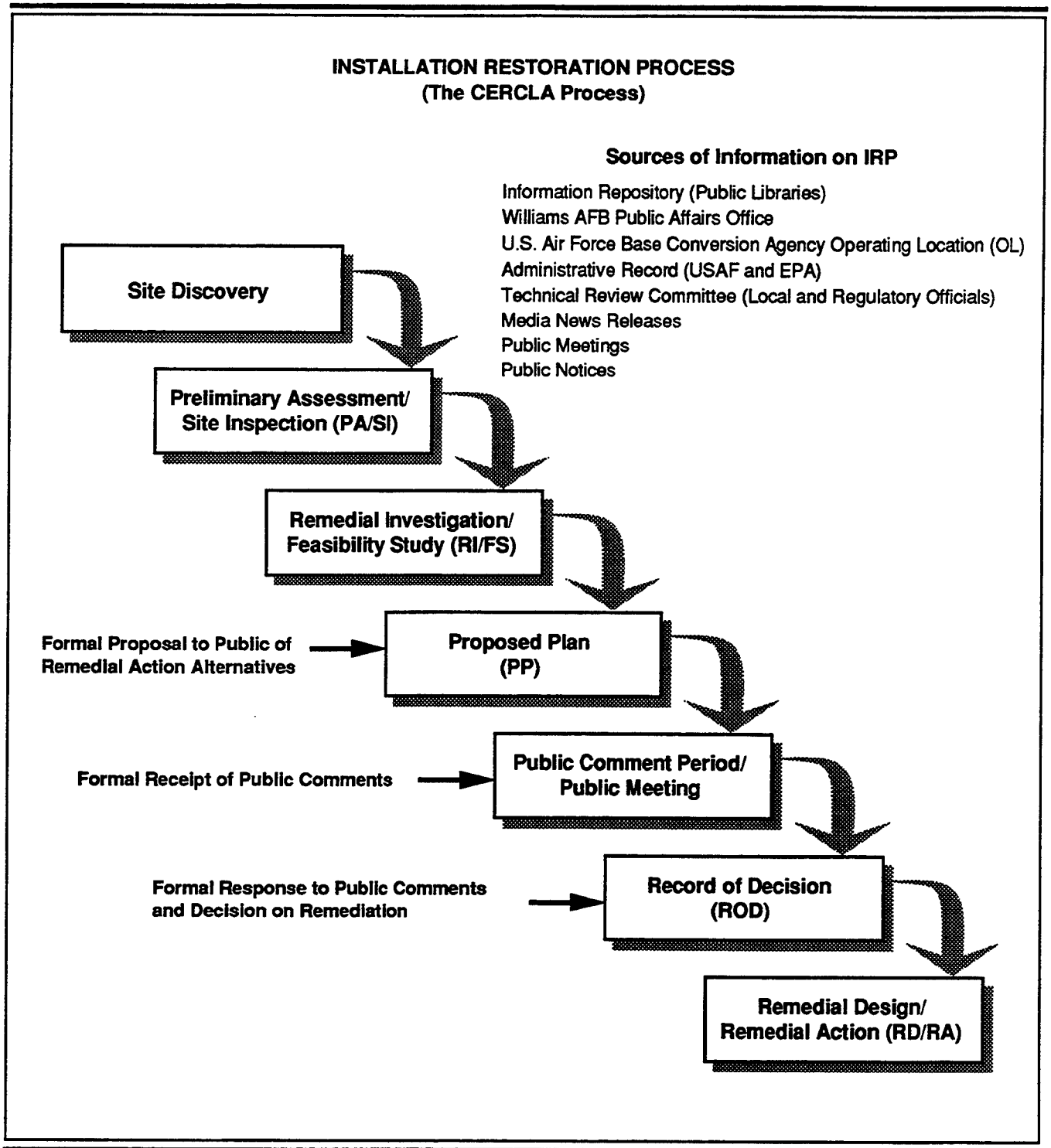
Sources: U.S. Air Force, 1992k; Lane, 1993a.

contamination or level of remediation effort at these IRP sites. Reasonably foreseeable land use constraints are discussed in this EIS. Regulatory review as required by the FFA and the Air Force programs will also ensure that any site-specific land use limitations are identified and considered. A representation of the IRP management process under CERCLA is shown in Figure 3.3-3. The original IRP was divided into four phases, consistent with CERCLA:

- Phase I: Problem Identification and Records Search
- Phase II: Problem Confirmation and Quantification
- Phase III: Technology Development
- Phase IV: Corrective Action.

After SARA was passed in 1986, the IRP was realigned to incorporate the terminology used by the U.S. EPA and to integrate the new requirements in the NCP. The result was the creation of three action stages:

- Preliminary Assessment/Site Inspection (PA/SI)
- Remedial Investigation/Feasibility Study (RI/FS)
- Remedial Design/Remedial Action (RD/RA).



Pictorial Presentation of IRP Process

Figure 3.3-3

The PA portion of the first stage under the NCP is comparable to the original IRP Phase I and consists of a records search and interviews to determine whether potential problems exist. A brief SI that may include soil and water sampling is performed to give an initial characterization or confirm the presence of contamination at a potential site.

An RI is similar to the original Phase II and consists of additional field work and evaluations in order to assess the nature and extent of contamination. It includes a risk assessment and determines the need for site remediation.

The original IRP Phase IV has been replaced by the FS and the RD within the third stage. The FS documents the development, evaluation, and selection of alternatives to remediate the site. The selected alternative is then designed (RD) and implemented (RA). Long-term monitoring is often performed in association with site remediation to assure future compliance with contaminant standards or achievement of remediation goals. The Phase III portion of the IRP process is not included in the normal SARA process. Technology development (TD) under SARA is done under separate processes including the Superfund Innovative Technology Evaluation Program. The Air Force has a TD program in cooperation with the U.S. EPA to find solutions to problems common to Air Force facilities.

The closure of Williams AFB does not affect the ongoing IRP activity. These IRP activities, managed by the OL, will continue in accordance with federal, state, and local regulations to protect human health and the environment, regardless of the disposal decision. The FFA among the U.S. Air Force, the U.S. EPA, the ADEQ, and the Arizona Department of Water Resources formalizes the joint involvement in the IRP. The investigations of IRP sites will be conducted in accordance with the FFA. The Air Force will retain necessary interests (for example, easements) in order to perform operations and maintenance on all remediation systems.

Again, the public may keep abreast of the IRP at Williams AFB through various sources of information (see Figure 3.3-3). Additionally, the IRP as mandated by CERCLA and the NCP, has a public participatory program much like the one in the preparation of this EIS. The Air Force will, with the acceptance of each RI/FS by the regulatory community, prepare a proposed plan for the remediation of a site(s) which will include a discussion of alternatives considered. The proposed plan will be distributed to the public for comment; a public meeting will be held to discuss the proposed plan and comments on the proposed plan will be accepted by the Air Force. The Air Force will then respond to all comments, making those responses part of a public decision document on what the remediation will entail prior to any remedial action being taken (see Figure 3.3-3).

Preclosure Reference. Because the Air Force began the IRP process at Williams AFB in 1984, prior to terminology and procedural changes, both

phases and stages are contained in the IRP administrative record. The IRP Phase I Records Search was published in February 1984. It initially identified nine sites where potentially hazardous materials were handled or disposed of. Of these sites, six were recommended for further evaluation.

A confirmation investigation was completed in December 1985 for the six sites recommended for further study. This study was initiated to confirm the presence of contamination and to delineate the extent of contamination. One site, the Southwest Drainage System, was advanced directly to remedial design. Remedial action was completed at this site in June 1988. In 1987, Williams AFB completed another investigation of the five remaining sites and also included the three sites not recommended for further action in the preliminary assessment study. In October 1988, Williams AFB initiated a remedial investigation of the eight sites studied in 1987, plus underground storage tank sites not previously studied, and additional investigative work at the Southwest Drainage System, for a total of 13 sites (U.S. Air Force, 1991d).

The primary sources of contamination at the RI sites are past aircraft maintenance activities and firefighter training. The types of contaminants that have been identified include solvents and petroleum products. The 13 RI sites identified include one hazardous materials storage area, two fire protection training areas, one landfill, four underground storage tank areas, two drainage systems, one radioactive instrumentation burial area, one liquid fuels storage area, and one pesticide burial area. In the spring of 1992, an additional site was identified for inclusion in the IRP: a collapsed stormwater line serving Facility 53 (Laird, 1992a).

As previously discussed, the IRP sites at Williams AFB have been placed into three Operable Units. A Draft Feasibility Study for OU-1 was prepared for FFA participants in February 1993 (Table 3.3-2). When finalized, the FS will identify the preferred remedy, if any is necessary, for each OU-1 IRP site. For OU-2, a Record of Decision identifying the selected remedy was issued in December 1992 (see Section 3.3.3.9); remedial activity is presently underway. Investigations at OU-3 sites will continue into 1994 and a Draft Feasibility Study defining remedial alternatives is expected in October 1994 (Table 3.3-2).

A summary of IRP site descriptions, including locations and wastes, is provided in Table 3.3-3. Sections 3.3.3.1 through 3.3.3.11 discuss the individual sites.

3.3.3.1 Hazardous Materials Storage Area (SS-01). Until abandoned in 1983, the Hazardous Materials Storage Area (located near Building 1090) was used as a staging area to store drums containing potentially hazardous substances including paint, solvents, caustics, and other maintenance chemicals. The storage area measured approximately 30 feet by 40 feet.

Table 3.3-3. Waste Sites and Disposal Area Investigations
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Site	Site Description/Name	IRP Operable Unit No.	Location and Waste Description
SS-01	Hazardous Materials Storage Area	OU-1	Near Building 1090. Suspected spillage or leakage of stored paints, solvents, caustics.
FT-02	Fire Protection Training Area No. 2	OU-1	Due south of the Hazardous Materials Storage Area and north of Perimeter Road near southern base boundary. Fuels, oils, hydraulic fluids, lubricants, cleaning solvents, and paint strippers.
FT-03	Fire Protection Training Area No. 1	OU-1	Northwestern corner of the base. Fuels, waste oils, solvents, and paint strippers.
LF-04	Landfill	OU-1	Southwestern corner of the base. Domestic garbage as well as wood, metal, brush, construction debris, and dried sludge.
ST-05	Underground Storage Tanks	OU-1	Building 789. Five USTs which were located at the former Base Motor Pool near the current cable television area. Fuels and petroleum products.
ST-06	Underground Storage Tanks	OU-1	Building 725. Two USTs which were located at the former site of the Higley gas station. Fuels and petroleum products.
ST-07	Underground Storage Tanks	OU-1	Building 1086. Two USTs which were located at Building 1086 and received wastes from a Paint Stripping Shop. Paint stripping and waste solvents.
ST-08	Underground Storage Tanks	OU-1	Building 1085. Three USTs which were located at Building 1085 and received wastes from industrial shop operations. Metal plating wastes, waste cutting oil, and solvents.

Table 3.3-3. Waste Sites and Disposal Area Investigations
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Site	Site Description/Name	IRP Operable Unit No.	Location and Waste Description
SD-09	Southwest Drainage System	OU-1/OU-3	Old system: Began east of 5th Street and ran north-northwest through the area that is now the South Desert Village Housing Area. Existing system: Runs 4,000 feet along the south boundary of South Desert Village. Plating shop rinse waters, aircraft washing wastes, miscellaneous spills from flight line and maintenance operations including fuel, oils, hydraulic fluid, solvents, paints, and thinners. The upper 350 feet of the existing system, which was initially remediated in 1988 by encapsulating contaminated soils in a soil/concrete mixture, is under further investigation as part of OU-3; the remainder of the system is addressed as part of OU-1.
SD-10	Northwest Drainage System	OU-1	Old system: Originated near the northwest corner of the flight line (North Apron), just to the north of 5th street, and traversed the area that is now the North Desert Village Housing Area in a southwesterly direction. Existing system: Begins near the North Apron area and runs parallel to K Street and the northern boundary of North Desert Village and west through the golf course. Spills of aircraft washing solution, stripping and shop wastes.
RW-11	Radioactive Instrumentation Burial Area	OU-1	Near the southern edge of the base to the east of the Landfill (LF-04). Radium dials and electron tubes.

Table 3.3-3. Waste Sites and Disposal Area Investigations
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Site	Site Description/Name	IRP Operable Unit No.	Location and Waste Description
ST-12	Liquid Fuels Storage Area	OU-2/OU-3	Located just to the northwest of the South Apron area in the southeast quadrant of the main base. Comprised of various ASTs, USTs, and underground fuel distribution lines which include Facilities 514, 538, 548, 555, 556, 557, and 688. Near-surface soil contamination to 25 feet bls and groundwater contamination are addressed as OU-2; vadose zone soil contamination is addressed as part of OU-3. Jet fuels.
DP-13	Pesticide Burial Area	OU-1	Located immediately to the northeast of LF-04 in the southwest corner of the base. Drummed pesticides.
LF-15	Storm Line	OU-3	Located between Facility 53 and the headworks of the Southwest Drainage System. Includes an underground pipeline along with oil-water separators and sumps at Facilities 53, 532, and 533. Oils and fuels.

Sources: U.S. Air Force, 1991d; IT Corporation, 1992a; U.S. Air Force et al., 1992.

Soil sampling detected the presence of metals and organics in surface soils and in some subsurface soils. The concentrations of metals were within background ranges for southern Arizona. Organics were below proposed state action levels. This area is part of IRP OU-1. The RI report recommended that this site be removed from further IRP consideration (IT Corporation, 1989; IT Corporation, 1992a).

3.3.3.2 Fire Protection Training Area No. 1 (FT-03). Fire Protection Training Area No. 1 was believed to have been used from the early 1940s until about 1958. Fuels, waste oil, solvents, and other combustibles were burned. Little data is available concerning the quantity of materials burned or the frequency of fire training exercises at the site, but fewer burns are believed to have been carried out in the 1940s than in later years. The area is part of IRP OU-1.

FT-03 comprises three burn areas: one measuring approximately 5,926 square feet, one measuring 3,590 square feet, and one measuring 9,840 square feet. These burn areas are located just to the north of Taxiway No. 5 and to the west of the westernmost runway (12R/30L) as confirmed by analysis of aerial photographs. Low levels of organics and metals were detected in soil and groundwater samples from this site. Detected organic compounds, however, were generally below proposed state action levels or were attributed to laboratory or sample contamination. The concentrations of the four metals (lead, silver, antimony, and cadmium) were below the proposed state action limits or within the acceptable background levels for the western United States except for silver and antimony. In 1989, silver was detected in one soil sample at a concentration of 12 ppm which is marginally in excess of the normal background range of 0.01 to 8 ppm. Antimony was detected in seven samples ranging from 16 to 61 ppm. The normal background range for antimony is less than 1 ppm. The detection of antimony may have been the result of analytical error as no contaminant source could be identified (IT Corporation, 1992a). The silver level was not expected to pose a risk because of its immobility in the region's soils and its low frequency of detection (IT Corporation, 1990d). The 1990 Decision Document (IT Corporation, 1990d) concluded that no further action is warranted at FT-03, and recommended that the site be removed from further IRP consideration.

3.3.3.3 Fire Protection Training Area No. 2 (FT-02). Fire Protection Training Area No. 2 is located on 8.5 acres near the southern boundary of the base and has been active since 1958. The area is part of IRP OU-1. From 1958 to 1968, this area consisted of an unlined pit used to burn large quantities of waste solvents, hydraulic fluids, oils, and aircraft fuel. The fires were extinguished as part of fire fighting training. In 1983, FT-02 was expanded from the single unlined burn pit to a large and a small pit with concrete liners. The large pit was fitted with a drain connecting to a collection tank. The frequency of training exercises ranged from two to

three times per week in the middle 1970s to more than eight times per week in recent years. Up to 1,000 gallons of flammable material was used per training event in the 1950s and 1960s, but this had decreased to about 300 gallons per event in the 1980s. Not all the materials were consumed during these exercises.

During the Phase II, Stage 2 soil sampling at the small burn pit at FT-02 (October 1986 and February 1987), chlorinated benzenes were detected at a maximum concentration of 120 ppm and BTEX compounds (benzene, toluene, ethylbenzene, and xylene) with a maximum benzene concentration of 310 ppm at a depth of 66 feet. Total petroleum hydrocarbons (TPH) were also detected at high concentrations with a maximum concentration of 84,000 ppm at a depth of 66 feet. Methyl ethyl ketone (MEK) was detected at concentrations ranging from 13 to 1,400 ppm. Low levels of methylene chloride and acetone were detected from soils at the large burn pit. Both are common laboratory contaminants. The only metal found to credibly exceed the background ranges in the soils at FT-02 was cadmium at 5 ppm. Groundwater samples from Phase II, Stage 2 during the period of January 1987 through August 1989 revealed TPH concentrations ranging from 1 to 6 ppb and lead and zinc at concentrations exceeding background (IT Corporation, 1992a). Borehole samples were well above enforcement levels for TPH, benzene, toluene, and ethylbenzene (Laird, 1992c).

Around the large burn pit, analytical results show some surface soil contamination with petroleum hydrocarbons. The highest TPH level was 30,000 ppm at a depth of 0.5 feet. Many samples contained TPH and oil/grease above ADEQ's enforcement level of 100 ppm. Benzene levels were also above the ADEQ's enforcement level of 0.13 ppm (Van Fleteren, 1991).

Specific remedial activities that may be required have not yet been identified but will be outlined in the Feasibility Study for OU-1.

3.3.3.4 Landfill (LF-04). The Landfill covers approximately 34 acres located in the southwestern corner of the base. The site is part of IRP OU-1. It was operational from 1941 to 1976 and received wastes designated by the State of Arizona as "Class II," most of which consisted of trash and garbage. It also received wood, brush, metal, and construction debris, and it is possible that solvents and chemicals were dumped into the facility along with the domestic trash. Dried sludge from the wastewater treatment plant was also disposed of at the site prior to 1973. Throughout the 1940s and 1950s, materials disposed of at the Landfill were burned. As part of the Landfill operations, disposal trenches were also dug 15 to 25 feet deep and filled to 10 to 15 feet above original ground level (U.S. Air Force, 1991f; 1992a; IT Corporation, 1992a).

Surface soil samples collected in December 1991 revealed the presence of pesticides and semivolatile organic compounds (SVOCs). The compound 4,4'-DDT and its degradation products (DDE and DDD) were found to have the highest occurrence. Their presence and the presence of other compounds such as dieldrin and chlordane isomers indicates either the site was used for the disposal of insecticides or that insecticides were applied to the surface for insect control. Beryllium, lead, and zinc were also detected in these surface soils at concentrations slightly above background levels (IT Corporation, 1992a).

Twelve monitoring wells in the vicinity of the site are sampled quarterly. Low concentrations of VOCs have been detected in the five deep wells which are screened between 275 and 335 feet bls. Low levels of BTEX compounds are responsible for the majority of the VOC detections. Groundwater samples taken from the shallow wells (with screened intervals ranging from 173 to 260 bls) showed low levels of several halogenated compounds such as perchloroethylene (PCE), trichloroethylene (TCE), and bromochloromethanes (IT Corporation, 1992a).

Specific remedial activities that may be required have not yet been identified but will be outlined in the Feasibility Study for OU-1.

3.3.3.5 Underground Storage Tanks (ST-05, ST-06, ST-07, ST-08). A total of 12 USTs were removed from four areas on-base designated as ST-05, ST-06, ST-07, and ST-08. The "Underground Storage Tank" sites in Operable Unit 1 comprise these four areas.

Area ST-05 formerly was part of a motor pool (Building 789); five USTs, formerly containing gasoline, diesel fuel, and waste oil, were removed from this area. Area ST-06 included two USTs (gasoline and waste oil) and is located in the vicinity of a now-removed gasoline station (Building 725). Area ST-07 included two USTs containing paint stripping wastes located around Building 1086. Area ST-08 included three USTs, containing metal plating wastes and waste cutting oil and solvents, and is located near Building 1085 (IT Corporation, 1992a).

All of these USTs were removed in November and December 1990. At the time of removal, contaminated soil associated with each tank was also excavated and disposed off-site at a licensed facility (IT Corporation, 1992a). The tanks at ST-07 and ST-08 were governed by RCRA Subtitle C and were therefore removed and disposed of according to an approved RCRA Partial Closure Plan (IT Corporation, 1991b). No further action at these sites is anticipated.

3.3.3.6 Southwest Drainage System (SD-09). The Southwest Drainage System has been in place since the base was constructed in 1941. Aerial photographs indicate that part of the system was rerouted between 1948

and 1954. This drainage system received plating shop rinse water, aircraft washing wastes, and miscellaneous aircraft and vehicle spills from flight line and maintenance operations (IT Corporation, 1992a). The Southwest Drainage System empties into a broad, flat catchment basin near the southwestern corner of the base.

Investigations were conducted in 1986 and 1987 along the existing section of the Southwest Drainage System to determine if there were contaminants in the soil resulting from the system's past use. The system was thought to be contaminated with heavy metals and organics because surface soils collected at the system's outfall and 50 feet downgradient from the outfall showed elevated levels of metals and organics. Extraction Procedure Toxicity Characteristic testing indicated a low potential for metal and organic contaminants to leach into groundwater. Nonetheless, 350 feet of the Southwest Drainage System were remediated in 1988 by installing a soil cement and 4-inch concrete cap (IT Corporation, 1990b). The soil cement was formed by exhuming the contaminated soil, mixing the soil with cement (using the soil as an aggregate in lieu of sand or gravel), and placing the concrete mixture back on the exhumed area, thus encapsulating and immobilizing the contaminants.

An older section of the ditch was evaluated in 1989. Lead and silver were detected at levels that exceed Arizona health-based cleanup guidelines. However, lead levels were within background limits and the silver levels exceeded background limits only by 3 ppm in one sample. Because contamination was limited, the RI Decision Document recommended that this site be removed from further IRP consideration (IT Corporation, 1990b). However, the capped portion of SD-09 was subsequently placed under OU-3 for further investigation under the IRP program (Laird, 1993b).

3.3.3.7 Northwest Drainage System (SD-10). The Northwest Drainage System has been in place since about 1950. Located in the northwest corner of the base, it drains what is now base housing, and also receives runoff from a portion of the flight line. Spills of aircraft washing solution and shop wastes may have washed into the system. Investigations were conducted in 1986 and 1989 along the old (now filled in) and existing sections of the Northwest Drainage System to determine if soil contamination has occurred. Fourteen subsurface and surface soil samples were collected in 1989 and analyzed for halogenated, nonhalogenated, and aromatic VOCs, semivolatile organic compounds, extraction procedure metals, cyanides, organochlorine pesticides, PCBs, oil and grease, and TPH. Concentrations detected were below proposed Arizona health-based levels, with the exception of lead. The levels of lead detected were within the range typical of background levels for soils in south-central Arizona. As a result, the RI Decision Document recommended that this site be removed from further IRP consideration (IT Corporation, 1990c).

3.3.3.8 Radioactive Instrumentation Burial Area (RW-11). This is a small area, covering approximately 100 square feet near the southern boundary of the base, where low-level radioactive wastes, including radium dials and electron tubes, were reportedly disposed of. The area is fenced and posted as a radioactive materials burial area (IT Corporation, 1992a).

The site contained concrete footings, buried underground, which reportedly contain radium dial faces from aircraft instrument panels decommissioned at the base before 1960. Surface radioactivity was reported as within normal background ranges in 1984 and 1989. Soil samples were collected from boreholes adjacent to the footings in 1987 and 1989 and analyzed for gross alpha activity, gross beta activity, radium, and uranium. Slightly elevated levels of radium were found in the 1984 samples; other samples and parameters were within naturally occurring ranges, indicating that migration was not occurring (IT Corporation, 1991c). Based on the results of these investigations, the site was not considered a hazard to the general public. However, as time passes, the footings could degrade and land uses on the base may change, thus allowing the site to pose a health risk to future residents if the footings do contain radium dial faces. A risk analysis conducted in April 1991 recommended removal and disposal (IT Corporation, 1991a). This action was taken in December 1992. No further action at this site is anticipated.

3.3.3.9 Liquid Fuels Storage Area (ST-12). The Liquid Fuels Storage Area is located in an area of the base which includes Facility Nos. 514, 538, 548, 555, 556, 557, and 688. JP-4 and other liquid fuels were stored here.

The RI for the Liquid Fuels Storage Area was completed in October 1991, the Draft Final RI Report was submitted to state and federal agencies for review, and the Final RI Report was issued in January 1992 (IT Corporation, 1992b). The RI focused on a 2.8-acre area where liquid fuels have been stored since 1942. According to the RI Report, the following potential sources of contamination have been identified:

- one 420,000-gallon aboveground tank at Facility 556
- one 840,000-gallon aboveground tank at Facility 557
- three 50,000-gallon USTs at Facilities 514, 538, and 688
- ten 25,000-gallon USTs at Facility 548
- one 17,000-gallon UST at Facility 548
- numerous valves and distribution points
- thousands of feet of 4- and 6-inch underground fuel distribution lines
- unspecified areas where sludge from the tanks was sprinkled on the ground and allowed to air-dry.

As of February 1992, all 14 USTs and five previously unidentified vaults had been removed from the Liquid Fuels Storage Area (U.S. Air Force, 1992a).

Groundwater and the first 25 feet of soils at the Liquid Fuels Storage Area comprise IRP OU-2 (IT Corporation, 1992d). The RI involved collecting 304 soil organic vapor survey samples, drilling 43 boreholes, installing 32 monitoring wells, collecting 161 soil samples, collecting 10 surface soil samples, and collecting 183 groundwater samples. The RI detected more than 36 contaminants in the area's soil and groundwater; the primary contaminants detected were JP-4 (jet fuel) and its components (IT Corporation, 1992b). Soil contaminants that are above established action levels and require remediation are benzene and 1,4-dichlorobenzene; groundwater contaminants above action levels and requiring remediation are benzene and toluene (IT Corporation, 1992d).

A petroleum hydrocarbon plume and free-floating JP-4 have been identified in the upper aquifer in the vicinity of OU-2; the deeper water supply aquifer has not been affected. It is estimated that between 650,000 and 1,400,000 gallons of JP-4 may be present in the upper aquifer (IT Corporation, 1992b). Since August 1990, as part of an ongoing pilot project, JP-4 has been pumped from the upper aquifer (U.S. Air Force, 1992a).

Currently, potentially site-related chemicals are not present in base production wells, and fate and transport modeling indicates that they will not reach these wells. This groundwater also does not discharge to the surface; therefore, there is currently no completed pathway for human exposure to the chemicals present in the groundwater. However, six chemicals of potential concern were identified in the surface soil at OU-2. Exposure to these chemicals by base personnel working in the area is currently possible (IT Corporation, 1992b).

A FS examined nine alternative technology and process options for soil remediation at the site and six alternatives for groundwater. The FS weighed the advantages and disadvantages of each alternative against the nine criteria established by the U.S. EPA (IT Corporation, 1992c). Through this process, the alternatives that best meet all evaluation criteria were identified. For soils, the preferred alternative combines soil vapor extraction and *in situ* bioremediation; remediation below health-protective levels is expected to take three years. For groundwater, the preferred alternative involves extraction of free product and extraction of contaminated groundwater, air stripping, and reinjection. Remediation below health-protective levels is expected to take 30 years (IT Corporation, 1992c). These were presented as the preferred alternative in the Proposed Plan for OU-2 remediation (IT Corporation, 1992d), and adopted as the selected remedy in the Record of Decision (IT Corporation, 1992e). Remedial activity at the site is presently underway.

Contaminated soils at ST-12 between a depth of 25 feet bls and the water table (i.e., vadose zone soils) are being addressed as part of OU-3. The

schedule for investigation and remedy selection for OU-3 sites is given in Table 3.3-2.

3.3.3.10 Pesticide Burial Area (DP-13). Located east of the Landfill on the southwestern corner of the base, the Pesticide Burial Area is a small site of less than 0.4 acres. Outdated pesticides were buried in drums at this site between 1968 and 1972; types and quantities are not known (IT Corporation, 1992a). Soil borings taken in 1987 detected metals and pesticides in some subsurface soils. The metal concentrations were within background ranges for southern Arizona. Pesticides were below to slightly above detection limits and were not believed to pose a threat to the environment because the pesticides appeared to be immobile. However, because the drums would eventually deteriorate and release their contents, the 1990 Decision Document for the site recommended removal and off-site disposal of the drums and associated soil (IT Corporation, 1990a).

Magnetometer and ground-penetrating radar surveys were used to verify the locations of buried drums, which were removed in 1991 and disposed of at a licensed disposal facility (U.S. Air Force, 1991e).

3.3.3.11 Storm Line (LF-15). A portion of the Storm Line located between Facility 53 and the headworks of the Southwest Drainage System collapsed in the spring of 1992. The Storm Line receives drainage from the flight line and outflow from three oil-water separators at Facilities 53, 532, and 533. Petroleum products were present in the collapsed piping and had contaminated adjacent soils. Approximately 10 cubic yards of soil were removed and 65 feet of 18-inch corrugated pipe replaced. The structural integrity of the remainder of the Storm Line is suspect. This site has been added to the IRP under Operable Unit 3 (Laird, 1992b; U.S. Air Force et al., 1992).

Closure Baseline. In addition to the mandates of the IRP, prior to the transfer of any property at Williams AFB, the Air Force must comply with the provisions of CERCLA §120. CERCLA §120(h) requires that, before property can be transferred from federal ownership, the United States must provide notice of specific hazardous substance activities on the property and include in the deed a covenant warranting that "all remedial action necessary to protect human health and the environment with respect to any [hazardous] substance remaining on the property has been taken before the date of such transfer." Remedial action is considered to have been taken "if the construction and installation of an approved remedial design has been completed, and the remedy has been demonstrated [to EPA] to be operating properly and successfully." The covenant must also warrant that "any additional remedial action found to be necessary after the date of such transfer shall be conducted by the United States."

The Air Force must complete the IRP for the contaminated sites on Williams AFB and provide the assurances required by CERCLA §120(h) for all properties transferred. The combination of these requirements may delay parcel disposition or conveyance and affect reuse.

The Air Force is committed to the identification, assessment, and remediation of the contamination from hazardous substances at Williams AFB. This commitment will assure the protection of public health as well as restoration of the environment. Additionally, the Air Force will work aggressively with the regulatory community to ensure that parcel disposition or conveyance occurs at the earliest reasonable date so as not to impede the economic redevelopment of the area through reuse of Williams AFB. Quantification of those delays based on the conceptual plans for all redevelopment alternatives and what is currently known at this stage of the IRP is not possible.

The closure of Williams AFB does not affect the ongoing IRP activity. These IRP activities will continue in accordance with U.S. EPA, state, and local regulatory agency regulations to protect human health and the environment, regardless of the alternative chosen for reuse. The FFA among the U. S. Air Force, U.S. EPA Region IX, and the State of Arizona, assures this joint involvement in the IRP.

IRP remedial activities will continue well past the September 1993 closure date for Williams AFB. To help accelerate the remediation process, the IRP sites at Williams AFB have been placed in three operable units. Sites designated to each operable unit were determined by common contamination type and geographical location. The sites associated with each operable unit are listed in Table 3.3.3. The OL will oversee the coordination of the contractors and assure that U.S. EPA, State of Arizona, and local regulatory agency concerns are addressed pursuant to the FFA. The Air Force will retain easements in order to perform operations and maintenance on all remediation systems. Funding for the restoration activities at closure installations was authorized by Congress in 1991, specifically for that purpose. It is anticipated that future authorization acts will continue to fund environmental restoration activities at closing installations. The current schedule for future IRP activities is provided in Table 3.3-2. The anticipated remediation timetable for OU-2 (Liquid Fuels Storage Area soils and groundwater) will require three years for soil remediation and 30 years for groundwater remediation (IT Corporation, 1992d). The Feasibility Study for OU-1 is in progress. This will outline the remediation schedule for OU-1 sites. The Remedial Investigation for OU-3 sites has been initiated; the Feasibility Study for OU-3 is expected in 1994.

3.3.4 Storage Tanks

Underground storage tanks (USTs) are subject to federal regulations within RCRA, 40 CFR Part 280. These regulations were mandated by the Hazardous and Solid Waste Amendments of 1984. In addition, Williams AFB USTs are subject to ADEQ state regulations under Arizona Title 49, Chapter 6, Articles 1, 2, 3 and 4 of the Arizona Revised Statutes (ARS). All operating USTs at Williams AFB complied with both sets of regulations (U.S. Department of Energy, 1992). The ADEQ does not regulate aboveground storage tanks unless a spill or leak occurs. The Arizona State Fire Marshal uses the Arizona State Fire Code to regulate aboveground storage tanks. The Arizona State Fire Code is similar to the federal 1988 Uniform Fire Code with the exception of a few appendices.

Preclosure Reference. Table 3.3-4 provides an inventory of USTs at Williams AFB. All known USTs, including those that were active at the time of base closure, have been removed.

There are several large aboveground storage tanks at Williams AFB which contain water or fuels. In addition, a variety of smaller aboveground tanks also exist. An inventory of aboveground storage tanks is given in Table 3.3-5.

An inventory of oil-water separators and sumps is provided in Table 3.3-6.

Closure Baseline. All known USTs and oil-water separators have been removed. The presence and location of the "Airfield USTs" noted in Table 3.3-4 and the Facility 46 sump noted in Table 3.3-6 is being investigated by the Air Force. All remaining aboveground storage tanks that are not in service have been purged to minimize leak and fire hazards.

3.3.5 Asbestos

Asbestos-containing material (ACM) remediation is regulated by the U.S. EPA and the Occupational Safety and Health Administration (OSHA). Asbestos fiber emissions into the ambient air are regulated in accordance with Section 112 of the Clean Air Act, which established the National Emissions Standards for Hazardous Air Pollutants (NESHAP). The NESHAP regulations address the demolition or renovation of buildings with ACM. The Toxic Substances Control Act (TSCA) and the Asbestos Hazard Emergency Response Act (AHERA) provide the regulatory basis for handling ACM in kindergarten through 12th grade school buildings. AHERA and OSHA cover worker protection for employees who work around or remediate ACM.

The ADEQ administers the asbestos NESHAP when demolition or renovation activities involving asbestos are planned. The state's NESHAP program for

Table 3.3-4. Inventory of Underground Storage Tanks
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Facility and Tank No.	Capacity (gallons)	Contents	Installation Date	Status
1	150	Diesel fuel	1971	Removed 1993
18	500	Diesel fuel	1961	Removed 1993
24-1	6,000	Regular unleaded gasoline	1977	Removed 1993
24-2	6,000	JP-4 jet fuel	1977	Removed 1993
32	1,000	Oil/water	1961	Removed 1992
48	1,000	Used oil	1942	Removed 1992
87	1,000	Gasoline	1956	Removed 1988
237	10,000	Diesel fuel	1974	Removed 1993
253	550	Diesel fuel	1964	Removed 1988
319-1	10,000	Regular gasoline	1986	Removed 1993
319-2	10,000	Regular unleaded gasoline	1986	Removed 1993
319-3	10,000	Premium unleaded gasoline	1986	Removed 1993
414	1,000	Waste acids	1984	Removed 1993
415	1,000	Waste solvents	1984	Removed 1993
425	150	Diesel fuel	1981	Removed 1993
514	50,000	Gasoline, JP-4 jet fuel	1942	Removed 1991
532-1	500	Waste fuel	1967	Removed 1993
533	1,000	Waste oil	1969	Removed 1993
534-1	6,000	Diesel fuel	1969	Removed 1993
534-2	12,000	Regular unleaded gasoline	1969	Removed 1993
534-3	12,000	Regular unleaded gasoline	1969	Removed 1993
538	50,000	JP-4 jet fuel	1942	Removed 1991
548-1	25,000	JP-4 jet fuel, aviation gasoline	1942	Removed 1991
548-2	25,000	JP-4 jet fuel, aviation gasoline	1942	Removed 1991
548-3	25,000	JP-4 jet fuel, aviation gasoline	1942	Removed 1991
548-4	25,000	JP-4 jet fuel, aviation gasoline	1942	Removed 1991
548-5	25,000	JP-4 jet fuel, aviation gasoline	1942	Removed 1991

Table 3.3-4. Inventory of Underground Storage Tanks
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Facility and Tank No.	Capacity (gallons)	Contents	Installation Date	Status
548-6	25,000	JP-4 jet fuel, aviation gasoline	1942	Removed 1991
548-7	25,000	JP-4 jet fuel, aviation gasoline	1942	Removed 1991
548-8	25,000	JP-4 jet fuel, aviation gasoline	1942	Removed 1991
548-9	25,000	JP-4 jet fuel, aviation gasoline	1942	Removed 1991
548-10	25,000	JP-4 jet fuel, aviation gasoline	1942	Removed 1991
548-11	12,000	JP-4 jet fuel, aviation gasoline	1942	Removed 1991
550-1	1,000	Waste JP-4 jet fuel	1988	Removed 1993
688	50,000	Diesel fuel, Gasoline, Jet fuel	1942	Removed 1991
712-1	150	Diesel fuel	1942	Removed 1985
712-2	150	Diesel fuel	1985	Removed 1993
715	500	Diesel fuel	1942	Removed 1988
716	12,000	Gasoline	1942	Removed 1991
730	1,000	Gasoline	Unknown	Removed 1991
730-1	1,000	Diesel fuel	1942	Removed 1991
760-1	10,000	Regular gasoline	1961	Removed 1993
760-2	10,000	Regular gasoline	1961	Removed 1993
760-3	10,000	Premium unleaded gasoline	1961	Removed 1993
760-4	10,000	Regular unleaded gasoline	1971	Removed 1993
760-5	10,000	Regular unleaded gasoline	1971	Removed 1993
760-6	500	Waste oil	1955	Removed 1993
762	550	Diesel fuel	1970	Removed 1993
789-1	12,000	Diesel	Unknown	Removed 1991
789-2	12,000	No. 98 lube oil	Unknown	Removed 1991
789-3	12,000	No. 20 lube oil	Unknown	Removed 1991
789-4	12,000	Used oil	Unknown	Removed 1991
1013	500	Diesel fuel	1942	Removed 1993
1056	550	Diesel fuel	1958	Removed 1993
1081	550	Diesel fuel	1969	Removed 1988

Table 3.3-4. Inventory of Underground Storage Tanks
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Facility and Tank No.	Capacity (gallons)	Contents	Installation Date	Status
1085-1	280	Used oil/solvents	1970	Removed 1991
1085-2	500	Used hydraulic oil	1971	Removed 1991
1085-4	600	Electroplating waste	1977	Removed 1991
1085-5	600	Electroplating waste	Unknown	Removed 1991
1086	5,000	Paint/strippers	1970	Removed 1990
1086	5,000	Paint/strippers	1970	Removed 1990
1089	1,000	Diesel fuel	1974	Removed 1993
1092-1	500	Waste JP-4	1975	Removed 1993
1095-1	500	Waste oil	1990	Removed 1993
1095-2	500	Waste oil	1990	Removed 1993
1100-1	250	Diesel fuel	1961	Removed 1981
1100-2	250	Diesel fuel	1981	Removed 1993
1101	550	Diesel fuel	1970	Removed 1993
1102	550	Diesel fuel	1974	Removed 1993
1108	550	Diesel fuel	1981	Removed 1988
1109-1	150	Diesel fuel	1966	Removed 1981
1109-2	150	Diesel fuel	1981	Removed 1993
1114-2	550	Diesel fuel	1969	Removed 1993
1115-1	150	Diesel fuel	1973	Removed 1981
1115-2	150	Diesel fuel	1981	Removed 1993
1121	550	Diesel fuel	1981	Removed 1988
1345	250	Diesel fuel	Unknown	Removed 1993
1540-1	500	Waste JP-4	1972	Removed 1992
Airfield USTs	Unknown	Jet fuels	Unknown	Unknown (under investigation)

Sources: U.S. Air Force, 1992a, 1992j; U.S. Department of Energy 1990, 1991, 1992; Greenawalt, 1992a, 1992b, 1993a, 1993b, 1993d; Lee, 1989; Greenawalt, et al., 1993; IT Corporation, 1993; Thompson, 1993; Zumbehl, 1992.

Table 3.3-5. Inventory of Aboveground Storage Tanks
Page 1 of 5

Facility and Tank No.	Capacity (gallons)	Contents	Installation Date	Status
1*	15	Diesel fuel	1982	Out of service
18*	15	Diesel fuel	1982	Out of service
20	Approx. 300	Diesel fuel	1985	Out of service
82	1,000	Diesel fuel	1983	In service
237*	15	Diesel fuel	1973	Out of service
253	1,000	Diesel fuel	Unknown	Removed 1983-1985
255	500	Gasoline	1955	Out of service
255	500	Diesel fuel	Unknown	Out of service
257	11,000	Non-potable water	Unknown	Out of service
257	5,000	Non-potable water	1972	Out of service
257	1,000	Liquid nitrogen fertilizer	Unknown	Out of service
257	120	Liquid potassium fertilizer	Unknown	Out of service
257	165	Liquid iron fertilizer	Unknown	Out of service
425*	15	Diesel fuel	1977	Out of service
518	2,000	Liquid oxygen	Unknown	Out of service
518	10,000	Liquid oxygen	Unknown	Out of service
518	10,000	Liquid oxygen	Unknown	Removed
543	25,000	Gasoline	1988	Out of service
543	25,000	Diesel fuel	1988	Out of service

Table 3.3-5. Inventory of Aboveground Storage Tanks
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Facility and Tank No.	Capacity (gallons)	Contents	Installation Date	Status
556	420,000	JP-4 jet fuel	1958	Out of service
557	840,000	JP-4 jet fuel	1958	Out of service
602	50	Diesel fuel	1986	Out of service
707	836,000	Water	1952	In service
712*	15	Diesel fuel	1985	Out of service
714	200,000	Water	1943	In service
715	500	Diesel fuel	1974	In service
715	Approx. 100	Sodium heximolipolyphosphate	Unknown	Out of service
724	500,000	Water	1943	In service
745	10,000	Asphalt emulsion	Unknown	Removed 1993
745	5,000	Waste oil	Unknown	Removed 1993
745	1,000	Propane	Unknown	Removed 1993
753	1,000	Diesel fuel	1989	Out of service
762*	15	Diesel fuel	1984	Out of service
766	22,000	Treated groundwater	1992	In service
766	22,000	Treated groundwater	1993	In service
766	22,000	Treated groundwater	1993	In service
766	22,000	Contaminated groundwater	1993	In service
790*	15	Diesel fuel	Unknown	Out of service

Table 3.3-5. Inventory of Aboveground Storage Tanks
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Facility and Tank No.	Capacity (gallons)	Contents	Installation Date	Status
1013*	15	Diesel fuel	1978	In service
1028-0	50	Diesel fuel	Unknown	Removed 1992
1028-1	50	Diesel fuel	Unknown	Removed 1992
1044	Approx. 250	Propane	Unknown	Out of service
1048	3,000	Waste JP-4 jet fuel	Unknown	Out of service
1048	Approx. 3,000	Water	Unknown	In service
1048	1,100	Aqueous fire fighting foam (AFFF)	Unknown	In service
1054**	Unknown	Unknown	Unknown	Removed
1056*	15	Diesel fuel	1983	Out of service
1063	1,680,000	JP-4 jet fuel	Unknown	Out of service
1069	550	Gasoline	Unknown	Removal in 1993
1069	550	Gasoline	Unknown	Removal in 1993
1069	650	Diesel fuel	Unknown	Removal in 1993
1069	1,000	Diesel fuel	Unknown	Removed 1992
1070	550	Diesel fuel	Unknown	Removed 1992
1070	550	Diesel fuel	Unknown	Removed 1992
1082	Approx. 100,000	Water	Unknown	In service
1083	250	Diesel fuel	1986	Out of service
1083	250	Diesel fuel	1986	Out of service

Table 3.3-5. Inventory of Aboveground Storage Tanks
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Facility and Tank No.	Capacity (gallons)	Contents	Installation Date	Status
1083	250	Diesel fuel	1986	Out of service
1083	250	Diesel fuel	1986	Out of service
1089*	15	Diesel fuel	1987	Out of service
1093	Approx. 1,000	Electroplating wastes	Unknown	Out of service
1094	Approx. 1,000	Electroplating wastes	Unknown	Out of service
1100*	15	Diesel fuel	1984	Out of service
1101*	15	Diesel fuel	1984	Out of service
1102*	15	Diesel fuel	1984	Out of service
1109*	15	Diesel fuel	1985	Out of service
1114*	15	Diesel fuel	1983	Out of service
1115*	15	Diesel fuel	1985	Out of service
1130	3,000	Water	Unknown	Out of service
1131	10,000	Water	Unknown	Out of service
1159*	15	Diesel fuel	1985	Removed
1162*	15	Diesel fuel	1985	Removed
1168	550	Diesel fuel	1990	Out of service
1169	550	Diesel fuel	1990	Out of service
1170	550	Diesel fuel	1990	Out of service
1171	550	Diesel fuel	1990	Out of service

Table 3.3-5. Inventory of Aboveground Storage Tanks
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Facility and Tank No.	Capacity (gallons)	Contents	Installation Date	Status
1540	4,000	JP-4 jet fuel	Unknown	Out of service
1542	4,000	JP-4 jet fuel	Unknown	Out of service

Notes: *AST is associated with an electrical power generator.
** Past presence of tank confirmed via field observation.

Sources: U.S. Air Force, 1992j; Greenawalt, 1993b; Husbands, 1993a, 1993b, 1993c; Clark, 1993a, 1993b; Combs, 1993.

Table 3.3-6. Inventory of Oil/Water Separators and Sumps (Settling Tanks)
Page 1 of 2

Location (Facility No.)	Capacity (gallons)	Description	Type	Installation Date	Status
46*	Unknown	Maintenance Hangar	Sump	Unknown	Unknown
53	600	Aircraft Wash Rack	Sump	Unknown	Removed 1993
59	Unknown	Old T-37 Wash Rack	Separator	Unknown	Removed 1993
71	1,500	AGE Wash Rack	Sump	1961	Removed 1993
491	250	Auto Hobby Shop	Separator	1977	Removed 1993
491	350	Auto Hobby Shop	Sump	Unknown	Removed 1993
532-2	250	Vehicle Maintenance	Sump	1967	Removed 1993
532-3	250	Vehicle Maintenance	Sump	1967	Removed 1993
533	2,000	Vehicle Maintenance	Separator	Unknown	Removed 1993
550-2	1,800	POL Facility	Separator	1987	Removed 1993
757	16	Pavement & Equipment Shop	Sump	Unknown	Removed 1993
773	700	CE Vehicle Wash Rack	Sump	Unknown	Removed 1993
1049-1	300	Fire Training Area	Sump	1980	Removal in 1993
1049-2	3,000	Fire Training Area	Sump	1980	Removal in 1993
1080	Unknown	Wheel and Tire Shop	Separator	Unknown	Removed 1993
1084	Unknown	Maintenance Hangar	Separator	Unknown	Removed 1993
1085-3	2,000	Chemical Cleaning Shop	Separator	1971	Removed 1993
1092-2	1,000	Aircraft Maintenance	Separator	1975	Removed 1993
1095	500	Jet Engine Shop	Separator	Unknown	Removed 1993

Table 3.3-6. Inventory of Oil/Water Separators and Sumps (Settling Tanks)
Page 2 of 2

Location (Facility No.)	Capacity (gallons)	Description	Type	Installation Date	Status
1540	350	Engine Test Cell	Separator	1972	Removed 1992
1542	5	Engine Test Cell	Separator	Unknown	Removed 1993

Notes: * Presence confirmed via field observation.

Sources: U.S. Air Force, 1992l, 1992n, 1992o; Lee, 1989; Greenawalt, 1992a; Greenawalt et. al., 1993; Husbands, 1993d; Lane, 1993a; Halliburton NUS Corporation, 1993; Thompson, 1993; IT Corporation, 1993.

asbestos is regulated under A.A.C. R18-2-901, which was adopted from the federal NESHAP program by incorporating by reference 40 CFR Part 61, Subpart M, as amended March 10, 1986. The federal program has been amended since this time and the ADEQ enforces the more recent regulations, although these more recent regulations have not yet been formally incorporated. Along with the federal and state regulations, Maricopa County has additional notification requirements for asbestos removal.

Renovation or demolition of buildings with ACM has a potential for releasing asbestos fibers into the air. Asbestos fibers could be released due to disturbance or damage to various building materials, such as pipe and boiler insulation, acoustical ceilings, sprayed-on fire proofing, and other material used for sound proofing or insulation.

There are two primary categories that describe ACM. Friable ACM is defined as any material containing more than 1 percent asbestos (as determined using the method described in Appendix A, Subpart F, 40 CFR Part 763, Section 1, polarized light microscopy) that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure. Nonfriable ACM are those materials that contain more than 1 percent asbestos, but do not meet the rest of the criteria for friable ACM.

Preclosure Reference. The current Air Force practice is to manage or remove ACM in active facilities, and remove ACM, per regulatory requirements, prior to facility demolition. Removal of ACM occurs when there is a potential for asbestos fiber release that would affect the environment or human health. The Air Force policy concerning the management of asbestos for base closures can be found in Appendix G.

A base-wide survey for ACM is required by FPMR disclosure law prior to base disposal. Williams AFB completed a 100 percent survey of base buildings in 1991 with the exception of individual family residences which were representatively sampled. Beginning in September 1991, the base initiated an asbestos abatement program. The representative inspection of individual family residences found asbestos in all as angle wrapping on hot water pipes. Consequently, all other family residences were inspected and the asbestos wrapping was removed from them. Since the start of the base-wide abatement program in 1991, all friable asbestos has either been removed or encapsulated to preclude dispersion of friable ACM. Most of the asbestos remaining in base buildings is nonfriable and is found in roofing materials and floor tiles (Allen, 1992; Nelms, 1992).

Closure Baseline. As a result of the base-wide asbestos survey, all friable asbestos has either been removed from base buildings or encapsulated to prevent the release of friable ACM. Beyond that, an analysis will be conducted to determine the cost effectiveness of removing ACM versus

devaluing the property prior to reuse. ACM will be removed if a building is, or is intended to be, used as a school or child-care facility. Exposed friable asbestos has already been removed or encapsulated in accordance with applicable health laws, regulations, and standards.

3.3.6 Pesticide Usage

The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) regulates the registration and use of pesticides. Pesticide management activities are subject to federal regulations contained in 40 CFR Parts 162, 165, 166, 170, and 171. State requirements include the Pesticide Act, which regulates the registration of pesticides in Arizona; the Pesticide Use Act, which licenses persons or companies that work as pesticide applicators; the A.A.C., R18-6-101 through R18-6-302, which regulates pesticide use for groundwater protection; the A.A.C., R18-8-201 through R18-8-280, which regulates hazardous wastes, including pesticide wastes if the pesticides meet the definition of hazardous waste; and the A.A.C., R18-11-101 through R18-11-506, which regulates pesticides in surface water and groundwater. The Pesticide Act and Pesticide Use Act are administered by the Arizona Department of Agriculture (Agricultural Chemicals and Environmental Services Division), which acts as the FIFRA investigative arm for the EPA. The A.A.C. Title 18, Chapters 6, 8, and 11 are administered by the ADEQ.

Preclosure Reference. Pesticides include herbicides, insecticides, fungicides, rodenticides, and miticides. Pesticides are used at Williams AFB to maintain the base grounds and golf course. All pesticides are managed and applied by licensed contractor personnel and are stored in Building 1010, the Entomology Shop. The 82nd Civil Engineering Squadron held responsibility for pesticide management at Williams AFB. Table 3.3-7 provides the Entomology Shop pesticide inventory typical of on-hand supplies during 1992 (U.S. Air Force, undated).

Closure Baseline. Subsequent to base closure, pesticides will continue to be used, on an as needed basis, for pest management and grounds maintenance.

3.3.7 Polychlorinated Biphenyls (PCBs)

Commercial PCBs are industrial compounds produced by chlorination of biphenyls. PCBs persist in the environment, accumulate in organisms, and concentrate in the food chain. PCBs are used in electrical equipment, primarily in capacitors and transformers, because they are electrically nonconductive and stable at high temperatures.

The disposal of these compounds is regulated under the federal TSCA, which banned the manufacture and distribution of PCBs with the exception

Table 3.3-7. Pesticide Storage, Entomology Shop (Building 1010)
Page 1 of 2

Name	Quantity
Non-herbicide Pesticides	
Perma Dust	2 (16-oz.) cans
Pt 565 Fogger	1 (16-oz.) can
Amdro	3 lbs.
ULD Bp 100	1/2 gallon
PT 250 Bagon	1 (16-oz.) can
DURSBAN	1/2 gallon
DURSBAN L O	1 pint
Wasp Freeze	2 (16-oz.) cans
Gopher Getter	24 oz.
DURSBAN T.C.	1-1/4 gallons
Maki Mouse Bait	8 lbs.
DURSBAN Granules	7 lbs.
Avitrol	3 lbs.
Teknar HP-D	2 gallons
Flytek	7 lbs.
Commador	1/2 lb.
FILAM W	1-1/2 lbs.
Rizol Tracking Powder	4 lbs.
Liqua-Tox	41 (1.7-oz.) pouches
Rizol Zinc	20 lbs.
Drione Dust	1 lb.
UL-47 Foggacide	1/2 gallon

Table 3.3-7. Pesticide Storage, Entomology Shop (Building 1010)
Page 2 of 2

Name	Quantity
Herbicides	
Princep Caliber 90	100 lbs.
Primitol	3/4 gallon
Spreader	4 gallons
Diquat	4 gallons
Weeder-64	1 gallon
Surflan	3 gallons
Hyuarx	6 lbs.
Arsynal	1 pint

Source: U.S. Air Force, undated.

of PCBs used in enclosed systems. By federal definition, PCB equipment contains 500 parts per million (ppm) PCBs or more, whereas PCB-contaminated equipment contains PCB concentrations of 50 ppm or greater, but less than 500 ppm. The U.S. EPA, under TSCA, regulates the removal and disposal of all sources of PCBs containing 50 ppm or more; the regulations are more stringent for PCB equipment than for PCB-contaminated equipment. In addition to the federal regulation, the ADEQ regulates PCBs in media through the A.A.C. Title 18, Chapter 11, Articles 1, 2, and 4.

Preclosure Reference. All transformers and capacitors containing PCBs were inventoried for removal in 1991 (U.S. Air Force, 1991b; 1991c). The 82nd Civil Engineering Squadron was responsible for the management of PCBs at Williams AFB. With one exception, all known PCB-containing capacitors and transformers were removed and transported off-base for disposal in accordance with applicable regulations. The one exception is a transformer located at Building 790, which was reclassified to non-PCB status. In December 1991, this transformer was drained, flushed, and retrofilled with non-PCB oil by an Air Force contractor. A second draining, flushing, and retrofilling was subsequently conducted, reducing the PCB concentration to 38.3 ppm, which is below the 50 ppm regulatory level (Wareing, 1992; Rebman, 1992b; U.S. Air Force, 1992q).

It should be noted that, as part of the PCB inventory, 396 pieces of electrical equipment were classified as non-PCB status based on negative PCB results using field test kits. Further sampling and laboratory analysis has confirmed the non-PCB status of 74 of these items. Confirmatory sampling and laboratory analysis for the remaining 322 items is ongoing (Mallery, 1992).

Mitigation of a PCB spill has also been completed. The spill occurred on October 27, 1991 when a PCB-containing capacitor exploded when struck by lightning. An emergency service contract was placed with an Air Force contractor who responded to mitigate the spill. The capacitor was sampled and removed off-base and the pole on which the capacitor was mounted was decontaminated. On October 28, potentially contaminated surface soils were sampled and removed for disposal (Watson, 1991). On April 28, 1992, the PCB spill site was excavated again and approximately 20,000 kilograms of PCB contaminated soil, plastic, and wood debris (constituting the electric pole) were removed. Analytical results from soil samples collected on April 28 confirmed that residual PCB concentrations at the site were below U.S. EPA action levels. The materials excavated from the site on April 28 were delivered to the U.S. Ecology disposal facility in Beatty, Nevada on May 21, 1992. The PCB capacitor was disposed of at the Rollins Environmental Services facility in Deer Park, Texas on September 22, 1992 (Greenawalt, 1992c; 1992d).

Closure Baseline. No federally regulated PCB or PCB-contaminated equipment will be left on the base at closure. All known PCB-containing transformers and capacitors have been removed, and the known PCB spill area has been remediated. If confirmatory sampling and laboratory analysis reveals the presence of PCBs above regulatory levels in electrical equipment, such equipment will be removed prior to base disposal.

3.3.8 Radon

Radon is a naturally-occurring, colorless and odorless radioactive gas that is produced by radioactive decay of naturally occurring uranium. Uranium decays to radium, of which radon gas is a by-product. Radon is found in high concentration in rocks containing uranium, granite, shale, phosphate, and pitchblende. Atmospheric radon is diluted to insignificant concentrations. Radon that is present in soil, however, can enter a building through small spaces and openings, accumulating in enclosed areas such as basements. The cancer risk caused by exposure through the inhalation of radon is currently a topic of concern.

There are no federal or state standards regulating radon exposure at the present time. The U.S. EPA offers a pamphlet, "A Citizen's Guide to Radon" (U.S. Environmental Protection Agency, 1988), which offers advice to persons concerned about radon in their homes. U.S. Air Force policy requires implementation of the Air Force Radon Assessment and Mitigation Program (RAMP) to determine levels of radon exposure of military personnel and their dependents. The U.S. EPA has made testing recommendations for both residential structures and schools. For residential structures, using a 2- to 7-day charcoal canister test, a level between 4 and 20 picocuries per liter (pCi/L) should lead to additional screening within a few years. For levels of 20 to 200 pCi/L, additional confirmation sampling should be accomplished within a few months. If the level is in excess of 200 pCi/L, the structure should be evacuated immediately. Schools are to use a 2-day charcoal canister test; if readings are 4 to 20 pCi/L, a 9-month school year survey is required. Table 3.3-8 summarizes the recommended radon surveys and action levels.

Preclosure Reference. The Air Force policy requires a detailed radon assessment program for levels of 4 pCi/L or greater. The Bioenvironmental Engineering Division of the 82nd Medical Squadron was responsible for implementing the RAMP at Williams AFB. The Air Force developed the RAMP to evaluate the concentration of radon in family housing units on military installations. If high concentrations of radon are detected, venting the gas is implemented according to RAMP recommendations. The initial radon screening at Williams AFB was conducted by the Bioenvironmental Engineering Division and consisted of 35 samples collected from the following structures: single-family detached houses (30 samples), child care center (1 sample), dormitory (3 samples), and transient living facility (1

Table 3.3-8. Recommended Radon Surveys and Mitigations

Facility	EPA Action Level	Recommendation
Residential	4 to 20 pCi/L	Additional screening. Expose detector for 1 year. Reduce radon levels within 3 years if confirmed high readings exist.
Residential	20 to 200 pCi/L	Perform follow-up measurements. Expose detectors for no more than 6 months.
Residential	Above 200 pCi/L	Follow-up measurements. Expose detectors for no more than one week. Immediately reduce radon levels.
	Two-Day Weekend Measurement	
School	4 to 20 pCi/L	Confirmatory 9-month survey. Alpha track or ion chamber survey.
School	Greater than 20 pCi/L	Diagnostic survey or mitigation.

Note: Congress has set a national goal for indoor radon concentration of the outdoor ambient levels of from 0.2 to 0.7 pCi/L.

Source: U.S. Environmental Protection Agency, 1988.

sample). Samples were collected between December 1987 and February 1988.

The average radon concentration found in these samples was 2.2 pCi/L. Only one structure had a radon level that exceeded 4.0 pCi/L, which RAMP specifies is the concentration above which further screening must be conducted. This structure, Building 9137, a single-family detached house, had a radon level of 4.2 pCi/L under worst-case (i.e., least-ventilated) conditions. Because this structure exceeded the 4.0 pCi/L RAMP limit, a more detailed assessment was planned (Coughlin, 1988; Buckingham, 1988).

The detailed assessment involved a one-year sample of all habitable facilities on the base. A total of 1,023 samples were collected, two of which showed a radon concentration above the lower 95 percent confidence limit for a 4 pCi/L exposure. These samples were from Building 237 (hospital) and Building 334 (dormitory), and registered 4.0 and 3.4 pCi/L, respectively. Building 9137, which was found to have a radon concentration of 4.2 pCi/L

during the initial screening, had a concentration of 2.3 pCi/L (Midwest Research Institute, 1992).

Closure Baseline. Levels of radon identified in 1988 indicated the possibility of finding elevated levels of radon elsewhere in base structures. A year-long sample of all habitable structures was completed in 1991 and identified two structures with radon levels above the lower 95 percent confidence limit for a 4 pCi/L exposure. Because only two of the 1,023 samples registered at or near 4 pCi/L, and because no sample exceeded 4 pCi/L, radon exposure is not expected to pose a general concern. However, further sampling at Building 237 and Building 334 should be conducted and mitigation measures implemented if high radon concentrations persist (Table 3.3-8).

3.3.9 Medical/Biohazardous Waste

Current federal regulations do not provide for the regulation of medical wastes, but do allow for states to individually regulate medical wastes. The Arizona Department of Health Services regulates in-facility handling of medical/biohazardous materials at licensed facilities under Title 36 (Health Services) of the Arizona Revised Statutes. Currently, no state environmental regulations for medical/biohazardous wastes exist, although such regulations are under development under Title 49 (Environment) of the Arizona Revised Statutes.

Preclosure Reference. Williams AFB has a 45-bed hospital that provided basic in-patient and out-patient care. In July 1992, the hospital was converted to serve as an out-patient clinic only. Hazardous wastes generated at the medical facility included mercury and test chemicals (U.S. Air Force, 1992m). Biohazardous wastes included bacterial wastes (e.g., fecal matter, blood) and sharps (e.g., needles). These biohazardous wastes were burned in the base incinerator (Facility 234), which was permitted by the Maricopa County Department of Health Services Bureau of Air Pollution Control. Discarded chemicals were not burned in the incinerator but were disposed of through the Defense Reutilization and Marketing Office (DRMO) facility at Luke AFB, Arizona. Mercury is present in thermometers and other instruments. Mercury was not incinerated but was recovered and reused by the Precision Measurement and Equipment Laboratory (PMEL) on-base (Birch, 1992b).

A number of photographic operations were conducted at Williams AFB (Table 3.3-9). Buildings 477 and 570 collected spent chemicals from photographic processing and transported the chemicals to Building 237 for processing in the silver recovery unit. Buildings 1090 and 481 maintained their own silver recovery units. After the silver was recovered in the recovery units, photographic wastes were discharged to the sanitary sewer system. Random samples of the wastewater from these facilities were taken to ensure that silver was not entering the sanitary sewer system (U.S.

Table 3.3-9. Facilities Managing Photochemical Wastes

Facility No.	Source
4	Photochemical waste generation point
42	Photochemical waste generation point
237	Silver recovery unit for base
351	Photochemical waste generation point
477	Spent photographic chemical collection point
481	Silver recovery unit for base photo laboratory
539	Photochemical waste generation point
548	Photochemical waste generation point
552	Photochemical waste generation point
570	Spent photographic chemical collection point
712	Photochemical waste generation point
1090	Silver recovery unit for Building 1090

Sources: U.S. Air Force, 1991l; Allen, 1990; Halliburton NUS Corporation, 1992; Williams AFB, 1993.

Air Force, 1992m). The silver that was recovered was sent to the DRMO Facility at Luke AFB, Arizona (Birch, 1992a).

Closure Baseline. The hospital will be inactive and no biohazardous waste will be generated at base closure. Existing biohazardous and photochemical wastes were removed prior to closure in accordance with appropriate federal, state, and local regulations.

3.3.10 Ordnance

The transportation of explosive ordnance falls under U.S. DOT regulations. Ordnance used for its intended purpose and ordnance used in training exercises are currently exempt from RCRA, as are the residues (such as metals, organics, or unexploded munitions) generated by these activities. Contamination of air, soil, or water that may have resulted from such activities, however, is subject to CERCLA. Furthermore, when soil containing wastes or residues from these activities is excavated for removal, the soil becomes subject to RCRA. Ordnance disposed of in ways other than its intended use, such as by burying or by open burning/open detonating excess munitions, is regulated under RCRA and/or CERCLA, as are any wastes or residues resulting from such activities.

Preclosure Reference. The Security Police stored munitions (small arms ammunition) at Facility 710. No permits are required for storage of these products. In the months immediately preceding closure, this was the only facility that handled or stored any type of ordnance (Busbee, 1993). Munitions have been stored in the past at several facilities (1004, 1007, 1008, 1110, 1111, 1112, 1113, 1120, 1122, 1126, and 1128). Munitions were stored at Facility 1124 (Conventional Munitions Shop) until 1992. Explosives associated with ejection seats of T-37 and T-38 training jets were kept at Facility 1080 (Battery/Pneudraulics/Former Wheel and Tire Shops) until 1992.

Two former firing-in buttresses (Facilities 1020 and 1051) were once filled with sand into which munitions were fired during aircraft gunnery sighting exercises. Munitions were once incinerated at Facility 1119. All munitions and other explosives have since been removed from these facilities. Furthermore, a walkover by the Luke AFB Explosive Ordnance Detachment (EOD) on February 4, 1993 concluded that the former firing-in buttresses and the former incinerator area are free from hazard from explosives (U.S. Air Force, 1993b).

Three areas have been the location of recreational and training-related small arms use: Facility 925 (Firing Range), Facility 930 (former skeet range and grenade-launching practice area), and the Former Skeet Range (no facility number).

Facility 925, typically referred to as the Firing Range (also sometimes referred to as the Combat Arms Training Facility), was used for small arms practice.

The skeet range at Facility 930 is one of two such ranges on the base. It was used infrequently for events such as turkey shoots as late as 1992. The former grenade-launching practice area at Facility 930 was used to practice launching mock "grenades" made of a lead ball coated with talcum powder and encased in a hard plastic shell. The shell would shatter upon impact, the talcum powder marking the point of impact, and the lead balls were collected afterwards for reuse. Facility 930 was investigated by the Luke AFB EOD on February 4, 1993 and found to be free from explosive hazards; a clearance certificate acknowledging this conclusion is pending (U.S. Air Force, 1993b). While there is no explosive hazard associated with these practice ranges, the U.S. Army Corps of Engineers (COE) will be contracted to perform a cleanup sweep of the grenade-launching practice area to remove any buried mock grenades (Laird, 1993b).

The Former Skeet Range is a former shooting range that existed on the south side of the base in the 1940s. It has since been developed and covered by asphalt and housing.

In addition, the Suspected Munitions Burial Site is a small area located on the eastern side of the base, south of the Facility 1101 transmitter site. No information is available concerning the history or origin of this site. The Luke AFB EOD performed a sweep of the suspected burial site with a metal detector during their February 4, 1993 walkover, but an extensive amount of fragments in the area precluded an accurate assessment. The EOD recommended sampling the area to assess whether a subsurface survey is required. The EOD also found two open trenches at the southern end of the Suspected Munitions Burial Site, one of which was filled with water and contained aircraft "start canisters" (which may contain explosives) and discarded antennas. The other trench could not be examined. The EOD recommended pumping out the water-filled trench and excavating the area to determine if any further action is required (U.S. Air Force, 1993b; Laird, 1993a). This area will be cleaned up by the COE under the same contract which will be used to clean up the grenade-launching area at Facility 930. The COE will sweep the suspected munitions burial site to remove the munitions, fragments, and other debris associated with this site. The trenches will also be excavated to remove their contents (Laird, 1993b).

Closure Baseline. The former skeet range and grenade-launching practice area (Facility 930), the Former Skeet Range, the former Munitions Incinerator (Facility 1119), and the Suspected Munitions Burial Site have been examined by the Luke AFB EOD for any remaining explosives. Facilities 930, 1119, and the Former Skeet Range were found to be free of explosive hazards and clearance certificates for these areas are pending. The Suspected Munitions Burial Site was recommended for further investigation. The area will be investigated and certified free of explosives prior to disposal of that parcel.

All explosive ordnance accumulated since the Firing Range (Facility 925) and the former skeet range at Facility 930 were closed has been properly packaged and transported off-base for use by other Air Force units (Busbee, 1993; Laird, 1993). The former munitions storage areas have been cleared of all explosive ordnance. The current munitions storage area (Facility 710) will be cleared of ordnance prior to disposal of that parcel. All explosive ordnance will be properly packaged and transported off-base for use by other Air Force units. At closure, no explosive ordnance remained on Williams AFB.

3.4 NATURAL ENVIRONMENT

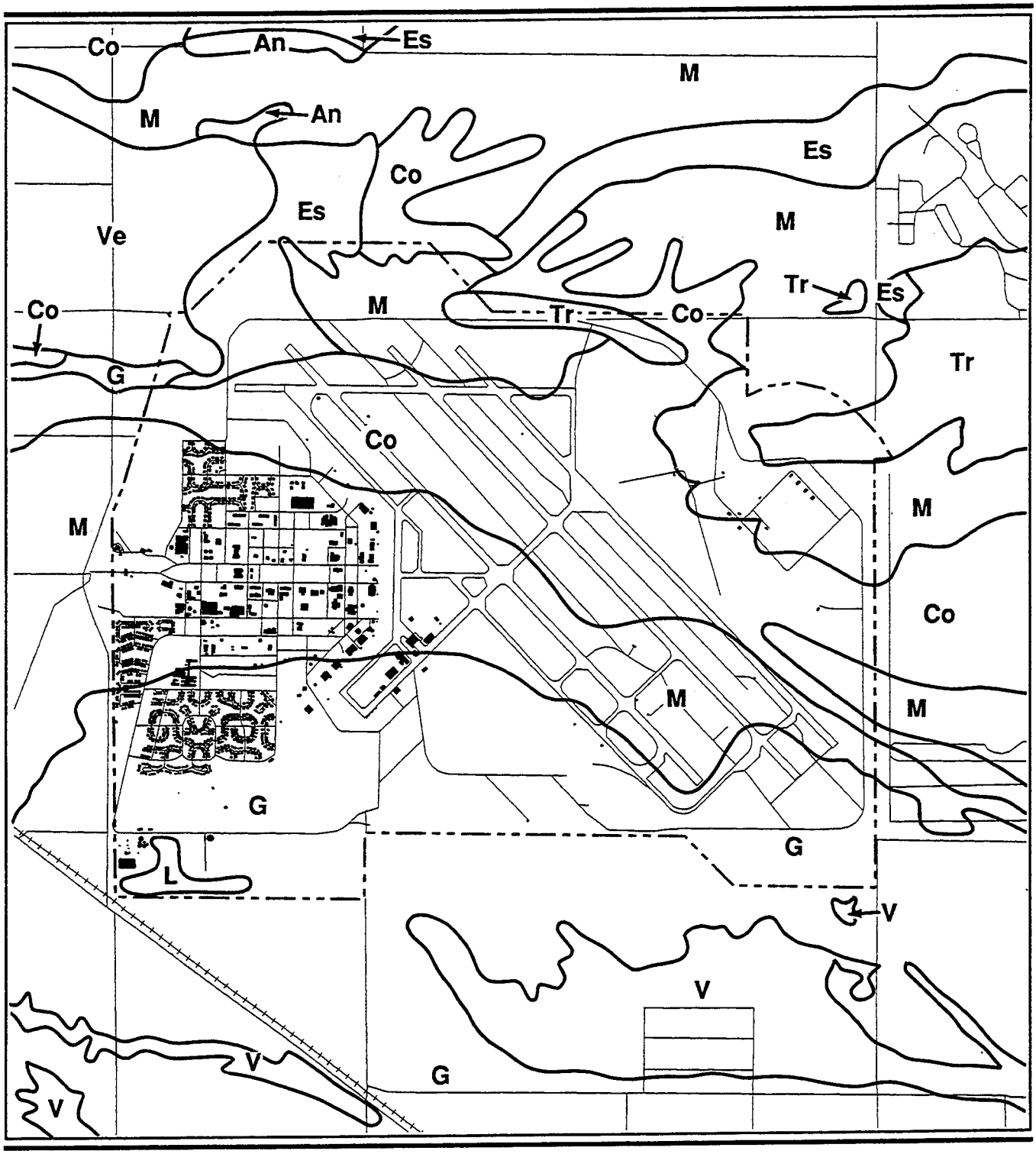
This section describes the affected environment for natural resources: soils and geology, water resources, air quality, noise, biological resources, and cultural resources.

3.4.1 Soils and Geology

Soils, geology, mineral resources, and seismic hazards are addressed in this section. The ROI for soils includes all areas within the boundaries of Williams AFB, as well as off-base areas that may be impacted by the Proposed Action or reuse alternatives. For geology, the ROI comprises the geologic strata which underlie Williams AFB and vicinity and extends off-base to local aggregate deposits, mineral resources, and other earth resources. The ROI for seismic conditions is the regional tectonic framework that encompasses the Salt River Valley Basin.

3.4.1.1 Soils. In general, soils at Williams AFB have formed on alluvial fan deposits derived from the nearby mountains. Two major soil associations are found on Williams AFB. The Mohall-Contine Association is found over much of the base. The Gilman-Estrella-Avondale Association is found in the southern portion of the base (U. S. Department of Agriculture, 1974). Figure 3.4-1 depicts the soils in the vicinity of Williams AFB. The Mohall-Contine Association consists of well-drained, deep, nearly level loams, clay loams, and sandy clay loams derived from old alluvial materials on old alluvial fans. Approximately 55 percent of this association is Mohall soils, 35 percent is Contine soils, and 10 percent is Vecont, Antho, Laveen, and Estrella soils. These soils are generally moderately alkaline and calcareous throughout, and permeability is moderately slow to slow. Their shrink-swell potential is moderate to high; these soils have medium to low shear strength. The Gilman-Estrella-Avondale Association consists of deep, well-drained, nearly level loams and clay loams on alluvial fans and floodplains. Approximately 65 percent of this association is Gilman soils, 15 percent Estrella soils, 10 percent Avondale soils, and 10 percent Vint, Trix, Antho, Pimer, Carrizo, Glenbar, Agualt, Cashion, and Pinamt soils. These soils are also moderately alkaline and calcareous throughout. Permeability is moderate to moderately slow, and their shrink-swell potential is low to moderate. These soils typically have medium to low shear strength. Both the Mohall-Contine and Gilman-Estrella-Avondale associations are deep, well-drained soils that are nearly level with slopes of less than one percent (U.S. Department of Agriculture, 1974).

Prime farmland is defined by the U.S. Department of Agriculture (USDA) as "land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for these uses (the land could be cropland, pastureland, rangeland, forest land, or other land, but not urban built-up land or water)" (7 CFR 657.5). Prime farmland must meet the specific criteria outlined in 7 CFR 657.5. The USDA Soil Conservation Service (SCS) has specifically classified prime farmland in Maricopa County as land which is used for cropland or pastureland, has a developed irrigation water supply, and meets the specific criteria in 7 CFR 657.5. Williams AFB does not contain prime or unique farmlands, as no areas on-base are being farmed (Gohmert, 1992).



EXPLANATION

Soils Distribution

Mohall-Contine Association

- M — Mohall Series
- Co — Contine Series
- Ve — Vecont Series
- An — Antho Series

Gilman-Estrella-Avondale Association

- G — Gilman Series
- Es — Estrella Series
- V — Vint Series
- Tr — Tremant Series

- L — Landfill
- Base Boundary

0 750 1500 3000 Feet

Figure 3.4-1

Off-base, however, soils of both the Mohall-Contine and the Gilman-Estrella-Avondale associations are used for most of the crops commonly grown in the area. Most of these soils qualify as prime farmlands since they are farmed, have a reliable supply of irrigation water, and meet the specific regulatory criteria (7 CFR 657.5) for prime farmlands (DeSimone, 1992a).

Lands immediately to the north, south, and east of the Williams AFB boundary are mapped as prime farmland and encompass soils of the Mohall, Contine, Vecont, Antho, Gilman, and Estrella series (see Figure 3.4-1). Part of the land areas to the north and to the northeast of Williams AFB have not been specifically inventoried and mapped for prime farmland, but the soil series specified above would also be expected to be prime farmlands in these areas. Soils of the Vint and Tremant Series do not qualify as prime farmland. Soil series delineated as prime farmland by the SCS include areas that have not been developed for agriculture but would likely classify as prime farmlands should an adequate irrigation water supply be developed to farm them (U.S. Department of Agriculture, 1974; 1977; 1984; DeSimone, 1992b).

Crops grown in the vicinity of the base generally require irrigation due to the low amounts of precipitation. Soil blowing and water erosion are not hazards or only slight hazards for both soil associations. Non-irrigated soils of these associations are suitable for recreation areas, wildlife habitat, or limited grazing following a period of high rainfall.

Soil contamination has been identified in several locations on the base. The identified soil contamination includes JP-4 jet fuel, other petroleum hydrocarbons, metals, and solvents. Information on the contaminants, concentrations, and specific locations is discussed in Section 3.3, Hazardous Materials and Hazardous Waste Management.

3.4.1.2 Physiography and Geology. Williams AFB is located in the eastern part of the Salt River Valley Basin of the Basin and Range Physiographic Lowlands Province. The Basin and Range Physiographic Lowlands Province is characterized by north to northwest trending, wide, flat, alluvial-filled basins bounded by separate, steep, low-relief, rugged mountain ranges. The area is bounded on the south by the Santan Mountains, on the west by South Mountain, on the north by the Goldfield Mountains, and on the east by the Superstition Mountains.

General topography of the region is controlled by large-scale normal faulting that has formed flat, broad, alluvial-filled valleys separated by steep hills and mountain ranges. Drilling data indicate the presence of more than 9,800 feet of sediment above the crystalline bedrock in some valleys (Eberly and Stanley, 1978). In South Chandler, the depth below land surface to the top of the crystalline rocks is estimated to be approximately 1,200 feet (Malcolm Pirnie, 1988). The topography of Williams AFB is relatively flat.

The land surface slopes to the west with a surface grade of generally less than one percent. The highest point on the base is in the southeast corner at approximately 1,390 feet MSL. At the west side of the base, the elevation drops to approximately 1,326 feet MSL. General elevations in the Salt River Valley Basin range from 5,057 feet MSL in the bordering mountain ranges to around 1,300 feet MSL in the basin.

Laney and Hahn (1986) identified six geologic units in the eastern Salt River Valley: crystalline rocks, extrusive rocks, red unit, lower unit, middle unit, and upper unit. The mountains and the basement rocks underlying the valley sediments are composed of the crystalline and extrusive rock units. The crystalline rocks are primarily granitic and gneissic rocks that are pre-Eocene (greater than 54 million years) in age (Eberly and Stanley, 1978). The extrusive rocks are primarily rhyolitic and basaltic pyroclastic and flow deposits that are middle to late Tertiary (approximately 15 to 30 million years) in age (Laney and Hahn, 1986). The valley basin contains the sedimentary red unit, lower unit, middle unit, and upper unit. The red unit and lower unit crop out locally along the edges of the basin. The middle unit is not exposed at the surface in the eastern Salt River Valley and is seen only in drill holes. The upper unit is found at the surface throughout most of the basin. Rocks of the valley basin are primarily non-marine in origin and were deposited under oxidizing conditions in fluvial and lacustrine environments.

The basement rocks in the basin are covered by the four sedimentary units (Laney and Hahn, 1986). These sediments are derived from the mountains and local drainage. The Tertiary-age red unit is the oldest of the four sedimentary units. The majority of the unit is thought to be no older than approximately 20 million years, based on radiometric dating. It immediately overlies the basement rocks and consists primarily of breccia, conglomerate, sandstone, and siltstone with interbeds of extrusive flow rocks. The sediments are well-cemented and continental in origin. The red unit was deposited prior to the beginning of the large-scale normal faulting that characterizes the Basin and Range Lowlands Physiographic Province. As a result, the faulting has cut the red unit and modified its upper surface.

Overlying the red unit is the lower unit. The lower unit is also Tertiary in age and is composed of playa, alluvial fan, and fluvial deposits with basaltic flows and evaporates in the lower portions. Most of these strata have been dated to range in age from 8 to 15 million years (Laney and Hahn, 1986). The lower unit is extremely thick and may reach thicknesses of 10,000 feet near the center of the basin, although it thins to approximately 600 feet in thickness near the mountains. Sediments in the lower unit were derived from the local mountains. The sediments are composed largely of granitic, quartz, feldspar, and gneissic material and may locally contain schist, quartzite, and volcanic material. The grain size of the sediments varies from clay to conglomerate, and deposits are commonly poorly sorted. Generally,

coarser material is found near the mountains and finer material is near the center of the basin.

The middle unit is found above the lower unit. It is composed of playa, alluvial fan, and fluvial deposits without associated evaporates. The unit is Tertiary in age, with the deposits ranging between 3.3 and 8 million years old. Sediments in the middle unit were derived primarily from the Salt River and Queen Creek drainage areas. Particle sizes in the middle unit range from silt to gravel. The finest grained material is generally located in the central part of the basin, with coarser material near the headwaters of the streams. The composition of the grains includes granite, quartz, feldspar, gneiss, and schist. The middle unit ranges in thickness from approximately 1,000 feet near Williams AFB to less than 100 feet adjacent to the mountains.

The youngest of the sedimentary units is the upper unit. It is composed of channel, floodplain, terrace, and alluvial fan deposits. The upper unit is Quaternary (recent to 2 million years) and Tertiary in age, although most of the deposits could be as old as 3.3 million years. The sediments are primarily unconsolidated and were derived from the Salt River and Queen Creek drainages. Sediments of the upper unit are found at the surface in the area around Williams AFB. The sediments range in size from clay to gravel, and the grains are commonly more rounded than those of the middle unit. Thickness of the upper unit ranges from a thin veneer near the mountains to 200 to 300 feet in the center of the basin.

During coring at the Liquid Fuels Storage Area, many thin calcium carbonate layers were encountered in the upper unit (IT Corporation, 1992b). The cemented layers appear to be discontinuous between two wells located approximately 250 feet apart. The degree of cementation also varied between the layers, with coarser grained layers typically being better cemented.

Mineral and Natural Resources. Although there are no known mineral or energy resources located on or beneath Williams AFB, active mines are present in the ROI. The area around the base has historically been mined for clay, sand, and gravel. Sand and gravel deposits were used primarily for construction. Clay deposits were mined for manufacturing brick and tile. Metallic mineral deposits are mined from the crystalline rocks in the mountains surrounding the basin.

Energy resources in the Williams AFB area include naturally heated waters. Two deep geothermal test wells have been drilled near Williams AFB. Geophysical logs for these wells show water temperatures of approximately 120° C (248° F) at a depth of 2,500 meters (8,200 feet) (Arizona Geothermal Commercialization Team, 1979). Geothermal resources could

be used to supplement existing energy supplies particularly for hot water and space heating and cooling.

Seismicity. There were several hundred earthquakes felt and/or instrumentally recorded in Arizona from 1776 to 1980. Three of the earthquakes (November 29, 1852; May 3, 1887; and May 19, 1940) caused heavy damage, including the collapse of some buildings. The epicenters of the 1852 and 1940 earthquakes were believed to be along the San Andreas Fault System in the Imperial Valley of California. The 1887 earthquake was epicentered in northern Mexico (DuBois et al., 1982). Approximately 40 other earthquakes caused moderate effects during the same time period including the breaking of dishes and glassware and the movement of some furniture.

Between 1830 and 1980, four felt earthquakes are believed to have been epicentered within 20 miles of Williams AFB. No earthquakes with epicenters in either Maricopa or Pinal Counties had been instrumentally recorded as of 1980 (DuBois et al., 1982).

Williams AFB is located in Seismic Zone 1 of the Uniform Building Code (International Conference of Building Officials, 1988). Seismic Zone 1 requires the least restrictive building requirements specified by the Uniform Building Code, reflecting a low hazard potential for earthquake damage to buildings. Due to the extreme depth to groundwater, there is little potential for the soils and unconsolidated sediments to mix with water and form a slurry following seismic events. The process of changing soil and sediments into a watery mixture is called liquefaction and can cause movement of underground structures, such as pipes or tanks, and aboveground structures, such as buildings.

3.4.2 Water Resources.

The surface and groundwater ROI generally extends beyond the base boundary, encompassing areas that would be affected by changes in resource usage. The ROI for groundwater includes all of the Phoenix Basin. There are no coastal areas or wild and scenic rivers in the surface water ROI.

3.4.2.1 Surface Water. The Eastern Part of the Salt River Valley contains two major streams: the Salt and Gila Rivers. Little flow occurs in either river due to upstream diversions. Queen Creek and the smaller washes in the area are intermittent streams, flowing only in response to heavy rainfall.

No perennial streams occur on-base. However, there are two small natural intermittent streams, located in the northwest corner of the base, as well as numerous man-made drainage ditches which are dispersed throughout the base. These surface water features are described in more detail in Section

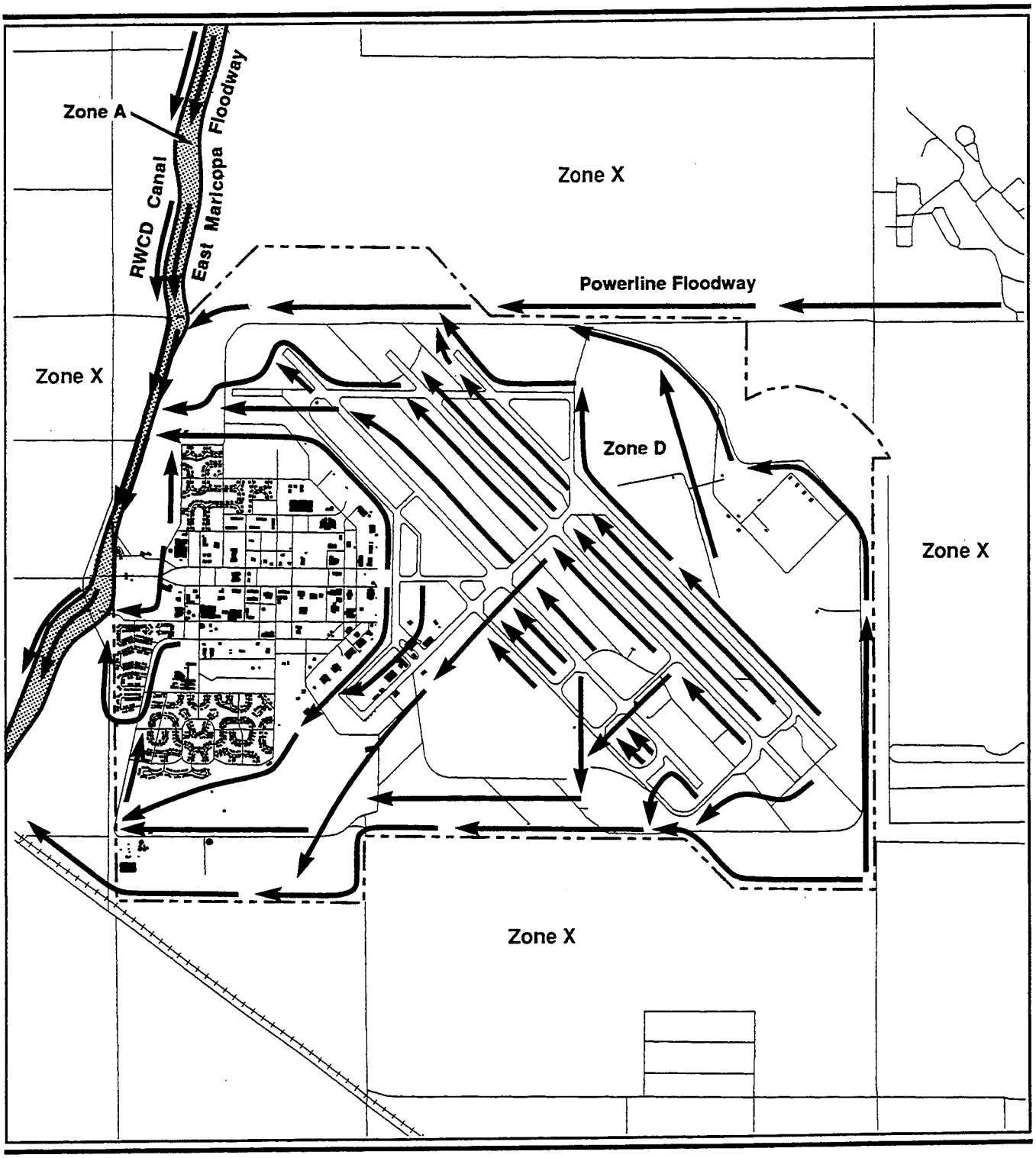
3.4.5.4. Two small, perennial, man-made ponds containing non-potable water are located on the base golf course. Treated effluent from the base wastewater treatment plant is pumped to these ponds for use in golf course irrigation. There are also two small lagoons located near the base wastewater treatment plant that are occasionally used to store wastewater effluent (Malcolm Pirnie, 1991).

The majority of the base is located in Zone D of the Federal Emergency Management Agency (FEMA) flood maps (Federal Emergency Management Agency, 1991). Zone D is used to represent areas of undetermined flood hazard. Areas just outside and surrounding the base are designated as located in the 500-year floodplain (Zone X). This designation also includes areas subject to the 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood. A narrow strip on the west side of the base, primarily confined to and adjacent to the East Maricopa Floodway, lies within the 100-year floodplain (Zone A). No habitable structures have been developed on the 100-year floodplain. Figure 3.4-2 depicts the surface hydrology of the base and surrounding areas.

Williams AFB has been allocated 833 acre-feet/year of water from the CAP. This allocation is adjustable to 733 acre-feet/year in dry years. The base currently does not have a system to accept CAP water or any water from off-base sources. The City of Mesa has considered plans to draw water from the CAP and deliver it to a metering station on-base after treatment (EDAW et al., 1992b).

Surface Water Quality. Surface water over much of the base is intermittent and results from runoff of rainfall. Due to the infrequent rain events, stormwater quality at Williams AFB varies widely (Franzoy Corey Engineers & Architects, 1988b). At the beginning of the storm, oils and wastes from the streets and other pavements are expected to be found in the stormwater. At later times during the storm, the quality of the stormwater would be expected to improve. Water in the two perennial ponds is derived primarily from wastewater treatment plant effluent.

3.4.2.2 Surface Drainage. A system of open drainage ditches and underground drainage structures exist on the base to convey stormwater runoff. In addition, a large diked drainage channel encompasses the north, east, and south sides of the base. Most of the water intercepted by this system is conveyed around the north side of the base and discharges at the extreme northwest corner of the base into the East Maricopa Floodway. This floodway parallels the east side of the RWCD Canal; both generally parallel the west side of the base. Stormwater collected by the base drainage system is conveyed either to the drainage channel, which borders the base and ultimately conveys most of the base drainage to the East Maricopa Floodway, or is discharged directly to the East Maricopa Floodway



EXPLANATION

- Overland Surface Drainage and Direction
- Base Boundary
- 100-Year Floodplain

0 750 1500 3000 Feet

Surface Hydrology and Drainage Patterns

Figure 3.4-2

(IT Corporation, 1992b; U.S. Air Force, 1991h). It should also be noted that a small amount of drainage enters the base from an off-base source. A small man-made depression near the southwest corner of the base appears to receive irrigation runoff from off-base agricultural activities (Halliburton NUS, 1992). Figure 3.4-2 shows the drainage patterns on Williams AFB.

The design capacity of the drainage system is inadequate, and ponding of water and some minor building flooding occurs with moderate rainfalls (EDAW et al., 1992b). Many catch basins do not have the required capacity to remove stormwater, and ponded water conditions are created with light rainfalls. Catch basins in the north and south apron areas are not at the low points of the subbasins, and buildings located at low points are flooded during heavy rains. In the north, central, and south base areas, water ponds in some streets and intersections. Many streets are poorly graded and do not have curbs, causing stormwater to pond in the streets or flow into areas adjacent to the streets. Culverts along drainage ditches in the north and south base areas do not have sufficient capacity to carry the flows in the drainage channels. Some culverts on the base are partially filled with sediment which reduces their capacity (Franzoy Corey Engineers & Architects, 1988b).

To find a remedy to the surface drainage problems at Williams AFB, Franzoy Corey (1988b) surveyed the existing drainage systems across the base and evaluated three alternatives to correct the problems; including installation of either a retention system, storm sewer system, or a combined storm sewer and drainage channel system. The combined storm sewer and drainage channel system was recommended. Franzoy Corey (1988b) also recommended specific system upgrades for areas on-base where only minor rehabilitation work is required to correct existing drainage problems. A plan of action was also outlined to aid implementation of the recommended improvements (Franzoy Corey Engineers & Architects, 1988b).

Additional problems with the storm drainage system are caused by interconnections of the storm drainage system with the sanitary sewer system. This sometimes results in a situation in which the treatment capacity of the base wastewater treatment plant is exceeded. This situation is detailed in Section 3.2.4.2. In addition, the storm sewer in the Building 300 parking lot is connected to the sanitary sewer system, and ponded water on a section of B Street drains through manholes into the sanitary sewer system (Franzoy Corey Engineers & Architects, 1988b).

Williams AFB has an NPDES permit for wastewater discharge through two outfalls. Outfall 001 discharged to the RWCD Canal, but was removed in February 1993. Outfall 002 discharges to the East Maricopa Floodway. Treated wastewater from Williams AFB is used for irrigation of the base golf course. Treated water flows into the north holding pond adjacent to the wastewater treatment plant and is pumped to the golf course distribution

system. Overflows are pumped to the south holding pond (Malcolm Pirnie, 1991). In 1990, all wastewater was reclaimed for use in golf course irrigation.

In 1990, fecal coliform reductions and pH limitations required for restricted access irrigation were generally achieved. Restricted access includes non-access for anyone other than players and separation of residential areas from the golf course by a fence or other barrier at least four feet in height. TSS concentrations frequently exceeded the NPDES permit maximum of 30 milligrams per liter (mg/L) from January through May 1990. No exceedances were observed from July through December 1990 (Malcolm Pirnie, 1991).

3.4.2.3 Groundwater. Laney and Hahn (1986) described six geologic units in the Eastern Salt River Valley: crystalline rocks, extrusive rocks, red unit, lower unit, middle unit, and upper unit. The crystalline and extrusive rock units do not transmit water readily and tend to act as aquitards.

The four sedimentary units are capable of yielding water to wells. The middle unit is the most important water source for the majority of the basin, although the other units are locally capable of yielding significant quantities of water. The red unit has been faulted and broken by large-scale normal faulting and can locally transmit water along fractures and faults. The red unit is capable of yields up to 1,000 gallons per minute (GPM) (IT Corporation, 1992b). Near Scottsdale the red unit is the major source of groundwater.

The ability of the lower unit to transmit water is dependent on the grain size of the sediments. Where sand and gravels are dominant, near the edges of the basin, the hydraulic conductivity is high. In the center of the basin, where silts and clays are dominant, the hydraulic conductivity is low. As much as 600 feet of the lower unit are saturated with water. Generally, the coarser material will yield more water to wells, and the finer grained material will yield relatively little water. In the center of the basin, the lower unit is usually a poor producer with yields less than 5 GPM to wells (Laney and Hahn, 1986).

The middle unit is the primary source of groundwater in the vicinity of Williams AFB. As much as 700 feet of the middle unit are saturated. The hydraulic conductivity increases with an increase in particle size, and the highest yields are found where the saturated thickness and percent sand and gravel are the highest. Yields range from a few hundred to a few thousand GPM. Although the middle unit is the finest grained of the four sedimentary units of the basin, it is the major producer of water.

The upper unit is capable of transmitting large volumes of water, but its ability to supply water has been reduced due to overuse that began in the

1940s. Currently, the upper unit is saturated only in perched zones in the southwest portion of the Salt River Valley Basin (IT Corporation, 1992b). This perched water probably results from the infiltration of irrigation water. The upper unit readily accepts water as recharge during floods along Queen Creek or the Salt River and from irrigation.

In the vicinity of Williams AFB, the depth to groundwater is approximately 280 feet below the ground surface (Reeter and Remick, 1986). Studies at the Liquid Fuels Storage Area on-base indicate the presence of two unconnected saturated zones (IT Corporation, 1992b). Each of the saturated zones contains interbedded coarse- and fine-grained sediments. The uppermost aquifer lies at a depth of approximately 225 feet bls. The lower aquifer is encountered at approximately 265 feet bls and is saturated to a depth of about 375 feet (the limit of the Liquid Fuels Storage Area study). Separating the two saturated zones is an approximately 20-foot-thick low permeability layer from which unsaturated samples were recovered. The two zones are believed to be interconnected on a broader geographic scale (IT Corporation, 1992b).

Groundwater flow in the two aquifers is predominantly to the east and southeast, but groundwater flow becomes more northerly to the east in the lower aquifer (IT Corporation, 1992b). Water levels in the deep aquifer vary by approximately 10 feet on an annual basis. The lowest water levels occur in July and August and the highest water levels occur in January. Fluctuations in the deeper aquifer result from withdrawals for irrigation. Water withdrawals for irrigation typically begin in the spring and end in late summer. Irrigation wells are located along the northern, western, and southern base boundaries. Wells are located as close as 500 feet from the base boundary.

Williams AFB uses groundwater from three wells to supply water needs. Well No. 7 supplies the munitions storage facility east of the runways, and Well Nos. 5 and 8 supply the remaining base facilities and are located in the central core area of the base (Yost and Gardner Engineers, 1988). A fourth well (No. 6), also located in the central core of the base, is not capable of producing. It may be dry or have a cracked casing, as it was pumping sand. The well has been disconnected from the base water distribution system (Lane, 1993a). Water usage on-base was approximately 1.5 MGD in 1987, but it has ranged between 1.2 and 1.3 MGD in recent years (Yost and Gardner Engineers, 1988; U.S. Air Force, 1992e). The capacity of the four wells is shown below.

Well No.	Motor HP	Capacity (GPM)
5	400	2,000
6	400	1,400
7	500	2,000
8	not available	not available

Several studies have concluded that the Phoenix Basin is in a state of overdraft and that the groundwater withdrawals exceed safe yields. Safe yield is defined as that quantity of water that can be withdrawn without impairing the aquifer as a water source. When groundwater is extracted (consumed) at a rate less than the safe yield, there is net inflow to the basin which results in a rising water table. When groundwater is extracted from the basin at a rate that exceeds the safe yield, the water table drops and the basin is considered to be in a state of overdraft. Large-scale pumping of water from the Phoenix Basin began in the early 1900s and increased during the 1940s. Much of the water is used for crop irrigation, although municipal and industrial use is increasing. Water levels near Queen Creek had declined by more than 300 feet by 1977 (Schumann and Genualdi, 1986). Land subsidence is associated with the decreased water levels. As water is removed from the aquifer, the sediments are compressed and the land surface drops. An area of more than 230 square miles near Queen Creek had subsided more than 3 feet by 1977 (Schumann and Genualdi, 1986). Water from the CAP is expected to reduce the demand for groundwater in the Salt River Valley Basin.

Groundwater Quality. Groundwater in the Phoenix Basin is generally suitable for industrial and agricultural uses. Locally there may be high concentrations of fluoride and dissolved solids (Reeter and Remick, 1986). Water quality data indicate that total dissolved solids (TDS) concentrations are often above the U.S. EPA Secondary Maximum Contaminant Level (MCL) of 500 mg/L for drinking water (Malcolm Pirnie, 1988). U.S. EPA Secondary MCLs are recommended guidelines for chemicals in groundwater that primarily affect the public acceptance of drinking water. Malcolm Pirnie (1988) sampled groundwater from 12 wells in the Chandler area. Nitrate concentrations ranged from < 0.1 to 15.6 mg/L. Nine of the 12 wells had nitrate concentrations that were lower than the U.S. EPA Primary MCL of 10.0 mg/L. Sulfate concentrations ranged from 70.4 to 374 mg/L. Ten of the 12 wells had sulfate concentrations that were lower than the U.S. EPA Secondary MCL of 250 mg/L. Heavy metal concentrations were below the U.S. EPA Primary and Secondary MCLs with the exception of iron and manganese in three wells. The presence of iron and manganese in these waters was believed to have resulted from leaching of the steel well casings (Malcolm Pirnie, 1988). Groundwater contamination has been identified in several locations on the base. The identified contamination includes JP-4 jet fuel and other petroleum hydrocarbons. Information on the contaminants, concentrations, and specific locations is discussed in Section 3.3, Hazardous Materials and Hazardous Waste Management.

3.4.3 Air Quality

Air quality in a given location is described as the concentration of various pollutants in the atmosphere, generally expressed in units of ppm or micrograms per cubic meter ($\mu g/m^3$). Air quality is determined by the type

and amount of pollutants emitted into the atmosphere, the size and topography of the air basin, and the prevailing meteorological conditions. The significance of a pollutant concentration is determined by comparing it to federal and/or state ambient air quality standards. These standards represent the maximum allowable atmospheric concentrations that may occur and still protect public health and welfare with a reasonable margin of safety. The federal standards are established by the U.S. EPA and termed the National Ambient Air Quality Standards (NAAQS). The NAAQS are presented in Table 3.4-1. The main pollutants considered in this EIS are the criteria pollutants regulated by the U.S. EPA: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), lead (Pb), and particulate matter equal to or less than 10 micrometers in diameter (PM_{10}). The previous NAAQS for particulate matter was based upon total suspended particulate (TSP) levels; it was replaced in 1987 by an ambient standard based only on the PM_{10} fraction of TSP. Hazardous Air Pollutants (HAPs) regulated under Title III of the Clean Air Act and the National Emissions Standards for Hazardous Air Pollutants are not addressed in this EIS because preclosure emissions inventories for these pollutants were not available and the reuse alternatives were not sufficiently detailed to support development of detailed HAP emissions inventories.

In 1990, the Arizona Department of Environmental Quality (ADEQ) adopted the NAAQS as the Arizona Ambient Air Quality Standards (AAAQS). The Arizona State Implementation Plan (SIP) includes the Arizona Air Pollution Control Laws and the Arizona Air Pollution Control Regulations under the Arizona Administrative Rules and Regulations. The Maricopa County nonattainment compliance plans submitted in 1988 for ozone and carbon monoxide and in 1991 for PM_{10} are also included in the SIP.

The existing air quality of the affected environment is defined by air quality data and emissions information. Air quality data are obtained by examining records from air quality monitoring stations maintained by the ADEQ, the Maricopa County Bureau of Air Pollution Control (MCBAPC), and the Pinal County Air Quality Control District (PCAQCD). Information on pollutant concentrations measured for short-term (24 hours or less) and long-term (quarterly or annual) averaging periods is extracted from the monitoring station data in order to characterize the existing air quality background of the area. Emission inventory information for the affected environment was obtained from the MCBAPC and Williams AFB. No emission inventory is available for Pinal County. Inventory data are separated by pollutant and reported in tons per year in order to describe the baseline conditions of pollutant emissions in the area.

Identifying the ROI for an air quality assessment requires knowledge of the pollutant types, source emission rates and release parameters, the proximity relationships of project emission sources to other emission sources, and local and regional meteorological conditions. For inert pollutants (all

Table 3.4-1. Federal and Arizona Ambient Air Quality Standards[a]

Pollutant	Averaging Time	Standards[b]	
		Primary[b,c]	Secondary[b,d]
Carbon monoxide	1 hour	35 ppm (40 mg/m^3)	-
	8 hours	9 ppm (10 mg/m^3)	-
Nitrogen dioxide	Annual	0.053 ppm (100 μg/m^3)	Same as primary standard
Ozone	1 hour	0.12 ppm (235 μg/m^3)	Same as primary standard
PM_{10}	24 hours	150 μg/m^3	Same as primary standard
	Annual	50 μg/m^3[e]	
Sulfur dioxide	3 hours	-	1,300 μg/m^3 (0.5 ppm)
	24 hours	365 μg/m^3 (0.14 ppm)	-
	Annual	80 μg/m^3 (0.03 ppm)	-
Lead	Calendar Quarter	1.5 μg/m^3	Same as primary standard

Notes:
[a] Standards other than ozone, PM_{10}, and those based on annual average or annual arithmetic means are not to be exceeded more than once a year. In the cases of ozone and PM_{10}, compliance is determined by the number of days on which the ozone or PM_{10} standard is exceeded. The number of exceedance days per year, based on a 3-year running average, is not to exceed 1.0.
[b] Concentration expressed first in units in which it was promulgated. Equivalent units given in parenthesis are based on a reference temperature of 25°C and a reference pressure of 760 mm of mercury. All measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 mm of mercury (1,013.2 millibar); ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.
[c] National Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.
[d] National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant. Each state must attain the secondary standards within "a reasonable time" after the implementation plan is approved by the EPA.
[e] Calculated as arithmetic mean.

Sources: 40 CFR Part 50 and Arizona Department of Environmental Quality, Office of Air Quality, 1991.

pollutants other than ozone and its precursors), the ROI is generally limited to an area extending a few miles downwind from the source.

Ozone is a secondary pollutant formed in the atmosphere by photochemical reactions of previously emitted pollutants or precursors. Ozone precursors are mainly nitrogen oxides (NO_x) and volatile organic compounds (VOCs) which are compounds containing carbon, excluding CO, carbonic acid, metallic carbides, metallic carbonates, and ammonium carbonate. VOC ozone precursors do not include methane or other nonreactive methane and ethane derivatives. NO_x is the designation given to the group of all oxygenated nitrogen species, including nitric oxide (NO), nitrogen dioxide (NO_2), nitrous oxide (N_2O), nitric anhydride (N_2O_6), and nitrous anhydride (N_2O_3).

The ROI for ozone may extend much further downwind than the ROI for inert pollutants. In the presence of solar radiation, the maximum effect of precursor emissions on ozone levels usually occurs several hours after they are emitted and, therefore, many miles from the source. Ozone and its precursors transported from other regions can also combine with local emissions to produce high local ozone concentrations. Ozone concentrations are generally the highest in the afternoon hours from April to October and coincide with periods of maximum solar radiation. Ozone concentrations in Phoenix occasionally exceed the NAAQS. Maximum ozone concentrations tend to be regionally distributed, because precursor emissions are homogeneously dispersed in the atmosphere.

For the purpose of the air quality analysis, the ROI for inert pollutants (all pollutants other than ozone and its precursors) is limited to an area extending a few miles downwind from the source. The ROI for emissions of ozone precursors from construction and operational activities consists of the airshed surrounding Williams AFB. This airshed includes the ozone nonattainment area located within the Maricopa County Air Quality Control Region plus areas in Pinal County within 30 miles of Williams AFB.

The Federal Clean Air Act, as amended in August 1977 and November 1990, dictates that project emission sources must comply with the air quality standards and regulations that have been established by federal, state, and county regulatory agencies. These standards and regulations focus on (1) the maximum allowable ambient pollutant concentrations resulting from project emissions, both separately and combined with other surrounding sources, and (2) the maximum allowable emissions from the project.

Section 176(c) of the Clean Air Act Amendments (CAAA) provides the basis for the relationship between the SIP and federal projects. It states that no federal department or agency shall support or approve any activity that does not conform to an implementation plan after the plan has been approved or

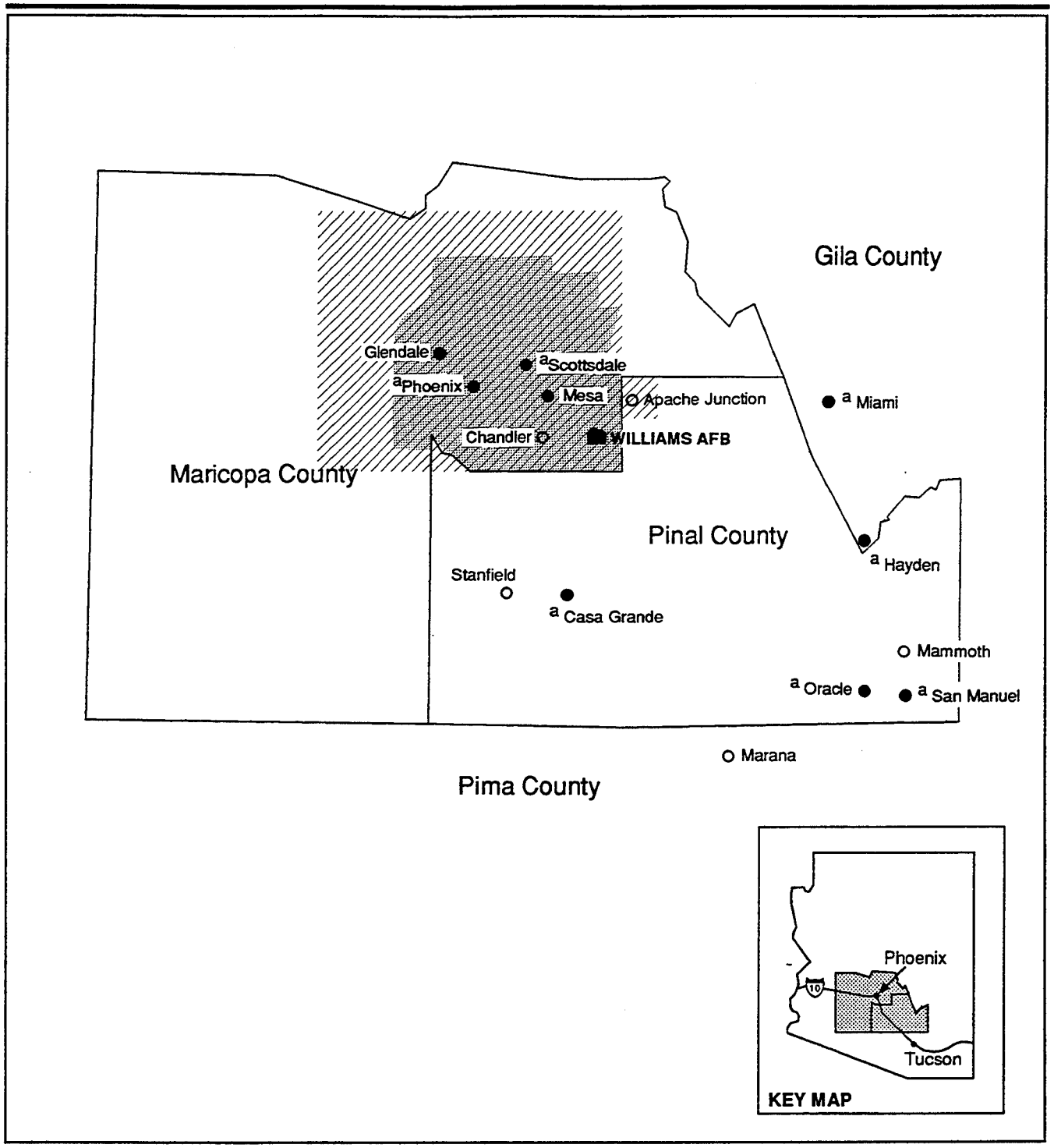
promulgated under Section 110. Conformity to the implementation plan means: (1) complying with the plan's objective of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of such standards, and (2) ensuring that any planned activity will not cause or contribute to any new violation of a standard, increase the frequency or severity of any existing violation of a standard, or delay timely attainment of any standard.

The development of a conformity determination is based upon an evaluation/comparison of the project's impacts, sources, emissions, pollutant concentrations, and mitigation measures with the appropriate element or component of the SIP. The rules and regulations of the ADEQ and MCBAPC (through permit and enforcement programs, etc.) will ensure that the air quality impacts from planned or forecasted activities for the disposal and reuse of Williams AFB adhere to all federal and state air quality standards.

3.4.3.1 Regional Air Quality. Williams AFB is located in mid-south Arizona, a region characterized by desert-type climate. Typical characteristics of this large, arid region include abundant sunshine, infrequent precipitation, low relative humidity, large diurnal temperature ranges, moderate wind speeds, and an occasional intense summer thunderstorm.

According to U.S. EPA guidelines, an area with air quality better than the NAAQS is designated as being in attainment; areas with worse air quality are classified as nonattainment areas. A nonattainment designation is given to a region if the primary NAAQS for any criteria pollutant is exceeded at any point in the region for more than 3 days during a 3-year period. Pollutants in an area may be designated as unclassified when there is a lack of data for the U.S. EPA to form a basis for attainment status.

Williams AFB is located in the Phoenix and Maricopa County Urban Planning Area, which is designated as a "moderate" nonattainment area for carbon monoxide, ozone and PM_{10}. The Phoenix urban planning nonattainment areas are shown in Figure 3.4-3. According to the CAAA of 1990 (U.S. Environmental Protection Agency, 1990), attainment dates for carbon monoxide, ozone, and PM_{10} are assigned at December 31, 1995, December 31, 1996, and December 31, 1994, respectively. In Pinal County, the Apache Junction and Hayden/Miami planning areas are designated as "moderate" nonattainment areas for PM_{10}, and the San Manuel and Hayden/Miami planning areas are designated as nonattainment areas for SO_2. The air quality impact on the San Manuel and Hayden/Miami nonattainment areas from Williams AFB is negligible. Federal and state attainment designations for Maricopa and Pinal counties are shown in Table 3.4-2.



EXPLANATION

- ● Gaseous pollutant or multipollutant monitoring site
- ○ Particulate sampling only
- a Multiple monitoring sites

- Phoenix PM_{10} Nonattainment Area
- Phoenix Carbon Monoxide/ Ozone Nonattainment Area

0 15 30 Miles

Phoenix and Maricopa County Nonattainment Areas and Air Quality Monitoring Stations in Maricopa and Pinal Counties

Figure 3.4-3

Table 3.4-2. Federal and State Ambient Air Quality Standard Designations for Maricopa and Pinal Counties, Arizona

	SO_2	CO	O_3	PM_{10}	NO_2	Pb
Maricopa County						
Maricopa Urban Planning Area*	A	N	N	N	U/A	U/A
Rest of Maricopa County	A	U/A	U/A	U/A	U/A	U/A
Pinal County						
Apache Junction Area	A	U/A	U/A	N	U/A	U/A
San Manuel Area	N	U/A	U/A	U/A	U/A	U/A
Hayden/Miami Planning Area	N	U/A	U/A	N	U/A	U/A
Rest of Pinal County	A	U/A	U/A	U/A	U/A	U/A

Notes: N = Nonattainment.
A = Attainment.
U = Unclassified.
* Maricopa Urban Planning Area covers most of Maricopa County.

Source: 40 CFR Part 81.

The MAG attainment plans for CO, O_3, and PM_{10} nonattainment areas are currently under revision. The proposed plans include establishing a state-wide vehicle inspection maintenance program, reducing 1990 PM_{10} emission rates by 23 percent by the end of 1994, improving short-range and long-range transit, converting bus fuel systems to alternative fuels and using electric buses for shuttle service (areawide), expanding the areawide monitoring network, using stage II vapor recovery to reduce emissions associated with the refueling process, expanding the MAG regional ridesharing program (areawide), and enforcing traffic, parking, and air pollution regulations.

The ADEQ, MCBAPC, and PCAQCD currently operate air quality monitoring stations in Maricopa and Pinal counties. Locations of these monitoring stations are shown in Figure 3.4-3. Stations in the vicinity of Williams AFB include Apache Junction, Chandler, Mesa, Scottsdale, and Phoenix. Multiple monitoring sites are operated in the Phoenix and Scottsdale areas. The Apache Junction and Chandler stations monitor only PM_{10} levels. The Mesa station monitors CO, O_3, and PM_{10}. Stations in the Scottsdale area monitor CO, NO_2, O_3, PM_{10}, and lead. Stations in the Phoenix area monitor all of the U.S. EPA criteria pollutants. Monitoring results for these stations are presented in Table 3.4-3 based on the 1988-1990 air quality summary reports provided by the ADEQ, and show a general trend of improving air quality in the region. Monitoring stations in the Phoenix and Scottsdale areas recorded the highest concentrations of the multiple monitoring

Table 3.4-3. Existing Air Quality In Area of Williams AFB

Page 1 of 2

Pollutant	Station	Average Period	Percentage of Time Federal and State Standard Exceeded				Maximum Concentration in $\mu g/m^3$ or (ppm)*			
			1988	1989	1990	1991	1988	1989	1990	1991
Carbon monoxide	Mesa	8-hr.	0	0	0	0	(7.4)	(4.2)	(2.6)	(4.5)
	Phoenix[c]		0.43[a]	0.26	0.06	0.04	(12.4)	(15.3)	(11.6)	(11.1)
	Scottsdale[d]		0	0	0	0	(7.9)	(7.2)	(7.8)	(6.2)
	Mesa	1-hr.	0	0	0	0	(10)	(7)	(5.1)	(7.3)
	Phoenix[c]		0	0	0	0	(20)	(22)	(13.2)	(16.1)
	Scottsdale[d]		0	0	0	0	(12)	(12)	(11.9)	(10.3)
Nitrogen dioxide	Phoenix[c]	Annual	ND	ND	0	0	ND	ND	35[a]	41
	Scottsdale		ND	ND	ND	0	ND	ND	34[a]	29
Ozone	Phoenix[c]	1-hr.	0.01	0	0.22[b]	0.06[b]	(0.13)	(0.12)	(0.17)[b]	(0.13)
	Mesa		0	0	0	0	(0.12)	(0.10)	(0.10)[b]	(0.10)
	Scottsdale[d]		0.01	0	0	0.05[b]	(0.15)	(0.11)	(0.11)[b]	(0.13)
Sulfur dioxide	Phoenix[c]	Annual	0	0	0	0	1	6	3.3	ND
		24-hr.	0	0	0	0	3	16	17.3	ND
		3-hr.	0	0	0	0	5	34	ND	ND

Table 3.4-3. Existing Air Quality In Area of Williams AFB

Pollutant	Station	Average Period	Percentage of Time Federal and State Standard Exceeded				Maximum Concentration in $\mu g/m^3$ or (ppm)*			
			1988	1989	1990	1991*	1988	1989	1990	1991*
PM_{10}	Apache Junction	Annual	NA	NA	NA	0	22	16	23	30
	Chandler		NA	NA	NA	0	ND	ND	49	50
	Scottsdale[d]		NA	NA	NA	0	39	42	37	44
	Mesa		NA	NA	NA	0	ND	ND	36	36
	Phoenix[c]		NA	NA	NA	0	59	70	46	47
	Apache Junction	24-hr.	0	0	0	0	52	30	59	77
	Chandler		ND	ND	0	0	ND	ND	117	114
	Scottsdale[d]		0	0	0	0	101	103	150	147
	Mesa		ND	ND	0	0	ND	ND	61	104
	Phoenix[c]		0	5.4	0	0	128	228	96	119
Lead	Phoenix[c]	3-month calendar quarter	0	0	0	0	0.21	0.10	0.09	0.11
	Scottsdale		0	0	0	ND	0.06	0.05	0.02	ND

Notes: * Latest three years of data are applied as most representative of background.
Data in parentheses are expressed as ppm; all other data are expressed as $\mu g/m^3$.
ND = No data available. In the case of SO_2, data were not valid (Jasson, 1992).
NA = Not applicable.
[a] Six months observation.
[b] Based on two seasons' data.
[c] Represents highest concentration of all Phoenix monitoring sites.
[d] Represents highest concentration of all Scottsdale monitoring sites.

Sources: Arizona Department of Environmental Quality, Office of Air Quality, 1989; 1990; 1991; 1992.

stations in the area. PM_{10} concentrations exceeded the NAAQS 5.4 percent of the time during 1989 in the Phoenix area. Ozone concentrations exceeded the NAAQS 0.01 percent of the time in both the Scottsdale and Phoenix areas in 1988, and 0.22 percent of the time in the Phoenix area in 1990 (limited data available). Carbon monoxide concentrations exceeded the NAAQS 0.43 percent of the time in 1988, 0.26 percent of the time in 1989, and 0.06 percent of the time in 1990 in the Phoenix area. Nitrogen dioxide, sulfur dioxide, and lead concentrations recorded in the 1988-1990 period for the Phoenix and Scottsdale areas were well below NAAQS.

The major sources affecting the air quality of the area are traffic on paved and unpaved roads (PM_{10}), mobile sources (CO, VOCs, SO_x, and NO_x), and power plants (SO_x and NO_x). However, air quality is also affected by pollutants transported from sources located outside the Maricopa County and Pinal County area.

Preclosure Reference. Williams AFB is located in the Phoenix and Maricopa County Nonattainment Area (PMCNA) for PM_{10}, O_3, and CO; the area is designated as attainment for SO_2, NO_2, and lead. Major new or modified stationary sources in the area of Williams AFB are subject to Prevention of Significant Deterioration (PSD) review to ensure that these sources are constructed without significant adverse deterioration of the clean air in the area. Emissions from any new or modified source must be controlled using Best Available Control Technology. The air quality impacts in combination with other PSD sources must not exceed the maximum allowable incremental increases identified in Table 3.4-4. Certain major national parks and wilderness areas are designated as Class I areas, where any appreciable deterioration in air quality is considered significant. Class II areas are those where moderate, well-controlled industrial growth could be permitted. Class III areas allow for greater industrial development. One Class I area is located within 50 miles of the base. The Superstition Wilderness Area is located approximately 11 miles northeast of Williams AFB. All of the surrounding area is designated by the U.S. EPA as Class II. Typical ambient pollutant concentrations are indicated in Table 3.4-5.

Closure Baseline. It can be reasonably assumed that pollutant concentrations after base closure would be similar to, or somewhat less than, concentrations experienced under preclosure conditions. This is because numerous emission sources are eliminated by closure of the base (e.g., aircraft operations and aerospace ground activity). Emissions associated with vehicles assigned to the base, military and commuting civilian employees, retirees visiting Williams AFB facilities, and truck traffic associated with base operations are virtually eliminated in the closure condition, with the exception of activities associated with the OL. However, total emissions from the base are small in comparison to the areawide emissions, and the overall effect of closure is expected to have minimal effects on areawide concentrations.

Table 3.4-4. Maximum Allowable Pollutant Concentration Increases Under PSD Regulations

Pollutant	Averaging Time	Maximum Allowable Increment ($\mu g/m^3$)		
		Class I	Class II	Class III
TSP	Annual	5	19	37
	24-Hour	10	37	75
SO_2	Annual	2	20	40
	24-Hour	5	91	182
	3-Hour	25	512	700
NO_2	Annual	2.5	25	50

Note: Class I areas are regions in which the air quality is intended to be kept pristine, such as national parks and wilderness areas. All other lands are initially designated Class II. Individual states have the authority to redesignate Class II lands to Class III to allow for maximum industrial use.

Source: 40 CFR 52.21.

3.4.3.2 Air Pollutant Emission Sources.

Preclosure Reference. The most recent emission inventories for Williams AFB and the nonattainment area of Maricopa County are presented in Table 3.4-6. The emissions inventory for Williams AFB is representative of preclosure conditions in 1990. The inventory for the nonattainment areas of Maricopa County represents 1989 emission rates. VOC emissions were not included in the preclosure inventory. Consequently, hydrocarbon (HC) emissions were conservatively assumed to equate to VOC emissions for the purposes of analysis. The primary source of SO_2, NO_2, CO, and VOCs from Williams AFB was aircraft flight operations. Fire training activities were the most significant contributor to the emissions of total suspended particulates (TSP). Emission rates for lead from Williams AFB and Maricopa County are not available. Impacts from lead emission sources at Williams AFB are assumed to be negligible.

Indirect air pollutant emissions associated with the operation of Williams AFB in 1990 were derived from the indirect employment data for Williams AFB and the similar air emissions projection methods used in calculating direct air pollutant emissions. The indirect employment data by emissions source category and land use category associated with operation of Williams AFB in 1990 were based on total employment data from the Economic Resource Impact Statement (U.S. Air Force, 1990) and the Regional Input-Output Modeling System (U.S. Bureau of Economic Analysis, 1992b).

Table 3.4-5. Ambient Background Air Quality Concentration in the Area of Williams AFB

Pollutant	Averaging Time	Background Concentration
CO	8-Hour	4.5 ppm
		(5,000 $\mu g/m^3$)
	1-Hour	7.3 ppm
		(8,342 $\mu g/m^3$)
NO_2	Annual	0.015 ppm
		(29 $\mu g/m^3$)
SO_2	Annual	0.002 ppm
		(6 $\mu g/m^3$)
	24-Hour	0.007 ppm
		(17.3 $\mu g/m^3$)
	3-Hour	0.012 ppm
		(34 $\mu g/m^3$)
PM_{10}	Annual	30 $\mu g/m^3$
	24-Hour	77 $\mu g/m^3$

Sources: Arizona Department of Environmental Quality, Office of Air Quality, 1989; 1990; 1991.

Closure Baseline. The emission inventory for Williams AFB at base closure is essentially eliminated. The remaining emissions can be estimated by assuming that emissions other than those associated with aircraft, aerospace ground equipment, firefighting, and heating/power generation are proportional to the change in on-base population. The ratio of the preclosure base population (including military personnel, military dependents, and civilian employees) to the base population after closure is applied to each of the vehicle, surface coating, and fuel evaporation category emissions in order to estimate closure emissions. Emissions from the aircraft, aerospace ground equipment, and firefighting categories are eliminated completely. Heating plants and power generators are assumed to operate at 20 percent of the preclosure capacity in order to fulfill minimum building heating and power requirements. The closure baseline emissions inventory also includes VOC emissions from the air stripping operation associated with groundwater remediation at the Liquid Fuels Storage Area (IRP Site ST-12) (see Section 3.3.3.9). Closure baseline emissions are presented in Table 3.4-7.

Table 3.4-6. Preclosure Emission Inventory (tons/year)

Source	TSP	SO_x	CO	VOCs[a]	NO_x
Williams AFB[b]					
Incinerator	0.083	0.029	0.119	0.036	0.036
Aerospace Ground Equipment	0.208	0.044	5.600	0.378	3.411
Heating and Power Production	0.832	0.301	7.407	0.432	4.466
Motor Vehicles	1.100	0.520	24.600	5.150	5.400
Fuel Evaporation Losses	0.000	0.000	0.000	60.793	0.000
Firefighting Training	4.940	0.000	21.620	12.350	0.160
Surface Coatings	0.000	0.000	0.000	18.250	0.000
Aircraft Ground Operations[c]	0.063	4.006	137.850	7.053	9.912
Aircraft Flying Operations	2.98	44.53	3,343.04	425.19	94.61
Subtotal					
Williams AFB Direct Emissions	10.21	49.43	3,540.24	529.63	118.00
Williams AFB Indirect Emissions	1.70	0.09	140.00	196.70	49.20
Total, Williams AFB Emissions	11.91	49.52	3,680.24	726.33	167.20
Maricopa County Nonattainment Area[f]	46,339[d]	6,160	245,748	87,212[e]	55,186

Notes:
[a] Inventory was conducted for HCs. For purposes of analysis, it is conservatively assumed that HC emissions equate to VOC emissions.
[b] Based on 1990 preclosure condition (U.S. Air Force, 1991i).
[c] Emission rates in this category have been recalculated due to inconsistencies found in the emissions inventory provided by Williams AFB (U.S. Air Force, 1991i).
[d] PM_{10} only.
[e] VOCs only.
[f] Based on 1989 emission inventory (Maricopa County Bureau of Air Pollution Control, 1992).

3.4.4 Noise

The ROI for noise is defined to include those areas in which noise levels may be directly or indirectly affected by existing activities of the base or by activities of any of the reuse alternatives. The ROI includes areas along access roads and transportation corridors, areas near construction sites, and areas near the base in which noise levels are affected by activities at Williams AFB. The ROI for Williams AFB also includes the area within the day-night noise level (DNL) 65 decibel (A-weighted) (dBA) contour for aircraft operations. This region includes parts of the City of Mesa and the towns of Queen Creek and Gilbert, and other portions of Maricopa County and Pinal County bounded approximately on the west by Greenfield Road,

Table 3.4-7. Closure Emission Inventory (tons/year)

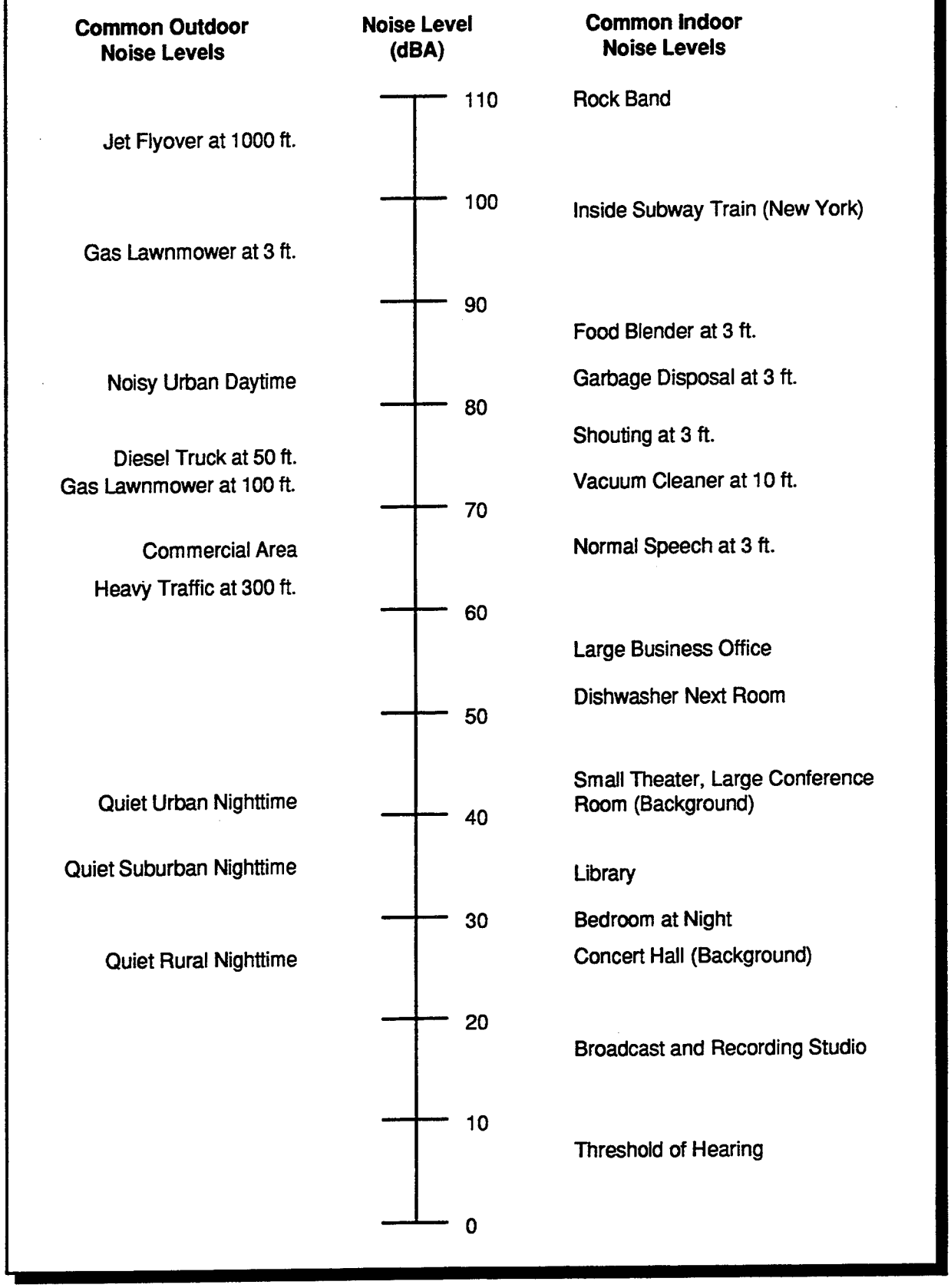
Source	TSP	SO_x	CO	VOCs*	NO_x
Williams AFB					
Incinerator	NA	NA	NA	NA	NA
Aerospace Ground Equipment	NA	NA	NA	NA	NA
Heating and Power Production	0.166	0.060	1.481	0.086	0.893
Motor Vehicles	0.010	0.002	6.367	1.658	2.161
Fuel Evaporation Losses	NA	NA	NA	56.595	NA
Firefighting Training	NA	NA	NA	NA	NA
Surface Coatings	NA	NA	NA	0.947	NA
Aircraft Ground Operations	NA	NA	NA	NA	NA
Aircraft Flying Operations	NA	NA	NA	NA	NA
Air Stripping Operations, Groundwater Remediation	NA	NA	NA	0.548	NA
Subtotal					
Williams AFB Direct Emissions	0.176	0.062	7.848	59.834	3.054
Williams AFB Indirect Emissions	0.004	0.001	2.329	21.052	0.791
Total, Williams AFB Emissions	0.180	0.063	10.177	80.886	3.845

Notes: * Based on preclosure emissions inventory which was conducted for HCs. For purposes of analysis, it is conservatively assumed that HC emissions equate to VOC emissions.
NA = Not applicable.

on the east by Vineyard Road, on the south by Chandler Heights Road, and on the north by the Superstition Freeway (U.S. 60).

The characteristics of sound include parameters such as amplitude, frequency, and duration. The decibel (dB), a logarithmic unit that accounts for the large variations in amplitude, is the accepted standard unit measurement of sound. Table 3.4-8 presents examples of typical sound levels. Some of these levels represent peak sound levels and others represent continuous levels. Different sounds may have different frequency contents. When measuring sound to determine its effects on a human population, A-weighted sound levels are typically used to account for the response of the human ear. A-weighted sound levels represent the sound level according to a prescribed frequency response established by the American National Standards Institute (American National Standards Institute, 1983).

Table 3.4-8. Comparative Sound Levels



Noise is usually defined as sound that is undesirable because it interferes with speech communication and hearing, is intense enough to damage hearing, or is otherwise annoying. Noise levels often change with time; therefore, to compare levels over different time periods, several descriptors were developed that take into account this time-varying nature. These descriptors are used to assess and correlate the various effects of noise on man and animals, including land use compatibility, sleep interference, annoyance, hearing loss, speech interference, and startle effects.

DNL was developed to evaluate the total community noise environment. DNL (sometimes abbreviated as L_{dn}) is the 24-hour A-weighted equivalent sound level with a 10 dB adjustment added to the nighttime levels (between 10 p.m. and 7 a.m.). This adjustment is an effort to account for the increased sensitivity to nighttime noise events. The DNL was developed by the U.S. EPA and is mandated by the U.S. Department of Housing and Urban Development (HUD), the FAA, and the DOD.

DNL is an accepted unit for quantifying human annoyance to general environmental noise, which includes aircraft noise. The Federal Interagency Committee on Urban Noise developed land use compatibility guidelines for noise in terms of DNL (U.S. Department of Transportation, 1980). Table 3.4-9 provides FAA-recommended DNL ranges for various land use categories based upon the committee's guidelines. The FAA guidelines were used in this study to determine noise impacts.

DNL is used in this report because it is the noise descriptor recognized by the FAA and the Air Force for airfield environments. DNL is sometimes supplemented with other metrics, primarily the equivalent sound level (L_{eq}). The L_{eq} is the equivalent (A-weighted), steady-state level that would contain the same acoustical energy as the time-varying level during the same time interval. Occasionally, the Sound Exposure Level (SEL) is used to supplement DNL, especially where sleep disturbance is a concern. The SEL value represents the A-weighted sound level integrated over the entire duration of the noise event and referenced to a duration of 1 second. When an event lasts longer than 1 second, the SEL value will be higher than the highest sound level during the event. SEL is used in this report when discussing sleep disturbance effects. The maximum sound level (L_{max}) A-weighted is used in some noise regulations and in evaluating speech interference. See Appendix I for an expanded discussion of these metrics.

The State of Arizona has not developed land use compatibility guidelines or regulations which specify limits on environmental noise. The cities of Mesa and Tempe have noise control ordinances which regulate allowable levels of noise within the community. Maricopa County has developed a zoning ordinance for the unincorporated area of the county around military airports to minimize exposure to crash hazards and high noise levels and to

Table 3.4-9. Land Use Compatibility with Yearly Day-Night Average Sound Levels
Page 1 of 2

Land Use	Yearly Day-Night Average Sound Level (DNL) in Decibels					
	Below 65	65-70	70-75	75-80	80-85	Over 85
Residential						
Residential, other than mobile homes and transient lodgings	Y	N(a)	N(a)	N	N	N
Mobile home parks	Y	N	N	N	N	N
Transient lodgings	Y	N(a)	N(a)	N(a)	N	N
Public Use						
Schools	Y	N(a)	N(a)	N	N	N
Hospitals and nursing homes	Y	25	30	N	N	N
Churches, auditoriums, and concert halls	Y	25	30	N	N	N
Governmental services	Y	Y	25	30	N	N
Transportation	Y	Y	Y(b)	Y(c)	Y(d)	Y(d)
Parking	Y	Y	Y(b)	Y(c)	Y(d)	N
Commercial Use						
Offices, business, and professional	Y	Y	25	30	N	N
Wholesale and retail--building materials, hardware, and farm equipment	Y	Y	Y(b)	Y(c)	Y(d)	N
Retail trade--general	Y	Y	25	30	N	N
Utilities	Y	Y	Y(b)	Y(c)	Y(d)	N
Communication	Y	Y	25	30	N	N
Manufacturing and Production						
Manufacturing, general	Y	Y	Y(b)	Y(c)	Y(d)	N
Photographic and optical	Y	Y	25	30	N	N
Agriculture (except livestock) and forestry	Y	Y(f)	Y(g)	Y(h)	Y(h)	Y(h)
Livestock farming and breeding	Y	Y(f)	Y(g)	N	N	N
Mining and fishing, resource production and extraction	Y	Y	Y	Y	Y	Y
Recreational						
Outdoor sports arenas and spectator sports	Y	Y(e)	Y(e)	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits and zoos	Y	Y	N	N	N	N
Amusements, parks, resorts, and camps	Y	Y	Y	N	N	N
Golf courses, riding stables, and water recreation	Y	Y	25	30	N	N

Letters in parentheses refer to notes (see next page). The designations contained in this table do not constitute a federal determination that any use of land covered by the program is acceptable or unacceptable under federal, state, or local law. The responsibility for determining the acceptable and permissible land uses and the relationship between specific properties and specific noise contours rests with the local authorities. FAA determinations under Part 150 are not intended to substitute federally determined land uses for those determined to be appropriate by local authorities in response to locally determined needs and values in achieving noise compatible land uses.

Key

Y (Yes)	Land use and related structures compatible without restrictions.
N (No)	Land use and related structures are not compatible and should be prohibited.
25, 30, or 35	Land use and related structures generally compatible; measures to achieve Noise Level Reduction (NLR) of 25, 30, or 35 dB must be incorporated into design and construction of structure.

Table 3.4-9. Land Use Compatibility with Yearly Day-Night Average Sound Levels
Page 2 of 2

Notes

(a) Where the community determines that residential or school uses must be allowed, measures to achieve outdoor to indoor Noise Level Reduction (NLR) of at least 25 dB and 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide an NLR of 20 dB, thus, the reduction requirements are often stated as 5, 10, or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year round. However, the use of NLR criteria will not eliminate outdoor noise problems.

(b) Measures to achieve an NLR of 25 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas or where the normal noise level is low.

(c) Measures to achieve an NLR of 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.

(d) Measures to achieve an NLR of 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.

(e) Land use compatible provided special sound reinforcement systems are installed.

(f) Residential buildings require an NLR of 25.

(g) Residential buildings require an NLR of 30.

(h) Residential buildings not permitted.

Source: Derived from FAR Part 150 Airport Noise Compatibility Planning (Federal Aviation Administration, 1989b).

encourage future development which is compatible with continued operation of the military airports (Maricopa County Planning Department, 1987). This ordinance defines districts around a military airport based on noise exposure levels and specifies permitted and prohibited uses by district. The towns of Queen Creek, Gilbert, and Apache Junction, and Pinal County have not developed ordinances with specific limits on noise levels.

The City of Chandler has adopted an Airport Impact Overlay as part of the zoning code (City of Chandler, 1987) which includes areas around Chandler Municipal Airport and Stellar Airpark.

The Mesa noise ordinance (City of Mesa, undated) limits sound levels by land use district. The limits are a 24-hour equivalent sound level (L_{eq}) of 60 dBA at a residential property line, 65 dBA at a commercial or business property line, and 70 dBA at an agricultural or industrial property line. The ordinance also places restrictions on noise from vehicles on city streets.

The Tempe noise ordinance (City of Tempe, undated) specifies levels of noise which are acceptable by zone of the adjacent property for daytime and nighttime periods. Allowable sound levels for residential areas are limited to a L_{max} of 45 dBA during nighttime and 55 dBA during daytime, commercial areas are limited to 55 dBA during nighttime and 65 dBA during daytime, and industrial areas are limited to 60 dBA during nighttime and 70 dBA during daytime. The allowable level is lower if the ambient level is below 40 dBA. Aircraft operations in conformity with federal laws, federal air regulations, and air traffic control instruction are exempt from the provisions of the ordinance. Other aircraft are limited to a L_{max} of 86 dBA within the city.

Appendix I provides additional information about the measurement and prediction of noise. This appendix also provides more information on the units used in describing noise, as well as information about the effects of noise such as annoyance, sleep interference, speech interference, health effects, and effects on animals.

3.4.4.1 Existing Noise Levels. Typical noise sources in and around airfields usually include aircraft, surface traffic, and other human activities. Military aircraft operations and surface traffic on local streets and highways are the primary sources of noise in the vicinity of Williams AFB. In airport analyses, areas with DNL above 65 dB are often considered in land use compatibility planning and impact assessment; therefore, the contours of DNL greater than 65 dB are of particular interest.

Preclosure Reference. Aircraft noise at Williams AFB occurs during aircraft engine warmup, maintenance and testing, taxiings, takeoffs, approaches, and landings. Noise contours for preclosure aircraft operations were taken from the AICUZ Study for Williams AFB (U.S. Air Force, 1984), which was

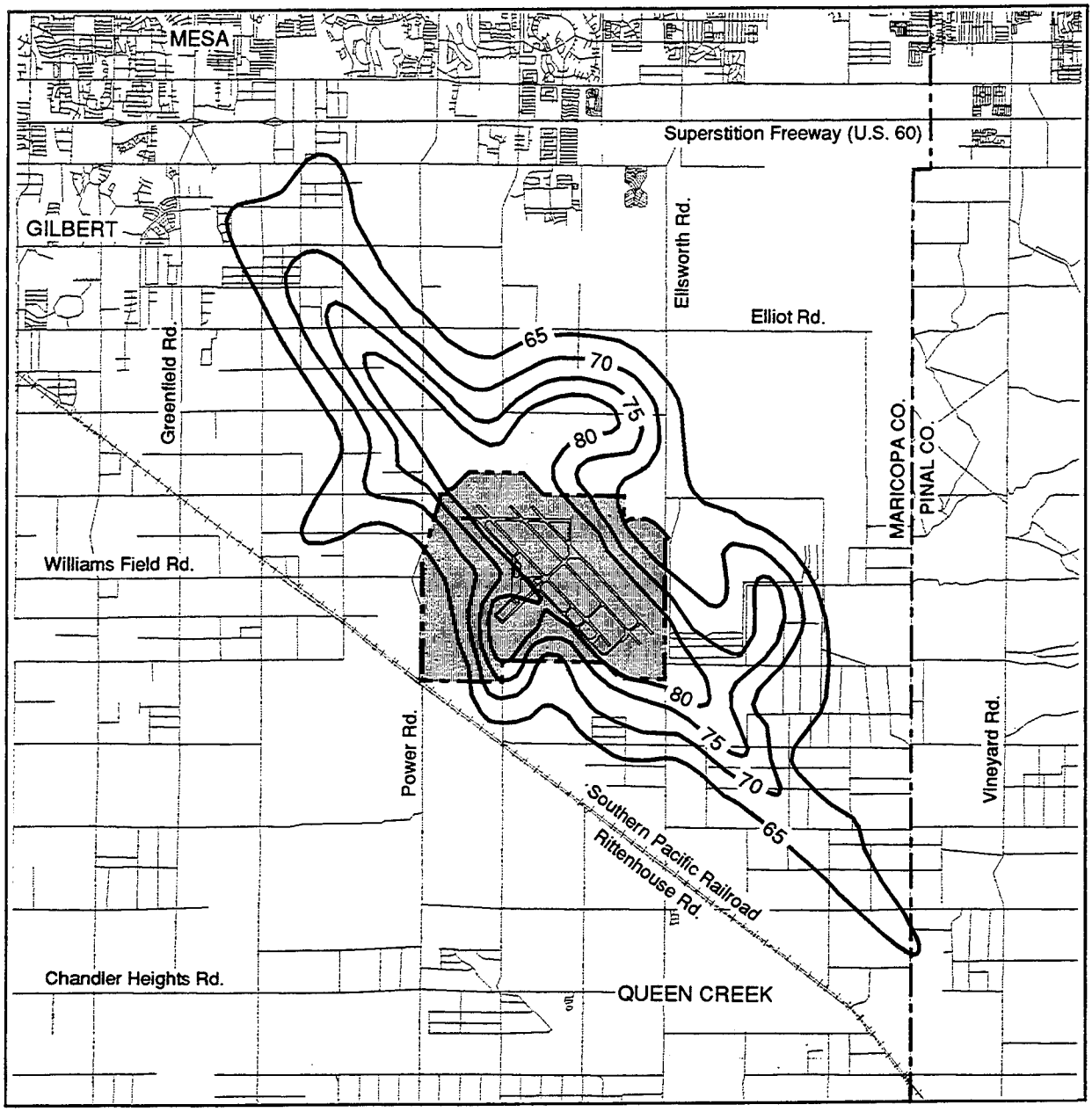
revalidated in 1991 (Adams, 1991). Information used in the development of these contours included information on aircraft types, runway use, runup locations, takeoff and landing flight tracks, aircraft altitude, speeds, and engine power settings, and number of daytime (7 a.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.) operations. The operations data for 1990 are comparable to those used to generate the DNL contours in 1984. The noise contours for preclosure are shown in Figure 3.4-4. Only those contours equal to or above DNL 65 dB are shown.

Surface vehicle traffic noise levels for roadways in the vicinity of Williams AFB were analyzed using the Federal Highway Administration's Highway Traffic Noise Prediction Model (U.S. Department of Transportation, 1978). This model incorporates vehicle mix, traffic volume projections, and speed to generate DNL. The noise levels are then presented as a function of distance from the centerline of the nearest road. The results of the modeling for surface traffic are presented in Table 3.4-10. The actual distances to the DNLs may be less than those presented in the table because the screening effects of intervening buildings, terrain, and walls were not accounted for in the modeling. Appendix I contains the data used in the surface traffic analysis, including ADTs, traffic mix, and speeds.

Closure Baseline. The projected noise levels for the closure baseline were calculated using the surface traffic projections at base closure (Appendix I). The results of the modeling for the roadways analyzed are presented in Table 3.4-10. Again, the actual distances to the DNLs may be less than those presented in the table because the model does not account for screening effects of intervening buildings, terrain, and walls.

3.4.4.2 Noise-Sensitive Areas. The preclosure ROI for Williams AFB includes noise-sensitive receptors such as residential units, hospitals, classrooms, and parks that are within the DNL 65 dB contour. The contours from the AICUZ Study (U.S. Air Force, 1984) indicate that there are 17,113 acres exposed to DNL 65 dB or greater in and around Williams AFB. This includes 7,016 acres with 1,538 residents in the region between DNL 65 and 70 dB, 3,896 acres with 571 residents in the region between DNL 70 and 75 dB, 2,663 acres with 91 residents in the region between DNL 75 and 80 dB, and 3,538 acres with 111 residents in the region greater than DNL 80 dB. Section 3.2.2, Land Use and Aesthetics, describes land uses on and near the base.

For the purposes of this analysis, it is assumed there would be no aircraft operations at closure and, therefore, there would be no areas impacted by aircraft noise.



EXPLANATION

- DNL Noise Contours (in 5 dB intervals)
- Railroads
- Base Boundary
- County Boundary

0 1/2 1 2 Miles

Preclosure Aircraft Noise Contours

Figure 3.4-4

Table 3.4-10. Distance to DNL from Roadway Centerline for the Preclosure Reference and Closure Baseline

Roadway	Distance (feet)		
	DNL 65	DNL 70	DNL 75
Preclosure			
Elliot Road	90	40	*
Ellsworth Road	100	40	*
Germann Road	30	*	*
Power Road	230	100	50
Rittenhouse Road	110	50	*
Williams Field Road	110	50	*
Closure			
Elliot Road	90	40	*
Ellsworth Road	110	50	*
Germann Road	40	*	*
Power Road	150	70	30
Rittenhouse Road	120	60	30
Williams Field Road	40	*	*

* Contained within the roadway.

3.4.5 Biological Resources

Biological resources include the native and introduced plants and animals in the project area. For discussion purposes, these are divided into vegetation, wildlife (including aquatic biota), threatened and endangered species, and sensitive habitats. The analysis of biological resources also considers the concept of biodiversity. Because naturally occurring species, communities, habitats, and ecosystems are interdependent, a reduction in the diversity (variety) of one element will affect the others as well. Biodiversity embodies this concept.

Human activities in the immediate vicinity of Williams AFB have altered the natural environment primarily through urbanization and agriculture. Irrigated agriculture occurs to the south, east, and west of Williams AFB. There are two dairy farms located to the north.

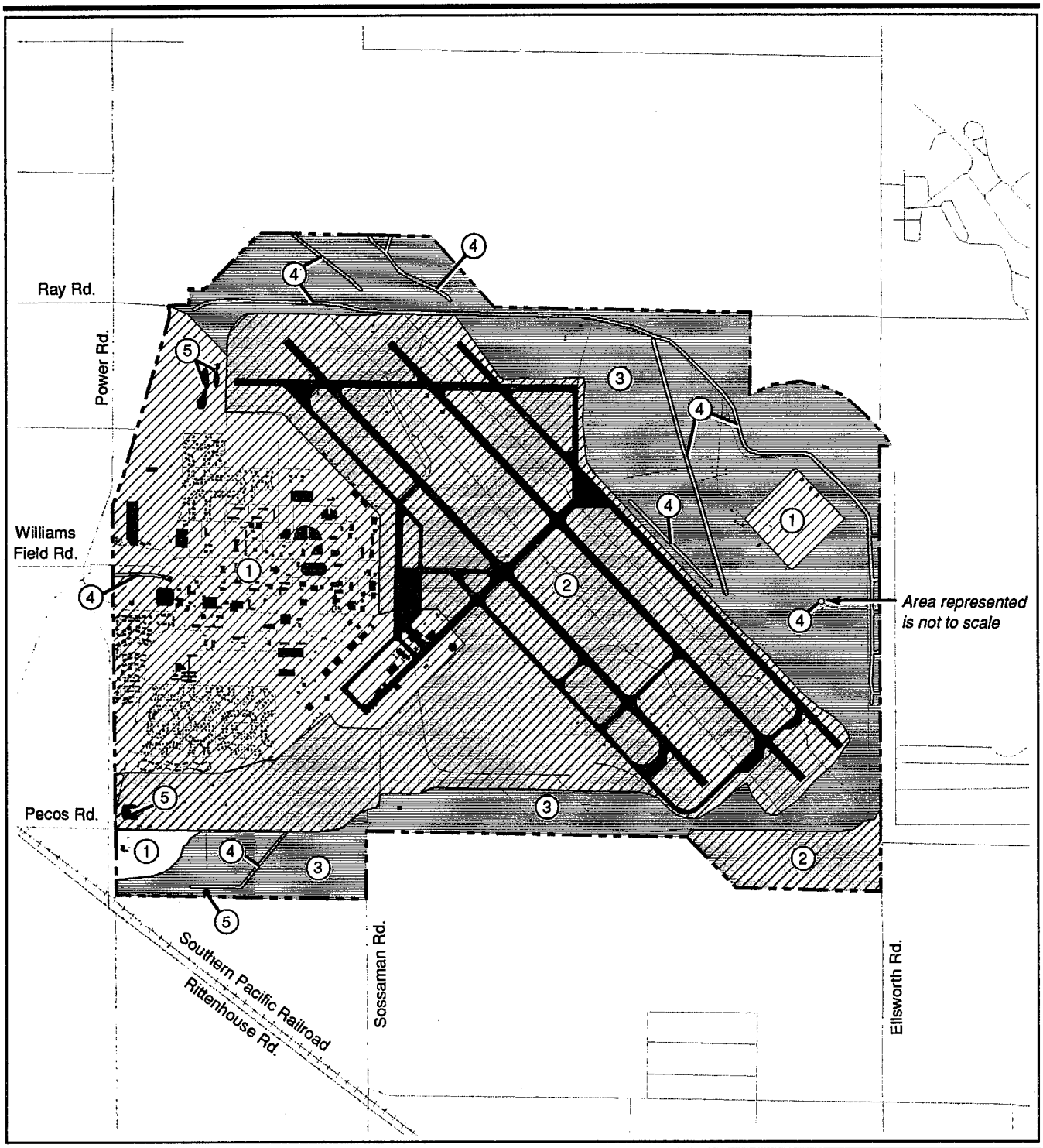
The ROI used for discussions of the biological resources present and potential impacts on these resources is the base itself and its immediate surroundings. This includes the area within which potential impacts could occur and provides a basis for evaluating the level of impact.

Information on the affected environment was obtained from available literature published by the U.S. Air Force; the U.S. Department of Agriculture (USDA), Soil Conservation Service; and a biological survey conducted from June 1 through June 5, 1992 (Halliburton NUS, 1992). Additional information was obtained from letters and personal communications with the Arizona Game and Fish Department (AGFD), the Arizona Department of Agriculture and Horticulture (ADAH), and the U.S. Fish and Wildlife Service (USFWS).

3.4.5.1 Vegetation. Williams AFB is located southeast of Phoenix, Arizona on a mostly level plain that is part of the lower Sonoran Desert. The hot, dry climate and lack of varied topography in the ROI have resulted in a relatively uniform Scrub-Shrub community dominated by creosote bush (*Larrea tridentata*) and other desert shrubs adapted to low rainfall conditions. Cacti and succulents typical of the Sonoran Desert occur within the ROI but are not frequent. Narrow strips of riparian vegetation (Riparian/Mesic) dominated by mesquite (*Prosopis* sp.) and other trees, shrubs, and grasses border ephemeral washes and drainageways. No large areas of Riparian/Mesic vegetation typically associated with perennial streams in the Sonoran Desert occur within the ROI. Much of the land that once supported native vegetation has been converted to cultivated cropland, primarily cotton (*Gossypium thurberi*) and citrus (*Citrus* sp.) groves that are dependent upon irrigation (Halliburton NUS, 1992).

Vegetative communities within Williams AFB are shown in Figure 3.4-5. The categories include Landscaped, Mowed/Maintained, Scrub-Shrub, and Riparian/Mesic vegetation. Much of the native on-base vegetation has been disturbed by human activities. However, a number of species used for landscaping at Williams AFB are either native to Arizona or accustomed to desert climates. Although not positively identified during the biological investigation, many more ephemeral herbaceous species (including several annual grass species and desert wildflower species) are believed to occur on Williams AFB.

The Landscaped vegetation type (approximately 939 acres) includes all vegetation on the base that is dependent upon irrigation. This vegetation covers nearly the entire western third of the base, including all urbanized parts of the base, base housing, Willie Park, and the golf course. Most irrigated Landscaped areas are lawns comprised primarily of bermudagrass. Typical woody landscape plants include eucalyptus (*Eucalyptus* sp.), oleander (*Nerium oleander*), palm (several species), ash (*Fraxinus* sp.), and citrus (*Citrus* sp.). Indigenous Sonoran Desert trees such as mesquite,



EXPLANATION

- (1) Landscaped
- (2) Mowed/Maintained
- (3) Scrub-Shrub
- (4) Riparian/Mesic
- (5) Water
- Developed
- Disturbed
- Base Boundary

0 750 1500 3000 Feet

Vegetation Distribution

Figure 3.4-5

desert ironwood (*Olneya tesota*), and blue paloverde (*Cercidium floridum*) are occasionally present in several irrigated Landscaped areas (Halliburton NUS, 1992).

Williams AFB contracts with a pesticide firm to maintain the urban/ landscaped and airstrip areas. A total of 700 acres are maintained with DURSBAN 2E (insecticide) and Arsynal (herbicide). Of these 700 acres, 350 are "spot" sprayed because they are located within residential/urban areas (Pennington, 1992a).

Small areas of Sonoran Desert xeriscaping using cacti and succulents such as saguaro (*Cerus gigantea*), coachwhip (ocotillo) (*Fouquieria splendens*), barrel cactus (*Ferocactus wislizenii*), and century plant (*Agave* sp.) have been established in certain areas on Williams AFB. These landscapes, which are frequent in the Phoenix area, are not dependent upon irrigation.

Most of the central third of Williams AFB, including lands between and surrounding the runways and hangars, supports a sparse Mowed/Maintained grass cover that is regularly mowed but not irrigated (approximately 1,798 acres, of which approximately 247 acres are paved). No woody plants and few other herbaceous plants were observed in these areas at the time of the June inspection, although western ragweed (*Ambrosia psilostachya*) or bermudagrass was dominant in several mowed runoff ditches.

Most lands to the north, east, and south of the runways on Williams AFB support Scrub-Shrub vegetation dominated by shrubs native to the lower Sonoran Desert (approximately 1,246 acres). Creosote bush is dominant in most areas not previously subjected to heavy disturbance. Saltbush (*Atriplex* sp.) and wolfberry (*Lycium* sp.) are codominant with creosote bush in many areas north and east of the airstrip. At the time of the June inspection, groundcover was limited to a sparse cover of desert grasses, although a field inspection during a wetter season may have revealed significant cover by ephemeral annual vegetation. A largely barren area east of the runways supports a sparse stand of crucifixion thorn (*Canotia holacantha*) and desert grasses. Two large areas, one near the base's northeastern corner and a second near the base's south central boundary, that have been used to deposit hardfill, support dense stands of desert broom (*Baccharis sarothroides*) with a groundcover of red brome (*Bromus rubens*).

Narrow zones of Riparian/Mesic vegetation border ephemeral washes and drainage ditches on Williams AFB (approximately 54 acres). Two ephemeral washes of natural origin crossing the base's northern boundary support Riparian/Mesic vegetation dominated by mesquite and blue paloverde, both small trees native to undisturbed Riparian/Mesic areas in the lower Sonoran Desert. Two drainageways east of the runways and one southwest of the runways are bordered by dense stands of desert broom, a native shrub

characteristic of disturbed Riparian/Mesic areas. Both drainageways appear to be of relatively recent origin following construction of the runways. The deeply cut northern and eastern perimeter drainage ditches support a moderately dense cover of desert broom and a composite shrub (*Isocoma acradenia*). The centers of many washes and ditches are largely barren of vegetation due to brief episodes of rapidly running water (Halliburton NUS, 1992).

The Arizona Native Plant Law, administered by the Arizona Department of Agriculture and Horticulture, protects state threatened and endangered plant species, and other native plants which grow in the wild, from destruction or removal. The Arizona Native Plant Law is further discussed in Section 3.4.5.3, Threatened and Endangered Species.

3.4.5.2 Wildlife. Wildlife in the vicinity of Williams AFB includes species associated with native vegetation (mesquite and creosote), landscaped areas, and disturbed weedy vegetation. These habitats support a wide range of species. Wildlife activity is the highest in the undisturbed areas and the lowest in areas disturbed by Air Force activities and urbanization.

Resident mammals of Williams AFB include the coyote (*Canis latrans*), javelina (*Dicotyles tajacu*), black-tailed jackrabbit (*Lepus californicus*), desert cottontail (*Sylvilagus audubonl*), valley pocket gopher (*Thomomys bottae*), and the round-tailed ground squirrel (*Citellus tereticaudus*). These species can be found in all habitat types on-base with the exception of those with heavy human influence. A badger (*Taxidea taxus*) den was also identified on-base. Ord's kangaroo rat (*Dipodomys ordi*), a species that prefers mesquite and creosote habitats with light, sandy soils, was identified in the eastern section of the base. The hispid cotton rat (*Sigmodon hispidus*), an herbivore, was identified on the golf course. Home ranges of the above mammals extend from 100 feet away from the nest (hispid cotton rat) to 10 miles (coyote) (Halliburton NUS, 1992).

Sparsely vegetated areas on-base provide habitat which may be used by other mammals including: the desert kangaroo rat (*Dipodomys deserti*), the southern grasshopper mouse (*Onychomys torridus*), the kit fox (*Vulpes macrotis*), and the striped skunk (*Mephitis mephitis*). The white-throated wood rat (*Neotoma albigula*) feeds on mesquite beans and prefers rocky areas. Although the base itself is fenced, desert shrub is habitat for mule deer (*Odocoileus hemionus*) (U.S. Air Force, 1989).

Birds present in nearly all habitat types on-base include: turkey vulture (*Cathartes aura*), killdeer (*Charadrius vociferus*), white winged dove (*Zenaida asiatica*), mourning dove (*Zenaida macroura*), Inca dove (*Columbina inca*), western kingbird (*Tyrannus verticalis*), black-chinned hummingbird (*Archilochus alexandri*), horned lark (*Eremophila alpestris*), cliff swallow (*Hirundo pyrrhonota*), verdin (*Auriparus flaviceps*), mockingbird (*Mimus*

polyglottos), great-tailed grackle (*Quiscalus mexicanus*), brown-headed cowbird (*Molothrus ater*), house finch (*Carpodacus mexicanus*), and house sparrow (*Passer domesticus*). Native vegetation (mesquite, creosote, and desert broom communities) provide habitats for pyrrhuloxia (*Cardinalis sinuatus*), Albert's towhee (*Pipilo aberti*), black-throated sparrow (*Amphispiza bilineata*), and Harris' hawk (*Parabuteo unicinctus*). Open desert with scattered vegetation provides habitat for the greater roadrunner (*Geococcyx californianus*), white-throated swift (*Aeronautes saxatalis*), loggerhead shrike (*Lanius ludovicianus*), red-tailed hawk (*Buteo jamaicensis*), and Say's phoebe (*Sayornis saya*). Desert Scrub-Shrub provides habitat for the Gambel's quail (*Callipepla gambelli*), cactus wren (*Campylorhynchus brunneicapillus*), lesser nighthawk (*Chordeiles acutipennis*), red-winged blackbird (*Agelaius phoeniceus*), and curve-billed thrasher (*Toxostoma curvirostre*). The burrowing owl (*Athene cunicularia*) prefers airfields and open grassland habitats (Halliburton NUS, 1992).

The Landscaped areas on the base provide habitat for a variety of birds. The house sparrow, rock dove (*Columba liva*), and starling (*Sturnus vulgaris*) are three species found primarily in the urban habitat (Halliburton NUS, 1992). Also in the Landscaped area are two golf course ponds which provide habitat for a variety of migratory waterfowl including: sandhill crane (*Grus canadensis*), mallard (*Anas platyrhynchos*), snow goose (*Chen caerulescens*), redhead (*Aythya americana*), lesser scaup (*Aythya affinis*), grebe (*Podicipedidae* sp.), gadwall (*Anas strepera*), green-winged teal (*Anas crecca*), northern shoveler (*Anas clypeata*), black-necked stilt (*Himantopus mexicanus*), and spotted sandpiper (*Actitis macularia*). The pied-billed grebe (*Podilymbus podiceps*) has been identified in the sewage effluent ponds along with black-necked stilt and mallards. Killdeer were also identified around these ponds (Spiller, 1992). Other waterfowl species with potential to occur on the base during migration and in the winter months include: Canada goose (*Branta canadensis*), northern pintail (*Anas acuta*), bufflehead (*Bucephala albeola*), and ruddy duck (*Oxyura jamaicensis*).

Raptors which winter, migrate, or reside in the vicinity of Williams AFB include: Swainson's hawk (*Buteo swainsoni*), golden eagle (*Aquila chrysaetos*), American kestrel (*Falco sparvenius*), prairie falcon (*Falco mexicanus*), and ferruginous hawk (*Buteo regalis*). The golf course also provides habitat for a family of great horned owls (*Bubo virginianus*) (Halliburton NUS, 1992).

The cultivated farmland around the base provides suitable habitat for the eastern meadowlark (*Sturnella magna*), western meadowlark (*Sturnella neglecta*), common ground dove (*Columbina passerina*), and barn owl (*Tyto alba*). Agricultural orchards are utilized by the cedar waxwing (*Bombycilla cedrorum*) in the winter. Bendire's thrasher (*Toxostoma bendirei*) utilizes desert and farmland habitats during breeding season. Birds which use desert and wash habitats, somewhat similar to those on-base, include:

vermilion flycatcher (*Pyrocephalus rubinus*), ash-throated flycatcher (*Myiarchus cinerascens*), sage thrasher (*Oreoscoptes montanus*), Costa's hummingbird (*Calypte costae*), ladder backed woodpecker (*Picoides scalaris*), and the Gila woodpecker (*Melanerpes uropygialis*). The white-crowned sparrow (*Zonotrichia leucophrys*) uses this type of habitat in the winter.

Amphibians which reside on-base concentrate near the drainages and ponds. Species on the base include: Colorado River toad (Sonoran Desert toad) (*Bufo alvarius*), bullfrog (*Rana catesbeiana*), and the Great Plains toad (*Bufo cognatus*) (Halliburton NUS, 1992). The Great Plains toad inhabits temporary ponds only during breeding season. Other species which may be on-base or in the vicinity include: red-spotted toad (*Bufo punctatus*), Woodhouse toad (*Bufo woodhousei*), leopard frog (*Rana pipiens*), and Couch spadefoot (*Scaphiopus couchii*). The Couch spadefoot prefers habitats of low rainfall such as creosote bush desert.

Reptiles which reside on-base in the creosote habitat include the desert spiny lizard (*Sceloporus magister*) and the Mojave rattlesnake (*Crotalus scutulatus*). The washes and rocky areas on-base provide habitat for the zebra-tailed lizard (*Callisaurus draconoides*) and the common collared lizard (*Crotaphytus collaris*). Subspecies of the western whiptail (*Cnemidophorus tigris*) reside in the desert/semi-arid habitats (Halliburton NUS, 1992).

Other species of reptiles which may reside in the desert habitats on-base include: western diamondback rattlesnake (*Crotalus atrox*), the coachwhip (*Masticophis flagellum*), gopher snake (*Pituophis melanoleucus*), glossy snake (*Arizona elegans*), western blind snake (*Leptotyphlops humilis*), and the night snake (*Hypsiglena torquata*). Creosote communities similar to those found on-base provide habitat for western banded gecko (*Coleonyx variegatus*), large spotted lizard (*Gambelia wislizenii*), desert horned lizard (*Phrynosoma platyrhinos*), regal horned lizard (*Phrynosoma solare*), many lined skink (*Eumeces multivirgatus*), spotted leaf-nosed snake (*Phyllorhynchus decurtatus*), western patch-nosed snake (*Salvadora hexalepis*), and speckled rattlesnake (*Crotalus mitchellii*). Mesquite communities provide habitat for the tree lizard (*Urosaurus ornatus*), long tailed bush snake (*Urosaurus graciosus*), and the sidewinder (*Crotalus cerastes*). Washes and rocky areas provide suitable habitat for the side-blotched lizard (*Uta stansburiana*), lesser earless lizard (*Holbrookia maculata*), western shovel-nosed snake (*Chionactis occipitalis*), western coral snake (*Micruroides euryxanthus*), common kingsnake (*Lampropeltis getulus*), lyre snake (*Trimorphodon biscutatus*), and the desert tortoise (*Gopherus agassizii*).

Aquatic habitats on the base are limited to ephemeral drainages and man-made ponds. Ephemeral drainages typically support aquatic insects (e.g., mosquitoes and flies) and other species, such as frogs and toads, that need

water for only part of their lifecycle. Williams AFB is surrounded by drainage ditches and associated floodways. The East Maricopa Floodway runs approximately parallel and adjacent to the west boundary of the base. In turn, the RWCD Canal parallels the west side of the East Maricopa Floodway. The golf course contains two man-made ponds. The ponds on the golf course and the sewage effluent ponds have been lined by mixing and compacting the soil with a chemical treatment. These ponds do not support vegetation. However, these ponds support waterfowl as mentioned above. In addition, the area around the base has numerous intermittent streams and irrigation ditches.

The Powerline Floodway (concrete), located along the northeast boundary of the base, joins with the base perimeter flood channels. At their junction is an area of standing water which supports bullfrogs and Colorado River toads (Sonoran Desert toad), and it is used as a watering hole by javelina and coyote, as evident by the tracks observed on the edges. Another depression, located near the southwest boundary of the base, is of unknown origin. This area is surrounded by desert broom and provides habitat for birds (e.g., mourning dove, Albert's towhee, thrashers, and pyrrhuloxia) and toads (unidentified species) (Halliburton NUS, 1992).

3.4.5.3 Threatened and Endangered Species. A number of federal and state threatened, endangered, or special concern species are known to be present in the vicinity of Williams AFB (Spiller, 1992; Arizona Game and Fish Department, 1988; Christofferson, 1992; Arizona Department of Agriculture and Horticulture, 1992). The status and distribution of these species were determined through contact with federal and state agencies, literature reviews, and an on-base biological survey. A letter was sent to the U.S. Fish and Wildlife Service requesting a list of species in the project area as required for initiation of an informal consultation under Section 7 of the Endangered Species Act, as amended. Their reply indicates that there is the potential for a number of species which could occur in the vicinity of Williams AFB. No further consultation with the USFWS is required on the part of the Air Force. However, additional consultation with the USFWS and AGFD should occur prior to initiating any ground-disturbing activities. Threatened, endangered, and other species of concern that may be present on or near Williams AFB are presented in Table 3.4-11.

Numerous loggerhead shrikes (*Lanius ludovicianus*), Federal Candidate (Category 2) species, were observed at different locations on the base. The loggerhead shrike prefers semi-open country and uses wires, trees, and scrub for lookout posts. The base has an abundance of this type of habitat, except in the urban areas (Halliburton NUS, 1992).

Other endangered/candidate species which may be on-base include three mammals and a reptile. Two of the mammals, the California leaf-nosed bat (*Macrotus californicus*) and the Yavapai Arizona pocket mouse (*Perognathus*

Table 3.4-11. Threatened and Endangered Species within the Vicinity of Williams AFB

Common Name	Scientific Name	Status		Habitat
		Federal	State	
Mammals:				
Lesser long-nosed bat (formerly Sanborn's long-nosed bat)	*Leptonycteris curasoae yerbabuenae*	E	NL	Caves and Mines
California leaf-nosed bat	*Macrotus californicus*	C2	C	Desert Scrub and Buildings
Yavapai Arizona pocket mouse	*Perognathus amplus amplus*	C2	NL	Arid Desert
Reptiles:				
Chuckwalla	*Sauromalus obesus*	C2	NL	Desert Creosote
Birds:				
Loggerhead shrike	*Lanius ludovicianus*	C2	NL	Desert

Notes: E = Endangered.
C = Candidate Species that may be considered for listing.
C2 = Category 2 Species, but there is not sufficient information to support proposed listing.
NL = Not Listed.

Sources: Christofferson, 1992; Spiller, 1992; Arizona Game and Fish Department, 1988.

amplus amplus), are Federal Candidate (Category 2) species. In addition, the California leaf-nosed bat is listed as a candidate species by the State of Arizona. The California leaf-nosed bat prefers desert scrub habitats and roosts in mine tunnels, caves (none on the base), or buildings during the day and sometimes at night. The Yavapai Arizona pocket mouse inhabits areas of scattered vegetation and arid desert (habitats which are present on the base). The third mammal, the lesser long-nosed bat (*Leptoncyteris curasoae yerbabuenae*), is a federal endangered species. Like the California leaf-nosed bat, this species roosts in caves and mine tunnels (none on the base), and sometimes buildings. The chuckwalla (*Sauromalus obesus*), a Federal Candidate (Category 2) reptile, is a rock-dwelling herbivore. The creosote bush occurs throughout most of its range. Although not positively identified during the biological investigation, a lizard of similar size, shape, and markings was observed in a rock/shrub area (Halliburton NUS, 1992).

The Arizona Native Plant Law (Arizona Revised Statutes, Chapter 7) protects native plant species, their seeds, and fruit from destruction or removal,

when growing wild on state, public, or privately owned land. The law is administered by the Arizona Department of Agriculture and Horticulture. Plant species are placed into five categories of protection: 1) Highly Safeguarded native plants are those plants whose prospects for survival are presently, or in the foreseeable future, in danger of extinction throughout all or part of their ranges; 2) Salvage Restricted plants are subject to high potential for damage by theft or vandalism; 3) Export Restricted plants are those that are subject to overdepletion if their export from the state is permitted; 4) Salvage Assessed native plants are those plants with sufficient value to be exported and support the cost of salvage tags; and 5) Harvest Restricted plants are those plants subject to excessive harvesting or overcutting because of the value of their by-products, fiber, or woody parts.

On-site consultation with the ADAH was conducted on June 2, 1992. Species which are present on-base and protected by the Native Plant Law, Salvage Restricted category, are the barrel cactus (*Ferocactus wislizenii*), Jerusalem thorn (*Parkinsonia aculeata*), and crucifixion thorn (*Castela emoryi*). Under the Salvage Assessed category, are the Jerusalem thorn, blue palo verde (*Cercidium floridum*), and mesquite (*Prosopis* sp.). These three species are also protected under the Harvest Restricted category (Halliburton NUS, 1992). The ADAH has indicated that many of the specimens used to landscape the base are in good condition and should be preserved if these areas are disturbed. These species are: saguaro cacti (*Carnegia gigantea*), barrel cacti (*Ferocactus wislizenii* and *F. acanthodes*), Ocotillo (*Fouquieria splendens*), prickly pear (*Opuntia phaeacantha*), soto (*Dasylirion wheeleri*), ironwood (*Olneya tesota*), palo verde (*Cercidium floridum* and *C. microphyllum*), and strawberry hedgehog (*Echinocerus engelmannii*). Additional consultation with the ADAH should occur prior to ground-breaking or clearing activities.

3.4.5.4 Sensitive Habitats. Sensitive habitats include wetlands, plant communities that are unusual or of limited distribution, and important seasonal use areas for wildlife (e.g., migration routes, breeding areas, or crucial summer/winter habitat).

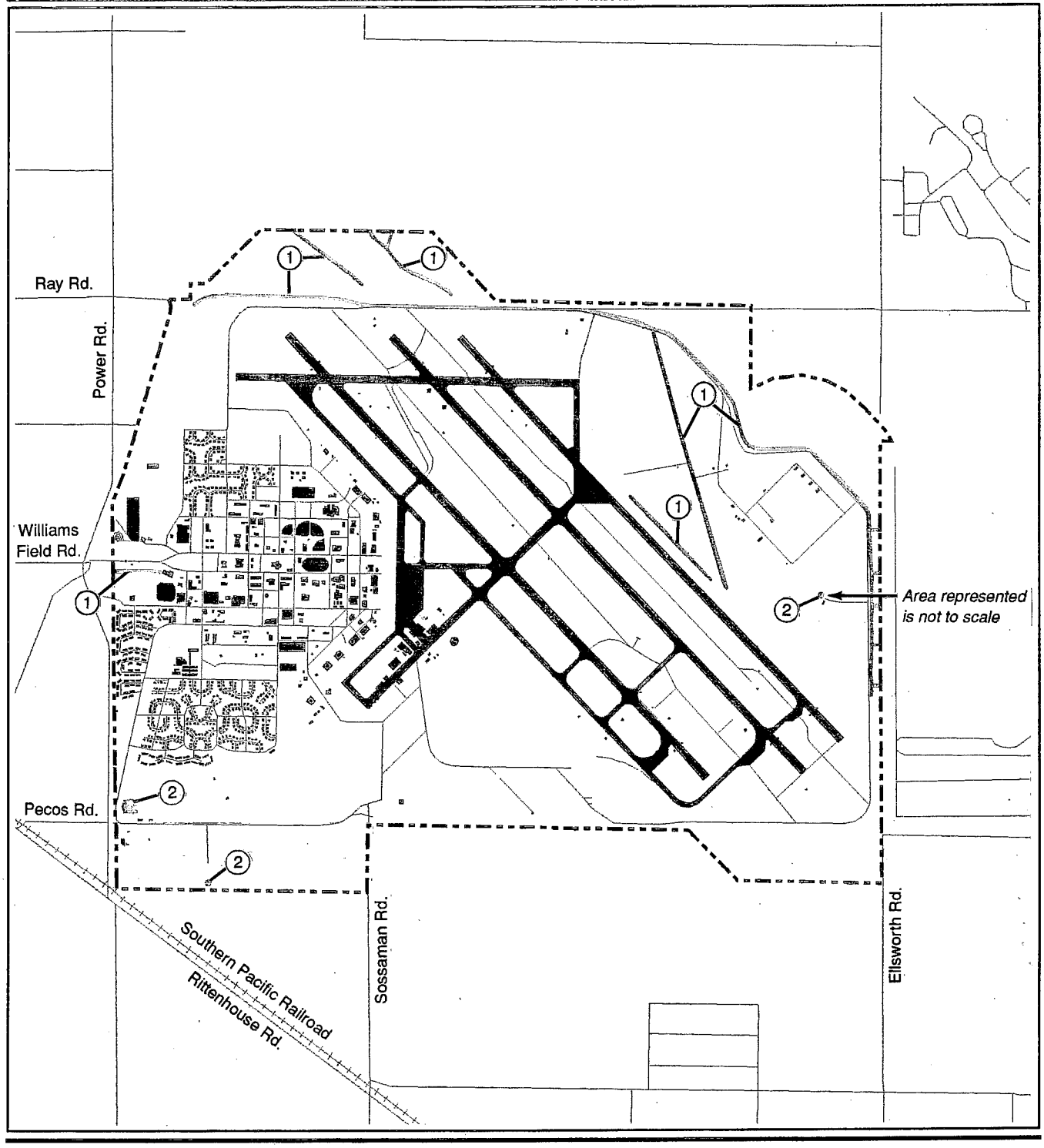
Sensitive habitats within the ROI are largely limited to narrow zones of Riparian/Mesic vegetation bordering ephemeral washes. There is pending Arizona legislation designed to protect riparian vegetation, and several species of common riparian vegetation, such as mesquite, are already protected under the Arizona Native Plant Law (Arizona Revised Statutes, Chapter 7). The Riparian/Mesic vegetation type contains small riparian inclusions that are considered sensitive habitats and could qualify as wetlands or as other and waters of the United States (Figure 3.4-5). Because wetlands and other waters of the United States are protected under Section 404 of the Federal Clean Water Act (Section 404), a field survey was conducted during the biological investigation to locate areas of potential jurisdiction on Williams AFB.

Wetlands are defined as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (Federal Interagency Committee for Wetland Delineation, 1989). Areas that are periodically wet but do not meet all three of the wetland delineation criteria (hydrophytic vegetation, hydric soils, and wetland hydrology) outlined in the *Corps of Engineers Wetlands Delineation Manual* (Manual) (U.S. Army Corps of Engineers, 1987) are not jurisdictional wetlands subject to Section 404 of the Federal Clean Water Act. Areas that have been disturbed or that are classified as problem area wetlands, however, may not meet all three wetland delineation criteria as a result of natural or man-induced reasons, yet are still considered jurisdictional wetlands.

Three small areas on the base contain hydrophytic vegetation that appears to be supported by surface runoff originating from man-made sources. These include a small area of cattail (*Typha augustifolia*) growing at a pipe leak near Facility 1101 east of the airfield, a small isolated depression near the southern base boundary that appears to collect irrigation runoff from a nearby farm, and a drainage ditch parallel to Williams Field Road at the main gate that appears to collect irrigation water used on base lawns. In addition, the basin of a sewage treatment pond near the southwestern corner of the base supports hydrophytic vegetation and was partially inundated at the time of the site visit.

The U.S. Army Corps of Engineers (COE) conducted a wetlands investigation on portions of the base in 1991. The determination was made that none of the areas surveyed contain jurisdictional wetlands (U.S. Army Corps of Engineers, 1991). Because the entire base was not surveyed by the COE, a basewide wetlands investigation was conducted as part of the June 1992 site visit (Halliburton NUS, 1992). No hydric soils were observed anywhere on the base and, consequently, no areas on the base meet all three of the wetland delineation criteria. However, some areas on the base provide seasonal water and vegetative cover conducive to wetland wildlife and are thus considered to be sensitive habitats (Figure 3.4-6).

No manual exists that establishes formal field procedures for the delineation of waters of the United States other than wetlands. 33 CFR 328.4 states that in the absence of adjacent wetlands, Section 404 jurisdiction extends over non-tidal waters of the United States to the ordinary high water mark. The ordinary high water mark is defined in 33 CFR 328.3 as that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.



EXPLANATION

1 Potential Waters of the United States

Base Boundary

2 Sensitive Habitats

0 750 1500 3000 Feet

Sensitive Habitats

Figure 3.4-6

At the time of the June 1992 site visit, several areas on the base displayed a potential to contain ephemeral stream channels that could qualify as waters of the United States under Section 404 jurisdiction. These are shown on Figure 3.4-6 and are discussed below.

- Two ephemeral washes of apparently natural origin near the base's northern boundary contain roughly 5- to 10-foot channels which are well defined, lack vegetation, and display puddle erosion (the physical breakdown of soil structure caused by the collection and downward leaching of standing water). These channels could potentially qualify as waters of the United States under Section 404 jurisdiction. The channels are bordered by a dense strip of palo verde (*Cercidium floridum*) and mesquite (*Prosopis* sp.) trees and shrubs. These species are typical of riparian lands in the Sonoran Desert.

- Two other ephemeral washes on land east of the airfield also appear to contain narrow channels that could potentially qualify as waters of the United States under Section 404 jurisdiction. Although unnaturally straight and of apparent man-made origin, these channels appear to be virtually identical to those described above. These channels are bordered by a dense strip of the shrub desert broom (*Baccharis sarothroides*). These channels appear to exist as disconnected segments; it is possible that surface runoff becomes channelized within these segments and infiltrates into the soil, evaporates, or exits again as unchannelized surface runoff.

- A large man-made runoff ditch, roughly 20 feet in depth and 100 feet in width, north and east of the airfield, supports upland vegetation but contains coarse sediments and gravel that appear to have been deposited by swiftly running water. It is not clear whether this ditch is a water of the United States under Section 404 jurisdiction. No areas appearing to be wetlands exist within or adjacent to this ditch.

Because any waters of the United States on Williams AFB would be considered "headwaters" (streams with an average flow rate under 5 cubic feet per second) by the COE, up to 10 acres of such waters (as measured from bank to bank at mean high water) can be filled under a nationwide permit. However, filling of between 1 and 10 acres would still require prior notification of the COE. Under certain circumstances, the COE could deny the request for the nationwide permit and require an application for an individual (site specific) permit. Otherwise, the COE could condition its approval upon the performance of specific mitigation measures. Filling of less than 1 acre does not require COE notification, but notification is still recommended. Consultation with the COE to obtain a formal jurisdictional determination officially identifying any waters of the United States on

Williams AFB is recommended prior to commencing any ground-disturbing activities which may affect the areas discussed above.

3.4.6 Cultural Resources

Cultural resources include prehistoric and historic sites, structures, districts, artifacts, or any location of human activity considered important to a culture, subculture, or community for scientific, traditional, religious, or any other reason (36 CFR Part 64). Cultural resources have been divided for ease of discussion into three main categories: prehistoric resources, historic structures and resources, and traditional resources. These types of resources are defined in Appendix E, Methods of Analysis. For the purposes of this analysis, paleontological remains, the fossil evidence of past plant and animal life, have been included within the cultural resources category.

The ROI for the analysis of cultural resources includes all areas within the base boundaries plus any off-base parcels which would be acquired under the Proposed Action or a reuse alternative. For this analysis, the ROI is synonymous with the Area of Potential Effect (APE) as defined by regulations implementing the National Historic Preservation Act (NHPA). The potential conveyance of federal property to a private party or nonfederal agency constitutes an undertaking, or a project that falls under the requirements of cultural resource legislative mandates, because any historic resources located on that property would cease to be protected by federal law. However, impacts resulting from conveyance could be reduced to a nonadverse level by placing covenants on the lease or disposal document. Development within designated parcels would, therefore, fall under the requirements of Section 106 of the NHPA.

The ROI includes those areas designated for potential acquisition under the Proposed Action or reuse alternatives that might be disturbed as a direct or indirect result of base reuse.

Numerous laws and regulations require federal agencies to consider the effects of a proposed project on cultural resources. These laws and regulations stipulate a process for compliance, define the responsibilities of the federal agency proposing the action, and prescribe the relationship among other involved agencies (e.g., State Office of Historic Preservation, the Advisory Council on Historic Preservation). Methods used to achieve compliance with these requirements are presented in Appendix E.

Only those potential historic resources determined to be significant under cultural resource legislation are subject to protection or consideration by a federal agency. The quality of significance, in terms of applicability to National Register of Historic Places (NRHP) criteria, and the quality of integrity, are discussed in Appendix E, Methods of Analysis. Significant

cultural resources, either prehistoric or historic in age, are referred to as "historic properties."

In compliance with the NHPA, the Air Force has initiated the Section 106 review process with the State Historic Preservation Officer (SHPO). Record and literature searches were performed at the State Historic Preservation Office and at Williams AFB June 8-12, 1992. An historic structures survey was conducted on Williams AFB September 8, 1992. A surface archaeological survey of approximately 2,000 undisturbed acres on Williams AFB was conducted during the period December 21, 1992 through January 14, 1993. Results are discussed under the appropriate resource category.

In accordance with the American Indian Religious Freedom Act of 1978 (AIRFA), the Air Force has initiated consultation with Native American tribal organizations who have historically inhabited or occupied the vicinity of Williams AFB. These consultations are in compliance with the NHPA which requires that identification and evaluation of historic properties be carried out in consultation with Native American tribes.

3.4.6.1 Prehistoric Resources. Numerous cultural resource surveys have been conducted on Williams AFB. Detailed descriptions of the methods, cultural context, findings, recommendations, and related topics are found in 1) *Williams AFB Historic Preservation Plan* (U.S. Air Force, 1992i); 2) *Definition and Preliminary Study of the Midvale Site* (Schoenwetter et al., 1973); 3) *Definition of the Boundaries for the Midvale Site* (Gasser et al., 1984); and 4) *Archaeological Survey of Williams AFB: A Class III Survey* (Anduze et al., 1993).

The Midvale Site (AZ U:10:24 ASU) occupies approximately 200 acres in the southwestern corner of Williams AFB and was officially listed on the NRHP in June 1990. Construction of the base in 1941 and subsequent continuing modifications to the land surface and shallow subsurface have destroyed or disturbed the upper layer of some cultural features and have dispersed surface artifacts over a wide area. However, archaeological investigations of the site, notably Schoenwetter et al. (1973) and Gasser et al. (1984), have indicated that many features survive intact or are, at worst, truncated. Ceramic evidence indicates a Hohokam occupation of the site commencing during the early Colonial Period (about A.D. 550 to 700) and continuing at least into the early Classic Period (about A.D. 1100 to 1300) with the most intensive occupation occurring during the Sedentary Period, Sacaton Phase (A.D. 900 to 1100). The presence of two reservoirs suggests that the Midvale Site was a large permanent village. The Midvale Site is of special significance because it has survived with sufficient integrity to yield valuable data concerning the prehistoric occupation of the area.

As a result of a surface survey of 2,000 undisturbed acres of Williams AFB, 11 additional archaeological sites were identified (Anduze et al., 1993).

These sites were characterized by surface artifact scatter as well as visible surface features. The surface survey report has recommended subsurface testing to determine the areal extent and NRHP eligibility of each site.

Two of the sites, AZ U:10:20 (ASU) and AZ U:10:25 (ASU) had been previously recorded, while nine of the sites are newly defined. The areal extent of these two sites, as evidence by surface scatter, was found to be much larger than previously suspected. AZ U:10:20 (ASU), an approximately 81-acre site, is located south of the Midvale Site. Portions of this site may have been obliterated by sanitary landfill operations at the southwestern corner of Williams AFB. Cultural material at this site has been identified with the Hohokam early Classic Period (about A.D. 1100 to 1300). AZ U:10:25 (ASU), an approximately 703-acre site, is located in the southeastern corner of Williams AFB. Much of this area is overlain by runway pavement and taxiways. Cultural material from this site has also been identified with the Hohokam early Classic Period (about A.D. 1100 to 1300). AZ U:10:60 (ASM) is an approximately 74-acre site occupying an area along the southern base boundary between AZ U:10:20 (ASU) and AZ U:10:25 (ASU). Subsurface testing is required to determine if these three sites are actually one continuous site. Of the eight remaining sites, AZ U:10:62 (ASM) is located northwest of AZ U:10:25 (ASU) adjacent to runway of 12R/30L, while five sites (AZ U:10:61 (ASM), AZ U:10:64 (ASM), AZ U:10:65 (ASM), AZ U:10:66 (ASM), and AZ U:10:67 (ASM)) are located north and east of runway 12L/30R. The remaining two sites, AZ U:10:63 (ASM) and AZ U:10:68 (ASM) are located at the north end of the flight line.

Table 3.4-12 lists the NRHP eligibility status for each of the 12 recorded archaeological sites on the base. The Air Force is pursuing subsurface testing to determine the areal extent and eligibility status of eleven of these sites in coordination with the Arizona SHPO. A non-specific base map showing areas of cultural resource sensitivity is presented as Figure 3.4-7. A further discussion of archaeological sites is provided in Appendix J.

3.4.6.2 Historic Structures and Resources. A review of land survey records circa 1911 revealed that a number of historic homesteads were located in and around the area presently occupied by Williams AFB. Although no evidence of the structures has survived base construction, one of the archaeological sites identified above was found to contain an historic component (Anduze et al., 1993).

Williams AFB was established in 1941 as an Army Air Corps airfield. Thirty-four structures that pre-date 1945 survive at Williams AFB. These are listed in Table 3.4-13; their locations are shown on Figure 3.4-8. Due to their age (approximately 50 years), these structures are considered historic. The 34 structures were surveyed, based on National Register Criteria for Evaluation (36 CFR 60.4), to determine their potential eligibility for the NRHP. As a

Table 3.4-12. National Register of Historic Places Eligibility of Archaeological Sites

Site Number	Site Type	Status
AZ U:10:60 (ASM)	Artifact scatter	Potentially eligible
AZ U:10:61 (ASM)	Artifact scatter with possible canal	Potentially eligible
AZ U:10:62 (ASM)	Artifact scatter	Potentially eligible
AZ U:10:63 (ASM)	Artifact scatter	Potentially eligible
AZ U:10:64 (ASM)	Artifact scatter, historic component	Potentially eligible
AZ U:10:65 (ASM)	Artifact scatter	Potentially eligible
AZ U:10:66 (ASM)	Artifact scatter with horno and rock piles	Potentially eligible
AZ U:10:67 (ASM)	Artifact scatter	Potentially eligible
AZ U:10:68 (ASM)	Artifact scatter	Potentially eligible
AZ U:10:20 (ASU)	Artifact scatter	Potentially eligible
AZ U:10:25 (ASU)	Artifact scatter with surface features	Potentially eligible
AZ U:10:24 (ASU)	Midvale Site	Listed June 1990

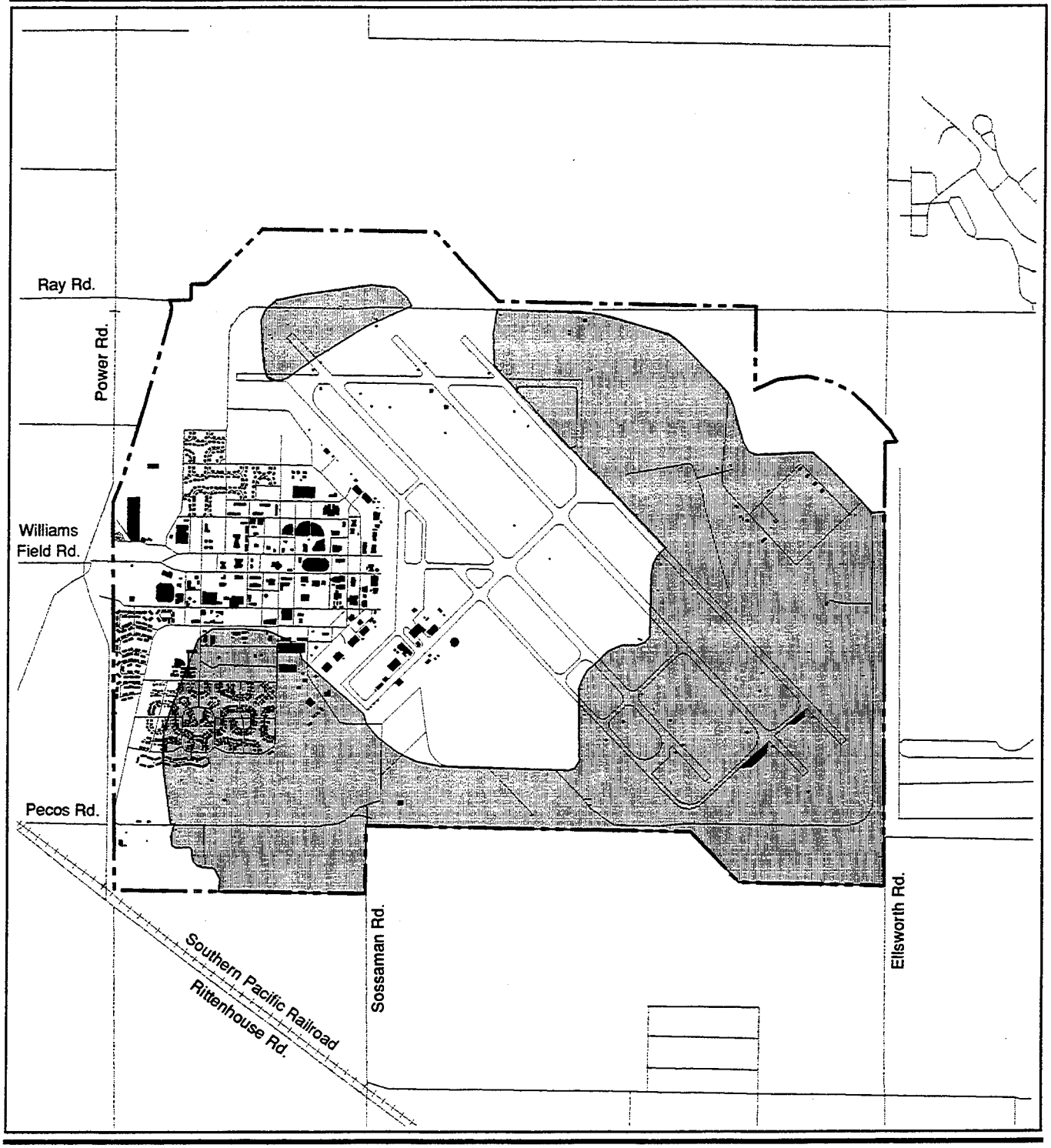
result of this survey, 12 structures were recommended as potentially eligible (Woodward et al., 1992).

A field inspection of all 34 structures by the Air Force and SHPO was conducted on February 18, 1993 to review eligibility recommendations. Subsequently, the Air Force recommended to the SHPO that 14 structures be nominated to the NRHP. The SHPO concurred on April 8, 1993 that 14 structures were eligible for inclusion in the NRHP (see Table 3.4-13). In March 1994, the Air Force submitted a request to the Keeper of the National Register for a final determination of eligibility. Upon review and concurrence by the Keeper, these structures will be submitted for listing on the NRHP.

3.4.6.3 Traditional Resources. Native American tribal organizations and communities have been consulted regarding traditional cultural resources at Williams AFB in accordance with AIRFA and the Native American Graves Protection and Repatriation Act (NAGPRA) of 1990.

The following Native American tribal organizations and communities have been contacted through letters, telephone conversations, and personal interviews. Primary Native American tribal affiliations are noted in parentheses.

- Ak-Chin Indian Community (Pima and Tohono O'odham)
- Fort McDowell Indian Community (Yavapai and Western Apache)



EXPLANATION

Cultural Resource Sensitivity Area

Cultural Resources

0 1500 3000 Feet

Figure 3.4-7

Table 3.4-13. Pre-1945 Structures at Williams AFB
Page 1 of 2

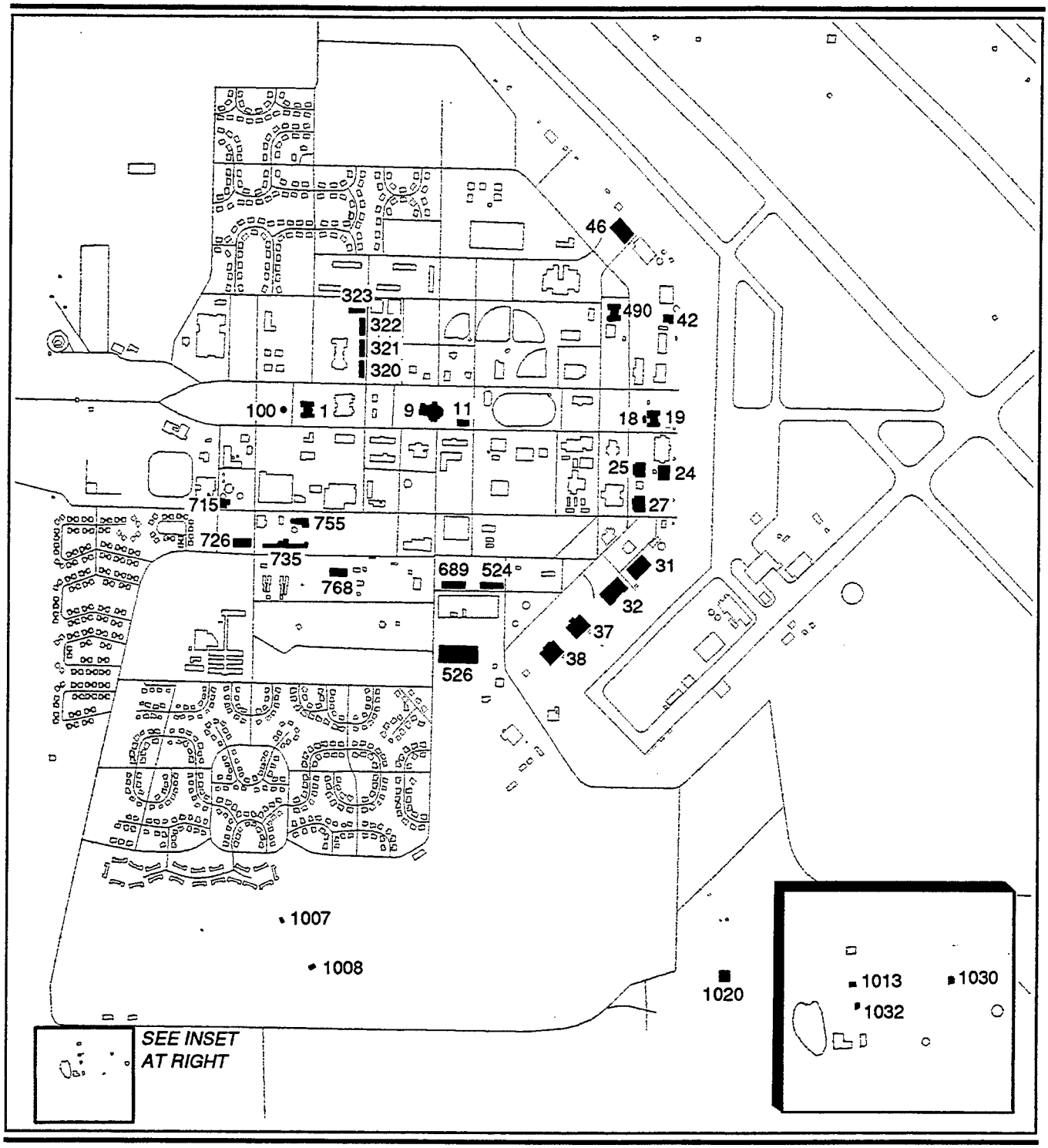
Facility No.	Building Name	Date Built
1	Base Headquarters	1941
9	Base Exchange	1941/1943
11	Library	1941
18	Electrical Power Station	1942
19	Base Operations	1941
24	Aircraft Maintenance Hangar	1942*
25	Aircraft Corrosion Control Hangar	1942*
27	Aircraft Maintenance Hangar	1942*
31	Demountable Maintenance Hangar	1941*
32	Demountable Hangar	1941*
37	Land Plane Hangar	1942/1945*
38	Land Plane Hangar	1942/1945*
42	Squadron Operations Building	1941
46	Demountable Hangar	1942*
100	Flagpole	1941*
320	Bachelor Officers Quarters	1942
321	Bachelor Officers Quarters	1942
322	Bachelor Officers Quarters	1942
323	Bachelor Officers Quarters	1942

Table 3.4-13. Pre-1945 Structures at Williams AFB
Page 2 of 2

Facility No.	Building Name	Date Built
490	Traffic Management	1941
524	Warehouse	1942
526	Open Storage, Base Supply	1942
689	Base Engineering Storage Warehouse	1942
715	Water Pump Station and Water Tower	1942*
726	Housing Storage Supply Warehouse	1941*
735	Civil Engineering Maintenance Shop	1941*
755	Civil Engineering Building	1942
768	Civil Engineering Maintenance Shop	1941
1007	Original Ammo Bunker	1942*
1008	Original Ammo Bunker	1942*
1013	Electrical Power Station	1942
1020	Firing-in Buttress	1942
1030	Waste Treatment Plant	1942
1032	Waste Treatment Plant Lift Station	1942

*Structure eligible for nomination to the NRHP.

Sources: Modified from U.S. Air Force, 1992h; Woodward et al., 1992.



Pre-1945 Structures

0 375 750 1500 Feet

Figure 3.4-8

- Gila River Indian Community (Pima and Tohono O'odham)
- Hopi Tribe (Hopi)
- Mescalero Apache Tribal Council (Mescalero Apache)
- Pascua Yaqui Tribe of Arizona (Pascua Yaqui and Guadalupe Yaqui)
- Salt River Pima-Maricopa Indian Community (Pima and Maricopa)
- San Carlos Apache Reservation (San Carlos and other Apache)
- Tohono O'odham Indian Nation (Tohono O'odham)
- Tonto Apache (Northern and Southern Tonto)
- White Mountain Apache Reservation (White Mountain and Cibecue Apache)
- Yavapai-Apache Reservation (Yavapai and Western Apache)
- Yavapai-Prescott (Yavapai)
- Zuni Tribe (Zuni)

The Ak-Chin, Gila River, and Salt River Pima-Maricopa Indian Communities and the Tohono O'odham Indian Nation, collectively known as *The Four Southern Tribes*, representing the Pima, Tohono O'odham, and Maricopa, have collectively and individually filed claims of cultural affinity with the Hohokam culture. The Pima claim ancestral cultural affinity with the Hohokam because they have historically lived in the Salt and Gila River valleys, including Williams AFB and its vicinity, and share similar cultural characteristics (particularly the use of elaborate irrigation systems). The Tohono O'odham claim cultural affinity with the Hohokam by sharing cultural and linguistic characteristics with the Pima. The Maricopa claim of affiliation with the Hohokam is more tenuous, based primarily on a few shared cultural practices such as cremation. Anthropological research supports the claims of these three groups. The Hopi Tribe has also claimed ancestral ties to the Hohokam culture through oral traditions and physical anthropological evidence.

The claims of affinity by the Pima, Tohono O'odham, Maricopa, and Hopi involve the prehistoric Hohokam cultural resources known to exist at Williams AFB as well as any additional prehistoric and traditional cultural resources that may be discovered as a result of subsurface testing of the eleven newly recorded archaeological sites. Representatives of these tribal organizations and communities have expressed both AIRFA- and NAGPRA-related concerns with regard to the reuse of Williams AFB. The Zuni, having possible connections to the Hohokam and the upper Gila River in late prehistoric times, have expressed NAGPRA concerns only.

Representatives of the Zuni, Yavapai-Apache, Yavapai Prescott, Fort McDowell Indian Community, San Carlos Apache, Tonto Apache, and White Mountain Apache Reservation have expressed neither specific AIRFA-related concerns nor identified any cultural ties to Hohokam sites at Williams AFB. Unless evidence can be found to the contrary, these tribal organizations and communities will not be involved in future AIRFA or NAGPRA consultations.

3.4.6.4 Paleontological Resources. The Salt River Valley area, in which Williams AFB is located, is underlain by as much as 10,000 feet of Cenozoic Era (Tertiary to Quaternary in age, 65 million years old to recent) unconsolidated and consolidated sedimentary materials which were deposited in fluvial and lacustrine continental environments. Basaltic, rhyolitic, and pyroclastic volcanic materials intrude the lowermost portions of these strata. These sedimentary materials, in turn, are underlain by extrusive and crystalline volcanic and metamorphic rocks ranging in age from Tertiary to pre-Eocene (1.8 million to greater than 54 million years old). It is the extrusive and crystalline rocks which also compose the mountain ranges which ring the valley (Eberly and Stanley, 1978; Laney and Hahn, 1986).

With regard to paleontological resources, the sedimentary deposits are the strata of importance. In the vicinity of Williams AFB, the unconsolidated sedimentary rocks and unconsolidated alluvium extend to a depth of approximately 6,600 feet bls (Engineering-Science, 1984). While Eberly and Stanley (1978) report that the Cenozoic stratigraphy of southwestern Arizona is "almost devoid of marker fossils," Quaternary terrace deposits from the Pleistocene and Pliocene epochs (10,000 to 5 million years old) have yielded outstanding fossils of Ice Age fauna (Chronic, 1983). Cenozoic lacustrine clays and beds of volcanic tuff are reported to contain fossils of a freshwater ostracod (a small crustacean). Cenozoic materials also are reported to yield "mammalian fossils" in some areas. While it is possible that alluvial processes could carry fossiliferous rocks or other paleontological resources into the Williams AFB area from fossil-rich areas elsewhere, a review of site-specific literature yielded no information concerning significant paleontological resources in the vicinity of Williams AFB.

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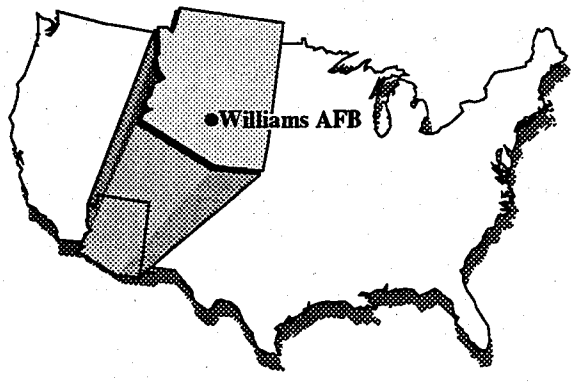


CHAPTER 4
ENVIRONMENTAL CONSEQUENCES

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

This chapter discusses the potential environmental consequences associated with the Proposed Action and alternatives. To provide the context in which potential environmental impacts may occur, discussions of potential changes to the local communities, including population, land use and aesthetics, transportation, and community and public utility services are included in this EIS. In addition, issues related to current and future management of hazardous materials and wastes are discussed. Impacts to the physical and natural environment are evaluated for soils and geology, water resources, air quality, noise, biological resources, and cultural resources. These impacts may occur as a direct result of disposal and reuse activities or as an indirect result caused by changes within the local communities. Possible mitigation measures to minimize or eliminate the adverse environmental impacts are also presented.

Cumulative impacts result from "the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (Council on Environmental Quality, 1978). Cumulative impacts are discussed by resource, as applicable, in this chapter.

Means of mitigating adverse environmental impacts that may result from implementation of the Proposed Action or alternatives by property recipients are discussed as required by NEPA. Mitigation measures are suggested for those components likely to experience substantial and adverse changes under any or all of these alternatives. Potential mitigation measures depend upon the particular resource affected. In general, however, mitigation measures are defined in CEQ regulations as actions that include:

(a) Avoiding the impact altogether by not taking an action or certain aspect of the action

(b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation

(c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment

(d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action

(e) Compensating for the impact by replacing or providing substitute resources or environments.

A discussion of the effectiveness of mitigation measures is included for those resource areas where it is applicable, as in the case of soils and geology. Where appropriate, a discussion regarding the probability of success associated with a particular mitigation is included.

Although reuse development would be decided by recipients and local zoning authorities, probable reuse scenarios were evaluated to analyze environmental impacts.

Alternatives will be defined for this analysis on the basis of (1) plans of local communities and interested individuals, and (2) general land use planning considerations. Reuse scenarios considered in this EIS must be sufficiently detailed to permit environmental analysis. Initial concepts and plans are taken as starting points for scenarios to be analyzed. Available information on any reuse alternative is then supplemented with economic, demographic, transportation, and other planning data to provide a reuse scenario for analysis. Approximately 33-36 years would be required to fully develop the base under civilian reuse.

4.2 LOCAL COMMUNITY

This section discusses potential effects on local communities as a result of disposal and reuse of Williams AFB.

4.2.1 Community Setting

Socioeconomic effects will be addressed only to the extent that they are interrelated with the biophysical environment. A complete assessment of socioeconomic effects is presented in the Socioeconomic Impact Analysis Study. The Phoenix MSA is coincident with Maricopa County, and along with the City of Apache Junction, in Pinal County, is considered the ROI for purposes of describing and analyzing employment and population effects. Employment and population generated by the implementation of the Proposed Action and each alternative are discussed herein. The closure baseline projects employment levels of 82 direct and 30 secondary jobs for the year 1993, remaining constant through the year 2013 for the No-Action Alternative. ROI population estimates for the closure baseline and post-closure are 2,301,022 for the year 1993 and 3,702,371 for the year 2013. This represents an increase of approximately 1,401,349 or 60.9 percent. ROI employment projections for the closure baseline and post-closure are 1,204,725 for the year 1993 and 2,088,426 for the year 2013. This represents an increase of approximately 883,701 or 73.3 percent.

This analysis recognizes the potential for community impacts arising from "announcement effects" stemming from information regarding the base's closure or reuse. Such announcements may impact the affected communities' perceptions and, in turn, could have important local economic effects. An example would be the in-migration of people anticipating employment under one of the reuse options. If it were later announced that the No-Action Alternative was chosen, many of the newcomers would leave the area to seek employment elsewhere. Such an effect could, therefore, result in an initial, temporary increase in population followed by a decline in population as people leave the area. Changes associated with announcement effects, while potentially important, are highly unpredictable and difficult to quantify. Such effects, therefore, were excluded from the quantitative analysis in this study and are not displayed in any of the tabular or graphic data presented in this report.

4.2.1.1 Proposed Action. It is estimated that the redevelopment activities at Williams AFB under the Proposed Action would generate approximately 43,331 jobs (18,632 direct and 24,699 secondary) by the year 2013, or 4.9 percent of ROI employment growth. Direct jobs would be located on base property whereas secondary jobs would be created throughout Maricopa County. Figure 4.2-1 shows the effects of the Proposed Action and alternatives on employment in the ROI.

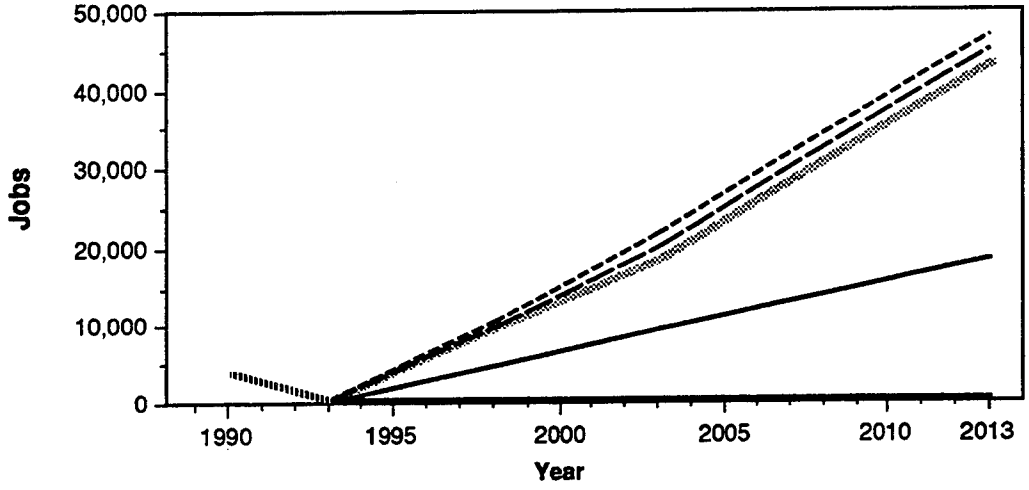
Under the Proposed Action, the population in the ROI would increase to approximately 3,748,303 by the year 2013. This represents a reuse-related increase of approximately 45,932, or 1.2 percent over the projected baseline population in 2013. Figure 4.2-2 shows the effects of the Proposed Action and alternatives on population in the ROI. The communities of Queen Creek, Mesa, and Apache Junction are likely to experience the largest percentage increases in population over baseline projections. The Proposed Action would generate positive economic benefits by increasing employment and earnings in the region.

4.2.1.2 General Aviation and Education Alternative. This alternative would generate approximately 46,718 jobs (19,428 direct and 27,290 secondary) by the year 2013, or 5.3 percent of ROI employment growth (Figure 4.2-1). The population of Maricopa County would increase to approximately 3,753,121 by the year 2013. This represents a reuse-related increase of approximately 50,750 or 1.4 percent over the projected baseline population in 2013 (Figure 4.2-2). The communities of Queen Creek, Apache Junction, and Mesa are likely to experience the largest percentage increases in population over baseline projections. This alternative would also have positive economic benefits.

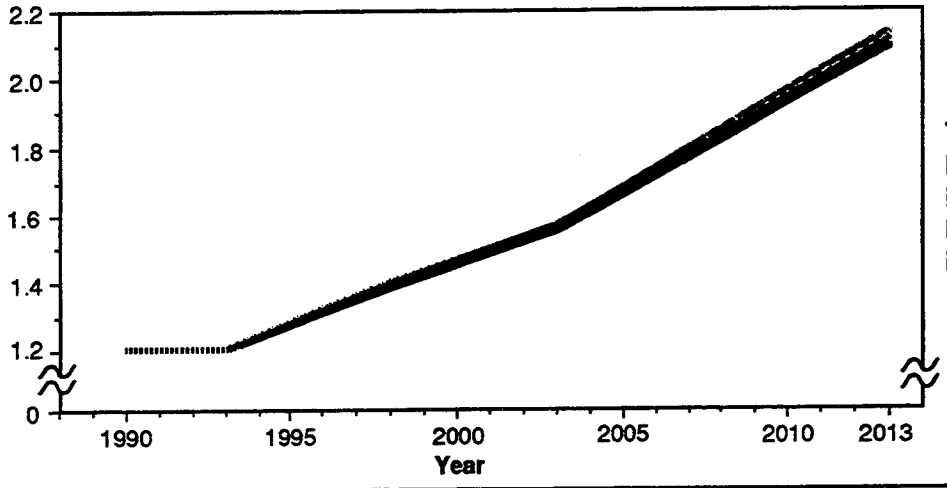
4.2.1.3 Commercial Aviation and Education Alternative. This alternative would generate approximately 45,021 jobs (19,153 direct and 25,868 secondary) by the year 2013 or 4.9 percent of ROI employment growth

ALTERNATIVE	1993	1998	2003	2013
Proposed Action	112	10,229	18,750	43,331
General Aviation and Education	112	10,353	21,705	46,718
Commercial Aviation and Education	112	9,887	20,037	45,021
Education and Planned Community	112	4,815	9,256	18,431
No-Action	112	112	112	112

Reuse-Related Employment Effects



Reuse-Related Employment Effects



Total ROI Employment Including Reuse Effects

EXPLANATION

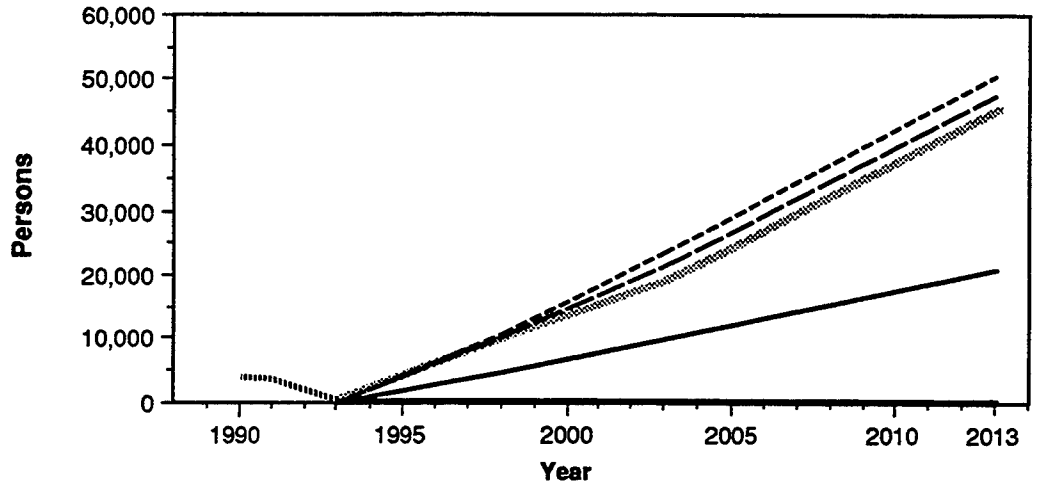
- No-Action/Post-Closure
- Proposed Action
- General Aviation and Education
- Commercial Aviation and Education
- Education and Planned Community
- Preclosure

ROI Reuse-Related Employment Effects

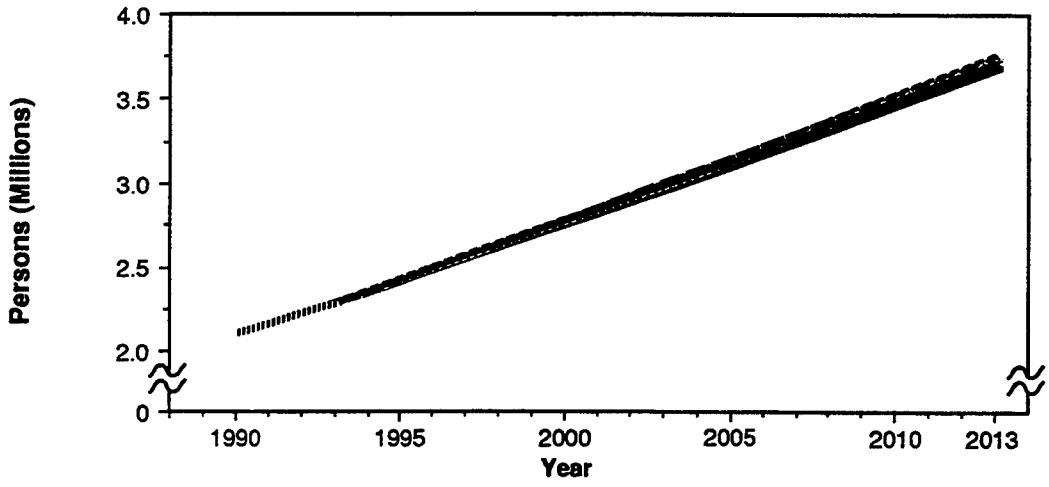
Figure 4.2-1

ALTERNATIVE	1993	1998	2003	2013
Proposed Action	0	10,716	19,753	45,932
General Aviation and Education	0	10,660	23,349	50,750
Commercial Aviation and Education	0	10,347	21,148	47,717
Education and Planned Community	0	4,849	9,832	20,777
No-Action	0	0	0	0

Reuse-Related Population Effects



Reuse-Related Population Effects



Total ROI Population Including Reuse Effects

EXPLANATION

- No-Action/Post-Closure
- Proposed Action
- General Aviation and Education
- Commercial Aviation and Education
- Education and Planned Community
- Preclosure

ROI Reuse-Related Population Effects

Figure 4.2-2

(Figure 4.2-1). The population of Maricopa County would increase to approximately 3,750,088 by the year 2013. This represents a reuse-related increase of approximately 47,717, or 1.3 percent over the projected baseline population in 2013 (Figure 4.2-2). The communities of Queen Creek, Apache Junction, and Mesa are likely to experience the largest percentage increases in population over baseline projections. This alternative would also have positive economic benefits.

4.2.1.4 Education and Planned Community Alternative. This alternative would generate approximately 18,431 jobs (11,502 direct and 6,929 secondary) by the year 2013 or 2.1 percent of ROI employment growth (Figure 4.2-1). The population of Maricopa County would increase to 3,723,148 by the year 2013. This represents a reuse-related increase of approximately 20,777 or 0.6 percent over the projected baseline population in 2013 (Figure 4.2-2). The communities of Queen Creek, Apache Junction, and Mesa are likely to experience the largest percentage increases in population over baseline projections. This alternative would also have positive economic benefits.

4.2.1.5 Other Land Use Concepts. Full conversion of Williams AFB property for civilian use will not occur under the federal property transfers and independent land use concepts. These transfers and land use concepts would be initiated on an individual basis and not as part of any integrated reuse alternatives. The potential effects of federal transfers and independent land use concepts are discussed in relation to their effects on the Proposed Action and/or other reuse alternatives through the year 2013 (Table 4.2-1). Only alternatives for which impacts exist are cited; the remainder have insignificant or no impacts.

Federal Bureau of Prisons. The Federal Bureau of Prisons has requested the transfer of approximately 20 acres in the northeastern portion of the base for use as a Federal Detention Center. The transfer of this land would reduce the acreages allotted to the land uses specified for each reuse alternative and would alter the employment and population projections associated with each reuse alternative. For the Proposed Action and the Commercial Aviation and Education Alternative, the Bureau of Prisons site would occupy land that is otherwise designated to the Industrial land use category. Not all of the acreage designated to the Industrial land use category will be developed over the 20-year planning period considered in this EIS, so the Bureau of Prisons site can be assumed to occupy land that would otherwise not be developed. Employment and population would therefore increase. If this proposal were enacted in conjunction with either the Proposed Action or the Commercial Aviation and Education Alternative, employment would increase by approximately 250 direct and 304 secondary jobs, with an associated increase in population of approximately 1,384 persons. The effects on employment and population would be approximately the same under either the General Aviation and Education

Table 4.2-1. Employment and Population Effects of Other Land Use Concepts

Land Use Concept	Reuse Alternative	Direct Employment Effects	Secondary Employment Effects	Population Effects
U.S. Department of Justice, Federal Bureau of Prisons	Proposed Action	250	304	1,384
	General Aviation and Education	250	304	1,384
	Commercial Aviation and Education	250	304	1,384
	Education and Planned Community	250	304	1,384
U.S. Department of Justice (sponsor), Arizona Department of Corrections	Proposed Action	(3,056)	(4,852)	(7,690)
	General Aviation and Education	2,030	3,279	7,076
	Commercial Aviation and Education	(2,792)	(4,395)	(6,889)
	Education and Planned Community	(45)	(793)	(328)

Note: Numbers in parentheses represent a decrease. Effects are relative to employment and population projected for each alternative.

Alternative or the Education and Planned Community Alternative. Under these scenarios, the Bureau of Prisons site would occupy land that is otherwise designated to the Residential and Public/Recreation land use categories, which are not employment generating.

Arizona Department of Corrections. The Arizona Department of Corrections has requested the transfer of approximately 970 acres of base property for use as a state correctional facility. Requested are the developed west-central area of the base and two currently undeveloped areas located in the south-central and northeast portions of the base. The transfer of this land would reduce the acreages allotted to the land uses specified for each reuse alternative, thereby altering the employment and population projections associated with each reuse alternative. If this proposal were enacted, the Proposed Action would lose approximately 3,056 direct and 4,852 secondary jobs with an associated population decrease of approximately 7,690 persons. The General Aviation and Education Alternative would experience a gain of 2,030 direct and 3,279 secondary jobs with an associated population gain of approximately 7,076 persons. The Commercial Aviation and Education Alternative would experience a loss of approximately 2,792 direct and 4,395 secondary jobs and an associated population loss of approximately 6,889 persons. The Education and Planned Community Alternative would experience a loss of approximately 45 direct

and 793 secondary jobs and an associated population decrease of approximately 328 persons.

Arizona Department of Health Services. The Arizona Department of Health Services has requested the transfer of approximately 196 acres of base property for use as transitional housing for homeless individuals and families. However, this transfer would not impact the employment or population associated with any of the reuse alternatives because the areas required by this proposal are residential and not employment generating.

4.2.1.6 No-Action Alternative. Under the No-Action Alternative, only caretaker status activities would occur at the base. It is estimated that the caretaker activities at Williams AFB would maintain approximately 82 direct and 30 secondary jobs through the year 2013. There would be no net increase in population as a result of the No-Action Alternative. Total employment in the ROI is projected to reach 2,088,538 (including the 112 OL personnel) by the year 2013 and total population in the ROI is expected to be 3,702,371 by the year 2013.

4.2.2 Land Use and Aesthetics

This section discusses the Proposed Action and alternatives relative to land use and zoning to determine potential impacts in terms of general plans, zoning, land use, and aesthetics. Land use compatibility with aircraft noise is discussed in Section 4.4.4.

4.2.2.1 Proposed Action

General Plans. The Proposed Action would be consistent with properties that surround the base which are subject to the *Mesa General Plan* or are within the Mesa Municipal Planning Area (MPA). These lands, located north, east, and south of the base, are designated for general industrial and commerce park uses. These uses are compatible with the proposed airport but would be buffered from proposed educational land uses by the golf course and airfield to the north and east and by proposed industrial and commercial uses to the south (City of Mesa, 1988). The Proposed Action would also be compatible with properties that are subject to the *Town of Gilbert General Plan* or are within the Gilbert MPA. These properties are designated for industrial and commercial uses west of Power Road and generally north of Williams Field Road within the vicinity of the proposed airport, and they are designated for medium density residential uses south of Williams Field Road adjacent to proposed educational uses and a proposed low-profile commercial center (Town of Gilbert, 1986).

Properties south of Germann Road are subject to the *Town of Queen Creek General Plan* or are within the Queen Creek MPA. Land use designations between Germann Road and Ocotillo Road are predominantly agricultural

with isolated areas for single-family residential uses (Town of Queen Creek, 1990a). The area is zoned predominantly for residential uses (Figure 3.2-4) (Maricopa County, 1992b; Town of Queen Creek, 1990c). Although these land uses are not incompatible with the Proposed Action, development of the proposed airport and satellite college campus may exert pressure on these areas to pursue more urbanized or more intensive land uses than those currently shown on the plan.

The surrounding properties within unincorporated Maricopa County are covered by Maricopa County General Plans and MPAs of the neighboring towns or cities. Maricopa County General Plans for the area show that all properties contain plan designations that are either consistent or compatible with their MPA designations, with the exception of a 1-square-mile area within unincorporated Maricopa County that is also within the Gilbert MPA. This area is bounded by Guadalupe Road and Elliot Road to the north and south and by Higley Road and Recker Road to the east and west. The *Town of Gilbert General Plan* (Town of Gilbert, 1986) designates the area for low-density residential uses while the *East Mesa Land Use Plan* (Maricopa County Board of Supervisors, 1992) for Maricopa County designates the area for mixed industrial/employment center and suburban residential uses. The area is currently zoned for residential uses (Figure 3.2-4) (Maricopa County, 1992b). The area lies beneath the existing noise contours for the base between DNL 70 and 75 dB, as determined by the *Eastside Joint Land Use Study* (Barnard Dunkleberg & Company and Mestre Greve Associates, 1988), making it currently unsuitable for residential use. Under the Proposed Action, however, noise contours in this area would be below DNL 65 dB which would be compatible with either plan designation.

Pinal County lies three miles east of the base. The recently drafted *Pinal County Comprehensive Plan* shows rural community uses as a dominant feature of the plan (Pinal County, 1992). Areas that would be subject to this plan would not be affected by the Proposed Action, due to their distance from the base and the low-density rural and agricultural nature of Pinal County.

Zoning. Properties that surround the base are generally zoned for low-density rural residential uses with large tracts zoned for agricultural uses. Interspersed along Rittenhouse Road and Power Road are a few small groups of parcels zoned for industrial or commercial uses and a large tract located west of Vineyard Road, between Pecos Road and Germann Road, which is zoned for industrial uses (Figure 3.2-4). Zoning within the vicinity of the base reflects its current rural undeveloped nature, outside more urbanized and intensive development patterns north and west of the base in Mesa and Gilbert (Maricopa County, 1992b; City of Mesa, 1991b; Town of Gilbert, 1991; Town of Queen Creek, 1990c; Pinal County, 1992). One exception to this pattern is the General Motors (GM) Proving Grounds located on the east side of Ellsworth Road adjacent to the base. Although

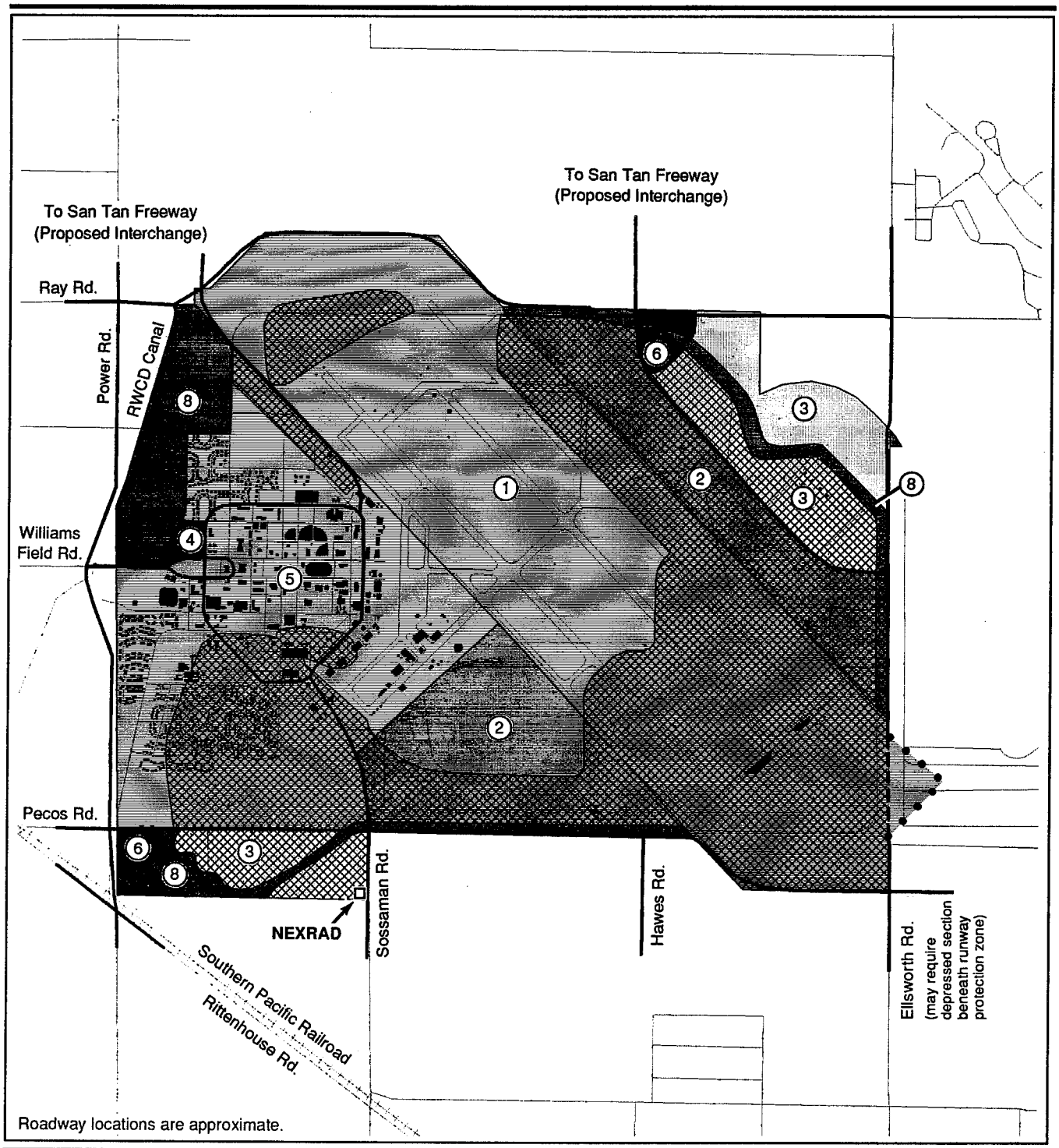
zoning for the property is Rural-43 (Rural Zoning District), the Proving Grounds operate under an approved special use permit (Maricopa County, 1991; Maricopa County, 1992b).

Current rural residential zoning patterns surrounding the base are not consistent with general plan classifications for those same properties which indicates the potential for future development to be more intensive industrial and residential land uses. With the exception of lands within Pinal County, the development of the Proposed Action may impact the area by exerting pressure on properties to be rezoned to reflect the industrial and higher density residential uses designated by their respective general plans.

The City of Mesa and Maricopa County have existing overlay zoning districts which restrict land uses that might be subject to aircraft crash hazards and noise impacts. The zoning districts are generally patterned after the Air Force's AICUZ Study and accident potential zones (EDAW et al., 1992b). These airport overlay zoning districts would be reduced in area and extent to reflect the reduced noise impacts and crash hazards anticipated from flight operations associated with the Proposed Action. Off-base lands which would be subject to noise impacts greater than DNL 65 dB would constitute 293 acres, at closure, due to continued operation of KC-135E aircraft but would be reduced to 8 acres by the year 2013, once conversion to the quieter KC-135R aircraft took place. These areas would continue to be included within the airport overlay districts for Mesa and Maricopa County. Areas that would lie within DNL 60 to 65 dB, or lie outside the DNL 60 dB contour, but are subject to frequent overflights, may also be included in an airport overlay district subject to the discretion of the local jurisdiction.

Land Use. For land uses within the Proposed Action, reuse of the three existing runways, two for general and commercial aviation runways and the center runway for a taxiway, would complement the existing land use pattern on the base. Along the northeast interface between the airfield and the education component, potential conflicts could occur as a result of noise generated from airfield activities. Other educational areas adjacent to the Airfield and Aviation Support land uses would be used for aviation education and therefore would not be subject to the same land use conflicts. The arrangement of the more intensive commercial aviation runway furthest from the education component would reduce noise impacts. In general, the proposed airport and education component would be oriented away from each other and toward opposite sides of the base, thereby minimizing potential conflicts from traffic and parking (Figure 4.2-3).

In the Proposed Action, the existing Landfill on the base (IRP Site LF-04) is designated for open space and recreational uses. Active or passive recreational reuse of the Landfill property would only be possible if the site is remediated to health-protective levels. Otherwise, reuse may be restricted to inaccessible open space. Industrial and Commercial uses



EXPLANATION

- (1) Airfield
- (2) Aviation Support
- (3) Industrial
- (4) Institutional (Medical)
- (5) Institutional (Education)
- (6) Commercial
- (7) Residential *
- (8) Public/Recreation
- (9) Agriculture *
- (10) Vacant Land *
- (11) Military Land *
- Poor compatibility between land uses, either existing or proposed
- Base Boundary
- Off-Base Extension

0 750 1500 3000 Feet

* Not Applicable

Land Use Conflicts - Proposed Action

Figure 4.2-3

proposed adjacent to the Landfill site would not pose a conflict if they are developed using landscaped buffers to shield them from undesirable views of the site.

The existing Liquid Fuels Storage Area and underlying contaminated groundwater plume (IRP Site ST-12) occupies an area of the base which would be designated for Institutional (Education) uses, both aviation and non-aviation related. Approximately 14 acres in this area would be retained by the Air Force to operate ongoing remediation efforts. This would present potential land use conflicts with education uses which could restrict reuse within this area for approximately 30 years or until remediation below health-protective levels is complete.

Approximately 350 linear feet of the existing Southwest Drainage System (IRP Site SD-09), located directly east of South Desert Village within the southwest quadrant of the base, occupies an area designated for Institutional (Education) uses. The site was partially remediated in 1988 by installing a soil/cement cap. However, additional investigation to determine the remediation required to achieve health-protective levels will be performed. Potential land use conflicts with education uses could delay or restrict reuse within this area until remediation is complete.

Of the land use conflicts identified for the Proposed Action, the largest areas stem from the cultural resource sensitivity areas depicted in Figure 3.4-7. Approximately 47 percent of the base lies within areas designated as cultural resource sensitivity areas, although the archaeological sites that are located within the sensitivity areas comprise a much smaller portion of the base. Cultural resource sensitivity areas include portions of existing base housing south of the central core of the base, existing runways and taxiways on the southeast and northwest ends of the flight line, presently undeveloped areas northeast of the flight line, and areas along the southern boundary of the base. Development of proposed Education, Industrial, Commercial, Airfield or Aviation Support uses over these areas, or any activity that requires additional land disturbance, may result in adverse impacts to archaeological resources. The Air Force is conducting ongoing investigations to determine the significance of known archaeological sites on the base.

The Air Force is currently conducting consultations with representatives of Native American groups as required under the American Indian Religious Freedom Act of 1978 (AIRFA). These consultations may result in the identification of areas of the base which contain traditional resources, and could result in potential land use conflicts from development activities associated with implementation of the Proposed Action.

Five historic buildings (Building Nos. 38, 726, 735, 1007, 1008) located within the Institutional (Education) land use area would be incompatible with

educational activities and would be identified for demolition under the Proposed Action.

Williams AFB is surrounded by properties that are generally vacant or by underdeveloped parcels with low-density residential and agricultural uses. Exceptions to this are the GM Proving Grounds along the entire length of the east side of Ellsworth Road adjacent to the base, and a small commercial center and apartment complex on the west side of the base at the intersection of Power Road and Williams Field Road. Airport operations associated with the Proposed Action are compatible with the GM Proving Grounds adjacent to the east side of the base, while the proposed education component is compatible with the existing commercial and multifamily residential uses adjacent to the west side of the base.

Runway protection zones which would be required at either end of both operational runways would be located entirely within the Airfield land use category on the base, with the exception of one zone which would encompass approximately 25 acres of off-base land adjacent to the southeast corner of the base. The land is currently vacant and is owned by the GM Proving Grounds. No anticipated land use conflicts would occur between proposed runway protection zones and current or planned land uses surrounding the base.

The Farmland Protection Policy Act (FPPA), 7 USC Sec. 4201 et seq., directs federal agencies to take into account the adverse effects of federal programs on the preservation of prime and unique farmland; consider alternative actions, as appropriate, that could lessen such adverse effects; and ensure that such federal programs, to the extent practicable, are compatible with state, local government, and private programs and policies to protect farmland. In developing the guidelines to be used in this process, the implementing regulations (7 CFR Part 658) provide that where the state in which the project will occur has developed an approved Land Evaluation and Site Assessment (LESA) system, the federal agencies should use that system to make their evaluation. Arizona does not have an approved LESA. The USDA Soil Conservation Service (SCS), however, reviewed the project to determine whether it was in compliance (Appendix H). Under the Proposed Action, 25 acres of off-base land would be converted to airfield use. This land is not considered prime or unique farmland.

Aesthetics. On-base adverse impacts on features of medium visual sensitivity are not expected as a result of implementation of the Proposed Action. The areas identified as exhibiting aesthetically pleasing qualities, including the golf course, residential family housing areas, and the central avenues onto the base would be retained and reused either as portions of the proposed satellite campus or as ongoing recreational facilities. New industrial and aviation support development on the south side of the base and in the northeast area of the base would cause minor visual effects due

to visibility of the new development from Ellsworth Road but would not result in significant adverse visual impacts to the surrounding area.

Adverse effects on views of the Superstition Mountains (a high-sensitivity visual resource) northeast of the base in Pinal County, resulting from new commercial and industrial construction within the northeast area of the base, are not expected. Zoning regulations for the City of Mesa restrict building heights for commercial districts to 30 feet or two stories, and building heights for industrial and manufacturing districts to 40 feet or two stories (City of Mesa, 1991a). A series of one- and two-story structures would not become a dominant feature on the landscape since they would be separated from areas to the west by a width of at least a large airfield.

Industrial and commercial uses proposed adjacent to the Landfill site would not result in adverse visual effects from the Landfill site, provided that those uses are developed using landscaped buffers to shield them from views of the site. Conversely, if the Landfill is fully remediated to allow active and passive recreation uses, existing landscaping and screening regulations implemented through the zoning ordinance of the City of Mesa would prevent adverse visual effects between commercial, industrial, and recreational uses.

Cumulative Impacts. No cumulative impacts to land use or aesthetics are anticipated.

Mitigation Measures. Mitigation measures may be implemented by Maricopa County, the City of Mesa, Town of Gilbert, and the Town of Queen Creek to minimize impacts due to development pressures exerted on surrounding areas under the Proposed Action. As buildout of the Proposed Action proceeds, rezoning of surrounding properties and annexation within municipal planning areas would need to occur. In addition, the Town of Queen Creek would need to evaluate whether the existing general plan should be revised to accommodate expected development pressures from the Proposed Action on properties in the northern portion of the planning area.

Existing airport overlay districts regulated by the City of Mesa and Maricopa County would need to be revised to reflect new noise contours and accident potential hazard areas.

Construction of a soil cover, emplacement of an engineered cap, excavation and removal, or other appropriate remedies could be undertaken by the Air Force or reuse proponents in consultation with the U.S. EPA and the State of Arizona to mitigate reuse conflicts at the Landfill. Alternatively, the Air Force or reuse proponents could secure the property and retain it as open space. Portions of the Liquid Fuels Storage Area and the Southwest

Drainage System may require restricted use during the period of time when remediation efforts are underway.

The City of Mesa could implement height restrictions, architectural design standards, and landscape requirements to mitigate adverse visual effects of new on-base construction of industrial and commercial areas in the northeast portion of the base.

Mitigation measures to protect archaeological resources must be incorporated in development on all areas of the base that are located within cultural resource sensitivity areas. Depending upon a determination of the significance of individual archaeological resource sites, mitigation measures could include avoidance of ground disturbing activities or, if necessary, full data recovery and documentation of all cultural material prior to site development. Full implementation of the Proposed Action may not be viable if avoidance of ground disturbing activities over large areas of the base is required.

Mitigation of impacts to traditional resources will be determined after completion of Air Force consultations with concerned Native American tribal organizations and communities.

Adverse impacts to five historic buildings identified for demolition (Building Nos. 38, 726, 735, 1007, 1008) could be mitigated through preservation and adaptive reuse, or through less desirable mitigation such as relocation to another site or full documentation of the resource prior to demolition.

4.2.2.2 General Aviation and Education Alternative

General Plans. The general plan impacts for this alternative would generally be the same as those of the Proposed Action, with the exception of planned residential uses in the northeast portion of the base and in the southwest portion of the base on the north and south side of the proposed extension of Pecos Road. Conflicts could occur between new residential areas and adjacent properties designated for industrial uses under the *Mesa General Plan* (City of Mesa, 1988).

Zoning. In the first 20 years after base closure, implementation of this alternative would result in similar development pressures to surrounding lands as those of the Proposed Action.

Existing overlay zoning districts would be greatly reduced in area and extent to reflect the reduced noise impacts and crash hazards anticipated from flight operations associated with the General Aviation and Education Alternative. Once KC-135 aircraft operations cease, noise impacts greater than DNL 65 dB would be eliminated from 293 acres of off-base property,

leaving noise contours which would be contained within the Airfield land use category and would not encroach on off-base lands.

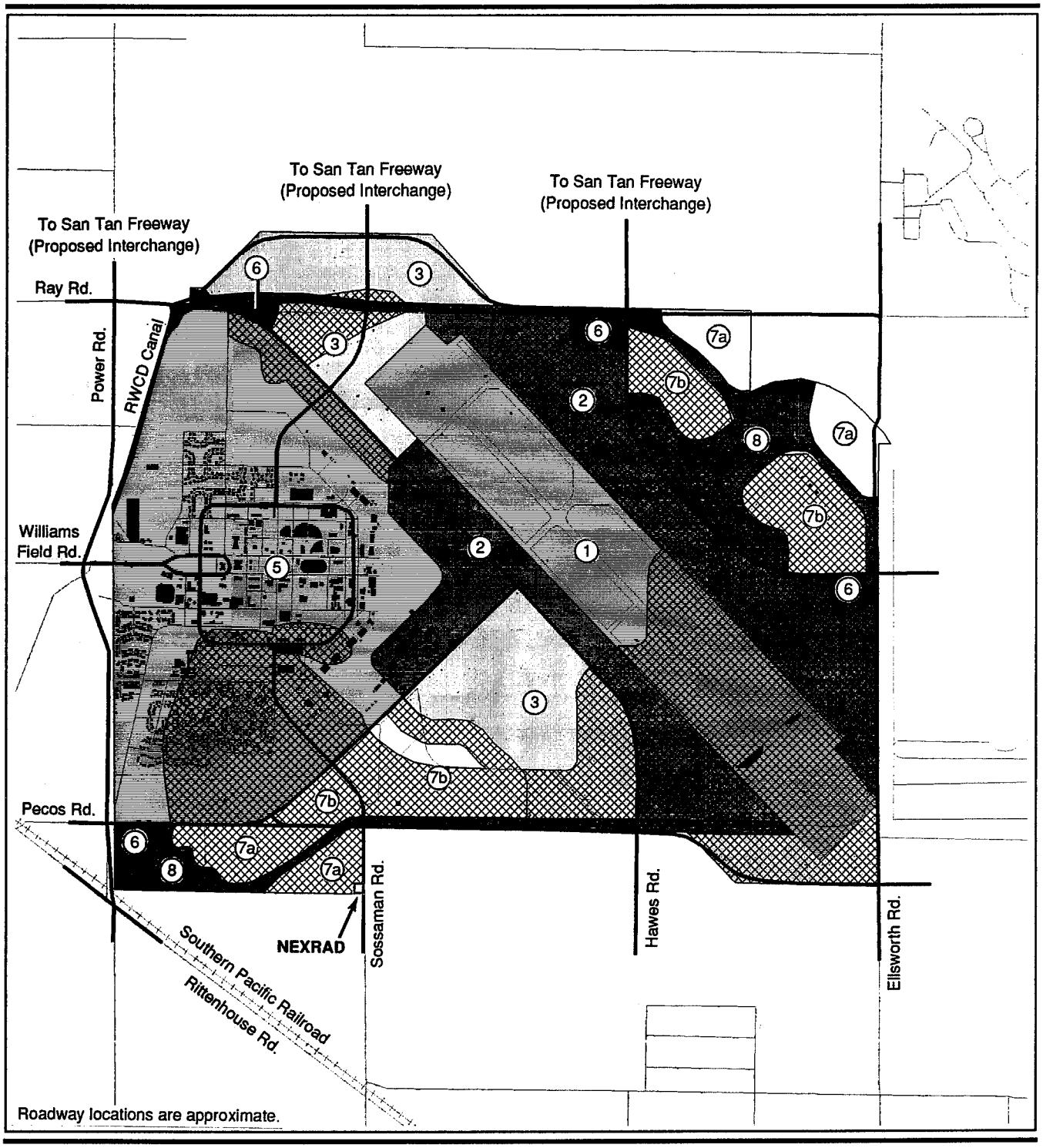
Land Use. With respect to on-base land uses, the general aviation component of this plan is compatible with the existing land use patterns. Potential conflicts could occur between the Institutional (Education) component and activities conducted within the Industrial and Aviation support land use areas surrounding the airfield. However, it is expected that those activities would be conducted at the same level of intensity as the operation of the airfield. As such, the scale of Airfield, Aviation Support, and Industrial activities would be smaller and less intense than the Proposed Action or preclosure training activities due to the differences in the types of aircraft utilizing the airfield and the frequency of flights. Other conflicts could occur between planned residential areas in the southwest area of the base and adjacent industrial areas. To a lesser extent, proposed residential areas in the northeast corner of the base could conflict with aviation support and commercial areas lining the airfield, but a proposed arterial would serve to separate the conflicting uses (Figure 4.2-4).

This alternative would not conflict with surrounding off-base land uses with the possible exception of proposed residential areas in the northeast corner of the base and the adjacent GM Proving Grounds on the east side of Ellsworth Road. However, adverse impacts to the residential areas are not anticipated because the GM Proving Grounds are set well back from Ellsworth Road and cannot be visually or audibly detected from the northeast corner of the base.

In this alternative, the existing Landfill (IRP Site LF-04) is designated for open space and recreational uses. As under the Proposed Action, such reuse would require a high degree of remediation. Alternatively, reuse could be restricted to inaccessible open space. Depending on the remedy selected, medium-density residential uses proposed adjacent to the landfill site could present a significant land use conflict and present the potential for nuisance impacts from the relatively close presence of a site which could be perceived as a detraction to the area.

The existing Liquid Fuels Storage Area and underlying contaminated groundwater plume (IRP Site ST-12) occupies an area of the base which would be designated for Institutional (Education) uses, both aviation and non-aviation related. Approximately 14 acres in this area would be retained by the Air Force to operate ongoing remediation efforts. This would present potential land use conflicts with education uses which could restrict reuse within this area for approximately 30 years or until remediation below health-protective levels is complete.

Approximately 350 linear feet of the existing Southwest Drainage System (IRP Site SD-09), located directly east of South Desert Village within the



EXPLANATION

- (1) Airfield
- (2) Aviation Support
- (3) Industrial
- (4) Institutional * (Medical)
- (5) Institutional (Education)
- (6) Commercial
- (7) Residential †
- (8) Public/Recreation
- (9) Agriculture *
- (10) Vacant Land *
- (11) Military Land *
- Poor compatibility between land uses, either existing or proposed
- Base Boundary
- Off-Base Extension *

0 750 1500 3000 Feet

* Not Applicable
† 7a - Medium Density; 7b - High Density

Land Use Conflicts - General Aviation and Education

Figure 4.2-4

southwest quadrant of the base, occupies an area designated for Institutional (Education) uses. The site was partially remediated in 1988 by installing a soil/cement cap. However, additional investigation to determine the remediation required to achieve health-protective levels will be performed. Potential land use conflicts with education uses could delay or restrict reuse within this area until remediation is complete.

Due to the presence of substantial areas of the base designated as cultural resource sensitivity areas, development of proposed Institutional (Education), Residential, Industrial, Commercial, Airfield, Aviation Support, or Public/Recreation uses, or any activity that requires additional land disturbance may result in adverse impacts to archaeological resources.

Potential land use conflicts resulting from proposed demolition of five historic buildings are similar to that of the Proposed Action. As with the Proposed Action, ongoing AIRFA consultations with Native American groups may identify traditional resources that result in potential land use conflicts associated with development of this alternative.

Runway protection zones which would be required at either end of both operational runways would be located entirely within the Airfield land use category on the base. No anticipated land use conflicts would occur between proposed runway protection zones and land uses surrounding the base.

Under this alternative, no on-base or off-base land would be converted from agricultural to non-agricultural uses; therefore, no prime and unique farmlands are affected.

Aesthetics. The on-base aesthetic effects caused by implementation of the General Aviation and Education Alternative would be similar to those for the Proposed Action, with the exception of the potential for visual impacts to proposed medium-density residential uses adjacent to the existing Landfill in the southwest corner of the site. The off-base aesthetic effects would be lessened from the effects identified for the Proposed Action by provision of medium- and high-density residential uses in the northeast corner of the base coupled with open space buffers which could provide a view corridor to the Superstition Mountains.

Cumulative Impacts. No cumulative impacts to land use or aesthetics are anticipated.

Mitigation Measures. Mitigation measures may be implemented by Maricopa County, the City of Mesa, Town of Gilbert, and the Town of Queen Creek to minimize impacts due to development pressures exerted on surrounding areas in the same manner as for the Proposed Action. As buildout occurs, rezoning of surrounding properties and annexation within municipal planning

areas would need to occur. In addition, the City of Mesa would need to incorporate mechanisms with which to buffer residential areas from future adjacent industrial uses either through amendment of the general plan to provide a more gradual transition from residential to industrial land uses or through implementation of open space buffers and design and performance standards.

As with the Proposed Action, the Town of Queen Creek would need to evaluate whether the existing general plan should be revised to accommodate expected development pressures from this alternative on properties in the northern portion of the planning area.

Existing airport overlay districts regulated by the City of Mesa and Maricopa County would need to be revised to reflect new noise contours and accident potential hazard areas.

Mitigation measures associated with the Landfill, the Liquid Fuels Storage Area, and the Southwest Drainage System would be similar to those identified for the Proposed Action.

Mitigation measures that could be implemented to offset impacts to archaeological and historic resources would be the same as for the Proposed Action. Mitigation of impacts to traditional resources will be determined after completion of Air Force consultations with concerned Native American tribal organizations and communities.

4.2.2.3 Commercial Aviation and Education Alternative

General Plans. The general plan impacts from the Commercial Aviation and Education Alternative are the same as those of the Proposed Action. This alternative is consistent or compatible with the general plans or MPAs of the City of Mesa and the Town of Gilbert, with the exception of a 1-square-mile area within unincorporated Maricopa County that is also within the Gilbert MPA. The general plans for these jurisdictions show land use designations permitting low-density residential uses and mixed industrial/employment center uses, respectively, for the same area. The area lies beneath the existing noise contours for the base between DNL 70 and 75 dB, as determined by the *Eastside Joint Land Use Study* (Barnard Dunkleberg & Company and Mestre Greve Associates, 1988), making it currently unsuitable for residential use. As with the Proposed Action, noise contours associated with the Commercial Aviation and Education Alternative would be below DNL 65 dB, which would be compatible with either plan.

Properties subject to the general plan of the Town of Queen Creek or the Queen Creek MPA have designated land uses that are not inconsistent with this alternative, but may experience pressure to pursue more urbanized or intensive uses than those currently shown on the plan.

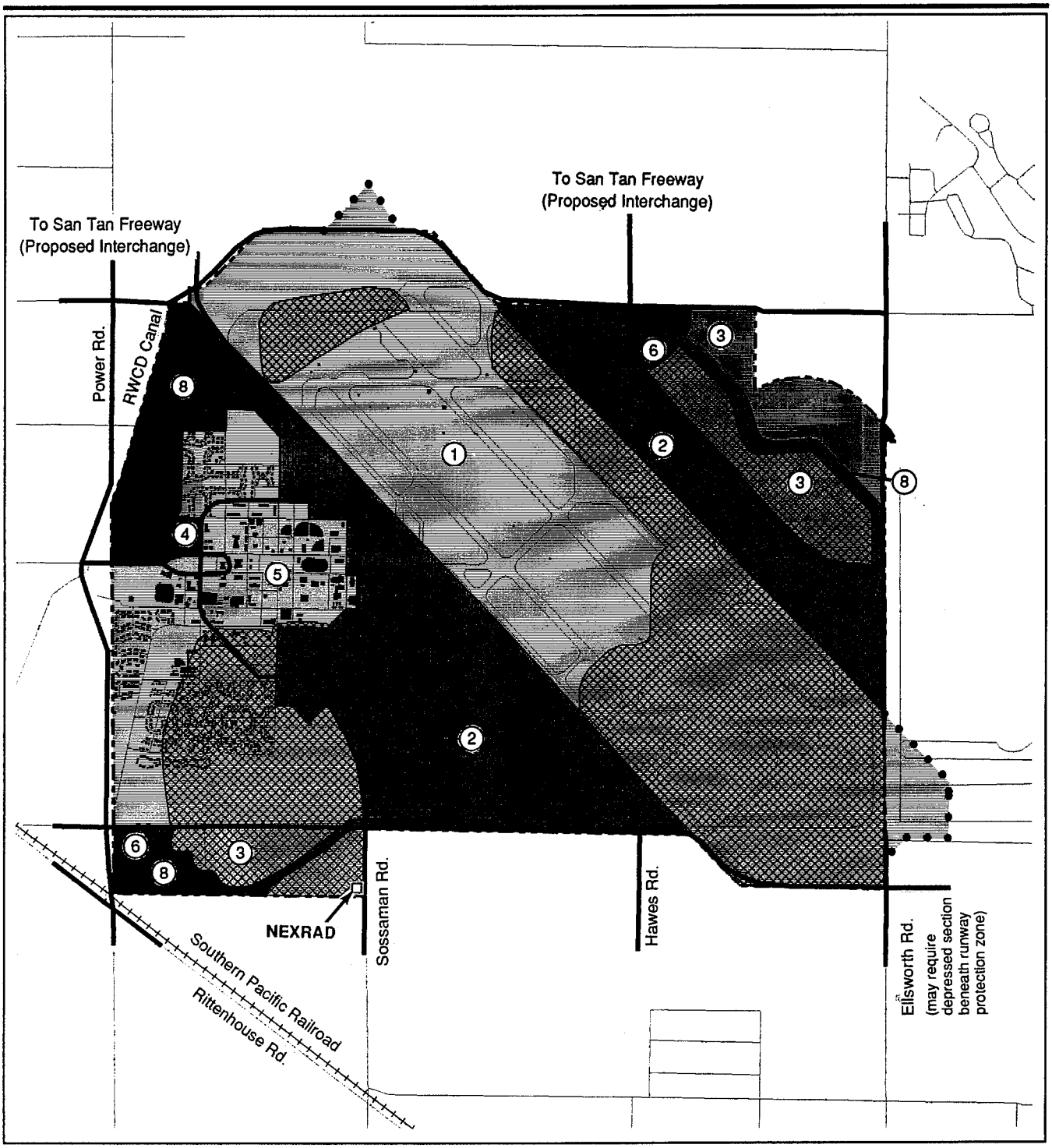
Zoning. The Commercial Aviation and Education Alternative would exert development pressures that are more intensive than those anticipated with the Proposed Action, due to the operation of a larger scale commercial service airport using two of the three existing runways. Runway 12L/30R would be expanded, requiring acquisition of 71 acres of land off-site to accommodate the new runway length and runway protection zones.

Off-base lands which would be subject to noise impacts greater than DNL 65 dB would initially constitute 1,327 acres, but would increase to 2,594 acres by the year 2013. The land areas subject to noise impacts from the Commercial Aviation and Education Alternative are greater than those anticipated for the Proposed Action. These areas would be included within the airport overlay districts for Mesa and Maricopa County. Areas that would lie within DNL 60 to 65 dB, or lie outside the 60 dB contour, but are subject to frequent overflights, may also be included in an airport overlay district subject to the discretion of the local jurisdiction.

Land Use. With respect to on-base land uses, the aviation component of this plan is compatible with reuse of the existing airfield and aviation support facilities. In accordance with Airport Overlay District regulations for the *City of Mesa Zoning Ordinance* (City of Mesa, 1991a), noise impacts from aviation activities would not be compatible with Commercial areas in the northeast quadrant of the base designated for hotel uses that would be located beneath noise contours of DNL 65 to 70 dB. Limited areas of proposed education uses within the Aviation Support land use category would also be located beneath the noise contours of DNL 65 to 70 dB; however, these uses would be considered compatible provided noise attenuation and reduction measures are implemented for new buildings designated for educational uses. Potential land use conflicts between proposed uses on-base are shown in Figure 4.2-5.

Potential land use conflicts associated with the Landfill (IRP Site LF-04) and the Southwest Drainage System (IRP Site SD-09) are the same as described for the Proposed Action. Potential land use conflicts may also occur as a result of conducting aviation support and education activities in the Liquid Fuels Storage Area (IRP Site ST-12). The degree and level of significance of the impact would depend upon the specific activities conducted within each of these land use categories.

Due to the presence of substantial areas of the base designated as cultural resource sensitivity areas, development of proposed Institutional (Education), Industrial, Commercial, Airfield, or Aviation Support land uses, or any activity that requires additional land disturbance, may result in adverse impacts to archaeological resources.



EXPLANATION

- (1) Airfield
- (2) Aviation Support
- (3) Industrial
- (4) Institutional (Medical)
- (5) Institutional (Education)
- (6) Commercial
- (7) Residential *
- (8) Public/Recreation
- (9) Agriculture *
- (10) Vacant Land *
- (11) Military Land *
- Poor compatibility between land uses, either existing or proposed
- Base Boundary
- • • • • Off-Base Extension

0 750 1500 3000 Feet

* Not Applicable

Land Use Conflicts - Commercial Aviation and Education

Figure 4.2-5

As with the Proposed Action, ongoing AIRFA consultations with Native American groups may identify traditional resources that result in potential land use conflicts associated with development of this alternative.

Four historic buildings (Building Nos. 726, 735, 1007, and 1008), located in the Institutional (Education) land use area, would be slated for demolition under this alternative.

Compatibility with off-base land uses is the same as under the Proposed Action, with the exception of runway protection zones. Under this alternative, a total of 71 acres of off-base land would be acquired at the northwest and southeast corners of the base for runway protection zones. Both areas proposed for runway protection zones would present potential conflicts with planned and existing land uses. Runway protection zones occupying off-base property in the northwest corner of the base would encompass vacant land and may encroach upon the right-of-way for the planned San Tan Freeway.

Within the Airfield component, the proposed runway protection zones located adjacent to the southeast corner of the base would encroach upon approximately 2 acres of prime farmland. This 2-acre area was determined to be prime farmland by the USDA SCS as part of its evaluation of 263 acres of off-base land adjacent to the northwest and southeast corners of the base (see Section 4.4.1.3). In accordance with the Farmland Protection Policy Act, the relative significance of the farmland was rated and assigned a score of 170 using the method specified in Form AD-1006 (Appendix H). Under the implementing regulations of the Act, a site that receives a score of 160 or more should be given "increasingly higher levels of consideration for protection" (7 CFR 658.4). Overall, however, adverse impacts to prime and unique farmlands within Maricopa County would not be significant since the loss would constitute less than 0.001 percent of the total amount of prime farmland within the county.

Aesthetics. Anticipated visual effects on both on- and off-base features are the same as those of the Proposed Action. On-base areas identified as exhibiting aesthetically pleasing qualities would be retained and reused. New industrial, commercial, and aviation support development located in the southwest, south, and northeast quadrants of the base would not result in adverse visual impacts to the surrounding areas. Development of new commercial and industrial construction in the northeast area of the base would not result in adverse effects on views of the Superstition Mountains, which are identified as a high-sensitivity visual resource.

Cumulative Impacts. No cumulative impacts to land use or aesthetics are anticipated.

Mitigation Measures. Mitigation measures could be implemented by Maricopa County, the City of Mesa, Town of Gilbert, and the Town of Queen Creek to minimize impacts due to development pressures exerted on surrounding areas in the same manner as for the Proposed Action. As buildout of this alternative occurs, rezoning of surrounding properties and annexation within MPAs would need to occur. The Town of Queen Creek would need to evaluate whether the existing general plan should be revised to accommodate expected development pressures from this alternative on properties in the northern portion of the planning area.

Operation of the proposed airport with a runway protection zone which could extend over the planned San Tan Freeway right-of-way may necessitate realignment of the right-of-way further north of its present location.

Proposed hotel uses subject to noise impacts on-base may be mitigated through discretionary permit approval and/or noise level reduction measures in accordance with the *City of Mesa Zoning Ordinance* (City of Mesa, 1991a). Existing airport overlay districts regulated by the City of Mesa and Maricopa County would need to be revised to reflect new noise contours and accident potential hazard areas.

Mitigation measures associated with the Landfill, the Liquid Fuels Storage Area, and the Southwest Drainage System would be similar to those identified for the Proposed Action.

The range of mitigation measures which could be incorporated to offset adverse impacts to archaeological and historic resources is the same as described for the Proposed Action. Mitigation of impacts to traditional resources will be determined after completion of Air Force consultations with concerned Native American tribal organizations and communities.

4.2.2.4 Education and Planned Community Alternative

General Plans. The Education and Planned Community Alternative is not consistent with the planned use of properties that surround the base which are subject to the *Mesa General Plan* or are within the Mesa MPA. These lands, located north, east and south of the base, are planned for general industrial and commerce park uses and were intended to be compatible with existing military airfield operations (City of Mesa, 1988). This alternative is also not consistent or compatible with properties that are subject to the *Town of Gilbert General Plan* or are within the Gilbert MPA. These properties are designated for industrial and commercial uses west of Power Road and generally north of Williams Field Road in the vicinity of the existing airfield. However, planned medium-density residential uses south of Williams Field Road would be compatible with proposed educational uses and proposed low-profile commercial centers at the intersection of Power

Road and Williams Field Road and at Power Road and Pecos Road (Town of Gilbert, 1986).

Land use designations within the *Town of Queen Creek General Plan* between Germann Road and Ocotillo Road are predominantly agricultural with isolated areas for single-family residential uses (Town of Queen Creek, 1990a). The area is generally zoned for residential uses (Figure 3.2-4) (Maricopa County, 1992b; Town of Queen Creek, 1990c). Although these land uses are not incompatible with the Education and Planned Community Alternative, development of the proposed satellite college campus and a planned community and new town center may exert pressure on these areas to pursue more urbanized or more intensive land uses than those currently shown on the plan. Development pressure may be less intensive than that of the Proposed Action, however, due to development of large tracts of land for uses that are not employment-centered, such as medium- and high-density residential development.

Pinal County lies three miles east of the base. The recently drafted *Pinal County Comprehensive Plan* (Pinal County, 1992) shows rural community uses as a dominant feature of the plan. Areas within Pinal County that would be subject to this plan are compatible with existing noise contours emanating from Williams AFB and would not be affected by the Education and Planned Community Alternative due to the absence of airport noise, the distance from the base, and the low-density rural and agricultural nature of western Pinal County.

Zoning. Current rural residential zoning patterns surrounding the base are not consistent with the general plan classifications for those same properties which indicate future development to more intensive industrial and residential land uses. With the exception of lands within Pinal County, the development of this alternative may impact the area by exerting pressure over properties in the vicinity to be rezoned in concert with industrial and higher-density residential uses designated by their respective general plans.

With the exception of the Town of Gilbert and the Town of Queen Creek, jurisdictions which govern land beneath the existing noise contours delineated by the *Eastside Joint Land Use Study* (Barnard Dunkleberg & Company and Mestre Greve Associates, 1988) restrict land uses through airport noise overlay districts. Under the Education and Planned Community Alternative, airport noise impacts would no longer occur, necessitating elimination of airport noise overlay districts within the ROI for Maricopa County (Gilbert MPA), the City of Mesa, the Town of Queen Creek MPA, and Pinal County (Maricopa County, 1992b; City of Mesa, 1991b; Pinal County, 1992).

Land Use. Because there is no aviation component within the Education and Planned Community Alternative, it is not compatible with the existing land

use pattern of most portions of the base, foremost being the Airfield and Aviation Support facilities (Figure 4.2-6). The education component would reuse most of the existing buildings within the central core of the base, as well as all on-base housing, and is compatible with existing land use patterns in these areas.

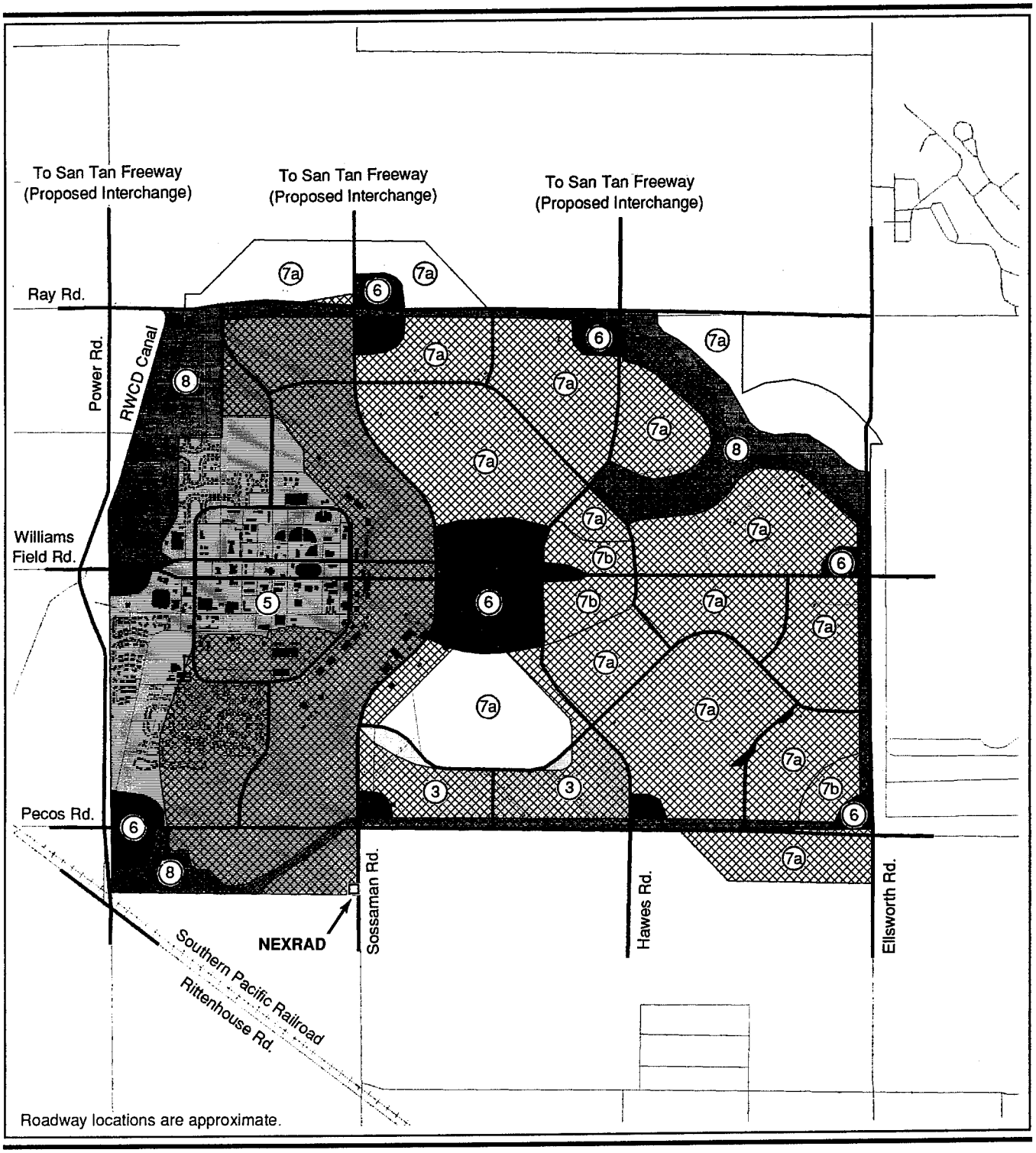
Due to the presence of substantial areas of the base designated as cultural resource sensitivity areas, development of proposed Institutional (Education), Residential, Commercial, Industrial, or Public Recreation land uses, or any activity that requires additional land disturbance, may result in adverse impacts to archaeological resources.

As with the Proposed Action, ongoing AIRFA consultations with Native American groups may identify traditional resources that result in potential land use conflicts associated with development of this alternative.

Land use conflicts would also occur as a result of demolition of twelve historic buildings (Nos. 24, 25, 27, 31, 32, 37, 38, 46, 726, 735, 1007, 1008) located within the Institutional (Education) land use area since their existing uses would not be compatible with educational activities.

Potential land use conflicts associated with the Landfill (IRP Site LF-04), the Liquid Fuels Storage Area (IRP Site ST-12), and the Southwest Drainage System (SD-09) are the same as described for the Proposed Action except that the education (rather than industrial) uses adjacent to the Landfill would be affected.

Williams AFB is surrounded by properties that are generally vacant, or underdeveloped parcels of low-density residential and agricultural uses. Exceptions to this are the GM Proving Grounds on the east side of Ellsworth Road adjacent to the base and a small commercial center and apartment complex on the west side of the base at the intersection of Power Road and Williams Field Road. Residential uses located throughout the east side of the base along Ellsworth Road are not compatible or consistent with the industrial uses on the GM Proving Grounds adjacent to the east side of the base. The residential areas that would be located in the southeast quadrant of the base would be shielded from adverse impacts, however, by Public/Recreation land use buffers. Both the GM Proving Grounds and the proposed residential areas in the northeast quadrant of the base are set well back from Ellsworth Road, so Proving Grounds activities would not be visually or audibly detected from the residential areas. The proposed education component on the west side of the base adjacent to Power Road is compatible with the existing commercial and multifamily residential uses adjacent to the west side of the base.



EXPLANATION

- (1) Airfield *
- (2) Aviation Support *
- (3) Industrial
- (4) Institutional (Medical) *
- (5) Institutional (Education)
- (6) Commercial
- (7) Residential †
- (8) Public/Recreation
- (9) Agriculture *
- (10) Vacant Land *
- (11) Military Land *
- Poor compatibility between land uses, either existing or proposed
- Base Boundary
- Off-Base Extension *

0 750 1500 3000 Feet

* Not Applicable
† 7a - Medium Density; 7b - High Density

Land Use Conflicts - Education and Planned Community

Figure 4.2-6

Under this alternative, no on-base or off-base land would be converted from agricultural to non-agricultural uses; therefore, no prime and unique farmlands are affected.

Aesthetics. The Education and Planned Community Alternative is not expected to result in any adverse effects to on-base features of medium visual sensitivity. Education uses adjacent to the existing Landfill may be subject to adverse visual impacts from location in proximity to a potential visual detraction. Implementation of this alternative would not result in adverse visual effects to surrounding areas or to views of the Superstition Mountains (a high-sensitivity visual resource).

Cumulative Impacts. No cumulative impacts to land use or aesthetics are anticipated.

Mitigation Measures. Off-base mitigation may require substantial revision of the *Mesa General Plan* to accommodate residential and town center development rather than the existing aviation use (City of Mesa, 1988). Without the provision of a large employment center or "anchor tenant" such as an airport, the requirement for large tracts of industrially planned and zoned property is lessened substantially.

Since implementation of a proposed satellite campus will represent more urbanized and intensive development than the current rural uses of surrounding areas, measures to minimize impacts due to the anticipated development pressures may be implemented by Maricopa County, the City of Mesa, the Town of Gilbert, and the Town of Queen Creek. As buildout proceeds, rezoning of surrounding properties in concert with their respective general plans and annexation within municipal planning areas to the determinant jurisdictions would need to occur. In addition, the Town of Queen Creek would need to evaluate whether the existing general plan should be revised to accommodate expected development pressures from the Education and Planned Community Alternative on properties in the northern portion of the planning area.

Existing airport overlay districts regulated by the City of Mesa and Maricopa County would no longer be needed due to the absence of an airfield.

Mitigation measures associated with the Landfill, the Liquid Fuels Storage Area, and the Southwest Drainage System would be similar to those identified for the Proposed Action.

Measures to avoid or offset adverse impacts to archaeological resources would be the same as those described for the Proposed Action. Mitigation of impacts to traditional resources will be determined after completion of Air Force consultations with concerned Native American tribal organizations and communities.

Mitigation to avoid or offset potential impacts from demolition of twelve historic buildings (Nos. 24, 25, 27, 31, 32, 37, 38, 46, 726, 735, 1007, 1008) should include reevaluation of the Institutional (Education) land use category to provide for retention and preservation of the structures. If this proves infeasible, relocation to another setting or full documentation prior to demolition would be less desirable alternatives.

4.2.2.5 Other Land Use Concepts. Of the functions on the base, only the National Weather Service Next-Generation Radar (NEXRAD) facility and the Willie VORTAC NAVAID (a navigation device) are scheduled to remain permanently after base closure and would be present under each alternative, including the No-Action Alternative and the Proposed Action. The NEXRAD station is located on a one-acre site in the southwest corner of the base. The Willie VORTAC is located between Runway 12R/30L and Runway 12C/30C.

Impacts of each proposed federal transfer and other independent land use concepts are evaluated for compatibility with land use plans and regulations, impacts to on- and off-base land uses, and general land use trends in the region.

Federal Bureau of Prisons

Land use. This proposal would not be compatible with land use activities planned as part of the Proposed Action or the Commercial Aviation and Education Alternative. The proposal would not be compatible within or adjacent to Industrial or Aviation Support land use categories due to the potential for disturbances (e.g., noise, dust, and other incompatible impacts associated with industrial and aviation support activities) to an institution which serves as a residence for large numbers of people, such as a detention facility.

The proposal may be compatible with the General Aviation and Education Alternative or the Education and Planned Community Alternative as a use with high-density residential characteristics, provided that the facility is separated from other residential, educational, and commercial uses.

Aesthetics. This proposal would be visually compatible with both on-base and adjacent development provided that landscaped buffers are established between the use and areas of medium and high visual sensitivity, as well as between the use and potentially incompatible residential, industrial, or educational activities.

Arizona Department of Corrections

Land Use. This proposal, in the location specified, would be incompatible with the Proposed Action and all the alternatives. The proposed use of existing residential areas and portions of the central core of the base would preempt use as campus housing and other facilities within the Institutional (Education) land use category.

Aesthetics. This proposal would be visually compatible with both on-base and adjacent development provided that landscaped buffers are established between the use and areas of medium and high visual sensitivity, as well as between the use and potentially incompatible residential, industrial, or educational activities.

Arizona Department of Health Services

Land Use. This proposal would not be compatible with land use activities planned as part of the Proposed Action, the Commercial Aviation and Education Alternative, or the General Aviation and Education Alternative. The proposal would preempt use of student housing associated with the Institutional (Education) land use category if located within the campus area and would not be compatible within or adjacent to Industrial or Aviation Support land use categories due to the potential for disturbances to an activity with residential characteristics.

The proposal would be compatible with the Education and Planned Community Alternative as a use with high-density residential characteristics, if alternate facilities were provided outside of the campus component of this alternative.

Aesthetics. This proposal would be visually compatible with both on-base and adjacent development provided that landscaped buffers are established between the use and areas of medium and high visual sensitivity, as well as between the use and potentially incompatible residential, industrial, or educational activities.

4.2.2.6 No-Action Alternative

General Plans. Permanent base closure with no reuse would not be in conflict with the general plans of surrounding jurisdictions within the ROI for Williams AFB. Caretaker status would, however, be inconsistent with redevelopment plans proposed by local jurisdictions for the reuse of Williams AFB.

Zoning. Placing Williams AFB in caretaker status would not conflict with zoning in adjacent jurisdictions. Since the airfield would no longer be in use, development restrictions created by airport noise overlay zoning districts in

the City of Mesa, Maricopa and Pinal counties, and the towns of Gilbert and Queen Creek would no longer be needed. However, removal of airport noise overlay districts and subsequent development of surrounding areas of the base could adversely impact potential future airfield development options for the base, if development of incompatible land uses and building heights occur.

Land Use. The No-Action Alternative would cause no physical changes in on-base land use from conditions at closure. Functionally, there would be no use of base land and facilities. OL personnel would continue to maintain the buildings and grounds. Because the federal government would retain ownership of the base under the No-Action Alternative, the property would remain outside the jurisdiction of the local communities and the county.

Aesthetics. The No-Action Alternative would not affect the visual and aesthetic quality of the base or the surrounding area. Some landscaped portions of the base would receive less intensive maintenance. The absence of human activity on the base would enhance and accelerate the return to natural conditions in some areas.

4.2.3 Transportation

The effects of the Proposed Action and alternatives on each component of the transportation system, including roadways, airspace and air traffic, and railroads, are presented in this section. Possible mitigation measures are discussed for those components likely to experience substantial adverse impacts under the Proposed Action or any alternative.

Roadways. Reuse-related effects on roadway traffic were assessed by estimating the number of trips generated by each land use considering employees, dwelling units, and service vehicles associated with construction and all other on-site activities for the Proposed Action and each alternative. Principal trip-generating land uses include aviation support, industrial, office, medical, education, commercial, residential, and recreational uses. These trips were distributed to the roadway system through the use of a gravity model based on proposed land uses. The gravity model uses the assumption that trips are distributed proportionately to the population of communities around the base and inversely proportional to distances to these communities. This analysis is based on daily trips as distributed, existing and projected data on roadway capacities, traffic volumes, and standards established by state and local transportation agencies.

To determine reuse-related effects on local roadways, baseline closure traffic volumes were first increased according to a growth factor based on historic traffic growth. The reuse-related traffic volumes associated with direct employment on-base were then added and traffic impacts were determined based on LOS changes for each of the key local and some

regional roads (see Table 3.2-2 for LOS definitions). The historic traffic growth factor reflects the historic growth of Williams AFB along with the surrounding communities. Indirect employment associated with each reuse alternative was not used to generate additional trips since the projected population if Williams AFB remained open is similar to the projected population if Williams AFB closed and the various alternatives were implemented. For the Proposed Action, General Aviation and Education Alternative, Commercial Aviation and Education Alternative, and Education and Planned Community Alternative, the projected population of the ROI is 1.2 percent, 1.4 percent, 1.3 percent, and 0.6 percent greater than the projected population of the ROI if Williams AFB remained open, respectively. In other words, the historic traffic growth accounts for indirect employment associated with each reuse alternative; therefore, there is no need to model indirect employment-generated traffic growth.

The transportation analysis used the standard analytical techniques of trip generation, trip distribution, and traffic assignment. Trip generation was based on applying the trip rates from the ITE Trip Generation Manual, 5th Edition (Institute of Traffic Engineers, 1991), to the existing and proposed land uses to obtain total daily trips and peak-hour trips.

The trip distribution analysis assumed that each of the reuse alternatives would have a network of new arterials. These arterials would be built to handle the traffic in 2013. Since specific entrances/exits to the various land use areas are unknown, trips were assigned to a generalized location for origin/destination.

Airspace/Air Traffic. The airspace analysis examines the type and level of aircraft operations projected for the Proposed Action and alternatives and compares them to how the airspace was configured and used under the preclosure reference. The impact analysis considers the relationship of the projected aircraft operations to the operational capacity of the airport, using criteria that have been established by the FAA for determining airport service volumes. Potential effects on airspace use were assessed based on the extent to which the Proposed Action or alternatives could (1) require modifications to the airspace structure or air traffic control systems and/or facilities; (2) restrict, limit, or otherwise delay other air traffic in the region; or (3) encroach on other airspace areas and uses.

The FAA is ultimately responsible for evaluating the specific effects that the reuse of an airport will have on the safe and efficient use of navigable airspace by aircraft. Such a study is based on details from the airport proponent's Airport Layout Plan (ALP) and consists of an airspace analysis, a flight safety review, and a review of the potential effect of the proposal on air traffic control and air navigational facilities. Once this study is completed, the FAA can determine the actual requirements for facilities, terminal and enroute airspace, and instrument flight procedures.

4.2.3.1 Proposed Action

Roadways. By the year 2013, the major traffic generators would be the 18,632 projected employees, including construction employees, associated with the Proposed Action on a typical weekday. At this time, it is estimated that about 131,000 one-way trips (vehicle trip ends) would be generated by the Proposed Action on a typical weekday (a round trip comprises two vehicle trip ends). The estimated number of trips generated by on-site development at various phases of reuse are depicted in Table 4.2-2. The number of trips generated by the Proposed Action would increase steadily, exceeding the 1991 preclosure level by the year 2013. The greatest change in volume would occur between the years 2003 and 2013. Figure 4.2-7 shows the non-project and project-generated peak-hour traffic for the years 1991 (preclosure), 1993 (closure), 1998, 2003, and 2013 and the associated LOS on key regional and local roads that would result from the Proposed Action. Project-generated traffic is directly associated with reuse activity, while non-project-generated traffic is the result of other activities not directly associated with reuse.

Regional. Project-generated and non-project-generated traffic would increase the average daily traffic on U.S. 89 by approximately 45 percent by the year 2013. The LOS would be reduced from D to F by the year 2013. Project-generated and non-project-generated traffic would increase the average daily traffic on U.S. 60 by approximately 16 percent by the year 2013. The LOS would remain at F.

Local. Through the year 2003, all key local roads would remain at LOS A or B, except Power Road which would deteriorate to an LOS of D. In 2013, all key local roads would have acceptable LOS (D or better) except for Power Road which would deteriorate to an LOS of F.

On-base. The Proposed Action assumes that existing on-base roadways would be used in the short-term during the construction period. As part of the eventual site development plan, internal circulation must accommodate the intensity of vehicular and pedestrian activities and provide an acceptable LOS including access from the local road network. Redevelopment plans are expected to incorporate internal circulation requirements which meet local planning objectives.

Airspace/Air Traffic. The Proposed Action assumes that the future aviation activity will be accommodated by the existing system of runways and taxiways. The configuration of the existing runway/taxiway system will be modified by lengthening Runway 12L/30R to 10,500 feet and shortening Runway 12R/30L to 8,800 feet. For the purpose of analysis, Runway 12C/30C was assumed operational for the 1993 fleet mix, but was assumed to be decommissioned and converted to a parallel taxiway prior to 1998. The existing aircraft parking apron would be used for general aviation

Table 4.2-2. Summary of Total Daily Trips Generated by Various Reuse Alternatives

Reuse Alternative	1998	2003	2013
Proposed Action	24,400	46,600	131,000
General Aviation and Education Alternative	18,900	54,400	119,000
Commercial Aviation and Education Alternative	23,700	57,000	157,000
Education and Planned Community Alternative	27,400	90,800	189,800

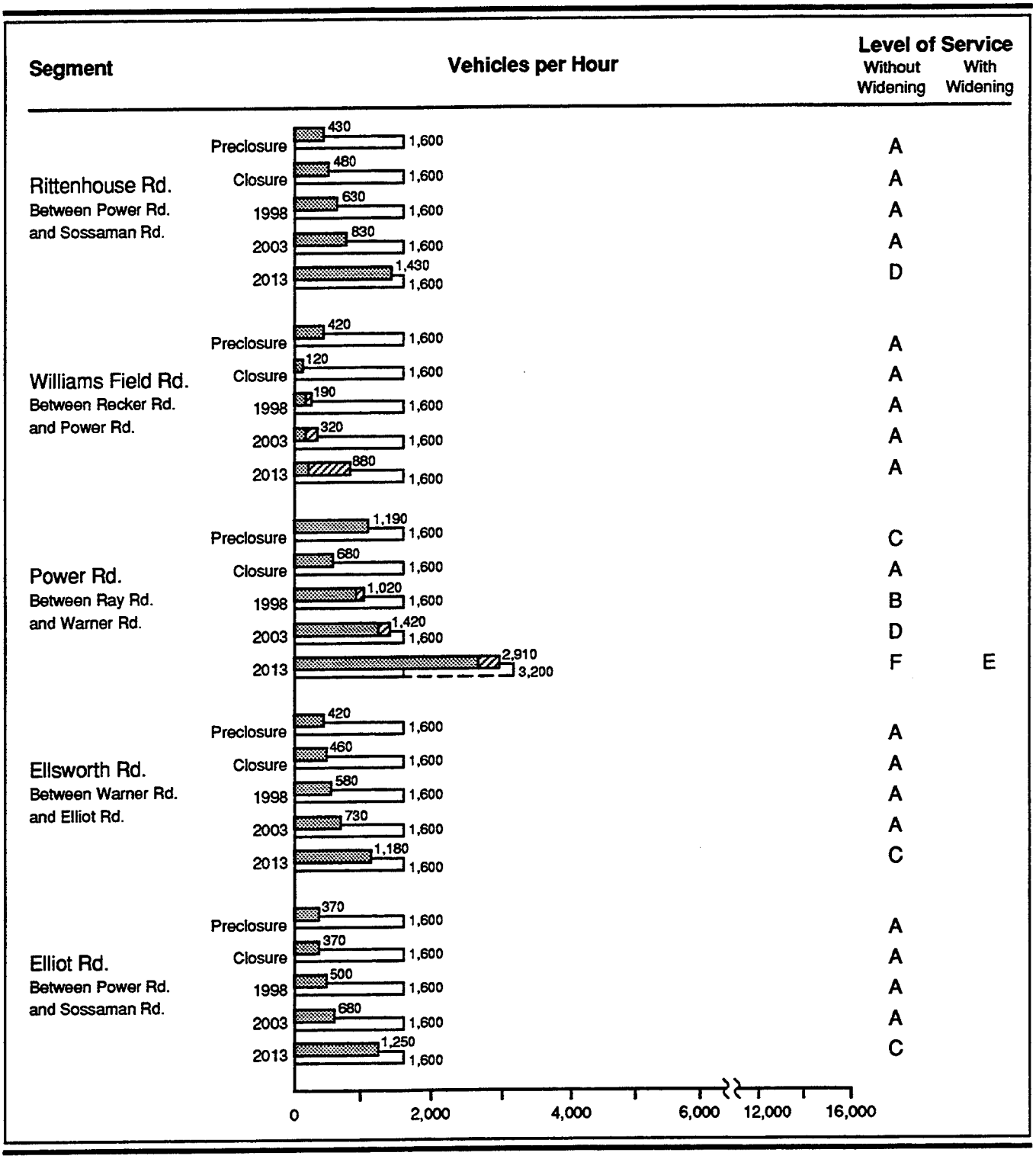
Note: Daily trips generated are defined as one-way vehicle trips.

aircraft. A new commercial passenger terminal and air carrier aircraft parking apron is proposed for development on the northeast side of Runway 12L/30R. The Proposed Action includes, in addition to the projected civil aviation activity (delineated in Table 2.2-4), the relocation of the Arizona ANG 161st AREFG to Williams and the continued use of Williams AFB for practice instrument approaches and touch-and-go landings on Runway 12L/30R.

For airspace planning purposes, it is assumed that the existing Willie VORTAC (a navigation aid) will be retained by the FAA for use in the National Airspace System. It is also assumed that the precision instrument landing system (ILS) will be relocated from Runway 30C to Runway 30R and that a non-precision instrument approach based on the use of the Willie VORTAC will be established for Runway 12L to support the civil and military aviation activities. It is also assumed that currently available FAA radar approach control services will continue to be furnished to Williams AFB. Three scenarios are possible relative to an air traffic control tower (ATCT) at Williams AFB: (1) the FAA could assume operation of the existing ATCT; (2) if aircraft operations levels do not justify an FAA-operated facility, the airport owner/operator or the Arizona ANG (111th Air Traffic Control Flight) could provide a non-federally operated ATCT or; (3) the ATCT could be closed.

As noted in Section 3.2.3.2, there is an existing proposal to realign the Williams MOA complex to form the new Outlaw and Jackel MOAs. This proposal was prepared and submitted to the FAA by the Arizona ANG which would be the primary users of the new MOAs after closure of Williams AFB. Under this proposal, there would not be any defense-related airspace areas overlying Williams AFB or within the areas required for VFR traffic pattern activity or for IFR arrival and departure patterns.

For airspace planning purposes, it is assumed that there will be a reconfiguration of the Williams MOA complex that will remove all

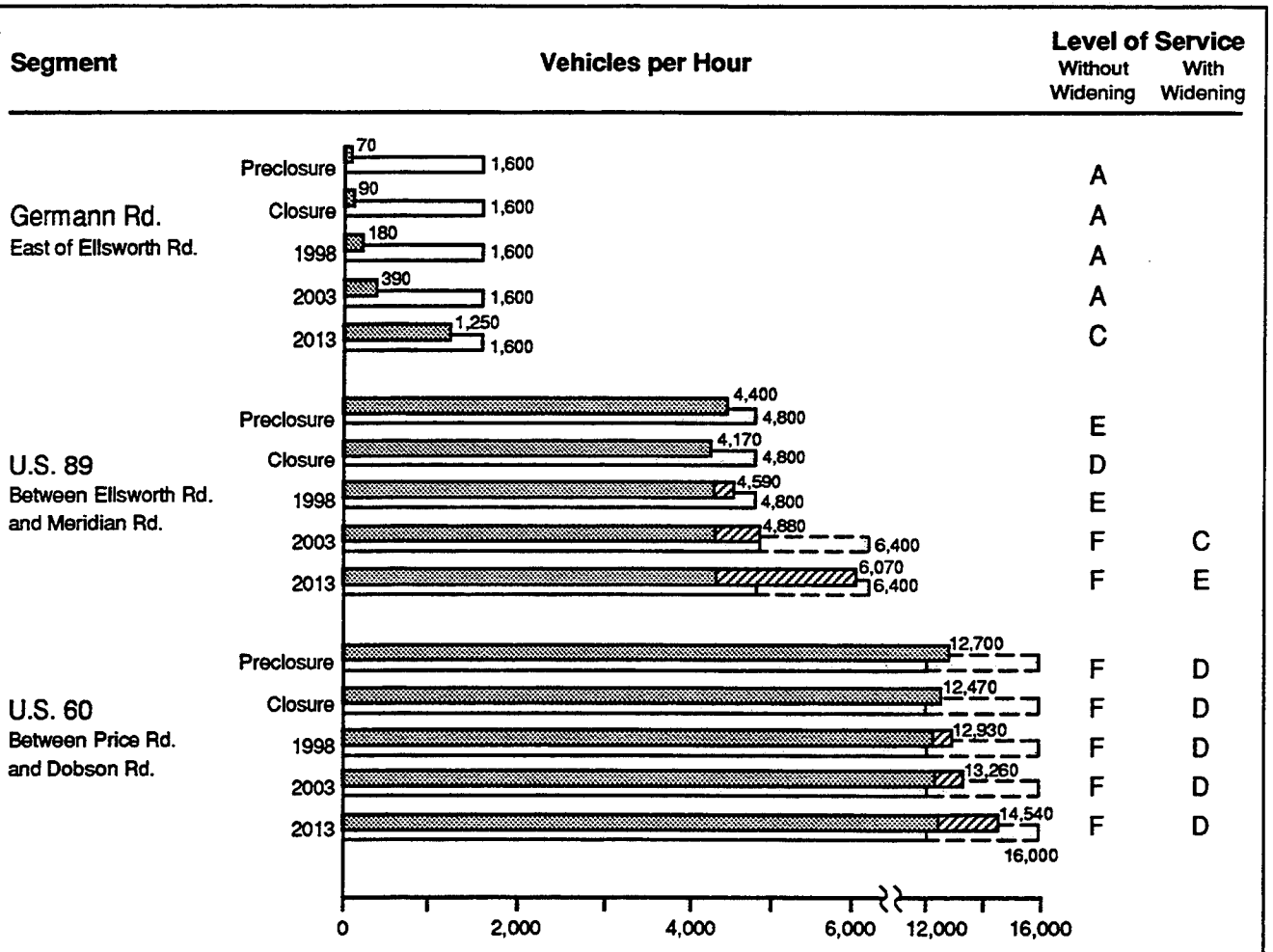


EXPLANATION

- Non-Project Generated Traffic (Vehicles per Hour)
- Project Generated Traffic (Vehicles per Hour)
- Existing Capacity
- Future Capacity

Peak-Hour Traffic Volume - Proposed Action

Figure 4.2-7 Page 1 of 2



EXPLANATION

- Non-Project Generated Traffic (Vehicles per Hour)
- Project Generated Traffic (Vehicles per Hour)
- Existing Capacity
- Future Capacity

Peak-Hour Traffic Volume - Proposed Action

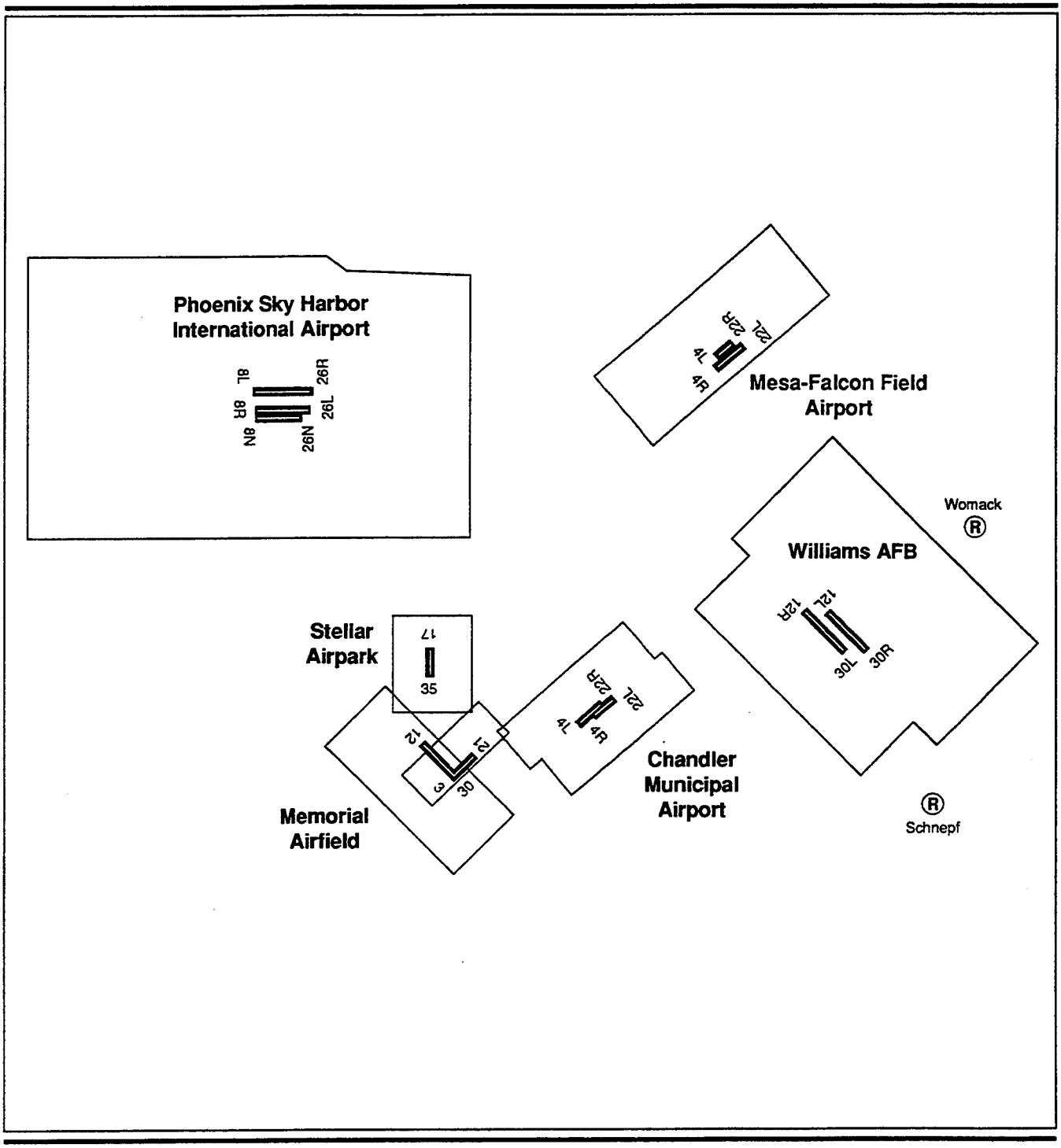
Figure 4.2-7 Page 2 of 2

defense-related airspace overlying the airspace needed for post-closure reuse aircraft operations at Williams AFB. If the existing MOA airspace remains in effect, air traffic rules provide that aircraft on an IFR flight plan could not transit the MOA area for takeoffs and landings at Williams AFB unless radar separation between all aircraft operating within the MOA could be achieved. Aircraft flying VFR can transit a MOA. However, within an active MOA, both civil and military pilots are required by federal and military regulations to maintain visual separation between aircraft. Thus, as is the case with preclosure conditions, extreme caution would have to be exercised by all pilots operating in the MOA.

To determine if the VFR traffic pattern requirements associated with the proposed civil and military aircraft operations at Williams AFB would be operationally compatible with the VFR traffic pattern requirements for nearby airports, the general VFR airspace guidelines delineated in FAA Handbook 7400.2C, *Procedures for Handling Airspace Matters* (Federal Aviation Administration, 1984) were used to analyze the potential airspace relationships resulting from aircraft activities at each of the public use airports in the vicinity of Williams AFB. The VFR traffic pattern criteria are predicated on airspace dimensions established by the FAA to accommodate the operational and performance characteristics of the categories of aircraft that will use the various airports. The airspace dimensions are defined by categories of aircraft grouped by ranges of approach speeds.

Figure 4.2-8 depicts the VFR traffic pattern airspace requirements for the Proposed Action at Williams AFB and the VFR traffic pattern airspace for each of the nearby airports. A review of the depiction indicates that the VFR airspace area for the proposed civil and military aircraft activity at Williams AFB will not interact with any of the VFR airspace areas of the four other public use airports nearest to Williams AFB. The two restricted private use Womack and Schnepf Airports will both lie outside the Proposed Action VFR traffic pattern airspace area for Williams AFB. These findings indicate that the Proposed Action will not have significant impacts on VFR airspace requirements for Williams AFB or on those for any of the airports in the vicinity of Williams AFB.

Under the Proposed Action, the conversion of Williams AFB to civilian use does not create any air traffic operational conditions that would change the terminal area traffic flow patterns associated with landings and takeoffs to or from Runway 30L or Runway 30R by aircraft that are flying on an IFR flight plan. Neither the civil aircraft operations nor the Arizona ANG 161st AREFG KC-135 operations on Runways 30L and 30R would require any significant alteration of the preclosure baseline approach and departure paths for these two runways. The areas south and east of Williams AFB are unencumbered by any public use airports that are affected by aircraft



EXPLANATION

Ⓡ Restricted/Private-use Airport

VFR Airspace Requirements Boundary

Note: Runway 8N/26N at Phoenix-Sky Harbor Airport is a new runway proposed for future construction

0 5 Nautical Miles

VFR Airspace Requirements

Figure 4.2-8

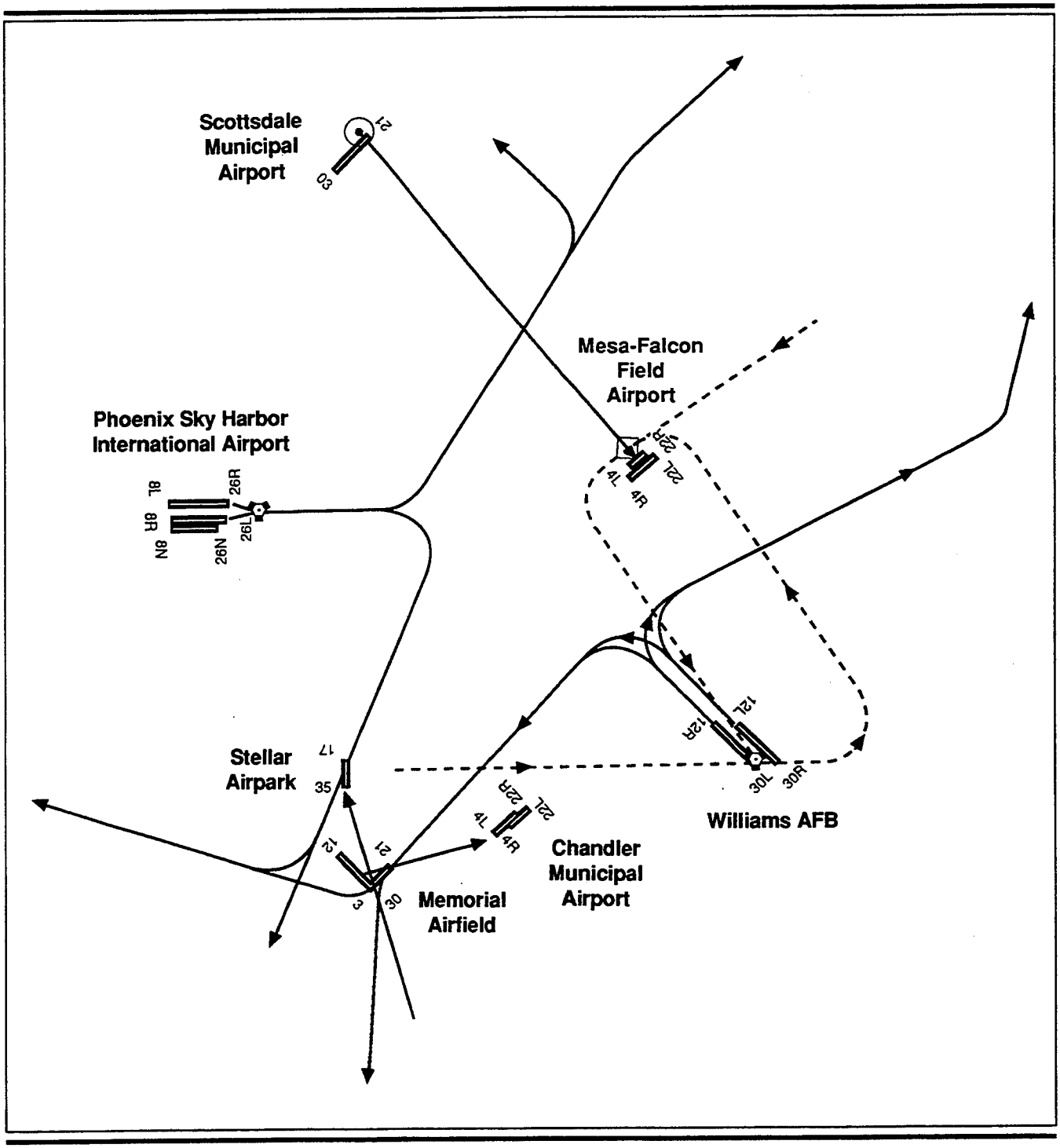
operations on Runways 30L and 30R. Civil aviation reuses of Williams AFB would, therefore, have no significant effects upon airspace management in the areas south and east of the airport.

Airspace management northwest of Williams AFB is complex and critical because of the terminal area air traffic flows associated with Phoenix Sky Harbor International Airport and Mesa-Falcon Field Airport. In particular, the key considerations to potential airspace impacts of the Proposed Action are landings and takeoffs on Runways 12R and 12L at Williams and Phoenix Sky Harbor International Airport air traffic involving departures and arrivals to or from the east.

The potential for airspace impacts to aircraft operations to the northwest of Williams AFB was determined by examining the relationship of the arrival and departure paths needed to accommodate the projected aircraft activity at Williams AFB with the arrival and departure routes at Phoenix Sky Harbor International Airport and with other airports in the vicinity of Williams AFB. The determination of the compatibility of air traffic flows associated with the aviation reuse flight activity northwest of Williams AFB with the air traffic flows at nearby airports considers four key operational scenarios. The four scenarios consist of (1) IFR arrivals to Runway 12L at Williams AFB and IFR departures from Phoenix Sky Harbor International Airport toward the east; (2) IFR departures from Williams AFB to the northwest from Runways 30R and 30L and departures from Phoenix Sky Harbor International Airport toward the east; (3) IFR arrivals to Runway 12L at Williams AFB and Phoenix Sky Harbor International Airport IFR arrivals toward the west; and (4) IFR departures from Williams AFB to the northwest from Runways 30R and 30L and Phoenix Sky Harbor International Airport IFR arrivals toward the west.

The existing flight paths associated with Williams AFB air traffic operations to the northwest provided the framework for defining the Williams AFB aviation reuse flight paths. These flight paths were modified as necessary to accommodate the differences in aircraft performance characteristics of the aircraft projected to use Williams AFB. Basically, the flight paths derived for analysis purposes were predicated on the operating parameters of the civil and military turbojet aircraft which require the greater amount of airspace.

Figure 4.2-9 depicts the relationship of Williams AFB flight operations toward the northwest (Scenarios 1 and 2) with the eastbound standard instrument departure procedures from Phoenix Sky Harbor International Airport. The analysis indicates that, under the typical operating conditions associated with these two scenarios, there is sufficient airspace to permit simultaneous operations at both Williams AFB and Phoenix Sky Harbor International Airport.



EXPLANATION

- Departures
- Arrivals
- Airspace Conflict
- VORTAC
- Non-Directional Radio Beacon

0 5 Nautical Miles

Williams AFB Northwest IFR Arrivals/Departures, Phoenix Sky Harbor International Airport IFR Departures to the East

Figure 4.2-9

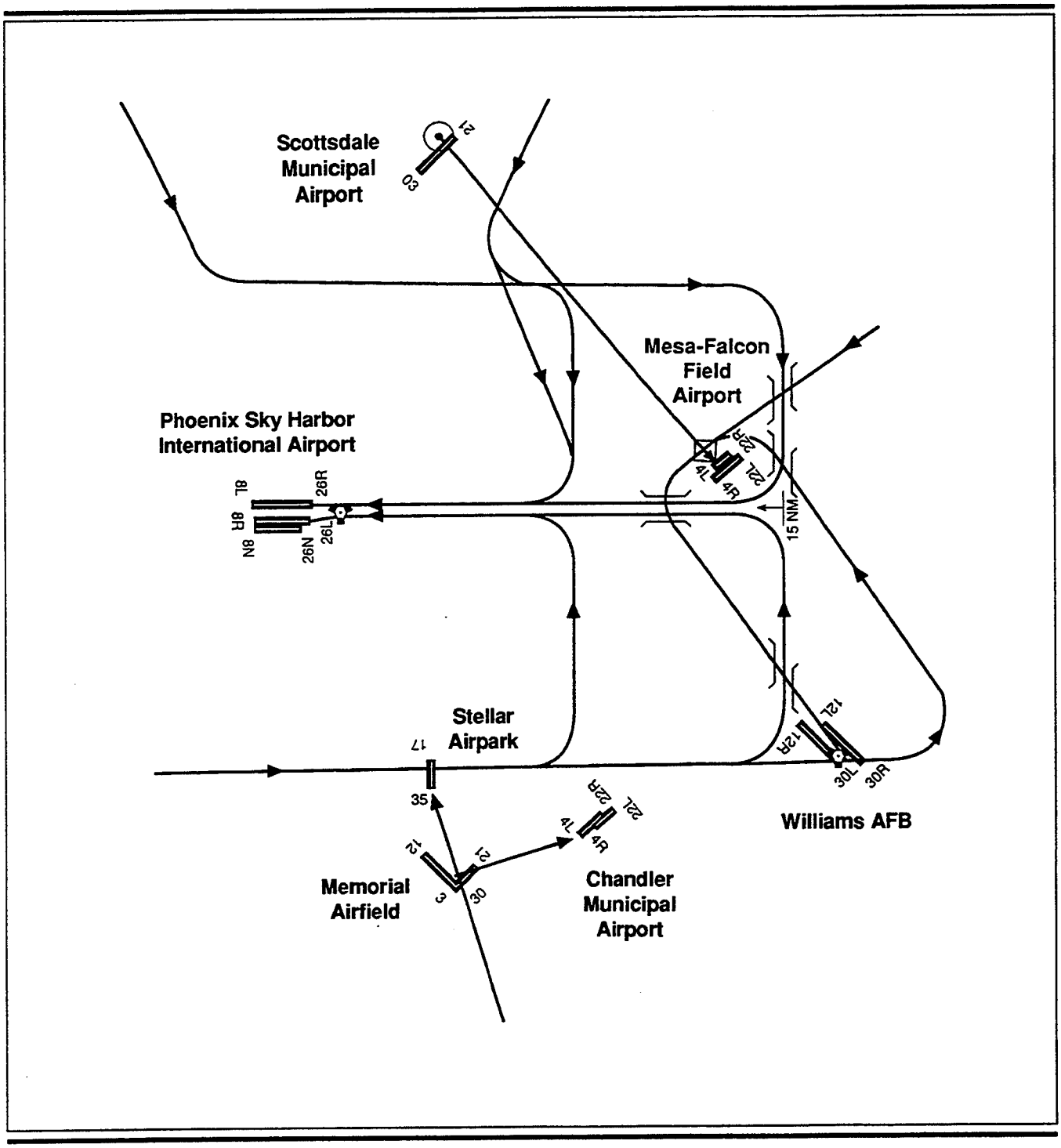
An airspace conflict presently exists between the existing instrument approach to Runway 12C at Williams AFB and the published instrument approach to Mesa-Falcon Field Airport (Pennington, 1992b). An airspace conflict occurs when minimum aircraft separation standards cannot be achieved which then preclude simultaneous aircraft operations. Delays accrue as a result of an airspace conflict. This analysis indicates that moving the approach from Runway 12C to Runway 12L would not alleviate this conflict. Under the Proposed Action, this airspace conflict would, therefore, be the same as the preclosure condition.

The relationship of IFR arrivals to Runway 12L at Williams AFB to IFR arrivals to Phoenix Sky Harbor International Airport from the east (Scenario 3) is shown on Figure 4.2-10. The analysis indicates that there is interaction between the arrival paths for both airports. However, because of the spatial relationship between the two airports, and because of standard ATC procedures currently in use, altitude separation is achieved between aircraft by crossing the Williams AFB inbound traffic below the altitudes of traffic inbound to Phoenix Sky Harbor International Airport. This produces the "tunneling" effect by Williams AFB arriving aircraft that is reflected in Figure 4.2-10. These findings indicate that simultaneous operations at both airports can be achieved and that the traffic flows associated with the Proposed Action will have no significant impacts upon IFR arrivals to Williams AFB or to Phoenix Sky Harbor International Airport.

Figure 4.2-11 depicts the flight paths associated with IFR departures from Williams AFB Runways 30L and 30R toward the northwest and the IFR arrival paths to Phoenix Sky Harbor International Airport from the east (Scenario 4). Under this condition, the Williams AFB departures will be below IFR arrivals to Phoenix Sky Harbor International Airport. This air traffic flow scenario does not, therefore, result in any constraints to simultaneous operations at both airports.

The IFR arrival and departure flight paths needed to accommodate civil and military reuse aircraft operations will not change the existing terminal area airspace relationships between Williams AFB, Chandler Municipal Airport, Stellar Airpark, and Memorial Airfield (a VFR-only facility). Interaction of inbound IFR aircraft to Williams AFB from the west with IFR operations at Chandler Municipal Airport and Stellar Airpark are avoided by crossing the Williams air traffic above the IFR air traffic at Chandler Municipal Airport and Stellar Airpark.

In addition to evaluating traffic flows, the frequency of Williams AFB-related operations to the northwest is a consideration relative to base reuse. Runway utilization data for Williams AFB provide that approximately 90.3 percent of all aircraft operations are on Runways 30L/30C/30R and 9.7 percent are on Runways 12R/12C/12L. Thus, arrivals to Williams AFB are predominantly from the southeast and departures are predominantly to the



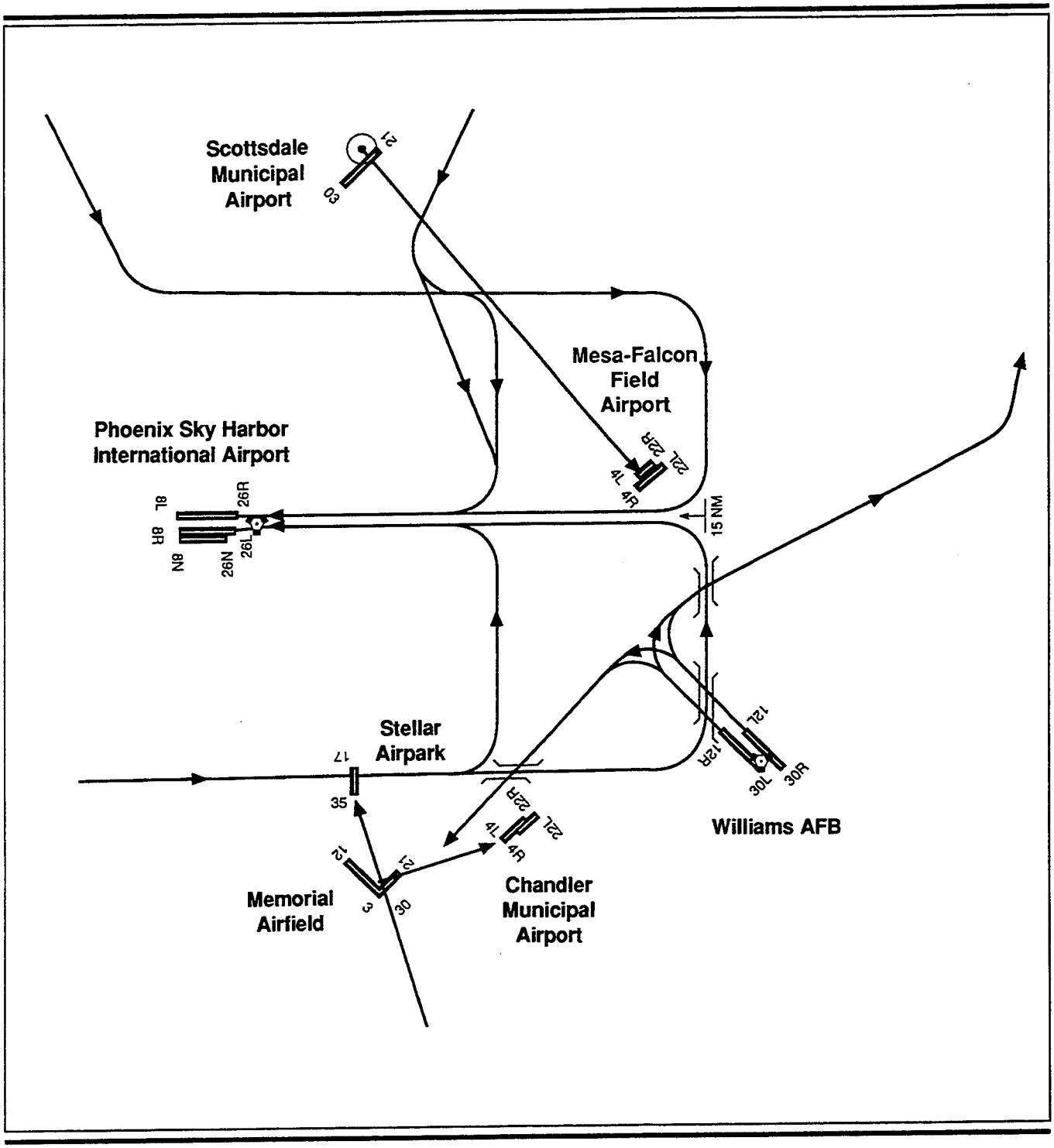
EXPLANATION

- Airspace Conflict
- Tunneling Procedures
- VORTAC
- Non-Directional Radio Beacon

0 5 Nautical Miles

Williams AFB IFR Arrivals to the Southeast, Phoenix Sky Harbor International Airport IFR Arrivals to the West

Figure 4.2-10



EXPLANATION

Tunneling Procedures

VORTAC

Non-Directional Radio Beacon

0 5 Nautical Miles

Williams AFB IFR Departures to the Northwest, Phoenix Sky Harbor International Airport IFR Arrivals to the West

Figure 4.2-11

northwest. Runway wind coverage, which has a variable effect upon different categories and types of aircraft, is the key factor in determining runway utilization. Runway use can also be influenced by noise and land use compatibility considerations. At Williams AFB, the projected higher percentage of large transport aircraft, which have greater operating flexibility relative to runway wind coverage requirements, creates the potential for increased levels of aircraft arrivals to Runways 12L and 12R. Although the percentage of arrivals from the northwest could increase, and the demand at Phoenix Sky Harbor International Airport is projected to increase, the absence of airspace constraints to inbound Williams and Phoenix Sky Harbor aircraft should preclude any extensive delays to airport operations. With respect to departures, the potential exists for an increased number of departures from Williams AFB to the southeast with a corresponding decrease in departures to the northwest. Although there are no constraints to departures to the northwest, a reduction of northwest departures would have the beneficial effect of reducing air traffic in this area. It should also be noted that although the percentage of aircraft operations toward the northwest could increase, the Proposed Action civil and military aircraft operations forecast for the year 2013 (88,250) (Table 2.2-4) is less than the 153,930 operations that occurred in calendar year 1990.

In summary, the Proposed Action will not change the airspace environment relative to aircraft operations south of Williams AFB. An analysis of traffic flows associated with aircraft operations northwest of Williams AFB indicates that the minimum required aircraft separation can be achieved between aircraft using standard ATC procedures. There would be an airspace conflict between Williams arrivals from the northwest and the instrument approach to Mesa-Falcon Field Airport. However, this is an existing condition. These findings indicate that implementation of the Proposed Action would have no significant impacts upon terminal area airspace in the vicinity of Williams AFB.

Air Transportation. The Proposed Action assumes a minimum long-term (year 2013) total passenger volume at Williams AFB of approximately 4.9 million annual passengers (MAP). This passenger volume was forecast by the *Maricopa Association of Governments, Regional Aviation System Plan (RASP) Update, Phase I, Final Report*, based on the projected demands on a satellite airport for Sky Harbor International Airport (P&D Aviation, 1992). This forecast also served as the basis for the *Williams AFB Economic Reuse Plan* (EDAW et al., 1992b), and it assumed that the passengers served at Williams AFB would include diversions from Phoenix Sky Harbor International and Tucson International Airports.

The Williams AFB passenger levels projected for 2013 equal 22 percent of the current passenger volume and approximately 15 percent of the projected passenger activity for the year 2015 at Phoenix Sky Harbor International

Airport. The year 2015 projected passenger levels for Phoenix Sky Harbor International Airport were projected in the RASP (P&D Aviation, 1992) to be 49.4 MAP.

The RASP, the *Phoenix Sky Harbor International Airport Master Plan Update* (HNTB, 1989) and other studies indicate that Phoenix Sky Harbor International Airport will experience demand that exceeds capacity, even with a third parallel runway, within the planning period of this EIS. These studies also indicate that this excess demand will increase the current delay experienced at Phoenix Sky Harbor International Airport from an average of 3 minutes per aircraft to 3.8 minutes by 2010, and 7.3 minutes by 2020. This is further detailed in the Regional Airport Feasibility Assessment (RAFA) study currently underway. In *Working Paper A-2: Demand/Capacity Analysis for the Arizona Regional Airport Feasibility Assessment (RAFA)*, (Apogee Research, 1992), the probability of Phoenix Sky Harbor International Airport being able to meet projected demand (with and without America West Airlines hubbing there) was evaluated. The study stated that by year 2020, Phoenix Sky Harbor International Airport had a 10 percent chance of meeting peak-hour and annual demand levels with an America West hub there, due to the increased activity associated with a hub, and a 50 percent chance without. The RAFA study (Apogee Research, 1992) states that Phoenix Sky Harbor International Airport's "net capacity shortfalls will translate into unacceptable delays by year 2010 with America West hubbing and soon after 2020 in the absence of hubbing." Likewise, Phoenix Sky Harbor International Airport landside (or terminal area) capacity was estimated by the RASP (P&D Aviation, 1992) to be 27 MAP while the same document projected year 2015 demand to be 49.4 MAP, greatly exceeding capacity. The commercial airport identified under the Proposed Action would meet part of this excess demand for regional air travel.

Concerning general aviation, the other regional airports that are expected to continue operating at or above capacity during the same timeframe include Chandler Municipal, Phoenix Goodyear, and Scottsdale Municipal (Arizona Department of Transportation, 1990). Some of these capacity-constrained facilities also have programmed improvements similar to the third runway slated for Phoenix Sky Harbor International Airport. According to the RASP (P&D Aviation, 1992), Chandler Municipal Airport "has planned for additional capacity," but Scottsdale Municipal Airport has not. The RASP states that while Scottsdale Municipal Airport "has an immediate need to increase airside capacity ... policy precludes a second runway."

As stated in Section 3.2.3.3, military and civilian airport operators in the region claim that an immediate demand exists for the general aviation capacity that would be available at Williams AFB. In addition, the *Phoenix Sky Harbor International Airport Master Plan Update* (HNTB, 1989) stated that the general aviation component of Phoenix Sky Harbor International Airport's demand equals 18 percent of the airside capacity. Military demand

utilizes an additional 0.2 percent of capacity. When Williams AFB is available for civilian and military training, a portion of the Phoenix Sky Harbor International Airport general aviation and military demand can be expected to use Williams AFB, thus delaying the time when Phoenix Sky Harbor International Airport will experience prolonged and severe airside congestion.

Finally, another element must be considered when estimating the true impact of Williams AFB on the region's general aviation airports. The *Williams AFB Economic Reuse Plan* (EDAW, 1992b) listed a number of reuse goals and objectives for Williams AFB, some of which pertain directly to its ability to provide aviation capacity for the region. In particular, this document states the following:

- General aviation activities at Williams AFB will be primarily focused on servicing aircraft of 30,000 pounds or greater of certificated gross weight.

- Chandler Municipal Airport, Mesa-Falcon Field Airport and the proposed Apache Junction Airport will be the principal general aviation service providers in the East Valley for aircraft of less than 30,000 pounds of certificated gross weight.

- Property reserved for use by general aviation aircraft of 30,000 pounds of certificated gross weight or less ... shall be limited to that amount of property determined to be reasonably necessary by applying Federal Aviation Administration standards to the forecasted general aviation annual operations.

These restrictions will limit the impact of Williams AFB on the region's general aviation airports but will also impact its ability to provide capacity relief to those airports that have excess demand. As the East Valley population grows, new pilots and air travelers might be more inclined to use the new facilities at Williams AFB. The Proposed Action assumes that about 62 general aviation aircraft could be expected to be based at Williams by the year 2013. Using standard operations per based aircraft ratios, these aircraft would produce about 47 departures per day.

Regarding cargo activity, the RASP (P&D Aviation, 1992) estimates that the existing three cargo terminals at Phoenix Sky Harbor International Airport have an annual capacity of 82,800 total tons. The RASP also projects that cargo tonnage will reach 143,272 total tons by year 2015, necessitating additional capacity some time after the year 2000. These tonnage estimates may be low as Phoenix Sky Harbor International Airport handled 131,000 total tons of cargo in 1991 (Arizona Department of Transportation, 1991a). Cargo levels that exceed an airport's cargo capacity result in processing times that exceed industry averages. Cargo processing time that is unacceptably high adversely affects the marketability of the airport and

serves as an impetus to search for additional cargo capacity. The Proposed Action provides a cargo facility for the 13,500 tons projected at Williams by 2015. This will assist the region's cargo facility shortfall, but the RASP also concludes that an additional 86,000 square foot cargo terminal at Phoenix Sky Harbor International Airport will be needed by 2015.

Railroad Transportation. The cargo carried on the Southern Pacific line just south of Williams AFB is projected to increase from 14,300 tons per day in 1998 to 20,400 tons per day in 2013 (Grant, 1992). This line has a capacity of around 60,000 tons per day. The increase in cargo is negligibly affected by the Proposed Action. The passengers carried by AMTRAK are projected to increase from 127,900 passengers per year in 1998 to 181,000 passengers per year in 2013 on the same line (Robertson, 1992). This line's capacity for passengers is primarily affected by available equipment and secondarily affected by Southern Pacific's schedule. Again, the increase in passengers is negligibly affected by the Proposed Action.

Cumulative Impacts. The San Tan Freeway is presently unfunded but planned in the vicinity of Williams AFB. This freeway would provide additional traffic-carrying capacity west and north of the base. U.S. 89 and U.S. 60 would get little relief from construction of the freeway, however, as these roads will continue serving as principal westward routes to Phoenix.

Mitigation Measures. Potential mitigation measures for road traffic include Transportation Demand Management (TDM) to encourage person- and vehicle-trip reductions and peak period modification. These measures could include, for example, reduced work weeks and telecommuting to reduce person-trips, ridesharing (vanpools and carpools), mass transit usage to reduce vehicle trips, and flexible work schedules to modify peak traffic periods. Implementation of TDM could reduce vehicle trips by approximately 10 percent. Studies have shown that areawide programs have achieved reductions of 20 percent, while individual employer programs have achieved reductions of 40 percent (Kuzmyak and Schreffler, 1990). To inspire the use of TDM measures, legal pressure (such as reserved lanes for carpools) or economic self interest (such as subsidized mass transit) are very important. Even with TDM at the 10 percent level, the projected LOS of F in the year 2013 on Power Road, U.S. 89, and U.S. 60, would not be raised. Another mitigation measure is to add capacity through additional lanes as depicted in Figure 4.2-7.

Mitigation of the potential airspace conflicts between IFR arrivals to Runway 12L at Williams AFB and IFR arrivals to Phoenix Sky Harbor International Airport from the east under the Proposed Action can be accomplished by following standard ATC tunneling procedures to achieve sufficient altitude separation between aircraft. Tunneling would also serve to mitigate the potential conflicts between IFR departures from Runways 30L and 30R to

the northwest and IFR arrivals to Phoenix Sky Harbor International Airport from the east.

4.2.3.2 General Aviation and Education Alternative

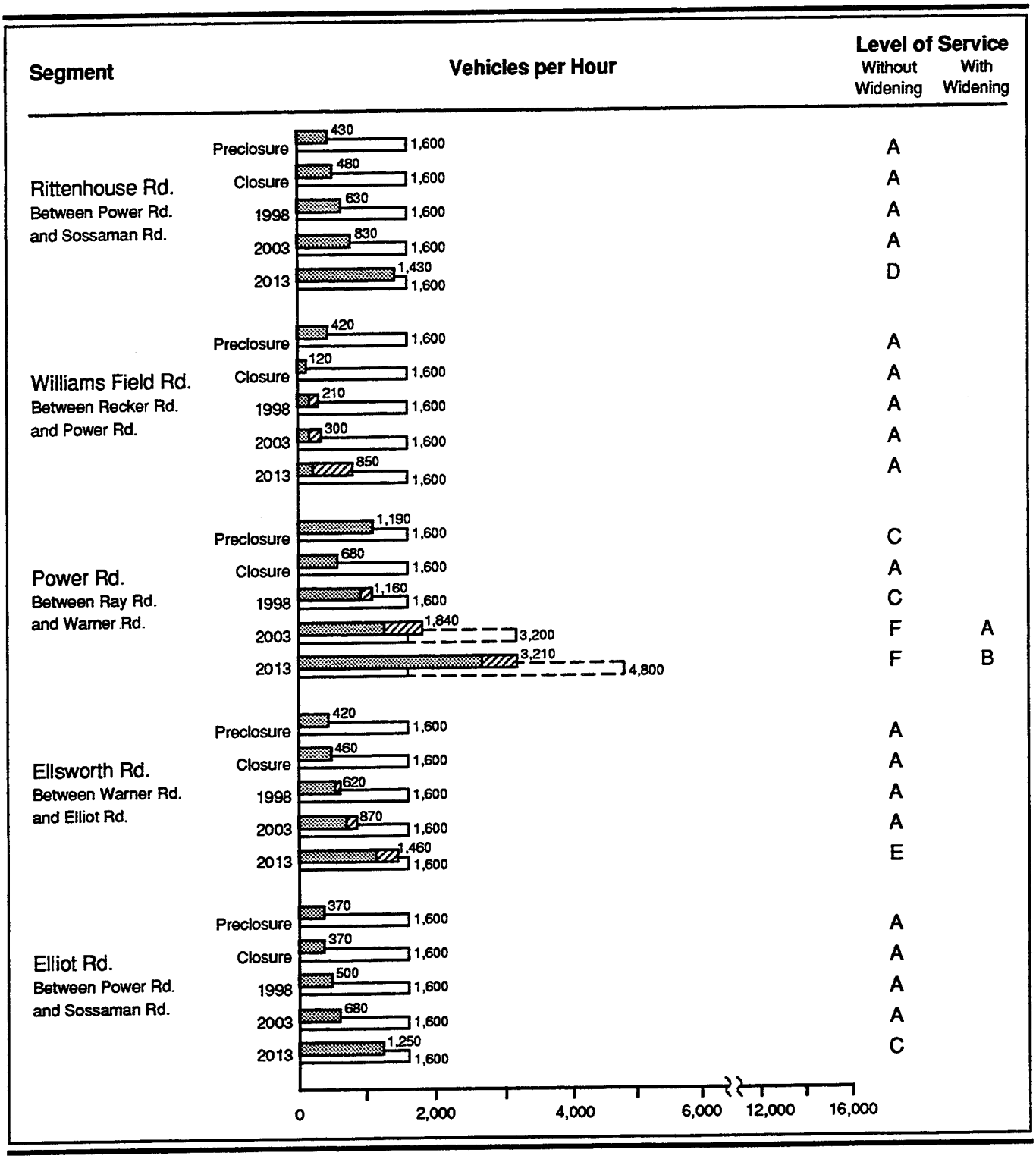
Roadways. By the year 2013, the major traffic generators would be the 19,428 projected employees, including construction employees, and the estimated 3,000 dwelling units associated with the General Aviation and Education Alternative. At this time, it is estimated that about 119,000 one-way trips (vehicle trip ends) would be generated by the General Aviation and Education Alternative on a typical weekday (a round trip comprises two vehicle trip ends). The estimated number of trips generated by on-site development at various phases of reuse are depicted in Table 4.2-2. The number of trips generated by the General Aviation and Education Alternative would increase steadily, exceeding the 1991 preclosure level by the year 2013. The greatest change in volume would occur between the years 2003 and 2013. Figure 4.2-12 shows the non-project and project-generated peak-hour traffic for the years 1991 (preclosure), 1993 (closure), 1998, 2003, and 2013 and the associated LOS on key regional and local roads that would result from the General Aviation and Education Alternative.

Regional. Project-generated and non-project-generated traffic would increase the average daily traffic on U.S. 89 by approximately 41 percent by the year 2013. The LOS would be reduced from D to F by the year 2013. Project-generated and non-project-generated traffic would increase the average daily traffic on U.S. 60 by approximately 15 percent by the year 2013. The LOS would remain at F.

Local. Through the year 2003, all key local roads would remain at LOS A, except Power Road which would deteriorate to an LOS of F. In 2013, all key local roads would have acceptable LOS (D or better) except for Power Road and Ellsworth Road. Power Road would remain at an LOS of F while Ellsworth Road would deteriorate to an LOS of E.

On-base. The General Aviation and Education Alternative assumes that existing on-base roadways would be used in the short-term during the construction period. As part of the eventual site development plan, internal circulation must accommodate the intensity of vehicular and pedestrian activities and provide an acceptable LOS, including access from the local road network. Redevelopment plans are expected to incorporate internal circulation requirements which meet local planning objectives.

Airspace/Air Traffic. The General Aviation and Education Alternative provides for the use of 9,250 feet of Runway 12C/30C and the closure of Runways 12R/30L and 12L/30R. It is assumed that the existing instrument approach capability to Runway 12C/30C and the FAA radar services to the airport will be retained. The general aviation forecast of the civil aircraft

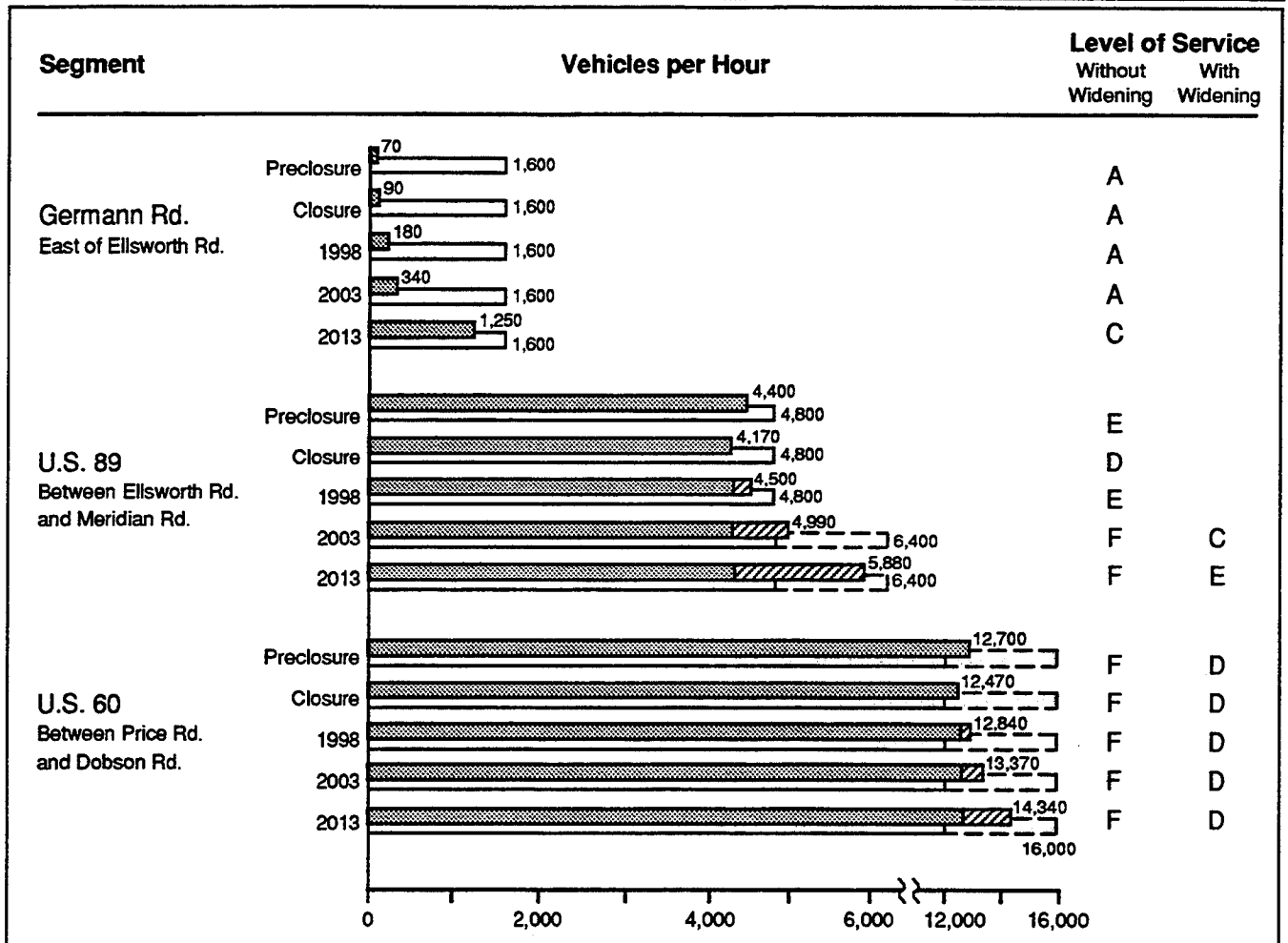


EXPLANATION

- Non-Project Generated Traffic (Vehicles per Hour)
- Project Generated Traffic (Vehicles per Hour)
- Existing Capacity
- Future Capacity

Peak-Hour Traffic Volume - General Aviation and Education Alternative

Figure 4.2-12 Page 1 of 2



EXPLANATION

- Non-Project Generated Traffic (Vehicles per Hour)
- Project Generated Traffic (Vehicles per Hour)
- Existing Capacity
- Future Capacity

Peak-Hour Traffic Volume - General Aviation and Education Alternative

Figure 4.2-12 Page 2 of 2

fleet mix (Table 2.3-4) includes turbojets and continued use of the airport by the Arizona ANG 161st AREFG KC-135 tanker aircraft for pilot proficiency approaches and departures during the first five years following base closure. The VFR traffic pattern airspace requirements for a single runway operation to accommodate these aircraft will be less than the VFR airspace area requirements associated with the Proposed Action. There will, therefore, be no significant VFR airspace impacts associated with the General Aviation and Education Alternative.

As noted previously in the Proposed Action airspace analysis, there are no IFR airspace conditions south of Williams AFB that would be affected by civil reuse of the base. With respect to general aviation activity northwest of Williams AFB, the flight paths required for IFR arrivals and departures at Williams AFB would be essentially the same as those associated with the Proposed Action. The projected general aviation fleet mix includes turbojets which would require the same airspace areas of operation as those associated with the Proposed Action. The only variation is that the final approach course for IFR approaches would be oriented to Runway 12C rather than to Runway 12L, which is equivalent to the existing HI-VOR/TACAN approach to Runway 12C. This variation would not appreciably alter the IFR approach pattern identified for the Proposed Action.

Under the General Aviation and Education Alternative, the airspace requirements for operations northwest of the base would not exceed preclosure conditions. Aircraft activity under this alternative is projected to reach 157,300 operations in the year 2013. However, 90 percent of this activity will be conducted by smaller single-engine and multi-engine piston aircraft.

Takeoff and landing performance parameters by these aircraft are more constrained relative to runway wind coverage, which would strongly favor the use of Runway 30C. Thus, approaches from the northwest would not be as frequent as those associated with the Proposed Action. The frequency of northwest departures from Runway 30C would increase. After takeoff, however, single- and multi-engine piston aircraft will fly a shorter distance toward the northwest before turning toward the west and east departure headings (generally less than 2 nautical miles). Under this alternative, the extent of the airspace interaction between Williams AFB departures to the northwest and Phoenix Sky Harbor International Airport traffic should not exceed the interaction associated with the Proposed Action.

Given these findings, the General Aviation and Education Alternative would not result in any significant impacts to airspace management within the ROI.

Air Transportation. Implementation of the General Aviation and Education Alternative would not provide for scheduled air passenger or air cargo

service at Williams AFB. Impacts on regional service in these two areas would be minimal. However, given the fact that Phoenix Sky Harbor International Airport will exceed its airside capacity within the buildout timeframe, the lack of additional regional air carrier and air cargo capacity at Williams AFB will necessitate a supplemental airport to accommodate the overflow demand.

Regarding impacts on general aviation activity in the region, this alternative would most likely attract activity from surrounding airports, including Phoenix Sky Harbor International. The airports that could most likely lose up to 15 percent of their based aircraft to Williams AFB are:

- Chandler Municipal Airport
- Coolidge Municipal Airport
- Estrella Sailpark
- Mesa-Falcon Field Airport
- Casa Grande Municipal Airport
- Stellar Airpark

While this will have a positive effect on congestion at Phoenix Sky Harbor International Airport, it could negatively impact activity at smaller fields.

Railroad Transportation. As with the Proposed Action, impacts to railroad transportation (cargo and passenger) would be minimal under the General Aviation and Education Alternative.

Cumulative Impacts. Cumulative impacts under this alternative would be the same as those under the Proposed Action.

Mitigation Measures. Road traffic mitigation measures under this alternative would be the same as those under the Proposed Action. Even with TDM at the 10 percent level, however, projected LOS of F in 2013 on Power Road, U.S. 89, and U.S. 60 would not be raised. Another mitigation measure is to add capacity through additional lanes as depicted in Figure 4.2-12.

4.2.3.3 Commercial Aviation and Education Alternative

Roadways. By the year 2013, the major traffic generators would be the 19,153 projected employees, including construction employees, associated with the Commercial Aviation and Education Alternative on a typical weekday. At this time, it is estimated that about 157,000 one-way trips (vehicle trip ends) would be generated by the Commercial Aviation and Education Alternative on a typical weekday (a round trip comprises two vehicle trip ends). The estimated number of trips generated by on-site development at various phases of reuse are depicted in Table 4.2-2. The number of trips generated by the Commercial Aviation and Education Alternative would increase steadily, exceeding the 1991 preclosure level by

the year 2013. The greatest change in volume would occur between the years 2003 and 2013. Figure 4.2-13 shows the non-project and project-generated peak-hour traffic for the years 1991 (preclosure), 1993 (closure), 1998, 2003, and 2013 and the associated LOS on key regional and local roads that would result from the Commercial Aviation and Education Alternative.

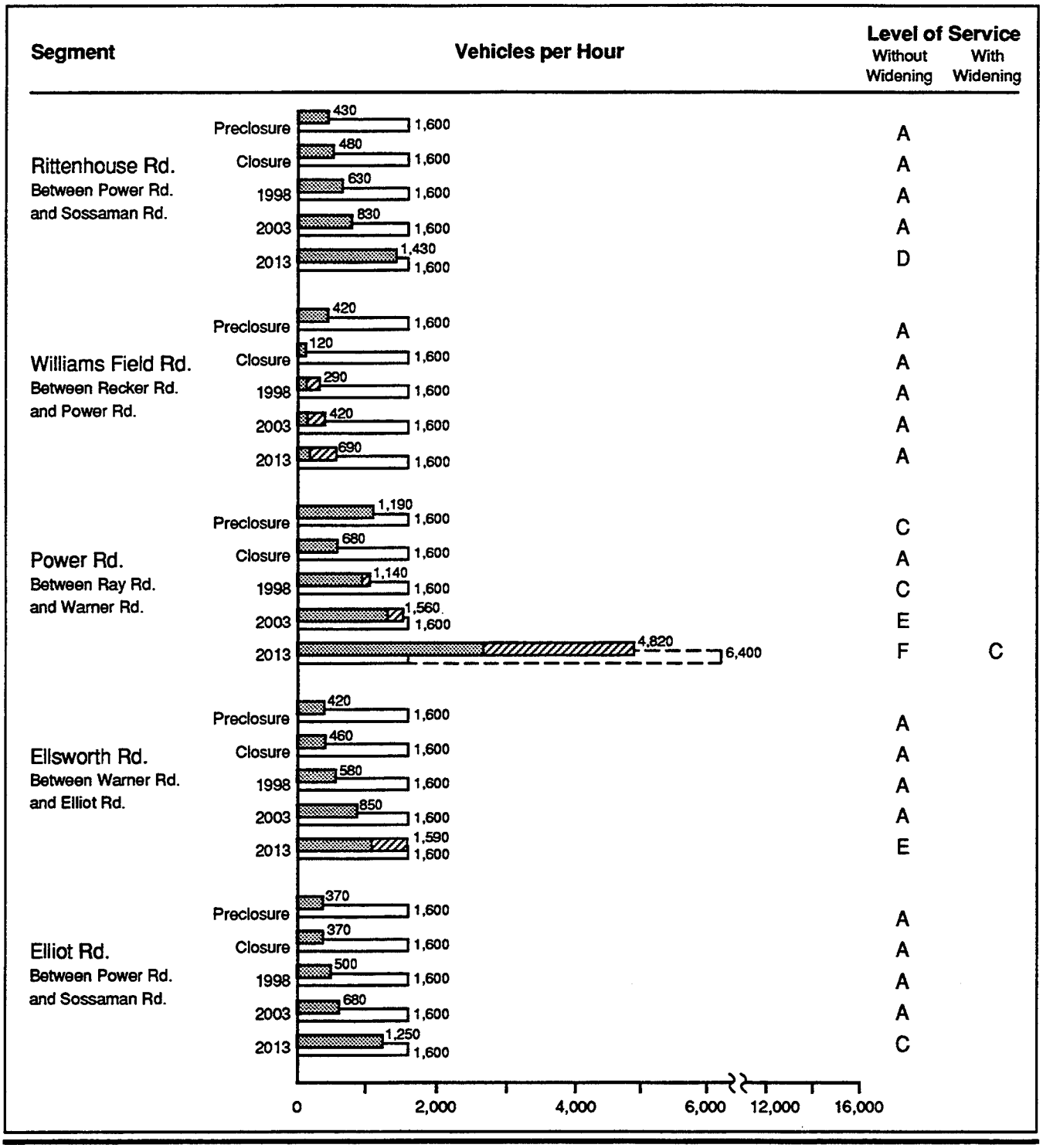
Regional. Project-generated and non-project-generated traffic would increase the average daily traffic on U.S. 89 by approximately 54 percent by the year 2013. The LOS would be reduced from D to F by the year 2003. Project-generated and non-project-generated traffic would increase the average daily traffic on U.S. 60 by approximately 19 percent by the year 2013. The LOS would remain at F.

Local. In 2003, Power Road would deteriorate to an LOS of E. In 2013, Power Road would further deteriorate to an LOS of F. Through the year 2003, all other key local roads would remain at an LOS of A. In 2013, Rittenhouse Road would have an LOS of D, Williams Field Road would have an LOS of A, Ellsworth Road would have an LOS of E, and Elliot Road and Germann Road would have an LOS of C. Only Williams Field Road, Power Road, and Ellsworth Road would experience a significant increase in traffic because of base-generated traffic.

On-base. The Commercial Aviation and Education Alternative assumes that existing on-base roadways would be used in the short-term during the construction period. As part of the eventual site development plan, internal circulation must accommodate the intensity of vehicular and pedestrian activities and provide an acceptable LOS including access from the local road network. Redevelopment plans are expected to incorporate internal circulation requirements which meet local planning objectives.

Airspace/Air Traffic. The Commercial Aviation and Education Alternative provides for the use of Runway 12L/30R and Runway 12R/30L. For the purpose of analysis, Runway 12C/30C was assumed operational for the 1993 fleet mix, but was assumed to be decommissioned and converted to a parallel taxiway prior to 1998. Runway 12L/30R would be lengthened from the existing 9,300 feet to 12,500 feet and the pavement strengthened to accommodate air carrier, air cargo, and military aircraft. Runway 12R/30L would be maintained at its present length of 10,400 feet, primarily to serve general aviation aircraft. This alternative includes the use of the Willie VORTAC for the development of non-precision instrument approach procedures to Runway 30L, Runway 12L, and Runway 12R. After Runway 12C/30C is decommissioned, the precision ILS would be relocated from Runway 30C to Runway 30R.

Because Runway 12R/30L is not expected to be strengthened to serve heavy jet aircraft, this alternative assumes that all of the air carrier, air

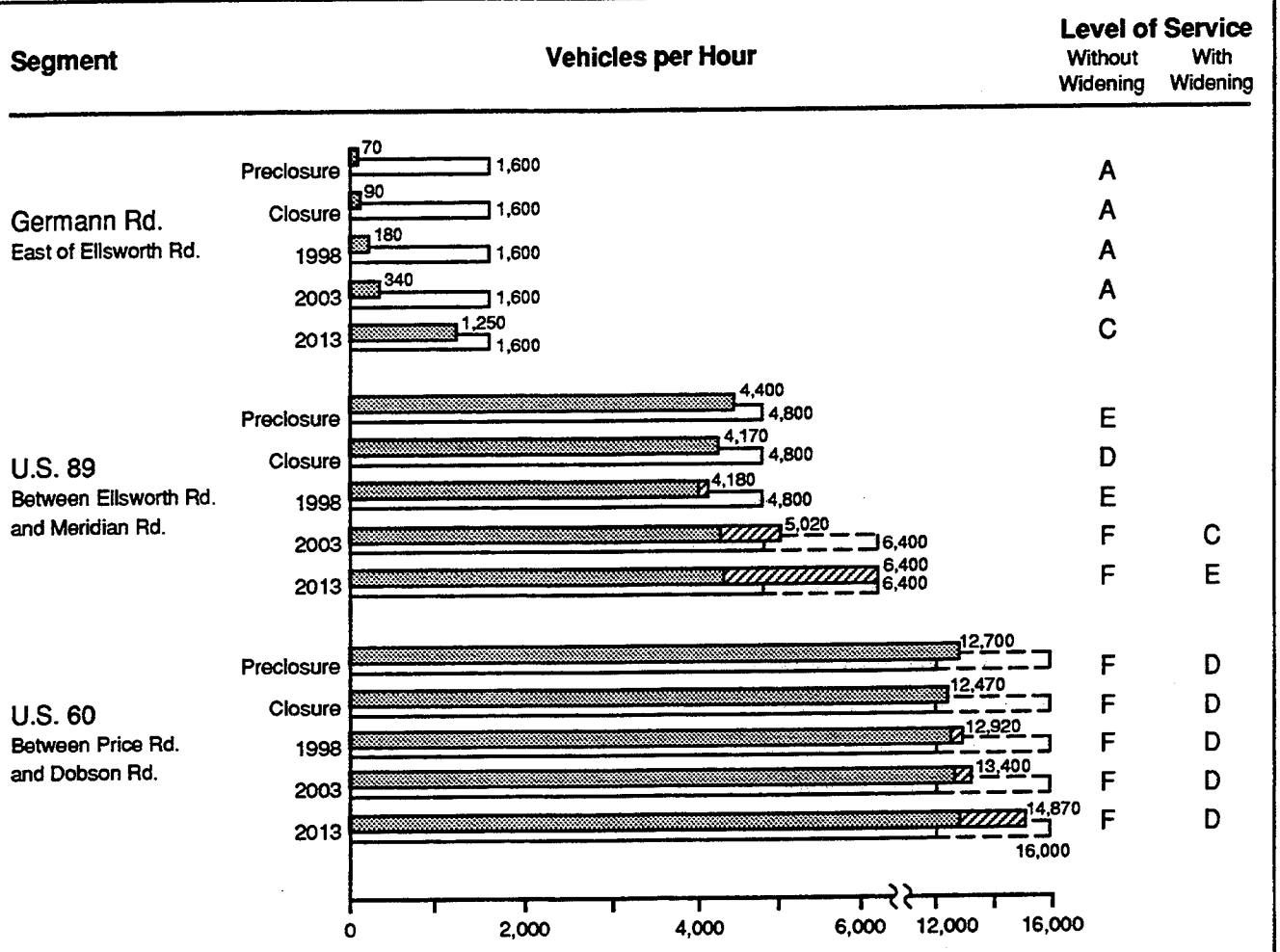


EXPLANATION

- Non-Project Generated Traffic (Vehicles per Hour)
- Project Generated Traffic (Vehicles per Hour)
- Existing Capacity
- Future Capacity

Peak-Hour Traffic Volume - Commercial Aviation and Education Alternative

Figure 4.2-13 Page 1 of 2



EXPLANATION

- Non-Project Generated Traffic (Vehicles per Hour)
- Project Generated Traffic (Vehicles per Hour)
- Existing Capacity
- Future Capacity

Peak-Hour Traffic Volume - Commercial Aviation and Education Alternative

Figure 4.2-13 Page 2 of 2

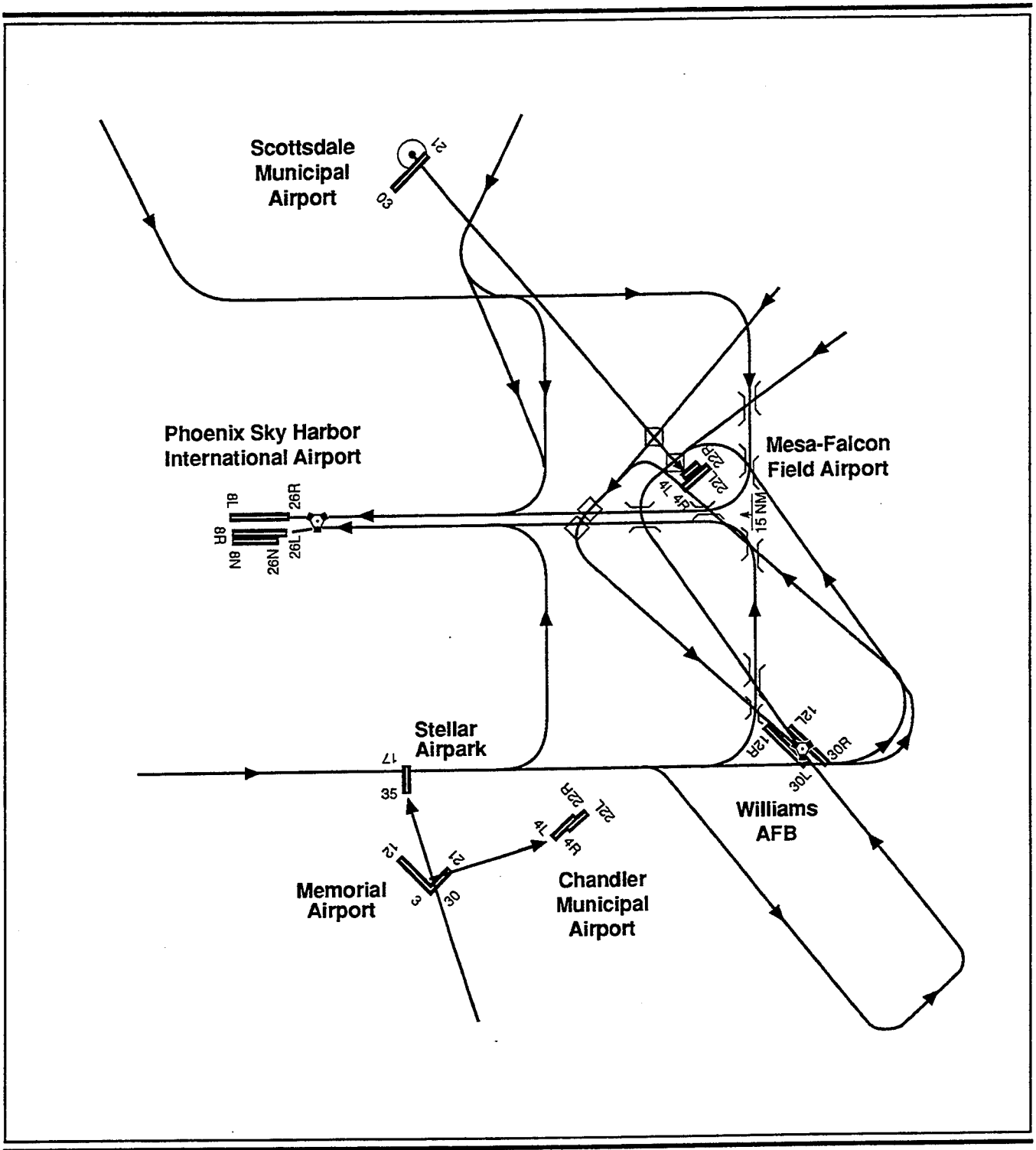
cargo, and military jet aircraft will use Runway 12L/30R. Given this scenario, the visual flight rule (VFR) airspace requirements would be the same as the airspace requirements associated with the Proposed Action. These airspace requirements are discussed in Section 4.2.3.1. The analysis of VFR airspace requirements which was conducted for the Proposed Action indicates no significant impacts on the overall VFR airspace requirements associated with Williams AFB or on those of any of the airports in the vicinity of Williams AFB. Due to the similarity of the alternatives, this conclusion also applies to the Commercial Aviation and Education Alternative.

With respect to instrument flight rule (IFR) flight operations, the establishment of a non-precision instrument approach to Runway 30L will not create any IFR airspace conflicts to the south of Williams AFB, with the IFR airspace requirements of any nearby airports, or with the general flow of IFR air traffic within the Phoenix terminal radar approach control airspace. Therefore, this instrument approach would not have any significant airspace impacts.

A new non-precision IFR approach to Runway 12L was assessed relative to the Proposed Action (Section 4.2.3.1). The analysis indicates that this new approach procedure would interact with arrival paths for Phoenix Sky Harbor International Airport, but the interaction would not create airspace conflicts that would preclude simultaneous operations at both the Williams AFB and Sky Harbor International Airports. An airspace conflict which presently occurs between the existing instrument approach to Runway 12C/30C at Williams AFB and the present instrument approach procedure to Mesa-Falcon Field Airport would not be alleviated under this alternative and would, therefore, remain unchanged from existing conditions.

An analysis of IFR airspace requirements for a potential non-precision instrument approach to Runway 12R indicates that the spatial relationship of an instrument approach to Runway 12R at Williams AFB to the flight paths of aircraft arrivals to Phoenix Sky Harbor International Airport from the east (shown in Figure 4.2-14) could result in a potential airspace conflict. In order to achieve minimum aircraft separation standards, air traffic control procedures would be required that could preclude simultaneous operations at both airports, with resulting delays to landing aircraft. The extent of the delays would be contingent upon the frequency of arrival operations at each airport.

The Commercial Aviation and Education Alternative projects a total of 281,300 aircraft operations at Williams AFB by the year 2013 (see Table 2.3-9). This alternative also projects intensive flight training activities at Williams AFB, which would be generated from the proposed development of an aviation college, from aircraft within the Phoenix region that would be attracted to Williams AFB because of the navigational aids that would be



EXPLANATION

- Airspace Conflict
- Non-Directional Radio Beacon
- Tunneling Procedures
- VORTAC

0 5 Nautical Miles

Williams AFB IFR Arrivals, Commercial Aviation and Education Alternative, Phoenix Sky Harbor International Airport IFR Arrivals to the West

Figure 4.2-14

available for practice instrument training, and from Arizona ANG military aircraft that would also use Williams AFB for practice instrument training. By the year 2013, it is estimated that flight training would constitute approximately 56 percent of the total annual aircraft operations at Williams AFB. With respect to the distribution of flight operations, this alternative provides that approximately 40 percent of landings and takeoffs will occur from the northwest on Runways 12L and 12R, and approximately 60 percent of landings and takeoffs will occur from the southeast on Runways 30L and 30R.

As previously noted, all air carrier and military aircraft operations would occur on Runway 12L/30R. General aviation aircraft would use Runways 12R/30L and 12L/30R; however, most of the general aviation activity would occur on Runway 12R/30L. It is expected, therefore, that the proposed new instrument approach to Runway 12R/30L would be used almost exclusively by general aviation aircraft for both IFR arrivals to Williams AFB and for instrument flight training. The projected level of general aviation operations, instrument training activities, and the distribution of 40 percent of the total operations from the northwest indicate the potential for significant usage of the proposed new instrument approach to Runway 12R. This potential usage, in combination with the projected increase in aircraft operations at Phoenix Sky Harbor International Airport could, relative to the new approach procedure, have a significant impact on air traffic operations.

Under this alternative, the airspace requirements associated with VFR and IFR departures would be the same as those needed for each of the other aviation alternatives. This alternative would, therefore, have no significant impacts on aircraft departure operations in the vicinity of Williams AFB.

In summary, this alternative will have no significant impacts on VFR traffic pattern operations at Williams AFB or at other nearby airports, on IFR approach operations to the southeast of Williams AFB, or on the IFR departure airspace environment. As noted in the Proposed Action, an instrument approach to Runway 12L will not adversely affect air traffic operations. This alternative analysis does indicate, however, that the traffic flow associated with a new instrument approach procedure to Runway 12R at Williams AFB could interact with air traffic operations at Phoenix Sky Harbor International Airport in such a way that may not permit simultaneous aircraft operations when the new procedure is in use.

Air Transportation. The Commercial Aviation and Education Alternative assumes a long-term (year 2013) total passenger volume of 4.2 MAP. This was interpolated from the MAG RASP (P&D Aviation, 1992) analysis of the passenger demands on a satellite commercial airport for Phoenix Sky Harbor International Airport.

As stated for the Proposed Action and in the *Williams AFB Master Plan Study* (Coffman Associates, 1993), this level of scheduled airline traffic is anticipated for two reasons: (1) increases in aircraft delay are anticipated at Phoenix Sky Harbor International Airport, and (2) the population in the East Valley is projected to increase substantially over the next decade, increasing demand within the Williams AFB service area. Overall, the commercial aviation element of this alternative is similar to the Proposed Action. As with the Proposed Action, implementation of the Commercial Aviation and Education Alternative would enable Williams AFB to accommodate a portion of the excess regional air traveler demand projected for Phoenix Sky Harbor International Airport. Annual air carrier operations for this alternative could reach 47,500 by 2013, or 700 more than the Proposed Action. In addition, it is also estimated that up to 20 percent of the annual air cargo/mail tonnage at Phoenix Sky Harbor International Airport could be diverted to Williams AFB by 2013 under this alternative. This tonnage level could generate up to approximately 4,800 annual cargo aircraft operations at Williams AFB by year 2013.

This alternative includes a substantial general aviation component (i.e., 199,900 annual operations in 2013 versus 34,250 for the Proposed Action). For this alternative, it is assumed that up to one-third of the aircraft that practice ILS approaches at Casa Grande Municipal Airport and at other area facilities would use Williams AFB when the base opens for civilian use. This number of attracted operations (24,000) would be expected to decrease over time to 9,600 by the year 2013, as total traffic increases at Williams AFB. In addition to this induced demand, it is projected that up to 61 aircraft would be based at Williams AFB and could generate 30,200 annual operations. Finally, based on inquiries from pilot training schools throughout the country, it is estimated that up to 40 training aircraft could be based at Williams AFB as early as 1995, with that number staying constant through 2013. These 40 aircraft would generate up to 160,000 annual training operations.

In summary, up to 199,900 annual general aviation operations are projected to occur by year 2013 at Williams AFB under this alternative. While this activity level would serve to alleviate congestion at area airports, it introduces a possible congestion element at Williams AFB. The combination of 47,500 air carrier operations and 4,800 air cargo operations (or 52,300 total annual commercial operations) may not be compatible with approximately 200,000 annual general aviation operations, 80 percent of which would be for pilot training.

The final component of this alternative is the military training activity that is projected to occur at Williams AFB. Based on input from the Army and the Arizona Air National Guard (AANG), these military branches could contribute up to 20,000 annual operations by F-16 aircraft, 4,100 annual operations by KC-135 aircraft, and 5,000 annual helicopter operations by 2013 (Coffman

Associates, 1993). This total of 29,100 military training operations could compound the problem of a potentially incompatible fleet mix associated with this alternative.

Railroad Transportation. As with the Proposed Action, impacts to railroad transportation (cargo and passenger) would be minimal under the Commercial Aviation and Education Alternative.

Cumulative Impacts. Cumulative impacts under this alternative would be the same as those under the Proposed Action.

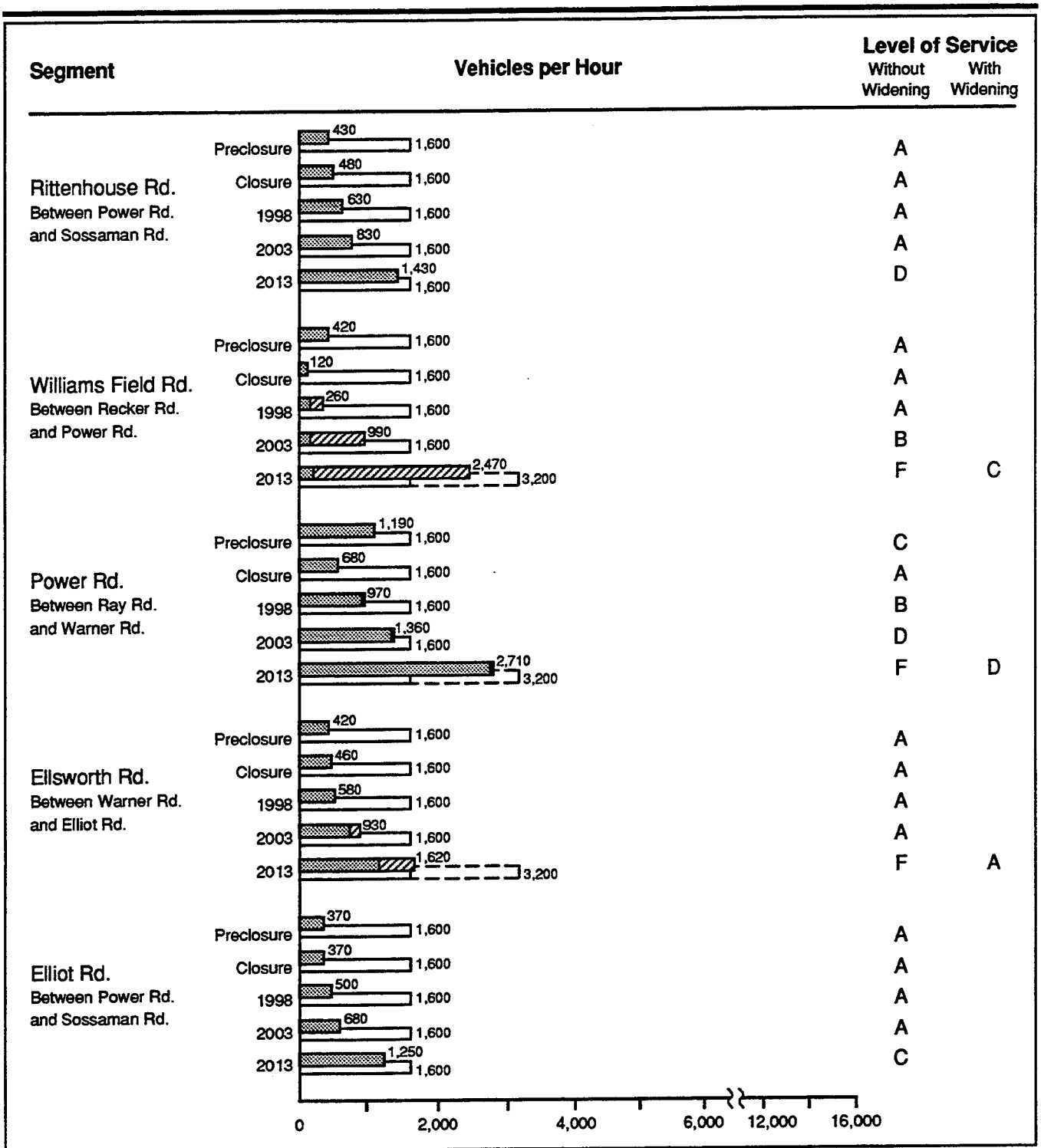
Mitigation Measures. Road traffic mitigation measures under this alternative would be the same as those under the Proposed Action. Even with TDM at the 10 percent level, however, projected LOS of F in 2013 on Power Road, U.S. 89, and U.S. 60 would not be raised. Another mitigation measure is to add capacity through additional lanes as depicted in Figure 4.2-13.

As discussed for the Proposed Action, tunneling procedures would be effective in mitigating the potential airspace conflict between IFR arrivals to Runway 12L at Williams AFB and IFR arrivals to Phoenix Sky Harbor International Airport from the east. However, the potential conflict between IFR arrivals to Runway 12R and IFR arrivals to Phoenix Sky Harbor International Airport from the east is not mitigable for this alternative.

4.2.3.4 Education and Planned Community Alternative

Roadways. By the year 2013, the major traffic generators would be the 11,502 projected employees, including construction employees, and approximately 5,300 dwelling units associated with the Education and Planned Community Alternative. At this time, it is estimated that about 189,800 one-way trips (vehicle trip ends) would be generated by the Education and Planned Community Alternative on a typical weekday (a round trip comprises two vehicle trip ends). The estimated numbers of trips generated by on-site development at various phases of reuse are depicted in Table 4.2-2. The number of trips generated by the Education and Planned Community Alternative would increase steadily, exceeding the 1991 preclosure level by the year 2003. The greatest change in volume would occur between the years 2003 and 2013. Figure 4.2-15 shows the non-project and project-generated peak-hour traffic for the years 1991 (preclosure), 1993 (closure), 1998, 2003, and 2013 and the associated LOS on key regional and local roads that would result from the Education and Planned Community Alternative.

Regional. Project-generated and non-project-generated traffic would increase the average daily traffic on U.S. 89 by approximately 66 percent by the year 2013. The LOS would be reduced from D to F by the year 2013. Project-generated and non-project-generated traffic would increase the

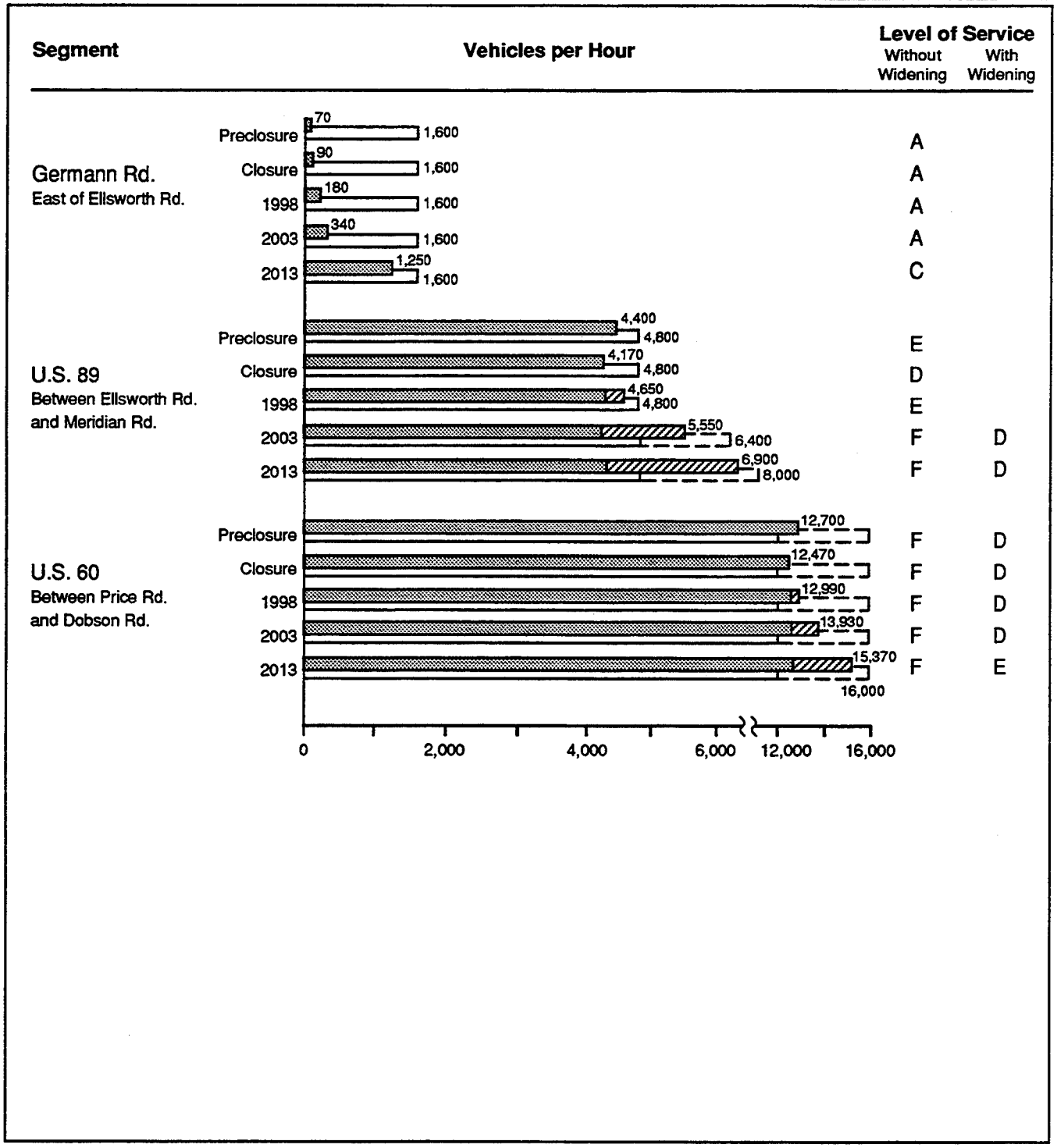


EXPLANATION

- Non-Project Generated Traffic (Vehicles per Hour)
- Project Generated Traffic (Vehicles per Hour)
- Existing Capacity
- Future Capacity

Peak-Hour Traffic Volume - Education and Planned Community Alternative

Figure 4.2-15 Page 1 of 2



EXPLANATION

- Non-Project Generated Traffic (Vehicles per Hour)
- Project Generated Traffic (Vehicles per Hour)
- Existing Capacity
- Future Capacity

Peak-Hour Traffic Volume - Education and Planned Community Alternative

Figure 4.2-15 Page 2 of 2

average daily traffic on U.S. 60 by approximately 23 percent by the year 2013. The LOS would remain at F.

Local. Through the year 2003, all key local roads would remain at an LOS of A or B, except Power Road which would deteriorate to an LOS of D. In 2013, Williams Field Road, Power Road, and Ellsworth Road would all deteriorate to an LOS of F. Rittenhouse Road would deteriorate to an LOS of D. Only Williams Field Road and Ellsworth Road would have a significant traffic increase because of base-generated traffic.

On-base. The Education and Planned Community Alternative assumes that existing on-base roadways would be used in the short-term during the construction period. As part of the eventual site development plan, internal circulation must accommodate the intensity of vehicular and pedestrian activities and provide an acceptable LOS including access from the local road network. Redevelopment plans are expected to incorporate internal circulation requirements which meet local planning objectives.

Airspace/Air Traffic. The Education and Planned Community Alternative provides that Williams AFB would be redeveloped to support educational, research and training facilities, and a new planned community that would include public schools and commercial and residential land uses. This alternative would not reuse the airfield or any of the existing aircraft support facilities for any aviation-related activities.

Since the Education and Planned Community Alternative will eliminate all aviation activity at Williams AFB, there would be no requirements to retain any of the airspace associated with the base and the enroute airspace system. The elimination of Williams-related airspace requirements and air traffic operations would provide additional airspace for the overall air traffic control environment within the ROI. The existing ATCT would be abandoned and all of the existing ATC-related radio facilities and aircraft landing aids would be decommissioned and removed. The abandonment and removal of these facilities would not affect airspace management in the area.

The Willie VORTAC would be compatible for usage as part of the National Airspace System. This facility could be transferred to the FAA and used as a NAVAID for instrument approaches to other airports within the Phoenix terminal area or as a component of the enroute airway system. Such usage could provide an enhancement to the overall airspace environment. However, the possibility exists that the development of the existing airfield area adjacent to the VORTAC facility to accommodate the education and planned community land uses could result in conditions that would be incompatible with continued operation of the VORTAC. Should this occur, the Willie VORTAC would be decommissioned and the equipment removed.

The removal of the Willie VORTAC would not affect airspace management in the area.

Air Transportation. Without any aviation amenities at Williams AFB, it could not provide additional air carrier, air cargo, and general aviation capacity to the region. The negative impacts would include the need to establish supplemental commercial and air cargo capacity for Phoenix Sky Harbor International Airport or elsewhere in the region. The lack of additional general aviation capacity is not considered a negative impact since the region possesses sufficient general aviation capacity if Williams AFB were not available for aviation reuse.

Railroad Transportation. As with the Proposed Action, impacts to railroad transportation (cargo and passenger) would be minimal under the Education and Planned Community Alternative.

Cumulative Impacts. Cumulative impacts under this alternative would be the same as those under the Proposed Action.

Mitigation Measures. Road traffic mitigation measures under this alternative would be the same as those under the Proposed Action. Even with TDM at the 10 percent level, however, the projected LOS of F in 2013 on Williams Field Road, Power Road, U.S. 89, and U.S. 60 would not be raised; the projected LOS of F on Ellsworth road could be raised to E. Another mitigation measure is to add capacity through additional lanes as depicted in Figure 4.2-15.

4.2.3.5 Other Land Use Concepts

Transportation effects are discussed for each proposed federal transfer and independent land use concept. The analysis considers the impact of the implementation of each of these plans in conjunction with the Proposed Action and alternatives.

The land use concepts proposed by the Federal Bureau of Prisons, Arizona Department of Corrections, and Arizona Department of Health Services are all essentially institutional/residential in nature. If implemented in conjunction with the Proposed Action or an alternative, any of the proposals would displace other land uses associated with the Proposed Action or alternative.

Federal Bureau of Prisons. Under each reuse alternative, this concept would have a net effect of creating about 250 jobs with a corresponding increase in population of approximately 1,384 people (Table 4.2-1). These increases would generate approximately 1,700 additional trips per day by the year 2013 for the Proposed Action and alternatives. This would represent approximately a 1.3 percent increase in the ADT for the Proposed Action, a

1.4 percent increase for the General Aviation and Education Alternative, a 1.1 percent increase for the Commercial Aviation and Education Alternative, and a 0.9 percent increase for the Education and Planned Community Alternative.

Arizona Department of Corrections. This land use concept would have a net effect on employment and population that varies with each reuse alternative (Table 4.2-1). Effects on ADT by the year 2013 would be expected to approximate the proportional effects on employment and population. The ADT associated with the Proposed Action would be expected to decline by approximately 6,100 trips per day by the year 2013 (a 4.7 percent decrease). The Commercial Aviation and Education Alternative and the Education and Planned Community Alternative ADTs would decline by approximately 10,500 and 5,700 trips per day by the year 2013 (a 6.7 percent and a 3.2 percent decrease, respectively). The ADT associated with the General Aviation and Education Alternative would increase by approximately 13,800 trips per day (an 11.6 percent increase).

Arizona Department of Health Services. This concept would not affect the employment or population associated with the Proposed Action or any alternative, as it would displace only residential land uses which are not employment generating. Thus, the concept would not produce any transportation effects.

4.2.3.6 No-Action Alternative

Roadways. In the absence of any reuse of the base under the No-Action Alternative, on-base roads would no longer be used except by the OL. All on-base roads would operate at an LOS of A.

Under the No-Action Alternative, traffic volumes on many of the local roadways would be expected to increase as this underdeveloped portion of Maricopa County continues to develop. The LOS on the road segments would deteriorate correspondingly. Rittenhouse Road would deteriorate to an LOS of D by 2013 while Power Road would deteriorate to an LOS of F by 2013.

Airspace/Air Traffic. Airspace and air traffic impacts, and the disposition of navigational aids, would be identical to those discussed for the Education and Planned Community Alternative.

Air Transportation. There would be no air transportation impact directly attributed to Williams AFB under the No-Action Alternative. The impacts to Phoenix Sky Harbor International Airport would be identical to those discussed for the Education and Planned Community Alternative.

Railroad Transportation. Impacts to railroad transportation (cargo and passenger) would be minimal under the No-Action Alternative.

Cumulative Impacts. Cumulative impacts under this alternative would be the same as those under the proposed Action.

Mitigation Measures. Road traffic mitigation measures under the No-Action Alternative would be the same as those under the Proposed Action. Even with TDM at the 10 percent Level, the projected LOS of F on Power Road in 2013 would not be raised. However, the projected LOS of D on U.S. 89 could be raised to C, and the projected LOS of F on U.S. 60 could be raised to E. Another mitigation measure is to add capacity through additional lanes.

4.2.4 Utilities

Direct and indirect changes in future utility demand for each alternative were estimated based on historic, preclosure, and per capita average daily use on Williams AFB and in those areas of the East Valley served by each utility that serves the base. These factors were applied to projections of numbers of future residents and employees associated with each of the alternatives. Table 4.2-3 shows the projected changes in utility demand for 5, 10, and 20 years after closure. The figures shown for the forecast ROI demand also represent the No-Action Alternative and reflect the change expected in utility usage in the area without redevelopment of the base. The other alternatives reflect the growth anticipated due to base reuse.

The forecast ROI demand was developed by reviewing past consumption levels for the individual utility purveyors. In the case of water, natural gas, and wastewater, the purveyors did not have long-term projections available for incorporation into this EIS. Baseline projections for these utilities were developed by determining a per capita rate for each utility system based on the information available. In the case of electricity and solid waste, long-term projections were taken directly from the projections made by the responsible planning boards and utility companies.

4.2.4.1 Proposed Action

Water Demand. The ROI for water demand includes the service area of the City of Mesa water treatment and distribution system. Analysis of the Proposed Action assumes that the current Williams AFB water supply system will be tied into water lines from the City of Mesa and that on-base water supply systems will be taken off-line. Table 4.2-3 indicates the projected demand for the City of Mesa system for the years 1998, 2003, and 2013. The projected increased water demand due to the Proposed Action would be 4.19 MGD in the year 2013. Total demand would be 96.16 MGD in 2013 (a 4.56 percent increase over the No-Action Alternative

Table 4.2-3. Total Projected Utility Demand in ROI[a]
Page 1 of 2

	1998	(Percent Increase)	2003	(Percent Increase)	2013	(Percent Increase)
Water Demand (MGD)						
No-Action Alternative[b]	75.19		83.62		91.97	
Proposed Action	0.98	1.30	1.80	2.16	4.19	4.56
General Aviation and Education Alternative	0.97	1.29	2.13	2.55	4.63	5.04
Commercial Aviation and Education Alternative	0.88	1.17	1.84	2.20	4.24	4.61
Education and Planned Community Alternative	0.44	0.59	0.90	1.07	1.90	2.06
Wastewater (MGD)						
No-Action Alternative[b]	32.69		36.35		39.98	
Proposed Action	0.43	1.30	0.78	2.16	1.82	4.56
General Aviation and Education Alternative	0.42	1.29	0.93	2.55	2.01	5.04
Commercial Aviation and Education Alternative	0.38	1.17	0.80	2.20	1.84	4.61
Education and Planned Community Alternative	0.19	0.59	0.39	1.07	0.82	2.06
Solid Waste (thousand tons/year)						
No-Action Alternative[b]	3,169.8		3,596.6		4,450.3	
Proposed Action	12.9	0.41	23.8	0.66	55.2	1.24
General Aviation and Education Alternative	12.8	0.40	28.2	0.78	61.0	1.37
Commercial Aviation and Education Alternative	12.4	0.39	25.5	0.71	57.4	1.29
Education and Planned Community Alternative	5.8	0.18	11.9	0.33	25.0	0.56

Table 4.2-3. Total Projected Utility Demand in ROI[a]
Page 2 of 2

	1998	(Percent Increase)	2003	(Percent Increase)	2013	(Percent Increase)
Electricity (MWH/day)						
No-Action Alternative[b]	47,191		51,935		61,937	
Proposed Action	192	0.41	344	0.66	768	1.24
General Aviation and Education Alternative	191	0.40	407	0.78	849	1.37
Commercial Aviation and Education Alternative	185	0.39	368	0.71	798	1.30
Education and Planned Community Alternative	87	0.18	171	0.33	348	0.56
Natural Gas (thousand therms/day)						
No-Action Alternative[b]	974.1		1,072.0		1,278.5	
Proposed Action	4.2	0.43	7.6	0.71	17.0	1.33
General Aviation and Education Alternative	4.2	0.43	9.0	0.84	18.8	1.47
Commercial Aviation and Education Alternative	4.1	0.42	8.1	0.76	17.7	1.38
Education and Planned Community Alternative	1.9	0.20	3.8	0.35	7.7	0.60

Notes: [a] Values for Proposed Action and reuse alternatives represent direct project-related demand beyond closure baseline.

[b] Represents total demand forecasted for the ROI for the years indicated assuming no base reuse under the No-Action Alternative, based on demand projected by local utility purveyors. The total demand in the ROI for the Proposed Action and for each of the reuse alternatives, for a particular year, can be found by adding the value of the No-Action Alternative plus the value of the Proposed Action or alternative.

Calculation of percentages may vary slightly due to rounding.

Sources: Maricopa Association of Governments, 1991b; Lapoint, 1992; Borrego, 1992; Cattanach, 1992.

or closure baseline). The City of Mesa's water treatment and distribution system has a current capacity of 156 MGD. This capacity is expected to be increased to 180 MGD in 1994 and to 220 MGD in 1996. The City of Mesa currently has an average daily potable water consumption of 64 MGD and an average daily peak demand of 70 MGD (Arizona Department of Commerce, 1991).

Wastewater. The ROI for wastewater includes the service area of the City of Mesa sanitary sewer system. Analysis of the Proposed Action assumes that the current Williams AFB wastewater collection and treatment system will be tied into wastewater lines from the City of Mesa and that on-base wastewater systems will be taken off-line. Table 4.2-3 indicates the projected wastewater flow to the City of Mesa system for the years 1998, 2003, and 2013. These projections do not include the contribution of stormwater inflow to the Williams AFB sanitary wastewater stream. During heavy precipitation events, stormwater inflow can increase the instantaneous flow rate to the base wastewater treatment plant by as much as a factor of four; however, the increase in volume is small compared to total annual throughput. The projected increased wastewater flow due to the Proposed Action would be 1.82 MGD in the year 2013. Total demand would be 41.80 MGD in 2013 (a 4.56 percent increase over the No-Action Alternative or closure baseline). The City of Mesa's sanitary sewer system consists of three interconnected treatment plants with a combined capacity of 39 MGD. The City of Mesa system currently has an average daily usage of 28 MGD (Arizona Department of Commerce, 1991). The City of Mesa will require increased capacity by 2013 in order to accommodate wastewater flows under any of the reuse alternatives, including the No-Action Alternative.

Solid Waste. The ROI for solid waste disposal includes all of Maricopa County. Table 4.2-3 indicates the projected demand for Maricopa County landfills for the years 1998, 2003, and 2013. The projected increased solid waste disposal due to population increases associated with the Proposed Action would be 55.2 thousand tons/year in the year 2013. Total disposal is projected to be 4,505.5 thousand tons/year in 2013 (a 1.24 percent increase over the No-Action Alternative or closure baseline). Demolition and construction activities under the Proposed Action would add approximately 227,000 tons of construction and demolition waste to the waste generated in the region. This construction and demolition waste would be disposed of over the time period that construction and demolition activities would occur and is not included in Table 4.2-3. In addition, if all of the airfield pavement (i.e., runways, taxiways, and aprons) was to be demolished under the Proposed Action or any of the reuse alternatives, approximately 790,000 tons of concrete and asphalt and approximately 229,000 tons of earthen materials would have to be disposed of. The Proposed Action and alternatives have not been defined well enough to determine which portions of the airfield pavement, if any, would be demolished.

The need for and location of a new regional landfill are being considered by the Southwest Regional Landfill Siting Committee. Land in Pinal County has been proposed for the new regional landfill site which may be constructed between 1993 and 1995. The new landfill will serve the eastern area of Maricopa County, including the area which Williams AFB currently occupies, and parts of Pinal County (Maricopa Association of Governments, 1991a).

Energy

Electricity. The ROI for electricity demand is the service area of Salt River Project Electric. Table 4.2-3 indicates the projected Salt River Project electric demand for the years 1998, 2003, and 2013. The projected increased demand due to the Proposed Action would be 768 MWH/day in the year 2013. Total demand would be 62,705 MWH/day in 2013 (a 1.24 percent increase over the No-Action Alternative or closure baseline). Salt River Project Electric has indicated that adequate capacity will be available to meet the increased demand (Borrego, 1992). The existing on-base substations and distribution system would continue to support reuse activities.

Natural Gas. The ROI for natural gas demand is the service area of Southwest Gas Company. Table 4.2-3 indicates the projected natural gas demand for the years 1998, 2003, and 2013. The projected increased demand due to the Proposed Action would be 17.0 thousand therms/day in the year 2013. Total demand would be 1,295.5 thousand therms/day in 2013 (a 1.33 percent increase over the No-Action Alternative or closure baseline). Currently, Southwest Gas has the capability to meet current and future demands in the ROI. The existing on-base natural gas distribution system would continue to support reuse activities.

Cumulative Impacts. No cumulative impacts are anticipated under the Proposed Action.

Mitigation Measures. The utility impacts identified as a result of the Proposed Action would be to local landfills, which are currently operating at or near capacity, and to the City of Mesa wastewater system. A potential mitigation measure for local landfills will be the siting of a new regional landfill. Measures that would decrease the effects of increased demand for landfill space include such demand management procedures as voluntary use reduction measures and incentives, increased recycling efforts, and other conservation programs. Recycling of construction and demolition wastes, as well as using the earthen runway materials for clean fill and the asphalt and concrete runway materials for roadway aggregate or as riprap for flood control, would also assist in decreasing the effects of increased demand for landfill space. Disposal of nonrecyclable materials in local private rubbish landfills may also be necessary in order to accommodate the increased solid waste disposal due to construction and demolition activities.

The City of Mesa sanitary sewer system would have to increase its capacity after 2003 in order to meet wastewater flow demands in 2013. This corresponds to the time that the City of Mesa would have to increase capacity under any circumstances, including the No-Action Alternative. However, it would be advisable to conduct a thorough cross-connection survey of the base sanitary and storm sewer systems and take appropriate corrective action to limit stormwater inflow to the Williams AFB sanitary sewer system. These measures would maximize the operating efficiency of the existing wastewater treatment plant, until the base is connected to the City of Mesa sanitary sewer system, and would reduce the volume of wastewater requiring transport and treatment by the existing sewer system.

4.2.4.2 General Aviation and Education Alternative

Water Demand. Analysis of the General Aviation and Education Alternative assumes that the current Williams AFB water supply system will be tied into water lines from the City of Mesa and that on-base water supply systems will be taken off-line. Table 4.2-3 indicates the projected demand for the City of Mesa system for the years 1998, 2003, and 2013. The projected increased water demand due to the General Aviation and Education Alternative would be 4.63 MGD in the year 2013. Total demand would be 96.60 MGD in 2013 (a 5.04 percent increase over the No-Action Alternative or closure baseline). The City of Mesa's water treatment and distribution system has a current capacity of 156 MGD.

Wastewater. Analysis of the General Aviation and Education Alternative assumes that the current Williams AFB wastewater collection and treatment system will be tied into wastewater lines from the City of Mesa and that on-base wastewater systems will be taken off-line. Table 4.2-3 indicates the projected wastewater flow to the City of Mesa system for the years 1998, 2003, and 2013. These projections do not include the contribution of stormwater inflow to the Williams AFB sanitary wastewater stream. During heavy precipitation events, stormwater inflow can increase the instantaneous flow rate to the base wastewater treatment plant by as much as a factor of four; however, the increase in volume is small compared to total annual throughput. The projected increased wastewater flow due to the General Aviation and Education Alternative would be 2.01 MGD in the year 2013. Total demand would be 41.99 MGD in 2013 (a 5.04 percent increase over the No-Action Alternative or closure baseline). The City of Mesa's sanitary sewer system consists of three interconnected treatment plants with a combined capacity of 39 MGD. The City of Mesa will require increased capacity by 2013 in order to accommodate wastewater flows under any of the reuse alternatives, including the No-Action Alternative.

Solid Waste. Table 4.2-3 indicates the projected demand for Maricopa County landfills for the years 1998, 2003, and 2013. The projected increased solid waste disposal due to population increases associated with

the General Aviation and Education Alternative would be 61.0 thousand tons/year in the year 2013. Total disposal is projected to be 4,511.3 thousand tons/year in 2013 (a 1.37 percent increase over the No-Action Alternative or closure baseline). Demolition and construction activities under the General Aviation and Education Alternative would add approximately 154,000 tons of construction and demolition waste to the waste generated in the region. This construction and demolition waste would be disposed of over the time period that construction and demolition activities would occur and is not included in Table 4.2-3. Waste generation due to airfield pavement demolition activities under this alternative is the same as described for the Proposed Action.

Energy

Electricity. Table 4.2-3 indicates the projected Salt River Project electric demand for the years 1998, 2003, and 2013. The projected increased demand due to the General Aviation and Education Alternative would be 849 MWH/day in the year 2013. Total demand would be 62,786 MWH/day in 2013 (a 1.37 percent increase over the No-Action Alternative or closure baseline). Salt River Project Electric has indicated that adequate capacity will be available to meet the increased demand (Borrego, 1992). The existing on-base substations and distribution system would continue to support reuse activities.

Natural Gas. Table 4.2-3 indicates the projected natural gas demand for the years 1998, 2003, and 2013. The projected increased demand due to the General Aviation and Education Alternative would be 18.8 thousand therms/day in the year 2013. Total demand would be 1,297.3 thousand therms/day in 2013 (a 1.47 percent increase over the No-Action Alternative or closure baseline). Currently, Southwest Gas has the capability to meet current and future demands in the ROI. The existing on-base natural gas distribution system would continue to support reuse activities.

Cumulative Impacts. No cumulative impacts are anticipated under the General Aviation and Education Alternative.

Mitigation Measures. Mitigation measures for impacts associated with the General Aviation and Education Alternative would be similar to those identified for the Proposed Action.

4.2.4.3 Commercial Aviation and Education Alternative

Water Demand. Analysis of the Commercial Aviation and Education Alternative assumes that the current Williams AFB water supply system will be tied into water lines from the City of Mesa and that on-base water supply systems will be taken off-line. Table 4.2-3 indicates the projected demand for the City of Mesa system for the years 1998, 2003, and 2013. The

projected increased water demand due to the Commercial Aviation and Education Alternative would be 4.24 MGD in the year 2013. Total demand would be 96.21 MGD in 2013 (a 4.61 percent increase over the No-Action Alternative or closure baseline). The City of Mesa's water treatment and distribution system has a current capacity of 156 MGD.

Wastewater. Analysis of the Commercial Aviation and Education Alternative assumes that the current Williams AFB wastewater collection and treatment system will be tied into wastewater lines from the City of Mesa and that on-base wastewater systems will be taken off-line. Table 4.2-3 indicates the projected wastewater flow to the City of Mesa system for the years 1998, 2003, and 2013. These projections do not include the contribution of stormwater inflow to the Williams AFB sanitary wastewater stream. During heavy precipitation events, stormwater inflow can increase the instantaneous flow rate to the base wastewater treatment plant by as much as a factor of four; however, the increase in volume is small compared to total annual throughput. The projected increased wastewater flow due to the Commercial Aviation and Education Alternative would be 1.84 MGD in the year 2013. Total demand would be 41.82 MGD in 2013 (a 4.61 percent increase over the No-Action Alternative or closure baseline). The City of Mesa's sanitary sewer system consists of three interconnected treatment plants with a combined capacity of 39 MGD. The City of Mesa will require increased capacity by 2013 in order to accommodate wastewater flows under any of the reuse alternatives, including the No-Action Alternative.

Solid Waste. Table 4.2-3 indicates the projected demand for Maricopa County landfills for the years 1998, 2003, and 2013. The projected increased solid waste disposal due to population increases associated with the Commercial Aviation and Education Alternative would be 57.4 thousand tons/year in the year 2013. Total disposal is projected to be 4,507.7 thousand tons/year in 2013 (a 1.29 percent increase over the No-Action Alternative or closure baseline). Demolition and construction activities under the Commercial Aviation and Education Alternative would add approximately 97,000 tons of construction and demolition waste to the waste generated in the region. This construction and demolition waste would be disposed of over the time period that construction and demolition activities would occur and is not included in Table 4.2-3. Waste generation due to airfield pavement demolition activities under this alternative is the same as described for the Proposed Action.

Energy

Electricity. Table 4.2-3 indicates the projected electric demand for the years 1998, 2003, and 2013. The projected increased demand due to the Commercial Aviation and Education Alternative would be 798 MWH/day in the year 2013. Total demand would be 62,735 MWH/day in 2013 (a

1.30 percent increase over the No-Action Alternative or closure baseline). Salt River Project Electric has indicated that adequate capacity will be available to meet the increased demand (Borrego, 1992). The existing on-base substations and distribution system would continue to support reuse activities.

Natural Gas. Table 4.2-3 indicates the projected natural gas demand for the years 1998, 2003, and 2013. The projected increased demand due to the Commercial Aviation and Education Alternative would be 17.7 thousand therms/day in the year 2013. Total demand would be 1,296.2 thousand therms/day in 2013 (a 1.38 percent increase over the No-Action Alternative or closure baseline). Currently, Southwest Gas has the capability to meet current and future demands in the ROI. The existing on-base natural gas distribution system would continue to support reuse activities.

Cumulative Impacts. No cumulative impacts are anticipated under the Commercial Aviation and Education Alternative.

Mitigation Measures. Mitigation measures for impacts associated with the Commercial Aviation and Education Alternative would be similar to those identified for the Proposed Action.

4.2.4.4 Education and Planned Community Alternative

Water Demand. Analysis of the Education and Planned Community Alternative assumes that the current Williams AFB water supply system will be tied into water lines from the City of Mesa and that on-base water supply systems will be taken off-line. Table 4.2-3 indicates the projected demand for the City of Mesa system for the years 1998, 2003, and 2013. The projected increased water demand due to the Education and Planned Community Alternative would be 1.90 MGD in the year 2013. Total demand would be 93.87 MGD in 2013 (a 2.06 percent increase over the No-Action Alternative or closure baseline). The City of Mesa's water treatment and distribution system has a current capacity of 156 MGD.

Wastewater. Analysis of the Education and Planned Community Alternative assumes that the current Williams AFB wastewater collection and treatment system will be tied into wastewater lines from the City of Mesa and that on-base wastewater systems will be taken off-line. Table 4.2-3 indicates the projected wastewater flow to the City of Mesa system for the years 1998, 2003, and 2013. These projections do not include the contribution of stormwater inflow to the Williams AFB sanitary wastewater stream. During heavy precipitation events, stormwater inflow can increase the instantaneous flow rate to the base wastewater treatment plant by as much as a factor of four; however, the increase in volume is small compared to total annual throughput. The projected increased wastewater flow due to the Education and Planned Community Alternative would be 0.82 MGD in

the year 2013. Total demand would be 40.80 MGD in 2013 (a 2.06 percent increase over the No-Action Alternative or closure baseline). The City of Mesa's sanitary sewer system consists of three interconnected treatment plants with a combined capacity of 39 MGD. The City of Mesa will require increased capacity by 2013 in order to accommodate wastewater flows under any of the reuse alternatives, including the No-Action Alternative.

Solid Waste. Table 4.2-3 indicates the projected demand for Maricopa County landfills for the years 1998, 2003, and 2013. The projected increased solid waste disposal due to population increases associated with the Education and Planned Community Alternative would be 25.0 thousand tons/year in the year 2013. Total disposal is projected to be 4,475.3 thousand tons/year in 2013 (a 0.56 percent increase over the No-Action Alternative or closure baseline). Demolition and construction activities under the Education and Planned Community Alternative would add approximately 203,000 tons of construction and demolition waste to the waste generated in the region. This construction and demolition waste would be disposed of over the time period that construction and demolition activities would occur and is not included in Table 4.2-3. Under this alternative, all of the airfield pavement (i.e., runways, taxiways, and aprons) would be demolished, producing as much as 790,000 tons of concrete and asphalt and 290,000 tons of earthen materials that would have to be disposed of.

Energy

Electricity. Table 4.2-3 indicates the projected electric demand for the years 1998, 2003, and 2013. The projected increased electric demand due to the Education and Planned Community Alternative would be 348 MWH/day in the year 2013. Total demand would be 62,285 MWH/day in 2013 (a 0.56 percent increase over the No-Action Alternative or closure baseline). Salt River Project Electric has indicated that adequate capacity will be available to meet the increased demand (Borrego, 1992). The existing on-base substations and distribution system would continue to support reuse activities.

Natural Gas. Table 4.2-3 indicates the projected natural gas demand for the years 1998, 2003, and 2013. The projected increased demand due to the Education and Planned Community Alternative would be 7.7 thousand therms/day in the year 2013. Total demand would be 1,286.2 thousand therms/day in 2013 (a 0.60 percent increase over the No-Action Alternative or closure baseline). Currently, Southwest Gas has the capability to meet current and future demands in the ROI. The existing on-base natural gas distribution system would continue to support reuse activities.

Cumulative Impacts. No cumulative impacts are anticipated under the Education and Planned Community Alternative.

Mitigation Measures. Mitigation measures for impacts associated with the Education and Planned Community Alternative would be similar to those identified for the Proposed Action.

4.2.4.5 Other Land Use Concepts. Changes in utility demand within each utility purveyors' service area resulting from the federal transfers and independent land use concepts would be generally commensurate with population changes resulting from these activities. Impacts from federal transfers and independent land use concepts are discussed below.

Federal Bureau of Prisons. This land use concept would result in an increase in utility demand of less than 0.1 percent over the projected utility demand for the Proposed Action and alternatives.

Arizona Department of Corrections. This land use concept would result in a decrease in utility demand of approximately 0.2 percent under the projected utility demand for the Proposed Action and the Commercial Aviation and Education Alternative, and a negligible decrease under the projected utility demand for the Education and Planned Community Alternative. This land use would result in an increase in utility demand of approximately 0.2 percent over the projected utility demand for the General Aviation and Education Alternative.

Arizona Department of Health Services. This land use concept would not affect the utility demands discussed for the Proposed Action or any of the alternatives.

4.2.4.6 No-Action Alternative. Utility usage on-site would be minimal in comparison to the Proposed Action and other alternatives. The disuse of utility systems, however, could result in their degradation over the long-term. The following utility usage is forecast using per capita demand factors provided by the utility providers in the study area.

Water Supply. Under the No-Action Alternative, the base water supply and distribution system will not be tied into the City of Mesa system. Water consumption at the base is expected to decrease from 0.719 MGD in 1993 to a minimal usage upon closure. Water demand will be handled by the existing on-base wells and distribution system. The water supply system will require extra maintenance to keep the existing system in adequate operating condition under demands that will be well below the system capacity.

Wastewater. Under the No-Action Alternative, the base wastewater collection and treatment system will not be tied into the City of Mesa system. Wastewater flow on-base is expected to decrease from 0.197 MGD in 1993 to a minimal flow upon closure. Wastewater treatment will be handled by the existing on-base collection and treatment system. The

base sewer system will require extra maintenance to keep the existing system in adequate operating condition under use conditions that will be well below the system capacity. The City of Mesa system will require increased capacity by 2013 in order to accommodate wastewater, even if base wastewater is not conveyed to the system.

Solid Waste. Maricopa County landfills are currently operating at or near capacity. Under the No-Action Alternative, solid waste from the base would decrease to a minimum. Solid waste disposal in Maricopa County is expected to increase from 2,743.0 thousand tons/year in 1993 to 4,450.3 thousand tons per year in 2013.

Energy

Electricity. Under the No-Action Alternative, the base electrical system will be operating at well below capacity. Increased maintenance on the system will be required in order to prevent deterioration. Electrical consumption in the ROI is expected to increase from 42,365 MWH/day in 1993 to 61,937 MWH/day in 2013.

Natural Gas. Under the No-Action Alternative, the base natural gas distribution system, which may already be deteriorating, will be operating at well below capacity. Increased maintenance on the system will be required in order to prevent further deterioration. Natural gas consumption in the ROI is expected to increase from 873.5 thousand therms/day in 1993 to 1,278.5 thousand therms/day in 2013.

Cumulative Impacts. Utility demands in the area would increase as a result of other developments, even without reuse of Williams AFB. The suppliers have indicated that these demands can be adequately met.

Mitigation Measures. Potential mitigation measures which may be used to minimize the adverse effects of the No-Action Alternative include increased on-base development to ensure that base system capacities are not under-utilized. Base systems could also be replaced with smaller systems, with decreased capacities, so as to decrease the deterioration effects of operating the systems at well below capacity.

4.3 HAZARDOUS MATERIALS AND HAZARDOUS WASTE MANAGEMENT

This section addresses the potential impacts of existing contaminated sites on the various reuse options and the potential for environmental impacts caused by hazardous materials/waste management practices associated with the reuse options. Hazardous materials/wastes, IRP sites, storage tanks, asbestos, pesticides, PCBs, radon, and medical/biohazardous wastes are discussed within this section.

The U.S. Air Force is committed to the remediation of all contamination at Williams AFB due to past Air Force activities. The OL will remain after base closure to coordinate cleanup activities. Delays or restrictions in disposal and reuse of property may occur due to the extent of contamination and the results of both the risk assessment and remedial designs determined for contaminated sites. Examples of conditions resulting in land use restrictions would be the capping of landfills and the constraints from methane generation and cap integrity, as well as the location of long-term monitoring wells. These conditions would have to be considered in the layout of future development. Options to recipients include creation of parks, greenbelts, or open spaces over these areas.

Regulatory standards and guidelines have been applied in determining the impacts caused by hazardous materials/waste. The following criteria were used to identify potential impacts:

- Accidental release of friable asbestos during the demolition or modification of a structure
- Generation of 100 kilograms (or more) of hazardous waste or 1 kilogram (or more) of an acutely hazardous waste in a calendar month, resulting in increased regulatory requirements
- New operational requirements or service for all UST and tank systems
- Any spill or release of a reportable quantity of a hazardous material
- Manufacturing of any compound that requires notifying the pertinent regulatory agency
- Exposure of the environment or public to any hazardous material through release or disposal practices.

4.3.1 Proposed Action

4.3.1.1 Hazardous Materials Management. The hazardous materials likely to be utilized for activities occupying the proposed land use zones are identified in Table 4.3-1. The types of hazardous materials used would be similar to those used by the base prior to closure. The quantity of hazardous materials utilized under the Proposed Action would increase over the baseline conditions at closure. The specific chemical compositions and exact use rates are not known.

Currently, handling of hazardous materials on the base is managed by the Air Force. If the Proposed Action were implemented, each separate organization would be responsible for the management of hazardous

Table 4.3-1. Hazardous Material Usage - Proposed Action and Alternatives

Land Use	Operation Process	Hazardous Materials
Airfield	Aircraft refueling; anti-/de-icing; utilization of clear zones, runways, taxiways, airport terminal parking, administration offices, corporate and private aviation facilities, aircraft parking	Aviation fuels, propylene glycol, ethylene glycol, heating oils, motor fuels
Aviation Support	Operations associated with aircraft maintenance and manufacturing, aeronautics research and development, air transportation-related industry and warehousing, law enforcement, airline maintenance, other governmental administrative services	Fuels, solvents, paints, POL, hydraulic fluids, degreasers, corrosives, heavy metals, reactives, thinners, paints, glycols, ignitables, heating oils, plating waste, cyanides, laboratory waste
Industrial	Activities associated with light industry, research and development, warehousing, and manufacturing	Solvents, heavy metals, POL, corrosives, catalysts, aerosols, fuels, heating oils, ignitables, pesticides
Institutional (Medical)	Hospital/clinic, rehabilitation facilities, X-ray unit	Pharmaceuticals, medical biohazardous waste, chemotherapeutic drugs, radiological sources, heavy metals
Institutional (Education)	Public education, higher education, research labs, training facilities, vocational schools	Laboratory waste, corrosives, ignitables, solvents, heating oils, lubricants, cleaners, pesticides, paints, thinners
Commercial (Office/Business Park)	Activities associated with offices, light industry, research and development, higher value warehousing, retail, service industries, restaurants	Fuels, solvents, corrosives, POL, ignitables, heating oils, pesticides, dry cleaning wastes
Residential	Utilization/maintenance of single-family and multifamily units, swimming pools, landscaping	Pesticides, fertilizers, fuels, waste oils, chlorine, household wastes
Public/Recreation	Maintenance of existing recreational facilities including golf course, swimming pools, and other recreational facilities	Pesticides, fertilizers, chlorine, heating oils, paints, thinners, cleaners, solvents, aerosols, POL

materials according to applicable regulations, including Arizona Administrative Code Title 18, Chapter 2, Article 9, which regulates emission of hazardous air pollutants. Additionally, each organization would have to comply with SARA, Section 311, Title III, which requires that local communities be informed of the use of hazardous materials.

4.3.1.2 Hazardous Waste Management. The proposed land use zones would host many operations that are yet to be specifically defined. Table 4.3-1 describes the types of operations in these land use zones that may generate hazardous wastes.

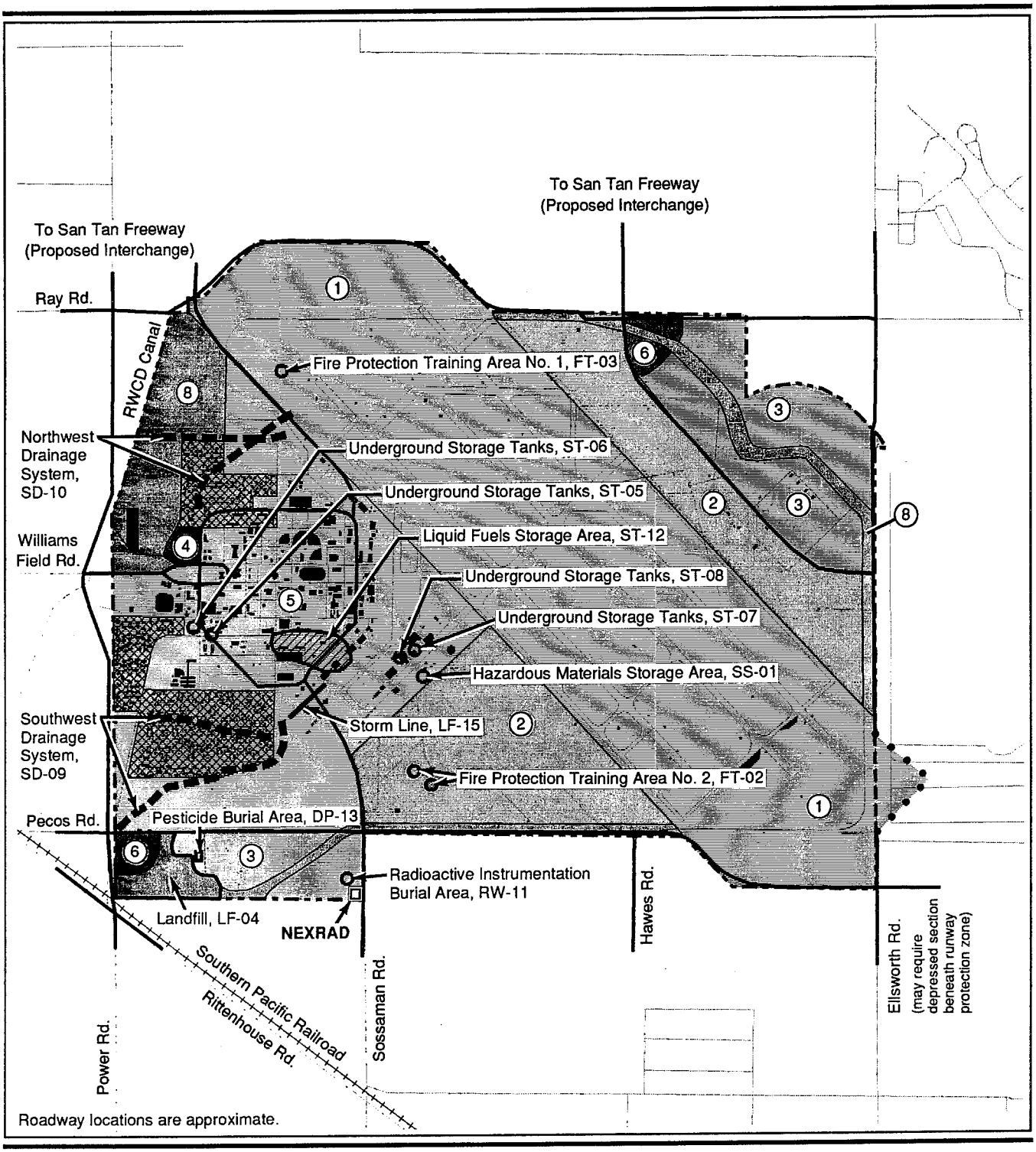
Upon disposal of parcels, hazardous waste management would fall under the control of the recipients, who would be required to comply with all applicable regulations including Arizona Administrative Code Title 18, Chapter 8, Article 2, which governs hazardous wastes. Once the responsibilities of hazardous waste management are allocated to individual organizations, proficiency with those materials and spill response is required by OSHA regulations (29 CFR). Mutual aid agreements with surrounding communities may require additional scrutiny and training of emergency staff.

The presence of numerous independent owners/operators on the base would change the regulatory requirements and probably increase the regulatory burden relative to hazardous waste management. Activities associated with the Proposed Action would lead to an increase in the amount of hazardous waste generated compared to the closure baseline.

4.3.1.3 Installation Restoration Program Sites. The U.S. Air Force is committed to continue IRP activities under DERP, CERCLA and the FFA between the U.S. Air Force, the U.S. EPA, the Arizona Department of Environmental Quality (ADEQ), and the Arizona Department of Water Resources (ADWR). IRP activities will be coordinated by the OL and the aforementioned agencies.

The type of development that is appropriate for property adjacent to or over an IRP site may be limited by the risk to human health and the environment posed by contaminants at the site. For example, residential development over an IRP landfill is generally not appropriate. The risk posed by IRP sites is measured by a risk assessment that analyzes the types of substances present at a site and the potential means by which the public and the environment may be exposed to them. The remedial design, or blueprint for remediating the IRP site, is based on the results of the risk assessment and the geographical extent of the contamination.

Disposal and reuse of some Williams AFB properties may be delayed or limited by the extent and type of contamination at IRP sites and by current and future IRP remediation activities (Figure 4.3-1). Based on the results of IRP investigations, the Air Force may, where appropriate, place limits on



EXPLANATION

- (1) Airfield
- (2) Aviation Support
- (3) Industrial
- (4) Institutional (Medical)
- (5) Institutional (Education)
- (6) Commercial
- (7) Residential *
- (8) Public/Recreation
- (9) Agriculture *
- (10) Vacant Land *
- (11) Military Land *
- Campus Residential Housing
- Petroleum Product Plume (Approximate Extent)
- Base Boundary
- Off-Base Extension

0 750 1500 3000 Feet

* Not Applicable

IRP Sites - Proposed Action

Figure 4.3-1

land reuse through deed restrictions on conveyances and use restrictions on leases. The Air Force may also retain right of access to other properties to inspect monitoring wells or conduct other remedial activities.

The IRP sites within each land use area for the Proposed Action are discussed below and summarized in Table 4.3-2. Additional IRP sites are being considered by Williams AFB but have not been confirmed.

- Airfield - The only IRP site located within this land use area under the Proposed Action is Fire Protection Training Area No. 1. The RI report concluded that no further action is necessary at this site. Thus, no remedial activities within the proposed airfield are expected to be necessary, and no impacts are projected.

- Aviation Support - The only IRP site located within this land use area under the Proposed Action is Fire Protection Training Area No. 2. The area has been recommended for remediation under the IRP, based on available data that suggests the presence of jet fuel and methyl ethyl ketone (MEK). The proposed construction of aviation support areas may be impacted by remedial activities, though specific remedial activities have not yet been determined.

- Industrial - The Radioactive Instrumentation Burial Area and the Pesticide Burial Area are located within this land use area under the Proposed Action. Remedial action at the Radioactive Instrumentation Burial Area resulted in removal of buried concrete footings, which may contain radioactive instruments, in December 1992. In May 1991, buried drums were excavated and removed from the Pesticide Burial Area. No further remedial action is planned at these two areas, and they are not expected to impact proposed industrial development.

- Institutional (Education) - The Liquid Fuels Storage Area, Storm Line, Hazardous Materials Storage Area, Southwest Drainage System, a portion of the Northwest Drainage System, and all of the Underground Storage Tanks sites are located in this land use category. Remedial activities associated with the Liquid Fuels Storage Area will impact institutional development under the Proposed Action. Remedial activities include groundwater extraction, treatment, and reinjection. Approximately 14 acres are expected to be retained by the Air Force to support these activities; full remediation may require as much as 30 years. In addition, monitoring well locations may restrict use of adjacent areas. Ongoing investigation and future remedial activity for the Storm Line site could affect reuse and development in that area as well. The Hazardous Materials Storage Area and the Northwest Drainage System have been recommended for

Table 4.3-2. IRP Sites within Land Use Areas - Proposed Action

Proposed Land Use	IRP Sites
Airfield	Fire Protection Training Area No. 1 (FT-03)
Aviation Support	Fire Protection Training Area No. 2 (FT-02)
Industrial	Radioactive Instrumentation Burial Area (RW-11), Pesticide Burial Area (DP-13)
Institutional (Medical)	None
Institutional (Education)	Liquid Fuels Storage Area (ST-12), Storm Line (LF-15), Hazardous Materials Storage Area (SS-01), Southwest Drainage System (SD-09), portion of Northwest Drainage System (SD-10), Underground Storage Tanks (ST-05, ST-06, ST-07, ST-08)
Commercial	None
Public/Recreation	Landfill (LF-04), portion of Northwest Drainage System (SD-10)

deletion from further IRP consideration. Thus, no further remediation of these two sites is expected to be necessary. However, potential remedial activities associated with the capped portion of the Southwest Drainage System, which has been placed under OU-3 for further investigation, could impact reuse activities. All of the Underground Storage Tanks (sites ST-05, ST-06, ST-07, and ST-08) have been removed and no further action is planned.

- Public/Recreation - The Landfill and a portion of the Northwest Drainage System are located in this land use category. Depending on the remedy selected for the Landfill, transfer of this property may be delayed or reuse may be restricted to inaccessible open space; alternatively, the Air Force may retain the Landfill property. In addition, monitoring well locations around the Landfill may restrict reuse of adjacent areas. The Northwest Drainage System has been recommended for removal from further IRP consideration, and no remedial activities associated with the drainage system are expected to be necessary.

Determination of future base land uses will be, to a certain extent, dependent upon a regulatory review of the remedial design of the IRP sites. This review will identify current monitoring well locations and future land use limitations as a result of their presence. Similarly, the review will identify limitations associated with incompatibilities between proposed levels of remediation and proposed reuses. These limitations may impact potential reuse options. The regulatory review process would include notifying the FAA concerning the construction and locations of monitoring wells and other remedial activities.

4.3.1.4 Storage Tanks. Flight and maintenance operations under the Proposed Action would require both aboveground tanks and USTs. USTs and aboveground storage tanks that would be required by the new owner/operators would be subject to all applicable federal, state, and local regulations. These regulations include acceptable leak detection methodologies, spill and overfill protection, cathodic protection, secondary containment for the tank systems including the piping, and liability insurance.

All identified USTs and sumps and separators are scheduled for removal prior to base disposal and will not present reuse impacts.

Existing aboveground fuel storage tanks that would not be utilized to support the reuse activities will be purged of fumes to preclude fire hazards. The Uniform Fire Code requires that tanks out of service for 1 year be removed from the property. The closure of these tanks would be subject to the requirements of the State Fire Marshal; the Arizona Department of Environmental Quality does not regulate aboveground tanks.

4.3.1.5 Asbestos. Renovation and demolition of existing structures with ACM may occur with reuse development. Such activities would be subject to all applicable federal, state, and local regulations, including Maricopa County asbestos regulations. All friable asbestos has already been removed from on-base structures or encapsulated; nonfriable asbestos remains in some roofing materials and floor tiles.

4.3.1.6 Pesticides. Pesticide usage associated with the Proposed Action would increase compared to amounts used under baseline conditions (caretaker status), but no adverse impacts are anticipated. The only areas potentially requiring significant pesticide use are the golf course and small green areas between buildings in the developed western half of the base. Under the Proposed Action, the golf course would remain in use and the layout of buildings in the western portion of the base (which would be converted to Institutional (Education) uses) would remain largely unchanged. Management practices would be subject to FIFRA and state regulations.

4.3.1.7 PCBs. All known federally regulated PCB-contaminated equipment and PCB-containing equipment has either been removed and properly disposed of or converted to non-PCB status. The Air Force is conducting confirmatory sampling and laboratory analyses of 322 electrical items that tested negative for PCBs using field test kits. If laboratory results reveal the presence of PCBs above regulatory levels in any of these items, that equipment will be removed prior to base disposal. Therefore, these materials will not create any impacts.

4.3.1.8 Radon. Results of an extensive radon survey completed in 1991, involving 1,023 samples from on-base buildings, showed two buildings with

radon concentrations exceeding the lower 95 percent confidence limit for a 4 pCi/L exposure (Building 237, hospital; Building 334, dormitory). Currently, no radon exposure guidelines or action levels have been established by federal or state regulatory agencies for buildings other than schools or residences. Schools require mitigation if radon levels exceed 20 pCi/L; for residences, evacuation and mitigation is necessary above 200 pCi/L (Table 3.3-8). Data from the radon survey indicate that radon will not generally impact reuse. However, further testing at Buildings 237 and 334 should be conducted prior to reuse.

4.3.1.9 Medical/Biohazardous Waste. Biohazardous materials generated with the reuse of the hospital would be subject to conformance with State of Arizona regulations. Currently, the only regulations regarding medical wastes were developed by the Arizona Department of Health Services under Title 36 of the Arizona Revised Statutes to address the in-hospital management of these wastes. The ADEQ is developing regulations on the environmental management of medical wastes under Title 49 of the Arizona Revised Statutes.

All of the existing medical and biohazardous wastes have been incinerated and removed prior to base closure. Under the Proposed Action, hospital operation, generation rates for waste products, and disposal requirements would not change appreciably from preclosure and adverse impacts are not anticipated.

4.3.1.10 Ordnance. Explosive ordnance has been removed from all storage facilities on the base. Of the areas inspected by the Luke AFB Explosive Ordnance Detail, only the Suspected Munitions Burial Site has yet to be certified free of explosive hazards. Further investigation of this site and removal of any explosive ordnance that may be present will occur prior to disposal. Because no explosive ordnance will remain when the base is disposed, there will be no impacts on reuse.

Further investigation of the Firing Range (Facility 925) to characterize potential lead contamination associated with spent bullets will also be conducted prior to disposal. If necessary, the Firing Range will be cleared of spent bullets prior to disposal in order to eliminate any impact on reuse.

4.3.1.11 Cumulative Impacts. No cumulative impacts of hazardous materials and hazardous waste are anticipated.

4.3.1.12 Mitigation Measures. A cooperative planning body for hazardous materials and waste management could be established with the support of the new individual operators on the base. Establishment of such a body could reduce the costs of environmental compliance training, health and safety training, and waste management, and could increase recycling, minimize waste, and assist in mutual spill responses.

All of the IRP sites may not need to be remediated; however, all of them must be addressed and properly closed out. Active coordination between the OL and new construction planning agencies could mitigate potential problems. The presence of IRP sites may limit or delay certain land uses within overlying areas; as with the Landfill, options could include reuse as inaccessible open space.

Aboveground tanks out of service should be closed in compliance with state and local regulations.

Coordination of asbestos removal or management in conjunction with construction or renovation activities could mitigate potential asbestos impacts. Compliance with NESHAPS would mitigate and preclude asbestos exposures.

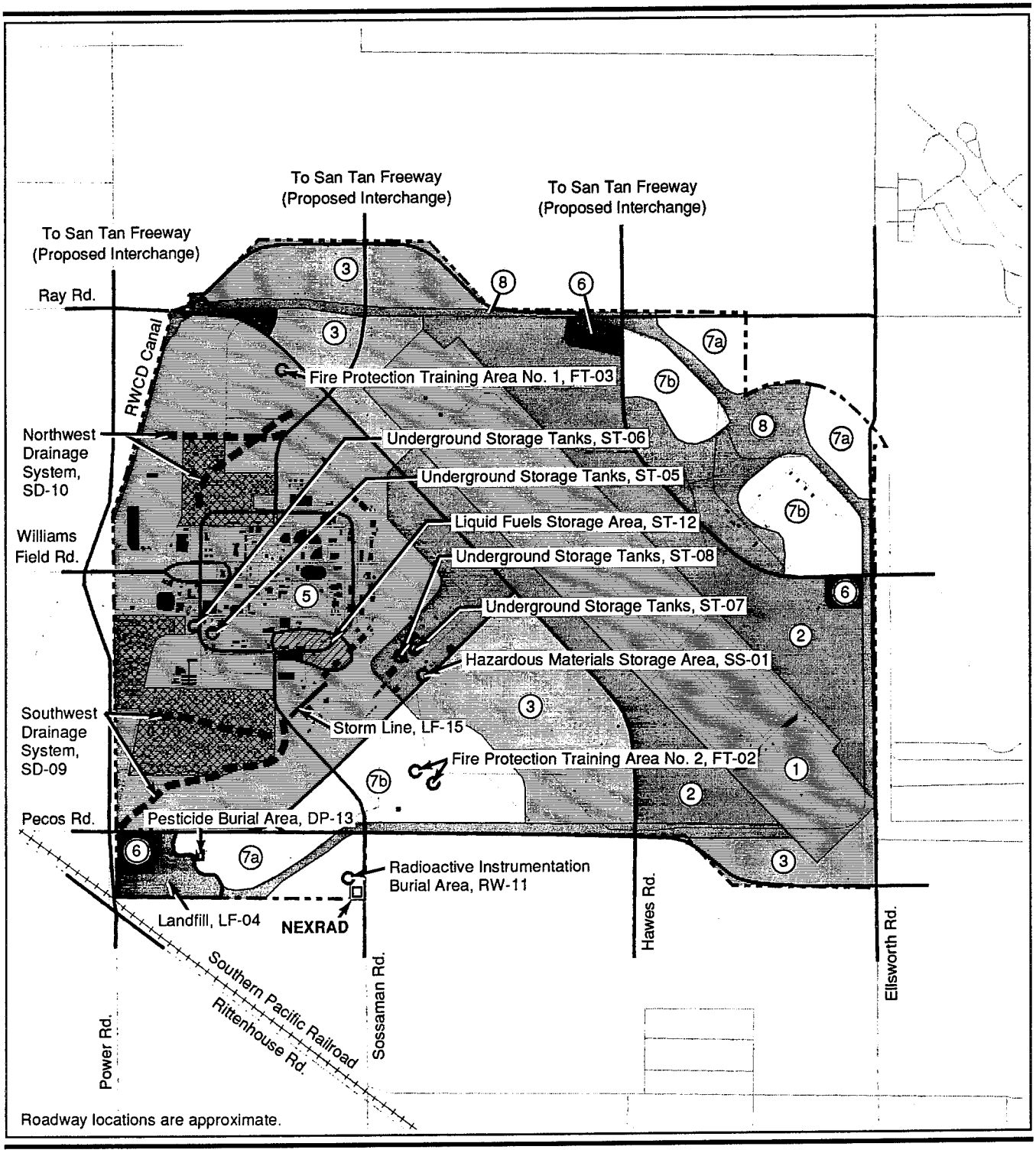
Additional radon testing at Buildings 237 and 334 is recommended. If radon levels above 4 pCi/L persist, continued monitoring is recommended; higher radon levels could be mitigated through improved ventilation.

4.3.2 General Aviation and Education Alternative

4.3.2.1 Hazardous Materials Management. This alternative differs from the Proposed Action in its emphasis on general aviation, without a commercial air passenger component, along with a substantial residential component. Hazardous materials associated with land use categories are identified in Table 4.3-1. The types of hazardous materials used would be similar to those used by the base prior to closure. The quantity of hazardous materials utilized under the General Aviation and Education Alternative would increase over the baseline conditions at closure but would be less than under the Proposed Action due to the lack of commercial flight operations. The specific chemical compositions and exact use rates are not known.

4.3.2.2 Hazardous Waste Management. The General Aviation and Education Alternative would include many operations that are yet to be specifically defined. Table 4.3-1 describes the types of operations that may generate hazardous wastes. Activities associated with the General Aviation and Education Alternative would lead to an increase in the amount of hazardous waste generated compared to the closure baseline. The presence of numerous independent owners/operators could increase the regulatory burden relative to hazardous waste management.

4.3.2.3 Installation Restoration Program Sites. The IRP sites within each land use area for the General Aviation and Education Alternative are identified in Figure 4.3-2 and summarized in Table 4.3-3. These are discussed below. Additional IRP sites are being considered by Williams AFB but have not been confirmed.



EXPLANATION

- (1) Airfield
- (2) Aviation Support
- (3) Industrial
- (4) Institutional (Medical) *
- (5) Institutional (Education)
- (6) Commercial
- (7) Residential †
- (8) Public/Recreation
- (9) Agriculture *
- (10) Vacant Land *
- (11) Military Land *
- Campus Residential Housing
- Petroleum Product Plume (Approximate Extent)
- Base Boundary
- Off-Base Extension *

0 750 1500 3000 Feet

* Not Applicable

† 7a - Medium Density; 7b - High Density

IRP Sites - General Aviation and Education Alternative

Figure 4.3-2

Table 4.3-3. IRP Sites within Land Use Areas - General Aviation and Education Alternative

Proposed Land Use	IRP Sites
Airfield	None
Aviation Support	Hazardous Materials Storage Area (SS-01), Underground Storage Tanks (ST-07 and ST-08))
Industrial	None
Institutional (Education)	Fire Protection Training Area No. 1 (FT-03), Underground Storage Tanks (ST-05 and ST-06), Southwest Drainage System (SD-09), Northwest Drainage System (SD-10), Liquid Fuels Storage Area (ST-12), Storm Line (LF-15)
Commercial	None
Medium-Density Residential	Radioactive Instrumentation Burial Area (RW-11), Pesticide Burial Area (DP-13)
High-Density Residential	Fire Protection Training Area No. 2 (FT-02)
Public/Recreation	Landfill (LF-04)

- Aviation Support - The Hazardous Materials Storage Area and two of the four Underground Storage Tanks sites (ST-07 and ST-08) are located within this land use area in the General Aviation and Education Alternative. However, the Hazardous Materials Storage Area has been recommended for removal from further IRP consideration. Furthermore, all of the Underground Storage Tanks (sites ST-05, ST-06, ST-07, and ST-08) have been removed and disposed of. Thus, no further remediation of these IRP sites is expected to be necessary, and no impacts are anticipated.

- Institutional (Education) - Fire Protection Training Area No. 1, two of the four Underground Storage Tanks sites (ST-05 and ST-06), the Southwest Drainage System, the Northwest Drainage System, the Liquid Fuels Storage Area, and the Storm Line are located within this land use area under the General Aviation and Education Alternative. Fire Protection Training Area No. 1 and the Northwest Drainage System have been recommended for deletion from further IRP consideration, so no impact from these sites on future reuse is expected. However, potential remedial activities associated with the capped portion of the Southwest Drainage System, which has been placed under OU-3 for further investigation, could impact reuse activities. All of the Underground Storage Tanks (sites ST-05, ST-06, ST-07, and ST-08) have been removed, so they are not expected to impact reuse development. However, remedial activities, including placement and operation of extraction,

reinjection, and monitoring wells, will delay or restrict reuse at the Liquid Fuels Storage Area; approximately 14 acres are expected to be retained by the Air Force to support remediation in the Liquid Fuels Storage Area for up to 30 years. Ongoing investigation and future remedial activity for the Storm Line site could affect reuse and development in that area as well.

- Residential - Fire Protection Training Area No. 2, the Radioactive Instrumentation Burial Area, and the Pesticide Burial Area are located within this land use area under the General Aviation and Education Alternative. Remedial efforts for Fire Protection Training Area No. 2 may delay residential development for that area. Remedial action at the Radioactive Instrumentation Burial Area resulted in removal of buried concrete footings, which may contain radioactive instruments, in December 1992. Buried drums were excavated and removed from the Pesticide Burial Area in 1991. No further remedial action is planned at these two sites and they are not expected to inhibit residential development.

- Public/Recreation - The Landfill is located in this land use area. Depending on the remedy selected for the Landfill, transfer of this property may be delayed or reuse may be restricted to inaccessible open space; alternatively, the Air Force may retain the Landfill property. In addition, monitoring well locations around the Landfill may restrict reuse of adjacent areas.

4.3.2.4 Storage Tanks. Flight and maintenance operations under the General Aviation and Education Alternative would require both aboveground tanks and USTs. USTs and aboveground storage tanks that would be required by the new owner/operators would be subject to the same regulations as discussed under the Proposed Action.

Existing aboveground storage tanks that would not support reuse activities would be expected to be closed in conformance with appropriate regulations. All identified USTs and sumps and separators are scheduled for removal prior to base disposal.

4.3.2.5 Asbestos. Renovation and demolition of existing structures with ACM may occur with reuse development. Such activities would be subject to all applicable federal, state, and local regulations, including Maricopa County asbestos regulations. All friable asbestos has already been removed from on-base structures or encapsulated; nonfriable asbestos remains in some roofing materials and floor tiles.

4.3.2.6 Pesticides. Pesticide usage associated with the General Aviation and Education Alternative would increase compared to amounts used under baseline conditions (caretaker status), but adverse impacts are not

anticipated. The areas potentially requiring pesticide use are the golf course, small green areas between buildings in the developed western half of the base, and green areas associated with new residential development. The golf course would likely remain in use and the layout of buildings in the western portion of the base (which would be converted to Institutional (Education) uses) would remain largely unchanged under the General Aviation and Education Alternative. However, substantial new high- and medium-density residential development could result in increased pesticide use. Management practices would be subject to FIFRA and state regulations.

4.3.2.7 PCBs. All known federally-regulated PCB-contaminated equipment and PCB-containing equipment has either been removed and properly disposed of or converted to non-PCB status. As discussed for the Proposed Action, confirmatory sampling and laboratory analysis is being conducted for 322 electrical items. Should any of these contain PCBs above regulatory levels, they will be removed prior to base disposal. Therefore, these materials will not create any impacts.

4.3.2.8 Radon. Results of the radon survey completed in 1991 showed only two buildings with radon concentrations exceeding the lower 95 percent confidence limit for a 4 pCi/L exposure. Therefore, radon is not expected to have general impacts on reuse. However, further testing at Buildings 237 and 334 should be conducted prior to reuse.

4.3.2.9 Medical/Biohazardous Waste. All of these materials have been incinerated and removed prior to base closure. Under this alternative, there would be no hospital use, so no medical/biohazardous waste would be generated.

4.3.2.10 Ordnance. As described for the Proposed Action, further investigation and removal of any explosive ordnance associated with the Suspected Munitions Burial Site will occur prior to base disposal, so there will be no ordnance impacts on reuse. Similarly, the Firing Range (Facility 925) will be investigated for lead contamination associated with spent bullets and will be cleared, if necessary, to prevent impacts on reuse.

4.3.2.11 Cumulative Impacts. No cumulative impacts of hazardous wastes and hazardous materials are anticipated.

4.3.2.12 Mitigation Measures. The same mitigation measures discussed for the Proposed Action would be appropriate for activities associated with this alternative. In addition, the scheduling of "household collection days" for hazardous residential wastes would mitigate any wastewater treatment plant and stormwater discharge concerns that might be associated with disposal of household hazardous wastes from the residential component of this alternative. Educational articles in the local papers and classes offered

by community educational programs could increase public awareness of recycling, appropriate use of pesticides, waste minimization, and appropriate waste disposal.

4.3.3 Commercial Aviation and Education Alternative

4.3.3.1 Hazardous Materials Management. This alternative represents the most intensive aviation reuse. It differs from the Proposed Action primarily in the intensity of all classes of aviation reuse, and in the configuration of aviation support uses. There is no residential component. Hazardous materials associated with land use categories are identified in Table 4.3-1. The types of hazardous materials used would be similar to those used by the base prior to closure. The quantity of hazardous materials utilized under the Commercial Aviation and Education Alternative would increase over the baseline conditions at closure and would be greater than under the Proposed Action. The specific chemical compositions and exact use rates are not known.

4.3.3.2 Hazardous Waste Management. The Commercial Aviation and Education Alternative would include many operations that are yet to be specifically defined. Table 4.3-1 describes the types of operations that may generate hazardous wastes. Activities associated with the Commercial Aviation and Education Alternative would lead to an increase in the amount of hazardous waste generated compared to the closure baseline. The presence of a number of independent owners/operators on the base could increase the regulatory burden relative to hazardous waste management.

4.3.3.3 Installation Restoration Program Sites. The IRP sites within each land use area for the Commercial Aviation and Education Alternative are identified in Figure 4.3-3 and summarized in Table 4.3-4. These are discussed below. Additional IRP sites are being considered by Williams AFB but have not been confirmed.

- Airfield - Fire Protection Training Area No. 1 is located within this land use area in the Commercial Aviation and Education Alternative, but has been recommended for removal from further IRP consideration and is not expected to impact airfield development and reuse.

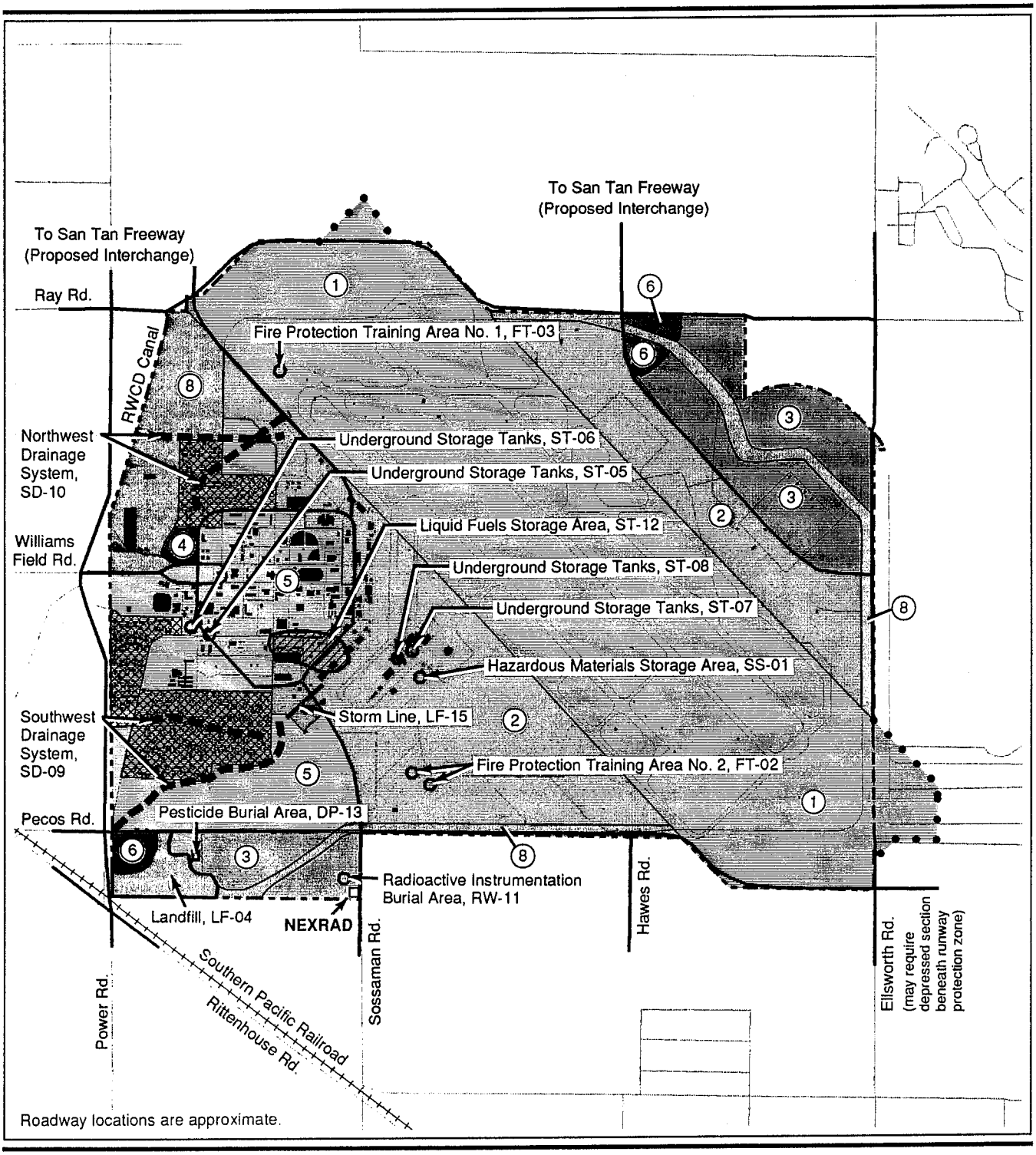
- Aviation Support - The Hazardous Materials Storage Area, Fire Protection Training Area No. 2, two of the four Underground Storage Tanks sites (ST-07 and ST-08), a portion of the Northwest Drainage System, most of the Liquid Fuels Storage Area and groundwater plume, and the Storm Line site are

Table 4.3-4. IRP Sites within Land Use Areas - Commercial Aviation and Education Alternative

Proposed Land Use	IRP Sites
Airfield	Fire Protection Training Area No. 1 (FT-03)
Aviation Support	Hazardous Materials Storage Area (SS-01), Fire Protection Training Area No. 2 (FT-02), two Underground Storage Tanks sites (ST-07 and ST-08), a portion of the Northwest Drainage System (SD-10), most of the Liquid Fuels Storage Area (ST-12), Storm Line (LF-15)
Industrial	Radioactive Instrumentation Burial Area (RW-11), Pesticide Burial Area (DP-13)
Institutional (Medical)	None
Institutional (Education)	Two Underground Storage Tanks sites (ST-05 and ST-06), Southwest Drainage System (SD-09), most of the Northwest Drainage System (SD-10), small portion of Liquid Fuels Storage Area (ST-12)
Commercial	None
Public/Recreation	Landfill (LF-04), portion of Northwest Drainage System (SD-10)

located within this land use area in the Commercial Aviation and Education Alternative. The Hazardous Materials Storage Area has been recommended for deletion from further IRP consideration, as has the Northwest Drainage System, and all of the Underground Storage Tanks have been removed and disposed of, so no further remediation or impacts on reuse are expected from these sites. However, remedial action at the Liquid Fuels Storage Area, including installation and operation of extraction, reinjection, and monitoring wells, will affect development at that location; also, approximately 14 acres are expected to be retained by the Air Force to support this remedial action for up to 30 years. Ongoing investigation and future remedial activity for the Storm Line and Fire Protection Training Area No. 2 could affect reuse and development in those areas as well.

- Industrial - The Radioactive Instrumentation Burial Area and the Pesticide Burial Area are located within this land use area under the Commercial Aviation and Education Alternative. Remedial action at the Radioactive Instrumentation Burial Area resulted in removal of buried concrete footings, which may contain radioactive instruments, in December 1992. In May 1991, buried drums were excavated and removed from the Pesticide Burial Area. No further remedial action is planned at these two areas, and they are not expected to impact proposed industrial development.



EXPLANATION

- (1) Airfield
- (2) Aviation Support
- (3) Industrial
- (4) Institutional (Medical)
- (5) Institutional (Education)
- (6) Commercial
- (7) Residential *
- (8) Public/Recreation
- (9) Agriculture *
- (10) Vacant Land *
- (11) Military Land *
- Campus Residential Housing
- Petroleum Product Plume (Approximate Extent)
- Base Boundary
- Off-Base Extension

0 750 1500 3000 Feet

* Not Applicable

IRP Sites - Commercial Aviation and Education Alternative

Figure 4.3-3

- Institutional (Education) - Two of the four Underground Storage Tanks sites (ST-05 and ST-06), most of the Northwest Drainage System, and a small portion of the groundwater plume associated with the Liquid Fuels Storage Area are located within this land use area in the Commercial Aviation and Education Alternative. All of the Underground Storage Tanks have been removed and disposed of, and the Northwest Drainage System has been recommended for deletion from further IRP consideration. Therefore, no further remedial activities or impacts on reuse are expected for these sites. However, potential remedial activities associated with the capped portion of the Southwest Drainage System, which has been placed under OU-3 for further investigation, could impact reuse activities. In addition, remedial activities aimed at the groundwater plume associated with the Liquid Fuels Storage Area may hinder development in that area.

- Public/Recreation - The Landfill and a small portion of the Northwest Drainage System are located in this land use area. Depending on the remedy selected, transfer of the Landfill property may be delayed or reuse may be restricted; alternatively, the Air Force may retain the Landfill property. Monitoring wells around the Landfill may restrict reuse of adjacent areas. The Northwest Drainage System has been recommended for removal from further IRP consideration and is not expected to impact Public/Recreation uses.

4.3.3.4 Storage Tanks. Flight and maintenance operations under the Commercial Aviation and Education Alternative would require both aboveground tanks and USTs. USTs and aboveground storage tanks that would be required by the new owner/operators would be subject to the same regulations as discussed under the Proposed Action.

Existing aboveground storage tanks that would not support reuse activities would be expected to be closed in conformance with appropriate regulations. All identified USTs and sumps and separators are scheduled for removal prior to base disposal.

4.3.3.5 Asbestos. Renovation and demolition of existing structures with ACM may occur with reuse development. Such activities would be subject to all applicable federal, state, and local regulations, including Maricopa County asbestos regulations. All friable asbestos has already been removed from on-base structures or encapsulated; nonfriable asbestos remains in some roofing materials and floor tiles.

4.3.3.6 Pesticides. Pesticide usage associated with the Commercial Aviation and Education Alternative would increase compared to amounts used under baseline conditions (caretaker status), but no adverse impacts are anticipated. The only areas potentially requiring significant pesticide use are the golf course and small green areas between buildings in the developed western half of the base. Under the Commercial Aviation and Education Alternative, the golf course would remain in use and the layout of buildings in the western portion of the base (which would be converted to Institutional (Education) uses) would remain largely unchanged. Management practices would be subject to FIFRA and state regulations.

4.3.3.7 PCBs. All known federally-regulated PCB-contaminated equipment and PCB-containing equipment has either been removed and properly disposed of or converted to non-PCB status. As discussed for the Proposed Action, confirmatory sampling and laboratory analysis is being conducted for 322 electrical items. Should any of these contain PCBs above regulatory levels, they will be removed prior to base disposal. Therefore, these materials will not create any impacts.

4.3.3.8 Radon. Results of the radon survey completed in 1991 showed only two buildings (Nos. 237 and 334) with radon concentrations exceeding the lower 95 percent confidence limit for a 4 pCi/L exposure. Therefore, radon is not expected to have general impacts on reuse. However, further testing at Buildings 237 and 334 should be conducted prior to reuse.

4.3.3.9 Medical/Biohazardous Waste. All of these materials have been incinerated and removed prior to base closure. As discussed for the Proposed Action, biohazardous materials generated with the reuse of the hospital under the Commercial Aviation and Education Alternative would be subject to conformance with State of Arizona regulations. Under this alternative, hospital operation, generation rates for waste products, and disposal requirements would not change appreciably from preclosure, and adverse impacts are not anticipated.

4.3.3.10 Ordnance. As described for the Proposed Action, further investigation and removal of any explosive ordnance associated with the Suspected Munitions Burial Site will occur prior to base disposal, so there will be no ordnance impacts on reuse. Similarly, the Firing Range (Facility 925) will be investigated for lead contamination associated with spent bullets and will be cleared, if necessary, to prevent impacts on reuse.

4.3.3.11 Cumulative Impacts. No cumulative impacts of hazardous wastes and hazardous materials are anticipated.

4.3.3.12 Mitigation Measures. The same mitigation measures discussed for the Proposed Action would be appropriate for activities associated with this alternative.

4.3.4 Education and Planned Community Alternative

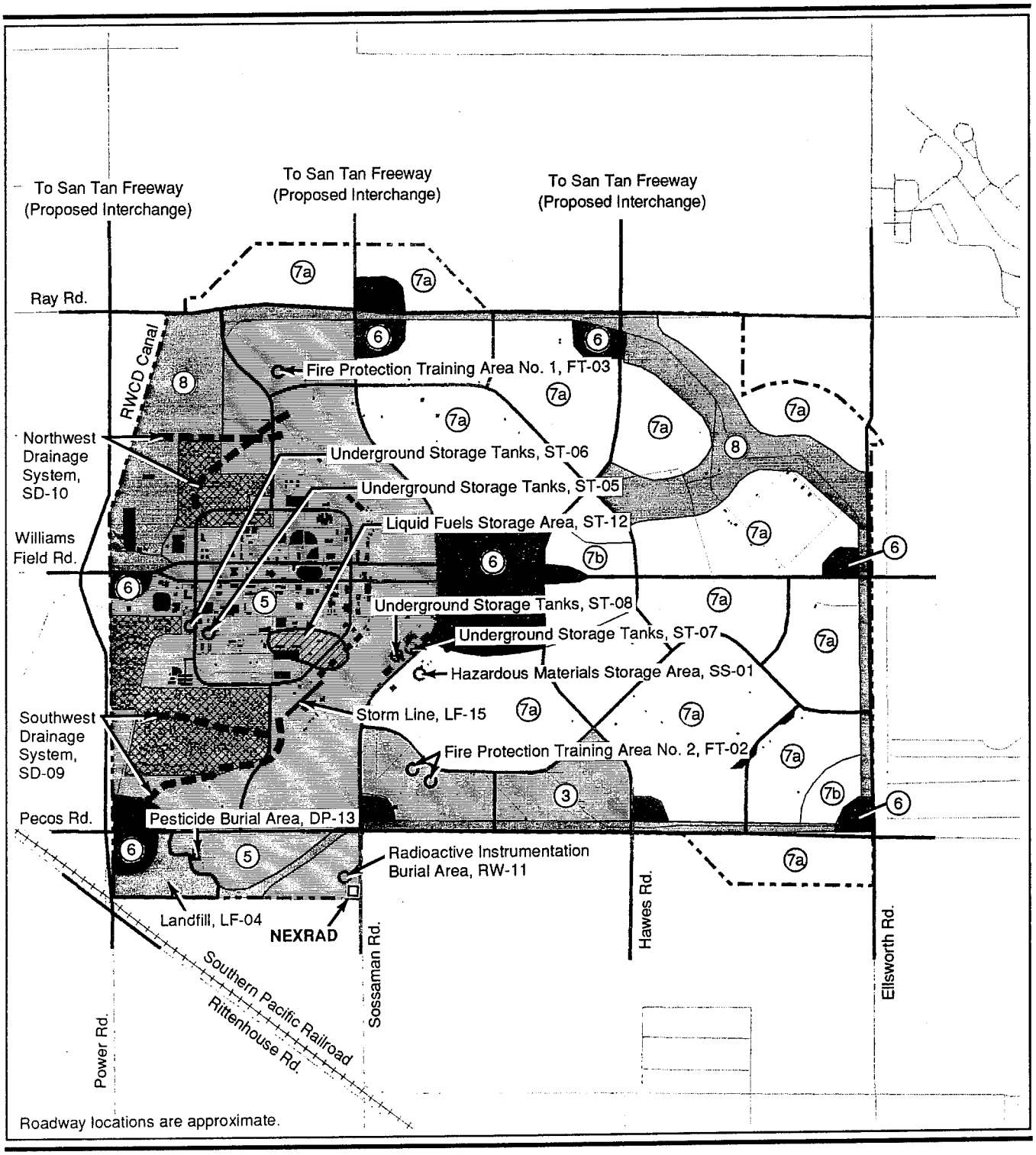
4.3.4.1 Hazardous Materials Management. The Education and Planned Community Alternative would involve development of a planned community with a large Institutional (Education) component. There would be no aviation reuse. Consequently, the number, types, and quantities of hazardous materials would be less than under the Proposed Action and less than was used by the base prior to closure. Hazardous materials associated with land use categories are identified in Table 4.3-1. The quantity of hazardous materials utilized would increase over the baseline conditions at closure. The specific chemical compositions and exact use rates are not known.

4.3.4.2 Hazardous Waste Management. The Education and Planned Community Alternative would include many operations that are yet to be specifically defined. Table 4.3-1 describes the types of operations that may generate hazardous wastes. Activities associated with the Education and Planned Community Alternative would lead to an increase in the amount of hazardous waste generated compared to the closure baseline. The presence of numerous independent owners/operators could increase the regulatory burden relative to hazardous waste management.

4.3.4.3 Installation Restoration Program Sites. The IRP sites within each land use area for the Education and Planned Community Alternative are identified in Figure 4.3-4 and summarized in Table 4.3-5. These are discussed below. Additional IRP sites are being considered by Williams AFB but have not been confirmed.

Table 4.3-5. IRP Sites within Land Use Areas - Education and Planned Community Alternative

Proposed Land Use	IRP Sites
Industrial	Fire Protection Training Area No. 2 (FT-02)
Institutional (Education)	Fire Protection Training Area No. 1 (FT-03), Underground Storage Tanks (ST-05, ST-06, ST-07, and ST-08), Southwest Drainage System (SD-09), Northwest Drainage System (SD-10), Radioactive Instrumentation Burial Area (RW-11), Liquid Fuels Storage Area (ST-12), Pesticide Burial Area (DP-13), Storm Line (LF-15)
Commercial	None
Medium-Density Residential	Hazardous Materials Storage Area (SS-01)
High-Density Residential	None
Public/Recreation	Landfill (LF-04), portion of Northwest Drainage System (SD-10)



EXPLANATION

- (1) Airfield *
- (2) Aviation Support *
- (3) Industrial
- (4) Institutional (Medical) *
- (5) Institutional (Education)
- (6) Commercial
- (7) Residential †
- (8) Public/Recreation
- (9) Agriculture *
- (10) Vacant Land *
- (11) Military Land *
- Campus Residential Housing
- Petroleum Product Plume (Approximate Extent)
- Base Boundary
- Off-Base Extension

0 750 1500 3000 Feet

* Not Applicable

† 7a - Medium Density; 7b - High Density

IRP Sites - Education and Planned Community Alternative

Figure 4.3-4

- Industrial - Fire Protection Training Area No. 2 is located within this land use area in the Education and Planned Community Alternative. Remediation of this site could delay or restrict industrial development.

- Institutional (Education) - Fire Protection Training Area No. 1, the Underground Storage Tanks (ST-05, ST-06, ST-07, ST-08), the Southwest Drainage System, most of the Northwest Drainage System, the Radioactive Instrumentation Burial Area, the Liquid Fuels Storage Area, the Pesticide Burial Area, and the Storm Line are located within this land use area in the Education and Planned Community Alternative. Fire Protection Training Area No. 1 has been recommended for deletion from further IRP consideration, as has the Northwest Drainage System and the Pesticide Burial Area. In addition, all of the Underground Storage Tanks have been removed, and the buried concrete footings at the Radioactive Instrumentation Burial Area have also been removed. No further remedial activities or impacts on reuse are expected for these sites. However, potential remedial activities associated with the capped portion of the Southwest Drainage System, which has been placed under OU-3 for further investigation, could impact reuse activities. Remedial activities associated with the Liquid Fuels Storage Area include installation and operation of extraction, reinjection, and monitoring wells, which will delay or restrict reuse in that area; approximately 14 acres are expected to be retained by the Air Force to support these remediation activities. Ongoing investigation and future remedial activity for the Storm Line could affect reuse and development in that area as well.

- Residential - The Hazardous Materials Storage Area is located within this land use area in the Education and Planned Community Alternative but has been recommended for deletion from further IRP consideration, so it is not expected to impact reuse development.

- Public/Recreation - The Landfill and a small portion of the Northwest Drainage System are located in this land use area. Depending on the remedy selected, transfer of the Landfill property may be delayed or reuse may be restricted; alternatively, the Air Force may retain the Landfill property. Monitoring wells around the Landfill may restrict reuse of adjacent areas. The Northwest Drainage System has been recommended for deletion from further IRP consideration and is not expected to impact Public/Recreation uses.

4.3.4.4 Storage Tanks. Vehicle and building maintenance operations under the Education and Planned Community Alternative would likely require both aboveground tanks and USTs. USTs and aboveground storage tanks that

would be required by the new owner/operators would be subject to the same regulations as discussed under the Proposed Action.

Existing aboveground storage tanks that would not support reuse activities would be expected to be closed in conformance with appropriate regulations. All identified USTs and sumps and separators are scheduled for removal prior to base disposal.

4.3.4.5 Asbestos. Renovation and demolition of existing structures with ACM may occur with reuse development. Such activities would be subject to all applicable federal, state, and local regulations, including Maricopa County asbestos regulations. All friable asbestos has already been removed from on-base structures or encapsulated; nonfriable asbestos remains in some roofing materials and floor tiles.

4.3.4.6 Pesticides. Pesticide usage associated with the Education and Planned Community Alternative would increase from amounts used under baseline conditions (caretaker status) and would be greater than under the Proposed Action; however, no adverse impacts are anticipated. The only areas potentially requiring significant pesticide use during caretaker status are the golf course and small green areas between buildings in the developed western half of the base. Under the Education and Planned Community Alternative, the golf course would remain in use and a large amount of new residential development would occur, likely resulting in more green areas requiring use of pesticides. Management practices would be subject to FIFRA and state regulations.

4.3.4.7 PCBs. All known federally-regulated PCB-contaminated equipment and PCB-containing equipment has either been removed and properly disposed of or converted to non-PCB status. As discussed for the Proposed Action, confirmatory sampling and laboratory analysis is being conducted for 322 electrical items. Should any of these contain PCBs above regulatory levels, they will be removed prior to base disposal. Therefore, these materials will not create any impacts.

4.3.4.8 Radon. Results of the radon survey completed in 1991 showed only two buildings with radon concentrations exceeding the lower 95 percent confidence limit for a 4 pCi/L exposure. Therefore, radon is not expected to have general impacts on reuse. However, further testing at Buildings 237 and 334 should be conducted prior to reuse.

4.3.4.9 Medical/Biohazardous Waste. All of these materials have been incinerated and removed prior to base closure. Under this alternative, there would be no hospital reuse, so no medical/biohazardous waste would be generated.

4.3.4.10 Ordnance. As described for the Proposed Action, further investigation and removal of any explosive ordnance associated with the Suspected Munitions Burial Site will occur prior to base disposal, so there will be no ordnance impacts on reuse. Similarly, the Firing Range (Facility 925) will be investigated for lead contamination associated with spent bullets and will be cleared, if necessary, to prevent impacts on reuse.

4.3.4.11 Cumulative Impacts. No cumulative impacts of hazardous wastes and hazardous materials are anticipated.

4.3.4.12 Mitigation Measures. The same mitigation measures discussed for the Proposed Action would be appropriate for activities associated with this alternative. In addition, the scheduling of "household collection days" for hazardous residential wastes would mitigate wastewater treatment plant and stormwater discharge concerns that might be associated with disposal of household hazardous wastes from the residential component of this alternative. Educational articles in the local papers and classes offered by community educational programs could increase public awareness on recycling, appropriate use of pesticides, waste minimization, and appropriate waste disposal.

4.3.5 Other Land Use Concepts. This section discusses transfers/ conveyances within the framework of the IRP and within the context of the hazardous materials typically associated with their proposed reuses.

The land use concepts advanced by the Federal Bureau of Prisons, Arizona Department of Corrections, and Arizona Department of Health Services are all essentially institutional and residential in nature. As such, the types of processes that use hazardous materials and produce hazardous wastes would be similar to those identified with the institutional and residential land use types in Table 4.3-1. Impacts associated with hazardous materials and wastes would not be expected to exceed the impacts associated with the Proposed Action or alternatives, as implementation of any of these other land use concepts would occur within the overall development scheme of the Proposed Action or alternatives.

There are no IRP sites in the proposed Federal Bureau of Prisons development area. The IRP sites within the Arizona Department of Corrections and Arizona Department of Health Services proposed development areas are discussed below and summarized in Table 4.3-6.

The Hazardous Materials Storage Area, Northwest Drainage System, and Southwest Drainage System have all been recommended for removal from further IRP consideration. Thus, no further remediation of these three sites is expected to be necessary, and their presence would not impact development of these other land use concepts. Fire Protection Training Area No. 2, however, has been recommended for remedial action; implementation

Table 4.3-6. IRP Sites within Land Use Areas - Other Land Use Concepts

Proposed Land Use	IRP Sites
Federal Bureau of Prisons	None
Arizona Department of Health Services	Portions of the Northwest Drainage System (SD-10), Southwest Drainage System (SD-09)
Arizona Department of Corrections	Hazardous Materials Storage Area (SS-01), Fire Protection Training Area No. 2 (FT-02), portions of the Northwest Drainage System (SD-10), Southwest Drainage System (SD-09)

of the Arizona Department of Corrections proposal in the area of this site may be impacted by remedial activities associated with soil and/or groundwater contamination, though specific remedial activities have not yet been determined.

4.3.6 No-Action Alternative. The principal hazardous waste issues associated with this alternative would concern the ongoing IRP activities. Under the No-Action Alternative, the OL would manage all waste generated under the applicable regulations. Painting and maintenance would be the primary activities that would involve hazardous materials.

4.3.6.1 Hazardous Materials Management. Hazardous materials would be utilized in preventive and regular maintenance activities, grounds maintenance, and water treatment. The materials used for these activities would include pesticides, fuels, paints, and corrosives. The OL would be responsible for hazardous materials handling training as well as hazardous materials communication requirements of OSHA regulations. Quantities of hazardous materials would be similar to those used at closure.

4.3.6.2 Hazardous Waste Management. With the exception of facilities utilized by OL personnel, all satellite accumulation points would be closed and the DRMO would dispose of all hazardous waste. The small amount of hazardous waste that would be generated under the No-Action Alternative may enable the OL to become an exempt, small-quantity generator. The OL must comply with all RCRA and State of Arizona regulations.

4.3.6.3 Installation Restoration Program Sites. Ongoing sampling and remediation activities would be continued by the individual IRP contractors. The OL would support the utility requirements for these contractors and provide security for the IRP areas.

4.3.6.4 Storage Tanks. All identified USTs and sumps and separators are scheduled for removal. Aboveground storage tanks would be purged of fuel

fumes to preclude fire hazards. The Arizona State Fire Marshal may order the removal of aboveground tanks that are out of service. The OL or its agents would provide cathodic protection, repair, and general maintenance for the aboveground storage tanks and piping.

4.3.6.5 Asbestos. There would be no asbestos impacts under the No-Action Alternative. All friable asbestos has already been removed from on-base structures or encapsulated; some nonfriable asbestos remains in roofing materials and floor tiles. Vacated buildings would be secured to prevent contact with ACM if the No-Action Alternative were implemented.

4.3.6.6 Pesticides. Under the No-Action Alternative, the grounds and golf course would be maintained in such a manner as to facilitate economic resumption of use. There should not be an appreciable increase in the use of pesticides from the closure baseline. Application of pesticides would be conducted in accordance with FIFRA and state regulations to ensure the proper and safe handling and application of all chemicals.

4.3.6.7 PCBs. All known federally regulated PCB-contaminated equipment and PCB-containing equipment has either been removed and properly disposed of or converted to non-PCB status. As discussed for the Proposed Action, confirmatory sampling and laboratory analysis is being conducted for 322 electrical items. Should any of these contain PCBs above regulatory levels, they will be removed. Therefore, these materials will not create any impacts.

4.3.6.8 Radon. Results of the radon survey completed in 1991 showed only two buildings (Nos. 237 and 334) with radon concentrations exceeding the lower 95 percent confidence limit for a 4 pCi/L exposure. Vacated buildings (including Buildings 237 and 334) would be secured under the No-Action Alternative and radon would not have any impacts.

4.3.6.9 Medical/Biohazardous Waste. All existing materials have been removed prior to closure; therefore, these materials would not create an impact under the No-Action Alternative.

4.3.6.10 Ordnance. The Suspected Munitions Burial Site will be investigated and any explosive ordnance found there will be removed, so there will be no ordnance impacts under the No-Action Alternative. The Firing Range (Facility 925) will be investigated for lead contamination associated with spent bullets. Because the base property will be secured, any such contamination that may be present will not pose a hazard under the No-Action Alternative.

4.3.6.11 Cumulative Impacts. No cumulative impacts of hazardous wastes and hazardous materials are anticipated.

4.3.6.12 Mitigation Measures. Under the No-Action Alternative, the OL would be responsible for the base-wide management of hazardous materials/waste. Contingency plans developed to address spill response would be less extensive than those required for the Proposed Action or the other reuse alternatives. Implementation of such procedures could effectively mitigate any potential impacts associated with the No-Action Alternative.

4.4 NATURAL ENVIRONMENT

This section describes the potential effects of the Proposed Action and alternatives on the natural resources of soils and geology, water resources, noise, biological resources, and cultural resources in the base area and the surrounding region.

4.4.1 Soils and Geology

The potential effects of the Proposed Action and reuse alternatives on the local soils and geology, as well as the potential effects from the conversion of farmland to other land uses, have been analyzed based on review of published literature. Soils and geology would be affected primarily during any construction, when local soil profiles are altered. After construction, soils would remain relatively stable because they would be overlain by facilities or pavements or will be managed following USDA Soil Conservation Service (SCS) recommendations to minimize erosion.

For the Proposed Action and alternatives, acres of disturbance were calculated by tabulating the acreages of the areas to be disturbed by demolition and/or construction minus facilities that would be retained and reused. Consequently, the acres of disturbance in this section do not equal those reported for the Proposed Action and alternatives in Chapter 2.

4.4.1.1 Proposed Action. Effects of the Proposed Action on the regional soils and geology would be minimal. Effects on local soils and geology would result primarily from the construction activities associated with the Proposed Action, such as grading, excavating, and recontouring the soils. These activities could alter the soil profiles and local topography. No impacts to prime farmland would result under this alternative.

Use of sand and gravel resources (e.g., for construction material and concrete) for new facilities and roadways would not be expected to reduce availability of these materials from local suppliers.

Local soils are either not susceptible or only slightly susceptible to wind and water erosion. Elevation ranges from approximately 1,390 feet mean sea level (MSL) in the southeast corner of the base to approximately 1,326 feet

MSL on the west side of the base. Aside from man-made embankments, dikes, and similar features, slopes across the base are less than 1 percent.

The Mohall-Contine Association, which is found across much of the base, has a moderate to high shrink-swell potential. The Gilman-Estrella-Avondale Association, which is found in the southern portion of the base, has a low to moderate shrink-swell potential (U.S. Department of Agriculture, 1974). The base is located in Seismic Zone 1 of the Uniform Building Code. There is little potential for earth movement in this zone.

Approximately 2,600 acres of land on-base would be disturbed under this alternative. In addition, approximately 25 acres of off-base land would be acquired to extend the easternmost runway and attendant runway protection zones. Additional acreage would be disturbed by off-base road construction to extend Hawes Road north to the San Tan Freeway and south to Germann Road. Soils in the various land use areas would be affected by construction activities. Construction-related activity associated with the renovation and extension of the existing Airfield would affect approximately 1,675 acres of on-base land and 25 acres of off-base land. Construction-related activity in the Aviation Support areas would disturb approximately 420 acres adjacent to both sides of the Airfield. Construction-related activity associated with the Industrial and Commercial areas would disturb approximately 225 acres. Demolition and construction-related activities associated with the Institutional (Education and Medical) areas would only affect approximately 110 acres, as these land uses would be concentrated on reuse of existing base facilities. Approximately 126 acres of existing Public/Recreation land would remain under this alternative, including the 125-acre golf course area, and approximately 186 acres of Vacant Land would be developed into Public/Recreation areas. No adverse effects on local soils are expected.

Cumulative Impacts. Cumulative short-term impacts associated with the increase in demand for construction-related resources (particularly sand and gravel) in the area would have a larger impact when combined with the planned construction of the San Tan Freeway. Because of the extensive sand and gravel pits along the Salt and Gila Rivers and the exploitable sand and gravel deposits present at the surface throughout the Phoenix Basin (Moore and Varga, 1976), this short-term increase in demand is not expected to have a long-term effect on future sources of sand and gravel.

Mitigation Measures. Mitigation measures are available to minimize erosion problems associated with wind and water, especially during the construction phase when trenches and cut slopes are exposed. During construction, the length of time vegetation and other cover is absent should be minimized. When cut slopes are exposed, any of the following measures may be useful in limiting erosion:

- Add protective covering with mulch, straw, or other material (tacking will be required)

- Limit the amount of area disturbed and the length of time slopes and barren ground are left exposed

- Construct diversion dikes and interceptor ditches to divert water away from construction areas

- Install slope drains (conduits) and/or water velocity-control devices to prevent concentrated high velocity streams from developing.

Although mitigation measures would help reduce the amount of erosion that could occur as a result of construction-related activities, erosion by wind and water cannot be completely eliminated. Application of mulch, straw, or synthetic material has proven very effective over the short-term for controlling erosion. After construction, long-term erosion control can be accomplished by keeping soils under vegetative cover and planting windbreaks. The type of vegetation used as windbreaks must comply with FAA standards in areas intended for aircraft runways. After construction, soils underlying facilities and pavements would not be subject to erosion.

Water and wind erosion are not serious hazards for soils of the Mohall-Contine and Gilman-Estrella-Avondale associations (U.S. Department of Agriculture, 1974); therefore, few preventive measures would be necessary to minimize erosion. Water erosion is likely to occur only during infrequent, heavy rainfall events (e.g., summer thunderstorms). Wind erosion is likely to occur on an intermittent basis depending on wind speeds. Use of the identified mitigative measures will minimize the potential for erosion.

Mitigation measures are also available to minimize the problems associated with unfavorable soil properties and seismic activity. The use of appropriate engineering practices, such as stronger foundations and deeper pilings, would reduce the effect of the shrinking and swelling of soils. Appropriate local building standards and best management practices would be followed during construction activities to accommodate potential effects from seismic events.

4.4.1.2 General Aviation and Education Alternative. Impacts associated with soils and geology under the General Aviation and Education Alternative would be similar to those under the Proposed Action, except that the area disturbed is smaller.

Approximately 2,400 acres of land would be disturbed under this alternative. No off-base land disturbance would be required, except for acreage associated with road construction to extend Sossaman Road and Hawes Road north to the San Tan Freeway and Hawes Road south to

Germann Road. Soils in the various land use areas would be affected by construction activities. Approximately 611 acres would be disturbed by renovation of the existing Airfield. Construction-related activity in the Aviation Support areas would disturb approximately 400 acres adjacent to both sides of the Airfield. Construction-related activity associated with the Industrial and Commercial areas would disturb approximately 365 acres. Approximately 531 acres of Vacant Land would be developed into Residential areas. Demolition and construction-related activities associated with the Institutional (Education) areas would only affect approximately 110 acres, as this land use would be concentrated on reuse of existing base facilities. The development of Public/Recreation areas would disturb approximately 362 acres, most of which is Vacant Land. No adverse effects on local soils are expected.

Cumulative Impacts. Cumulative impacts would be similar to those discussed for the Proposed Action.

Mitigation Measures. Potential mitigation measures would be similar to those discussed for the Proposed Action.

4.4.1.3 Commercial Aviation and Education Alternative. Impacts associated with soils and geology under the Commercial Aviation and Education Alternative would be similar to those under the Proposed Action except that the area disturbed is larger. Also, approximately 2 acres of prime farmland off-base would be affected.

Approximately 2,900 acres of on-base land would be disturbed under this alternative, along with approximately 71 acres of additional off-base land that would be acquired to accommodate additional runway lengths and runway protection zones. Additional acreage would be disturbed by off-base road construction to extend Hawes Road north to the San Tan Freeway and south to Germann Road. Soils in the various land use areas would be affected by construction activities. Construction-related activity associated with the renovation and extension of the existing Airfield would affect approximately 1,675 acres of on-base land and 71 acres of off-base land. Construction-related activity in the Aviation Support areas would disturb approximately 661 acres adjacent to both sides of the Airfield. Demolition and construction-related activities associated with the Industrial and Commercial areas would affect approximately 225 acres, most of which is Vacant Land. Approximately 126 acres of existing Public/Recreation land would remain under this alternative, and approximately 186 acres of Vacant Land would be developed into Public/Recreation areas. No adverse effects on local soils are expected.

Williams AFB does not contain any prime or unique farmland. The 71 acres of off-base land to be impacted under the Commercial Aviation and Education Alternative falls within two parcels of land, totaling 263 acres

adjacent to the northwest and southeast corners of the base, which were evaluated by the USDA SCS for the presence of prime or unique farmland. Approximately 135 acres adjacent to the southeast corner of the base was determined to be prime farmland (see Appendix H). The Commercial Aviation and Education Alternative will only impact approximately 2 acres of the 135 acres determined to be prime farmland. This 2-acre area appears on the various maps depicting the Commercial Aviation and Education Alternative in this EIS as the small triangular area at the base of the larger polygon which represents off-base land use acquisition on the southeast corner of the base. Soils of the Gilman series comprise the 2 acres and are classified as prime farmland because this land is farmed and has a dependable irrigation water supply (DeSimone, 1992c; 1992d; U.S. Department of Agriculture, 1984). USDA Form AD-1006, Farmland Conversion Impact Rating, can be found in Appendix H.

Cumulative Impacts. Cumulative impacts would be similar to those discussed for the Proposed Action.

Mitigation Measures. Potential mitigation measures would be similar to those discussed for the Proposed Action. In addition, in accordance with the Farmland Protection Policy Act, the relative significance of the 2 acres of prime farmland to be impacted under this alternative was rated and received a score of 170 using the method specified in form AD-1006 (Appendix H). Under the implementing regulations of the Act, a site that receives a score of 160 or more should be given "increasingly higher levels of consideration for protection" (7 CFR 658.4). Overall, however, adverse impacts to prime and unique farmlands within Maricopa County would not be significant since the loss would constitute less than 0.001 percent of the total amount of prime farmland within the county.

4.4.1.4 Education and Planned Community Alternative. Impacts associated with soils and geology under the Education and Planned Community Alternative would be similar to those under the Proposed Action.

Approximately 2,700 acres of land would be disturbed under this alternative. No off-base land disturbance would be required, except for acreage associated with road construction to extend Sossaman Road and Hawes Road north to the San Tan Freeway and Hawes Road south to Germann Road. Soils in the various land use areas would be affected by construction activities. Construction-related activity associated with the Industrial and Commercial areas would disturb approximately 274 acres. Construction-related activity associated with the Residential areas would disturb approximately 1,874 acres but would be concentrated in areas already developed by base-related activities. Demolition and construction-related activities associated with the Institutional (Education) areas would only affect approximately 110 acres since this land use would be concentrated on reuse of existing base facilities. Approximately 126 acres

of existing Public/Recreation land would remain under this alternative and approximately 394 acres of vacant and previously disturbed land would be developed into Public/Recreation areas. No adverse effects on local soils are expected.

Cumulative Impacts. Cumulative impacts would be similar to those discussed for the Proposed Action.

Mitigation Measures. Potential mitigation measures would be similar to those discussed for the Proposed Action.

4.4.1.5 Other Land Use Concepts. Effects on soils and geology as a result of federal and independent land use concepts that may be implemented in addition to one of the integrated reuse alternatives are discussed below.

Federal Bureau of Prisons. Potential impacts to soils may result from construction on the 20 acres of undeveloped land. Impacts from erosion are expected to be short-term during the construction phase when steep-walled trenches and barren soil are exposed. Once construction is complete, the erosion potential will be minimized by revegetation or the presence of overlying facilities.

Arizona Department of Corrections. Potential impacts to soils and geology in the west-central area designated for immediate use would be insignificant because new construction, if any, would be limited to minor renovation. Potential impacts to soils may result from construction on the areas of undeveloped land in the northeast and south-central portions identified for future use. Impacts from erosion are expected to be short-term during the construction phase when steep-walled trenches and barren soil are exposed. Once construction is complete, the erosion potential will be minimized by revegetation or the presence of overlying facilities.

Arizona Department of Health Services. Potential impacts to soils and geology in the designated west-central areas would be insignificant because new construction, if any, would be limited to minor renovation.

4.4.1.6 No-Action Alternative. The No-Action Alternative would not result in any major new impacts to the soils and geology of the base area and the surrounding region. The construction operations associated with this alternative would be minimal or non-existent and restricted to maintenance-type activities. No cumulative impacts would result, and no mitigation measures would be required.

4.4.2 Water Resources

The following section describes the potential impacts on water resources as a result of the Proposed Action and reuse alternatives. Construction

activities could alter soil profiles and natural drainages, which, in turn, may alter drainage patterns temporarily. Water quality is described in Section 3.4.2.

4.4.2.1 Proposed Action

Surface Water. Under the Proposed Action, soils would be compacted during new construction and overlain by asphalt, asphaltic concrete, or buildings, creating impervious surfaces that would cause increased stormwater runoff to local storm drainage and sewerage systems. As a result, drainage patterns would be altered to divert water away from facilities and airfield pavements. Stormwater discharge (non-point source) from the airfield, airfield support areas, and other heavy industrial areas may contain fuels, oils, and other residual contaminants which could degrade surface water resources.

Surface water over much of the base is intermittent and results from precipitation runoff. Stormwater discharges would increase because of the new construction associated with the Proposed Action. Approximately 2,600 acres of land would be disturbed under this alternative in addition to 25 acres of off-base land. Stormwater quality is expected to remain similar to existing conditions due to the infrequent rainfall events. Surface water that could be affected by activities at Williams AFB is not used as a source of domestic or industrial water supply.

The project will be subject to NPDES permit requirements for stormwater discharges during the construction period and for the duration of airport operations. Specifically, construction activities involving clearing, grading, or excavation which results in the disturbance of 5 or more acres of land and certain activities associated with transportation facilities (e.g., maintenance shop operations) are subject to NPDES permit requirements for stormwater discharges (40 CFR 122). This provision is contained in the NPDES Permit Application Regulations for Stormwater Discharges issued by the U.S. EPA as a final rule on November 16, 1990.

The existing storm drainage system will continue to remove runoff from the western portion of the base and the runway/taxiway areas. Storm drainage systems will be required for the newly developed areas of the base. The increased area of impervious surfaces will increase the volume and rate of stormwater discharge from the base. This increase in stormwater discharge is expected to be minimal due to the minor increase in total impervious surface area that will be drained and the infrequency of rainfall. Stormwater may pond if the capacity of the drainage system is insufficient to remove water as it is collected. A comprehensive stormwater runoff management plan and a comprehensive landscape plan are recommended. No increase in flooding potential is anticipated with properly designed and constructed stormwater management and drainage systems.

Groundwater. Under the Proposed Action, it is assumed that water will be provided by the City of Mesa from both groundwater and surface water sources. Base wells will be removed from service. The City of Mesa currently withdraws groundwater for approximately 10 percent of the total water produced (Wisz, 1993). This percentage would be expected to remain the same or decline in the future with an increase in the use of surface water. Projected water production associated with the Proposed Action for the year 1993 (closure) and the years 1998, 2003, and 2013 is shown in Table 4.4-1. For comparison, Williams AFB has been producing between 1.2 and 1.3 MGD from groundwater in recent years which is greater than the projected groundwater demand for the Proposed Action or any of the alternatives.

Table 4.4-1. Projected Water Demand - Proposed Action

Year	Total Production (MGD)	Groundwater Production (MGD)	Contribution to Overdraft (ft/yr)	Increase Over Current Base Operations (ft/yr)
1993*	0.04	0.04	0.00	0.00
1998	0.98	0.10	0.00	0.00
2003	1.80	0.18	0.00	0.00
2013	4.19	0.42	0.00	0.00

*1993 (closure) demand represents that associated with the OL after closure and is equivalent to the No-Action Alternative.

Impacts of projected water withdrawals on the Phoenix Basin are shown in Table 4.4-2. Impacts of projected water usage on the Phoenix Basin will vary depending on the source of the water. The Phoenix Basin is in a state of overdraft. Groundwater levels in the basin have dropped by more than 300 feet since 1940, and the average annual drawdown for the East Salt River Valley is between 4 and 6 feet (Arizona Department of Water Resources, 1991). Drawdown rates within the ROI are projected to be reduced through conservation and the development of alternative sources of water. The Proposed Action should contribute positively, but negligibly, to regional drawdown due to disuse of the current production wells on Williams AFB. The amount of groundwater used under the Proposed Action and reuse alternatives is small relative to total groundwater use in the ROI and is projected to have little effect on the average regional drawdown rate of 5 feet per year.

Cumulative Impacts. The Air Force has an agreement with the Bureau of Reclamation for surface water from the Central Arizona Project (CAP). However, Williams AFB has sent letters to the Bureau of Reclamation and to the Central Arizona Water Conservation District stating its desire to relinquish its CAP entitlement (Smith, 1993a; 1993b). The base currently

Table 4.4-2. Cumulative Projected Drawdown Values (feet) in the ROI

	1993	1998	2003	2013
Proposed Action	5.0	25.0	50.0	100.0
General Aviation and Education Alternative	5.0	25.0	50.0	100.0
Commercial Aviation and Education Alternative	5.0	25.0	50.0	100.0
Education and Planned Community Alternative	5.0	25.0	50.0	100.0
No-Action Alternative	5.0	25.0	50.0	100.0

Note: Drawdown values account for existing lowering of the water table at a rate of 5 ft/yr due to regional overdrafting.

does not have a system to accept CAP water, and an agreement between the City of Mesa and Williams AFB to extend a City of Mesa water line to the base to convey CAP water was never executed. However, the City of Mesa currently has its own CAP entitlement of 34,000 acre-feet/year and makes use of some 15,000 to 16,000 acre-feet/year (Wisz, 1993). The availability of CAP water has enabled the City of Mesa to rely less on groundwater. Groundwater now accounts for only about 10 percent of the City of Mesa's water needs and is used only for peaking purposes (Wisz, 1993). As the Williams AFB property lies within the City of Mesa, it is assumed that the City of Mesa will extend water service to the base property in the future to better enable reuse development. Providing City of Mesa water to the base property would result in a beneficial cumulative impact on groundwater demand, compared to the preclosure reference, due to less reliance on groundwater as a water source.

Mitigation Measures. To minimize ponding, flooding, and potential impacts to surface water quality, construction designs should incorporate provisions to control stormwater runoff. The following practices could be implemented to reduce the impacts to surface water quality during construction:

- Create landscaped areas which are pervious to surface water
- Minimize areas of surface disturbance
- Control site runoff
- Minimize time that disturbed areas are exposed to erosion
- Schedule surface-disturbing activities during dry seasons
- Provide regular street sweeping.

Oil-water separators could be installed to improve water quality prior to discharge to stormwater drainage systems.

4.4.2.2 General Aviation and Education Alternative

Surface Water. Types of impacts associated with surface water under this alternative would be similar to those under the Proposed Action, except that the area disturbed is smaller than under the Proposed Action. Stormwater discharges would increase under this alternative relative to the closure baseline because of the new construction; however, the increase would be

less than that under the Proposed Action. This alternative would disturb approximately 2,400 acres. Associated impacts are expected to be similar to those discussed for the Proposed Action. The additional decrease in disturbed area would be minor in comparison to the total surface area.

Groundwater. Under the General Aviation and Education Alternative, impacts to groundwater resources are expected to be similar to those described for the Proposed Action. Projected water production associated with this alternative for the years 1993, 1998, 2003, and 2013 is shown in Table 4.4-3.

Table 4.4-3. Projected Water Demand - General Aviation and Education Alternative

Year	Total Production (MGD)	Groundwater Production (MGD)	Contribution to Overdraft (ft/yr)	Increase Over Current Base Operations (ft/yr)
1993*	0.04	0.04	0.00	0.00
1998	0.97	0.10	0.00	0.00
2003	2.13	0.21	0.00	0.00
2013	4.63	0.46	0.00	0.00

*1993 (closure) demand represents that associated with the OL after closure and is equivalent to the No-Action Alternative.

Cumulative Impacts. Cumulative impacts are expected to be similar to those described for the Proposed Action.

Mitigation Measures. Potential mitigation measures would be similar to those discussed for the Proposed Action.

4.4.2.3 Commercial Aviation and Education Alternative

Surface Water. Types of impacts associated with surface water under this alternative would be similar to those under the Proposed Action, except that the area disturbed is larger than under the Proposed Action. Stormwater discharges would increase under this alternative relative to the closure baseline because of the new construction. This alternative would disturb approximately 2,900 acres on-base, along with 71 acres of off-base land that would be acquired to accommodate additional runway lengths and runway protection zones. This alternative would disturb approximately 300 acres more than the Proposed Action. Impacts associated with flooding and drainage systems are expected to be similar to those described for the Proposed Action.

Groundwater. Under the Commercial Aviation and Education Alternative, impacts to groundwater are expected to be similar to those described for the Proposed Action. Projected water production associated with this alternative for the years 1993, 1998, 2003, and 2013 is shown in Table 4.4-4.

Table 4.4-4. Projected Water Demand - Commercial Aviation and Education Alternative

Year	Total Production (MGD)	Groundwater Production (MGD)	Contribution to Overdraft (ft/yr)	Increase Over Current Base Operations (ft/yr)
1993*	0.04	0.04	0.00	0.00
1998	0.88	0.09	0.00	0.00
2003	1.84	0.18	0.00	0.00
2013	4.24	0.42	0.00	0.00

*1993 (closure) demand represents that associated with the OL after closure and is equivalent to the No-Action Alternative.

Cumulative Impacts. Cumulative impacts are expected to be similar to those described under the Proposed Action.

Mitigation Measures. Potential mitigation measures would be similar to those discussed for the Proposed Action.

4.4.2.4 Education and Planned Community Alternative

Surface Water. Types of impacts associated with surface water under this alternative would be similar to those under the Proposed Action. Stormwater discharges would increase under this alternative relative to the closure baseline. This alternative would disturb approximately 2,700 acres because of the conversion of the existing airfield to residential, commercial, and institutional uses. Impacts to flooding and drainage systems are expected to be similar to those discussed for the Proposed Action.

Groundwater. Under the Education and Planned Community Alternative, impacts to groundwater are expected to be similar to those described under the Proposed Action. Projected water production associated with this alternative for the years 1993, 1998, 2003, and 2013 is shown in Table 4.4-5.

Cumulative Impacts. Cumulative impacts are expected to be similar to those described under the Proposed Action.

Table 4.4-5. Projected Water Demand - Education and Planned Community Alternative

Year	Total Production (MGD)	Groundwater Production (MGD)	Contribution to Overdraft (ft/yr)	Increase Over Current Base Operations (ft/yr)
1993*	0.04	0.04	0.00	0.00
1998	0.44	0.04	0.00	0.00
2003	0.90	0.10	0.00	0.00
2013	1.90	0.20	0.00	0.00

* 1993 (closure) demand represents that associated with the OL after closure and is equivalent to the No-Action Alternative.

Mitigation Measures. Potential mitigation measures would be similar to those discussed for the Proposed Action.

4.4.2.5 Other Land Use Concepts. Effects on water resources as a result of federal and independent land use concepts that may be implemented in addition to one of the integrated reuse alternatives are discussed below.

Federal Bureau of Prisons. Potential impacts to surface water may result from construction on the 20 acres of undeveloped land which the Federal Bureau of Prisons has expressed interest in. An increase in stormwater drainage would be associated with an increase in the impervious area. Use of mitigation measures as discussed for the Proposal Action and a storm drainage system will minimize impacts to surface water. Potential impacts to groundwater would be minimal since water will be supplied to the area by the City of Mesa. Much of the water will be derived from surface water sources, so impacts on groundwater resources will be minimized.

Arizona Department of Corrections. Potential impacts to surface water in the west-central area designated for immediate use would be insignificant because new construction, if any, would be limited to minor renovation. Potential impacts to surface water may result from construction on the undeveloped land in the northeast and south-central portions identified for future use. Impacts can be minimized through the use of mitigation measures as discussed for the Proposal Action and the design of a storm drainage system. Potential impacts to groundwater are minimal since water would be supplied to the area by the City of Mesa. Much of the water will be derived from surface water sources, so impacts on groundwater resources will be minimized.

Arizona Department of Health Services. Potential impacts to surface water from construction in the designated west-central areas would be insignificant because new construction, if any, would be limited to minor renovation. Potential impacts to groundwater are minimal since water

would be supplied to the area by the City of Mesa. Much of the water would be derived from surface water sources, so impacts on groundwater resources would be minimized.

4.4.2.6 No-Action Alternative. The No-Action Alternative would have positive effects on surface water and groundwater quantity and quality. With very limited operations and no increase in population, water demands from OL personnel would be minimal and could be accommodated by the existing on-base water supply system. No cumulative impacts would result, and no mitigation measures would be required.

4.4.3 Air Quality

Air quality impacts will occur during construction and operations associated with the Proposed Action and alternatives for the reuse of Williams AFB. Intermittent construction-related impacts result from fugitive dust (particulate matter) and construction/demolition equipment emissions. Operational impacts occur from: (1) mobile sources such as aircraft flying operations, aircraft operation support equipment, commercial transport vehicles, and personal vehicles; (2) stationary point sources such as aircraft ground operations, heating/power plants, generators, incinerators, and storage tanks; (3) miscellaneous sources such as solvent use; and (4) secondary emission sources associated with a general population increase, such as residential heating.

The methods selected to analyze impacts depend upon the type of air emission sources being examined. Air quality analytical methods are summarized here and presented in further detail in Appendix E, Methods of Analysis. The primary emission source categories associated with the Proposed Action and other reuse alternatives include construction, aircraft operations, motor vehicles, and stationary sources such as fuel combustion and aircraft ground operations. Analysis for stationary source and mobile source emissions consists of quantifying the emissions and evaluating how those emissions would affect attainment or maintenance of the National Ambient Air Quality Standards (NAAQS) and the Arizona Ambient Air Quality Standards (AAAQS).

The Emissions and Dispersion Modeling System (EDMS), jointly developed by the FAA and the U.S. Air Force, and the SCREEN model, developed by the U.S. EPA, are used to assess air quality impacts associated with the Proposed Action and the other reuse alternatives for Williams AFB. EDMS is used to estimate the criteria pollutant emissions from aircraft flying operations and to predict pollutant concentrations associated with aircraft flying operations and on-road mobile vehicles. The EDMS model is initially used in a screening mode with an array of 1-hour worst-case meteorological conditions which consist of wind speeds of 1 meter per second, F stability class (stable), and wind directions from 10 to 360 degrees in increments of

10 degrees. Stability class F is used in the analysis because these meteorological conditions provide the most conservative air quality impact results. If predicted ground level concentrations from the screening mode modeling results in an exceedance of an AAQS, EDMS is used in a refined mode. One year of meteorological data from the Rittenhouse, AZ PRISMS Network Station was applied when modeling in refined mode. This meteorological station, located within 3 miles of Williams AFB, provides meteorological data which is representative of Williams AFB. Data from the station was used because 24-hour data is not collected at the base. Meteorological data from 1991 was used since it represents the most recent complete data set. Details on the refined modeling approach, including receptor selection and other inputs, is described in Appendix E. SCREEN is used to predict criteria pollutant concentrations resulting from emissions of stationary point sources. The SCREEN model is run in a simple terrain mode using worst-case meteorological conditions consisting of wind speeds of 1 meter per second and F stability class (stable). Total concentrations at each receptor are obtained by post-processing to combine the EDMS and SCREEN concentration contributions.

Emission source groups, the associated emission inventory for criteria pollutants, and modeling assumptions for the Proposed Action and reuse alternatives are given in Appendix K. There is no "major source" projected in any of the base reuse alternatives. A "major source" in a nonattainment area (see Section 3.4.3.1) is defined in Article 1 of the Arizona Air Pollution Control Regulations (State of Arizona, 1990) as any stationary source which emits, or has the potential to emit, 100 tons per year or more of any pollutants subject to regulation under the Clean Air Act. Prevention of Significant Deterioration (PSD) regulations also do not apply to the projected emission sources since the reuse alternatives considered do not include source categories which are subject to PSD regulations. Offset of emission rates associated with the Proposed Action and reuse alternatives and demonstration of net air quality benefit are also exempted since no "major source" is associated with the base reuse alternatives considered. However, demonstration of compliance with NAAQS is required. Hazardous Air Pollutant (HAP) emissions were not addressed in the emissions inventories since preclosure emission levels were not available and the preliminary nature of the reuse alternatives did not support development of detailed emissions inventories for HAPs.

Air quality modeling is presented for the Proposed Action and alternatives through the year 2003 (ten years of analyses). The effects of the 1990 Clean Air Act Amendments, such as electric and other low-emission vehicle ownership percentages, cannot be accurately predicted very far into the 21st century. The uncertainties of long-range population and traffic projections, future Clean Air Act changes, and the complex interaction of meteorology with emission inventories makes a 20-year pollution concentration estimate too speculative.

To estimate PM_{10} emissions from construction activities for the Proposed Action and alternatives, acres of disturbance were calculated by tabulating the areas to be disturbed by construction and/or demolition minus facilities that would be retained and reused. Consequently, the areas of disturbance by phase presented in this section do not equal those reported for the Proposed Action and alternatives in Chapter 2.

4.4.3.1 Proposed Action. Total estimated unmitigated emissions of the Proposed Action are presented in Table 4.4-6 for the years 1993, 1998, and 2003. The methodologies used to generate these emissions are discussed in Appendix E and summarized in Appendix K.

Table 4.4-6. Unmitigated Pollutant Emissions Associated with the Proposed Action (tons/year)[a]

	Preclosure Annual Emission Inventory[b]		Base Reuse[c]			
Pollutant	PMCUPA	WAFB	1993	1998A[f]	1998B[f]	2003
VOCs	87,212[d]	726.3[e]	61.6	835.1	823.7	1,433.1
PM_{10}	46,339	11.9	2.5	55.2	55.1	14.1
CO	245,748	3,680.2	89.5	1,574.2	1,553.5	2,222.9
NO_x[g]	55,186	167.2	26.9	379.4	365.6	534.9
SO_x[g]	6,160	49.5	2.1	10.0	9.1	9.9

Notes:
[a] Includes controls for late 1990s fleet mix but otherwise unmitigated.
[b] Refer to Table 3.4-6. Williams AFB emissions include emission data from Table 3.4-6 plus indirect emissions associated with operation of Williams AFB.
[c] See Appendix K for details on each emission source category.
[d] VOC emissions.
[e] Hydrocarbon emissions.
[f] The 1998A case assumes that the Arizona ANG 161st AREFG relocates to Williams AFB and performs 7,200 annual operations following closure. The 1998B case assumes the 161st AREFG does not relocate to Williams AFB following closure but does perform 3,000 touch-and-goes (6,000 operations) annually.
[g] For purposes of analysis, NO_x is equated to NO_2 and SO_x is equated to SO_2.

Construction. Fugitive dust and combustive emissions would be generated during construction activities associated with Airfield, Aviation Support, Industrial, Institutional, Commercial, Residential, and Public/Recreation land uses. These emissions would be greatest during site clearing and grading activities. Uncontrolled fugitive dust (particulate matter) emissions from ground disturbing activities are assumed to be emitted at a rate of 1.2 tons per acre per month (U.S. Environmental Protection Agency, 1992). The PM_{10} fraction of the total fugitive dust emissions is assumed to be 50 percent or 0.6 tons per acre per month. It is further assumed that a month consists of 22 working days and that disturbed soils would not remain exposed for more than 4 days. The effective PM_{10} generation rate thus becomes approximately 220 pounds per acre.

It is estimated that construction and demolition activity would disturb a total of approximately 2,245 acres over the first 10-year period of project development. Approximately 2,115 acres would be disturbed during the period 1993 to 1998 and approximately 130 acres during the next 5-year period from 1998 to 2003. Assuming that the disturbance is spread evenly throughout these periods, the average area of disturbance in any one year is estimated to be 423 acres and 26 acres for each time period, respectively. The average unmitigated amount of PM_{10} emissions in one year would, therefore, be 46.5 and 2.9 tons, respectively. The impact of these emissions would cause elevated short-term concentrations of particulates at receptors close to the construction areas. However, the elevated concentrations would be a temporary effect that would fall off rapidly with distance.

Operations. Total estimated unmitigated emissions associated with operations under the Proposed Action are presented in Table 4.4-6 for the years 1993, 1998, and 2003. It should be noted that two cases are presented for 1998 emissions. Case 1998A assumes that the Arizona ANG 161st AREFG will relocate to the base and conduct 1,200 KC-135R annual operations in addition to 3,000 annual touch-and-goes (representing 3,000 landings and 3,000 takeoffs). Case 1998B assumes that the Arizona ANG 161st AREFG does not relocate to the base but still performs 3,000 annual touch-and-goes (representing 3,000 landings and 3,000 takeoffs). Estimates of aircraft operation emissions are based on U.S. EPA aircraft emission factors provided as part of the built-in database of the EDMS model. The EDMS model uses U.S. EPA emission factors and information on hourly operations (including takeoff, runway climb and approach, runway queuing, taxi-in and taxi-out, and idling) to produce an emissions inventory report. Estimates for emissions of all other source categories are calculated as described in Appendix K and earlier in this section.

Potential impacts to air quality as a result of criteria air pollutant emissions from the operations under the Proposed Action were evaluated in terms of two spatial scales: regional and local. The regional-scale analysis compared the potential source emissions to the Phoenix and Maricopa County Nonattainment Area (PMCNA) emissions for the criteria pollutants. The local-scale analysis evaluated the potential impact to ambient air quality concentrations in the immediate vicinity of the base.

Regional Scale. The Federal Clean Air Act Amendments of 1990 (CAAA), Arizona Air Pollution Control Laws, and Arizona Air Pollution Control Regulations establish a variety of air emission management and control requirements which will affect both existing and future sources of air pollutants in the State of Arizona. The National Ambient Air Quality Standards and Arizona Ambient Air Quality Standards for the criteria pollutants are presented in Table 3.4-1. Williams AFB is located in the Phoenix and Maricopa County Urban Planning Area (PMCUPA), which is

designated as a "moderate" nonattainment area for CO, O_3, and PM_{10}. It is designated as attainment for SO_2, NO_2, and lead. According to the 1990 CAAA, attainment dates for CO, O_3, and PM_{10} are assigned as December 31, 1995, December 31, 1996, and December 31, 1994, respectively. In Pinal County, the Apache Junction and Hayden/Miami planning areas are designated as "moderate" nonattainment areas for PM_{10}, and the San Manuel and Hayden/Miami planning areas are designated as nonattainment areas for SO_2. Air quality impacts on these areas from the Proposed Action are negligible.

The Maricopa Association of Governments (MAG) attainment plans for CO, O_3, and PM_{10} nonattainment areas are currently under revision. Proposed attainment plans include establishing a state-wide vehicle inspection program, reducing 1990 PM_{10} emission rates by 23 percent by the end of 1994, improving long- and short-term transit, converting bus fuel systems to alternative fuels, using electric buses for shuttle service (areawide), and other similar programs.

The evaluation of regional-scale impacts from the Proposed Action has considered the potential criteria air pollutant emissions sources which could have an effect on the air quality attainment status of the NAAQS. Since different requirements will apply to nonattainment pollutants and attainment pollutants, this analysis is subdivided by nonattainment pollutants (CO, PM_{10} and O_3) and attainment pollutants (SO_2 and NO_2).

Nonattainment Pollutants (O_3, CO, and PM_{10}). The PMCUPA currently exceeds the NAAQS for ozone, CO, and PM_{10}. Since ozone is a secondary pollutant formed in the atmosphere and not directly emitted as a pollutant by itself, emissions of its precursor pollutants, NO_x and VOCs, are examined. The potential NO_x and VOC emissions as well as the CO and PM_{10} emissions from the Proposed Action are evaluated to determine if those emissions would be a major contributor to the overall emission levels in the area.

The major contributors of the emissions associated with the Proposed Action are aircraft flying operations (NO_x and CO), on-road vehicles (NO_x, CO, VOCs), construction/demolition (NO_x, CO, VOCs, and PM_{10}), solvent use (VOCs), petroleum storage and transfer (VOCs), and industrial processes (VOCs). In addition, small quantities of VOCs will be produced from air stripping operations associated with groundwater remediation at the Liquid Fuels Storage Area (IRP Site ST-12). Fume incineration, in conjunction with carbon adsorption if necessary, will limit air stripper VOC emissions to less than 3 pounds per day (IT Corporation, 1992e). Table 4.4-6 summarizes the results of the emission calculations for the Proposed Action for the 0-, 5-, and 10-year increments after closure. This table also provides a comparison of the magnitude of the direct reuse-associated emissions with the 1989 Maricopa County nonattainment area emission inventory and the

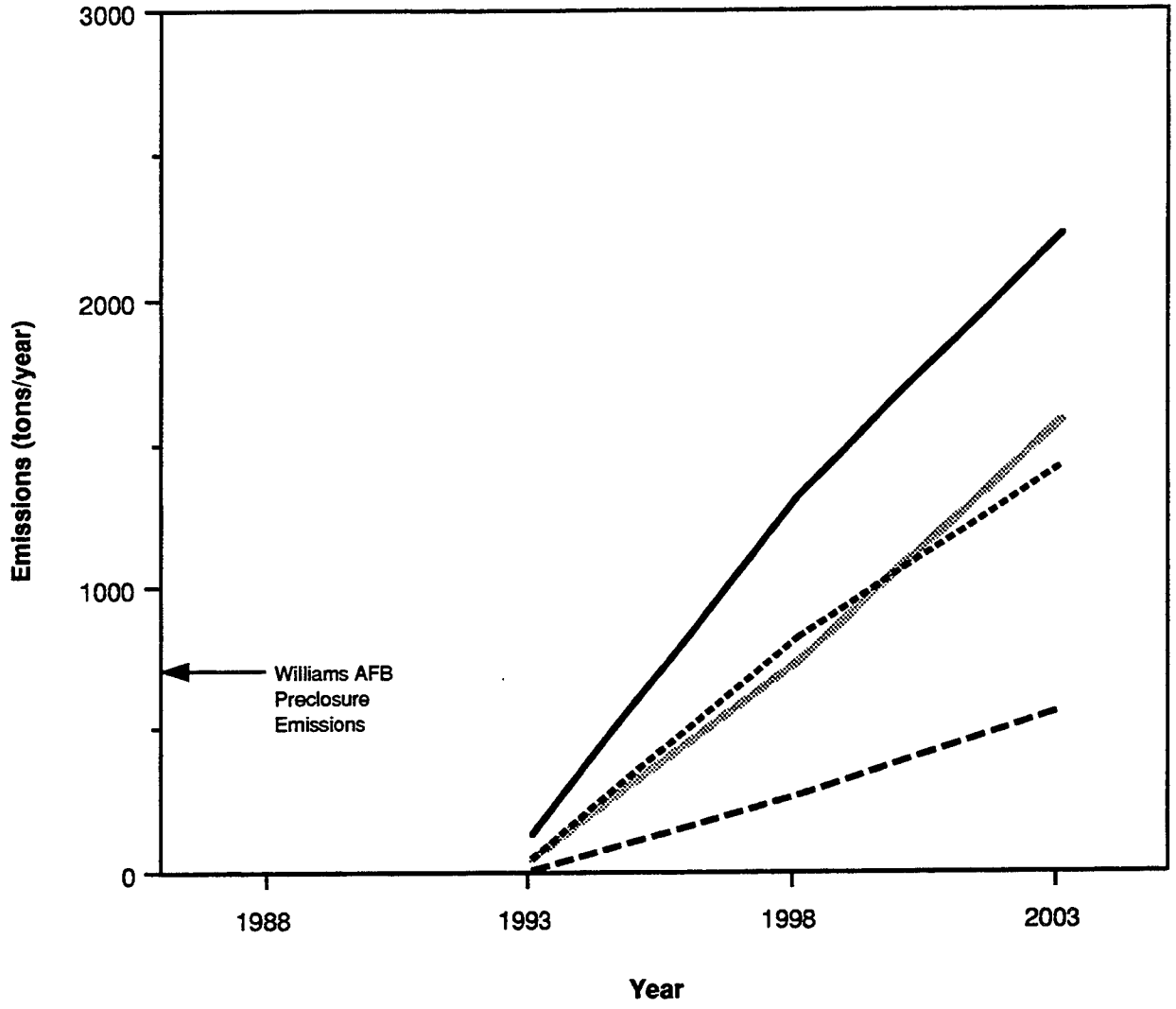
1990 Williams AFB emission levels. Figures 4.4-1 through 4.4-4 provide a graphical representation of these emissions for VOCs, PM_{10}, CO, and NO_x for the 10-year period of 1993 through 2003. The ozone precursor emissions of NO_x and VOCs and the emissions of CO and PM_{10} associated with the Proposed Action are a small percentage of the areawide emissions (less than 1 percent).

Attainment Pollutants (NO_2 and SO_2). The PMCUPA is in attainment of the NAAQS for NO_2 and SO_2. For purposes of analysis, NO_x is equated to NO_2 and SO_x is equated to SO_2. The primary contributors to the total emissions of SO_x associated with the Proposed Action are construction/demolition and aircraft flying operations. Table 4.4-6 provides a comparison of the SO_x and NO_x emissions associated with the Proposed Action and the PMCUPA SO_x and NO_x emission levels. Figures 4.4-4 and 4.4-5 provide a graphical representation of NO_x and SO_x emissions for the 10-year period of 1993 through 2003 and also show that SO_x and NO_x emissions are a small percentage of the areawide emissions (less than 1 percent). Although future attainment emission levels of SO_x and NO_x are not available from the Maricopa County Bureau of Air Pollution Control, the Proposed Action is not expected to have an adverse impact on regional air quality for the attainment pollutants.

Local Scale. Table 4.4-7 presents a summary of potential impacts from activities associated with the Proposed Action. Included in the table are background concentrations for each pollutant. These are based on data collected from monitoring stations considered representative for Williams AFB. For the Proposed Action, all modeled concentrations were developed using EDMS in screening mode. Refined EDMS modeling was not required for this alternative because screening mode results did not predict an AAQS exceedance. Modeling results for the Proposed Action show that the maximum 1-hour pollutant concentration would occur along the southeast sections of the base boundary. The table shows that concentrations associated with the Proposed Action are in compliance with the NAAQS and AAAQS for all pollutants for all years considered in this analysis.

Cumulative Impacts. No other projects have been identified that would contribute to air quality impacts from the Proposed Action. The San Tan Freeway, originally scheduled for completion in 2005, has been delayed due to lack of funding; construction is now not expected to begin until sometime after 2006. Therefore, cumulative impacts on air quality within the 10-year period of analysis are expected to be minimal.

Mitigation Measures. Air quality impacts during construction would occur from (1) fugitive dust emissions from ground-disturbing activities and (2) combustive emissions from construction equipment. The future project proponents would have the responsibility of mitigating these impacts. The use of water sprays twice a day during ground-disturbing activities would



1989 Baseline Emissions in the PMCNA = 87,212 tons/year

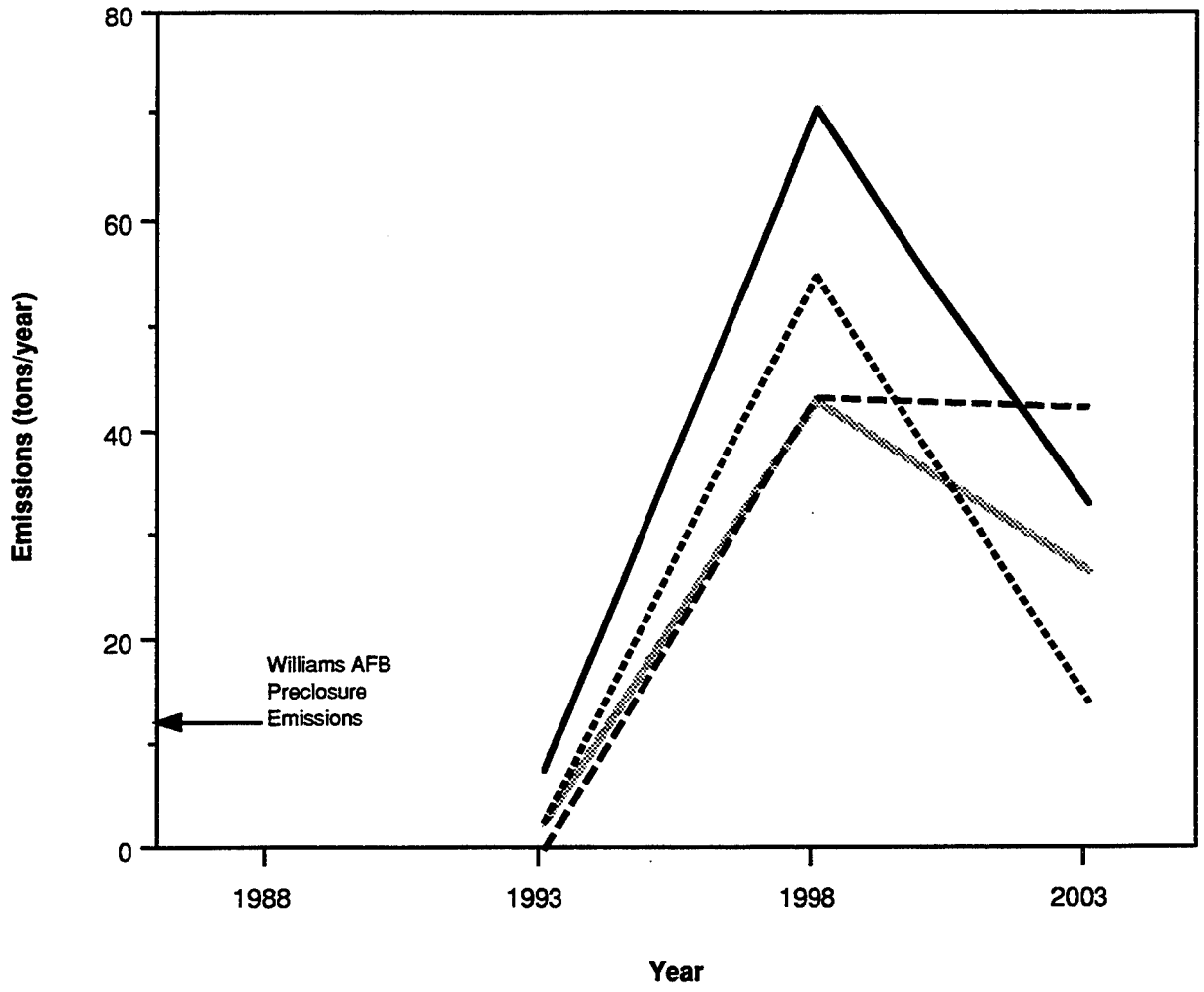
1990 Preclosure Emissions at Williams AFB = 726.3 tons/year

EXPLANATION

- Proposed Action (Case 1988A shown)
- General Aviation and Education
- Non-Aviation – Education and Planned Community
- Commercial Aviation and Education

VOC Emissions from Williams AFB Reuse Alternatives

Figure 4.4-1



1989 Baseline Emissions in the PMCNA = 46,339 tons/year

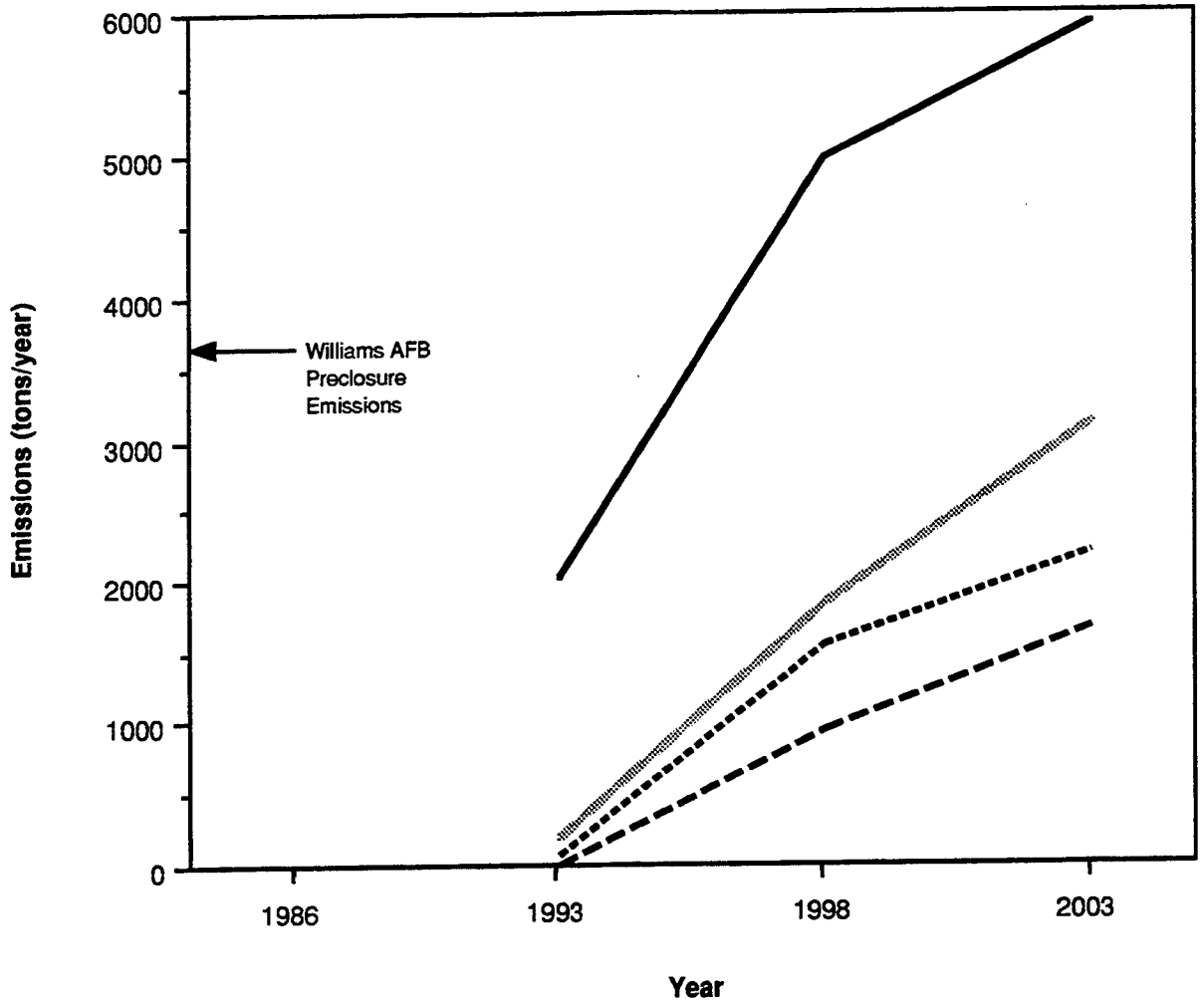
1990 Preclosure Emissions at Williams AFB = 11.9 tons/year

EXPLANATION

- Proposed Action (Case 1988A shown)
- General Aviation and Education
- Non-Aviation – Education and Planned Community
- Commercial Aviation and Education

PM_{10} Emissions from Williams AFB Reuse Alternatives

Figure 4.4-2



1989 Baseline Emissions in the PMCNA = 245,748 tons/year

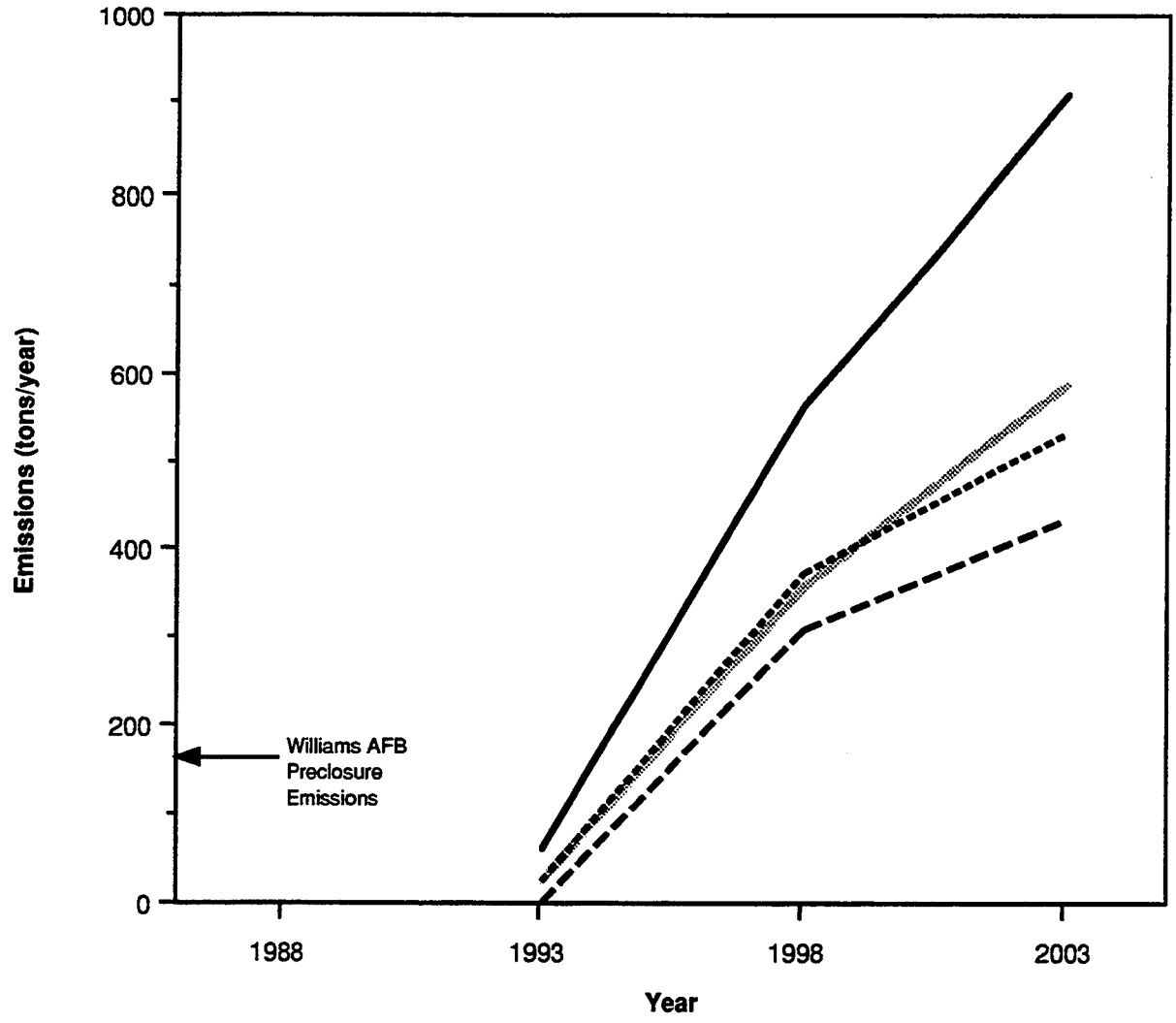
1990 Preclosure Emissions at Williams AFB = 3,680.2 tons/year

EXPLANATION

- Proposed Action (Case 1988A shown)
- General Aviation and Education
- Non-Aviation – Education and Planned Community
- Commercial Aviation and Education

CO Emissions from Williams AFB Reuse Alternatives

Figure 4.4-3



1989 Baseline Emissions in the PMCNA = 55,186 tons/year

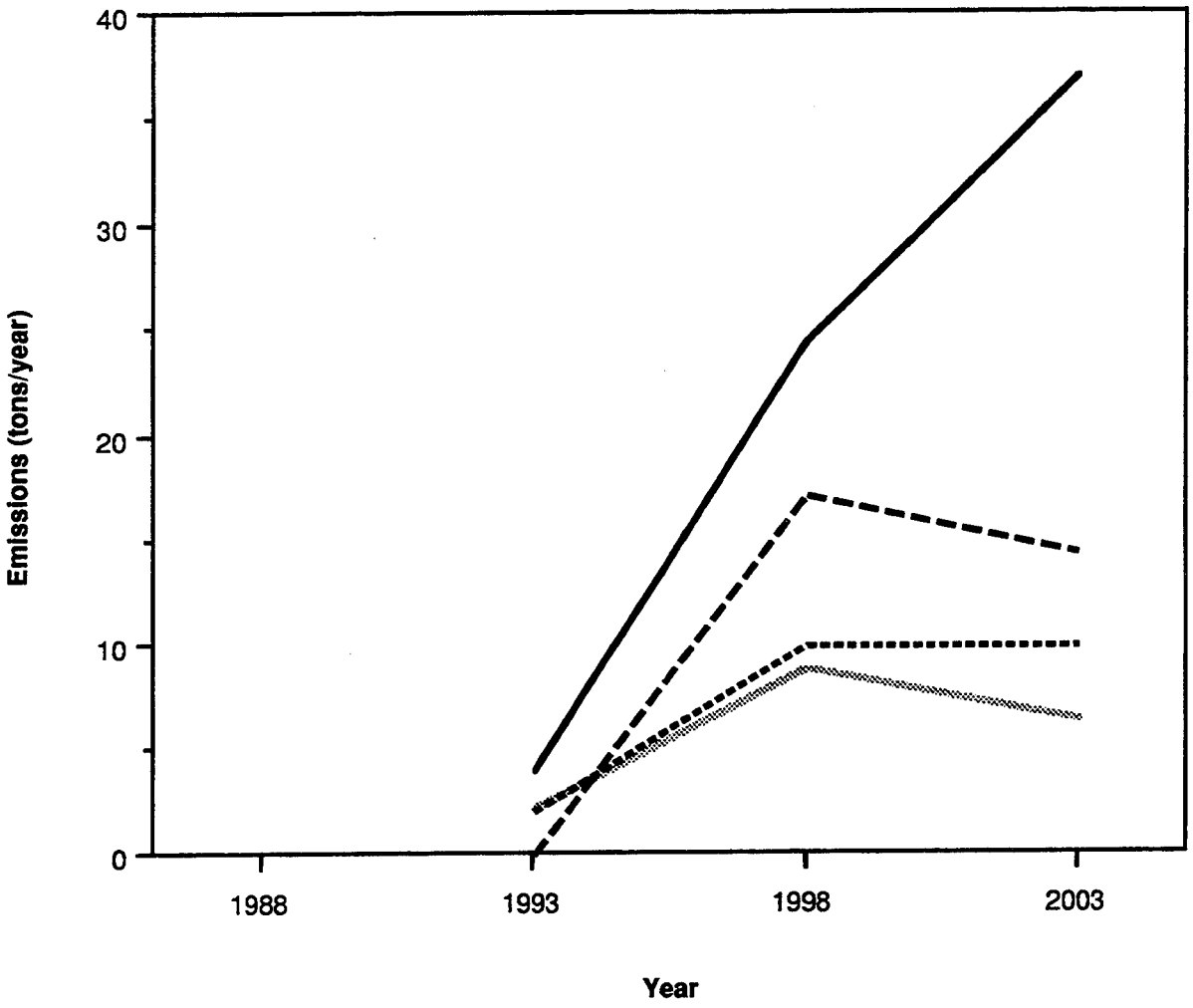
1990 Preclosure Emissions at Williams AFB = 167.2 tons/year

EXPLANATION

- Proposed Action (Case 1988A shown)
- General Aviation and Education
- Non-Aviation – Education and Planned Community
- Commercial Aviation and Education

NOx Emissions from Williams AFB Reuse Alternatives

Figure 4.4-4



1989 Baseline Emissions in the PMCNA = 6,160 tons/year

1990 Preclosure Emissions at Williams AFB = 49.5 tons/year

EXPLANATION

- Proposed Action (Case 1988A shown)
- General Aviation and Education
- Non-Aviation – Education and Planned Community
- Commercial Aviation and Education

SO_x Emissions from Williams AFB Reuse Alternatives

Figure 4.4-5

Table 4.4-7. Air Quality Results for the Proposed Action ($\mu g/m^3$)

Pollutant	Averaging Time	Predicted Concentration[a] 1993	1998A[f]	1998B[f]	2003	Background Concentration	NAAQS
CO	8-hour	355	944	944	1,072	5,000[c]	10,000
	1-hour	507	1,349	1,349	1,531	8,343[c]	40,000
SO_2[b]	Annual	0	3	2	5	6[d]	80
	24-hour	1	12	7	19	17.3[d]	365
	3-hour	3	27	17	44	34[d]	1,300
PM_{10}	Annual	0	1	1	1	30[e]	50
	24-hour	2	5	5	12	77[e]	150

Notes:
[a] Predicted concentration represents modeled impacts only and does not include background concentration.
[b] All SO_x are assumed to be converted to SO_2.
[c] Maximum monitored concentration at Mesa monitoring station from 1989 through 1991 is used.
[d] Maximum monitored concentration at Phoenix monitoring station from 1989 through 1990 is used; 1991 data are not available.
[e] Maximum monitored concentration at Apache Junction monitoring station from 1989 through 1991 is used.
[f] The 1998A case assumes that the Arizona ANG 161st AREFG relocates to Williams AFB and performs 7,200 annual operations following closure. The 1998B case assumes the Arizona ANG 161st AREFG does not relocate to Williams AFB following closure but does perform 3,000 touch-and-goes (6,000 operations) annually.

mitigate fugitive dust emissions by at least 50 percent (U.S. Environmental Protection Agency, 1992). Decreasing the time period during which newly graded sites are exposed to the elements would further mitigate fugitive dust emissions.

Combustion emission impacts could be mitigated by efficient scheduling of equipment use, implementing a phased construction schedule to reduce the number of units operating simultaneously, and performing regular vehicle engine maintenance. Implementation of these measures would substantially reduce air quality effects from construction activities associated with the Proposed Action. In addition, aviation development during the construction phase must comply with measures contained in the FAA *Standards for Specifying Construction of Airports* (Federal Aviation Administration, 1990) and state regulations. Air pollution permitting/regulatory staff of the Maricopa County Bureau of Air Pollution Control indicated that dispersion modeling for the fugitive dust emissions associated with construction and demolition is not required (Bott, 1993). However, a permit application has to be submitted before any construction or demolition commences, and proper control methods have to be implemented during construction and demolition to control fugitive emissions.

Although the air pollutant concentrations associated with the Proposed Action comply with air quality standards, potential operational mitigation measures would likely focus on some type of land use or transportation planning and management measures to reduce motor vehicle pollution. The purpose of these measures would be to reduce vehicle miles traveled, vehicle trips, and peak-hour travel. These reductions would, therefore, reduce both regional and localized vehicle-related emissions of CO, NO_x, VOCs, and PM_{10}.

The types of operational mitigation measures that could be implemented include: (1) development of an airport shuttle system to reduce personal vehicle use; (2) promotion of carpools and vanpools by providing a rider matching service, preferential parking and financial incentives; (3) improvements such as bicycling lanes; and (4) on-site location of facilities that would reduce the need for off-site travel (e.g., childcare facilities, cafeterias, etc.).

The EPA published its general (non-transportation) conformity rule on November 15, 1993. The Air Force will comply with EPA's final rule regarding conformity determinations to the extent it applies to the specific proposed reuses of the base property. Where applicable, the Air Force will prepare a conformity determination, if necessary, prior to the disposal/conveyance or lease of parcels of base property. The ADEQ, MCBAPC, and EPA Region IX will be consulted in arriving at a final conformity determination, in accordance with Section 176(c) of the CAAA.

4.4.3.2 General Aviation and Education Alternative. The primary difference between this alternative and the Proposed Action is reduced commercial air traffic and increased general aviation and vehicular traffic. Since these sources contributed a large portion of the Proposed Action emissions inventory, the air quality impacts under this alternative are comparable to those for the Proposed Action as described below.

Total estimated unmitigated emissions associated with the General Aviation and Education Alternative are presented in Table 4.4-8 for the years 1993, 1998, and 2003. This table also provides a comparison of the magnitude of the reuse-related emissions in relation to the preclosure emission levels.

Table 4.4-8. Unmitigated Pollutant Emissions Associated with the General Aviation and Education Alternative (tons/year)[a]

	Preclosure Annual Emission Inventory[b]		Base Reuse[c]		
Pollutant	PMCUPA	WAFB	1993	1998	2003
VOCs	87,212[d]	726.3[e]	54.6	745.8	1,591.1
PM_{10}	46,339	11.9	2.7	43.0	26.8
CO	245,748	3,680.2	205.9	1,848.9	3,122.3
NO_x[f]	55,186	167.2	27.6	360.7	589.4
SO_x[f]	6,160	49.5	2.2	8.8	6.4

Notes:
[a] Includes controls for late 1990s fleet mix but otherwise unmitigated.
[b] Refer to Table 3.4-6. Williams AFB emissions include emission data from Table 3.4-6 plus indirect emissions associated with operation of Williams AFB.
[c] See Appendix K for details on each emission source category.
[d] VOC emissions.
[e] Hydrocarbon emissions.
[f] For purposes of analysis, NO_x is equated to NO_2 and SO_x is equated to SO_2.

Construction. Construction impacts from this alternative would be less than under the Proposed Action primarily because of the smaller amount of land disturbed by construction activities. It is estimated that construction would disturb a total of approximately 1,785 acres over the first 10 years of project development. Approximately 1,387 acres would be disturbed during the period 1993 to 1998 and approximately 398 acres during the next 5-year period from 1998 to 2003. Assuming that the disturbance is spread evenly throughout these periods, the average area of disturbance in any one year is estimated to be 277.4 acres and 79.6 acres for each time period, respectively. The average unmitigated amount of PM_{10} emissions in one year would, therefore, be 30.5 and 8.8 tons, respectively. The impact of these emissions would cause elevated short-term concentrations of

particulates at receptors close to the construction areas. However, the elevated concentrations would be a temporary effect that would fall off rapidly with distance.

Operations. Table 4.4-8 summarizes the results of the unmitigated emission calculations associated with the General Aviation and Education Alternative for the years 1993, 1998, and 2003. Estimates for all emissions categories were calculated as described in Appendix K.

As with the Proposed Action, potential impacts to air quality as a result of criteria pollutant emissions from the operations under the General Aviation and Education Alternative were evaluated in terms of two spatial scales: regional and local.

Regional Scale. The evaluation of regional-scale impacts from the General Aviation and Education Alternative considered all potential criteria air pollutant emission sources which could have effects on attainment of the ambient air quality standards. The following paragraphs summarize the results of the regional-scale impact analysis for the nonattainment and attainment pollutants respectively.

Nonattainment Pollutants (O_3, CO, and PM_{10}). The potential NO_x and VOC emissions as well as the CO and PM_{10} emissions from the General Aviation and Education Alternative are evaluated to determine if those emissions would be a major contributor to the overall levels in the area. Table 4.4-8 summarizes the results of the emission calculations for this alternative for the 0-, 5-, and 10-year increments after closure (i.e., for the years 1993, 1998, and 2003, respectively). The table also provides a comparison of the magnitude of the reuse-related emissions with the 1989 Maricopa County emission rates and 1990 Williams AFB emission rates. The ozone precursor emissions of NO_x and VOCs and the emissions of CO and PM_{10} are a small percentage of the overall emission levels within the ROI (less than 2 percent).

Attainment Pollutants (NO_2 and SO_2). The PMCUPA is in attainment of the NAAQS and AAAQS for NO_2 and SO_2. Table 4.4-8 provides a comparison of the General Aviation and Education Alternative emissions to emission levels within the ROI. These results show that the emissions from the General Aviation and Education Alternative are much smaller than the overall emission levels within the ROI (less than 1 percent), and the regional air quality impacts associated with these emissions would be negligible.

Local Scale. Table 4.4-9 presents a summary of potential impacts from activities associated with the General Aviation and Education Alternative. Included in the table are background concentrations for each pollutant. These data are based on monitoring stations considered representative for Williams AFB. For the General Aviation and Education Alternative, all

Table 4.4-9. Air Quality Results for the General Aviation and Education Alternative ($\mu g/m^3$)

Pollutant	Averaging Time	Predicted Concentration[a] 1993	1998	2003	Background Concentration	NAAQS
CO	8-hour	397	1,191	2,245	5,000[c]	10,000
	1-hour	567	1,701	3,208	8,343[c]	40,000
SO_2[b]	Annual	0	0	1	6[d]	80
	24-hour	0	2	3	17.3[d]	365
	3-hour	0	3	8	34[d]	1,300
PM_{10}	Annual	0	1	4	30[e]	50
	24-hour	0	13	37	77[e]	150

Notes:
[a] Predicted concentration represents modeled impacts only and does not include background concentration.
[b] All SO_x are assumed to be converted to SO_2.
[c] Maximum monitored concentration at Mesa monitoring station from 1989 through 1991 is used.
[d] Maximum monitored concentration at Phoenix monitoring station from 1988 through 1990 is used; 1991 data are not available.
[e] Maximum monitored concentration at Apache Junction monitoring station from 1989 through 1991 is used.

modeled concentrations were developed using EDMS in screening mode. Refined EDMS modeling was not required for this alternative because screening mode results did not predict an AAQS exceedance. Modeling results for the General Aviation and Education Alternative show that the maximum 1-hour pollutant concentration would occur along the northeast and northwest sections of the base boundary. Maximum concentrations are also found at receptors located in the Institutional (Education) land use area. The modeling results indicate that all of the pollutant concentrations would be below the applicable air quality standards in the immediate area surrounding the base and would have no adverse impact on the local air quality.

Cumulative Impacts. As with the Proposed Action, no other projects have been identified within the 10-year period of analysis that would contribute to air quality impacts as a result of development of the General Aviation and Education Alternative. Therefore, cumulative impacts on air quality are expected to be minimal.

Mitigation Measures. Mitigation measures under the General Aviation and Education Alternative would be similar to those discussed for the Proposed Action.

4.4.3.3 Commercial Aviation and Education Alternative. The primary difference between this alternative and the Proposed Action is increased air and vehicular traffic. Since these sources contributed a large portion of the Proposed Action emissions inventory, the air quality impacts for this alternative generally exceed those predicted for the Proposed Action as described in the discussion below.

Total estimated unmitigated emissions associated with the Commercial Aviation and Education Alternative are presented in Table 4.4-10 for the years 1993, 1998, and 2003. The methodologies used to generate these emissions have been discussed previously. This table also provides a comparison of the magnitude of the reuse-related emissions in relation to the preclosure emission levels.

Construction. Construction impacts from this alternative would be comparable to those discussed for the Proposed Action since the land disturbed by construction activities is similar. It is estimated that construction would disturb a total of approximately 2,488 acres over the first 10-years of project development. Approximately 2,343 acres would be disturbed during the period 1993 to 1998 and approximately 145 acres during the next 5-year period from 1998 to 2003. Assuming that the disturbance is spread evenly throughout these periods, the average area of disturbance in any one year is estimated to be 469 acres and 29 acres for each time interval, respectively. The average unmitigated amount of PM_{10} emissions in one year would therefore be 51.5 and 3.2 tons, respectively.

Table 4.4-10. Unmitigated Pollutant Emissions Associated with the Commercial Aviation and Education Alternative (tons/year)[a]

	Preclosure Annual Emission Inventory[b]		Base Reuse[c]		
Pollutant	PMCUPA	WAFB	1993	1998[f]	2003
VOCs	87,212[d]	726.3[e]	141.1	1,327.2	2,245.9
PM_{10}	46,339	11.9	7.8	74.3	30.1
CO	245,748	3,680.2	2,056.5	5,004.3	5,945.2
NO_x[g]	55,186	167.2	66.2	567.0	912.0
SO_x[g]	6,160	49.5	4.0	24.5	37.1

Notes:
[a] Includes controls for late 1990s fleet mix but otherwise unmitigated.
[b] Refer to Table 3.4-6. Williams AFB emissions include emission data from Table 3.4-6 plus indirect emissions associated with operation of Williams AFB.
[c] See Appendix K for details on each emission source category.
[d] VOC emissions.
[e] Hydrocarbon emissions.
[f] Only one 1998 alternative was analyzed for this alternative because military aircraft operations are not differentiated between based and itinerant operations.
[g] For purposes of analysis, NO_x is equated to NO_2 and SO_x is equated to SO_2.

The impact of these emissions would cause elevated short-term concentrations of particulates at receptors close to the construction areas. However, the elevated concentrations would be a temporary effect that would fall off rapidly with distance.

Operations. Table 4.4-10 summarizes the results of the unmitigated emission calculations associated with the Commercial Aviation and Education Alternative for the years 1993, 1998, and 2003. Estimates for all emissions categories were calculated as described in Appendix K.

As with the Proposed Action, potential impacts to air quality as a result of criteria pollutant emissions from the operations under the Commercial Aviation and Education Alternative were evaluated in terms of two spatial scales: regional and local.

Regional Scale. The evaluation of regional-scale impacts from the Commercial Aviation and Education Alternative considered potential criteria air pollutant emissions which could have effects on attainment of the ambient air quality standards. The following paragraphs summarize the results of the regional-scale impact analysis for the nonattainment and attainment pollutants respectively.

Nonattainment Pollutants (O_3, CO, and PM_{10}). The potential NO_x and VOC emissions as well as the CO and PM_{10} emissions from the Commercial Aviation and Education Alternative are evaluated to determine if those emissions would be a major contributor to the overall levels in the area. Table 4.4-10 summarizes the results of the emission calculations for this alternative for the 0-, 5-, and 10-year increments after closure (i.e., for the years 1993, 1998, and 2003, respectively). The table also provides a comparison of the magnitude of the reuse-related emissions with the 1989 Maricopa County emission rates and 1990 Williams AFB emission rates. The ozone precursor emissions of NO_x and VOCs and the emissions of CO and PM_{10} are only a small percentage of the overall emission levels within the ROI (less than 3 percent).

Attainment Pollutants (NO_2 and SO_2). The PMCUPA is in attainment of the NAAQS and AAAQS for NO_2 and SO_2. Table 4.4-10 provides a comparison of the Commercial Aviation and Education Alternative emissions to emission levels within the ROI. These results show that the emissions from the Commercial Aviation and Education Alternative are much smaller than the overall emission levels within the ROI (less than 2 percent), and the regional air quality impacts associated with these emissions would be negligible.

Local Scale. Table 4.4-11 presents a summary of potential impacts from activities associated with the Commercial Aviation and Education Alternative. Included in the table are background concentrations of each pollutant. These data are based on monitoring stations considered representative for Williams AFB. For the Commercial Aviation and Education Alternative, all modeled concentrations, except the 8-hour carbon monoxide concentrations in 1998 and 2003, were developed using EDMS in screening mode. Refined EDMS modeling was used to predict the 8-hour carbon monoxide concentrations in 1998 and 2003 because the EDMS screening mode results predicted an exceedance of the AAQS. Table 4.4-11 shows lower carbon monoxide concentrations for 1998 and 2003 than for 1993, despite higher emission rates, because of the refined modeling approach that was employed. Modeling results for the Commercial Aviation and Education Alternative show that the maximum 1-hour pollutant concentration would occur along the north-northwest sections of the base boundary. Maximum concentrations are also found at receptors located in the Institutional (Education) land use area. The modeling results indicate that all of the pollutant concentrations would be below the applicable air quality standards in the immediate area surrounding the base and would have no adverse impact on the local air quality.

Cumulative Impacts. As with the Proposed Action, no other projects have been identified within the 10-year period of analysis that would contribute to air quality impacts from the Commercial Aviation and Education Alternative. Therefore, cumulative impacts on air quality are expected to be minimal.

Table 4.4-11. Air Quality Results for the Commercial Aviation and Education Alternative ($\mu g/m^3$)

Pollutant	Averaging Time	Predicted Concentration[a] 1993	1998[f]	2003	Background Concentration	NAAQS
CO	8-hour	3,082	2,139[g]	2,941[g]	5,000[c]	10,000
	1-hour	4,403	9,207	12,568	8,343[c]	40,000
SO_2[b]	Annual	1	11	26	6[d]	80
	24-hour	3	43	103	17.3[d]	365
	3-hour	7	97	233	34[d]	1,300
PM_{10}	Annual	1	3	5	30[e]	50
	24-hour	4	14	24	77[e]	150

Notes:
[a] Predicted concentration represents modeled impacts only and does not include background concentration.
[b] All SO_x are assumed to be converted to SO_2.
[c] Maximum monitored concentration at Mesa monitoring station from 1989 through 1991 is used.
[d] Maximum monitored concentration at Phoenix monitoring station from 1988 through 1990 is used; 1991 data are not available.
[e] Maximum monitored concentration at Apache Junction monitoring station from 1989 through 1991 is used.
[f] Only one 1998 scenario was analyzed for this alternative because military aircraft operations are not differentiated between based and itinerant operations.
[g] These concentrations represent refined EDMS modeling results.

Mitigation Measures. Mitigation measures under the Commercial Aviation and Education Alternative would be similar to those discussed for the Proposed Action.

4.4.3.4 Education and Planned Community Alternative. This alternative eliminates airfield operations. Emissions associated with the Education and Planned Community Alternative result primarily from motor vehicles and light industrial operations.

Total estimated unmitigated emissions associated with the Education and Planned Community Alternative are presented in Table 4.4-12 for the years 1993, 1998, and 2003. This table also provides a comparison of the magnitude of the reuse-related emissions in relation to the preclosure emission levels.

Table 4.4-12. Unmitigated Pollutant Emissions Associated with the Education and Planned Community Alternative (tons/year)[a]

	Preclosure Annual Emission Inventory[b]		Base Reuse[c]		
Pollutant	PMCUPA	WAFB	1993	1998	2003
VOCs	87,212[d]	726.3[e]	3.0	273.2	577.7
PM_{10}	46,339	11.9	0.0	43.5	42.4
CO	245,748	3,680.2	13.7	962.5	1,678.8
NO_x[f]	55,186	167.2	2.6	314.8	439.2
SO_x[f]	6,160	49.5	0.0	17.2	14.5

Notes:
[a] Includes controls for late 1990s fleet mix but otherwise unmitigated.
[b] Refer to Table 3.4-6. Williams AFB emissions include emission data from Table 3.4-6 plus indirect emissions associated with operation of Williams AFB.
[c] See Appendix K for details on each emission source category.
[d] VOC emissions.
[e] Hydrocarbon emissions.
[f] For purposes of analysis, NO_x is equated to NO_2 and SO_x is equated to SO_2.

Construction. Fugitive dust and combustive emissions would be generated during construction activities associated with Industrial, Institutional, Commercial, Residential, and Public/Recreation land uses.

It is estimated that construction would disturb a total of approximately 2,288 acres over the first 10 years of project development. Approximately 1,224 acres would be disturbed during the period 1993 to 1998 and approximately 1,064 acres during the next 5-year period from 1998 to 2003. Assuming that the disturbance is spread evenly throughout these periods, the average area of disturbance in any one year is estimated to be 244.8 acres and 212.8 acres for each of the time periods, respectively.

The average unmitigated amount of PM_{10} emissions in one year would, therefore, be 26.9 and 23.4 tons, respectively. The impact of these emissions would cause elevated short-term concentrations of particulates at receptors close to the construction areas. However, the elevated concentrations would be a temporary effect that would fall off rapidly with distance.

Operations. Table 4.4-12 summarizes the results of the unmitigated emission calculations associated with the Education and Planned Community Alternative for the years 1993, 1998, and 2003. Estimates for all emissions categories were calculated as described in Appendix K.

As with the Proposed Action, potential impacts to air quality as a result of criteria pollutant emissions from operations under the Education and Planned Community Alternative were evaluated on two spatial scales: regional and local.

Regional Scale. The evaluation of regional-scale impacts from the Education and Planned Community Alternative has considered the potential criteria air pollutant emissions which could have effects on maintenance and attainment of the ambient air quality standards. The following paragraphs summarize the results of the regional-scale impact analysis for the nonattainment and attainment pollutants, respectively.

Nonattainment Pollutants (O_3, CO, and PM_{10}). The potential NO_x and VOC emissions as well as the CO and PM_{10} emissions from the Education and Planned Community Alternative are evaluated to determine if those emissions would be a major contributor to the overall levels in the area. Table 4.4-12 summarizes the results of the emission calculations for this alternative for the 0-, 5-, and 10-year increments after closure (i.e., for the years 1993, 1998, and 2003, respectively). The table also provides a comparison of the magnitude of the reuse-related emissions with the 1989 Maricopa County emission rates and 1990 Williams AFB emission rates. The ozone precursor emissions of NO_x and VOCs and the emissions of CO and PM_{10} are only a small percentage of the overall emission levels within the ROI (less than 1 percent).

Attainment Pollutants (NO_2 and SO_2). The PMCUPA is in attainment of the NAAQS and AAAQS for NO_2 and SO_2. Table 4.4-12 provides a comparison of the Education and Planned Community Alternative emissions to emission levels within the ROI (less than 1 percent). These results show that the emissions from the Education and Planned Community Alternative are much smaller than the overall emission levels within the ROI, and the regional air quality impacts associated with these emissions would be negligible.

Local Scale. Table 4.4-13 presents a summary of potential impacts from activities associated with the Education and Planned Community Alternative.

Table 4.4-13. Air Quality Results for the Education and Planned Community Alternative ($\mu g/m^3$)

Pollutant	Averaging Time	Predicted Concentration[a] 1993	1998	2003	Background Concentration	NAAQS
CO	8-hour	0	1,204	1,947	5,000[c]	10,000
	1-hour	1	1,721	2,781	8,343[c]	40,000
SO_2[b]	Annual	0	0	0	6[d]	80
	24-hour	0	1	2	17.3[d]	365
	3-hour	0	2	5	34[d]	1,300
PM_{10}	Annual	0	2	5	30[e]	50
	24-hour	0	23	55	77[e]	150

Notes:
[a] Predicted concentration represents modeled impacts only and does not include background concentration.
[b] All SO_x are assumed to be converted to SO_2.
[c] Maximum monitored concentration at Mesa monitoring station from 1989 through 1991 is used.
[d] Maximum monitored concentration at Phoenix monitoring station from 1988 through 1990 is used; 1991 data are not available.
[e] Maximum monitored concentration at Apache Junction monitoring station from 1989 through 1991 is used.

Included in the table are background concentrations of each pollutant. These data are based on monitoring stations considered representative for Williams AFB. For the Education and Planned Community Alternative, all modeled concentrations were developed using EDMS in screening mode. Refined modeling was not required for this alternative because screening mode results did not predict an AAQS exceedance. Modeling results for the Education and Planned Community Alternative show that the maximum 1-hour pollutant concentration would occur along the northeast sections of the base boundary. Maximum concentrations are also found at receptors located in the Institutional (Education) land use area. The modeling results indicate that all of the pollutant concentrations would be below the applicable standards in the immediate area surrounding the base and would have no adverse impact on the local air quality.

Cumulative Impacts. As with the Proposed Action, no other projects have been identified within the 10-year period of analysis that would contribute to air quality impacts from the Education and Planned Community Alternative. Therefore, cumulative impacts on air quality are expected to be minimal.

Mitigation Measures. Mitigation measures under the Education and Planned Community Alternative would be similar to those discussed for the Proposed Action, except that mitigation associated with aviation would not be necessary since this alternative contains no aviation component.

4.4.3.5 Other Land Use Concepts. Potential changes in air quality resulting from implementation of one or more of the federal transfers and land use concepts in conjunction with that of the Proposed Action or alternatives are described below.

Federal Bureau of Prisons. This alternative would generate stationary source emissions associated with fuel combustion for heating and power and mobile source emissions related to employee vehicle traffic. These emissions are expected to be negligible when compared to the total emissions from each reuse alternative.

Arizona Department of Corrections. This land use concept would generate stationary source emissions associated with fuel combustion for heating and power and mobile source emissions related to employee vehicles. These emissions are expected to be negligible when compared to the total emissions from each reuse alternative.

Arizona Department of Health Services. Employment and population effects associated with this land use would not differ from those associated with the Proposed Action or alternatives. Therefore, the air quality impacts resulting from this land use would be negligible.

4.4.3.6 No-Action Alternative. The No-Action Alternative would have no adverse impact on air quality. Essentially all of the existing emissions sources would be eliminated except those associated with minimum building heating and power requirements and the air stripping operation at the Liquid Fuels Storage Area. Air quality conditions at the time of closure would not be adversely affected by continued maintenance of the base at the closure level of activity. Cumulative impacts are not anticipated, and air quality mitigation measures would not be required for the No-Action Alternative because there are no impacts associated with this alternative.

4.4.4 Noise

Environmental impact analysis related to noise includes the potential effects on the local human and animal populations. This analysis will estimate the extent and magnitude of noise levels generated by the Proposed Action and alternatives using the predictive models discussed below. The baseline noise conditions and predicted noise levels will then be assessed with respect to potential annoyance, speech interference, sleep disturbance, hearing loss, health and land use impacts. The metrics used to evaluate noise are DNL and L_{eq} which are supplemented occasionally by SEL and L_{max}. See Appendix I for an expanded discussion of these metrics.

Methods used to quantify the effects of noise such as annoyance, speech interference, sleep disturbance, health and hearing loss have undergone extensive scientific development during the past several decades. The most reliable measures at present are noise-induced hearing loss and annoyance. Extra-auditory effects (those not directly related to hearing capability) are also important, although they are not as well understood. The current scientific consensus is that "evidence from available research reports is suggestive, but it does not provide definitive answers to the question of health effects, other than to the auditory system, of long-term exposure to noise" (National Academy of Sciences, 1981). The effects of noise are summarized within this section and a detailed description is provided in Appendix I.

Annoyance. Noise annoyance is defined by the U.S. EPA as any negative subjective reaction to noise on the part of an individual or group. Table 4.4-14 presents the results of over a dozen studies of transportation modes, including airports, investigating the relationship between noise and annoyance levels. This relationship has been suggested by the National Academy of Sciences (1977) and recently reevaluated (Fidell et al., 1988) for use in describing people's reaction to semicontinuous (transportation) noise. These data are shown to provide a perspective on the level of annoyance that might be anticipated. For example, 15 to 25 percent of persons exposed to DNL of 65 to 70 dB would be highly annoyed by the noise levels.

Table 4.4-14. Percentage of Population Highly Annoyed by Noise Exposure

DNL Interval in dB	Percentage of Persons Highly Annoyed
<65	<15
65-70	15-25
70-75	25-37
75-80	37-52

Source: Adapted from National Academy of Sciences, 1977.

Speech Interference. One of the ways that noise affects daily life is by prevention or impairment of speech communication. In a noisy environment, understanding speech is diminished when speech signals are masked by intruding noises. Reduced intelligibility of speech may also have other effects; for example, if the understanding of speech is interrupted, performance may be reduced, annoyance may increase, and learning may be impaired. Research suggests that aircraft flyover noises that exceed approximately 60 dB (maximum instantaneous sound level [L_{max}]) interfere with speech communication (Pearsons and Bennett, 1974; Crook and Langdon, 1974). Increasing the level of the flyover noise maximum to 80 dB will reduce the intelligibility to zero, even if the person speaks in a loud voice. This interference lasts as long as the event which is momentary for a flyover.

Sleep Interference. The effects of noise on sleep are of concern primarily in assuring suitable residential environments. DNL incorporates consideration of sleep disturbance by assigning a 10 dB penalty to nighttime noise events. SEL may be used to supplement DNL in evaluating sleep disturbance. When evaluating sleep disturbance, studies have correlated SEL values with the percent of people awakened. The relationships between percent awakened and SEL are presented in Appendix I. Most of these relationships, however, do not reflect habituation and, therefore, would not address long-term sleep disturbance effects. SEL takes into account an event's sound intensity, frequency content, and time duration by measuring the total A-weighted sound energy of the event and incorporating it into a single number. Unlike DNL which describes the daily average noise exposure, SEL describes the normalized noise from a single flyover, called an event.

Studies (Lukas, 1975; Goldstein and Lukas, 1980) show great variability in the percentage of people awakened by exposure to noise. A recent review (Pearsons et al., 1989) of the literature related to sleep disturbance, including field as well as laboratory studies, suggests that habituation may reduce the effect of noise on sleep. The authors point out that the

relationship between noise exposure and sleep disturbance is complex and affected by the interaction of many variables. The large differences between the findings of the laboratory and field studies make it difficult to determine the best relationship to use. The method developed by Lukas would estimate seven times more awakening than the field results reported by Pearsons.

Hearing Loss. Hearing loss is measured in decibels and refers to a permanent auditory threshold shift of an individual's hearing. The U.S. EPA (1974) has recommended a limiting daily energy value of L_{eq} 70 dB to protect against hearing impairment over a period of 40 years. This daily energy average would translate into a DNL value of approximately 75 dB or greater. Based on U.S. EPA recommendations, hearing loss is not expected in people exposed to DNL 75 dB or less. The potential for hearing loss involves direct exposure, on a regular, continuing long-term basis, to DNLs above 75 dB. The Federal Interagency Committee on Urban Noise (U.S. Department of Transportation, 1980) states that hearing loss due to noise: (1) may begin to occur in people exposed to long-term noise levels of DNL 75 dB and above, (2) will not likely occur in people exposed to noise levels between DNL 70 and 75 dB, and (3) will not occur in people exposed to noise levels less than DNL 70 dB.

Health. Research investigating the relationship between noise and adverse extra-auditory health effects has been inconclusive. Alleged extra-auditory health consequences of noise exposure which have been studied include birth defects, psychological illness, cancer, stroke, hypertension, and cardiac illnesses. Although hypertension appears to be the most biologically plausible of these consequences, studies addressing this issue have failed to provide adequate support. Studies that have found negative consequences have failed to be replicated, thereby bringing into question the validity of those studies (Frerichs et al., 1980; Anton-Guirgis et al., 1986). Studies that have controlled for multiple factors have shown no, or very weak, associations between noise exposure and extra-auditory effects (Thompson and Fidell, 1989). The current state of technical knowledge cannot support inference of a causal or consistent relationship, or a quantitative dose-response, between residential aircraft noise exposure and health consequences.

Animals. Literature concerning the effects of noise on animals is not extensive, and most of the studies have focused on the relation between dosages of continuous noise and effects (Belanovskii and Omel'yanenko, 1982; Ames, 1974). A literature survey (Kull and Fisher, 1986) found that the literature is inadequate to document long-term or subtle effects of noise on animals. No controlled study has documented any serious accident or mortality in livestock despite extreme exposure to noise.

Land Use Compatibility. Estimates of total noise exposure resulting from aircraft operations, as expressed using DNL, can be interpreted in terms of the compatibility with designated land uses. The Federal Interagency Committee on Urban Noise developed land use compatibility guidelines for noise (U.S. Department of Transportation, 1980). Based upon these guidelines, suggested compatibility guidelines for evaluating land uses in aircraft noise exposure areas were developed by the FAA and are presented in Section 3.4.4. The land use compatibility guidelines are based on annoyance and hearing loss considerations previously described. Part 150 of the FAA regulations describes the procedures, standards, and methodology governing the development, submission, and review of airport noise exposure maps and airport noise compatibility programs. It prescribes use of yearly DNL in the evaluation of airport noise environments. It also identifies those land use types that are normally compatible with various levels of exposure. Compatible or incompatible land use is determined by comparing the predicted DNL level at a site with the recommended land uses.

Noise Modeling. In order to define the noise impacts from aircraft operations at Williams AFB, the Air Force NOISEMAP model Version 6.1 was utilized to predict DNL 65, 70, and 75 dB noise contours and SEL values for noise-sensitive receptors. Appendix I defines these descriptors. The contours were generated for the Proposed Action and other aviation alternatives for the baseline year (1993) and three future-year projections (1998, 2003, and 2013). These contours were overlaid on a USGS map of the base and vicinity. Input data to NOISEMAP Version 6.1 include information on aircraft types; runway use; takeoff and landing flight tracks; aircraft altitude, speeds, and engine power settings; and number of daytime (7 a.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.) operations.

Surface vehicle traffic-noise levels for roadways in the vicinity of Williams AFB were analyzed using the *Federal Highway Administration Highway Traffice Noise Prediction Model* (Version OFA) (U.S. Department of Transportation, 1978). This model incorporates vehicle mix, traffic volume projections, day/night split, and speed to generate DNL.

Major Assumptions. Half of all aircraft operations were assumed to be takeoffs and half were landings. The mixes of aircraft operations for noise modeling were developed based on the fleet mixes for each alternative presented in Tables 2.2-4, 2.3-4, and 2.3-9. For the Proposed Action and General Aviation and Education Alternative, it was assumed that touch-and-go activities account for 59 percent of the single-engine general aviation operations; 6,000 KC-135 operations (representing 3,000 landings and 3,000 takeoffs) were also assumed to be touch-and-go activities. For the General Aviation and Education Alternative, KC-135 training operations are assumed to be discontinued before 1998. For the purposes of this analysis for the Proposed Action and the Commercial Aviation and Education

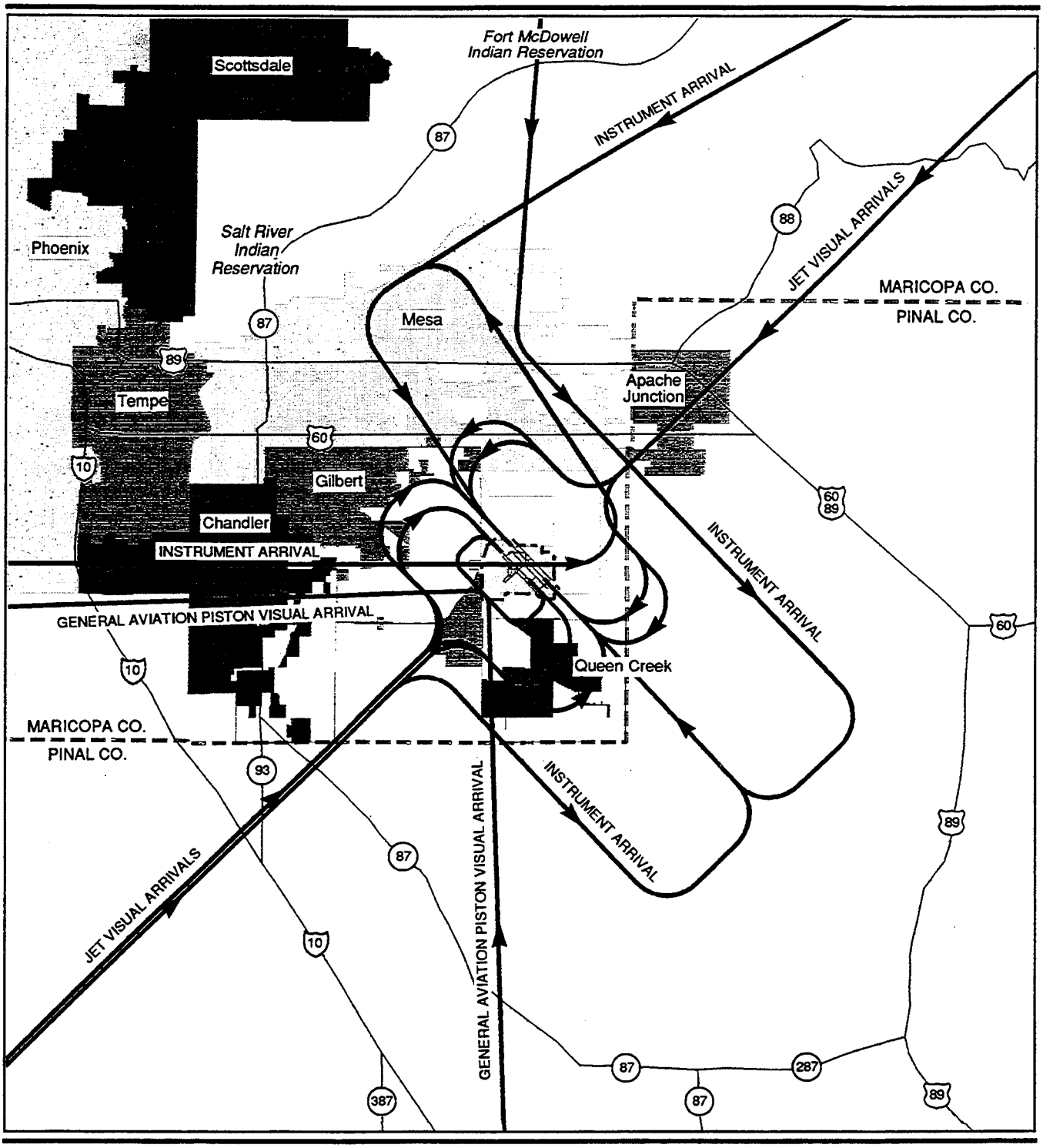
Alternative, Runway 12C/30C is decommissioned before 1998 and converted to a taxiway. Also for the purpose of analysis for the Commercial Aviation and Education Alternative, 10 percent of the ANG F-16 training operations were assumed to use afterburners on departure. Flight tracks (incoming and outgoing), aircraft operations, and aircraft mixes as modeled are included in Appendix I. Vicinity flight tracks assumed for modeling are shown in Figures 4.4-6 and 4.4-7 for the Proposed Action, in Figures 4.4-8 and 4.4-9 for the General Aviation and Education Alternative, and in Figures 4.4-10 and 4.4-11 for the Commercial Aviation and Education Alternative. For the Proposed Action and Commercial Aviation and Education Alternative, flight tracks associated with Runway 12C/30C are not depicted in the figures due to their similarity to the tracks associated with the other two runways; they were, however, included in the noise modeling and analysis. All civilian operations were assumed to follow standard glide slopes and takeoff profiles provided by the FAA's Integrated Noise Model Database 3.9 which have been incorporated in the NOISEMAP model. The use of Stage 3 aircraft is reflected in all the commercial aircraft operations. B-747 operations were modeled as B-747-200 (Stage 2) since the B-747-400 are not yet incorporated in the model. Conversion of the Air National Guard KC-135E (JT3D engines) to the quieter KC-135R (CFM56 engines) is reflected in operations in 1998 and later years.

The criteria that define Stage 2 and Stage 3 aircraft are described in FAR Part 36 (Federal Aviation Administration, 1988). Noise level limits are defined for takeoff, approach, and sideline measurements. The noisiest aircraft were determined from the A-weighted maximum sound level (L_{max}) as presented in FAA Advisory Circular 36-3E (Federal Aviation Administration, 1987).

Major roads leading to or around the base were analyzed. Traffic data used to project future noise levels were derived from information gathered in the traffic analysis presented in Section 4.2.3. Traffic data used in this analysis are presented in Appendix I.

4.4.4.1 Proposed Action. The results of the aircraft noise modeling for the Proposed Action are presented as noise contours in Figures 4.4-12 through 4.4-15. The slight widening of the noise contours along the east side of the airfield in Figures 4.4-13 through 4.4-15 is the result of KC-135 runup operations.

Table 4.4-15 presents the approximate number of acres and estimated population within each DNL range for each of the study years. Compared to the preclosure reference, this represents a decrease of 15,866 acres within DNL 65 dB in 1993, 16,797 acres in 1998, 16,623 acres in 2003, and 16,318 acres in 2013. The maximum exposure is projected for 1993, after which the conversion of KC-135E to quieter KC-135R aircraft would result in reduced noise exposure. Stage 3 aircraft are assumed for the civilian



EXPLANATION

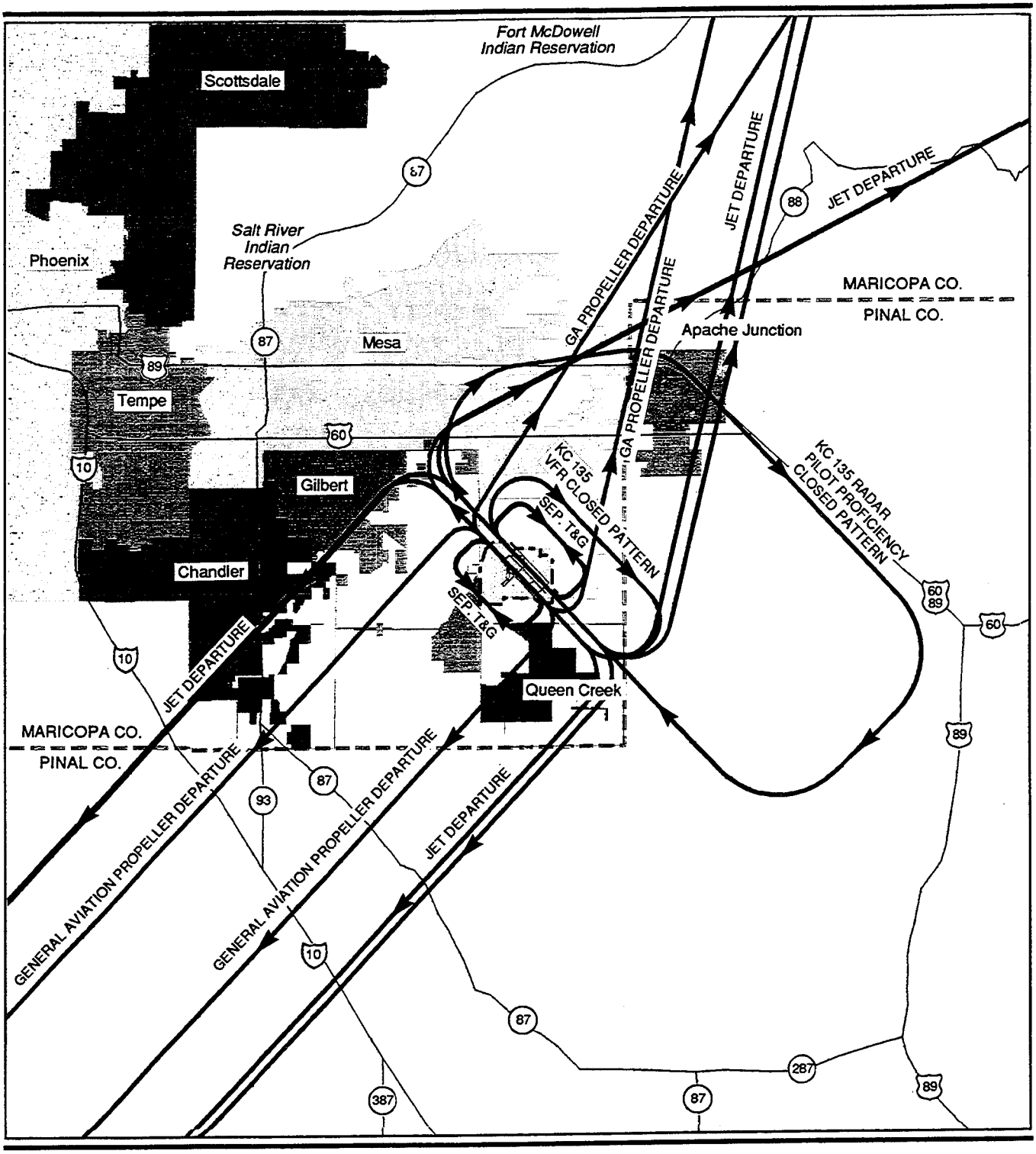
Direction of Travel on Flight Path

Base Boundary

Primary Flight Tracks - Proposed Action - Arrivals

0 3 6 Miles

Figure 4.4-6



EXPLANATION

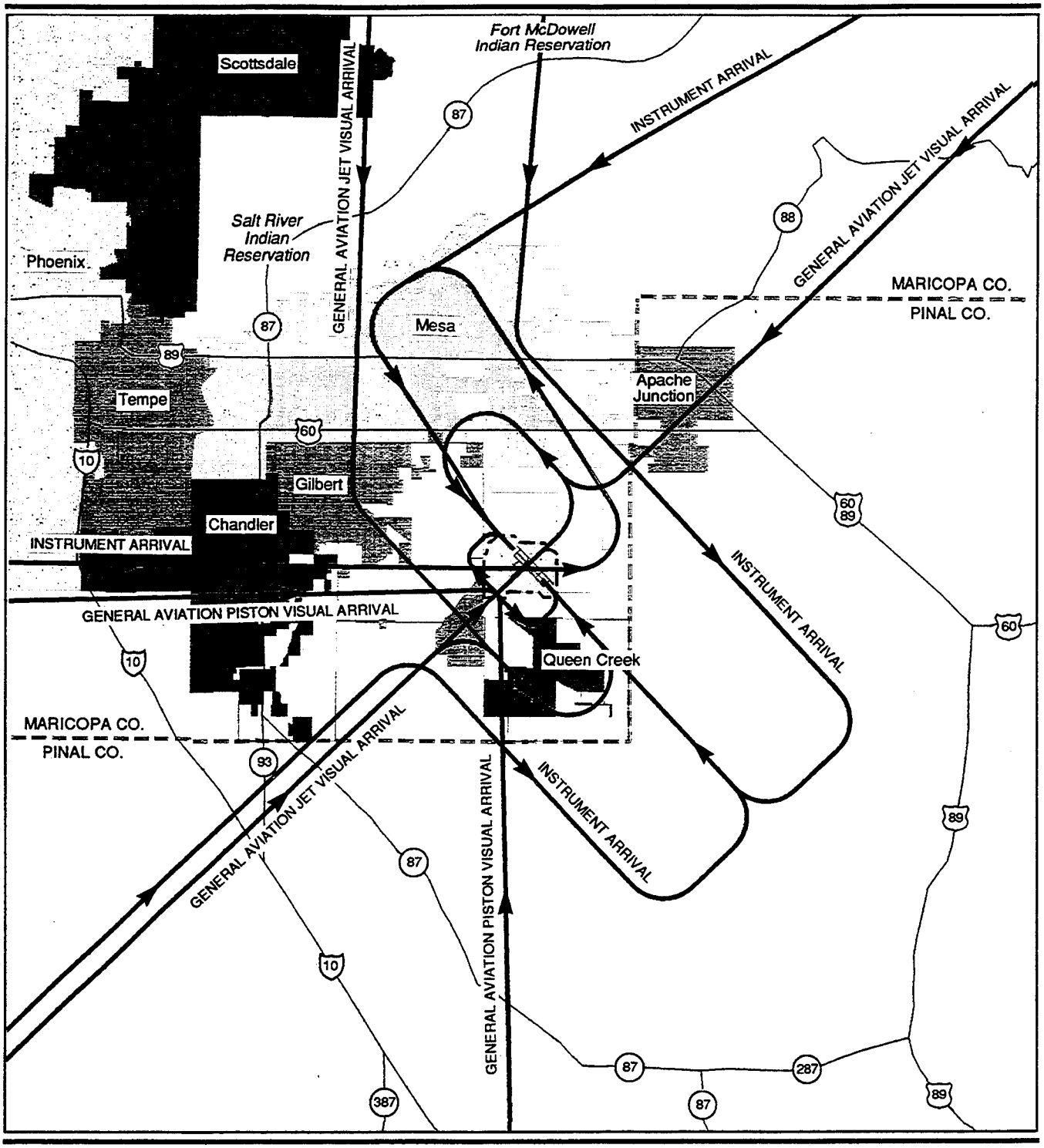
Direction of Travel on Flight Path

Base Boundary

Primary Flight Tracks - Proposed Action - Departures and Touch-and-Go

0 3 6 Miles

Figure 4.4-7



EXPLANATION

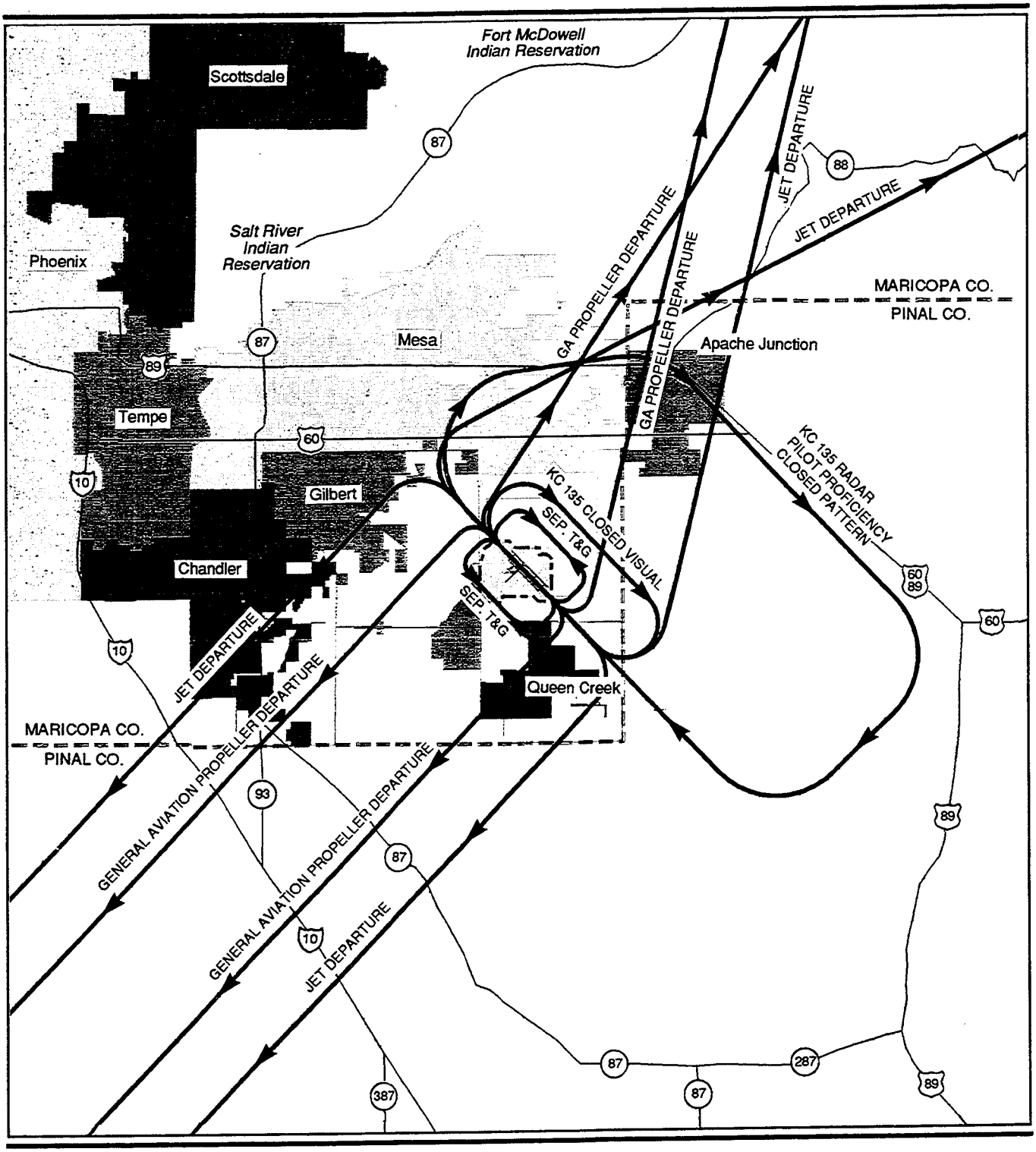
Direction of Travel on Flight Path

Base Boundary

0 3 6 Miles

Primary Flight Tracks - General Aviation and Education Alternative - Arrivals

Figure 4.4-8



EXPLANATION

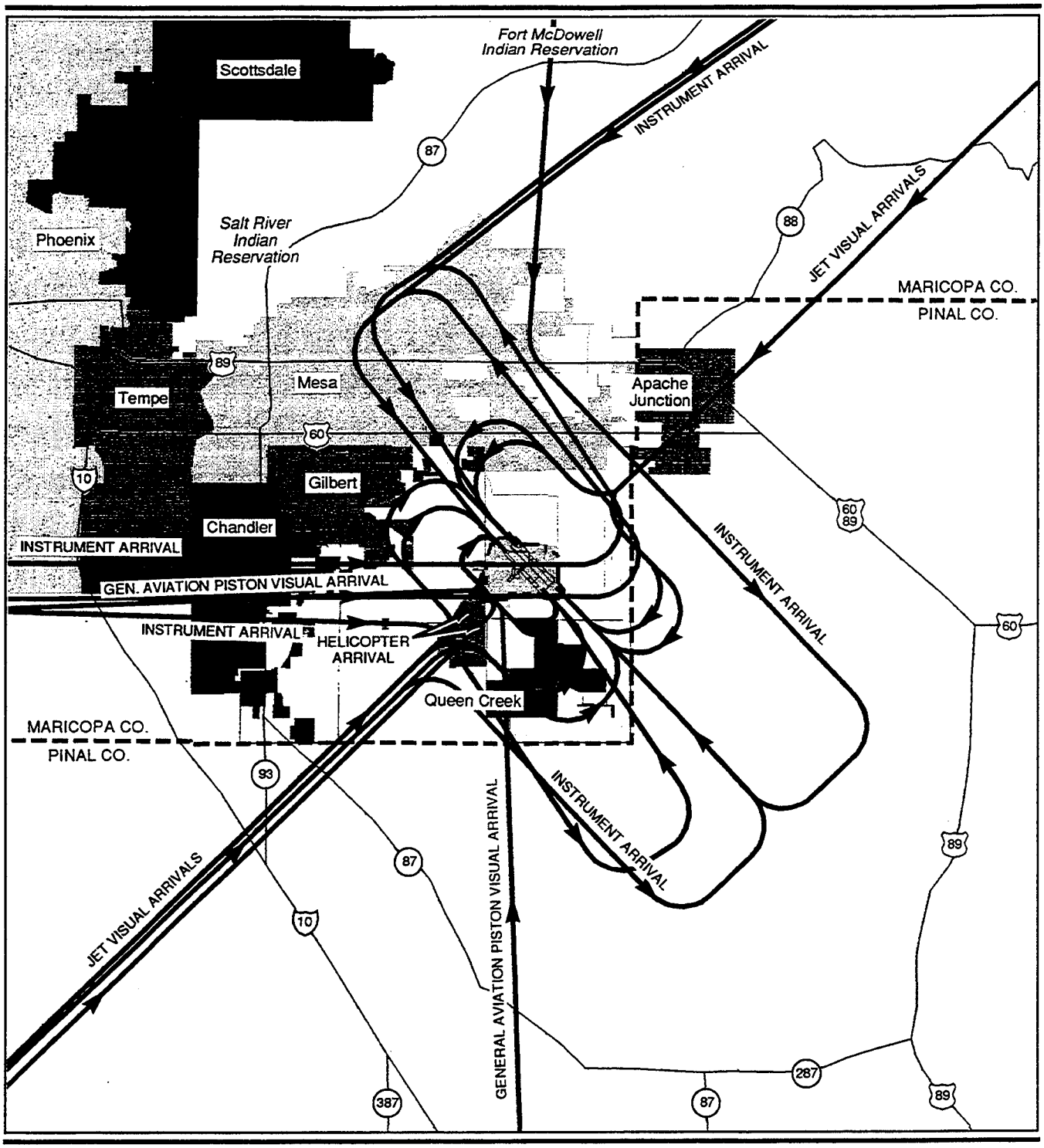
Direction of Travel on Flight Path

Base Boundary

Primary Flight Tracks - General Aviation and Education Alternative - Departures and Touch-and-Go

0 3 6 Miles

Figure 4.4-9



EXPLANATION

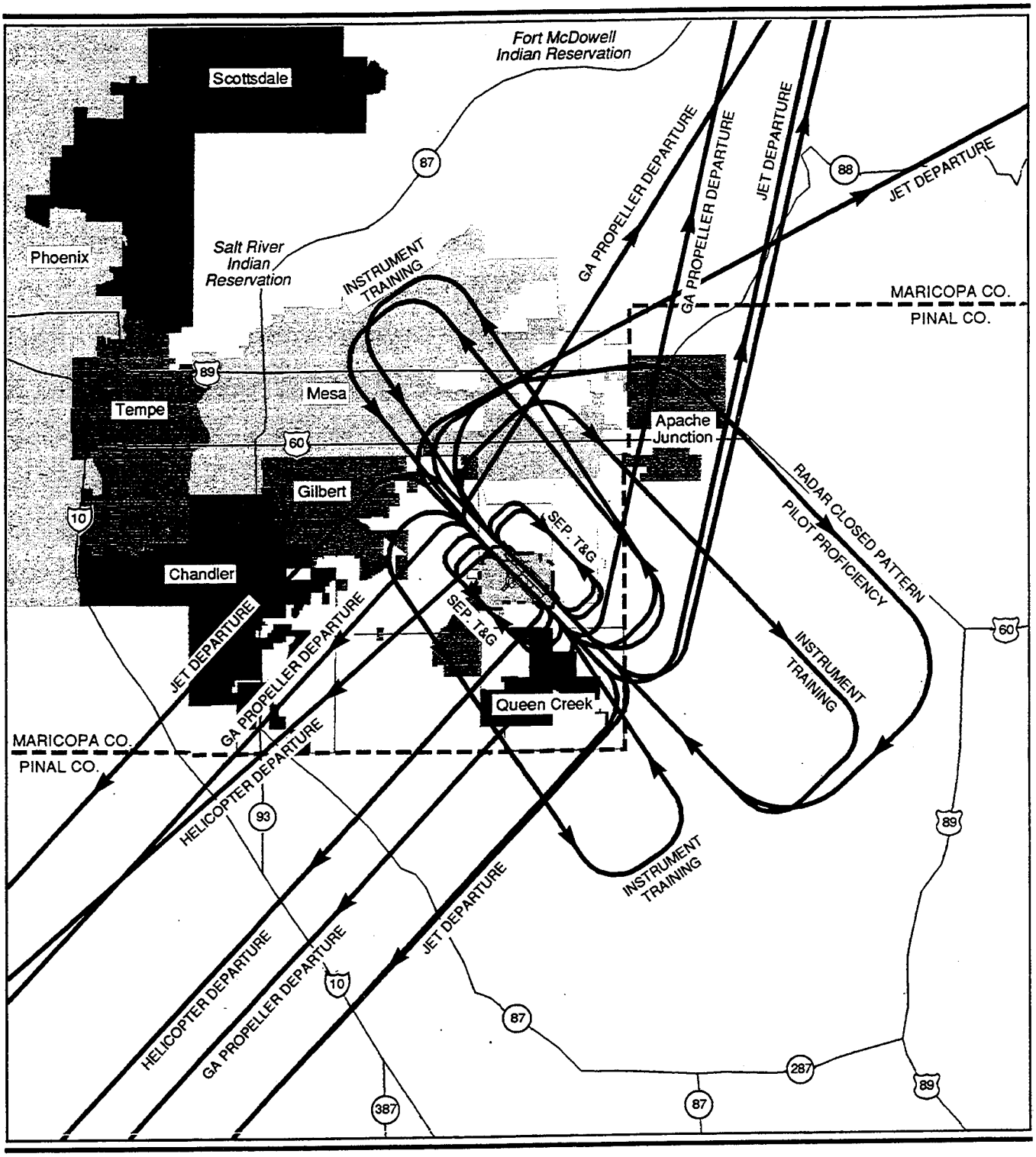
Direction of Travel on Flight Path

Base Boundary

Primary Flight Tracks - Commercial Aviation and Education Alternative - Arrivals

0 3 6 Miles

Figure 4.4-10



EXPLANATION

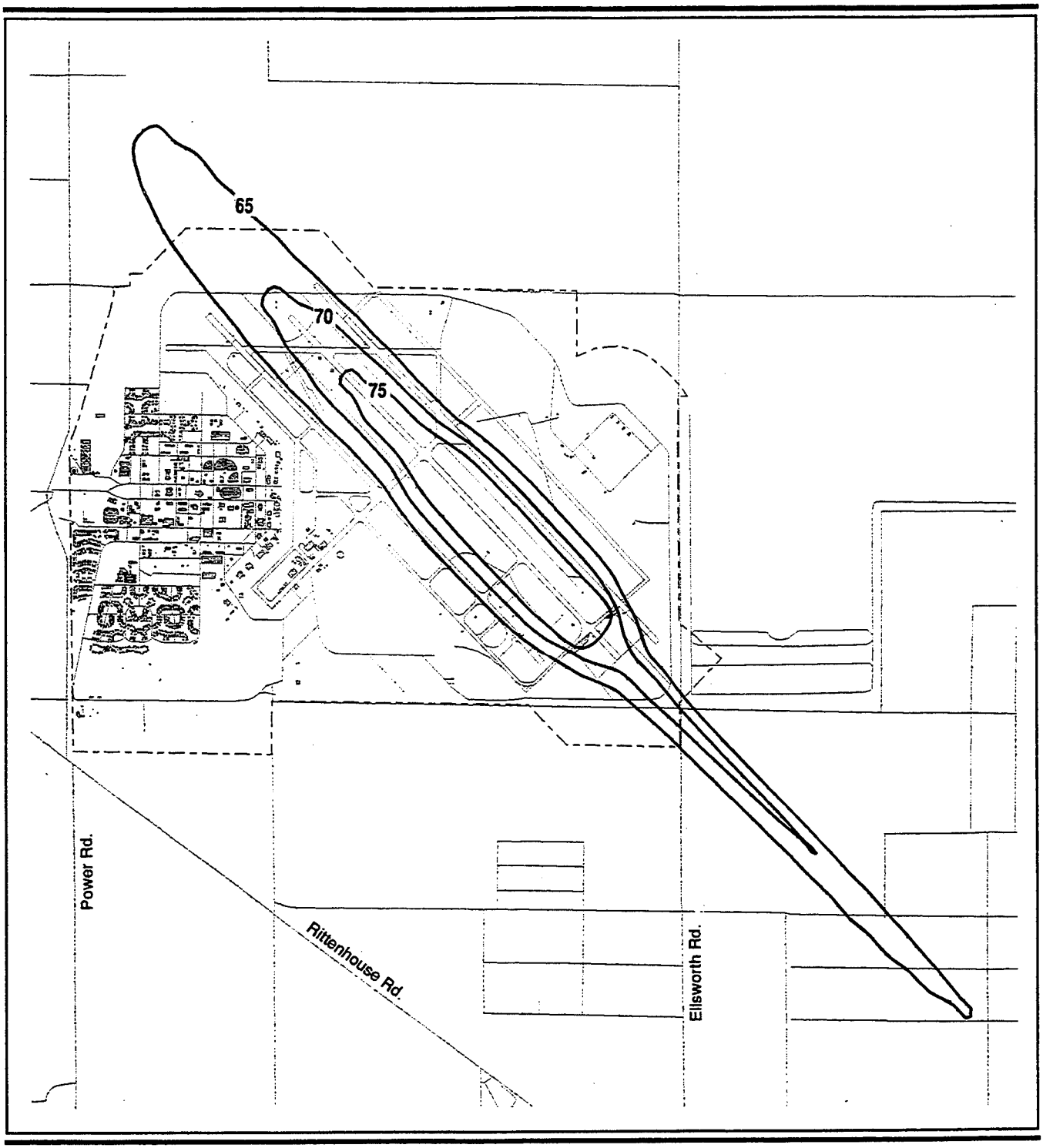
Direction of Travel on Flight Path

Base Boundary

Primary Flight Tracks - Commercial Aviation and Education Alternative - Departures and Touch-and-Go

0 3 6 Miles

Figure 4.4-11



EXPLANATION

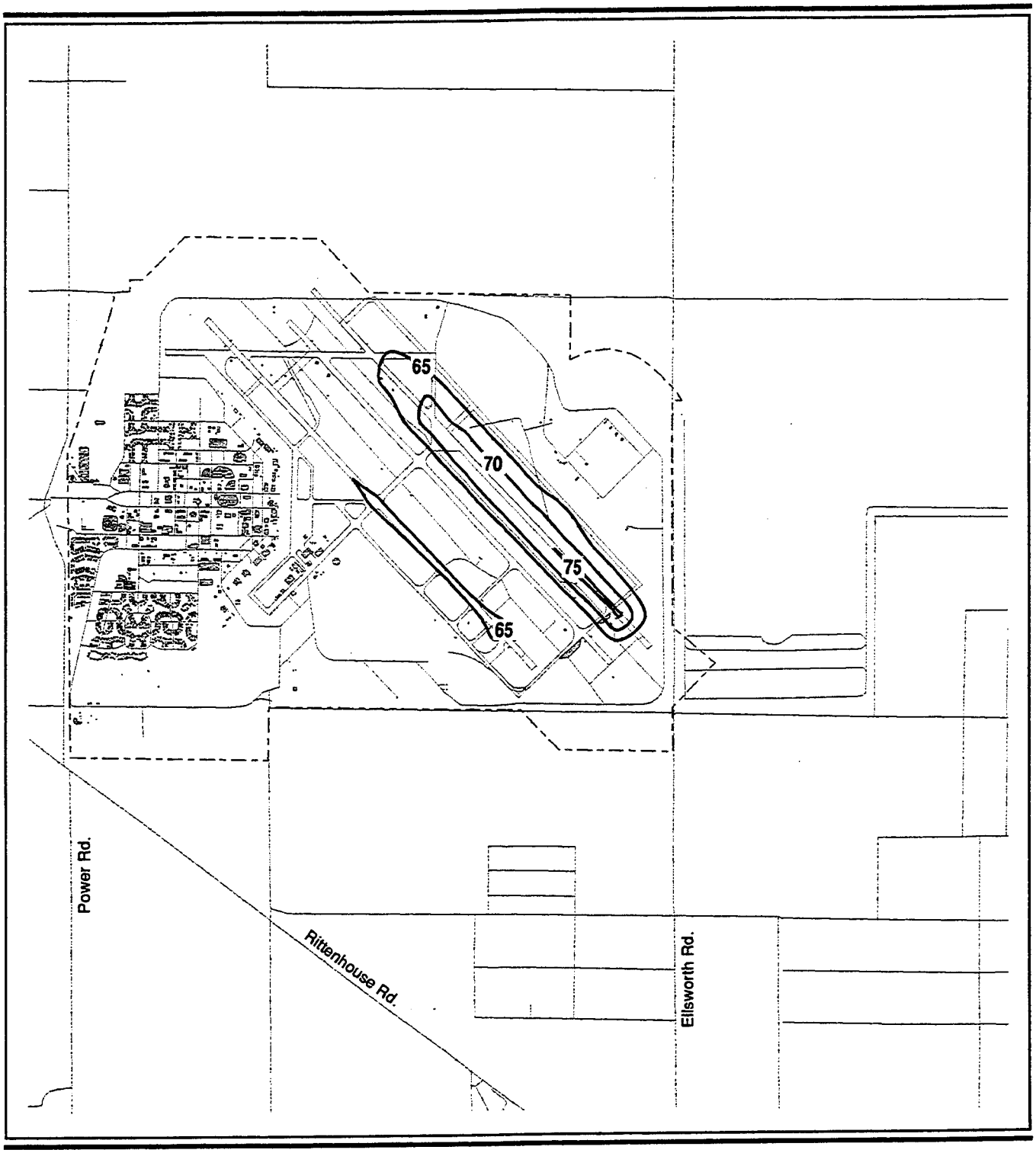
—75— DNL Noise Contours (in 5 dB intervals)

– – – – – Base Boundary

0 1/2 1 Mile

DNL Noise Contours - Proposed Action (1993)

Figure 4.4-12



EXPLANATION

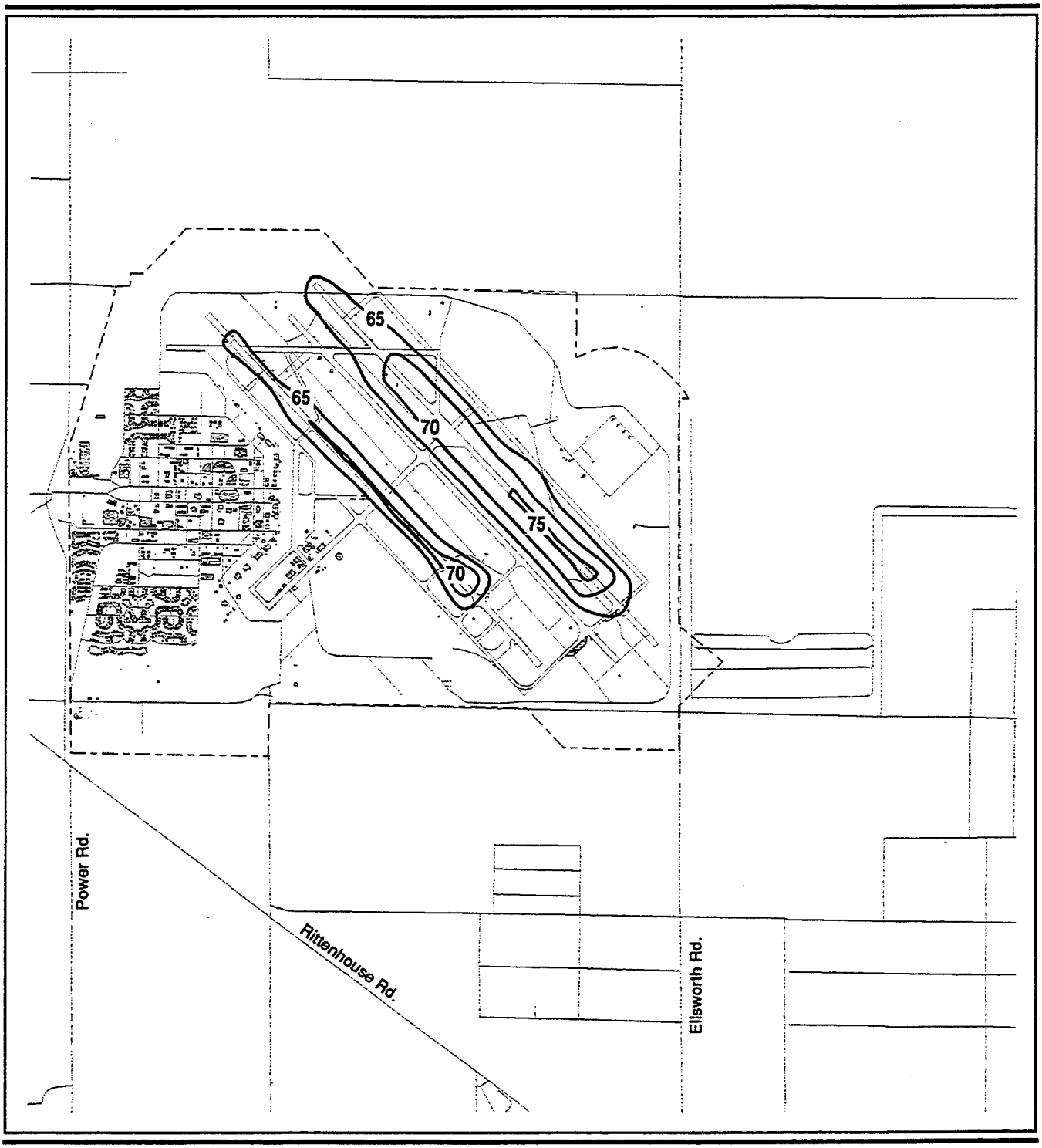
—75— DNL Noise Contours (in 5 dB intervals)

- - - - - Base Boundary

DNL Noise Contours - Proposed Action (1998)

0 1/2 1 Mile

Figure 4.4-13



EXPLANATION

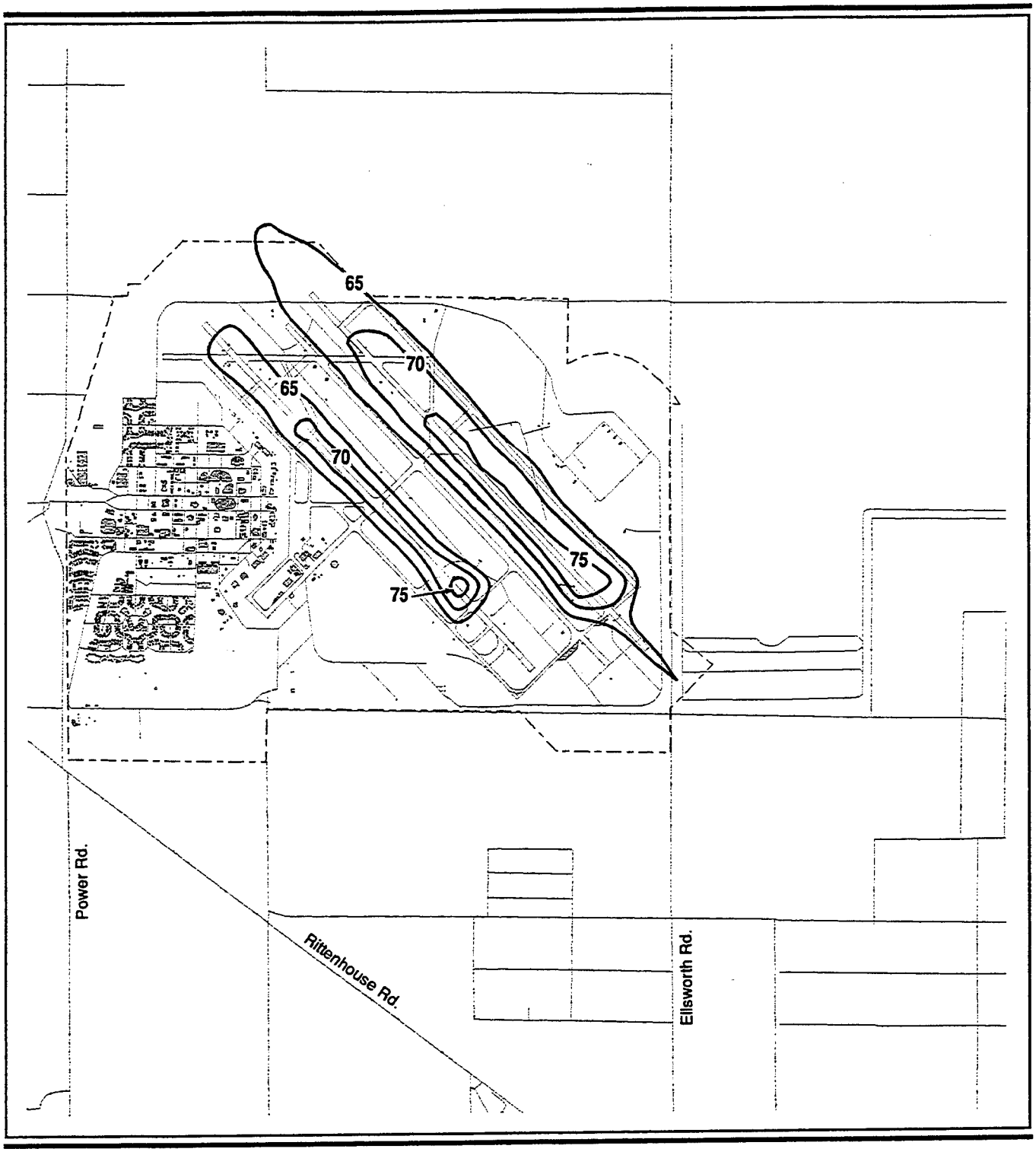
—75— DNL Noise Contours (in 5 dB intervals)

- - - - - Base Boundary

DNL Noise Contours - Proposed Action (2003)

0 1/2 1 Mile

Figure 4.4-14



EXPLANATION

—75— DNL Noise Contours (in 5 dB intervals)

– – – – – Base Boundary

DNL Noise Contours - Proposed Action (2013)

0 1/2 1 Mile

Figure 4.4-15

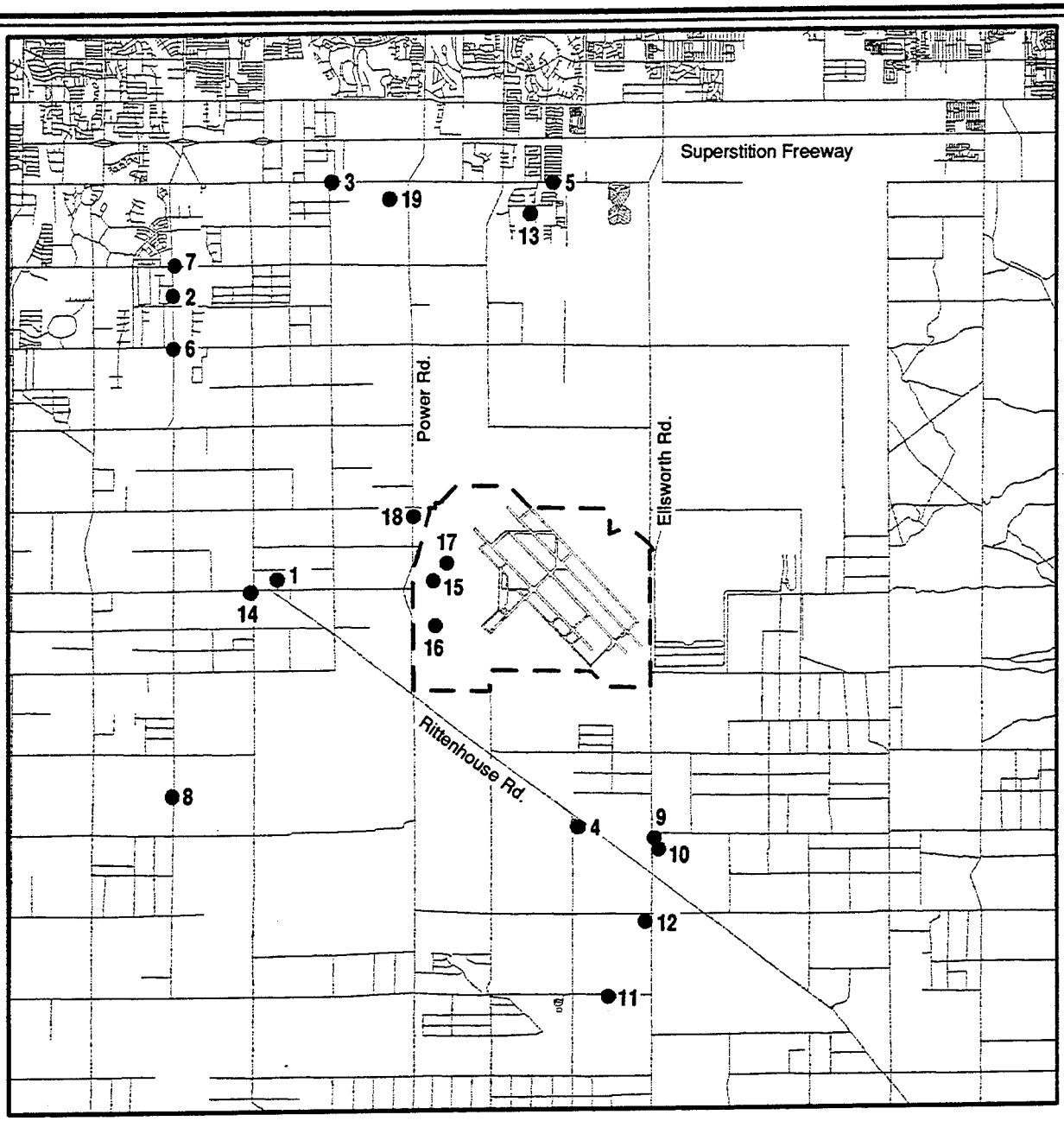
Table 4.4-15. DNL Exposure for the Alternative Reuse Plans

		DNL in dB					
		65-70		70-75		>75	
Year	Alternative	Acres	Population	Acres	Population	Acres	Population
1993	Proposed Action	682	0	287	0	278	0
	General Aviation and Education	675	0	287	0	277	0
	Commercial Aviation and Education*	1,634	43	809	0	884	0
1998	Proposed Action	190	0	121	0	5	0
	General Aviation and Education	94	0	1	0	0	0
	Commercial Aviation and Education*	2,061	43	1,093	0	1,188	0
2003	Proposed Action	319	0	161	0	10	0
	General Aviation and Education	89	0	0	0	0	0
	Commercial Aviation and Education*	2,238	43	1,077	0	1,308	0
2013	Proposed Action	463	0	263	0	69	0
	General Aviation and Education	181	0	125	0	26	0
	Commercial Aviation and Education*	2,494	43	1,101	0	1,429	0

* Population estimates for this alternative are based on 1990 census data for off-base areas. The areas within the DNL 65 contours fall within areas which have planning classifications which would minimize noise conflicts with military airfield uses.

aircraft mix for all years. No residences or sensitive receptors, such as hospitals, schools, and religious institutions, would be exposed to noise levels of DNL 65 dB or greater, and no incompatible land uses were identified due to aircraft noise.

SEL was calculated at locations representative of nearby residential areas as shown in Figure 4.4-16 for the noisiest and most common jet aircraft; the results are presented in Table 4.4-16. SEL values are calculated by the NOISEMAP model based on the flight track and the slant distance to the receptor. The scientific literature does not provide a consensus on sleep disturbance due to noise (Appendix I, Section 4.3), and there is no recognized standard which provides guidance to assess sleep disturbance. Based on Lukas' (1977) worst-case sleep disturbance curve (Figure I-9 in Appendix I) and the calculated SELs, it is estimated that between 0 and 35 percent of the population in the areas near the receptor locations might be disturbed during nighttime sleep by a single aircraft event. Sleep disturbance can be expected to be less when windows are closed and can



1	Higley Elementary School	8	Church of Christ-East	15	WAFB Base Hospital
2	Greenfield Elementary School	9	Grace Assembly of God	16	WAFB Education Complex
3	Baseline Bible Church	10	Queen Creek Junior H.S.	17	North Desert Village Housing
4	Arizona Boys Ranch	11	Queen Creek Elementary School	18	Grace Baptist Church
5	Baseline Baptist Church	12	Central Queen Creek	19	Superstition Springs Golf Club
6	Hope Presbyterian Church	13	Sunland Village		
7	Nativity Lutheran Church	14	Central Higley		

EXPLANATION

● Receptor Locations

— — Base Boundary

Sound Exposure Level (SEL) Receptor Locations

0 1 2 Miles

Figure 4.4-16

Table 4.4-16. Sound Exposure Levels at Representative Noise Receptors - Proposed Action

Community	Receptor Location	Sound Exposure Level (dB) Aircraft Type					
		BAe-146	B-737	MD-83	B-757	GA Jet	KC-135R
Higley	Higley Elementary	55	55	61	58	66	64
Gilbert	Greenfield Elem.	73	75	81	74	89	69
Mesa	Baseline Bible Church	72	87	80	86	86	84
Queen Creek	Arizona Boys Ranch	53	57	64	58	72	65
Mesa	Baseline Baptist Church	74	77	75	74	78	74
Gilbert	Hope Presbyterian Church	79	82	79	80	85	68
Gilbert	Nativity Lutheran Church	73	73	80	74	88	70
Chandler	Church of Christ	52	61	60	55	56	44
Queen Creek	Grace Assembly of God	52	58	60	58	63	64
Queen Creek	Queen Creek Junior High	63	64	70	57	79	68
Queen Creek	Queen Creek Elementary	69	72	70	70	75	56
Queen Creek	Queen Creek (central)	57	61	65	52	74	62
Mesa	Sunland Village	58	70	68	61	72	77
Higley	Higley (central)	53	67	65	56	64	61
Mesa	Base Hospital	66	67	73	70	84	75
Mesa	Base Educational Complex	61	63	68	66	76	72
Mesa	North Desert Village Housing	69	71	77	73	91	78
Mesa	Grace Baptist Church	71	72	77	73	93	79
Gilbert	Superstition Springs Golf Club	67	73	74	69	78	79

be reduced by minimizing nighttime aircraft operations. The noisiest aircraft would be the KC-135, MD-83, B-737, B-757, and business jets, with the most frequent civilian jet aircraft operations by the MD-83.

Surface traffic sound levels for several road segments are presented in Table 4.4-17. These levels are presented in terms of DNL as a function of distance from the centerline of the roadways analyzed. For every doubling of distance from a road, the noise level decreases by approximately 4.5 dB. In the area within approximately 3 miles of the base, there would be an estimated 107 residents in areas exposed to noise levels of DNL 65 dB or greater due to surface traffic by the year 2013. Surface traffic noise impacts would also occur along roads on the base. The number of residents

Table 4.4-17. Distance to DNL from Roadway Centerline - Proposed Action

Year	Roadway	Distance (ft) DNL 65 dB	Distance (ft) DNL 70 dB	Distance (ft) DNL 75 dB
1998	Rittenhouse Road	150	70	30
	Williams Field Road	70	30	*
	Power Road	200	90	40
	Ellsworth Road	130	60	30
	Elliot Road	110	50	*
	Germann Road	50	30	*
	Ray Road (east of Power)	60	30	*
	Williams Field Road (east)	*	*	*
2003	Rittenhouse Road	170	80	40
	Williams Field Road	90	40	*
	Power Road	260	120	50
	Ellsworth Road	150	70	30
	Elliot Road	140	60	30
	Germann Road	80	40	*
	Ray Road	90	40	*
	Williams Field Road (east)	40	*	*
2013	Rittenhouse Road	260	120	50
	Williams Field Road	180	80	40
	Power Road	430	200	90
	Ellsworth Road	200	90	40
	Elliot Road	200	90	40
	Germann Road	200	90	40
	Ray Road	200	90	40
	Williams Field Road (east)	100	50	*

* Contained within the roadway.

impacted along new and redeveloped roads on the base cannot be estimated because detailed plans for residential areas have not been developed.

Cumulative Impacts. Cumulative impacts from aircraft and surface traffic noise could occur where a residence is exposed to both aircraft noise and traffic noise.

Mitigation Measures. For future development, land use planning should incorporate noise compatibility measures when establishing residential areas. Due to continued KC-135 operations, development should be consistent with the Military Airport Zoning Ordinance (Maricopa County Planning Department, 1987). Reuse development on the base should incorporate designs to minimize aircraft and traffic noise effects, especially for residential and educational facilities. No mitigation of aircraft noise (soundproofing) at existing schools, hospitals, religious institutions, and

residences would be required since none of these are within the DNL 65 dB contour.

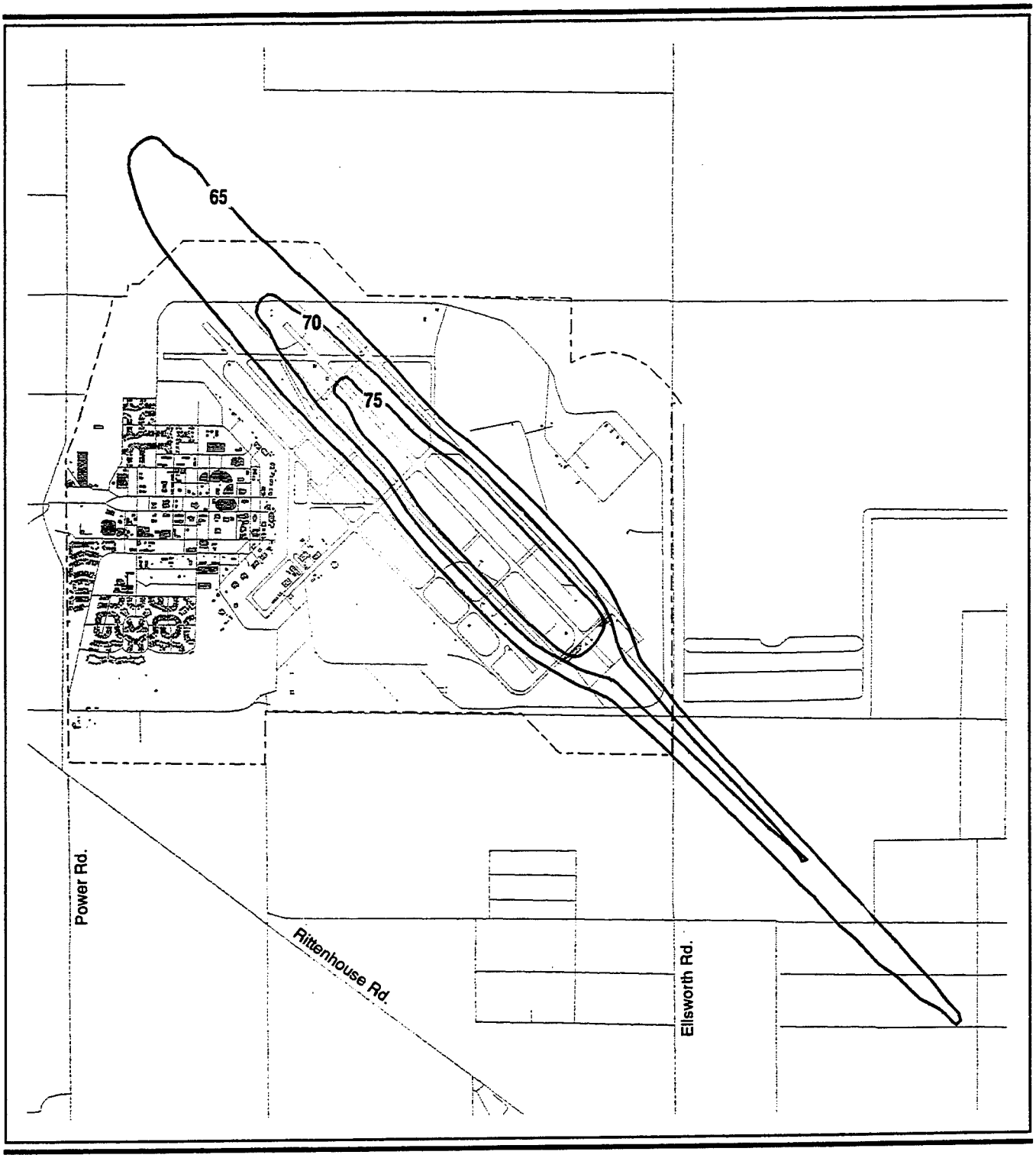
4.4.4.2 General Aviation and Education Alternative. The results of the aircraft noise modeling for the General Aviation and Education Alternative are presented as noise contours in Figures 4.4-17 through 4.4-20.

Table 4.4-15 presents the approximate number of acres within each DNL range for each of the study years. Compared to the preclosure reference, this represents a decrease of 15,874 acres within DNL 65 dB in 1993, 17,018 acres in 1998, 17,024 acres in 2003, and 16,781 acres in 2013. The maximum exposure is projected for 1993, after which KC-135 operations are assumed to be discontinued, resulting in reduced noise exposure even though numbers of aircraft operations would continue to increase.

No residences would be exposed to noise levels of DNL 65 dB or greater, and no incompatible land uses were identified due to aircraft noise.

SEL was calculated at locations representative of nearby residential areas for the fixed wing civilian aircraft (see Figure 4.4-16); the results are presented in Table 4.4-18. SEL values are calculated by the NOISEMAP model based on the flight track and the slant distance to the receptor. The scientific literature does not provide a consensus on sleep disturbance due to noise (Appendix I, Section 4.3), and there is no recognized standard which provides guidance to assess sleep disturbance. Based on Lukas' (1977) worst-case sleep disturbance curve (Figure I-9, in Appendix I) and the calculated SELs, it is estimated that between 0 and 30 percent of the population in the areas near the receptor locations might be disturbed during nighttime sleep by a single aircraft event. Sleep disturbance can be expected to be less when windows are closed and can be reduced by minimizing nighttime aircraft operations. The noisiest aircraft would be the business jets with the most frequent operations by single-engine piston aircraft.

Surface traffic sound levels for several road segments are presented in Table 4.4-19. These levels are presented in terms of DNL as a function of distance from the centerline of the roadways analyzed. For every doubling of distance from a road, the noise level decreases by approximately 4.5 dB. In the area within approximately 3 miles of the base, there would be an estimated 107 residents in areas exposed to noise levels of DNL 65 dB or greater due to surface traffic by the year 2013. Surface traffic noise impacts would also occur along roads on the base. The number of residents impacted along new and redeveloped roads on the base cannot be estimated because detailed plans for residential areas have not been developed.



EXPLANATION

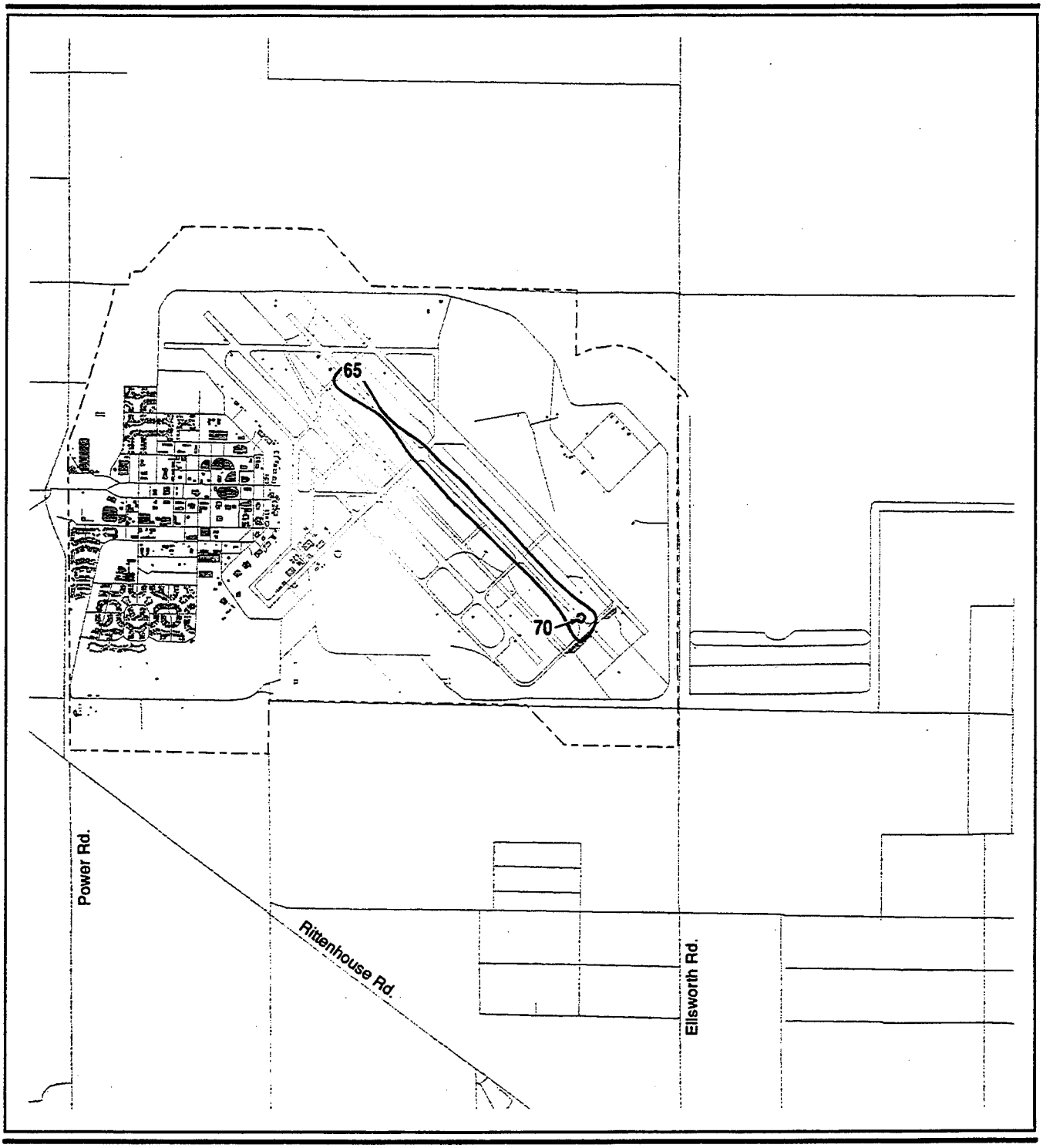
—75— DNL Noise Contours (in 5 dB intervals)

- - - - - Base Boundary

DNL Noise Contours - General Aviation and Education Alternative (1993)

0 1/2 1 Mile

Figure 4.4-17



EXPLANATION

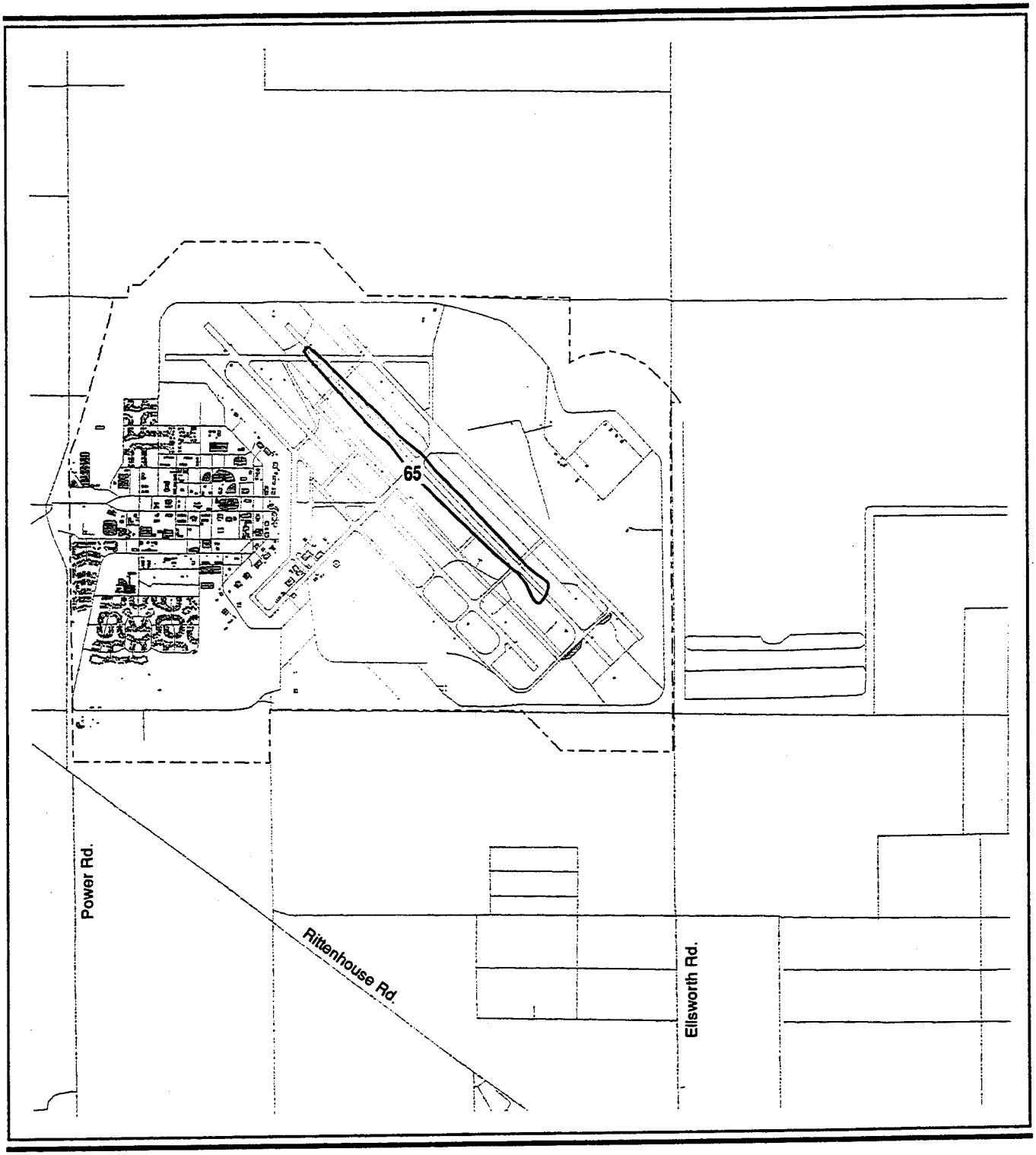
—75— DNL Noise Contours (in 5 dB intervals)

- - - - - Base Boundary

DNL Noise Contours - General Aviation and Education Alternative (1998)

0 1/2 1 Mile

Figure 4.4-18



EXPLANATION

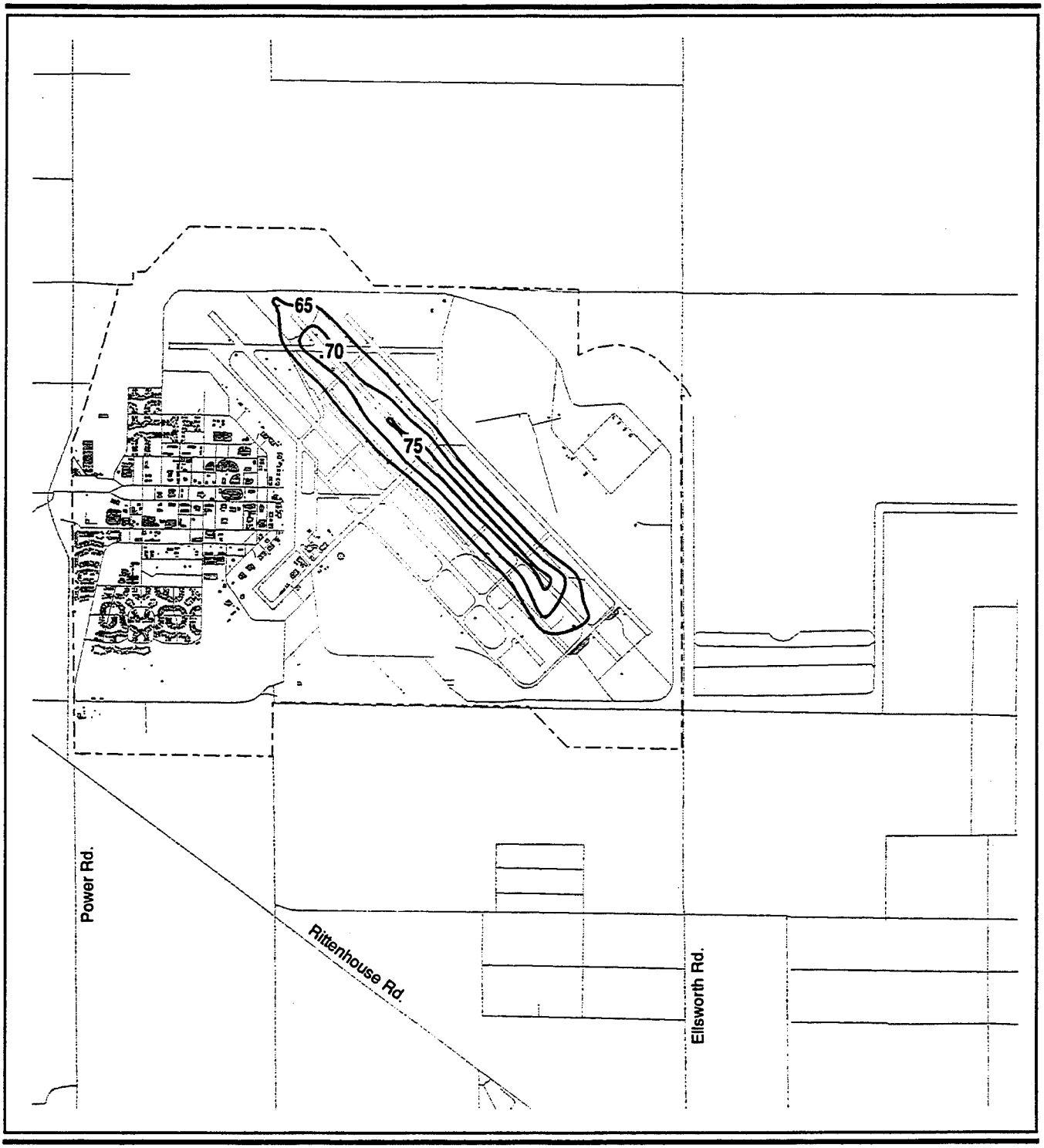
—75— DNL Noise Contours (in 5 dB intervals)

- - - - - Base Boundary

DNL Noise Contours - General Aviation and Education Alternative (2003)

0 1/2 1 Mile

Figure 4.4-19



EXPLANATION

—75— DNL Noise Contours (in 5 dB intervals)

- - - - - Base Boundary

DNL Noise Contours - General Aviation and Education Alternative (2013)

0 1/2 1 Mile

Figure 4.4-20

Table 4.4-18. Sound Exposure Levels at Representative Noise Receptors - General Aviation and Education Alternative

Community	Receptor Location	Sound Exposure Level (dB) Aircraft Type				
		Cessna Conquest	COMSEP	Beech Baron 58P	Composite GA Jet	KC-135R
Higley	Higley Elementary	54	77	79	64	64
Gilbert	Greenfield Elem.	66	48	56	88	69
Mesa	Baseline Bible Church	68	57	63	87	84
Queen Creek	Arizona Boys Ranch	-	67	74	69	65
Mesa	Baseline Baptist Church	67	75	77	73	74
Gilbert	Hope Presbyterian Church	66	49	58	85	68
Gilbert	Nativity Lutheran Church	65	47	55	85	70
Chandler	Church of Christ	52	64	70	53	44
Queen Creek	Grace Assembly of God	-	80	81	77	64
Queen Creek	Queen Creek Junior High	-	78	81	76	68
Queen Creek	Queen Creek Elementary	65	65	71	70	56
Queen Creek	Queen Creek (central)	54	68	75	69	62
Mesa	Sunland Village	62	75	78	69	77
Higley	Higley (central)	60	77	79	62	61
Mesa	Base Hospital	61	70	70	79	75
Mesa	Base Educational Complex	62	77	72	73	72
Mesa	North Desert Village Housing	65	69	72	84	78
Mesa	Grace Baptist Church	67	83	76	86	79
Gilbert	Superstition Springs Golf Club	64	55	64	79	79

Table 4.4-19. Distance to DNL from Roadway Centerline - General Aviation and Education Alternative

Year	Roadway	Distance (ft) DNL 65 dB	Distance (ft) DNL 70 dB	Distance (ft) DNL 75 dB
1998	Rittenhouse Road	140	70	30
	Williams Field Road	70	30	*
	Power Road	230	100	50
	Ellsworth Road	130	60	30
	Elliot Road	110	50	*
	Germann Road	60	30	*
	Pecos Road	60	30	*
	Hawes Road (extended to Sossaman)	30	*	*
	Sossaman Road (extended to Hawes)	40	*	*
	Williams Field Road (east)	30	*	*
	Sossaman Road (Hawes to Ray)	90	40	*
	Ray Road	50	*	*
2003	Rittenhouse Road	170	80	40
	Williams Field Road	90	40	*
	Power Road	310	140	60
	Ellsworth Road	170	80	30
	Elliot Road	140	60	30
	Germann Road	80	40	*
	Pecos Road	110	50	*
	Hawes Road (extended to Sossaman)	40	*	*
	Sossaman Road (extended to Hawes)	80	40	*
	Williams Field Road (east)	40	*	*
	Sossaman Road (Hawes to Ray)	150	70	30
	Ray Road	70	40	*
2013	Rittenhouse Road	260	120	50
	Williams Field Road	170	80	40
	Power Road	410	190	90
	Ellsworth Road	220	110	50
	Elliot Road	200	90	40
	Germann Road	200	90	40
	Pecos Road	140	60	30
	Hawes Road (extended to Sossaman)	90	40	*
	Sossaman Road (extended to Hawes)	170	80	40
	Williams Field Road (east)	110	50	*
	Sossaman Road (Hawes to Ray)	260	120	60
	Ray Road	170	80	40

* Contained within the roadway.

Cumulative Impacts. Cumulative impacts from aircraft and surface traffic noise could occur where a residence is exposed to both aircraft noise and traffic noise.

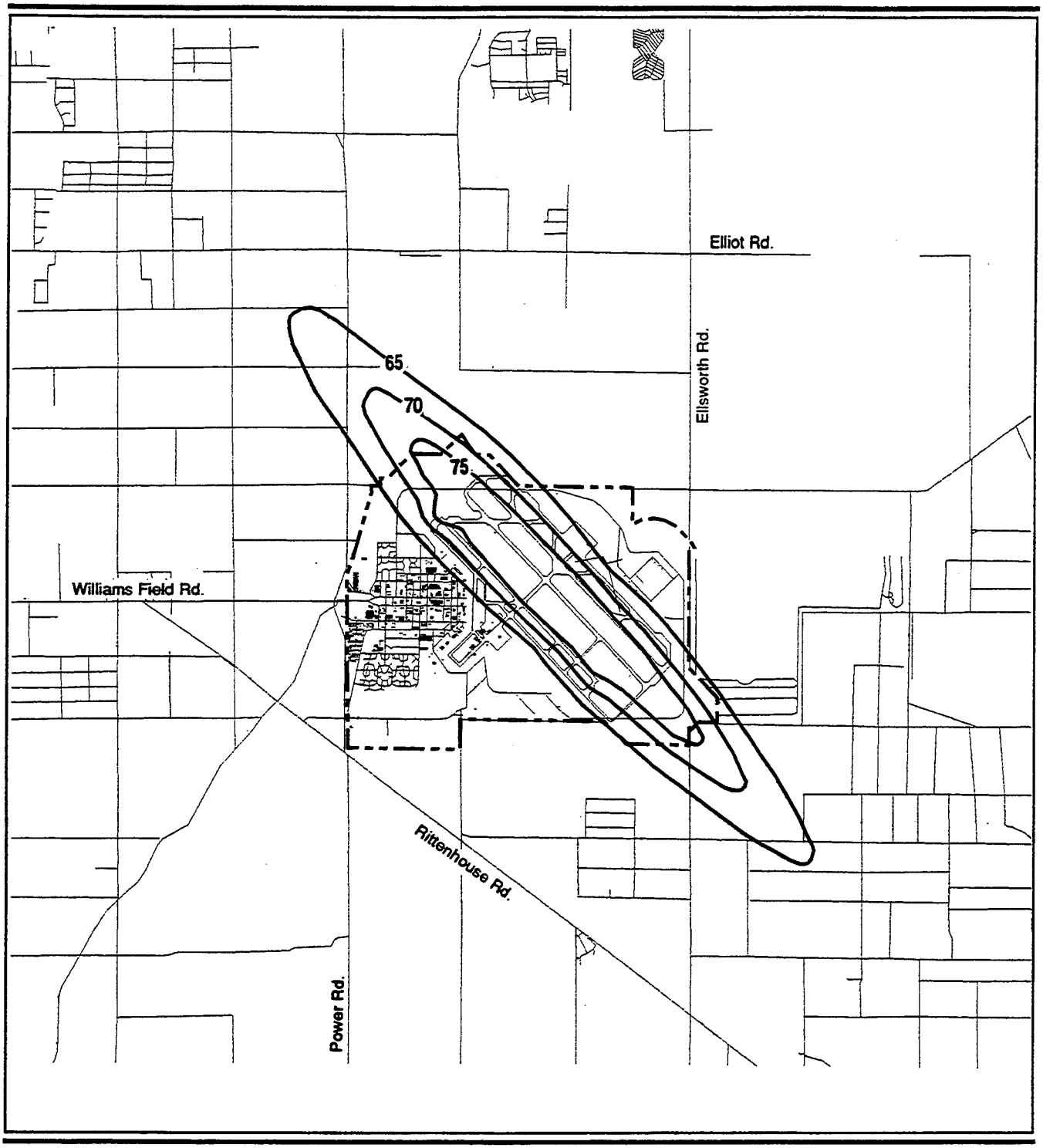
Mitigation Measures. For future development, land use planning should incorporate noise compatibility measures when establishing residential areas. Reuse development on the base should incorporate designs to minimize aircraft and traffic noise effects, especially for residential and educational facilities. No mitigation of aircraft noise (soundproofing) at existing schools, hospitals, religious institutions, and residences would be required since none of those are within the DNL 65 dB contour.

4.4.4.3 Commercial Aviation and Education Alternative. The results of the aircraft noise modeling for the Commercial Aviation and Education Alternative are presented as noise contours in Figures 4.4-21 through 4.4-24. Some spreading of the contours at the north and south ends of Runway 12R/30L results from helicopter landings. The principal contributors to the larger contours, as compared to the Proposed Action, are the 20,000 annual F-16 training operations, 10 percent of which were assumed to use afterburners on departure.

Limited areas of proposed education uses within the Aviation Support land use category, as well as Commercial areas in the northeast quadrant of the base designated for hotel uses, would be located beneath noise contours of DNL 65 to 70 dB. Existing facilities in these areas that would be reused could be adversely impacted. However, new construction for education or hotel uses could mitigate noise impacts to a non-adverse level by incorporating appropriate noise reduction measures in facility construction.

Table 4.4-15 presents the approximate number of acres and estimated population within each DNL range for each of the study years. Compared to the preclosure reference, this represents a decrease of 13,786 acres within DNL 65 dB in 1993, 12,771 acres in 1998, 12,490 acres in 2003, and 12,089 acres in 2013. As many as 43 residents would be exposed to DNL 65 dB or greater due to aircraft noise. Stage 3 aircraft are assumed for the commercial aircraft mix for all years. No additional incompatible land uses other than those existing for the preclosure reference were identified due to aircraft noise.

SEL was calculated at locations representative of nearby residential areas for the noisiest and most common jet aircraft (see Figure 4.4-16); the results are presented in Table 4.4-20. SEL values are calculated by the NOISEMAP model based on the flight track and the slant distance to the receptor. The scientific literature does not provide a consensus on sleep disturbance due to noise (Appendix I, Section 4.3), and there is no recognized standard which provides guidance to assess sleep disturbance. Based on Lukas' (1977) worst-case sleep disturbance curve (Figure I-9 in Appendix I) and the



EXPLANATION

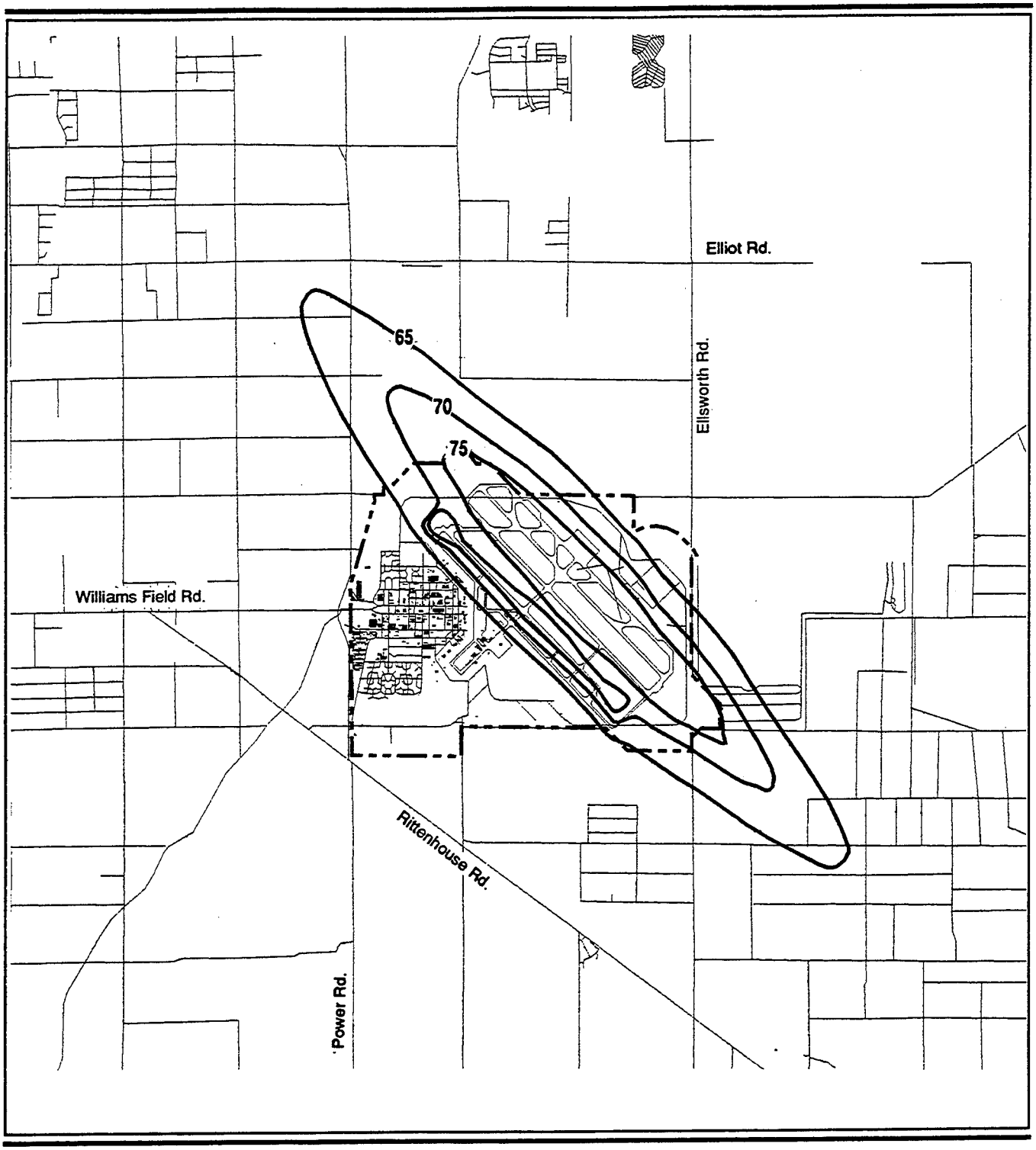
75 DNL Noise Contours (in 5 dB intervals)

Base Boundary

0 1/2 1 Mile

DNL Noise Contours - Commercial Aviation and Education Alternative (1993)

Figure 4.4-21



EXPLANATION

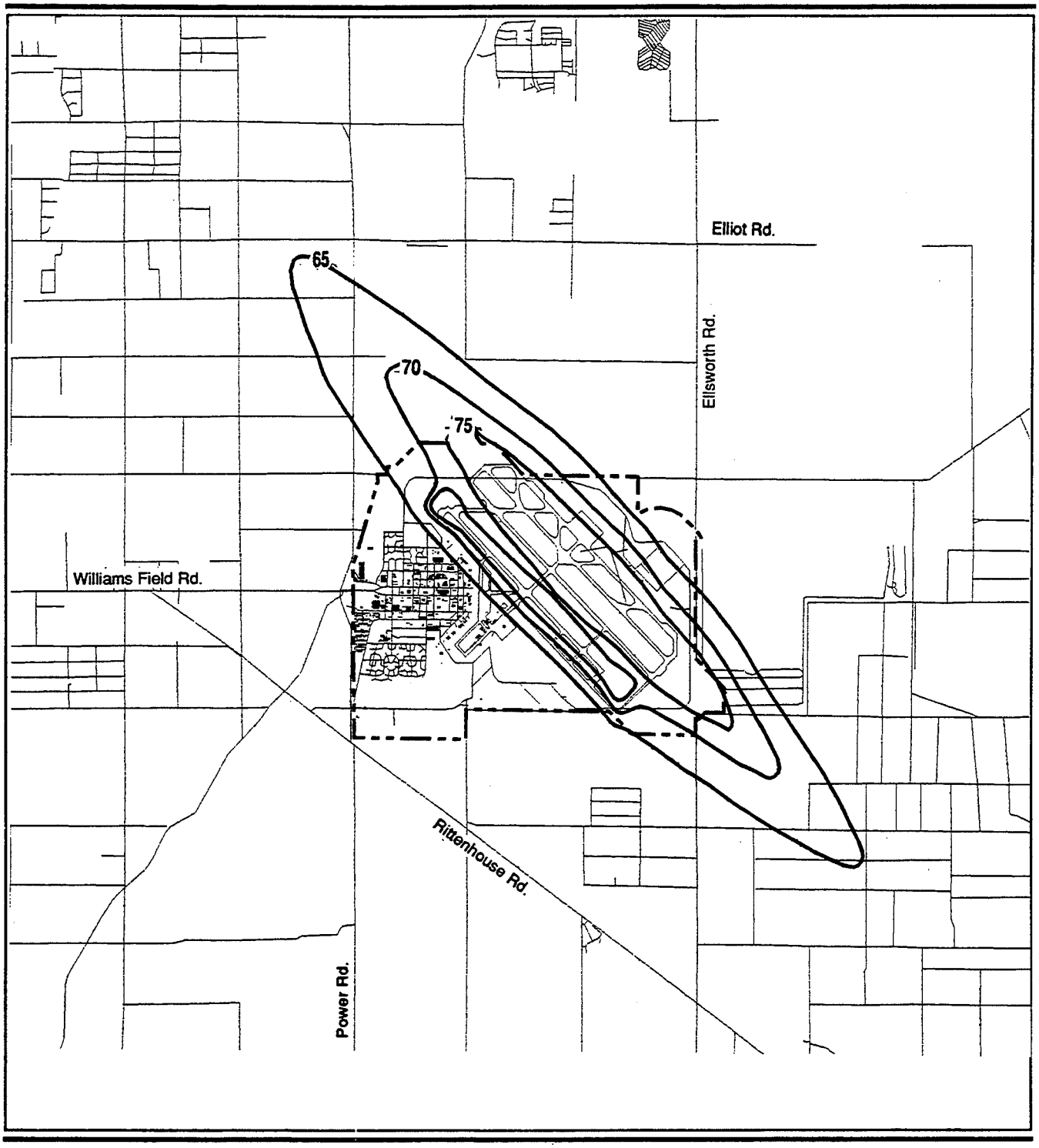
—75— DNL Noise Contours (in 5 dB intervals)

— - - — Base Boundary

0 1/2 1 Mile

DNL Noise Contours - Commercial Aviation and Education Alternative (1998)

Figure 4.4-22



EXPLANATION

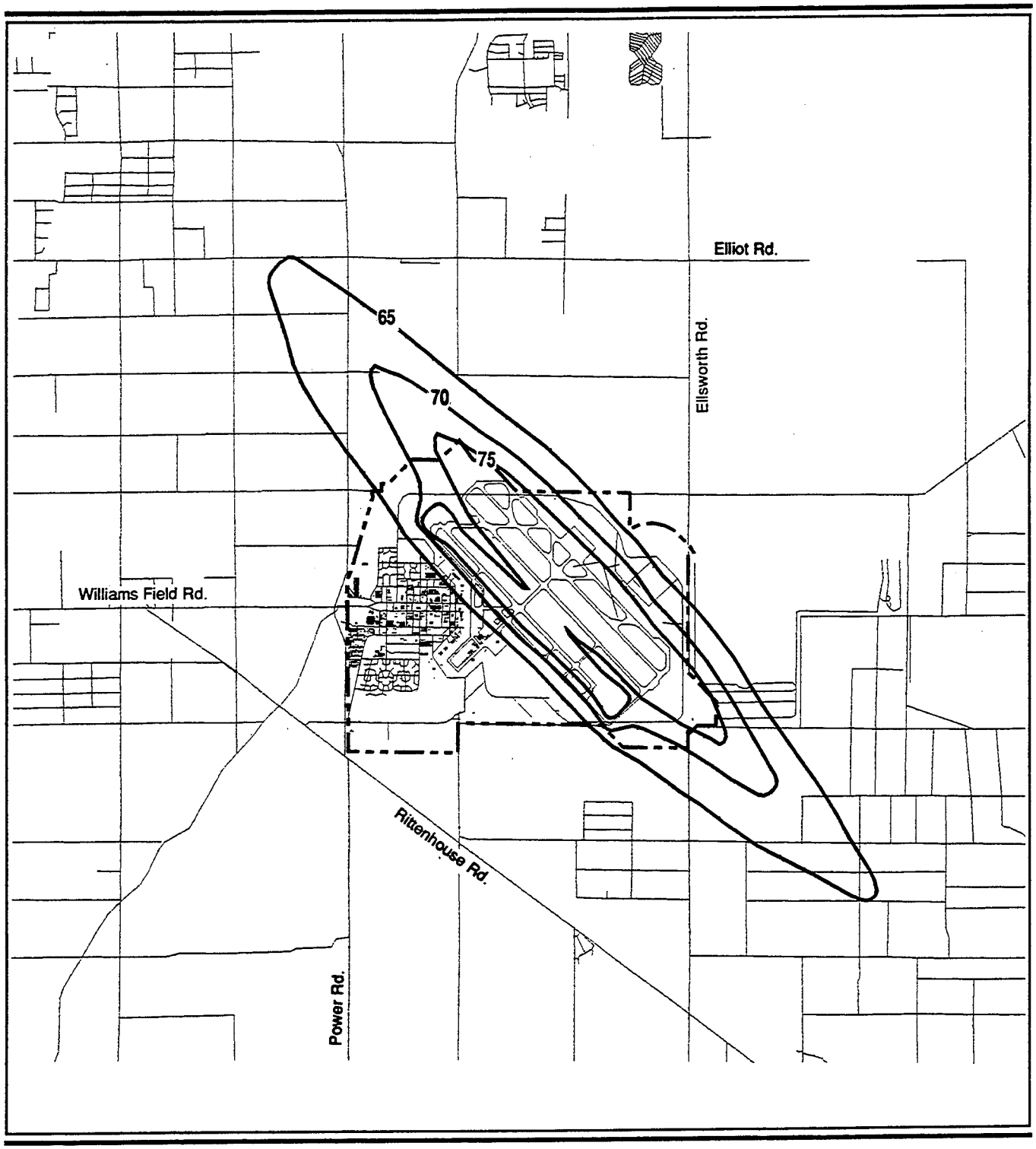
—75— DNL Noise Contours (in 5 dB intervals)

— - - - — Base Boundary

0 1/2 1 Mile

DNL Noise Contours - Commercial Aviation and Education Alternative (2003)

Figure 4.4-23



EXPLANATION

—75— DNL Noise Contours (in 5 dB intervals)

— - - — Base Boundary

DNL Noise Contours - Commercial Aviation and Education Alternative (2013)

0 1/2 1 Mile

Figure 4.4-24

Table 4.4-20. Sound Exposure Levels at Representative Noise Receptors - Commercial Aviation and Education Alternative

		Sound Exposure Level (dB) Aircraft Type							
Community	Receptor Location	B-727	B-737	MD-83	B-757	GA Jet	KC-135R	F-16	DC8-70
Higley	Higley Elementary	72	63	61	-	67	-	85	-
Gilbert	Greenfield Elem.	90	82	79	80	85	-	89	82
Mesa	Baseline Bible Church	88	83	80	81	75	85	100	83
Queen Creek	Arizona Boys Ranch	75	-	64	-	72	-	89	-
Mesa	Baseline Baptist Church	79	76	74	73	76	66	89	76
Gilbert	Hope Presbyterian Church	84	77	74	74	79	-	88	76
Gilbert	Nativity Lutheran Church	94	75	79	73	88	-	90	81
Chandler	Church of Christ	64	61	60	-	60	-	67	-
Queen Creek	Grace Assembly of God	82	-	70	-	81	72	94	-
Queen Creek	Queen Creek Junior High	81	-	70	-	79	71	94	-
Queen Creek	Queen Creek Elementary	75	72	70	69	76	-	81	72
Queen Creek	Queen Creek (central)	75	60	64	-	70	-	87	-
Mesa	Sunland Village	74	69	67	-	68	66	88	-
Higley	Higley (central)	70	67	65	-	63	-	82	-
Mesa	Base Hospital	81	-	73	-	85	73	98	-
Mesa	Base Educational Complex	76	-	68	-	77	-	92	-
Mesa	North Desert Village Housing	84	-	77	-	91	76	101	-
Mesa	Grace Baptist Church	88	-	77	-	93	79	101	-
Gilbert	Superstition Springs Golf Club	82	63	71	-	77	78	97	-

calculated SELs, it is estimated that between 0 and 35 percent of the population in the areas near the receptor locations might be disturbed during nighttime sleep by a single aircraft event. Sleep disturbance can be expected to be less when windows are closed and can be reduced by minimizing nighttime aircraft operations. The analysis suggests that, for the Commercial Aviation and Education Alternative, some aircraft overflights could affect the sleep of some residents in the area. The noisiest aircraft would be the F-16, KC-135, B-727, MD-83, B-737, and business jets, with the most frequent civilian jet aircraft operations by the MD-83.

Surface traffic sound levels for several road segments are presented in Table 4.4-21. These levels are presented in terms of DNL as a function of distance from the centerline of the roadways analyzed. For every doubling of distance from a road, the noise level decreases by approximately 4.5 dB. In the area within approximately 3 miles of the base, there would be an estimated 107 residents in areas exposed to noise levels of DNL 65 dB or greater due to surface traffic by the year 2013. Surface traffic noise impacts would also occur along roads on the base. The number of residents impacted along new and redeveloped roads on the base cannot be estimated because detailed plans for residential areas have not been developed.

Table 4.4-21. Distance to DNL from Roadway Centerline - Commercial Aviation and Education Alternative

Year	Roadway	Distance (ft) DNL 65 dB	Distance (ft) DNL 70 dB	Distance (ft) DNL 75 dB
1998	Rittenhouse Road	140	70	30
	Williams Field Road	80	40	*
	Power Road	220	100	50
	Ellsworth Road	130	60	30
	Elliot Road	110	50	*
	Germann Road	60	30	*
	Williams Field Road (east)	60	30	*
	Ray Road	50	*	*
2003	Rittenhouse Road	170	80	40
	Williams Field Road	110	50	*
	Power Road	260	120	60
	Ellsworth Road	160	70	30
	Elliot Road	140	60	30
	Germann Road	80	40	*
	Williams Field Road (east)	80	40	*
	Ray Road	170	80	40
2013	Rittenhouse Road	260	120	50
	Williams Field Road	150	70	30
	Power Road	560	260	120
	Ellsworth Road	240	110	50
	Elliot Road	200	90	40
	Germann Road	200	90	40
	Williams Field Road (east)	150	70	30
	Ray Road	230	100	50

* Contained within the roadway.

Cumulative Impacts. Cumulative impacts from aircraft and surface traffic noise could occur where a residence is exposed to both aircraft noise and traffic noise.

Mitigation Measures. For future development, land use planning should incorporate noise compatibility measures when establishing residential areas.

Due to continued KC-135 operations and other military aircraft operations, development should be consistent with the Military Airport Zoning Ordinance (Maricopa County Planning Department, 1987). If afterburners are not employed on any of the F-16 training operations, noise impacts to the Aviation Support areas designated for educational use and the Commercial area designated for hotel use would be reduced but not eliminated. Reuse development on the base should incorporate designs to minimize aircraft and traffic noise effects, especially for residential and educational facilities.

4.4.4.4 Education and Planned Community Alternative. For this alternative, there would be no airport activity and, therefore, no aircraft noise impacts.

Surface traffic sound levels for several road segments are presented in Table 4.4-22. These levels are presented in terms of DNL as a function of distance from the centerline of the roadways analyzed. For every doubling of distance from a road, the noise level decreases by approximately 4.5 dB. In the area within approximately 3 miles of the base, there would be an estimated 99 residents in areas exposed to noise levels of DNL 65 dB or greater due to surface traffic by the year 2013. Surface traffic noise impacts would also occur along roads on the base. The number of residents impacted along new and redeveloped roads on the base cannot be estimated because detailed plans for residential areas have not been developed.

Cumulative Impacts. No major noise impacts other than the impacts from increased traffic are anticipated.

Mitigation Measures. For future development, land use planning should incorporate noise compatibility measures when establishing residential areas. Reuse development on the base should incorporate designs to minimize traffic noise effects, especially for residential and educational facilities.

4.4.4.5 Other Land Use Concepts.

Federal Bureau of Prisons. No noise impacts are associated with this reuse concept.

Arizona Department of Corrections. If incorporated in conjunction with the Commercial Aviation and Education Alternative, areas proposed by the Arizona Department of Corrections in the northeast quadrant of the base would be exposed to DNL 65 to 75 dB, and areas in the south-central part of the base would be exposed to DNL 65 to 70 dB. New construction in the northeast and south-central areas of the base could mitigate noise impacts to a non-adverse level by incorporating appropriate noise reduction measures. Outdoor noise impacts, however, would persist. No noise impacts are associated with the Proposed Action or other reuse alternatives.

Table 4.4-22. Distance to DNL from Roadway Centerline - Education and Planned Community Alternative

Year	Roadway	Distance (ft) DNL 65 dB	Distance (ft) DNL 70 dB	Distance (ft) DNL 75 dB
1998	Rittenhouse Road	150	70	30
	Williams Field Road	80	40	*
	Power Road	190	90	40
	Ellsworth Road	120	60	30
	Elliot Road	110	50	*
	Germann Road	50	30	*
	Pecos Road	90	40	*
	Hawes Road (extended)	60	30	*
	Hawes Road (north end)	170	70	30
	Williams Field Road (east)	30	*	*
	Sossaman Road (extended to Ray)	40	*	*
2003	Rittenhouse Road	170	80	40
	Williams Field Road	200	90	40
	Power Road	240	110	50
	Ellsworth Road	170	80	40
	Elliot Road	140	70	30
	Germann Road	80	40	*
	Pecos Road	110	50	*
	Hawes Road (extended)	100	50	*
	Hawes Road (north end)	280	130	60
	Williams Field Road (east)	120	60	30
	Sossaman Road (extended to Ray)	140	70	30
2013	Rittenhouse Road	270	120	50
	Williams Field Road	350	170	80
	Power Road	370	170	80
	Ellsworth Road	240	110	50
	Elliot Road	200	90	40
	Germann Road	200	90	40
	Pecos Road	200	90	40
	Hawes Road (extended)	110	50	*
	Hawes Road (north end)	270	130	60
	Williams Field Road (east)	200	90	40
	Sossaman Road (extended to Ray)	370	170	70

* Contained within the roadway.

Arizona Department of Health Services. No noise impacts are associated with this reuse concept.

4.4.4.6 No-Action Alternative. There would be no airport activity under the No-Action Alternative. Some initial decrease in traffic noise levels along roads near the base is expected. Growth in the area will eventually result in an increase in traffic noise above the levels projected for the closure year.

Surface traffic sound levels for several road segments are presented in Table 4.4-23. These levels are presented in terms of DNL as a function of distance from the centerline of the roadways analyzed. For every doubling of distance from a road, the noise level decreases by approximately 4.5 dB. In the area within approximately 3 miles of the base, there would be an

Table 4.4-23. Distance to DNL from Roadway Centerline - No-Action Alternative

Year	Roadway	Distance (ft) DNL 65 dB	Distance (ft) DNL 70 dB	Distance (ft) DNL 75 dB
1998	Rittenhouse Road	150	70	30
	Williams Field Road	50	*	*
	Power Road	190	90	40
	Ellsworth Road	120	60	30
	Elliot Road	110	50	*
	Germann Road	60	30	*
2003	Rittenhouse Road	170	80	40
	Williams Field Road	60	30	*
	Power Road	240	110	50
	Ellsworth Road	150	70	30
	Elliot Road	140	60	30
	Germann Road	80	40	*
2013	Rittenhouse Road	270	120	50
	Williams Field Road	60	30	*
	Power Road	380	180	80
	Ellsworth Road	200	90	40
	Elliot Road	200	90	40
	Germann Road	200	90	40

* Contained within the roadway.

estimated 96 residents in areas exposed to noise levels of DNL 65 dB or greater due to surface traffic by the year 2013.

Cumulative Impacts. There are no cumulative impacts expected from transportation noise sources under the No-Action Alternative.

Mitigation Measures. For future development, land use planning should incorporate noise compatibility measures when establishing residential areas.

4.4.5 Biological Resources

The Proposed Action and reuse alternatives (except No-Action) could potentially affect biological resources primarily through alteration or loss of vegetation and wildlife habitat. Potential impacts to vegetation, wildlife, threatened and endangered species, and sensitive habitats are described below for the Proposed Action and each alternative.

Assumptions used in analyzing the effects of the Proposed Action and alternatives include:

- All staging and other areas disturbed temporarily by construction would be located in areas previously developed, landscaped, or otherwise maintained, to the fullest extent possible.

- Unless otherwise noted, development of each parcel and phase (Figure 2.2-1 and corresponding figures for each alternative)

would require the removal of all existing vegetation throughout the entire parcel. Therefore, the acreages disturbed in this section are greater than those shown in Chapter 2.

- In all cases, existing Riparian/Mesic and Scrub-Shrub vegetation would be preserved to the fullest extent compatible with reuse objectives. Appropriate regulatory agencies would be consulted when the construction footprints are finalized.

- Following construction, all acreage within each developed parcel that has not been paved or occupied by permanent structures would be appropriately landscaped.

4.4.5.1 Proposed Action. Under the Proposed Action, most of the natural vegetation and terrestrial wildlife habitat in the eastern, northern, and southern parts of the base could be lost to accommodate an expanded and reconfigured airfield, aviation support facilities, and industrial, commercial, and residential development. The golf course, most of the existing landscaping in the residential and administrative parts of the base, and part of the existing drainageway system would not be disturbed. Although the most severe impacts to biological resources would be attributable to new construction, the operational phases of the Proposed Action would involve an increased human presence throughout areas of the base that are presently not accessible to the general public.

Vegetation. Overall, the Proposed Action could result in a potential loss of most of the existing natural vegetation on the base, including as much as 935 acres of Scrub-Shrub vegetation and as much as 50 acres of Riparian/Mesic vegetation (Table 4.4-24). A potential maximum of 805 acres of Landscaped areas could be impacted along with a potential maximum of 1,575 acres of Mowed/Maintained vegetation. In addition, as much as 25 acres of additional natural vegetation could be lost off-base to accommodate the expanded airfield. Disturbances would be spread over time in three development phases as shown in Table 4.4-24. These losses would result from new construction and expansion of existing airfield, aviation support, industrial, commercial, and residential structures. Most of the impact on existing vegetation would occur in Phase 1, affecting 2,750 acres or 82 percent of the total number of acres potentially impacted.

During operations, maintenance of an expanded airfield might require additional areas of Scrub-Shrub vegetation within the airfield area be converted to Mowed/Maintained vegetation to provide additional safety clearance for runways.

Wildlife. Impacts to wildlife would be the direct result of loss of vegetation and the indirect result of development and operational activities. The loss of Scrub-Shrub and Riparian/Mesic vegetation would result in the loss of

Table 4.4-24. Direct Impacts of the Proposed Action on Vegetation

Habitat	Acres of Impact			
	1993-1998	1998-2003	2003-2013	Total
Scrub-Shrub	750	55	130	935
Landscaped	605	<5	200	805
Mowed/ Maintained	1,345	75	155	1,575
Riparian/Mesic	50	<5	0	50
Water	<5	0	0	<5
Total	2,750	130	485	3,365*

Note: Acreage figures are approximate and represent the maximum potential areas of disturbance for each habitat. Later stages in the design of individual development projects may reveal opportunities to preserve areas of existing vegetation, reducing the figures shown above.

* Total does not include an additional 25 acres to be acquired off-base which would be disturbed for airfield expansion.

habitat for wildlife adapted to desert life and more permanent water sources. The disturbance of any Landscaped vegetation in the developed parts of the base would result in temporary loss of habitat for wildlife adapted to an urban setting.

Habitat Alteration and Loss. Under the Proposed Action, wildlife species would experience long-term habitat loss especially in the eastern, northern, and southern parts of the base. The loss of the 25 adjacent acres of off-base natural vegetation would further contribute to changes in habitat quality. Wildlife species with small home ranges such as some birds (cactus wren, roadrunner, and burrowing owl), mammals (pocket gopher and Ord kangaroo rat), amphibians, and reptiles would be severely impacted by land clearing activities. More mobile species would be forced into adjacent land areas. The displaced animals could cause the carrying capacity of adjacent habitats to be temporarily exceeded, causing ecological disruption until an equilibrium is reached. The loss of habitat would also affect wider-ranging species such as raptors, predators, and migratory birds. The ultimate effects would be the local decrease in populations, the increase of urban tolerant species, and the potential to affect migratory waterfowl and song bird populations (e.g., green-winged teal, snow goose, and white-crowned sparrow).

Noise/Activity. Activity and noise associated with construction of new facilities would have short-term effects on wildlife. Studies on the effects of noise on wildlife have suggested a number of possible types of reaction.

These reactions include becoming frightened and running away, leaving permanently if the noise persists, altering migration patterns, experiencing physiological damage due to high intensity noise (e.g., temporary or permanent loss of hearing), changing home range (often increasing it), displaying abnormal behavior problems, ceasing or altering reproduction patterns, or adapting to the noise and activity (U.S. Environmental Protection Agency, 1980). Noise, lighting, and activity associated with an airport, industrial, and commercial facilities could continue these effects indefinitely. If reuse occurs immediately after closure, aircraft noise and visual presence would continue. At present, the base has flights only during daylight hours. Under the Proposed Action, aircraft flight times would occur both at night (2 percent) and during daytime (98 percent). This change in flight times would impact wildlife on base since many desert animals are nocturnal. There would be an initial decrease in the animals living near the airfield until habituation to activity occurs. Noise levels could change with a change in aircraft. In addition, the types of birds caught in the engines of the planes may change if night flying occurs.

Overall, effects of noise and activity on wildlife are expected to be short-term since many of the species will eventually habituate. However, the species which will reside in the area could change due to habitat alteration.

Threatened and Endangered Species. Impacts to threatened and endangered species would be the direct result of construction and land clearing activities. A preliminary consultation under Section 7 of the Endangered Species Act was performed to identify federally listed threatened and endangered species that could potentially occur in the vicinity of the base. Table 3.4-11 presents the list of species generated by that consultation.

Habitats suitable for the lesser-nosed bat (a federal endangered species) and the California leaf-nosed bat, Yavapai Arizona pocket mouse, and chuckwalla (three federal candidate, Category 2 species) would be adversely impacted by the demolition of buildings and land clearing activities. These species were not identified on-base during field investigations.

The loggerhead shrike (Federal Candidate, Category 2) was identified numerous times on the base in semi-open areas using wires, trees, and scrub for lookout posts. Loss of the generally thorny Scrub-Shrub and Riparian/Mesic vegetation, which serves as a water source and provides habitat for insects and rodents (food for the shrike), would result in the loss of suitable habitat for the loggerhead shrike. The removal of chain-link and barbed-wire fences would result in the additional loss of suitable habitat. Any fences with barbs erected as a part of reuse development would partially offset these losses.

Plant species protected under the Arizona Native Plant Law and identified on the base include barrel cactus, Jerusalem thorn, blue palo verde, honey mesquite, and crucifixion thorn. During field investigations, the Arizona Department of Agriculture and Horticulture (ADAH) indicated that most of the on-base specimens were not salvageable except for some of the specimens in the Landscaped (developed) areas of the base. However, those species in the Landscaped areas of the base are exempt from the law because they are not growing wild. Protected plant species would be salvaged as directed through consultation with the ADAH. Section 3.4.5.3 outlines the Arizona Native Plant Law in greater detail.

Sensitive Habitats. Development under the Proposed Action could result in the loss of approximately 30 acres of Riparian/Mesic vegetation, which is where most of the sensitive habitats on-base are found. Ephemeral stream channels that may be waters of the United States under the jurisdiction of Section 404 of the Federal Clean Water Act are located within the Riparian/Mesic vegetation areas subject to disturbance under the Proposed Action (Section 3.4.5.4). Construction activities under the Proposed Action could potentially involve filling between 1 and 10 acres of water of the United States under Section 404 jurisdiction. Filling less than 10 acres may not require an individual COE permit because this activity is covered under an existing nationwide permit (Nationwide Permit #26). Filling between 1 and 10 acres requires prior written notification of the COE whereas the filling of a less than 1 acre does not. However, notification of the COE is recommended even in those cases where filling of less than 1 acre is anticipated. All work performed under a nationwide permit must comply with the conditions in 33 CFR 330, Appendix A.

Approximately 20 acres of Riparian/Mesic vegetation would be maintained as Public/Recreation land uses which would be compatible with protecting sensitive habitats and waters of the United States. However, these areas could potentially be subject to changes in surface hydrology and increased surface runoff and sedimentation resulting from construction activities. Therefore, these areas are included as acres disturbed in Table 4.4-24. Diversion of drainageways and ephemeral washes could result in the decline of existing mesic vegetation. Increased or more frequent flow in the drainageways and ephemeral washes could result in the replacement of existing vegetation with open water or invasive wetland vegetation dominated by species such as common cattail or saltcedar.

Cumulative Impacts. Vegetation and wildlife habitat alteration resulting from developing most of the existing vacant land could contribute to a long-term decrease in biodiversity in the vicinity of Williams AFB. The loss of Scrub-Shrub and Riparian/Mesic vegetation could result in increased competition by migratory and other terrestrial wildlife for the limited remaining areas of these habitats in the vicinity of Williams AFB.

Mitigation Measures. Although a preliminary inspection for plants protected under the Arizona Native Plant Law (Arizona Revised Statutes, Chapter 7) has already been performed by the Air Force (Section 3.4.5.3), individual reuse proponents could inspect existing natural vegetation on their sites prior to initiating land clearing activities. Any protected plants that are found could be tagged and transplanted to suitable sites on or off of the base. Reuse proponents could also delineate any areas of existing natural vegetation that could be easily preserved while still meeting construction objectives. To prevent accidental encroachment into these areas by construction equipment or personnel, the boundaries could be prominently marked and posted with signs.

Following the removal of existing vegetation, reuse proponents should temporarily or permanently stabilize exposed soils to prevent the sedimentation of adjacent areas of natural vegetation. Reuse proponents could landscape using plant species that are adapted to an arid environment (xeriscaping) where possible.

Reuse proponents should consult with the U.S. Fish and Wildlife Service and the Arizona Game and Fish Department prior to initiating any ground-disturbing activities that could impact threatened, endangered, or species of concern. In addition, reuse proponents could develop and implement mitigation management plans for migrating waterfowl and for threatened, endangered, or species of concern whether or not these species were positively identified on-base. Mitigation measures include avoiding disturbance during breeding times, leaving designated open areas as native habitat, and landscaping commercial, industrial, and residential areas with native vegetation.

Mitigation measures for the filling of stream channels that are waters of the United States under Section 404 jurisdiction would be developed in consultation with the COE. At a minimum, the COE would review the impacts to determine whether there are practicable means to avoid or minimize the stream channel fills. If stream channel fill cannot be completely avoided, the COE would determine what mitigation measures would be required under the Section 404 permit program.

Avoidance of disturbance to riparian vegetation and other sensitive habitats could include controlling runoff from construction sites into drainages through use of berms, silt curtains, straw bales and other management practices. Equipment could be washed in areas where wash water could be contained and treated or evaporated. Reuse proponents whose projects encroach on Riparian/Mesic vegetation should make all practicable efforts to avoid or minimize encroachment into those areas. Prior to commencing any activities which could impact Riparian/Mesic vegetation, consultation with the COE is advised in order to determine the jurisdictional status of

individual Riparian/Mesic areas and to determine any permitting requirements.

4.4.5.2 General Aviation and Education Alternative. Under this alternative, most of the natural vegetation and terrestrial wildlife habitat in the eastern, northern, and southern parts of the base could be lost to accommodate a reconfigured airfield, aviation support facilities, and industrial, commercial, and residential development. The golf course, much of the existing landscaping in the residential and administrative parts of the base, and much of the existing drainageway system would not be disturbed. Although the most severe impacts to biological resources would be attributable to new construction, the operational phases of this alternative involve an increased human presence throughout areas of the base that are presently not accessible to the general public.

Vegetation. The General Aviation and Education Alternative could potentially impact 3,050 acres of vegetation. No vegetation would be impacted off-base. Disturbances would be spread over time in three development phases as shown in Table 4.4-25. The impact on existing vegetation peaks in Phase 1, affecting 1,890 acres or 62 percent of the total number of acres potentially affected.

Table 4.4-25. Direct Impacts of the General Aviation and Education Alternative on Vegetation

	Acres of Impact			
Habitat	1993-1998	1998-2003	2003-2013	Total
Scrub-Shrub	525	125	205	855
Landscaped	500	<5	290	790
Mowed/ Maintained	835	265	265	1,365
Riparian/Mesic	30	5	5	40
Water	<5	0	0	<5
Total	1,890	395	765	3,050

Note: Acreage figures are approximate and represent the maximum potential areas of disturbance for each habitat. Later stages in the design of individual development projects may reveal opportunities to preserve areas of existing vegetation, reducing the figures shown above.

Wildlife. Impacts to wildlife associated with the General Aviation and Education Alternative would be the direct result of loss of vegetation and the indirect result of development and operational activities. The loss of

Scrub-Shrub and Riparian/Mesic vegetation would result in the loss of habitat for wildlife adapted to desert life and more permanent water sources. The disturbance of any Landscaped vegetation in the developed parts of the base would result in the temporary loss of habitat for wildlife adapted to an urban setting.

Habitat Alteration and Loss. Habitat alteration and loss would be similar under this alternative as discussed for the Proposed Action.

Noise/Activity. Activity and noise associated with the development and construction of new facilities would be similar under this alternative as discussed for the Proposed Action.

Threatened and Endangered Species. Impacts to threatened and endangered species would be the direct result of construction and land clearing activities. Impacts under this alternative would be similar to those discussed under the Proposed Action.

Sensitive Habitats. Development under the General Aviation and Education Alternative could result in the loss of approximately 10 acres of Riparian/Mesic vegetation which is where most of the sensitive habitats on-base are found. These areas contain ephemeral stream channels that may be waters of the United States (Section 3.4.5.4). Construction activities under this alternative could potentially result in filling between 1 and 10 acres under Section 404 jurisdiction. As discussed for the Proposed Action, this activity is covered by the existing authorization of a nationwide permit (Nationwide Permit #26) but requires prior written notification of the COE.

Approximately 30 acres of Riparian/Mesic vegetation would be maintained as Public/Recreation land uses which would be compatible with protecting sensitive habitats and waters of the United States. However, as discussed for the Proposed Action, these areas could potentially be subject to changes in surface hydrology and increased surface runoff and sedimentation resulting from construction activities.

Cumulative Impacts. Cumulative impacts would be similar to those discussed for the Proposed Action.

Mitigation Measures. Mitigation measures would be similar to those discussed for the Proposed Action.

4.4.5.3 Commercial Aviation and Education Alternative. Under this alternative, most of the natural vegetation and terrestrial wildlife habitat in the eastern, northern, and southern parts of the base could be lost to accommodate an expanded and reconfigured airfield, aviation support facilities, and industrial and commercial development. The golf course, most of the existing landscaping in the residential and administrative parts of the

base, and part of the natural vegetation associated with the existing drainageway system would not be heavily disturbed. Although the most severe impacts to biological resources would be attributable to new construction, the operational phases of this alternative involve an increased human presence throughout areas of the base that are presently not accessible to the general public.

Vegetation. The Commercial Aviation and Education Alternative could potentially impact approximately 3,445 acres on-base and an additional 71 off-base acres. The affected off-base land primarily consists of natural Scrub-Shrub vegetation, along with a small area of cropland (approximately 2 acres). Disturbances would be spread over time in three development phases as shown in Table 4.4-26. Most of the impact on existing vegetation would occur in Phase 1, affecting 2,785 acres or 81 percent of the total number of acres potentially impacted.

Table 4.4-26. Direct Impacts of the Commercial Aviation and Education Alternative on Vegetation

	Acres of Impact			
Habitat	1993-1998	1998-2003	2003-2013	Total
Scrub-Shrub	750	80	210	1,040
Landscaped	675	20	220	915
Mowed/ Maintained	1,310	45	85	1,440
Riparian/Mesic	50	<5	<5	50
Water	<5	0	0	<5
Total	2,785	145	515	3,445*

Note: Acreage figures are approximate and represent the maximum potential areas of disturbance for each habitat. Later stages in the design of individual development projects may reveal opportunities to preserve areas of existing vegetation, reducing the figures shown above.

* Total does not include an additional 71 acres to be acquired off-base which would be disturbed for airfield expansion.

Wildlife. Impacts to wildlife associated with the Commercial Aviation and Education Alternative would be the direct result of loss of vegetation and the indirect result of development and operational activities. The loss of Scrub-Shrub and Riparian/Mesic vegetation would result in the loss of habitat for wildlife adapted to desert life and more permanent water sources. The disturbance of the developed parts of the base would result in the temporary loss of habitat for wildlife adapted to an urban setting.

Habitat Alteration and Loss. Under this alternative, wildlife species would experience long-term habitat loss throughout the entire base. The loss of the 71 adjacent acres of off-base native vegetation and cropland would further contribute to changes in habitat quality. More mobile species would enter adjacent areas, potentially causing the carrying capacity of those lands to be exceeded. Less mobile species would be severely impacted during land clearing activities.

Noise/Activity. Activity and noise associated with the development and construction of new facilities would be similar under this alternative as discussed for the Proposed Action.

Threatened and Endangered Species. Impacts to threatened and endangered species would be the direct result of construction and land clearing activities. Impacts under this alternative would be similar to those discussed under the Proposed Action.

Sensitive Habitats. Development under the Commercial Aviation and Education Alternative could result in the loss or modification of approximately 50 acres of Riparian/Mesic vegetation, which is where most of the sensitive habitats on-base are found. These areas contain ephemeral stream channels that may be waters of the United States (Section 3.4.5.4). Construction activities under this alternative could potentially result in filling between 1 and 10 acres under Section 404 jurisdiction. As discussed under the Proposed Action, this activity is covered by the existing authorization of a nationwide permit (Nationwide Permit #26) but requires prior written notification of the COE.

Approximately 20 acres of Riparian/Mesic vegetation would be maintained as Public/Recreation land uses which would be compatible with protecting sensitive habitats and waters of the United States. However, as discussed for the Proposed Action, these areas could potentially be subject to changes in surface hydrology and increased surface runoff and sedimentation resulting from construction activities.

Cumulative Impacts. Cumulative impacts would be similar to those discussed for the Proposed Action.

Mitigation Measures. Mitigation measures would be similar to those discussed for the Proposed Action.

4.4.5.4 Education and Planned Community Alternative. Under this alternative, most of the natural vegetation and terrestrial wildlife habitat in the eastern, northern, and southern parts of the base could be lost to accommodate industrial, commercial, and residential development. The golf course, much of the existing landscaping in the residential and administrative parts of the base, and much of the existing drainageway

system would not be disturbed. Although the most severe impacts to biological resources would be attributable to new construction, the operational phases of this alternative involve an increased human presence throughout areas of the base that are presently not accessible to the general public.

Vegetation. The Education and Planned Community Alternative could potentially impact 3,205 acres of vegetation. No vegetation would be impacted off-base. Disturbances would be spread over time in three development phases as shown in Table 4.4-27. Most of the impact to vegetation would occur during Phases 1 and 2, accounting for 52 and 33 percent of total disturbance, respectively.

Table 4.4-27. Direct Impacts of the Education and Planned Community Alternative on Vegetation

	Acres of Impact			
Habitat	1993-1998	1998-2003	2003-2013	Total
Scrub-Shrub	590	415	85	1,090
Landscaped	410	30	230	670
Mowed/Maintained	620	610	165	1,395
Riparian/Mesic	40	10	<5	50
Water	<5	0	0	<5
Total	1,660	1,065	480	3,205

Note: Acreage figures are approximate and represent the maximum potential areas of disturbance for each habitat. Later stages in the design of individual development projects may reveal opportunities to preserve areas of existing vegetation, reducing the figures shown above.

Wildlife. Impacts to wildlife associated with the Education and Planned Community Alternative would be the direct result of loss of vegetation and the indirect result of development and operational activities. The loss of Scrub-Shrub and Riparian/Mesic vegetation would result in the loss of habitat for wildlife adapted to desert life and more permanent water sources. The disturbance of the developed parts of the base would result in the temporary loss of habitat for wildlife adapted to an urban setting.

Habitat Alteration and Loss. Habitat alteration and loss would be similar under this alternative as discussed for the Proposed Action.

Noise/Activity. Activity and noise associated with the development and construction of new facilities would have a short-term impact on the wildlife on the base. As outlined under the Proposed Action, studies on wildlife have shown that there are a number of changes that occur with an increase of noise. The same effects would occur under this alternative as with the Proposed Action. However, impacts associated with aviation activities would not occur since the levels of noise associated with aviation and residential uses are different. Overall, effects of noise on wildlife are expected to be short-term since most wildlife would be expected to habituate to the disturbance and move back to their habitats.

Threatened and Endangered Species. Impacts to threatened and endangered species would be the direct result of construction and land clearing activities. Impacts under this alternative would be the same as those discussed for the Proposed Action.

Sensitive Habitats. Development under the Education and Planned Community Alternative could result in the loss of approximately 20 acres of Riparian/Mesic areas, which is where most of the sensitive habitats on-base are found. These areas contain ephemeral stream channels that may be waters of the United States (Section 3.4.5.4). Construction activities under this alternative could potentially result in filling between 1 and 10 acres under Section 404 jurisdiction. As discussed for the Proposed Action, this activity is covered by the existing authorization of a nationwide permit (Nationwide Permit #26) but requires prior written notification of the COE.

Approximately 30 acres of Riparian/Mesic vegetation would be maintained as Public/Recreation land uses which would be compatible with protecting sensitive habitats and waters of the United States. However, as discussed for the Proposed Action, these areas could potentially be subject to changes in surface hydrology and increased surface runoff and sedimentation resulting from construction activities.

Cumulative Impacts. Cumulative impacts would be similar to those discussed for the Proposed Action.

Mitigation Measures. Mitigation measures would be similar to those discussed for the Proposed Action.

4.4.5.5 Other Land Use Concepts. Federal transfers and independent land use concepts have been identified which may take place in addition to one of the integrated reuse alternatives.

Federal Bureau of Prisons. This reuse concept involves the development of 20 acres of undeveloped land. Impacts on vegetation, wildlife, threatened and endangered species, and sensitive environments would be of the same type as those discussed for the Proposed Action.

Arizona Department of Corrections. This reuse concept involves the use of existing buildings and the future use of undeveloped land. The use of existing buildings will have no impact on biological resources. However, disturbance of undeveloped land will have impacts of the same type as discussed for the Proposed Action.

Arizona Department of Health Services. This reuse concept involves the use of existing buildings only. Therefore, there will be no impact on biological resources.

4.4.5.6 No-Action Alternative. Maintenance of the base under the OL would have minimal adverse effects on biological resources. A reduction in human activity and a cessation of aircraft flights would reduce disturbance to wildlife on and in the vicinity of the base. Habitat quality could improve if mowing and landscaping were terminated, thereby allowing native species to return to the base. However, the reestablishment of native vegetation on disturbed lands on the base would be very slow due to the extreme level of existing disturbance and the arid climate. Landscape vegetation, which is not native to the region, within the golf course and administrative and residential parts of the base could decline if maintenance, especially irrigation, is interrupted or reduced. No cumulative impacts would result from the No-Action Alternative, and no mitigation measures would be required.

4.4.6 Cultural Resources

Potential impacts to cultural resources were assessed by (1) identifying types and possible locations of reuse activities that could directly or indirectly affect cultural resources, and (2) identifying the nature and significance of cultural resources in potentially affected areas. Pursuant to the National Historic Preservation Act (NHPA), consultation, as directed by the Section 106 review process, has been initiated with the Arizona State Historic Preservation Officer (SHPO).

Historic properties, under 36 CFR Part 800, are defined as "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the NRHP. This term includes, for the purposes of these regulations, artifacts, records, and remains that are related to and located within such properties. The term 'eligible for inclusion in the National Register' includes both properties formally determined as such by the Secretary of the Interior and all other properties that meet National Register listing criteria." Therefore, sites not yet evaluated are considered potentially eligible to the NRHP and, as such, are afforded the same regulatory consideration as nominated historic properties.

As a federal agency, the Air Force is responsible for identifying any historic properties on Williams AFB. This identification process includes not only

field surveys and recording of cultural resources but also evaluations to develop determinations of significance in terms of NRHP criteria. (NRHP criteria and related qualities of significance are discussed in Appendix E, Methods of Analysis.) Completion of this process results in a listing of historic properties subject to federal regulations regarding the treatment of cultural resources. The Air Force is currently pursuing recommendations from the SHPO regarding archaeological sites and historic structures which are present on Williams AFB.

Twelve archaeological sites have been identified on Williams AFB. One of these, the Midvale Site (AZ U:10:24 (ASU)), has been placed on the NRHP. The NRHP eligibility of the other 11 sites, AZ U:10:20 (ASU), 10:25 (ASU), 10:60 (ASM), 10:61 (ASM), 10:62 (ASM), 10:63 (ASM), 10:64 (ASM), 10:65 (ASM), 10:66 (ASM), 10:67 (ASM), and 10:68 (ASM) is not known; therefore, they are presumed eligible. The Air Force will be conducting archaeological field testing to determine the areal extent and eligibility status of these sites. Based on results of the subsurface archaeological investigation, the Air Force, in consultation with the Arizona SHPO, will nominate appropriate sites for inclusion in the NRHP.

The Air Force has surveyed 34 structures on the base which predate 1945. Fourteen of these structures have been found to be eligible for listing on the NRHP. Seven of the structures are hangars (Buildings 24, 25, 27, 31, 32, 37, and 38) which are eligible for listing as a "Williams Field Aircraft Hangar Historic District." The SHPO concurred with the Air Force determination of eligibility for these 14 structures. Nomination forms have been prepared for the hangar district and individual structures and forwarded for review by the State Historic Sites Review Committee. Upon their concurrence, the Air Force will submit the nominations to the Keeper of the National Register.

The Air Force is currently conducting consultations with representatives of Native American groups as required under the American Indian Religious Freedom Act of 1978 (AIRFA). The purpose of these consultations is to determine AIRFA-related concerns such as access to sites of past cultural activity, landforms, and components of the natural environment (such as certain plants) which may occur on Williams AFB and are important to traditional religious practices of Native American groups. At the present time, four Native American groups (the Pima, Tohono O'odham, Maricopa, and Hopi) have expressed AIRFA-related claims of affinity to the Hohokam people who inhabited the area during the period from about 1 to 1450 A.D. The results of subsurface archaeological field testing will influence the nature and extent of AIRFA-related claims by these Native American groups.

Due to the potential for prehistoric human remains to be located on Williams AFB, several Native American tribal organizations have expressed concern. The tribes are: the Pima, Tohono O'odham, Maricopa, Hopi, and Zuni. If human remains are found to exist on the base, NAGPRA requires

consultation with appropriate Native American tribes prior to the intentional excavation, or removal after inadvertent discovery, of several kinds of cultural items, including human remains and objects of cultural patrimony.

4.4.6.1 Proposed Action. Regulations for implementing Section 106 of the NHPA indicate that the conveyance of historic property without adequate measures to ensure preservation is procedurally considered to be an adverse impact, thereby ensuring full regulatory consideration in federal project planning and execution. All confirmed and potential historic properties on-base could be impacted by conveyance.

Under the Proposed Action, all 12 of the known archaeological sites may be impacted (Table 4.4-28). Existing base housing overlying the Midvale Site (AZ U:10:24) would be reused as student housing. While such reuse would not pose an adverse effect, new construction or demolition and reconstruction to provide additional student housing in this area would create a substantial adverse impact. Site AZ U:10:20, in the southwest corner of the base, would be affected by proposed Industrial, Institutional, and Public/Recreation uses. The Industrial uses represent new development which would pose a substantial adverse impact to this archaeological site; industrial uses could also affect site AZ U:10:61. Site AZ U:10:25, in the southeast corner of the base, may be affected by airfield use and planned aviation support activity. Extension of the existing runway and new construction for aviation support would pose a substantial adverse impact to this site. Sites AZ U:10:60, 10:61, 10:64, 10:65, 10:66, and 10:67 would all be adversely impacted by proposed aviation support reuse activity. The advisability of aviation support activities northeast of runway 12L/30R is questionable given the presence of these archaeological sites. Sites AZ U:10:62, 10:63, 10:64, 10:66, and 10:68 would be impacted by proposed improvements to the Airfield component of this reuse alternative.

All 14 structures determined to be eligible for listing on the NRHP are located in the Institutional (Education) land use category under the Proposed Action. Nine of these structures are proposed to be maintained and reused. The extent of alterations necessary for reuse is unknown at this time; alterations could affect the historical integrity of a structure. Five structures, Buildings 38, 726, 735, 1007, and 1008 are slated for demolition under the Proposed Action. Structures that could be affected by the Proposed Action are presented in Table 4.4-29.

Impacts of the Proposed Action on traditional resources are presently unknown. The Air Force is conducting archaeological investigations and AIRFA consultations with Native American tribal organizations and communities to identify traditional resources and evaluate impacts.

Table 4.4-28. Archaeological Sites Subject to Impact - Proposed Action

Land Use Category	Archaeological Site	Site Acreage	Impacts
Airfield	AZ U:10:25, 10:63, 10:68, 10:62, 10:64, 10:66	Boundary of sites not yet delineated	Construction and associated activities
Aviation Support	AZ U:10:25, 10:67, 10:66, 10:65, 10:64, 10:61, 10:60	Boundary of sites not yet delineated	Construction and associated activities
Industrial	AZ U:10:20, 10:61	Boundary of sites not yet delineated	Construction and associated activities
Institutional (Medical)	None identified to date	NA	NA
Institutional (Education)	AZ U:10:24	Approximately 200 acres	Potential construction or demolition and associated activities
	AZ U:10:20	Boundary of site not yet delineated	Potential construction or demolition and associated activities
Commercial	None identified to date	NA	NA
Public/ Recreation	AZ U:10:20, 10:60, 10:25	Boundary of sites not yet delineated	Potential construction or demolition and associated activities

Cumulative Impacts. No cumulative impacts are anticipated under the Proposed Action.

Mitigation Measures. Mitigation measures which can reduce or eliminate potential impacts associated with the Proposed Action require that properties would be conveyed to nonfederal owners with preservation covenants. Covenants ensure that future owners will abide by cultural resource management procedures dictated by the NHPA, or their equivalent,

Table 4.4-29. Historic Structures Subject to Impact - Proposed Action

Land Use Category	Historic Structures	Impacts
Airfield	None	NA
Aviation Support	None	NA
Industrial	None	NA
Institutional (Medical)	None	NA
Institutional (Education)	Structures numbered 24, 25, 27, 31, 32, 37, 38, 46, 100, 715, 726, 735, 1007, 1008	9 structures are maintained and reused; 5 structures slated for demolition (38, 726, 735, 1007, 1008)
Commercial	None	NA
Public/Recreation	None	NA

as approved by the SHPO and the Advisory Council on Historic Preservation. Impacts due to conveyance can thus be reduced to a non-adverse level.

In accordance with Section 106 of the NHPA and its implementing regulations, the agency or reuse proponent, as appropriate, would consult with the SHPO and the Advisory Council on Historic Preservation during the development and implementation of specific procedures and mitigation measures. Mitigation proposed would comply with the appropriate standards and guidelines established for historic preservation activities by the Secretary of the Interior and other federal, state, and local regulations, as applicable.

An agreement document may be prepared to establish the acceptable mitigation measures. A Memorandum of Agreement or Programmatic Agreement must be coordinated with, at a minimum, the SHPO, the Advisory Council on Historic Preservation, concerned Native American tribal organizations and communities, and the Air Force. Mitigation measures to ensure protection of cultural resources include design of the proposed reuse activity to avoid construction over archaeological sites. If avoidance is not possible, mitigation could be accomplished by full data recovery and documentation of archaeological resources. The Institutional (Education) portion of the Proposed Action should be designed so that any new construction, if needed, does not occur over the Midvale Site. The same recommendation applies to the Airfield, Aviation Support, and Industrial uses which would affect the eleven potentially eligible sites; however, keeping the archaeological sites free from ground-disturbing activity may not be

feasible in these areas. Data recovery and documentation of all cultural material should be carried out before any construction.

Adverse impacts to the five historic structures identified for demolition under this alternative could be avoided if reuse plans are reevaluated to include reuse of those structures. Another possible mitigation measure would be removal to an off-base location; however, removal alters the historical context thereby degrading the historic value of the structure. In the event of either demolition or off-base removal, the structures should first be documented in accordance with the standards of the Historic American Buildings Survey and Historic American Engineering Record (HABS/HAER). This documentation would include a written historical and descriptive narrative, measured drawings, and photographic documentation.

Mitigation of impacts to traditional resources will be determined after completion of Air Force consultations with concerned Native American tribal organizations and communities.

4.4.6.2 General Aviation and Education Alternative. The discussion related to conveyance impacts and ground disturbing impacts presented for the Proposed Action is equally appropriate for this alternative.

All 12 of the known archaeological sites could be affected by land uses associated with the General Aviation and Education Alternative (Table 4.4-30). Most of the Midvale Site (AZ U:10:24) is located in the Institutional (Education) land use category which proposes reuse of existing buildings. Proposed construction associated with residential reuse would cause adverse impacts to sites AZ U:10:61, 10:60, and 10:20, as well as to a portion of the Midvale Site, 10:24. The ground-disturbing activity associated with new construction would have a substantial adverse impact on these archaeological sites. Site AZ U:10:25 is located in four land use categories: Airfield, Aviation Support, Industrial, and Public/Recreation, each of which require new construction which would cause adverse impacts resulting from ground-disturbing activity. Sites AZ U:10:60, 10:62, and 10:68 would be adversely impacted by proposed Industrial reuse activity while site AZ U:10:63 would be similarly impacted by proposed Institutional land use activities. Sites AZ U:10:64, 10:66, and 10:67 would be adversely impacted by proposed Aviation Support activities northeast of Runway 12L/30R.

All 14 of the structures determined to be potentially eligible for listing on the NRHP are located in the Institutional (Education) land use category under this alternative. As with the Proposed Action, nine of these structures are proposed to be maintained and reused, while five structures (Buildings 38, 726, 735, 1007, and 1008) are slated for demolition and are thereby adversely affected by the General Aviation and Education Alternative.

Table 4.4-30. Archaeological Sites Subject to Impact - General Aviation and Education Alternative

Land Use Category	Archaeological Site	Site Acreage	Impacts
Airfield	AZ U:10:25	Boundary of site not yet delineated	Construction and associated activities
Aviation Support	AZ U:10:25, 10:67, 10:66, 10:64, 10:61	Boundary of sites not yet delineated	Construction and associated activities
Industrial	AZ U:10:25, 10:62, 10:60, 10:68	Boundary of sites not yet delineated	Construction and associated activities
Institutional (Education)	AZ U:10:24	Approximately 184 acres	Potential construction or demolition and associated activities
	AZ U:10:63	Boundary of site not yet delineated	Construction and associated activities
Commercial	AZ U:10:67	Boundary of site not yet delineated	Construction and associated activities
Medium-Density Residential	AZ U:10:20	Boundary of site not yet delineated	Construction and associated activities
High-Density Residential	AZ U:10:24	Approximately 16 acres	Construction and associated activities
	AZ U:10:20, 10:60, 10:61	Boundary of sites not yet delineated	Construction and associated activities
Public/Recreation	AZ U:10:25, 10:60, 10:20, 10:64, 10:65, 10:66, 10:68	Boundary of sites not yet delineated	Construction and associated activities

Structures that could be affected by the proposed land uses under this alternative are presented in Table 4.4-31.

Table 4.4-31. Historic Structures Subject to Impact - General Aviation and Education Alternative

Land Use Category	Historic Structures	Impacts
Airfield	None	NA
Aviation Support	None	NA
Industrial	None	NA
Institutional (Education)	Structures numbered 24, 25, 27, 31, 32, 37, 38, 46, 100, 715, 726, 735, 1007, 1008	9 structures maintained and reused; 5 structures slated for demolition (38, 726, 735, 1007, 1008)
Commercial	None	NA
Medium-Density Residential	None	NA
High-Density Residential	None	NA
Public/ Recreation	None	NA

Impacts of the General Aviation and Education Alternative on traditional resources are presently unknown. The Air Force is conducting archaeological investigations and AIRFA consultations with Native American tribal organizations and communities to identify traditional resources and evaluate impacts.

Cumulative Impacts. No cumulative impacts are anticipated under this alternative.

Mitigation Measures. Measures to avoid or offset adverse impacts of this alternative on archaeological resources and historic structures would be as described for the Proposed Action.

Mitigation of impacts to traditional resources will be determined after completion of Air Force consultations with concerned Native American tribal organizations and communities.

4.4.6.3 Commercial Aviation and Education Alternative. Archaeological sites that could be affected by land uses associated with the Commercial Aviation and Education Alternative are identified in Table 4.4-32. Under this

Table 4.4-32. Archaeological Sites Subject to Impact - Commercial Aviation and Education Alternative

Land Use Category	Archaeological Site	Site Acreage	Impacts
Airfield	AZ U:10:25, 10:63, 10:68, 10:66, 10:64, 10:62	Boundary of sites not yet delineated	Construction and associated activities
Aviation Support	AZ U:10:25, 10:67, 10:66, 10:65, 10:64, 10:61, 10:60	Boundary of sites not yet delineated	Construction and associated activities
Industrial	AZ U:10:20, 10:61	Boundary of sites not yet delineated	Construction and associated activities
Institutional (Medical)	None identified to date	NA	NA
Institutional (Education)	AZ U:10:24	Approximately 200 acres	Potential construction or demolition and associated activities
	AZ U:10:20	Boundary of site not yet delineated	Construction and associated activities
Commercial	None identified to date	NA	NA
Public/ Recreation	AZ U:10:20, 10:60, 10:25	Boundary of sites not yet delineated	Construction and associated activities

alternative, existing base housing overlying the Midvale Site (AZ U:10:24) would be reused as student housing. While such a reuse would not pose an adverse impact, new construction or demolition and reconstruction to provide additional student housing would create a substantial adverse impact on this site and possibly on a small portion of site AZ U:10:20. Planned Industrial uses under this alternative would similarly impact site AZ U:10:20 in the southwest corner of the base and site AZ U:10:61 in the northeast corner. Proposed Public/Recreation land uses would impact sites AZ U:10:20 and 10:60 along the base southern perimeter. Most of site AZ U:10:25 is located in the Airfield land use category and extends into the Aviation Support area. This site would be affected by construction activity related to improving and lengthening runways and aviation support facilities.

Sites AZ U:10:62, 10:63, and 10:68 would similarly be adversely impacted by proposed airfield improvements under this alternative. The extent of aviation support construction planned northeast of Runway 12L/30R would cause adverse impacts on sites AZ U:10:61, 10:64, 10:65, 10:66, and 10:67. Aviation support facilities planned southwest of Runway 12R/30L would adversely impact site AZ U:10:60.

Of the 14 structures determined to be eligible for listing on the NRHP, eight are located in the Aviation Support land use category while six are located in the Institutional (Education) land use category. The eight structures located in the Aviation Support land use area are proposed to be maintained and reused. Of the six structures in the Institutional (Education) land use area, four structures are slated for demolition under this alternative. A summary of structures subject to impact under this alternative is presented in Table 4.4-33.

Table 4.4-33. Historic Structures Subject to Impact - Commercial Aviation and Education Alternative

Land Use Category	Historic Structures	Impacts
Airfield	None	NA
Aviation Support	Structures numbered 24, 25, 27, 31, 32, 37, 38, 46	8 structures maintained and reused
Industrial	None	NA
Institutional (Medical)	None	NA
Institutional (Education)	Structures numbered 100, 715, 726, 735, 1007, 1008	2 structures maintained and reused (100, 715); 4 structures slated for demolition (726, 735, 1007, 1008)
Commercial	None	None
Public/Recreation	None	NA

Impacts of the Commercial Aviation and Education Alternative on traditional resources are presently unknown. The Air Force is conducting archaeological investigations and AIRFA consultations with Native American tribal organizations and communities to identify traditional resources and evaluate impacts.

Cumulative Impacts. No cumulative impacts are anticipated under this alternative.

Mitigation Measures. Measures to avoid or offset adverse impacts on archaeological resources would be as described for the Proposed Action. The adverse impacts of proposed demolition of structures 726, 735, 1007, and 1008 can be avoided if the reuse plans are reevaluated to include reuse of these structures for purposes other than their present use. Other mitigation alternatives include relocation, removal to an off-base location after HABS/HAER standard documentation, or demolition after HABS/HAER documentation. Relocation/removal options, however, alter the historic context and degrade the historic value of the structure.

Mitigation of impacts to traditional resources will be determined after completion of Air Force consultations with concerned Native American tribal organizations and communities.

4.4.6.4 Education and Planned Community Alternative. This alternative is the only non-aviation reuse alternative under consideration. Previous discussions relating to conveyance of property under the Proposed Action are equally appropriate for this alternative.

Archaeological sites affected by the Education and Planned Community Alternative are identified in Table 4.4-34. Archaeological sites AZ U:10:20 and AZ U:10:24 are located in the Institutional (Education) land use category. Existing buildings in this category would be reused, thereby reducing the need for new construction and minimizing impacts on the archaeological sites. Sites AZ U:10:25, 10:61, 10:62, 10:64, 10:65, 10:66, 10:67 and 10:68 are located in the Residential land use category, which would require new construction. Unless open spaces are planned for these archaeological sites, new construction would have a substantial adverse impact. Similarly, site AZ U:10:63 in the Institutional land use category, site AZ U:10:68 in the Commercial land use category, and site AZ U:10:60 in the Industrial land use category would be adversely impacted by new construction or ground-disturbing activities.

All 14 structures determined to be potentially eligible for listing on the NRHP are located in the Institutional (Education) land use category under this alternative, and twelve are slated for demolition. These 12 structures include all seven hangars (Buildings 24, 25, 27, 31, 32, 37, and 38) which have been determined to be potentially eligible as a "Williams Field Aircraft Hangar Historic District." Since it is unlikely that all seven hangars could be maintained under the Education and Planned Community Alternative, this alternative would present a severe adverse impact. A summary of historic structures subject to impact from this reuse alternative is presented in Table 4.4-35.

Table 4.4-34. Archaeological Sites Subject to Impact - Education and Planned Community Alternative

Land Use Category	Archaeological Site	Site Acreage	Impacts
Industrial	AZ U:10:25, 10:60	Boundary of sites not yet delineated	Construction associated activities
Institutional (Education)	AZ U:10:20, 10:63	Boundary of sites not yet delineated	Construction associated activities
	AZ U:10:24	Approximately 200 acres	Potential construction or demolition associated activities
Commercial	AZ U:10:25, 10:68, 10:67, 10:60	Boundary of sites not yet delineated	Construction and demolition associated activities
Medium-Density Residential	AZ U:10:25, 10:62, 10:68, 10:67, 10:66, 10:65, 10:64, 10:61	Boundary of sites not yet delineated	Construction and demolition associated activities
High-Density Residential	AZ U:10:25	Boundary of site not yet delineated	Construction and demolition associated activities
Public/ Recreation	AZ U:10:20, 10:25, 10:68, 10:65, 10:64, 10:61, 10:60	Boundary of sites not yet delineated	Construction and demolition associated activities

Impacts of the Education and Planned Community Alternative on traditional resources are presently unknown. The Air Force is conducting archaeological investigations and AIRFA consultations with Native American tribal organizations and communities to identify traditional resources and evaluate impacts.

Cumulative Impacts. No cumulative impacts are anticipated under this alternative.

Table 4.4-35. Historic Structures Subject to Impact - Education and Planned Community Alternative

Land Use Category	Historic Structures	Impacts
Industrial	None	NA
Institutional (Education)	Structures numbered 24, 25, 27, 31, 32, 37, 38, 46, 100, 715, 726, 735, 1007, 1008	2 structures maintained and reused; 12 structures slated for demolition (24, 25, 27, 31, 32, 37, 38, 46, 726, 735, 1007, 1008)
Commercial	None	NA
Medium-Density Residential	None	NA
High-Density Residential	None	NA
Public/Recreation	None	NA

Mitigation Measures. Measures to avoid or offset adverse impacts of this alternative on archaeological resources would be as described for the Proposed Action.

Seven of the 12 structures identified for demolition under the Education and Planned Community Alternative represent an historic district. Reevaluation of the reuse plan to retain these structures should be the first mitigation measure considered. Lacking the ability to retain or reuse these and the other five structures (46, 726, 735, 1007, and 1008), relocation to another setting would be a possible mitigation measure. However, relocation/removal alters the historical context thereby degrading the historic value of these structures. Demolition, after appropriate HABS/HAER documentation, is another mitigation alternative.

Mitigation of impacts to traditional resources will be determined after completion of Air Force consultations with concerned Native American tribal organizations and communities.

4.4.6.5 Other Land Use Concepts

Federal Bureau of Prisons. The Federal Bureau of Prisons has expressed interest in a 20-acre parcel of land in the northeast corner of Williams AFB adjacent to Ellsworth Road. The Bureau of Prisons would develop this land

for a Federal Detention Center. No known archaeological sites or historic structures exist on the parcel chosen for this land use.

Arizona Department of Corrections and Arizona Department of Health Services. Implementation of these proposals would have potentially adverse impacts on archaeological sites as shown on Table 4.4-36. While reuse of existing facilities would not pose an adverse effect, new construction or demolition and reconstruction to provide additional facilities in these areas could adversely impact these archaeological sites.

Table 4.4-36. Archaeological Sites Subject to Impact - Other Land Use Concepts

Land Use Category	Archaeological Site	Site Acreage	Impacts
Federal Bureau of Prisons (20 acres)	None identified to date	NA	NA
Arizona Department of Corrections	AZ U:10:24, 10:60, 10:25, 10:61	Unknown at this time	Construction and associated activities
Arizona Department of Health Services	AZ U:10:24	Unknown at this time	Construction and associated activities

Both the Arizona Department of Corrections and the Arizona Department of Health Services alternative plans would affect historic Structure 715, the Water Pump Station and Water Tower, as indicated on Table 4.4-37.

Impacts of these other land use concepts on traditional resources are presently unknown. The Air Force is conducting archaeological investigations and AIRFA consultations with Native American tribal organizations and communities to identify traditional resources and evaluate impacts.

Cumulative Impacts. No cumulative impacts are anticipated.

Mitigation Measures. Appropriate mitigation measures for archaeological sites are the same as those outlined for the Proposed Action.

As discussed for the Proposed Action, mitigation of adverse impacts to historic structures can be accomplished, if necessary, by redesigning the plan to include rather than demolish the structure or documenting the structure according to HABS/HAER standards before demolition.

Table 4.4-37. Historic Structures Subject to Impact - Other Land Use Concepts

Land Use Category	Historic Structures	Impacts
Federal Bureau of Prisons (20 acres)	None	NA
Arizona Department of Corrections	Structure 715	Construction and associated activities
Arizona Department of Health Services	Structure 715	Construction and associated activities

Mitigation of impacts to traditional resources will be determined after completion of Air Force consultations with concerned Native American tribal organizations and communities.

4.4.6.6 No-Action Alternative

Impacts on archaeological resources would be minimal under the No-Action Alternative. One exception could come from ground disturbance due to remediation of hazardous waste sites. These impacts are not considered adverse, if mitigation measures as described for the Proposed Action are implemented.

Maintenance and repair of existing facilities during caretaker status may result in physical changes to architectural qualities that make historic structures eligible for listing on the NRHP. In addition, some historic structures may not receive maintenance necessary to preserve their historic integrity. These impacts can be avoided or reduced by following procedures for preservation, rehabilitation, maintenance, and reuse of historic properties as described in 36 CFR Part 68.

Cumulative Impacts. The No-Action Alternative would not result in cumulative impacts.

Mitigation Measures. The OL would ensure adequate security to discourage illegal looting of the archaeological sites and to preserve the integrity of traditional resources. Preservation or data recovery for historic properties that would not be maintained under caretaker status would be undertaken. Specific mitigation would be defined in consultation with the SHPO and be detailed in a treatment plan and agreement document, if applicable, initiated by the Air Force.

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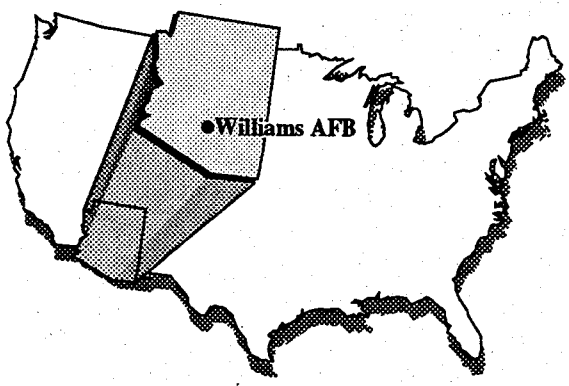

CHAPTER 5
CONSULTATION AND COORDINATION

5.0 CONSULTATION AND COORDINATION

The federal, state, and local agencies and private agencies/organizations that were contacted during the course of preparing this environmental impact statement are listed below.

FEDERAL AGENCIES

Federal Aviation Administration
Federal Emergency Management Agency
Federal Highway Administration
Federal Railroad Administration
Phoenix Veterans Medical Center
United States Air Force, Air Force Center for Environmental Excellence
United States Air Force, Base Conversion Agency
United States Air Force, Luke Air Force Base
United States Air Force, Williams Air Force Base
United States Air Force, Wright-Patterson Air Force Base
United States Army Corps of Engineers
United States Department of Agriculture, Forest Service
United States Department of Agriculture, Soil Conservation Service
United States Department of Commerce, Bureau of the Census
United States Department of Commerce, Bureau of Economic Analysis
United States Department of Commerce, Research Department
United States Department of the Interior, Bureau of Indian Affairs
United States Department of the Interior, Bureau of Land Management
United States Department of the Interior, Fish and Wildlife Service
United States Department of the Interior, National Park Service
United States Department of the Interior, Geological Survey
United States Department of Transportation
United States Department of Transportation, AMTRAK
United States Environmental Protection Agency

STATE AGENCIES

Arizona Chamber of Commerce
Arizona Department of Agriculture and Horticulture
Arizona Department of Commerce
Arizona Department of Game and Fish
Arizona Department of Transportation
Arizona Department of Water Resources
Arizona Department of Environmental Quality
Arizona Geological Survey
Arizona Land Department
Arizona Mines and Mineral Resources Department
Arizona Railroad Commission

Arizona State Parks, State Historic Preservation Office
Arizona State University
Williams AFB Economic Reuse Advisory Board
Williams Redevelopment Partnership

LOCAL/REGIONAL AGENCIES

Chandler Regional Hospital
City of Casa Grande
City of Chandler
City of Mesa
City of Phoenix
City of Tempe
Maricopa Association of Governments
Maricopa County
Pinal County
Sky Harbor Airport Authority
Town of Apache Junction
Town of Gilbert
Town of Queen Creek

NATIVE AMERICAN TRIBAL ORGANIZATIONS AND COMMUNITIES

Ak-Chin Indian Community
Fort McDowell Indian Community
Gila River Indian Community
Hopi Tribe
Mescalero Apache Tribal Council
Pascua Yaqui Tribe of Arizona
Salt River Pima-Maricopa Indian Community
San Carlos Apache Reservation
Tohono O'odham Indian Nation
Tonto Apache
White Mountain Apache Reservation
Yavapai-Apache Reservation
Yavapai-Prescott
Zuni Tribe

PRIVATE ORGANIZATIONS AND INDIVIDUALS

A.J. Fowler Corporation
Arizona Golf Resort
Arizona Association of Realtors
Barnard Dunkelberg & Company
Burn's Pesticides
Coffman Associates
EDAW Inc.

Good Samaritan Regional Medical Center
Hammer Siler George Associates
Landiscor Aerial Photography, Inc.
Operational Technologies Corporation
Salt River Project Electric Company
Southern Pacific Railroad Company
Southwest Gas
St. Joseph's Hospital Medical Center
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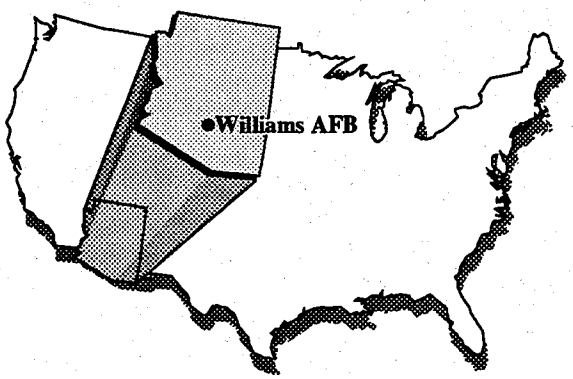

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6.0 LIST OF PREPARERS AND CONTRIBUTORS

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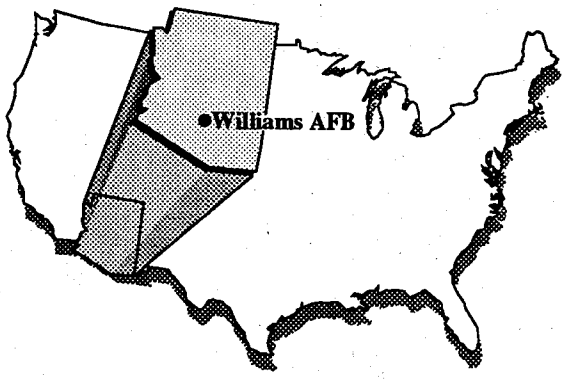

CHAPTER 7
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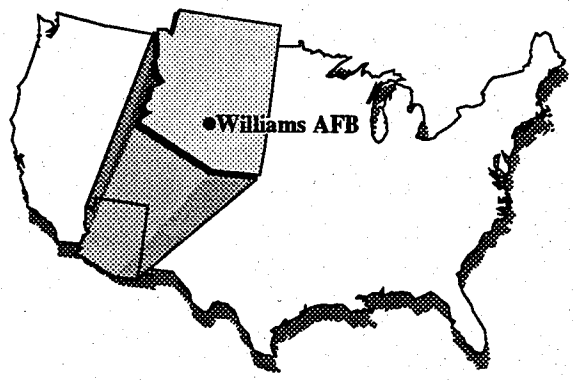

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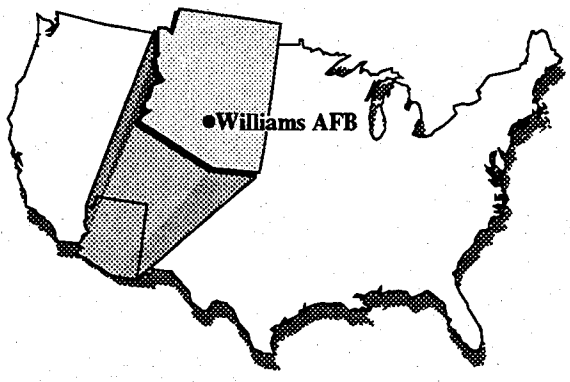

CHAPTER 9
PUBLIC COMMENTS AND RESPONSES

9.0 PUBLIC COMMENTS AND RESPONSES

INTRODUCTION

The Air Force has complied with the National Environmental Policy Act (NEPA) mandate of public participation in the environmental impact analysis process primarily in two ways:

- A public hearing was held in Gilbert, Arizona on October 7, 1993, at which the Air Force presented the findings of the Draft Environmental Impact Statement (DEIS) for disposal and reuse of Williams Air Force Base (AFB) and invited public comments.

- The subject DEIS was made available for public review and comment from September 1993 through November 1993.

Public comments received both verbally at the public meeting and in writing during the response period have been reviewed and are addressed by the Air Force in this chapter.

ORGANIZATION

This Public Comment and Response section is organized into several subsections, as follows:

- This Introduction, which describes the process, organization, and approach taken in addressing public comments

- A consolidated comment-response section

- An index of commenters

- A transcript of the public hearing

- Photocopies of all written comments received.

These sections are described below.

Comments received that are similar in nature or address similar concerns have been consolidated to focus on the issue of concern, and a response is provided that addresses all of the similar comments. Some comments simply state a fact or an opinion, for example, "the DEIS adequately assesses the impacts on [a resource area]." Such comments, although

appreciated, do not require a specific response and are not called out herein. The comments and responses are grouped by area of concern, as follows:

1.0 Air Force Policy

2.0 Purpose and Need for Action

3.0 Alternatives Including the Proposed Action

4.0 Land Transfer/Disposal

5.0 Local Community

6.0 Land Use/Aesthetics

7.0 Transportation

8.0 Airspace

9.0 Utilities

10.0 Hazardous Materials/Waste Management

11.0 Soils and Geology

12.0 Water Resources

13.0 Air Quality

14.0 Noise

15.0 Biological Resources

16.0 Cultural Resources

17.0 Socioeconomic Impact Analysis Study

Within each area, each consolidated comment-response is numbered sequentially. For example, under 8.0 Airspace, individual comments-responses are numbered 8.1, 8.2, etc. At the end of each numbered comment-response is a set of numbers that refer to the specific comment in the documents received that were combined into that consolidated comment. The numbers of the individual comments are indicated in parentheses, e.g., (4-2, 6-1, 8-22, 11-4). Comment 4-2, for example, refers to document 4, comment number 2. A reader who wishes to read the specific comment(s) received may turn to the photocopies of the documents included in this section. Below each comment number is the

number of the consolidated comment in which the specific comment has been encompassed, e.g. 8.5. Thus, the reader may reference back and forth between the consolidated comments-responses and the specific comment documents as they were received.

It should be further noted that some comments in the documents received are not included in the consolidated comment-response document. These comments fall into two categories:

- Comments to which no response is required, as explained above

- Comments regarding the Socioeconomic Impact Analysis Study (SIAS).

Effects upon the physical or natural environment that may result from projected changes in certain socioeconomic factors that are associated with or caused by the disposal or reuse of the base are addressed within this EIS. Other socioeconomic issues, such as the region's employment base, school budgets, municipal/state tax revenues, municipal land planning, medical care for military retirees and dependents, local governments and services, real estate, and economic effects on utility systems and specific businesses are beyond the scope of NEPA and Council on Environmental Quality (CEQ) requirements. Analysis of impacts associated with these issues is provided in the SIAS; that public document will also support the base reuse decision-making process. The environmental impact analyses presented in this EIS are based on the results of the socioeconomic analyses described in detail in the SIAS. All comments pertaining solely to issues addressed in the SIAS were considered beyond the scope of this EIS, and so are not addressed in this comment and response chapter. However, those comments have been reviewed and responses have been provided to the commenters. Comments related to socioeconomic factors that are addressed in this EIS (e.g., population, employment) have been included in this comment-response chapter.

Finally, it should be emphasized that not only have responses to EIS comments been addressed in this comment-response chapter, as explained, but the text of the EIS itself has also been revised, as appropriate, to reflect the concerns expressed in the public comments.

The list of commenters includes the name of the commenter, the identifying document number that has been assigned to it, and the page number in this section on which the photocopy of the document is presented.

PUBLIC COMMENTS AND RESPONSES

1.0 POLICY

1.1 Comment: The notification procedure for public comment was inadequate and resulted in a failure to provide a full and complete opportunity for public comment. (4-7, 4-25, 5-7)

Response: The DEIS was mailed to public officials, regulatory agencies and interested parties on September 9, 1993. The cover page within the DEIS provided notification that the public comment period would close on November 1, 1993 and provided information on where to send written comments. Notice of the availability of the DEIS appeared in the Federal Register on September 17, 1993. Press releases notifying the public of the time and place for the public hearing appeared in the Phoenix Gazette and Arizona Republic on September 29 and October 6, 1993. Copies of the DEIS were sent to regional libraries on September 9, 1993. The presentation at the public hearing was a one-hour summary of the base disposal process and results of the environmental impact analysis. Detailed information was available in the DEIS and could have been brought up as questions at the public hearing. The Air Force has provided adequate notice of the availability of the DEIS and the public comment period, and has encouraged comments from the public on this document.

1.2 Comment: The Air Force should develop a guidance and policy document on interim use and disposal of base property taking into account cleanup actions proposed and land use compatibility. (8-2)

Response: Proposed cleanup actions are being developed at this time and will be delineated in the Base Realignment and Closure (BRAC) Cleanup Plan for IRP sites and the Facilities Assessment/Evaluation Assessment Work Plan for non-IRP sites on base.

1.3 Comment: Deed encumbrances, restrictive covenants, reservations and cooperative agreements should be used by the Air Force to promote protection and appropriate use of natural and cultural resources after base disposal. (8-3)

Response: Where appropriate, the Air Force will use a variety of institutional controls to protect natural and cultural resources.

1.4 Comment: The Air Force should take a leadership role in promoting pollution prevention, energy conservation, waste minimization and the protection and appropriate use of sensitive resources through through appropriate development of reuse alternatives and placement of conditions on property conveyance. (8-4, 8-17)

Response: Comment noted.

1.5 Comment: The FEIS should contain a short description of the interaction between interim uses and the hazardous waste cleanup actions being implemented by the Air Force. (8-5)

Response: The Air Force has prepared two separate documents, the BRAC Cleanup Plan and the Facility Assessment/Evaluation Assessment Work Plan, which address this issue.

1.6 Comment: The Air Force should closely coordinate with appropriate air pollution control agencies to reconcile potential air quality impacts from anticipated base reuses. (8-11)

Response: The Air Force has been working closely with the Maricopa Association of Governments (MAG) on predicted emissions modeled from the Proposed Action and alternatives presented in the DEIS. The MAG has been working with the state to include projected emissions from reuse alternatives into the State Implementation Plan (SIP). The Air Force, where required, will prepare conformity determinations and make this information available to the reuse proponents and the MAG.

1.7 Comment: EPA recommends that the Air Force commit to mitigation methods for air quality attainment as part of the Record of Decision and include these requirements in property conveyance documents. (8-12)

Response: Comment noted.

1.8 Comment: EPA recommends that the Air Force include in the FEIS discussions of the Green Lights Program and other measures which would lessen energy usage for reuse alternatives. (8-18)

Response: Comment noted.

1.9 Comment: The FEIS should explore the possibility of structuring an incentive program into the land conveyance process which would evaluate proposed uses on the basis of the project's level of pollution prevention, waste minimization and conservation. (8-19)

Response: Comment noted.

1.10 Comment: The Air Force should consider tradeoffs between potential environmental impacts and socioeconomic benefits of each proposed reuse alternative in their Record of Decision. (8-20)

Response: Comment noted.

2.0 PURPOSE AND NEED FOR ACTION

No comments were received for this area of concern.

3.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

3.1 Comment: The analysis of the reuse of Williams AFB should not center around civilian aviation reuse alone. The base should be kept in mothballs by the federal government in the event that world events make it necessary to use it as a military air base again. (3-2)

Response: The DEIS analyzes the environmental effects of the U.S. Government retaining Williams AFB in caretaker status after closure under the No Action Alternative. In the No Action Alternative Williams AFB would be preserved in order to limit deterioration and ensure public safety. The Air Force Base Conversion Agency Operating Location would also ensure base resource protection, grounds maintenance, and utilities operations as needed, and that buildings are maintained.

3.2 Comment: The DEIS evaluated the environmental effects of noise and air emissions for the Proposed Action and the Commercial Aviation and Education Alternative based upon an assumed aircraft type and mix that is unreasonably low. The analysis should not assume that a third runway would be built at Phoenix Sky Harbor International Airport, and makes the same faulty assumptions regarding technological improvements and changes in the fleet mix that are made by the DEIS prepared by the City of Phoenix for the addition of the third runway at Sky Harbor. (4-1, 4-8, 4-9)

Response: The Defense Base Closure and Realignment Act (DBCRA) requires the Air Force to consider reuse plans provided by the local communities prior to disposal of Air Force property. The DEIS presents an assessment of the environmental impacts of available plans developed by the Williams AFB Economic Reuse Advisory Board and by the Williams Redevelopment Partnership. The assumptions developed regarding the aircraft type and mix for the Proposed Action and alternatives were generated and reviewed by these groups prior to the Air Force analysis of environmental effects in the DEIS. The aircraft type and mix for the Commercial Aviation and Education Alternative were provided directly by the Williams Redevelopment Partnership. The proposed aircraft type and fleet mix for the Proposed Action and alternatives represent the local communities estimation of a reasonable range of activities which could be conducted at Williams AFB under commercial aviation reuse. These assumptions were further reviewed by the Air Force for reasonableness prior to incorporation into the DEIS.

3.3 Comment: The DEIS did not incorporate a regional airport suggested by the Governor's Regional Airport Advisory Committee Report as a reasonable alternative to the Proposed Action. (4-21)

Response: The Proposed Action and alternatives analyzed in the DEIS were developed by the Williams AFB Economic Reuse Advisory Board and the Williams Redevelopment Partnership, which were chartered for this purpose by the Governor of Arizona and surrounding jurisdictions. The reuse plan and airport development plan focused on the 4,042 acres on Williams AFB, with minor additions to this acreage to accommodate proposed runway protection zones. The magnitude of the proposed regional airport envisioned by the Governor's Regional Airport Advisory Committee far exceeds the acreage available for disposal at Williams AFB. A separate environmental analysis would have to occur to identify potential environmental effects for such a large scale proposal.

3.4 Comment: The DEIS did not incorporate an alternative which describes education uses at Williams AFB, with a regional airport located outside of Williams AFB in another area. (5-15, 5-16)

Response: The DEIS presents a non-aviation alternative, the Education and Planned Community Alternative, which includes a satellite college campus combined with a residential community as a reuse of the base. Analysis of a plan for a civilian airport outside of the boundaries of Williams AFB is beyond the scope of this EIS.

3.5 Comment: The DEIS describes the Airport Master Plan developed by the Williams Redevelopment Partnership as the Commercial Aviation and Education Alternative rather than the Proposed Action. This is confusing because the document does not clearly point out that this is the plan which is being implemented by the Williams Redevelopment Partnership. The Airport Master Plan should be the Proposed Action and not an alternative. (6-1)

Response: The Proposed Action was developed from the reuse plan adopted by the Williams AFB Economic Reuse Advisory Board, which was established by Arizona Governor Fife Symington in November 1991. The Commercial Aviation and Education Alternative reflects the Airport Master Plan being developed for the base by the Williams Redevelopment Partnership, which builds upon the Proposed Action but incorporates a number of differences. An explanation of the development of these plans is included in Chapter 2, pages 2-3 and 2-4. Representing the Airport Master Plan as the Commercial Aviation and Education Alternative, rather than as the Proposed Action, does not preclude the decision maker from selecting that alternative, any other alternative, or portions of alternatives in the Record of Decision.

4.0 LAND TRANSFER/DISPOSAL

4.1 Comment: The DEIS should incorporate text regarding 160 acres on the base which are Public Land Order withdrawals from the U.S. Department of the Interior, Bureau of Land Management as an Other Land Use Concept. (2-1, 10-3)

Response: The text of Chapter 3 page 3-13 of the DEIS has been revised to explain the presence of the Public Land Order withdrawals at Williams AFB. The Public Land Order withdrawals have not been added as an Other Land Use Concept since the Bureau of Land Management has no plans for reuse of the 160 acres on the base, but represents another owner of base lands in addition to the Air Force.

4.2 Comment: The DEIS should incorporate, as an Other Land Use Concept, the proposed transfer of land at Williams AFB from the Federal Government to the State of Arizona in exchange for lands owned by the State of Arizona. (8-21, 9-3)

Response: The proposed transfer of land from the Federal Government to the State of Arizona is one of several alternatives for transferring base properties in order to implement either the Proposed Action or an alternative. The proposed transfer is discussed in Chapter 1 on page 1-2 as a method of property disposal; however, since the transfer is not a plan or reuse proposal, it has not been added as an Other Land Use Concept.

5.0 LOCAL COMMUNITY

5.1 Comment: The DEIS should include potential growth inducing effects which are secondary or cumulative in nature to surrounding rural areas resulting from implementation of the Proposed Action and alternatives. (8-9)

Response: Secondary employment and population effects are presented in Section 4.2.1 Community Setting, in Chapter 4 of the EIS. A more detailed analysis is included in Chapter 4 of the separate Socioeconomic Impact Analysis Study prepared by the Air Force for the disposal and reuse of Williams AFB.

6.0 LAND USE/AESTHETICS

6.1 Comment: The DEIS should incorporate, as an Other Land Use Concept, a proposal by the U.S. Army Reserves to reuse Building #410 on Williams AFB for reserve unit activities. (9-1)

Response: Administrative office, classroom and/or aviation related uses which could be conducted by reserve units in this facility fall within the range of activities analyzed for impacts under the Proposed Action and alternatives and as such do not require a separate analysis.

6.2 Comment: The DEIS should incorporate proposals by the Recruiting Commands and the Military Entrance Processing Service to reuse Building #4 as an office. (9.2)

Response: See response to Comment 6.1.

6.3 Comment: The Air Force should remove the existing sanitary landfill from future reuse for public or recreational activities due to proposed plans by the Air Force to address the issue of potential surface contamination. In addition, the FEIS should clearly state potential restrictions and legal constraints on future uses at other major IRP sites. (8-1)

Response: The designation of the landfill (IRP Site LF-04) in the "Public/Recreation" land use category does not necessarily mean that any "public or recreational activities" will actively occur on the landfill site. The DEIS recognizes that limitations will likely be placed on reuse of the landfill site and consistently states that reuse may be limited to "inaccessible open space." The Air Force believes that reuse in this manner, as open space retention and wildlife habitat preservation for example, may be properly regarded as a "Public/Recreation" land use.

With respect to "potential restrictions and legal constraints" on the future use of IRP sites, the Air Force notes that while potential reuses may be limited by the selected remedy, it is also true that the remedy ultimately selected for any IRP site may well be influenced by proposed reuses. At present, the reuse alternatives analyzed in the EIS are largely conceptual in nature. As actual reuse plans are more fully developed and IRP decisions are made, appropriate restrictions and legal constraints, if any are necessary, will be incorporated into the transfer documents.

6.4 Comment: Section 3.2.1 of Chapter 3 does not note the strip annexation by the City of Mesa to the north. (12-6)

Response: The strip annexation is shown in Figure 3.2-3, while the location of the base within the jurisdiction of the city of Mesa is noted in Section 3.2.2.1 of Chapter 3.

6.5 Comment: Section 3.2.2.1 of Chapter 3 should note the East Mesa and Queen Creek Area Land Use Plans for Maricopa County. The text inaccurately states that the Queen Creek Plan is currently undergoing revision. (12-7)

Response: The above-mentioned plans are noted in Section 3.2.2.1 of Chapter 3. The text has been revised to delete reference to revisions to the Queen Creek Plan.

6.6 Comment: Figure 3.2-4 does not show the special use zoning for the adjacent General Motors Proving Grounds. (12-8)

Response: The General Motors Proving Grounds lie within the zoning jurisdiction of Maricopa County. The land is zoned RU-43, which permits principal uses such as farms and nonfarm residential uses by right. The Proving Grounds operate under the provisions of special use permits granted by the Maricopa County Board of Supervisors. Special uses may be permitted in any zoning district provided the use is granted and subsequently operated under the provisions of approval by Maricopa County. Figure 3.2-4 shows low density residential zoning for the Proving Grounds since that is permitted by right by the underlying zoning district.

7.0 TRANSPORTATION

7.1 Comment: The "document of decision" should reflect interim and final configurations of roadways and runways contained in the Draft Final Master Plan (FAA Master Plan) for Williams AFB. The plan is a variation on the Proposed Action. (12-1)

Response: Roadways and runways shown in the Commercial Aviation and Education Alternative reflect the input of the Williams Redevelopment Partnership, which is developing the Airport Master Plan for the base. As the Airport Master Plan has developed over time, final configurations of roadways and runways may differ from those depicted in the Commercial Aviation and Education Alternative in the EIS. As the alternatives examined in the EIS are largely conceptual in nature, this is acceptable. The Record of Decision is concerned principally with property transfer and does not, itself, contain such details as roadway and runway configurations.

7.2 Comment: Ellsworth Road is shown as having a depressed road section in the vicinity of extended runway 12L/30R, to accommodate the runway protection zone. Due to drainage problems, a depressed roadway will create a large sump and require pumps to keep the road passable. This feature would be costly to maintain. (12-2)

Response: Under the Proposed Action or the Commercial Aviation and Education Alternative, Ellsworth Road is shown as potentially requiring a depressed section in the vicinity of extended runway 12L/30R. This option was shown in the reuse plan adopted by the Williams AFB Economic Reuse Advisory Board, and is depicted in the EIS to show the range of physical alterations to the roadway which could achieve FAA required clearances within the proposed runway protection zone while maintaining the road in its present alignment. Further studies conducted on behalf of the Williams Redevelopment Partnership for the FAA Master Plan may show that a depressed section would not be required.

7.3 Comment: The Proposed Action shows Sossaman Road as a through route with projected average daily traffic (ADT) of 27,420 in the year 2013. The road is not conducive as a through route handling that amount of traffic and appears better suited as an internal circulation roadway. (12-3)

Response: The Proposed Action (Figure 2.2-1) shows Sossaman Road extending onto the base from the south and ending at an intersection with an internal loop road configuration within the Institutional (Education) land use component. An unnamed arterial

extends from the north side of the internal loop system and exits the north side of the base, but it does not follow the Sossaman Road alignment. For the Proposed Action, traffic volumes for Sossaman Road and the unnamed arterial were not modelled. The projected ADT of 27,420 (Table I-7) applies to the circulation system shown in the General Aviation and Education Alternative (Figure 2.3-1), and relates specifically to the segment of Sossaman Road between the Hawes Road extension and Ray Road.

7.4 Comment: Section 4.2.3 of Chapter 4 does not address traffic volumes on Sossaman Road. Figure 4.2-7 also does not show Sossaman Road, even though the Proposed Action shows Sossaman Road extending through the base. (12-4)

Response: The configuration of the extension of Sossaman Road as depicted in the Proposed Action is discussed in the response to comment 7.3. Traffic volumes are shown in Table I-7 of Appendix I for selected segments of the extension of Sossaman Road, which is shown as a through route in the case of the Education and Planned Community Alternative, and as north and south extensions connecting with an internal loop road in the case of the General Aviation and Education Alternative. For the Proposed Action and the Commercial Aviation and Education Alternative, Sossaman Road does not extend through the base, as explained in the response to Comment 7.3. The road segments selected for discussion in Section 4.2.3 and in Figure 4.2-7 reflect segments of existing roads which ring the base in order to illustrate the intensity of traffic conditions for local regional roadways.

7.5 Comment: Figure 3.2-11 does not note AM or PM for the peak hour traffic volume in the legend. (12-9)

Response: The peak hour traffic volumes shown in Figure 3.2-11 and related figures (3.2-12, 4.2-7, 4.2-12, 4.2-13, 4.2-15) are PM volumes.

8.0 AIRSPACE

8.1 Comment: The presence of another airport in the Phoenix area would result in too much air traffic. The DEIS underestimates the number of over flights likely to occur as a result of the Proposed Action or the Commercial Aviation and Education alternative, and should use other proposed flight paths. (3-1, 4-11)

Response: The assumptions regarding the number of flights likely to occur and the anticipated flight paths for the Proposed Action and alternatives were developed in consultation with the FAA, the Phoenix area TRACON (Terminal Radar Approach Control), the Maricopa Association of Governments, the Williams AFB Economic Reuse Advisory Board, and the Williams Redevelopment Partnership prior to analysis of environmental effects. Anticipated flights and flight paths for the Proposed Action and alternatives represent the local community's estimation of a reasonable range of activities which could be conducted at Williams AFB during a commercial aviation reuse.

8.2 Comment: The DEIS makes incorrect assumptions regarding the flight paths and air space conflicts which could occur if Sky Harbor is operated with a third runway. The assumptions and subsequent analysis do not take into account deviations from the prescribed flight paths. (4-2, 4-14, 4-15)

Response: Flight paths and air space conflicts were analyzed assuming the operation of Sky Harbor International Airport with a third runway. Assumptions were developed based upon information contained within the Regional Aviation System Plan (RASP) Update, Phase I Final Report, as well as consultation with the groups listed in response 8.1. The prescribed flight paths for Sky Harbor International Airport represent reasonable assumptions based upon area plans and forecasts. It is not within the scope of this EIS to anticipate all possible deviations from this assumption.

8.3 Comment: The DEIS fails to anticipate the potential cumulative impacts of the combined operations of Williams AFB and Sky Harbor International Airport. (4-3, 4-16)

Response: The airspace/air traffic analysis in Transportation, Section 4.2.3, Chapter 4 of the EIS includes discussion of the potential interaction of the Proposed Action and aviation related alternatives with other airports in the region, including Sky Harbor International Airport. The analysis includes air safety and airspace conflicts which may result from projected operations within the 20-year period of analysis.

8.4 Comment: The DEIS fails to assess impacts resulting from the potential limitations in operational capacity at Sky Harbor International Airport if the third runway is not constructed or restrictions on flights arriving or departing from the east are put into effect. (4-12, 4-13)

Response: The projected level of operations at Williams AFB which would result from the Proposed Action and aviation related alternatives was based upon the projections contained within the RASP study, with consultation and review from the groups listed in response 8.1. The projected level of operations represent a reasonable assumption based upon area plans and forecasts, with further input from local and regional agencies and the FAA. It is not within the scope of this EIS to anticipate all possible changes to these assumptions based upon deviations from the future actions planned for Sky Harbor International Airport.

8.5 Comment: The DEIS fails to adequately address potential adverse environmental effects which would be caused by delays in the operation of both facilities, resulting from adherence to the proposed flight paths for Williams AFB and Sky Harbor International Airport. (4-17, 5-12, 5-13)

Response: The airspace/air traffic analysis in Transportation, Section 4.2.3 of Chapter 4 of the EIS includes discussion of the potential interaction of the Proposed Action and aviation related alternatives with other airports in the region, including Sky Harbor International Airport. This analysis takes into account projected increases in operations for both Williams AFB and Sky Harbor International Airport, maintaining the flight paths proposed for each airport. With one exception, the use of air traffic control standard tunneling procedures would mitigate delays to traffic flows, as discussed in Section 4.2.3 of the EIS. The one exception, which occurs in connection with the Commercial Aviation and Education Alternative, is also addressed in Section 4.2.3.

8.6 Comment: The DEIS fails to address airspace conflicts that could occur if the City of Phoenix fails to enforce restrictions on where planes may operate. (4-18)

Response: It is not within the scope of this EIS to analyze the enforcement practices of the City of Phoenix with respect to instances where deviations from prescribed flight paths may occur.

8.7 Comment: The DEIS fails to state whether flight patterns proposed are rigid, inflexible and enforceable. (4-19, 5-14)

Response: The prescribed flight paths are reasonable assumptions based upon area plans and forecasts. The basis for these assumptions is stated in the airspace/air traffic discussion in Transportation, Section 4.2.3, Chapter 4.

8.8 Comment: The DEIS for Williams fails to address possible mitigation which may include the use of mandatory flight paths which are enforceable through both administrative and civil actions. (4-5, 4-20)

Response: Mitigation measures which address potential airspace conflicts for the Proposed Action and the Commercial Aviation and Education Alternative are included in Section 4.2.3, Chapter 4. The FAA provides an adequate regulatory framework for implementing these mitigation measures.

8.9 Comment: Five wilderness areas lie within a 50-mile radius of Williams AFB. Wilderness characteristics would be compromised if civilian aircraft flight paths frequently pass over these areas. FAA regulations provide for a 2,000 foot aerial threshold over wilderness areas. (10-1)

Response: Proposed flight tracks and aviation operations for the Proposed Action and all aviation related alternatives were developed under consultation with the FAA. Maintenance of a 2,000 foot threshold over wilderness areas is incumbent upon individual pilots and FAA air traffic control. It is beyond the scope of this EIS to estimate whether and to what extent pilots may violate such thresholds.

8.10 Comment: The San Tan Regional Park lies 6 miles south of Williams AFB. Frequent flights over this park may impact park recreational values. (10-2)

Response: The regional park is located outside of projected airport noise contours which would be incompatible with recreation uses.

9.0 UTILITIES

No comments were received for this area of concern.

10.0 Hazardous Materials/Waste Management

10.1 Comment: The FEIS should be updated to reflect the most current Operable Unit (OU) definitions and site status under the IRP. (8-6)

Response: The DEIS reflects correct OU definitions and IRP site status as of the publication date of the document. Since then, changes in OU definition and IRP site status have occurred. Such changes will no doubt continue to occur after the publication date of the FEIS. The Air Force believes that the IRP information presented in the DEIS is adequate to the task of evaluating impacts vis-a-vis reuse alternatives. Since recent IRP developments do not fundamentally alter the underlying environmental condition of the property and do not substantively affect the analysis presented in the DEIS, they have not been reflected in the FEIS.

11.0 SOILS AND GEOLOGY

No comments were received for this area of concern.

12.0 WATER RESOURCES

No comments were received for this area of concern.

13.0 AIR QUALITY

13.1 Comment: There are a number of retirement communities in the area of Williams AFB. People moved here because of the quality of life; clean air, quiet neighborhoods, etc. Proposed reuse of Williams AFB as a commercial airport will cause air pollution, noise and air traffic. (3-3)

Response: Although predictions of unmitigated pollutant emissions associated with the Proposed Action and other alternatives with an airfield component exceed estimated preclosure conditions at Williams AFB, modeling results show that predicted concentration levels will not exceed national or state ambient air quality standards. The predicted emissions under the most severe alternative studied represent only a small fraction, 2.5 percent, of the total Phoenix and Maricopa County Urban Planning Area emissions inventory representative of preclosure conditions. Comment responses for air traffic can be found in Section 8.0 while noise comment responses can be found in Section 14.0.

13.2 Comment: The DEIS does not address conformity to air quality plans. The Air Force should conduct a conformity analysis and make a conformity determination prior to disposal of the base property. (8-10)

Response: The Air Force will comply with the EPA's final rule regarding conformity determination(s) to the extent it applies to the specific proposed reuses of the base property. Where applicable, the Air Force will prepare a conformity determination(s), if necessary, prior to disposal/conveyance of parcels of base property.

13.3 Comment: Before the end of the year, the EPA could designate the Maricopa County PM-10 non-attainment area as serious, then the entire county would be classified as non-attainment. It is not suggested that re-analysis of air quality is necessary; however, the potential serious designation should be noted. (12-5)

Response: The comment is noted. However, no change has been made in the FEIS since no redesignation of the non-attainment area had occurred at the time the FEIS was being prepared.

14.0 NOISE

14.1 Comment: Establishment of a new airport at Williams AFB will result in increased noise in the area. (3-5)

Response: Potential environmental effects from aviation related noise are analyzed in Section 4.4.4 of Chapter 4 of the EIS. Noise exposures predicted for the year 2013 under the Proposed Action and alternatives with an air aviation component are less severe than from preclosure military operations at Williams AFB.

14.2 Comment: The DEIS fails to assess the noise impacts that could occur from the combined operation of Williams AFB and Sky Harbor International Airport if flight paths and air space restrictions are violated. (4-4)

Response: Combined impacts due to aircraft noise from Williams AFB and Sky Harbor International Airport is not discussed since no additional incompatible land uses (compared to preclosure conditions) were identified within projected noise contours for the Proposed Action and alternatives. It is not within the scope of this EIS to anticipate all possible deviations or violations from prescribed flight paths for Sky Harbor International Airport.

14.3 Comment: The DEIS relies upon 65 dB DNL noise contours to predict adverse noise impacts; however, adverse noise impacts can occur at levels less than 65 dB DNL. (4-6, 4-23, 5-1)

Response: The DEIS uses FAA guidelines (based on DNL noise ranges) for assessing the compatibility of various land uses at different noise levels. These guidelines are based on the work of the Federal Interagency Committee on Urban Noise (FICON) and are the currently accepted criteria for assessing compatibility of aircraft noise. The DNL measure was developed to account for the noise levels of individual events, the duration of each event, the number of events, and the time at which events occur. The conclusions presented in the DEIS are based on the guidelines using 65 dB DNL to indicate noise impacts for residential uses as well as a variety of other land uses.

14.4 Comment: The DEIS fails to consider noise mitigation measures for residential areas between Sky Harbor and Williams AFB, such as "no-fly" zones and mandatory flight paths. (4-22)

Response: No mitigation of aircraft noise is discussed for residential areas between Williams AFB and Sky Harbor International Airport because no additional incompatible land uses were identified for

which noise mitigation would be required. The determination of incompatible land uses are based upon the FAA land use compatibility guidelines within FAR part 150. However, the proponent agencies could choose to analyze and pursue implementation of additional noise reduction measures such as operational or facility modifications.

14.5 Comment: The DEIS fails to report adverse noise impacts for facilities with sound exposure levels (SEL) which would result in repeated exposure to noise levels above the 65 dB DNL guidelines. (4-24, 5-2, 5-3, 5-4, 5-5, 5-6).

Response: The conclusions presented in the DEIS are based on the accepted FAA guidelines using DNL. Sound Exposure Levels (SEL) are presented in the text for the various alternatives, but should not be compared to the DNL ranges used in the FAA guidelines. SEL values represent the A-weighted sound level integrated over the entire duration of the noise event and referenced to a duration of 1 second. Typically, most events (aircraft flyovers) last longer than 1 second, and the SEL value will be higher than the maximum sound level of the event. Also, the SEL values presented in the EIS are outdoor values; indoor SELs can be expected to be lower by between 17 dB (windows open) and 27 dB (windows closed). Further explanation of noise metrics can be found in Appendix I.

14.6 Comment: The DEIS does not adequately assess noise impacts to proposed educational uses on Williams AFB that are adjacent to civilian aviation uses. (5-8, 5-9, 5-10, 5-11)

Response: The land use compatibility guidelines shown in Table 3.4-9 of Chapter 3 of the DEIS indicate that areas with DNL less than 65 dB are compatible with educational uses (schools). Outdoor areas of an educational campus may be considered to be recreational in use. Areas with DNL less than 70 dB are considered to be compatible with most recreational uses except for outdoor music shells and amphitheaters, which are compatible with DNL less than 65 dB. Therefore, it is concluded that the educational use is a compatible use.

14.7 Comment: So called "quieter" aircraft operate by changing the frequency pitch from higher to lower frequencies which will cause significant adverse impact upon structures including historical and archaeological sites in the area of Williams. (4-10)

Response: Available literature on the effects of low frequency noise resulting from civilian aviation use indicate that effects to surrounding structures from low frequency noise are negligible.

Noise induced vibration that can result from impulsive noise such as sonic booms and blast noises can have an adverse effect on surrounding structures; however, neither of these occurrences is anticipated with implementation of the Proposed Action and alternatives.

15.0 BIOLOGICAL RESOURCES

15.1 Comment: The results of a 1991 wetland determination by the Army Corps of Engineers should be incorporated into the FEIS. (6-2)

Response: The results of the 1991 survey have been incorporated into the text. Although the Army Corps of Engineers conducted an investigation of portions of the base, not all of the base was inspected. As noted in the EIS, hydric soils were not encountered anywhere on the base, thus the three criteria for a jurisdictional determination were not met as outlined in the 1987 *Corps of Engineers Wetlands Delineation Manual*. Since it is Air Force policy to use the 1987 manual for wetlands delineation, the areas formerly identified in the DEIS as potential wetlands are discussed only as sensitive habitats in the FEIS.

15.2 Comment: There is concern about the amount of Scrub-Shrub and Riparian/Mesic habitat that would potentially be lost due to implementation of the Proposed Action. (7-1)

Response: As stated in Table 4.4-24 of the DEIS, the acreage disturbed (935 acres of Scrub-Shrub and 50 acres of Riparian/Mesic habitats) is an approximate number and represents the maximum acreage potentially disturbed. See Appendix E, Methods of Analysis, for further details on the method used to calculate the acreage disturbed.

15.3 Comment: Add additional threatened, endangered, or candidate species to Table 3.4-11. (7-2)

Response: Table 3.4-11 reflects the official USFWS response of 24 March 1992, as coordinated with Ron McKimstrey, Field Supervisor, USFWS.

15.4 Comment: There is concern for the loss of suitable habitat for threatened and endangered species on the base and the need for further consultation with the USFWS. (7-3)

Response: As stated in Table 3.4-11, there is only one endangered species identified as potentially occurring in the vicinity of the base. This table also shows the preferred habitat for this species as being mines and caves. There are no mines or caves on Williams AFB, therefore, there is no suitable habitat for this species on the base.

In addition, the habitats listed for the candidate species are the preferred or natural habitats for these species. This does not mean that any of these species actually utilize the habitat. To avoid

further confusion, the statement regarding suitable habitats on the base has been deleted from Section 4.4.5 of the FEIS. Habitat suitability is clearly discussed in Section 3.4.5.

15.5 Comment: Consideration of species protected under the Migratory Bird Treaty Act should be given, especially the loggerhead shrike which was observed on the base. (7-4)

Response: It is understood that the species has protection under the Migratory Bird Treaty Act; however, the loss of natural habitat on Williams AFB is minor when compared to the suitable natural habitat for this species which occurs from Texas to the Pacific Ocean. In addition, the species adapts to man-made habitats and would continue to inhabit the area, even after reuse.

15.6 Comment: Other ecological studies of Williams AFB have identified ecological features on the base which have not been mentioned in the DEIS. (8-7)

Response: Ecological survey results have been considered in the FEIS. For example, the burrowing owl, as well as many other species, was identified during field investigations of the base and is listed in Appendix M, Biological Resources.

15.7 Comment: The discussion on impacts to biological resources does not agree with the summary. (8-8)

Response: The summary has been changed to agree with the impacts discussed in Section 4.4.5, Biological Resources.

15.8 Comment: The FEIS should include a formal delineation of Section 404 jurisdictional waters, if any. (8-13)

Response: As noted in response to comment 15.1, there are no jurisdictional wetlands on Williams AFB. In regards to other waters of the United States, this is a regulatory issue and jurisdiction will need to be determined by the reuse proponent prior to obtaining permits for any land disturbing activity.

15.9 Comment: The DEIS does not adequately demonstrate that federally listed threatened or endangered species are not jeopardized and that there will not be significant degradation to aquatic ecosystems. In addition, there should not be a reliance on consultation and coordination for impact mitigation since some projects do not require regulatory consultation. (8-14)

Response: See response to comment 15.4 regarding impacts to threatened and endangered species. The mitigation measures listed in the document should offset potential impacts to biological resources; however, it is the ultimate responsibility of the reuse proponent to implement mitigation actions prior to implementation of any reuse plan.

15.10 Comment: The DEIS does not state the amount of acreage of jurisdictional waters of the United States impacted by each alternative. A mitigation plan for these impacts should be included in the FEIS. (8-15)

Response: Jurisdictional determinations have not been made at this time. It is possible that Riparian/Mesic habitats may include jurisdictional waters of the United States. Actual disturbance of Riparian/Mesic habitats due to reuse alternatives will depend upon the actual location of the disturbance, which is unavailable at this time due to the conceptual nature of the reuse plans. As reuse plans become more fully developed, reuse proponents will need to obtain jurisdictional determinations and prepare mitigation plans as necessary.

15.11 Comment: A Habitat Management Plan should be developed for the base. (8-16)

Response: As determined in consultation with the USFWS, there is no prime habitat on Williams AFB for any threatened or endangered species. The habitat which does exist on base is neither unique nor critical for the common species which utilize it. Although the USFWS has not requested a habitat management plan at this time, the Air Force is of the opinion that it is appropriate for future users to consult with the USFWS prior to starting development.

16.0 CULTURAL RESOURCES

16.1 Comment: The Department of the Interior, Bureau of Land Management requests results of any archaeological or cultural resource studies conducted on 160 acres of public land (Public Land Order No. 6551) in the southeast corner of Williams AFB. (10-4)

Response: The Air Force conducted a pedestrian surface survey of this area of the base in January 1993. The results confirmed the presence of surface features and high densities of artifacts suggesting that this area possesses qualities that meet the requirements for inclusion to the National Register of Historic Places. A follow-up subsurface survey is planned by the Air Force. The results of the surface and subsurface surveys will be made available to the BLM.

16.2 Comment: The Native American Graves Protection and Repatriation Act (NAGPRA) and consultation with Native Americans under Section 106 of the National Historic Preservation Act (NHPA) should be discussed in greater detail since there is the potential for impacting prehistoric human remains as a result of reuse actions. (11-1)

Response: A discussion of NAGPRA requirements has been included in the introductory paragraphs for Section 4.4.6. On-going consultations with concerned Native American groups and communities under the American Indian Religious Freedom Act (AIRFA) fulfill requirements under Section 106 of the NHPA as well. A discussion of the process has been included in the introduction to Section 3.4.6.

16.3 Comment: The potential to impact prehistoric human remains should be considered an adverse effect since the remains have value beyond their informational potential as stated by the 1988 policy statement by the Advisory Council on Historic Preservation. (11-2)

Response: The covenants imposed on future reuse proponents would require compliance with AIRFA and NAGPRA, thus ensuring the protection of any potential prehistoric human remains on Williams AFB.

16.4 Comment: Recommend that Historic American Buildings Survey (HABS) standard documentation be changed to Historic American Buildings Survey/Historic American Engineering Record (HABS/HAER) documentation when discussing mitigation for demolition/alteration of historic structures. (11-3)

Response: This comment has been incorporated into the text of the FEIS.

16.5 Comment: Recommend that a Programmatic Agreement (PA) is more appropriate than a Memorandum of Agreement (MOA) for the protection of cultural resources. (11-4)

Response: On page 4-189 of the DEIS, it is noted that mitigation measures could be established by either a PA or MOA. Following subsurface testing at Williams AFB, the Air Force will begin negotiations with the SHPO and the Advisory Council on Historic Preservation regarding the selection and wording of a PA or MOA.

17.0 SOCIOECONOMIC IMPACT ANALYSIS STUDY

17.1 Comment: The establishment of a large civilian airport would diminish the quality of life for the several retirement communities present in the area. A reuse of this kind would negatively affect the value of homes in the area. (3-4)

Response: Analysis of socioeconomic impacts to residents within the community which may result from the Proposed Action and alternatives is included in the Air Force's Socioeconomic Impact Analysis Study for the disposal and reuse of Williams AFB. Changes in property values which may or may not occur as a result of base reuse does not produce environmental impacts, and therefore is not included in the analysis conducted for the DEIS.

17.2 Comment: New roads would have to be built to accommodate a new airport reuse, which would increase taxes for area residents. (3-6)

Response: Effects of infrastructure requirements on local tax rates are not environmental impacts and are beyond the scope of this EIS.

17.3 Comment: An evaluation of potential impacts to the military retirees which reside in the area should be included in the FEIS or the Socioeconomic Evaluation. (8-22)

Response: The following information regarding the use of Williams Air Force Base facilities by military retirees is included in the Socioeconomic Impact Analysis Study (SIAS) for the Disposal and Reuse of Williams Air Force Base:

- **Section 3.3- Population-** Number of military retirees associated with Williams AFB living within a 50-mile radius (years 1988-1991); number of military retirees expected to leave the area following the closure of Williams AFB.

- **Section 3.5.5- Health Care-** Type of health care services historically provided at Williams AFB Hospital for military retirees and their dependents; effects of closure of base hospital on military retirees; background information about civilian and military health care facilities in the area where retirees can receive health care following the closure of Williams AFB Hospital; driving distance from Williams AFB to the nearest military facility where retirees can receive free health care; costs associated with civilian health care facilities (vs. military health care facilities).

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WILLIAMS AIR FORCE BASE DISPOSAL AND
REUSE DEIS
PUBIC HEARING - 7 OCTOBER, 1993

COL. JAMES HEUPEL: Good evening, ladies and gentlemen. Thank you for coming out. This is the Public Hearing on the Draft Environmental Impact Statement for the Disposal and Reuse of Williams Air Force Base. I am Colonel James Heupel, and I will be the presiding officer for tonight's hearing.

This hearing is being conducted in accordance with provisions of the National Environmental Policy Act and implementing regulations. The Act requires Federal agencies to analyze the potential environmental impacts of Federal actions and to consider the findings of those analyses in deciding how to proceed.

The Air Force started the environmental process two years ago. As part of this effort on November 7, 1991, the Air Force held what is called a scoping meeting in Mesa to consider public suggestions -- your suggestions concerning what you felt should be covered in the Environmental Impact Statement or EIS. You will hear that referred to probably quite a few times tonight -- the EIS. Since that meeting the Air Force has examined the environmental concerns that you raised, as well as other concerns, and has prepared a draft Environmental Impact Statement that is the subject of tonight's hearing.

The purpose of tonight's hearing is to receive your comments, suggestions, and concerns on the draft EIS. For those who have not had the opportunity to review the draft EIS, I mention the draft EIS is at several of the public libraries in the local area. In fact, I believe there is a sheet outside the council chambers that lists some of those public libraries. If you haven't had an opportunity to look at that, you may want to read the summary that is contained in this brochure that I am holding up. I think most of you should have received it. Again it is on the table just outside the council chambers. Now these findings will also be addressed by panel members in their presentations this evening.

Before I introduce the members of the panel, I would like to explain my role in this hearing. I am the Chief Trial Judge for the Air Force. I serve as a Criminal -- Military Criminal Trial Judge hearing cases as well as supervising other judges, so I am not here as an expert on this draft EIS other than having looked at it. I haven't any expertise on it at all. I have not had any

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connections with its development. I am not going to be here to act as a legal advisor to the Air Force representative who will address these proceedings. My purpose is simply to ensure we have a fair, orderly hearing, and all who wish to be heard tonight have a fair chance to speak.

I would like to introduce the members of the hearing panel. On my immediate right is Mr. John Smith, who is representing the Air Force Base Disposal Agency. He will describe the Air Force Base disposal process to you. To his right is Lieutenant Colonel Terry Armstrong. Lieutenant Colonel Armstrong is the Programs Coordinator of the Environmental Planning Division at the Air Force Center for Environmental Excellence which is located at Brooks Air Force Base, Texas. He will be briefing you extensively on the Environmental Impact Analysis Process, and he will summarize the results which are reported in the draft EIS.

Now, on the far right is Mr. Peter Melia, representing the Federal Aviation Administration or FAA. Mr. Melia is from the FAA'S Western Pacific Regional Office. Because most of the reuse proposals analyzed in the EIS involve some portion of Air Force -- excuse me, of airport operations, the FAA will be directly involved in the decision-making process. Additionally, the FAA has special expertise to assist the Air Force in analyzing environmental impacts associated with airport operations. For these reasons the FAA is a cooperating agency with the Air Force for the purposes of preparing the EIS. Mr. Melia will try to answer any questions you may have regarding issues peculiar to FAA's role.

This informal meeting is to provide a continuing forum for two-way communication about the draft EIS with a view to improving the overall decision-making process.

You will notice I said "two-way communication." In the first part of the hearing process, the most knowledgeable individuals will brief you on details of the actions and anticipated environmental impacts. The second part of the process will give you an opportunity to provide information and to make statements for the record. Now this input ensures that the decision makers may benefit from your knowledge of the whole area and any adverse environmental effects that you think may result from the proposed action or alternatives.

Also if you have a clarifying question regarding environmental impacts presented either in the draft EIS or during tonight's briefing, if you would during the public comment portion ask the panel members, and they will try to clarify that information for you. If your question is a

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technical one that requires further research and cannot be answered tonight, then the Air Force will ensure your question will be answered in the final EIS.

Tonight's hearing is designed to give you an opportunity to comment. Keep in mind that the EIS is simply intended to ensure that the decision maker will be fully apprised of the environmental impacts associated with the various reuse alternatives before they decide on a course of disposal. As the result comment on issues not related to the environmental impact issues are beyond the scope of the hearing and should not be addressed.

Now, when you came in tonight, most of you, I think, were provided an attendance card, and asked to fill it out. Those of you who didn't get one, we would ask you to fill one out at the break. You are not required to. It would help us to provide us with a record of who is in attendance, and anyone wishing to make comments, there is a block in the bottom portion of the card that my finger kind of pointing to right here (indicating) where you can check that to indicate you would like to make a statement.

After Mr. Smith and Lieutenant Colonel Armstrong have finished their presentations we will have a recess, and that will give us a chance to collect any cards that we have not gotten so far. That will determine if we have any public officials, elected officials that wish to speak. They will be given an opportunity to speak first, and then the public at large will be given an opportunity to speak, and I will do the public at large by a random basis, so it is fair for everyone. I will just shuffle the cards and draw one out and that will be the first speaker and so on. If you did not get a card, you will have an opportunity to fill out a card at the break and turn that in at the registration table that is just outside the council chambers.

Now, if you don't feel like speaking up here tonight and making a statement, you still have until November 1st of this year to submit a copy of your statement for the Air Force's consideration prior to publishing the final EIS. Now, the Air Force will continue to accept comments after November 1st, but it cannot guarantee that late comments will be included in the final EIS.

Now, as you see on the slide, we have the address your comments should be sent to. You may have picked up one of the written comment sheets. I am holding one of those up. If you want to handwrite out comments on this, you can do so. Again, that address is at the bottom of this comment sheet. You can turn in written or typed

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comments, whatever you wish to do. That will be fine. The address is also itself on the very bottom of the back page. It's not in the same kind of block format, but the very last thing on the last page also has the address for Lieutenant Colonel Baumgartel, and that's B-a-u-m-g-a-r-t-e-l, who the comments should be sent to.

Now, also statements received before November 1st will be considered by the Air Force and if the final EIS has not been completed, you can get your comments in. If they come in after November 1st, the Air Force will try to get them in too. The point I would like to make, all comments whether they are oral comments here tonight, written comments you turn in tonight, or whether they are written comments that you send into that address later on; all of those comments will be considered the same. In other words, they all have the same value. They will be given the same consideration. You can speak tonight and later turn in comments. You can turn in comments tonight. You can still send in comments to this address. Don't be shy or hesitant to make a statement. I do want to ensure that all who wish to speak have a fair chance to be heard tonight.

We do have a court reporter here who will take down word for word everything that is said. This verbatim record will become a part of the final EIS. The reporter will be able to make a complete record only if she can hear or understand what you say. With that in mind, I would ask you to follow these rules.

When we get into the public comment portion, I would ask you to only speak after I recognize you and to please address your remarks to me. If you have a written statement, we will have someone to collect that from you. If you have some notes or perhaps already have a typed out statement that you are making your comments from, the court reporter would certainly be most happy if you would be willing to leave your transcript with her so she can use that in making the verbatim record.

Second, if you would please speak clearly and slowly into the microphone. I would ask you to identify yourself, your name, what city you are from and the capacity in which you speak, either if you are a public elected official, if you are a representative of a group, or if you are appearing as a concerned citizen.

Thirdly, each person will be recognized for five minutes. That includes public officials, designated spokespersons and private individuals. I will keep the time. I will raise my hand at the end of five minutes and ask that you go ahead and wrap up within a few sentences

from that standpoint. It does not look like we have a large number of people here tonight. I think there will be a certain latitude. I need to have you wrap it up in five minutes.

Lastly, I ask people not speak when a speaker is speaking. I will only recognize one person to speak at a time. I can't stress enough you may have information about environmental impacts that are unknown to the people that have worked on this draft Environmental Impact Statement, so we are very interested in identifying and analyzing all potential environmental impacts of the proposed action and alternatives. If you know of some environmental impacts, we ask you to raise those. You have experience from living in this area. The second part of today's communication, that part that flows from you to us is very important.

I would ask that you not either drink in this auditorium, and my understanding is that smoking is not allowed in most or any public buildings here in Arizona, and that applies to this building as well.

At this point it is my pleasure to introduce Mr. John Smith, who will describe the Air Force Base disposal process.

Mr. Smith.

MR. JOHN SMITH: Thank you, Colonel Heupel. My name is John Smith, and I work for the Air Force Base Disposal Agency, an office that was created to manage the cleanup and disposal of the Air Force bases closed under the authorities of the two base closure and realignment laws. In discussing the disposal of Williams Air Force Base, I'd like to cover four general topics.

First is disposal planning, second is the objective used by the Air Force to guide its planning, third is disposal considerations the Air Force will use to arrive at a decision, and lastly, the Air Force decision itself, that is, what actions the Air Force will take based on the findings in the EIS and other considerations.

Normally, the general services administration is responsible for disposing of federal property. However, under the 1988 Base Closure and Realignment Act and the Defense Realignment Act of 1990, the secretary of the Air Force has been delegated the authority to act as the disposal agent for the federal government for the Air Force bases being closed. Williams Air Force Base is one of those bases.

In carrying out his authority -- excuse me -- her authority to dispose of closure bases, the secretary of the Air Force will follow the laws and regulations that apply to disposal of federal property. The secretary has also issued additional guidance to the Air Force Base Disposal Agency to address specific disposal situations.

The 1988 and 1990 Acts require the Air Force to consult with the state governor and local government officials when considering plans and proposals for the reuse of closure bases. The Air Force has met this consultation requirement by working closely first with the governor's economic reuse advisory board and its successor, the Williams redevelopment partnership.

The Air Force recognizes the significant economic impact closure will have on the local communities, and it's the Air Force's goal to complete the closures as quickly and efficiently as possible. The federal government and the Air Force are committed to assisting communities in their efforts to replace the departing military activities with viable public and private enterprises. We are currently in the process of developing a comprehensive disposal plan. That plan attempts to balance the needs of the community, the environmental consequences of our disposal decisions, and the needs of the Air Force.

However, Congress has only provided startup capital for the implementation of the realignments and closures. Therefore, any revenue sales, or the revenue from the sales, will be used to offset this initial funding.

The disposal of property from the Air Force focuses on the community EIS, the reuse plan, and the Air Force disposal plan. Normally, it's Air Force policy that we adopt the community reuse plan, if one exists, as the proposed action in the EIS, the local reuse plan being used as the proposed action in the EIS. The Air Force also looks at other reasonable alternatives and other reuse options. The Air Force will prepare an environmental impact statement which is required under the National Environmental Policy Act, otherwise known as NEPA. The EIS process results signing of a record of decision that documents how the Air Force will dispose of the base property. It also specifies what environmental mitigation may be needed to protect human health and the environment as a result of the disposal options selected.

Under the current law, the Air Force must give priority consideration to federal agencies and homeless assistance providers when deciding how to dispose of excess Air Force/Federal property. The Air Force will inform the local community representatives if any federal agency or homeless assistance provider expresses interest in the Williams Air Force Base property.

In general, the Air Force has the following disposal options: Transfer within DOD or transfer to another federal agency; public benefit transfers to states or their political subdivisions, and eligible nonprofit institutions; negotiated sales to public agencies; and public sales. The laws and regulations governing disposal establish guidelines for disposal and provide the secretary of the Air Force with the broad discretion necessary to ensure that all federal property is disposed of in an efficient and effective manner. The secretary of the Air Force will decide on the final disposal plan. These decisions will be documented in the record of decision.

The last subject I'd like to address is the environmental cleanup. The Air Force is committed to cleaning up all areas contaminated by past Air Force activities as a result or -- correction -- as required to protect human health and the environment. Cleanup of many contaminated sites at Williams Air Force Base is already underway.

If contaminated areas are not ready for conveyance at the time the base closes, the federal government will retain ownership until the property is cleaned up. The Air Force may reserve easements, rights-of-entries, or other actions to permit long-term monitoring and treatment. We do not, however, expect cleanup activities to delay the reuse of parcels conveyed.

Thank you for the opportunity to meet with you this evening. Now I would like to turn the meeting back to Colonel Heupel.

COL. JAMES HEUPEL: Thank you, Mr. Smith. Now I present Lieutenant Colonel Terry Armstrong, who will speak on the environmental process.

COL. TERRY ARMSTRONG: Good evening. I'm Lieutenant Colonel Terry Armstrong. I'm the programs coordinator for the environmental planning division at the Air Force center for environmental excellence at

Brooks Air Force Base, Texas. Our organization is conducting the environmental impact analysis process for the disposal and reuse of Williams Air Force Base, as well as for the other major installations mandated to close under the Base Closure and Realignment Acts.

Tonight I will present the schedule for the environmental impact analysis process and show how the public comment period fits into the schedule. I'll also discuss the scope of the study and the relationship between the environmental impact statement and the socioeconomic study. Last, I will present the results of our analysis by resource category.

This environmental effort was initiated in October 1991 with a notice of intent to prepare an environmental impact statement, or what I will refer to as an EIS, for base disposal and reuse.

A scoping meeting was held in the Mesa Convention Center November 7, 1991, to identify the environmental issues relevant to the disposal and reuse of the base. Since then, our office has received additional input from the public, as well as a preferred reuse plan and alternatives from the governor's economic reuse advisory Board. An additional reuse plan was later developed by the Board's successor, the Williams redevelopment partnership.

Because of the potential for an aviation reuse of the base, the federal aviation administration, western pacific region, was invited and subsequently agreed to become a cooperating agency in the preparation of the EIS. The Air Force has worked with the Federal Aviation Administration to include their environmental requirements in the EIS.

After scoping, we collected the necessary data and conducted the environmental analysis. The notice of availability for the draft EIS was published in the Federal Register on September the 17th, 1993. The notice of availability opened the public comment period on the draft EIS.

In addition to tonight's hearing, written comments on the draft EIS will continue to be accepted at this address until November the 1st, 1993. After the comment period is over, we will evaluate all comments, both written and verbal, and perform additional analysis or change the EIS where necessary. Again, as in the scoping process, equal consideration will be given to all

comments, whether they are presented here tonight or mailed prior to November 1st, 1993.

Once the review process is complete, we will produce a final EIS, scheduled for completion in February 1994, and mail it to all those on the original draft EIS distribution list. If you are not on our mailing list, you can request a copy by writing to this address. The final EIS will include comments received during the public review period and our response to those comments.

If appropriate, we will group comments into categories and respond accordingly. Depending on the numbers and diversity of comments or the need to conduct additional analyses, the final EIS may consist of a revised version of the draft EIS, a separate volume as a companion to the draft EIS, or as a cover letter and errata sheets. The final EIS will aid in the development of the record of decision, which will document the disposal action taken by the Air Force. As you just heard from Mr. Smith, other studies and consideration of other issues besides those addressed in the EIS will enter into the final disposal decision. We expect to publish the record of decision in March of 1994.

The draft EIS was prepared to comply with the National Environmental Policy Act and the council on environmental quality regulations. Efforts were made to reduce needless bulk, write in plain language, focus only on those issues that are clearly related to the environment, and to integrate with other documents required as part of the decision-making process. Reuse alternatives that were developed during the scoping process were individually analyzed and assessed.

This analysis focuses on impacts to the natural environment that may occur as a direct result of base and reuse or indirectly through changes in the community. Resources evaluated are geology and soils, water, both service and groundwater, air quality, noise, and biological and cultural resources. Indirect changes to the community that provide measures against which environmental impacts could be analyzed include changes to the local population, land use and aesthetics, transportation, and community utility services. In addition, the following issues related to current and future management of hazardous materials and wastes are discussed in the document: Hazardous materials management, the Air Force's installation restoration program, asbestos, pesticides, polychlorinated biphenyls or PCBs, radon, medical or biohazardous waste management, and photochemical waste management.

If, as a result of our analysis, it was determined that substantial adverse environmental impacts would occur through implementation of a reuse alternative, suggested mitigation measures were identified and included in the document.

As I mentioned earlier, this draft EIS focuses on the impacts to the natural environment that would occur either directly or indirectly from the disposal and reuse of Williams Air Force Base. The document addresses socioeconomic factors where there is a relationship between base disposal and changes to socioeconomic conditions that would result in impacts to the natural environment. Our organization has recently produced a separate socioeconomic study that is not required under the National Environmental Policy Act. It describes in greater detail how disposal and reuse of Williams Air Force Base may economically affect the surrounding areas.

Specifically, the socioeconomic study addresses the following factors for each of the reuse alternatives: Population, employment, housing, public finance, education, government, police and fire, medical, transportation, and utilities. Copies of this document will be provided to federal, state, and local officials and will be available for review at libraries in the area. This document will be forwarded to the decision-maker for input into this disposal process.

Now I would like to present an overview of the proposed action and alternatives that have been analyzed. Afterwards, I will present a synopsis of the results of our analysis by resource category at five and 20-year points in the future.

Please note that the title of each alternative is presented to give the reader only a general idea of the action. Each of the alternatives contains numerous activities that may not be included in the title.

This figure shows the features for the proposed action as provided to us by the governor's economic reuse advisory board. The focus of the proposed action is the reuse of Williams Air Force Base for an expanded airfield with commercial and general aviation operations, as well as operations conducted by the Arizona Air National Guard. To implement this airfield reuse, an additional 25 acres will be acquired off base. Another major component of the base would be reused as a college satellite campus with student housing, including

an aviation education campus. Other land uses would include aviation support and industrial development; retention of the existing golf course and development of landscaped and natural open space; and medical clinic; and ancillary commercial uses.

The airfield uses are shown in orange. Aviation-related land uses are indicated in blue. Industrial land uses are shown in gray, and commercial land uses are shown in red. Land uses proposed for other portions of the base property include recreation areas shown in green, educational areas shown in pink, and medical uses shown in purple.

The focus of the general aviation and education alternative includes a single-runway general aviation airfield, a college satellite campus with student housing, and an aviation education campus. This alternative reduces use of the existing three runways to a single runway, reusing the two existing peripheral runways as taxiways for general aviation uses.

Proposed airfield uses are shown in orange. Aviation support uses are shown in blue, while all industrial uses are shown in gray. The proposed satellite campus with student housing and aviation education campus are shown in pink. Other uses include single family and multiple family residential uses shown in yellow. Open space and recreation uses shown in green, and commercial uses shown in red.

This figure shows the main features of the commercial aviation and education alternative, including and expanded airfield with emphasis on commercial, air cargo, and general aviation operations, as well as military operations conducted by the Arizona Air National Guard. This alternative was proposed by the Williams redevelopment partnership, the successor to the governor's economic reuse advisory board. It includes reuse of two of the existing runways on the base, expansion of the eastern-most runway, and acquisition of additional property off-base to implement airfield uses.

Airfield uses are shown in orange, aviation support uses are shown in blue, industrial uses are shown in gray, and educational areas are shown in pink. Other features of the plan would include retention of the existing golf course and other open space, shown in green, and ancillary commercial uses shown in red.

This figure shows the features of the education and planned community alternative which is a

nonaviation alternative. The main features would include a satellite college campus with student housing and a commercial town center surrounded by single family and multiple family residential uses.

The satellite college campus is shown in pink, town center uses are commercial uses shown in red, and residential uses are shown in yellow. Other uses include a limited area for industrial uses shown in gray. The existing golf course and open space and recreational uses are shown in green.

As required by the National Environmental Policy Act, the no-action alternative also was evaluated. The no-action alternative would result in the Air Force retaining control of the base property after closure with continued operation of the Nexrad Radar Facility and the Willy Vortac navigational aid. The balance of the property would be closed and maintained in a condition to prevent deterioration. Base disposal and personnel would be employed to ensure base security and maintain the grounds and physical assets, including the existing utilities and structures.

I would now like to discuss the results of our analysis that are presented in the draft EIS. The proposed action and all alternatives were analyzed to the same level of detail. The baseline that was used to evaluate impacts was based on conditions representative of Williams Air Force Base at the time of closure, as of September 1993. The following slides show the comparative impacts among the reuse alternatives.

This bar graph shows the increase in employment in the region due solely to reuse activities at the base projected through the year 2013. In addition to the direct jobs generated on-site, a number of indirect or secondary jobs would be created throughout the region. These additional jobs would increase regional earnings, income, and spending. Employment would be phased over the 20-year development period.

Depending on the alternative followed, reuse activities at the base could result in an additional 11,500 to 19,400 direct jobs in the region by the year 2013. Indirect jobs generated by the reuse alternatives by the year 2013 range from 6900 to 27,300. These figures represent two to five percent of the total employment growth in the region in the year 2013.

Redevelopment activities and job growth in the region are also expected to result in some population

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in-migration into the region. The city of Mesa would likely experience the largest increase in population.

This bar graph shows the increase in regional population resulting from reuse activities at the base projected through 2013. Depending on the alternative selected, population increases associated with reuse activities represent one and a half to three and a half percent of the total population growth in the region in the year 2013.

The redevelopment of Williams Air Force Base would affect local and regional transportation networks. Reuse of the base would increase traffic on arterial roads near the base, particularly Power Road, US 89 and US 60.

This bar graph shows the estimated number of average daily trips projected to be generated by the year 2013 per each of the reuse alternatives. For comparison purposes, the average number of daily trips generated by Williams Air Force Base prior to base closure was estimated at about 90,000. By the year 2013, the number of daily trips associated with the reuse would range from approximately 119,000 with the general aviation and education alternative to approximately 190,000 with the education and planned community alternative. The impact of this traffic would be a decline in level of service for some surrounding roads, and increased traffic congestion.

The proposed action, the general aviation and education alternative, and the commercial and all involve an aviation reuse component. The education and planned community alternative and the no-action alternative do not. This graph shows the level of annual air operations projected through the year 2013 for each of the alternatives. For reference, approximately 154,000 air operations occurred at Williams Air Force Base in 1990. By 2013, the number of annual air operations are estimated at 88,000 for the proposed action, about 157,000 for the general aviation and education alternative, and about 281,000 for the commercial aviation and education alternative. The proposed action would include air passenger, military, and general aviation operations. The general aviation and education alternative would limit operations to general aviation aircraft only. The commercial aviation and education alternative would include a mix of air passenger, cargo, military, and general aviation operations.

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Redevelopment of Williams Air Force Base would increase demands on local utility systems, including water, wastewater, solid waste disposal, electricity, and natural gas. While Williams Air Force Base operated its own water and wastewater systems, these services are assumed to be provided by the City of Mesa during reuse.

This table shows the projected utility demand increases for each of the reuse alternatives. As reference, the first column shows the projected utility demand in the year 2013 without reuse of the base. For instance, total water demand is projected to be 91.97 million gallons per day by 2013.

The other four columns show the increases in utility demand associated with each alternative in the year 2013. For example, with the proposed action, total water demand is projected to be 4.19 million gallons per day higher than the demand without the reuse of the base. Increases in demand range from less than two percent for solid waste, electricity, and natural gas, to the two to five percent range for water and wastewater. Except for wastewater treatment, local utility suppliers have sufficient existing or planned capacity to meet these demands. For wastewater treatment, additional capacity would be required by the year 2013, even in the absence of any reuse of Williams Air Force Base.

The Air Force is continuing to conduct investigations to characterize and remediate environmental contamination on Williams Air Force Base that has resulted from past actions. This comprehensive effort is called the installation restoration program, or IRP.

Cleanup activities will be accomplished in accordance with applicable federal and state laws and regulations. Some initial remedial actions are underway and will be completed prior to transfer of the base. Others will continue after the transfer, requiring further work and monitoring. Cleanup and monitoring of certain sites at the base may require long-term access to the site to ensure the success of the remediation efforts.

The Air Force will take all necessary actions for environmental cleanup of the base to protect public health and the environment. Deeds of property transfer will contain this assurance.

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All underground storage tanks at the base will be removed, with the exception of five tanks which are to be left in place to support reuse activities. And asbestos survey was undertaken for the base. Asbestos-containing materials have been removed or are being managed in accordance with Air Force policy. Renovation or demolition of asbestos-containing structures during base reuse will require compliance with applicable federal, state, and local regulations. This is the responsibility of the reuse proponent.

Polychlorinated biphenyl compounds, called PCBs, were once used extensively in electrical equipment. All known PCB-containing and PCB-contaminated equipment has been removed and properly disposed of, with the exception of one PCB transformer that has been converted and remains in service. A number of other electrical equipment items which are not thought to contain PCBs above the regulatory threshold concentration have been sampled for laboratory analysis. Should any be found to contain PCBs above the regulatory threshold, they will be removed.

Two radon surveys, covering all habitable structures on the base and involving over 1000 samples, have been conducted under the radon assessment and mitigation program. The highest level reported was 4.2 picocuries per liter of air. The environmental protection agency recommends mitigation to reduce radon levels and concentrations exceed 20 picocuries per liter in schools or 200 picocuries per liter in residences. As all concentrations were well below these levels, radon is not a problem at Williams Air Force Base.

Potential impacts to soils and geology at Williams Air Force Base under any of the reuse alternatives would be short-term and result primarily from ground disturbance associated with construction activities. Ground disturbance would range from approximately 2,400 acres under the general aviation and education alternative to approximately 2,900 acres under the commercial aviation and education alternative. Approximately 2,600 acres would be disturbed under the proposed action, which includes 25 acres of off-base land that could be disturbed due to airfield expansion. The projected 2,900 acres of disturbance under the commercial aviation and education alternative includes 71 acres of off-base land for airfield expansion. Once construction is complete, most areas will be covered or landscaped, reducing the potential for erosion. Construction would minimally alter soil profiles and would have little effect on the local topography.

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Prior to closure, Williams Air Force Base used 1.28 million gallons from groundwater sources for its potable and non-potable needs. However, the surface water provides most of the water supplied by the City of Mesa; while groundwater accounts for only about 10 percent of the total supply. For our analysis, it was assumed that the City of Mesa would provide water for all of the reuse alternatives, and that the base groundwater wells would be decommissioned. Total water demand in the region is expected to increase for all of the reuse alternatives, however, groundwater demand associated with the reuse activities in the year 2013 is expected to range from 0.19 million gallons per day under the education and planned community alternative to 0.46 million gallons per day under the general aviation and education alternative. Because the City of Mesa relies mainly on surface waters to supply its needs, all reuse alternatives are projected to have a positive, but small, impact on groundwater drawdown as compared to the preclosure condition.

Surface water and surface drainage would also be affected by reuse activities. Construction of new facilities and infrascructure may change surface water runoff patterns and require erosion control during construction. Reuse activities are expected to comply with applicable federal, state, and local regulations to reduce the potential effects on ground surface water quality.

Air pollutant emissions associated with the proposed action and alternatives would increase above baseline closure levels, however, local ambient pollutant concentrations would not exceed the national or state ambient air quality standards. The highest unmitigated pollutant emissions projected in the year 2003 are associated with the commercial aviation and education alternative. Although these emissions would exceed the Williams Air Force Base estimated preclosure emissions levels they are a small fraction, less than 2.5 percent, of the total Phoenix and Maricopa County urban planning area emissions inventory representative of preclosure conditions.

I have here three graphics comparing preclosure and future DNL noise contours associated with proposed aviation activities at the base. DNL is the day-night average sound level expressed in decibels, with a penalty added to account for increased annoyance from noise during the night. 65 decibels is equivalent to normal speech at 3 feet and is the accepted threshold for restrictions on land uses.

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On this graphic, the preclosure 65 decibel DNL noise contour associated with military operations is shown as a solid line. The future noise contour associated with the proposed action for the year 2013 is shown as a dash line.

On this graphic, the preclosure 65 decibel DNL noise contour once again is shown as a solid line. The general aviation and education alternative 65 decibel DNL noise contour for the year 2013 is shown as a dash line.

Finally, this graphic shows the preclosure 65 decibel DNL noise contour as a solid line and the commercial aviation and education alternative 65 decibel DNL noise contour for the year 2013 as a dash line.

Note that in each case the area within the 65 decibel DNL contour for the reuse activity is substantially less than the area affected by preclosure flight activity.

This slide illustrates the approximate acreage exposed to DNL noise levels of 65 decibels or greater from aircraft activity associated with the reuse alternatives. Preclosure military operations at the base exposed a much larger area, about 17,113 acres, to 65 DNL or greater noise levels. Under the no-action and education and planned community alternatives, there would be no aircraft operations and, thus, no aircraft-related noise impacts. You will notice that, for the proposed action, the affected acreage decreases between 1993 and 1998. This is the result of conversion of some aircraft types to quieter engines over time. The same is true of the general aviation and education alternative, which in addition to quieter engines, phases out all military operations after 1993. The increases and are the result of increasing numbers of flight operations over time.

Only the commercial aviation and education alternative would expose existing off-base residential areas to aircraft DNL noise levels of 65 decibels or greater. Under that alternative, approximately 43 people could be exposed to aircraft DNL noise levels between 65 and 70 decibels.

Noise-related impacts from traffic associated with reuse would increase surface level noise along some road segments. Within a radius of about three miles, for all the reuse alternatives, approximately 100 people would be exposed to traffic noise levels of 65 decibels or greater by the year 2013.

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Biological resources at Williams Air Force Base include native and introduced plants and animals, threatened and endangered species, and sensitive or critical habitats. While some of the construction or development associated with reuse would occur in previously disturbed areas with low sensitivity, all of the alternatives except the no-action alternative could potentially affect some areas of the base containing native vegetation.

The loss of scrub-shrub and riparian/mesic vegetation could reduce habitat for wildlife adapted to desert life and desert water sources. Up to 50 acres of riparian/mesic areas, some of which may contain wetlands, could be disturbed by construction or development associated with reuse. The disturbance of landscaped and mowed or maintained vegetation in the developed areas of the base could result in the temporary loss of habitat for wildlife and could affect local wildlife populations but would not affect regional wildlife populations. Suitable habitat for several threatened or endangered species is present on Williams Air Force Base. However, only the loggerhead shrike -- a bird which is a candidate for the threatened or endangered status -- is known to actually occur on the base. The loss of native scrub-shrub and riparian/mesic areas could reduce occurrences of the loggerhead shrike on the base.

Consultation with the Arizona state historic preservation officer concerning cultural resources at Williams Air Force Base is ongoing. One archaeological site on the base -- the Midvale site -- is currently listed on the national register of historic places. A recently completed survey has identified 11 additional sites whose eligibility for the national register has not yet been determined. These are the subject of an ongoing Air Force study. The Air Force is also consulting with affected Native American tribal groups and communities concerning the presence of traditional resources associated with archaeological sites or other features at Williams Air Force Base. Finally, 14 historic structures on the base which predate 1945 have been found eligible, and the Air Force will nominate them for inclusion on the National Register of Historic Places.

In closing, I remind you that the study is in the draft stage. Our goal is to provide Air Force decision-makers with accurate information on the environmental consequences of its actions. To do this, we are soliciting your comments on the draft EIS. This information will support informed Air Force decision making.

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COL. JAMES HEUPEL: Thank you, Colonel Armstrong.

We are going to take a recess in just a moment. Since there were several people that came in after we started, let me just cover a couple of important points. If you want to make comments tonight or to ask clarifying questions, we would ask you to indicate that on the registration card that you may have filled out. And if you haven't filled out a registration card, even if you don't want to make comments, we'd still ask you to fill it out. And you can -- for those of you that want to make comments, this is particularly important -- just fill them out at the registration table outside the council chambers. And when we come back in, we will start up.

If we have any public elected officials, they will be allowed to speak first. And then I'll take comments or clarifying questions from the public at large on a random basis, and everyone will have approximately five minutes each to speak. If you don't want to speak tonight, you can make written comments, and you can send that to the address that's listed on the bottom of this sheet or on the back page of the brochure describing tonight's summary -- hearing. Let's take about a 10-minute recess at this time and come back about five minutes after 8:00.

(A recess ensued.)

COL. HEUPEL: At this time, I have one speaker, and I would ask that speaker to come up to the podium and that speaker would be Lee Paulis.

MR. PAULIS: That is okay. I am just listening.

COL. HEUPEL: Well, I don't have any speakers then with written comments. Let me ask, do I have anybody who has not turned in a card that would like to make a statement however brief or that has any questions based upon what was presented that wish to ask a question?

Sir, if you would come on down to the podium and indicate your name and what city you are from.

MAYOR BROWN: My name is Wilburn and that's W-i-l-b-u-r-n Brown. I am the mayor of Gilbert. I had not really anticipated speaking, because I thought I would listen to hear what others were asking. I had an opportunity to be updated on what happened. I am a member

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of the IGA and have frequent meetings with regard to the base.

In the absence of others to speak, I really don't have questions, but would like to express appreciation for your bringing this opportunity to this community so our citizens would have the opportunity to hear and understand what is happening as far as the program at the base is concerned, and that they do have the opportunity to ask questions and get a response.

I would like to say that I have been especially pleased with the way this whole project has come together so far. From our prospective, it is a very big project for the Town of Gilbert to be involved in. We feel it is a very big part of the future of what the town will be, and we are especially pleased that there has been such a good coordination and cooperation between the Air Force and the other government agencies in the area that are working together to make this project come together. We are just especially pleased that things have gone as well as they have.

As a matter of fact, when people ask me what kind of problems are you experiencing there, I say, really by comparison what we might have anticipated, almost none. There are, of course, those tough issues to work through on a daily basis, but as we continue to work to solve those things, they just continue to be solved, and so we are very pleased at the way things are going at the present time.

I would be happy to respond to any questions if anyone had any they would like to ask.

COL. HEUPEL: Thank you, Mayor Brown. Does anybody else have any comments they would like to make? Apparently not.

Mayor Brown, I would like to take this opportunity to thank you as well as the Gilbert Town Council for the use of your chambers. I am quite honestly quite happy to see a mayor here. I have done a number of these hearings for the Air Force. We have a trial judge conduct these hearings. I have done a number of them. I must say this is the first hearing I have done in over a year that we have had a mayor in attendance, let alone spoken. I do appreciate your comments.

Let me point out as most of you have heard me in my earlier portion, if you do decide that you have some comments that you would like to make, we have given you those addresses on the bottom of the briefing sheet that are

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on the written comment sheet or that is on the slide. You can send in any comments that you might have and again if you in talking with people about what is going on, if you happen to come to knowledge of any kind of environmental problems that have not been identified otherwise, please write to Colonel Baumgartel and point that out, so that the Air Force can try to make sure that all environmental issues have been analyzed and have been covered.

If there is nothing else from anyone, we thank you for your attendance and your interest and this hearing is adjourned.

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I, MARCELLA PETERS, do hereby certify that the proceedings had upon the hearing of the foregoing cause are contained fully and accurately in the shorthand record made by me thereof, and that such shorthand was reduced to writing under my direction and the foregoing typewritten pages of said transcript contain a full, true and correct transcript of my shorthand notes taken by me as aforesaid, all to the best of my skill and ability.

DATED this the 14th day of October , 1993, at Chandler, Arizona.

MARCELLA PETERS
Certified Court Reporter

DOCUMENT 2

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
ARIZONA REAL ESTATE OFFICE
3636 NORTH CENTRAL AVENUE, SUITE 770
PHOENIX, ARIZONA 85012-1936

REPLY TO ATTENTION OF

CESPL-RE-AR-K 20 October 1993

MEMORANDUM FOR Gary P. Baumgartel, Lt. Col, USAF, Chief, Environmental Planning Division, Environmental Services, 8106 Chennault Road, DEPARTMENT OF THE AIR FORCE, Brooks AFB, Texas 78235-5318

SUBJECT: Comments on the Disposal and Reuse of Williams Air Force Base, Arizona; Socioeconomic Impact Analysis Study, September 1993

1. Herein are our comments, per your request for comments on or before 15 November 1993, regarding the Disposal and Reuse of Williams Air Force Base, AZ,

1 2. Please insert the following text as the last paragraph under section 1.4.5 Other Land Use Concepts, at page 1-17:

U.S. Department of the Interior, Bureau of Land Management.

Two Public Land Order withdrawals for the Department of the Air Force must be relinquished. The servicing real estate office for the Air Force is the U.S. Army Corps of Engineers, Phoenix Real Estate Office, who will prepare relinquishment documents and submit them to the Bureau of Land Management. This is expected to be 4.1 completed on or before 31 December 1994. The two land withdrawals were made pursuant to section 204 of the Federal Land Policy and Management Act of 1976, 43 U.S.C. § 1714, and are listed below:

Public Land Order No. 776, dated 29 December 1951, Rittenhouse Auxiliary Field, Arizona (Pinal County), 480 acres (+/-).

Public Land Order No. 6551, dated 23 July 1984, Existing Runways or in Operational Clear Zones of WAFB, Arizona (Maricopa County), 160 acres (+/-).

DOCUMENT 2

3. If you have any questions, please call Rosemari Knoki at (602) (602) 640-5376.

ROSEMARI KNOKI
Acting Chief
Arizona Real Estate Office

CF:
Allan P. Babbitt, Deputy for Hazardous Materials and Waste, Deputy Assistant Secretary of the Air Force (Environment, Safety and Occupational Health), DEPARTMENT OF THE AIR FORCE, Washington, D.C.

Susie Leatherwood, Chief, Real Estate Branch, Programs Division, Directorate of Civil Engineering, 73 Main Circle, Randolph AFB TX 78150-4549

Jim Anderson, U.S. Department of the Interior, BLM, Phoenix District Office, 2015 Q. Deer Valley, Phoenix, AZ 85027

John Mezes, U.S. Department of the Interior, BLM, Arizona State Office, 3707 N. 7th St., Phoenix, AZ 85014

CESPL-RE (Dave Taylor)

DOCUMENT 3

Lt. Col. Gary Bawmgartel Chief.
Inv. Planning Div.
AFCEE/ESE
8106 Chennault Rd.
Brooks AFB, Texas 78235-5318

Re. Reuse of Williams Air Force Base.

Sir,
I'm writing to you to communicate my feelings and viewpoints regarding the use of Williams Air Force Base located South of Mesa, Ariz.
When the base was used for the training of our armed forces for the security of our country there was no opposition to it's use and accepting by the nearby residents. Now however with the closure of the base and the reuse of the airport as a regional airport doesn't sit well with many of the residents in the south corridor of the city, even though the city officials and the governor would like to get the airport for their use.

8.1 1 I feel that the there are four airports in the metro Phoenix area and I'm concerned that there would be too much air traffic in the community. I'm also concerned that if the need arises in the future for the need of a
2 training facility because of a possible conflict or full out WAR that the facilities will not be there and we would have to build a new one at taxpayers expense and that the time element would not be there which would put our National Defense in grave jeopardy. I believe that some of the closed bases should be kept in
3.1 mothballs by the government as a back up just as the ships are kept in mothball to be refitted if needed.

I relise that the facility would not be used if not turned over to the city, but they it would be there if needed by our Armed Forces.

13.1 3 There is also a selfish motive. I moved to this area because there was no commercial airport in the area to cause air pollution noise and air traffic as well as no AUTO traffic to congest the streets and arteries of
4 the community. There are a number of retirement communities in this area where seniors have moved to
17.1 enrich their quality of life with the clean air and quite neighborhood I believe that if this facility were to be used as a regional airport the value of the homes would be deminished and that the neighborhood would deteriorate.

I have lived near other airports in the past like O'Hare in Chicago and Stapleton in Denver also by Lowery Air Base in denver and I know what the consequences will be through my past experiences

14.1 5 I'm aware that the new planes have government controls to make them more quite but the glide paths and the pollution would still be there and also some noise. We would have to build new roads and access roads
17.2 6 which would add to our taxed which are to high now for the retired community.

It appears to me that this Airport would NOT be in the best interest of this community or to the U.S. AIR FORCE, if the need arises

Thank You for your valuable time in reading my letter.

DOCUMENT 3

MICHAEL J. DE SIMONE
MARY ANN R. DE SIMONE
8120 E. Mcnetto Ave
Mesa, Arizona 85208

DOCUMENT 4

October 28, 1993

Lt. Col. Gary Baumgartel
Chief of Environmental Planning Division
AFCEE/ESE
8106 Chennault Road
Brooks Air Force Base, Texas 78235-5318

RE: TEMPE NEIGHBORHOOD PROTECTION COALITION'S COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT SEPTEMBER 1993 - DISPOSAL AND REUSE OF WILLIAMS AIR FORCE BASE, ARIZONA

Dear Lt. Baumgartel:

The Tempe Neighborhood Protection Coalition, a coalition representing neighborhood and homeowner associations in the City of Tempe, hereby provides the following comments to the Draft Environmental Impact Statement for September 1993, regarding the Disposal and Reuse of Williams Air Force Base, Arizona.

The Williams Reuse Draft Environmental Impact Statement (DEIS) is inadequate in the following respects:

3.2 1 a. It is based upon incorrect assumptions regarding the type and mix of aircraft which would be used under the proposed action and the commercial and educational alternative;

8.2 2 b. It makes incorrect and unwarranted assumptions with regard to the air space conflicts which would occur if the proposed action and commercial and educational alternative plan is implemented;

8.3 3 c. It fails to address the cumulative impact on Tempe and other East Valley citizens of operating both Williams and Sky Harbor as commercial airports, both from a safety and noise perspective;

14.2 4 d. It ignores Sky Harbor Airport's long-standing history of failing to cooperate with neighboring communities to reduce noise impact of it's operations;

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8.8 5 e. It fails to address all possible mitigation measures which could be taken;

14.3 6 f. It makes incorrect assumptions regarding adverse impact levels for noise;

1.1 7 g. The notification procedures for public comment was inadequate and resulted in the failure to provide a full and complete opportunity for public comment.

8 A. The Draft Environmental Impact Statement (DEIS) makes evaluations on the potential noise and air pollution impact of Williams under the proposed and alternative actions based upon assumptions regarding the type and mix of aircraft which will be used, as well as the number of flights which will be incoming and outgoing from Williams. These assumptions are unreasonably
3.2 optimistic, not warranted by existing technology and incorrectly assume that an unrestricted third runway will be built at Sky Harbor International Airport. Therefore, the DEIS fails to address potential impacts on human health and the environment based upon existing and likely aircraft technology and fleet mixes Further, it fails to account for the possibility of increased over flights if Sky Harbor does not build a third runway.

9 The DEIS makes the same faulty assumptions regarding aircraft type and mix, as well as technological improvements and changes in fleet mix by commercial carriers which characterize the City of Phoenix's DEIS on the Sky
3.2 Harbor expansion. The City of Tempe provided numerous comments showing why those assumptions are incorrect or, at least, unreliable for the purposes of making the evaluations required in an environmental impact statement. Those comments are incorporated fully herein and demonstrate why it is unreasonable to assume that commercial air carriers will be upgrading fleets to levels assumed
10 in the Williams DEIS. Further, the study ignores the fact that the so called "quieter" aircraft do not, in fact, operate any quieter than current aircraft, but
14.7 merely change the frequency pitch from the higher to the lower frequencies. These lower frequencies will cause significant adverse impact upon structures, including historical and archaeological sites in the area of Williams. The potential impact of these aircraft have not been adequately addressed.

11 Additionally, the DEIS underestimates the number of over flights
8.1 which are likely to occur, under either the proposed action or the commercial and educational alternative, especially if Phoenix is not successful in building the third runway. It is not at all certain that the City of Phoenix will be entitled to complete a third runway due to the tremendous adverse impact that a third runway would have on the environment and human health, all of which is documented in the numerous comments to the Sky Harbor DEIS. Neighborhood

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Groups and Coalitions in the vicinity of the airport and the likely flight paths have organized to bring legal challenges to any attempt by the City of Phoenix to construct the third runway, as proposed. Additionally, the City of Tempe is also prepared to pursue legal challenges to the proposed third runway. Therefore, the assumption that a third runway will be built within the time frame proposed by
12 the City of Phoenix is probably incorrect. The DEIS for Williams should take into
8.4 account the possibility that a third runway will either not be built, or will be significantly delayed.

Even if the City of Phoenix is successful in building the third runway, it will likely be forced to operate under severe restrictions for flights arriving from and departing to the east. These restrictions affect both night and day time operations. These limitations would likely limit Sky Harbor's capacity
13 well below that considered in the Williams DEIS. The Williams DEIS should therefore consider the possibility that Sky Harbor's capacity will be significantly
8.4 less than that currently projected and address the possible impacts on the number of flights into and out of Williams either under the proposed usage or commercial and educational alternative.

14 B. The Williams DEIS makes incorrect and unwarranted assumptions regarding the flight paths and air space conflicts which would likely occur if Sky Harbor is operated with the third runway. Figures 4.2-9 through 4.2-
8.2 14 and 4.4-6 through 4.4-11 of the Williams' DEIS reportedly sets forth the flight paths which would be utilized to safely operate both Sky Harbor and Williams as commercial airports. Those alleged flight paths do not represent the true flight paths which would likely be utilized.

For instance, all Williams DEIS Diagrams show flights approaching from the southwest coming in over the Stellar Air Park, turning north either just before Chandler Municipal Airport or Williams Air Force Base to the Salt River and then following a western flight path directly in line with the runways. In reality, the planes approaching from the southwest fly much farther north, as set forth in attached diagram B1, (not to scale). Therefore, most flights coming from the southwest either to Williams or Sky Harbor will travel in a corridor between Stellar Air Park and Phoenix Sky Harbor. Further, the planes turning west to Sky Harbor do not traditionally follow the river bed. Studies have shown that up to 60% of the planes entering or leaving Sky Harbor deviate from the flight path along the river bottom, flying over populated residential neighborhoods. There is every reason to assume that, as the number of travelers entering the Phoenix Metropolitan area via aircraft increases, the pressure to get planes on and off the ground more quickly, both at Sky Harbor and Williams, will cause even more
15 deviations from the proposed flight paths. Therefore, the true flight paths which
8.2 will be used will more likely be those set forth in Diagrams B1 and B2. The potential impact upon human health and the environment of deviations from the proposed flight path is not considered in the Williams DEIS. Those impacts

15 need to be re-evaluated from a noise, air pollution and safety perspective using the flight paths identified in Diagrams B1 and B2.

16 C. The DEIS fails to address the cumulative impact of all of the full blown operations at Sky Harbor and Williams, either under the proposed action or the commercial and educational alternative. As the two airports will
8.3 necessarily be required to operate in conjunction with each other to achieve the purported goal of meeting the State of Arizona's air transportation needs into the twenty-first century, the EIS for each facility should address the cumulative impact of operations at the other. Neither the Sky Harbor or Williams DEIS does this. As such, crucial issues such as the cumulative impact of noise on the communities under the likely flight paths, the cumulative impacts of delays and conflicts in air space upon the quality of air in the Phoenix Metropolitan area (an EPA non-attainment zone for air pollution) and potential threats to the safety of both passengers and individuals on the ground are not adequately addressed. As set forth previously, the assumptions regarding where planes will be flying do not comport with the reality of how Sky Harbor is operated today. As pressures increase, it is likely that flight paths into both airports will be altered, bringing more and more flights over residential areas. This will result in a crowding of the air space over the City of Tempe and it's surrounding communities. This not only will substantially increase the noise levels which affects those communities, but also greatly increases the possibility of mid-air collisions for both commercial
17 and general aviation aircraft. Conversely, assuming that, by some miracle,
8.5 proposed flight paths are maintained, then the DEIS fails to adequately address the potential adverse environmental effects which will be caused by the inevitable delays which will occur in the operations of both facilities.

D. In making the evaluations regarding the combined cumulative effects of operating Williams in conjunction with Sky Harbor, the DEIS fails to take into account the City of Phoenix's long-standing history of failing to abide by agreements reached with regard to flight paths and air space restrictions. As mentioned previously, some studies show that up to 60% of the aircraft departing toward or arriving from the east deviate from the flight paths
18 shown in Figures 4.2-10 through 4.2-14. The DEIS fails to consider the impact which would occur if the City of Phoenix follows it's previous history and refuses
8.6 to enforce restrictions on where planes may operate. Obviously, such unilaterally approved deviations from proposed flight paths could create air space conflicts with regard to commercial and general aviation aircraft using the Williams facility, as well as the other general aviation facilities in the area.

19 An EIS is required to evaluate all potential impacts on human health and the environment from a proposed action and all reasonable
8.7 alternatives. Changes in flight patterns unilaterally imposed by the City of Phoenix to benefit the Sky Harbor operations should be considered a very real possibility and, therefore, the impact of these potential changes should be

19 investigated. Conversely, if the flight patterns proposed in the DEIS are rigid, inflexible and enforceable, this should also be stated in the DEIS.

20 E. The DEIS for Williams fails to address all possible mitigation measures. The first possible mitigation measure which is ignored is the use of
8.8 mandatory flight paths which are enforceable through both administrative and civil actions. The failure to include such restrictions in the DEIS is a tacit admission that the projected flight paths used to evaluate potential impacts are nothing more than pure speculation and, therefore, inadequate for the task at hand.

21 The DEIS also fails to consider a Regional Airport as an alternative to either the proposed action or the commercial and educational alternative. The Governor's Regional Airport Advisory Committee Report, a FAA funded
3.3 document, strongly suggests a Regional Airport will be necessary to relieve traffic congestion and delays for the state's future aviation needs. Because that alternative has been identified, the Williams' DEIS should have investigated this possibility as an alternative to the proposed action.

22 Finally, the DEIS fails to consider possible noise mitigation
14.4 procedures for the residential areas between Sky Harbor and Williams, including the possibility of a commercial and military aircraft "no fly" zone over those communities. Diagrams B3 and B4 (attached) set forth a possible scenario in which aircraft approaching Sky Harbor and/or Williams from the south and west would be required to maintain a flight path south and east of Williams, while aircraft approaching from the north and east intending to use the north runway at Sky Harbor or Williams would be required to maintain an approach pattern north of Sky Harbor and east of Mesa Falcon Field Airport. The take off patterns would be essentially identical, only reversed. Despite the feasibility of such an option, the DEIS does not discuss that possibility. As that is a viable possibility for mitigation of the adverse impacts of the combined operations of Sky Harbor and Williams, that should be addressed in the EIS, along with the question of enforcement of any proposed flight paths.

23 F. In the analysis regarding possible noise impacts upon the residential communities, the DEIS relies exclusively on the 65 DNL noise contour standards to project where there would be adverse noise impacts,
14.3 incorrectly assuming that there are no adverse impacts from noise at levels below 65 decibels. Adverse impacts upon residential communities can occur well below the 65 decibel level identified in the DEIS and these should be investigated, particularly in light of the fact that there is no way to accurately predict at what time or how often residents will be subjected to aircraft noise.

24 Further, although the 65 decibel level is used as a measuring point, no mitigation effects are set forth because the DEIS assumes that there

24 will be no adverse impacts. This directly contradicts the Table 4.4-16 which shows sound exposure levels (SEL's) for schools, hospitals, religious institutions and residents in the vicinity. Table 4.4-16 demonstrates that there will be
14.5 repeated exposure to noise levels well above the 65 decibel limit to these facilities, as well as to the residents within their immediate vicinity. Nevertheless, the DEIS fails to set forth any proposals to regulate or limit this impact.

25 G. The Air Force apparently failed to provide adequate notice and information to the public as required by applicable law. It failed to obtain adequate public comments to its proposals by restricting the number of public hearings on the proposed usages to one. Further, it appears that during the one
1.1 meeting which did occur, key information, such as the identified SEL levels, was withheld from the public, thereby preventing adequate public comment on that issue. Cumulatively, the failure to provide adequate public notice of the comment periods, failure to hold sufficient meetings to allow additional input and failure to provide all relevant information has resulted in artificial limits on public comments which should have been obtained under the law.

These comments have been submitted on behalf of the Tempe Neighborhood Protection Coalition, by and through their attorney Jeff Bouma. Any and all responses, public notifications or additional publications related to the Williams disposal and reuse EIS should be sent to Mr. Jeff Bouma, c/o Weyl, Guyer, MacBan & Olson, P. O. Box 47250, Phoenix, Arizona 85068-7250.

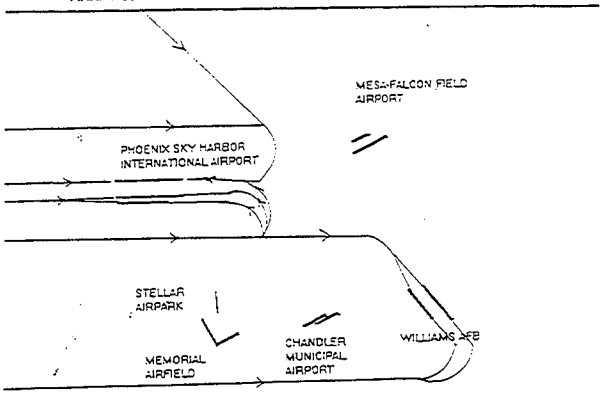
Sincerely,

Jeff Bouma
Attorney for Tempe Neighborhood
Protection Coalition

JJB:ncm

DOCUMENT 4

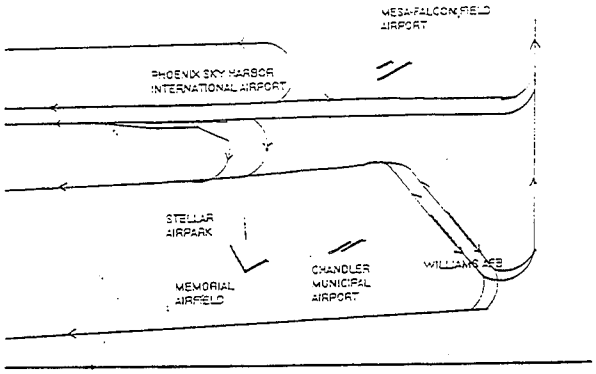
ARRIVALS FROM SOUTH AND WEST - SKY HARBOR AND WILLIAMS



B-1 NOT TO SCALE N

DOCUMENT 4

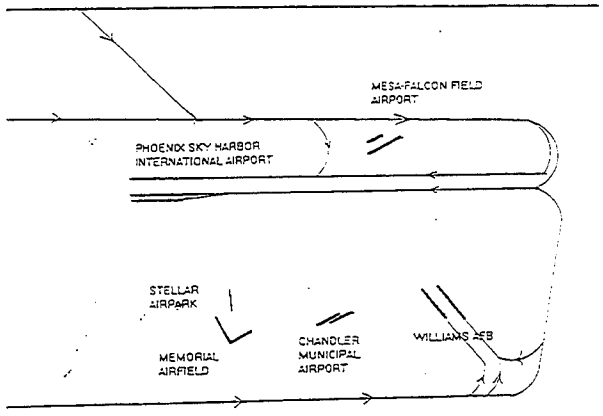
DEPARTURES - SKY HARBOR AND WILLIAMS



B-2 NOT TO SCALE N

DOCUMENT 4

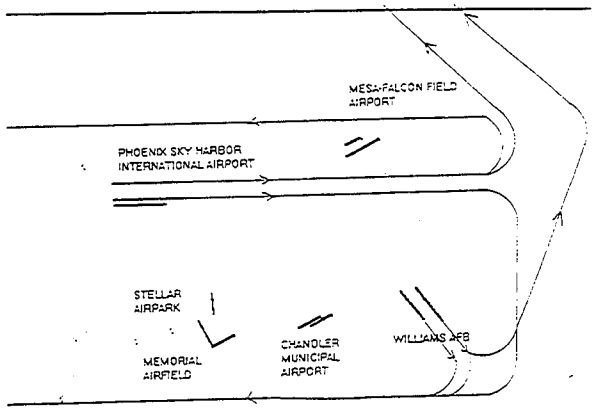
ARRIVALS - COMMERCIAL AND MILITARY " NO-FLY ZONE " OPTION



B-3 NOT TO SCALE N

DOCUMENT 4

DEPARTURES - COMMERCIAL AND MILITARY " NO-FLY ZONE " OPTION



B-4 NOT TO SCALE N

DOCUMENT 5

October 27, 1993

Lt. Col. Gary Baumgartel
Chief of Environmental Planning Division
AFCEE/ESE
8106 Chennault Road
Brooks Air Force Base, Texas 78235-5318

Dear Lt. Col. Baumgartel:

This letter contains the City of Tempe's comments on the draft Environmental Impact Statement (EIS) for the disposal and reuse of Williams Air Force Base.

Harry E. Mitchell
Neil G. Giuliano
Dennis J.
Don Cassano
Joseph Lewis
Frank B. Pioncher
Carol E. Smith

14.3

1 The EIS relies exclusively on the 65 DNL noise contour standard to predict where there would be adverse noise impacts. Noise impacts on single family residential areas, however, will extend beyond the 65 DNL contour.

2 Interestingly, the EIS does document Sound Exposure Levels (SEL) for schools, hospitals, religious institutions and residences (Table 4.4-16). The EIS states that "it is estimated that between 0 and 35 percent of the population in the areas near the receptor locations might be disturbed during nighttime sleep by a single event aircraft". The EIS however discounts this impact by stating no mitigative measures "would be required since none of these are within the DNL 65 dB contour". (pg 4-156)

14.5

3 The EIS does not include the SEL data in the Summary of Environmental Impacts and the Summary simply states "No residential areas would be exposed to DNL of 65 dB or higher from aircraft noise". (pg. S-22). Yet the SEL data (Table 4.4-16) shows Sunland Village, a retirement community, exposed to noise levels ranging from 61 dB to 77 dB for commercial and military aircraft. While the frequency of noise events are not great enough to place this area in the 65 DNL contour, residents would be impacted.

70 dB is equivalent to a vacuum cleaner at 10 feet or a gas lawn mower at 100 feet. 80 dB is equivalent to a garbage disposal at 3 feet. Clearly a retirement community will be impacted by these aircraft noise events.

DOCUMENT 5

Although the frequency of events is not great enough to qualify this area for inclusion in the 65 DNL contour,

4 the overflight of this area will be significant. In the year 2013, it is predicted that the Proposed Action will generate 88,250 flights from Williams. Although it is

14.5 unclear from the published EIS data how many of these flights would fly over an area like Sunland Village, there potentially could be tens of thousands of flights annually.

Likewise, the SNL data shows an elementary school, Greenfield Elementary School, being exposed to noise levels up to 81 dB; a church, Baseline Bible Church, being exposed to noise levels up to 86 dB; and a housing complex, North Desert Village Housing, being exposed to noise levels up to 91 dB.

5 These impacts are adverse in nature and should be documented as such in the EIS. Once again, while the

14.5 frequency of flights does not qualify these areas as being in the 65 DNL contour, they could be overflown tens of thousands of times per year.

6 Because of the nature of aircraft operations, these

14.5 operations would not be spaced at equal intervals during a 24 hour period. There would be peak times when operations would be continuous, thus making the frequency problem more bothersome.

7 Also, it is unclear whether through the EIS process there was due diligence in notifying the impacted communities listed in Table 4.4-16. As noted above, the SEL data was not referred to in the summary. There appears to have been only one public hearing on the draft EIS although many communities could be impacted. At the one public hearing, it does not appear that the SEL data

1.1 was presented. A meeting scheduled for elected officials to brief them on the EIS was cancelled and not rescheduled.

Because of this lack of notification to potentially impacted communities and institutions, the EIS process does not appear to have fulfilled its obligation to notify potentially impacted communities.

8 The impact of commercial aviation on educational uses at Williams also appears to be understated in the EIS.

14.6 The Proposed Action Alternative section of the EIS does not analyze the impact of aircraft noise on the proposed educational uses. Even though educational uses are part of the Proposed Action no analysis is done of the impact of a commercial aviation airport adjacent to a university in this section(Section 4.4.4.1).

DOCUMENT 5

8 The Commercial Aviation and Education Alternative section does analyze the impact of a commercial aviation airport adjacent to an educational use (Section 4.4.4.3).

The EIS states that "limited areas" of proposed educational uses would be within the 65 DNL contour and that noise impacts could be mitigated "to a non-adverse level by incorporating appropriate noise mitigation measures in facility construction". (4.4.4.3)

Educational facilities in close proximity to a commercial airport will be impacted even though they may or may not be within the 65 DNL contour.

9 Although classroom impacts can be mitigated through proper facility construction, it will be impossible to mitigate the impact on those parts of the campus that are not inside a facility.

14.6 Part of a college experience occurs outside of the classroom and enjoyment of the part of the campus that is outdoors will be impacted by aircraft noise. In this respect, campus open spaces and outdoor recreational areas are park-like in nature. The impact of aircraft noise on campus open spaces needs to be evaluated differently than the impact of aircraft noise on a closed facility.

10 SEL's were presented in the noise impact section of the

14.6 Commercial Aviation and Education Alternative (Section 4.4.4.3 and Table 4.4-20), although the EIS does not address how these SEL readings may impact the educational component.

Three SEL noise receptor sites are located on Williams Air Force Base and would be in close proximity to or at the same location as proposed educational facilities. These three sites are the Base Educational Complex, the Base Hospital and North Desert Village Housing. SEL's at these locations range from 68 dB to 101 dB.

11 Noise levels of this magnitude would have an impact on

14.6 the educational component. The EIS does not give the public or potentially impacted institutions a clear picture of aviation's noise impact on proposed educational facilities.

12 The EIS also does not address the potential impact that

8.5 flight procedures at Williams Air Force Base may have on noise abatement/flight procedures at Sky Harbor Airport. Commercial aircraft using Williams will at certain times have to "tunnel" under aircraft using Sky Harbor and/or suffer flight delays because of these interactions.

DOCUMENT 5

12 The tunneling procedure or flight delay could be eliminated by altering the existing Sky Harbor flight procedure or the proposed Williams flight procedure.

13 An EIS is supposed to evaluate the environmental impact

8.5 of all reasonable alternatives. As changes in flight patterns could be considered in order to avoid flight delays or tunneling, the impact of this potentiality should be investigated.

8.7 14 If a change in flight patterns is not going to be considered, this should be stated in the EIS.

15 The EIS investigated five Alternatives. None of the

3.4 Alternatives investigated the impacts of placing education activities at Williams and commercial aviation activities at another airport.

16 The Governor's Regional Aviation Advisory Committee

3.4 report, which is also an FAA-funded document, states that there is an alternative area to Williams in which a commercial airport can be located. Since this alternative has been identified, the Williams EIS should investigate a scenario where commercial aviation capacity is increased but not at the Williams site.

Sincerely,

Randy Gross
Assistant to the Mayor

DOCUMENT 6

Williams REDEVELOPMENT PARTNERSHIP
AND THE INTERGOVERNMENTAL AGREEMENT GROUP

October 28, 1993

Lt. Col. Gary Baumgartel
Chief of Environmental Planning Division
AFCEE/ESE
8106 Chennault Road
Brooks AFB, Texas 78235-5318

Dear Lt. Col. Baumgartel:

This letter is in response to the request for comments on the Draft Environmental Impact Statement (DEIS) for the disposal and reuse of Williams AFB, Arizona. The IGA Group submits the following comments for Air Force consideration in the final EIS.

1 1. Throughout the document, the proposed action is based upon the recommended action in the Williams AFB Economic Reuse Plan (August 1992). However, the alternative that the Williams Redevelopment Partnership is implementing is the Commercial Aviation and Education Alternative described in the DEIS. This leads to confusion for the reader because the document does not clearly point out the alternative being pursued. Consider making the Commercial Aviation and Education Alternative the Proposed Action. Otherwise, the document should clearly reflect the planned implementation of the Commercial Aviation and Education Alternative by the Williams Redevelopment Partnership based on the Airport Master Plan.

3.5

2 2. Section 3.4.5.4 (Sensitive Habitats) discusses the possible impacts on wetlands at Williams AFB. On page 3-144, the text notes that several areas on base may qualify as man-induced wetlands. Specifically, text on page 3-146 states that the sewage treatment ponds appear to qualify as man-induced wetlands. However, the Army Corps of Engineers performed a survey at Williams AFB in 1991, and they determined that the ponds and other areas they surveyed on base do not qualify as wetlands. (See attached letter.) I request you incorporate their findings in the DEIS with regard to the existence of wetlands at the base.

15.1

I appreciate your consideration of these comments in the issuance of the final EIS for Williams AFB. If you have any questions, please contact me at (602)988-1013.

Sincerely,

Lynn F. Kusy
Executive Director

LKL
Attch

An Association of public agencies dedicated to the successful reuse of Williams Air Force Base
6001 South Power Road, Building 314, Mesa, Arizona 85206-0903 • (602) 988-1013 • Fax (602) 988-2315

DOCUMENT 6

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
P.O. BOX 2711
LOS ANGELES, CALIFORNIA 90053-2325

Office of the Chief
Regulatory Branch

Department of the Air Force
ATTN: Steve Galloway
Headquarters 82nd Flying Training Wing (ATC)
Williams Air Force Base, Arizona 85240

File Number: 91-433-RF

Gentlemen:

Reference is made to your letter of June 13, 1991 in which you requested that a wetland survey be performed in attempt to identify the existence of wetlands on Williams Air Force Base, Maricopa County, Arizona.

A site visit to the potential wetland areas, identified by Mr. Steve Galloway, was performed by representatives of the Soil Conservation Service and the U.S. Army Corps of Engineers. Mr. Galloway escorted the party to the golf course ponds, various drainage areas and sewage treatment ponds located on the installation. These areas were visually inspected and soil samples extracted. Based on the inspections and sampling, these areas are not considered as jurisdictional wetlands by the Corps of Engineers.

The receipt of your letter is appreciated. If you have any questions please contact Ron Fowler of my staff at (602) 640-5385.

Sincerely,

Diane K. Noda
for Acting Chief, Northern Section

U.S. Army Corps of Engineers
LOS ANGELES DISTRICT
Ron W. Fowler
Enforcement & Compliance
Regulatory Branch

ARIZONA AREA OFFICE
3636 N. CENTRAL, SUITE 750
PHOENIX, ARIZONA 85012-1936 (602) 640-5385

DOCUMENT 7

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Affairs
600 Harrison Street, Suite 515
San Francisco, California 94107-1376

ER 93/745

October 28, 1993

Lt. Gary Baumgartel
Chief of Environmental Planning Division, AFCEE/ESE
8106 Chennault Road
Brooks Air Force Base, Texas 78235-5318

Dear Lt. Baumgartel:

The Department of the Interior (Department) has reviewed the Draft Environmental Impact Statement (DEIS) on the Disposal and Reuse of Williams Air Force Base in Arizona and offers the following comments.

GENERAL COMMENTS

The Department finds this document adequately addresses the impacts of the proposed action on the biological resources.

1 However, we are concerned over the loss of 3,365 acres of scrub-shrub and riparian/mesic vegetation, plus an additional 25 acres off-base.

15.2

SPECIFIC COMMENTS

2 Table 3.4-11, page 3-142. In addition to the threatened and endangered species which may occur in the project area, as listed in Table 3.4-11 and referenced in the Fish and Wildlife Service's (Service) March 24, 1992 letter (Appendix L, Agency Letters and Certifications), please add the following species:

15.3

Endangered
Peregrine falcon (Falco peregrinus anatum)
Bald eagle (Haliaeetus leucocephalus)

Category 2
Desert tortoise, Mohave population (Gopherus agassizii)
Ferruginous hawk (Buteo regalis)
Spotted bat (Euderma maculatum)

3 Page 4-176. There is a concern about the statement made in the last paragraph on this page which states, "Habitats suitable for the lesser-nosed (sic) [lesser long-nosed] bat (a federal endangered species) and the California leaf-nosed bat, Yavapai Arizona pocket mouse, and chuckwalla (three federal candidates, Category 2 species) would be adversely impacted by the demolition of buildings and land clearing activities." Details are not included in the DEIS on the field investigations which lead to

15.4

DOCUMENT 7

3 the conclusion that, even though these species may be impacted, they were not identified in the project area. Regulations require formal consultation with the Service if a project may affect a threatened or endangered species. Consultation should continue with the Service on reuse programs.

4 Page 4-177. The first full paragraph discusses the loss of suitable habitat for the loggerhead shrike. While candidate species are not protected under the Endangered Species Act, they are protected under the Migratory Bird Treaty Act. The Service would appreciate your consideration of them during the development of the reuse programs. It may be possible to mitigate the loss of scrub-shrub and riparian/mesic vegetation which is used by many species of wildlife, including migratory birds.

15.5

SUMMARY COMMENTS

The Department requests that the Service be kept informed on the land-use planning and reuse mitigation measures. Please contact the Field Supervisor, Arizona Ecological Services Field Office, at 3616 West Thomas Road, Suite 6, Phoenix, Arizona 85019, telephone (602) 379-4720. In future communications on this project with the Service, please refer to consultation number 2-21-92-I-333.

Thank you for the opportunity to provide comments on this draft environmental impact statement.

Sincerely,

Patricia Sanderson Port
Regional Environmental Officer
San Francisco

cc:
Director, OEA, with original incoming
Regional Director, Fish and Wildlife Service, Albuquerque, NM

DOCUMENT 8

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

November 1, 1993

Lt. Colonel Gary Baumgartel
Chief of Environmental Planning Division
AFCEE/ESE
8106 Chennault Road
Brooks AFB, TX. 78235-5318

Dear Colonel Baumgartel:

The Environmental Protection Agency (EPA) has reviewed the Draft Environmental Impact Statement (DEIS) for the project entitled Disposal and Reuse of Williams Air Force Base, Mesa, Arizona. Our review is pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508), and Section 309 of the Clean Air Act.

The proposed disposal and reuse of Williams Air Force Base (Williams AFB) is in accordance with the legislative requirements of the Defense Base Closure and Realignment Act of 1990, Public Law 101-510 (BRAC). Located southeast of Phoenix, AZ, Williams AFB was closed September 30, 1993. The Air Force has based its Proposed Action on the Williams AFB Economic Reuse Advisory Board (established by the State of Arizona) reuse plan, which is a comprehensive reuse plan based on a combined general aviation/commercial airport and a satellite university campus. The proposal includes a general aviation/commercial service airfield and aviation support facilities, expansion of the airfield by 25 acres, satellite university campus, aviation college, research facilities, commercial uses to serve the airport and education components, industrial uses, public/recreation open space, and retention of the golf course.

Reuse alternatives evaluated include a General Aviation and Education Alternative, Commercial Aviation and Education Alternative (a counter proposal by the Williams Redevelopment Partnership representing 5 surrounding local governments), Education and Planned Community Alternative, other individual discrete land use concepts (e.g., Federal Detention Center on a portion of the base), and the No-Action Alternative.

EPA believes the decisions that the Air Force will make concerning hazardous waste cleanup activities could have a direct influence on the nature of the future use of the property.

DOCUMENT 8

Therefore, it is critical that the redevelopment community, as well as the community concerned with the remediation activities, be provided with adequate information on the impending interaction of these two programs. We note that the DEIS has designated the Landfill (LF-04) as "Public/Recreation" for many of the reuse alternatives. However, it is our understanding that the Air Force intends to restrict public access to this contaminated site by installing a final cover and fence as part of the remedial actions under the Installation Restoration Program (IRP). 1 We strongly recommend the Air Force take the Landfill out of consideration for public or recreational use due to the Air Force proposed plan to address the surface contamination. Furthermore, 6.3 we believe the FEIS should clearly state the probable final land use that will be permitted for other major IRP sites. We believe it is crucial that future landowners fully understand potential restrictions and legal constraints on potential future use.

2 Furthermore, to assure a smooth and expedited transition between closure and reuse, we suggest the Air Force develop a guidance and policy document on interim use and disposal (prior to interim use actions) which contains advanced identification of property for specific types of interim use and reuse, disposal 1.2 protocols (e.g., who has reuse priority), specific hazardous waste cleanup/management coordination requirements (e.g, when coordination is necessary and point-of-contact telephone numbers) and land use compatibility requirements.

3 EPA believes deed encumbrances, restrictive covenants, reservations, and cooperative agreements should be used to 1.3 promote protection and appropriate use of notable resources such as riparian, native desert, and threatened and endangered species habitats and significant cultural resources. 4 We also believe development of reuse alternatives provides an excellent opportunity for pollution prevention, energy conservation, and waste minimization. These are needs which should not be disjoined from the physical, economic, and 1.4 political nature of the disposal and reuse action. We urge the Air Force to take a leadership role in promoting pollution prevention and the protection and appropriate use of sensitive resources.

Based upon our review of the DEIS, we have classified this document as category EC-2, Environmental Concerns - Insufficient Information (see attached "Summary of the EPA Rating System"). Our rating reflects our concern with the interaction of the reuse and IRP programs, cumulative impact analysis, air quality impacts, and maintenance of biodiversity. Our detailed comments are enclosed.

Due to the evolving nature of the reuse proposals, we urge tiered environmental documentation of final specific disposal actions to ensure public review and full disclosure pursuant to NEPA.

DOCUMENT 8

We appreciate the opportunity to review this DEIS. Please send three copies of the FEIS to this office at the same time it is officially filed with our Washington D.C. Office. If you have any questions, please call me at (415) 744-1574, or Laura Fujii, of my staff, at (415) 744-1579.

Sincerely,

David J. Farrel, Chief
Environmental Review Section
Office of Federal Activities

Enclosure: (6 pages)

93-372
AZ0001913
Filename: Williams.dei

cc: Mr. Terry Yonkers, HQ AFEDA/BDV, Washington, D.C.
Mr. J.B. Cole, Director AFCEE, Brooks AFB, Texas
Base Commander, Williams AFB
Mr. Phil Lamm, AFRCE, San Francisco, CA.
FAA, Los Angeles, CA.
USFWS, Region 2, albuquerque, NM
Maricopa County Air Quality Planning & Analysis Section
Williams AFB Economic Reuse Advisory Board
Williams Redevelopment Partnership

DOCUMENT 8

COMMENTS

Hazardous and Toxic Waste Site Remediation (Superfund)

Williams AFB is listed on the Superfund National Priorities List (NPL) which is EPA's list of contaminated sites potentially posing the greatest long-term threat to public health and the environment. This listing is based on actual and potential releases of hazardous materials into the environment. Under Superfund law [Section 120(h)(3) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); better known as the Superfund program], the Air Force has a statutory requirement to take all necessary remedial action to protect public health and the environment before the transfer of base property. If the land transfer is by deed, the Air Force must provide an agreement, prior to transfer, that guarantees that all necessary remedial action has been taken.

5 We recommend the FEIS include a short description of the interaction between interim use and hazardous waste cleanup actions. Describe the level of remediation and cleanup required 1.5 prior to interim use, the process for preventing incompatible land uses in the vicinity of remediation actions, and the process for minimizing interference with the investigation and cleanup of the base (e.g., traffic congestion, security, access).

6 The FEIS should be updated to reflect the most current Operable Unit (OU) definitions and Site Status (according to the Remedial Investigation/Feasibility Study (RI/FS)) under the IRP. Revisions should include the following:

1. Section 3.3.3.3, page 3-76 to 77. The text should be updated to indicate that Site FT-02 is being addressed in OU-3 under a removal action. Under the Engineering Evaluation/Cost Analysis (EE/CA), concrete/piping and surface debris will be removed and Soils will be remediated using Bioventing with soil 10.1 Vapor Extraction as a contingency.

2. Section 3.3.3.4, Landfill, page 3-77. Update the Section to indicate that the Air Force's preferred remedy in the IRP feasibility study phase is a Soil Cover, with institutional controls.

3. Section 3.3.3.2 and Section 3.3.3.7; Sites FT-03 and SD-10; pages 3-72 to 79. These Sections should be updated to indicate that additional confirmatory sampling was recently conducted under the IRP for Sites FT-03 and SD-10. To the extent possible, the results and conclusions of the sampling should be incorporated into the FEIS.

DOCUMENT 8

6 4. Table 3.3.3., page 3-73. Revise the Table to reflect the most recent OU definitions. For example, Site FT-02 is now being addressed under OU-3.

5. Section 3.3.3.10, Site DP-13, page 3-81. The text should be
10.1 updated to indicate that this site is being recommended for no further action in the IRP feasibility study phase.

6. Section 3.3.4, Storage Tanks, page 3-83. The Air Force should indicate that several underground storage tanks (USTs) are being addressed under OU-1, and that oil/water separators and sumps are being investigated as part of agreements under the IRP.

7 7. Figure 3.4-6, Sensitive Habitats, page 3-145. Ecological features that have been identified under the IRP program (Preliminary Draft Basewide Ecological Risk Assessment) should be incorporated into the text and Figure 3.4-6. For example, a
15.6 significant breeding population of burrowing owls have been observed along the southern portion of the fence line. EPA and Air Force personnel have conducted ecological surveys of the Base under the IRP. For more information, contact Roxy Barnett (EPA toxicologist) at (415) 744-2308.

8 The DEIS discussion concerning the effects of the proposed action on biological resources is confusing and should be revised. For instance, Section 4.4.5.1 states that most of the
15.7 natural vegetation and terrestrial wildlife habitat in the eastern, northern, and southern parts of the base would be lost whereas page S-26 states that the "Effects of the Proposed Action on...Biological Resources.. would be minimal."

Cumulative Impact Analysis

9 Although the DEIS indicates that the surrounding rural areas could receive pressure to urbanize as a result of the proposed reuse alternatives (pg. 4-10), there is no evaluation of
5.1 potential secondary or cumulative impacts from induced growth. The FEIS should fully disclose and evaluate these potential indirect and cumulative impacts as required by the NEPA.

Indirect impacts are defined as those which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. These effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems. Cumulative impacts include impacts on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency

DOCUMENT 8

or person undertakes such other actions [40 CFR Sections 1508.7 and 1508.8(b)].

Air Quality

Conformity to Air Quality Plans

10 The DEIS does not fully address conformity to air quality
13.2 plans. Federal agencies are required by the Clean Air Act (CAA) to assure that actions conform to an approved implementation plan (Section 176(c) Clean Air Act). Conformity to an implementation plan means:

"conformity to an implementation plan's purpose of eliminating or reducing the severity and number of violations of the National Ambient Air Quality Standards (NAAQS) and achieving expeditious attainment of such standards; and

that such activities will not (i) cause or contribute to any new violation of any standard in any area; (ii) increase the frequency or severity of any existing violation of any standard in any area; or (iii) delay timely attainment of any standards or any required interim emission reductions or other milestones in any area." (Clean Air Act, Section 176(c)).

On March 15, 1993, EPA published a Proposed General Conformity Rule (Federal Register, Volume 58, pgs. 13836-13868). EPA plans to publish the final Rule in November 1993. We refer you to the final rule, when published, to facilitate your conformity determination.

10 We understand that the Air Force will conduct a conformity analysis and make a conformity determination prior to disposal of
13.2 the base property (page 4-127). The Clean Air Act requires the Air Force to make a finding of conformity, prior to approval of, or otherwise enabling any reuse of, this facility.

11 We encourage the Air Force to closely coordinate with the appropriate air pollution control agencies (e.g., Maricopa County
1.6 Air Quality Planning & Analysis Section) to reconcile potential air quality impacts of anticipated uses of Williams AFB with the State's obligations to submit attainment plans and with conformity requirements applicable to Federal actions.

Mitigation

Williams AFB is located in a nonattainment area for carbon monoxide (CO), ozone and fine particulates (PM10). Although a

DOCUMENT 8

small fraction of the overall regional emissions inventory (pg. 4-127), all reuse alternatives, except no-action, would increase emission rates above preclosure conditions and could potentially interfere with attainment and maintenance of the federal air
12 quality standards (pg. S-12). Therefore, we encourage a commitment to mitigate (e.g., establish public transportation and transportation demand management) for potential air quality impacts in advance of project initiation. We recommend that mitigation be expressed as commitments in the FEIS and Record of
1.7 Decision and included in the property conveyance.

Mitigation plans should: demonstrate that effectiveness estimates for mitigation are reasonable; describe the schedule, funding, and responsibilities for the measures; demonstrate enforceability; and show that projected emissions will fully conform.

Natural Resources

Section 404 of the Clean Water Act

13 The FEIS should include a formal delineation of Section 404 jurisdictional waters, if any. Provide a determination whether construction would occur in project areas which qualify as jurisdictional waters. Any discharge of fill or dredged material
15.8 into waters of the United States would require authorization by the U.S. Army Corps of Engineers and must comply with the Federal Guidelines for Specification of Disposal Sites for Dredged or Fill Materials (40 CFR 230) [referred to as the Guidelines], promulgated pursuant to Section 404(b)(1) of the Clean Water Act (CWA).

14 Furthermore, the FEIS should demonstrate that the project does not jeopardize any federally-listed threatened or endangered species, and that the project would not cause or contribute to
15.9 significant degradation of the aquatic ecosystem. The DEIS states that mitigation of biological resources is determined through coordination and permitting actions with appropriate agencies (pg. S-23). While often true, reliance on future coordination and permitting to assure protection of biological resources should not be presumed since there are many actions which may not activate regulatory consultation.

Mitigation

15 The DEIS states that the project area contains waters of the
15.10 United States, but fails to describe how many acres will be affected by each alternative. Moreover, the FEIS should provide a mitigation plan to offset unavoidable impacts to waters of the United States and to compensate for the acreage and values lost.

DOCUMENT 8

15 The plan should include specific mitigation goals, site characteristics, site preparation, species composition, planting density, success criteria, implementation schedule, maintenance and monitoring plan, and a remediation plan should the mitigation plan fail to meet established goals.

Threatened and Endangered Species

Although a number of federal and state threatened, endangered, or special concern species are known to be present in the vicinity of Williams AFB, the Air Force states that no further consultation with the US Fish and Wildlife Service (USFWS), other than the present literature search and on-base biological survey, is required on the part of the Air Force (pg. 3-141). Additional consultation is deferred to proponents of
16 future ground-disturbing activities. Because of the complexity of future reuse jurisdictions, EPA encourages the Air Force to consider coordination and development of an installation-wide habitat management plan (HMP). Section 7 endangered species coordination with the USFWS on a installation-wide basis may also be more reasonable from an ecological and workload perspective. An installation-wide HMP would help provide management and mitigation strategies to ensure longevity of sensitive species
15.11 while allowing base disposal and reuse. We encourage the use of agreements, mitigation and covenants on land transfers to protect existing and potential habitat for sensitive species and to ensure implementation of the HMP (if developed) by nonfederal agencies and private individuals. Possible mitigation measures for wildlife habitat losses could include development of water sources for wildlife and preservation of nearby vacant scrub-shrub or riparian/mesic habitat.

Conservation, Pollution Prevention, Waste Minimization, and Recycling

17 EPA believes the Air Force has the opportunity to assure that beneficial environmental conditions are maintained in a positive manner regardless of the future use of the property by
1.4 ensuring that appropriate conditions are placed on the property conveyance. We urge the Air Force to use this mechanism to incorporate specific recommendations offered in our review of the DEIS and to promote conservation, pollution prevention, waste minimization, recycling and preservation of biodiversity.

18 As part of the purpose and need for this action, we recommend the Air Force consider including a brief discussion on
1.8 the opportunities for implementing the above principles. For example, we suggest the FEIS discuss the Green Lights Program and other measures which would lessen energy usage for reuse alternatives and construction.

DOCUMENT 8

19 | 1.9 EPA also views base transfers as an opportunity to encourage implementation of "waste" recycling and minimization programs. These programs and the principles of minimization and recycling should be seriously considered when determining the advantages/disadvantages between alternatives which propose complete demolition of existing facilities and those which propose reuse of these facilities. For instance, the FEIS should explore the possibility of structuring an incentive program into the actual land conveyance process which would evaluate proposed uses on the basis of the project's level of pollution prevention, waste minimization, conservation, etc. Furthermore, we recommend the FEIS discuss recycling options for the demolition and construction materials which could result from base closure and reuse.

General Comments

20 | 1.10 1. We recommend the Air Force carefully consider the tradeoffs between potential environmental impacts and socioeconomic benefits of each proposed reuse alternative. For instance, although the Commercial Aviation alternative may provide a slightly higher gain in employment, it could cause greater airspace conflicts and air quality and noise impacts than the Proposed Action.

21 | 4.2 2. The DEIS states that Congress authorized the Air Force to transfer portions of Williams AFB to the State of Arizona in exchange for specific properties and mineral rights held by the State (pg. 1-2). The FEIS should describe actions which may occur as a result of this authorization.

22 | 17.3 3. The FEIS should include information regarding the use of Williams AFB facilities by military retirees and their dependants. An evaluation of potential impacts to these constituents would be included in the FEIS or Socioeconomic Evaluation.

DOCUMENT 9

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
ARIZONA REAL ESTATE OFFICE
3636 NORTH CENTRAL AVENUE, SUITE 770
PHOENIX, ARIZONA 85012-1936

REPLY TO ATTENTION OF

CESPL-RE-AR 5 November 1993

MEMORANDUM FOR Gary P. Baumgartel, Lt. Col., USAF, Chief, Environmental Planning Division, Environmental Services, 8106 Chennault Road, DEPARTMENT OF THE AIR FORCE, Brooks AFB, Texas 78235-5318

SUBJECT: Additional Comments on the Disposal and Reuse of Williams Air Force Base, Arizona; Socioeconomic Impact Analysis Study, September 1993

1. Per your request for comments, please add the following to Section 2.4.5 "Other Land Use Concepts":

1 | 6.1 a. Building #410 has been identified by the U.S. Army Reserves as suitable space for relocation of units in the Phoenix area. This would result in an annual rental savings of 1/2 million dollars in rent and enable them to get out of the present unsatisfactory facility at East High School.

2 | 6.2 b. The Recruiting Commands and the Military Entrance Processing Service have identified Building #4 as a suitable replacement for their present office space at Monroe School. The annual rental savings would be 3/4 million dollars a year.

3 | 4.2 c. PL 102-484 authorizes exchanging land at Williams AFB for State owned lands at Goldwater Aerial Gunnery Range (81,121 acres), Yuma Test Station (7,563 acres), Fort Huachuca East Range (2,537 acres), Davis-Monthan AFB (133 acres), and Arizona National Memorial Cemetery (5 acres). By our current estimates the Aviation Support area in the reuse plan is approximately of equal value to the aforementioned Arizona State owned lands needed by the Federal Government. The exchange should be consummated prior to any disposal and reuse action to ensure the Federal Government's needs and requirements are provided for in this process. Annual rentals on these State owned lands are approximately 1/2 million dollars.

2. If you have any questions, please call me at (602)640-2016.

FOR THE COMMANDER:

STEPHEN C. BLACKBURN
Chief, Arizona Real Estate Office

DOCUMENT 9

CESPL-RE-AR
SUBJECT: Additional Comments on the Disposal and Reuse of Williams Air Force Base, Arizona; Socioeconomic Impact Analysis Study, September 1993

CF:
Allan P. Babbitt, Deputy for Hazardous Materials and Waste, Deputy Assistant Secretary of the Air Force (Environment, Safety and Occupational Health), DEPARTMENT OF THE AIR FORCE, Washington, DC

Susie Leatherwood, Chief, Real Estate Branch, Programs Division, Directorate of Civil Engineering, 73 Main Circle, Randolph AFB, TX 78150-4549

Lt Col Johnson, Cdr, 63rd ARCOM, ATTN: AFRC-ACA-EN, Armed Forces Reserve Center, Los Alamitos, CA 90720-5001

Mr. Ron Liveris, Accession Policy Directorate, OASD - (P and R), (MMPP) AP, Office of Secretary of Defense, Room 2B271, 4000, Defense Pentagon, Washington, D.C. 20301-4000

Cdr, U.S. Military Entrance Processing Command, ATTN: Mr. Barron J. Tilton, Director, Facilities, 2500 Green Bay Road, North Chicago, IL 60064 3094

US Army Corps of Engineers, Los Angeles District, ATTN: CESPL-RE (Dave Taylor), P.O. Box 2711, Los Angeles, CA 90053-2325

DOCUMENT 10

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Arizona State Office
3707 N. 7th Street
P.O. Box 16563
Phoenix, Arizona 85011

IN REPLY REFER TO
1600 (931)

November 10, 1993

Lieutenant Colonel Gary Baumgartel
AFCEE-ESE
8106 Chennault Road
Brooks Air Force Base, TX 78235-5318

Dear Lieutenant Colonel Baumgartel:

Re: Draft Environmental Impact Statement, Disposal and Reuse of Williams Air Force Base, Arizona

We have the following comments to make regarding the Draft Environmental Impact Statement. The first two relate to the General Aviation alternatives, and the third, to any of the action alternatives.

1 | 8.9 1. Five Wilderness areas lie within a 50-mile radius, including White Canyon, about 35 miles southeast of Williams AFB and Sierra Estrella about 30 miles west. Wilderness characteristics could be compromised if civilian aircraft flight paths frequently pass over these areas. Federal Aviation Authority regulations provide for a 2,000 foot aerial threshold over wilderness areas.

2 | 8.10 2. Maricopa County-Bureau of Land Management jointly managed San Tan Regional Park lies 6 miles south of Williams AFB. Frequent flights over this area may impact park recreational values.

3 | 4.1 3. Public land totaling 160 acres is located in T. 1 S., R. 7 E., sec. 33, SE 1/4. It is currently withdrawn, PLO 6551 (expires 7-22-2004). This land will require some type of disposal action and should be addressed in your plan.

4 | 16.1 4. Williams Air Force Base area contains highly significant prehistoric Hohokam sites, which will need to be evaluated for future projects. We would appreciate being furnished results of any studies conducted on the 160 acres referenced above.

Thank you for the opportunity to comment on this document.

Sincerely,

for Herman Kast
Deputy State Director
Lands and Renewable Resources

DOCUMENT 11

ARIZONA STATE PARKS

1300 W. WASHINGTON
PHOENIX, ARIZONA 85007
TELEPHONE 602-542-4174

FIFE SYMINGTON
GOVERNOR

STATE PARKS BOARD MEMBERS
JILLIE A. GENTRY
CHAIR
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SECRETARY
PENNY HOWE
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WILLIAM G. ROE
TUCSON
ROBERT A. FRONT
SCOTTSDALE
DEAN M. FLAKE
SHOW LOW
M. JEAN HASSELL
STATE LAND COMMISSIONER

KENNETH E. TRAVOUS
EXECUTIVE DIRECTOR
CHARLES R. EATHERLY
DEPUTY DIRECTOR

November 18, 1993

Joe L. Martin
Installation Manager
Department of the Air Force
Headquarters Air Force Base Disposal Agency
AFBDA/OL-S
6001 South Power Road, Building 1
Mesa, Arizona 85206-0901

RE: Williams AFB Closure. Draft Environmental Impact Statement (EIS). DOD-AF

Dear Mr. Martin:

Thank you for sending me a copy of the draft EIS that the agency has prepared for the above undertaking. I have reviewed those portions of the draft EIS that apply to cultural resources and have the following comments:

Generally speaking, I believe that the Air Force and its consultants have done an excellent job in preparing this document. It is thorough and contains viable alternatives with an adequate discussion of the consequences of each alternative. However, I would like to offer the following comments that might be useful to enhance the final EIS.

1 The draft EIS makes repeated reference to consultation with Native Americans in accordance with the American Indian Religious Freedom Act (AIRFA), and in only one instance that I noticed (page 3-150), referred to such consultation as also being in accordance with the Native American Graves Protection and Repatriation Act (NAGPRA). In my opinion, since it is possible that prehistoric human remains may be impacted by reuse options, NAGPRA should be cited more often in the EIS. I also believe that the EIS should state that Section 106 consultations under the National Historic Preservation Act (NHPA) require consultations with appropriate Native Americans, including seeking their opinions about the potential for traditional cultural properties (TCPs) within the area of potential effect. Thus, given the nature of the federal undertaking, AIRFA consultation is perhaps the least important compared to impacts or actions that might arise out of NAGPRA and the NHPA.

16.2

2 The draft EIS implies that impacts to archaeological sites can be reduced to a "non-adverse level" (page 4-189) if protective deed restrictions are in place and the EIS also implies that archaeological sites are only of value for their information potential. While such may be the case under regulations (36 CFR 800.9), the Advisory Council on Historic Preservation has issued a policy statement (1988) that states, in essence, that if archaeological sites contain human remains, those remains have value beyond their information content and undertakings that impact human remains have to result in a determination of adverse effect. Since more than one of the archaeological sites at Williams AFB probably contain human remains, and these could be impacted by future reuse activities, I believe that it is best to view such impacts as having an adverse effect.

16.3

DOCUMENT 11

3 The draft EIS also consistently refers to HABS standard documentation. As you know, at least two structures at Williams AFB were determined to be eligible for the National Register. If these structures will be demolished or altered, HAER documentation will be needed. I recommend that reference to HABS documentation be changed to HABS/HAER documentation.

16.4

4 The draft EIS states at a Memorandum of Agreement (MOA) will be needed between the Air Force and the SHPO. Since non-federal entities (the reuse group) will have major decision making responsibilities in the future and because all of the consequences of the undertaking are currently unknown, I believe that a Programmatic Agreement (PA) is more appropriate than a MOA. The PA will be between the Air Force, SHPO and the Advisory Council; it will have to include concurring signatures of each reuse group indicating that they have made a legal commitment to the terms of the PA.

16.5

Again, thank you for the opportunity to review this document. I hope the above comments will be helpful. I look forward to continuing our consultations on this complex undertaking and appreciate your good cooperation with our office. If you have any questions, please contact me at (602) 542-7137 or 542-4009.

Sincerely,

Robert E. Gasser
Compliance Coordinator
State Historic Preservation Office

DOCUMENT 12

D. E. Sagramoso, P.E.
Director

DEPARTMENT OF TRANSPORTATION

November 17, 1993

Lt. Col. Gary Baumgartel, Chief
Environmental Planning Division
Air Force Center for Environmental Excellence
3106 Chennault Road
Brooks Air Force Base, Texas 78235-5318

Dear Lt. Col. Baumgartel:

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS) - DISPOSAL AND REUSE OF WILLIAMS AIR FORCE BASE (WAFB), ARIZONA

Maricopa County Department of Transportation (MCDOT) appreciates the opportunity to review and comment on the WAFB DEIS. As a provider of transportation service to the installation, MCDOT is vitally interested in the future planning of this facility and its ultimate reuse.

The comments of the Transportation Planning Division are organized in two areas: (A) alternatives and infrastructure issues and (B) technical matters (modeling assumptions, projections, data inquiries). We hope the comments are timely and assist the Air Force Center for Environmental Excellence in completion of the final EIS.

(A) Alternatives/Infrastructure

1 The MCDOT supports the reuse plan as a general aviation/commercial airport and education facility. The County was an active partner in planning for the reuse configurations and MCDOT would expect the "document of decision" to reflect interim and final configurations of roadways and runways contained in the Draft Final Master Plan for WAFB, prepared by Coffman Associates, Inc., August, 1993. We believe the Master Plan variation on the proposed action, contained in the DEIS, would have lower costs, reduce the timeframes to reuse the facility and reduce adjacent impacts to Ellsworth Road.

7.1

DOCUMENT 12

1 MCDOT does not believe the above noted comments should affect the disposal and reuse decision of the DEIS process; but rather represents a refinement that can be fully evaluated in subsequent tiered or project specific environmental assessments or EISs.

2 Ellsworth Road is identified as needing to be depressed in the vicinity of extended runway 12L/30R to accommodate the runway protection zone. Ellsworth Road historically has had drainage problems, a depressed roadway will create a large sump and require pumps to keep the road passable. This would be a costly feature to the city of Mesa and/or Maricopa County. (We understand that the Master Plan does not call for this feature.)

7.2

3 The Proposed Action-Airport Plan (Figure 2.2-2) shows Sossaman Road as a future through route with Year 2013 projections of 27,420 Average Daily Traffic (ADT) (Table 1-7). The road, as shown in the Draft EIS, is not conducive as a through route handling the projected traffic. The route appears better suited as an internal circulation roadway.

7.3

4 Chapter 4.2.3 on Transportation does not address traffic volumes on Sossaman Road. Figure 4.2-7 does not list Sossaman, yet the mapping indicates an extension through the base.

7.4

5 Table 3.4-2 shows the current Air Quality classification for Maricopa County. Before the end of the year, the Environmental Protection Agency could designate the Maricopa County PM-10 Non-attainment Area as serious, then the entire County would be classified as non-attainment. This potential serious designation should be noted in the EIS. However, MCDOT is not suggesting a re-analysis of the air quality modeling is necessary. The importance of operational mitigation measures, as noted on page 4-126, should be a critical development component of the reuse planning. Implementation of trip reduction and best available control measure requirements should be anticipated.

13.3

DOCUMENT 12

(8) TECHNICAL MATTERS

6.4 6 | Chapter 3.2.1 on Community Setting does not note the strip annexation by the City of Mesa to the north.

6.5 7 | Chapter 3.2.2.1 on Land Use should note the East Mesa and Queen Creek Area Land Use Plans (for Maricopa County) that were originally adopted in 1988 and revised in 1992. Additionally, the Queen Creek Plan is not currently undergoing revision.

6.6 8 | Figure 3.2-4 does not show the special use zoning for the adjacent General Motors Proving Ground.

7.5 9 | Figure 3.2-11 does not note AM or PM for the peak hour traffic volume in the legend.

Please contact me at (602) 506-1874, or my staff at (602) 506-4606 if you have any questions regarding our comments.

Sincerely,

Thomas R Buick

Thomas A. Buick, P.E., Chief
Transportation Planning Division

CC: D. E. Sagramoso, P.E., Transportation Director

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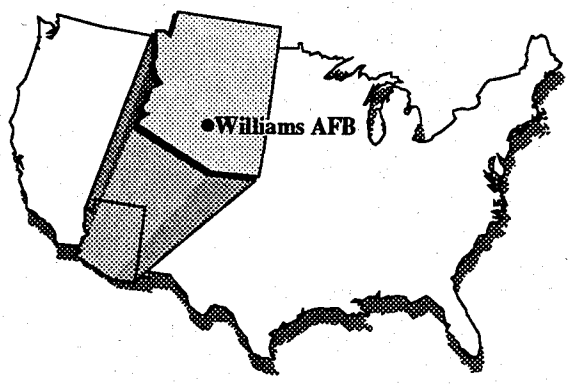
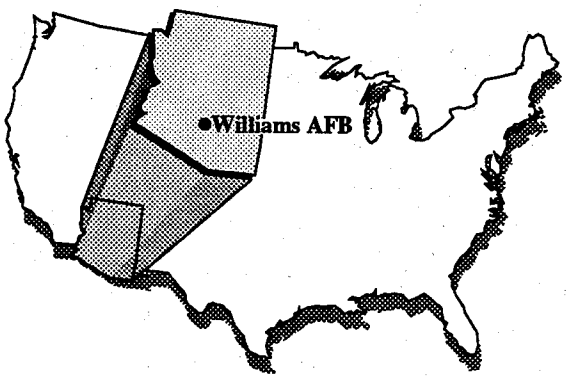


APPENDICES



APPENDIX A

APPENDIX A

GLOSSARY OF TERMS AND ACRONYMS/ABBREVIATIONS

GLOSSARY OF TERMS

A-Weighted Sound Level (dBA). A number representing the sound level which is frequency weighted according to a prescribed frequency response established by the American National Standards Institute (ANSI S1.4-1971) and accounts for the response of the human ear.

Advisory Council on Historic Preservation. A 19-member body appointed, in part, by the President of the United States to advise the President and Congress and to coordinate the actions of federal agencies on matters relating to historic preservation, to comment on the effects of such actions on historic and archaeological cultural resources, and to perform other duties as required by law (Public Law 89-655; 16 USC 470).

Aesthetics. Referring to the perception of beauty.

Aggregate. Materials such as sand, gravel, or crushed stone used for mixing with a cementing material to form concrete or alone as railroad ballast or graded fill.

Air Route Traffic Control Center (ARTCC). A facility which provides ATC services to aircraft operating on IFR flight plans within controlled airspace and principally during the enroute phase of flight.

Aircraft Operation. A takeoff or landing at an airport.

Airport Radar Service Area (ARSA). Regulatory airspace surrounding designated airports wherein air traffic control provides vectoring and sequencing on a full-time basis for all IFR and VFR aircraft.

Airport Traffic Area. Airspace within a radius of 5 statute miles of an airport with an operating control tower, encompassing altitudes between the surface and 3,000 feet AGL, in which an aircraft cannot operate without prior authorization from the control tower.

Alluvium. Clay, silt, sand, gravel, or similar material deposited by running water.

Ambient Air Quality Standards. Standards established on a state or federal level that define the limits for airborne concentrations of designated "criteria" pollutants (nitrogen dioxide, sulfur dioxide, carbon monoxide, total suspended particulates, ozone, and lead) to protect public health with an adequate margin of safety (primary standards) and to protect public welfare, including plant and animal life, visibility, and materials (secondary standards).

Approach Control Service. ATC service provided by an approach control facility for arriving and departing VFR/IFR aircraft and, on occasion, enroute aircraft.

Aquifer. The water-bearing portion of subsurface earth material that yields or is capable of yielding useful quantities of water to wells.

Archaeology. A scientific approach to the study of human ecology, cultural history, and cultural processes.

Arterial. Signalized street that serves primarily through-traffic and provides access to abutting properties as a secondary function.

Asbestos. A carcinogenic substance formerly used widely as an insulation material by the construction industry; often found in older buildings.

Association. Two or more soils occurring together in a characteristic pattern.

Attainment Area. A region that meets the National Ambient Air Quality Standards for a criteria pollutant under the Clean Air Act.

Avigational. Pertaining to navigation by aircraft.

Benzene. Colorless, volatile, flammable, toxic, liquid aromatic hydrocarbon.

Biodiversity. The diversity of genes, species, and ecosystems.

Biophysical. Pertaining to the physical and biological environment, including the environmental conditions crafted by humans.

Biota. The plant and animal life of a region.

Capacity. The maximum rate of flow at which vehicles can be reasonably expected to traverse a point or uniform segment of a lane or roadway during a specified time period under prevailing roadway, traffic, and control conditions.

Carbon Monoxide (CO). A colorless, odorless, poisonous gas produced by incomplete fossil-fuel combustion. One of the six pollutants for which there is a national ambient standard. See Criteria Pollutants.

Class I, II, and III Areas. Under the Clean Air Act, clean air areas are divided into three classes. Very little pollution increase is allowed in Class I areas, some increase in Class II areas, and more in Class III areas. National parks and wilderness areas receive mandatory Class I protection. All other areas start out as Class II. States can reclassify Class II areas up or down, subject to federal requirements.

Clear Zone. Area at the immediate end of a runway, in which use is restricted or precluded for safety reasons.

Commercial Aviation. Aircraft activity licensed by state or federal authority to transport passengers and/or cargo for hire on a scheduled or nonscheduled basis.

Comprehensive Plan. A public document, usually consisting of maps, text, and supporting materials, adopted and approved by a local government legislative body, which describes future land uses, goals, and policies.

Conformity. Conformity is defined in the Clean Air Act as the action's compliance with an implementation plan's purpose of eliminating or reducing the severity and number of violations of the National Ambient Air Quality Standards and achieving expeditious attainment of such standards; and that such activities will not: (1) cause or contribute to any new violation of any standard in any area; (2) increase the frequency or severity of any existing violation of any standard in any area; or (3) delay timely attainment of any standard or any required interim emission reduction or other milestones in any area.

Contaminants. Undesirable substances rendering something unfit for use.

Control Zone. Controlled airspace with a normal radius of 5 statute miles from a primary airport plus any extensions needed to include instrument arrival and departure paths, encompassing altitudes between the surface and 14,449 feet MSL.

Council on Environmental Quality (CEQ). Established by the National Environmental Policy Act (NEPA), the CEQ consists of three members appointed by the President. CEQ regulations (40 CFR Parts 1500-1508, as of July 1, 1986) described the process for implementing NEPA, including preparation of environmental assessments and environmental impact statements, and the timing and extent of public participation.

Corrosive. A material that has the ability to cause visible destruction of living tissue and has a destructive effect on other substances. A strong acid or a base.

Criteria Pollutants. The Clean Air Act required the Environmental Protection Agency to set air quality standards for common and widespread pollutants after preparing "criteria documents" summarizing scientific knowledge on their health effects. Today there are standards in effect for six "criteria pollutants": sulfur dioxide (SO_2), carbon monoxide (CO), particulate matter less than 10 micrometers in diameter (PM_{10}), nitrogen dioxide (NO_2), ozone (O_3), and lead (Pb).

Cultural Resources. Prehistoric and historic districts, sites, buildings, objects, or any other physical evidence of human activity considered important to a culture, subculture, or a community for scientific, traditional, religious, or any other reason.

Cumulative Impacts. The combined impacts resulting from all activities occurring concurrently at a given location.

Day-Night Average Sound Level (DNL). The 24-hour A-weighted equivalent sound level expressed in decibels, with a 10-decibel penalty added to sound levels between 10:00 p.m. and 7:00 a.m. to account for increased annoyance due to noise during night hours.

Decibel (dB). A unit of measurement on a logarithmic scale which describes the magnitude of a particular quantity of sound pressure or power with respect to a standard reference value.

Easement. A right or privilege (agreement) that a person may have on another's property.

Effluent. Waste material discharged into the environment.

Endangered Species. A species that is threatened with extinction throughout all or a significant portion of its range.

Environmental Impact Analysis Process. The process of conducting environmental studies as outlined in Air Force Regulation 19-2.

Environmental Protection Agency (EPA). The independent federal agency, established in 1970, that regulates environmental matters and oversees the implementation of environmental laws.

Erosion. Wearing away of soil and rock by weathering and the action of streams, wind, and underground water.

Fault. A fracture in the earth's crust accompanied by a displacement of one side of the fracture with respect to the other and in a direction parallel to the fracture.

Fleet Mix. Combination of aircraft using an airport.

Freeway. A multilane divided highway having a minimum of two lanes for exclusive use of traffic in each direction and full control of access and egress.

Friable. Easily crumbled or reduced to powder.

Fungicide. Any substance which kills or inhibits the growth of fungi.

General Aviation. All aircraft which are not commercial or military aircraft.

Groundwater. Water within the earth that supplies wells and springs.

Groundwater Basin. Subsurface structure having the character of a basin with respect to collection, retention, and outflow of water.

Groundwater Recharge. Absorption and addition of water to the zone of saturation.

Hazardous Material. Generally, a substance or mixture of substances that has the capability of either causing or significantly contributing to an increase in mortality or an increase in serious irreversible or incapacitating reversible illness; or posing a substantial present or potential risk to human health or the environment. Use of these materials is regulated by the U.S. Department of Transportation (DOT), the Occupational Safety and Health Administration (OSHA), and the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA).

Hazardous Waste. A waste, or combination of wastes, which, because of its quantity, concentration, or physical, chemical, or toxic characteristics, may either cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible illness; or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed. Regulated under the Resource Conservation and Recovery Act (RCRA).

Herbicide. Any chemical substance, either organic or inorganic, used to destroy unwanted vegetation, especially various types of weeds, grasses, and woody plants.

Hydrocarbons (HC). Any of a vast family of compounds containing hydrogen and carbon. Used loosely to include many organic compounds in various combinations; most fossil fuels are composed predominately of hydrocarbons. When hydrocarbons mix with nitrogen oxides in the presence of sunlight, ozone is formed; hydrocarbons in the atmosphere contribute to the formation of ozone.

Impacts. An assessment of the meaning of changes in all attributes being studied for a given resource; an aggregation of all the adverse effects, usually measured using a qualitative and nominally subjective technique. In this EIS, as well as in the CEQ regulations, the word impact is used synonymously with the word effect.

L_{eq}. The equivalent steady state sound level which, in a stated period of time, would contain the same acoustical energy as a time-varying sound level during the same period.

L_{max}. The highest A-weighted sound level observed during a single event of any duration.

Lead (Pb). A heavy metal used in many industries, which can accumulate in the body and cause a variety of negative effects. One of the six pollutants for which there is a national ambient air quality standard. See Criteria Pollutants.

Level of Service (LOS). In transportation analyses, a qualitative measure describing operational conditions within a traffic stream and how they are perceived by motorists and/or passengers. In public services, a measure describing the amount of public services (e.g., fire protection and law enforcement services) available to community residents, generally expressed as the number of personnel providing the services per 1,000 population.

Loam, Loamy. Rich, permeable soil composed of a mixture of clay, silt, sand, and organic matter.

Loudness. The qualitative judgement of intensity of a sound by a human being.

Magnitude. Richter scale logarithmic measurement of the energy released by an earthquake.

Masking. The action of bringing one sound (audible when heard alone) to inaudibility or to unintelligibility by the introduction of another sound.

Mesic. Characterized by, relating to, or requiring a moderate amount of moisture.

Military Operations Area. Airspace areas of defined vertical and lateral limits established for the purpose of separating certain training activities, such as air combat maneuvers, air intercepts, and acrobatics, from other air traffic operating under instrument flight rules.

Military Training Route. Defined routes above the ground established for military flight training at speeds greater than 250 knots and generally below altitudes of 10,000 feet MSL; however, route segments can extend above 10,000 feet.

Mineral. Naturally occurring inorganic element or compound.

Mitigation. A method or action to reduce or eliminate program impacts.

National Ambient Air Quality Standards (NAAQS). Section 109 of the Clean Air Act requires the EPA to set nationwide standards, the National Ambient Air Quality Standards, for widespread air pollutants. Currently, six pollutants are regulated by primary and secondary NAAQS: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM_{10}), and sulfur dioxide (SO_2). See Criteria Pollutants.

National Priorities List. U.S. EPA's list of sites where hazardous substances, pollutants, or contaminants appear to pose a substantial threat to human health, welfare, or the environment, and require response under CERCLA.

National Register of Historic Places. A register of districts, sites, buildings, structures, and objects important in American history, architecture, archaeology, and culture, maintained by the Secretary of the Interior under authority of Section 2(b) of the Historic Sites Act of 1935 and Section 101(a)(1) of the National Historic Preservation Act of 1966, as amended.

Native Americans. Used in a collective sense to refer to individuals, bands, or tribes who trace their ancestry to indigenous populations of North America prior to Euro-American contact.

National Environmental Policy Act (NEPA). Public Law 91-190, passed by Congress in 1969. The Act established a national policy designed to encourage consideration of the influences of human activities (e.g., population growth, high-density urbanization, industrial development) on the natural environment. NEPA also established the Council on Environmental Quality. NEPA procedures require that environmental information be made available to the public before decisions are made. Information contained in NEPA documents must focus on the relevant issues in order to facilitate the decision-making process.

Natural Vegetation. Plant life that occurs naturally in an area without agricultural or cultivational efforts. It does not include species that have been introduced from other geographical areas and become naturalized.

Nitrogen Dioxide (NO_2). Gas formed primarily from atmospheric nitrogen and oxygen when combustion takes place at high temperature. NO_2 emissions contribute to acid deposition and formation of atmospheric ozone. One of the six pollutants for which there is a national ambient standard. See Criteria Pollutants.

Nitrogen Oxides (NO_x). Gases formed primarily by fuel combustion, which contribute to the formation of acid rain. Hydrocarbons and nitrogen oxides combine in the presence of sunlight to form ozone, a major constituent of smog.

Noise. Any sound that is undesirable because it interferes with speech and hearing, or is intense enough to damage hearing, or is otherwise annoying (unwanted sound).

Noise Annoyance. Any negative subjective reaction to noise on the part of an individual or group.

Noise Attenuation. The reduction of a noise level from a source by such means as distance, ground effects, or shielding.

Noise Contour. A curve connecting points of equal noise exposure on a map. Noise exposure is often expressed using the average day-night sound level, DNL.

Nonattainment Area. An area that has been designated by the U.S. EPA, or the appropriate state air quality agency, as exceeding one or more National or State Ambient Air Quality Standards.

100-Year Floodplain. Land area having a 1-percent chance of being flooded during a given year.

Ozone. A major ingredient of smog. Ozone is produced from reactions of hydrocarbons and nitrogen oxides in the presence of sunlight and heat. Some 68 areas, mostly metropolitan areas, did not meet a 31 December 1987 deadline in the Clean Air Act for attaining the ambient air quality standard for ozone. See Criteria Pollutants.

Paleontological Resources. The physical remains of life forms from earlier geological ages, such as fossils.

PCB-Contaminated Equipment. Equipment which contains a concentration of PCBs from 50 to 499 ppm and regulated by the U.S. EPA.

PCB Equipment. Equipment which contains a concentration of PCBs of 500 ppm or greater and regulated by the U.S. EPA.

PCB Items. Equipment which contains a concentration of PCBs from 5 to 49 ppm and regulated by the State EPA.

Perched Water. Groundwater separated from an underlying main body of groundwater by an unsaturated zone.

Permeability. The capacity of a porous rock or sediment to transmit a fluid.

Pesticide. Any substance, organic or inorganic, used to destroy or inhibit the action of plant or animal pests; the term thus includes insecticides, herbicides, fungicides, rodenticides, miticides, fumigants, and repellents. All pesticides are toxic to humans to a greater or lesser degree. Pesticides vary in biodegradability.

Physiographic Province. A region in which all parts are similar in geologic structure and climate.

Pitchblende. A mineral formed by radioactive decay, often found in sulfide-bearing veins.

Plume. An elongated mass of contaminated fluid moving with the flow of the fluid.

Polychlorinated Biphenyls (PCBs). Any of a family of industrial compounds produced by chlorination of biphenyl. These compounds are noted chiefly as an environmental pollutant that accumulates in organisms and concentrates in the food chain with resultant pathogenic and teratogenic effects. They also decompose very slowly.

Potable Water. Suitable for drinking.

Prehistoric. The period of time before the written record.

Prevention of Significant Deterioration (PSD). In the 1977 Amendments to the Clean Air Act, Congress mandated that areas with air cleaner than required by National Ambient Air Quality Standards must be protected from significant deterioration. The Clean Air Act's PSD program consists of two elements: requirements for best available control technology on major new or modified sources, and compliance with an air quality increment system.

Prevention of Significant Deterioration Area. A requirement of the Clean Air Act that limits the increases in ambient air pollutant concentrations in clean air areas to certain increments even though ambient air quality standards are met.

Prime Farmland. Environmentally significant agricultural lands protected from irreversible conversion to other uses.

Primary Roads. A consolidated system of connected main roads important to regional, statewide, and interstate travel; they consist of rural arterial routes and their extensions into and through urban areas of 5,000 or more population.

Radon. Naturally occurring, colorless and odorless radioactive gas produced by radioactive decay of radium.

Restricted Area. Designated airspace in which aircraft activity, while not prohibited, is subject to certain restrictions.

Riparian. Of, pertaining to, or situated or dwelling on, the bank of a river or other body of water.

Section 106. A section of the the National Historic Preservation Act which establishes a process requiring federal agencies to consider the effects of their undertakings on cultural resources.

Sediment. Material deposited by wind or water.

Seismicity. Relative frequency and distribution of earthquakes.

Shrink/Swell Potential. Volume change possible upon wetting or drying of soils.

Site. As it relates to cultural resources, any location where humans have altered the terrain or discarded artifacts.

Sludge. A heavy, slimy deposit, sediment, or mass resulting from industrial activity; solids removed from wastewater.

Soil Series. A group of soils having similar parent materials, genetic horizons, and arrangement in the soil profile.

Solid Waste. Non-hazardous residential, commercial, industrial, and construction refuse, not including materials that are recycled.

Solvent. A substance that dissolves or can dissolve another substance.

Sound. The auditory sensation evoked by the compression and rarefaction of the air or other transmitting medium.

Sound Exposure Level. The level, in decibels, which is a measure of the total sound energy of an event, such as an aircraft flyover, which accounts for sound intensity and frequency content, referenced to a duration of one second.

State Historic Preservation Officer. The official within each state, authorized by the State at the request of the Secretary of the Interior, to act as liaison for purposes of implementing the National Historic Preservation Act.

Sulfur Dioxide (SO_2). A toxic gas that is produced when fossil fuels, such as coal and oil, are burned. SO_2 is the main pollutant involved in the formation of acid rain. SO_2 also can irritate the upper respiratory tract and cause lung damage. See Criteria Pollutants.

Terminal Control Area. Controlled airspace extending upward from the surface or higher to specified altitudes, within which all aircraft are subject to operating rules and pilot equipment requirements specified in FAR 91.

Therm. A measurement of heat; 1 therm = 100,000 BTU.

Threatened Species. Plant and wildlife species likely to become endangered in the foreseeable future.

Toluene. Liquid aromatic hydrocarbon used as a solvent.

Total Suspended Particulates (TSP). The particulate matter in the ambient air. The previous National Ambient Air Quality Standard for particulates was based on TSP levels; it was replaced in 1987 by an ambient standard based on particulate matter less than 10 micrometers in diameter (PM_{10}). See Criteria Pollutants.

Traditional Resources. Those resources which contribute to the culture, religion, or society of Native American people.

Transition Area. Controlled airspace extending upward from 700 feet AGL when designated in conjunction with an airport with an approved instrument approach procedure; or from 1,200 feet AGL when designated in conjunction with airway route structures or segments. Transition areas contain arriving and departing IFR operations within a terminal area and the enroute airspace system.

Transportation Demand Management (TDM). The implementation of measures which encourage people to change their mode of travel or not to make a trip at all (e.g., ridesharing, telecommunications, parking management, pricing incentives).

Trichloroethylene (TCE). An organic solvent used in dry cleaning and removal of grease from metal.

Trip Distribution. A determination of the interchange of trips among zones in the region.

Trip Generation. A determination of the quantity of trip ends associated with a parcel of land.

Vadose Zone. The zone of aeration, above the groundwater table.

Vehicle Trip End. A one-direction vehicle movement with either the origin, the destination, or both inside the study site.

Wetlands. Areas that are inundated or saturated with surface or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil. This classification includes swamps, marshes, bogs, and similar areas.

Xeriscaping. Use of indigenous desert vegetation tolerant of low water availability in landscaping.

Zoning. The division of a municipality (or county) into districts for the purpose of regulating land use, types of building, necessary off-street parking, and other prerequisites to development. Zones are generally shown on a map and the text of the zoning ordinance specifies requirements for each zoning category.

ACRONYMS/ABBREVIATIONS

AAAQS	Arizona Ambient Air Quality Standards
AAC	Arizona Administrative Code
AC	Advisory Circular
ACHP	Advisory Council on Historic Preservation
ACM	Asbestos-Containing Material
ADAH	Arizona Department of Agriculture and Horticulture
ADEQ	Arizona Department of Environmental Quality
ADC	Arizona Department of Corrections
ADD	Airport Development District
ADT	Average Daily Traffic
ADWR	Arizona Department of Water Resources
AFB	Air Force Base
AFCEE	Air Force Center for Environmental Excellence
AFHRL	Air Force Human Resources Laboratory
AFOSI	Air Force Office of Special Investigations
AFR	Air Force Regulation
a.f./yr	Acre-Feet per Year
AGE	Aerospace Ground Equipment
AGL	Above Ground Level
AHERA	Asbestos Hazard Emergency Response Act
AIRFA	American Indian Religious Freedom Act
AICUZ	Air Installation Compatible Use Zone
ALP	Airport Layout Plan
AMC	Air Mobility Command
ANG	Air National Guard
ANSI	American National Standards Institute
APE	Area of Potential Effect
APZ	Accident Potential Zone
AREFG	Air Refueling Group
ARSA	Airport Radar Service Area
ARTCC	Air Route Traffic Control Center
AST	Aboveground Storage Tank
ATC	Air Traffic Control
ATCF	Air Traffic Control Flight
ATCT	Air Traffic Control Tower
AZ ANG	Arizona Air National Guard
BCA	Base Conversion Agency
bls	Below Land Surface
BOP	Federal Bureau of Prisons
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
BTU	British Thermal Unit
CAA	Clean Air Act (Federal)
CAAA	Clean Air Act Amendments
CAP	Central Arizona Project

CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
cfs	Cubic Feet per Second
CO	Carbon Monoxide
COE	Corps of Engineers (U.S. Army)
CUD	Compatible Use District
CY	Calendar Year
CZ	Clear Zone
dB	Decibel
dBA	Decibel A-Weighted
DBCRA	Defense Base Closure and Realignment Act
DEIS	Draft Environmental Impact Statement
DERP	Defense Environmental Restoration Program
DNL	Day-Night Average Sound Level
DOD	Department of Defense
DOT	Department of Transportation
DRMO	Defense Reutilization and Marketing Office
EDMS	Emissions and Dispersion Modeling System
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
FBO	Fixed Base Operator
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FFA	Federal Facilities Agreement
FHWA	Federal Highway Administration
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FL	Flight Level
FPMR	Federal Property Management Regulations
FPPA	Farmland Protection Policy Act
FS	Feasibility Study
FSS	Flight Service Station
FTA	Fire Training Area
FY	Fiscal Year
GERAB	Governors Economic Reuse Advisory Board
GIMM	Graphical Input Microcomputer Model
GPD	Gallons per Day
gpm	Gallons per Minute
GSA	General Services Administration
HABS/HAER	Historic American Buildings Survey and Historic American Engineering Record
HC	Hydrocarbons
HCM	Highway Capacity Manual
HHS	Department of Health and Human Services

HI-TACAN	High Altitude Tactical Air Navigation
HMTA	Hazardous Materials Transportation Act
HUD	Department of Housing and Urban Development
IAG	Interagency Agreement
IFR	Instrument Flight Rules
IGA	Inter-Governmental Agreement
ILS	Instrument Landing System
IR	IFR Military Training Routes
IRP	Installation Restoration Program
ITE	Institute of Traffic Engineers
km	Kilometer
L_{dn}	Abbreviation of DNL
L_{eq}	Equivalent Sound Level
L_{max}	A-weighted Maximum Sound Level
LESA	Land Evaluation and Site Assessment
LOS	Level of Service
MAC	Miliary Airlift Command
MACT	Maximum Achievable Control Technology
MAG	Maricopa Association of Governments
MALSR	Medium-intensity Approach Lighting System; Runway Alignment Indicator Lights
MAP	Million Annual Passengers
MCBAPC	Maricopa County Bureau of Air Pollution Control
MCL	Maximum Contaminant Level
MEK	Methyl Ethyl Ketone
mg/L	Milligrams per Liter
$\mu g/m^3$	Micrograms per Cubic Meter
MGD	Million Gallons per Day
mm	Millimeter
MOA	Military Operations Area; Memorandum of Agreement
MPA	Municipal Planning Area
mph	Miles per Hour
MSA	Metropolitan Statistical Area
MSDS	Material Safety Data Sheet
MSL	Mean Sea Level
MTR	Military Training Routes
MW	Megawatts
MWH	Megawatt-Hours
MUR	Military Unleaded Regular (gasoline)
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NAS	National Academy of Sciences; National Airspace System
NAVAID	Navigational Aid
NCP	National Contingency Plan
NEPA	National Environmental Policy Act of 1969
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NEXRAD	Next-Generation (Weather) Radar

NHPA	National Historic Preservation Act
NLR	Noise Level Reduction
NM	Nautical Mile
NOI	Notice of Intent
NOTAM	Notices to Airmen
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
NPDES	National Pollution Discharge Elimination System
NPL	National Priorities List
NRHP	National Register of Historic Places
NZ	Noise Zones
O_3	Ozone
OL	Operating Location
ORV	Off Road Vehicle
OSHA	Occupational Safety and Health Administration
OU	Operational Unit
PA	Preliminary Assessment
PA/SI	Preliminary Assessment/Site Inspection
Pb	Lead
PCAQCD	Pinal County Air Quality Control District
PCBs	Polychlorinated Biphenyls
PCE	Perchloroethylene
pCi/L	Picocuries per Liter
P.L.	Public Law
PMCNA	Phoenix and Maricopa County Nonattainment Area
PMCUPA	Phoenix and Maricopa County Urban Planning Area
PM_{10}	Particulate Matter Less Than 10 Micrometers in Diameter
POL	Petroleum, Oils, and Lubricants
PP	Proposed Plan
ppb	Parts per Billion
ppm	Parts per Million
PSD	Prevention of Significant Deterioration
RA	Remedial Action
RAFA	Regional Airport Feasibility Assessment
RAMP	Radon Assessment and Mitigation Program
RASP	Regional Aviation System Plan
REILS	Runway End Identifier Lighting System
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RD/RA	Remedial Design/Remedial Action
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
ROI	Region of Influence
RPZ	Runway Protection Zone
RSU	Runway Supervisory Unit
RWCD	Roosevelt Water Conservation District

SAP	Satellite Accumulation Point
SARA	Superfund Amendments and Reauthorization Act
SCS	Soil Conservation Service
SEL	Sound Exposure Level
SF	Square Feet
SH	State Highway
SHPO	State Historic Preservation Officer
SI	Site Inspection
SIAS	Socioeconomic Impact Analysis Study
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
SO_x	Sulfur Oxides
SR	State Route
SRP	Salt River Project
SR-SS	Sunrise to Sunset
SVOC	Semivolatile Organic Compounds
TAC	Tactical Air Command
TACAN	Tactical Air Navigation
TCE	Trichloroethylene
TD	Technology Development
TDM	Transportation Demand Management
TDS	Total Dissolved Solids
tpd	Tons per Day
TPH	Total Petroleum Hydrocarbons
tpy	Tons per Year
TRACON	Terminal Radar Approach Control
TSCA	Toxic Substances Control Act
TSD	Treatment, Storage, or Disposal
TSP	Total Suspended Particulates
TSS	Total Suspended Solids
UICP	Underground Injection Control Permit
UPT	Undergraduate Pilot Training
USC	United States Code
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	Underground Storage Tank
V	Volt
VFR	Visual Flight Rules
VOC	Volatile Organic Compound
VOR	Very High Frequency Omnidirectional Range
VORTAC	Very High Frequency Omnidirectional Range Tactical Air Navigation
VR	Visual Flight Rules Military Training Route
WAFB	Williams Air Force Base

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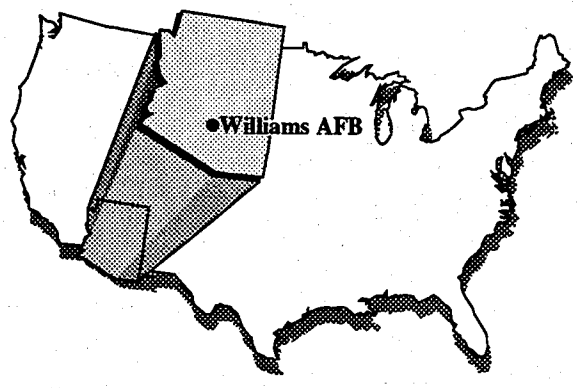

APPENDIX B

APPENDIX B

NOTICE OF INTENT

The following notice of intent was circulated and published by the Air Force in the October 9, 1991 Federal Register in order to provide public notice of the Air Force's intent to prepare an Environmental Impact Statement for disposal and reuse of Williams Air Force Base. This Notice of Intent has been retyped for clarity and legibility.

NOTICE OF INTENT
TO PREPARE ENVIRONMENTAL IMPACT STATEMENTS
FOR DISPOSAL AND REUSE OF THIRTEEN AIR FORCE BASES

The United States Air Force will prepare thirteen environmental impact statements (EISs) to assess the potential environmental impacts of disposal and reuse of the following Air Force bases recently directed to be closed under the provisions of the Defense Base Closure and Realignment Act of 1990 (Public Law 101-510, Title XXIX):

Closing Base

Bergstrom AFB, Austin, Texas

Carswell AFB, Fort Worth, Texas

Castle AFB, Merced, California

Eaker AFB, Blytheville, Arkansas

England AFB, Alexandria, Louisiana

Grissom AFB, Peru, Indiana

Loring AFB, Limestone, Maine

Lowry AFB, Denver, Colorado

Myrtle Beach AFB, Myrtle Beach, South Carolina

Richards Gebaur ARS, Kansas City, Missouri

Rickenbacker AGB, Columbus, Ohio

Williams AFB, Chandler, Arizona

Wurtsmith AFB, Oscoda, Michigan

Each EIS will address the disposal of the property to public or private entities and the potential impacts of reuse alternatives. All available property will be disposed of in accordance with provisions of Public Law 101-510 and applicable federal property disposal regulations.

The Air Force plans to conduct a scoping and screening meeting within the local area for each base during October and November 1991. Notice of the time and place of each meeting will be made available to public officials and local news media outlets once it has been finalized. The purpose of each meeting is to determine the environmental issues and concerns to be analyzed for the base disposal and reuse in that area, to solicit comments on the proposed action and to solicit proposed

disposal and reuse alternatives that should be addressed in the EIS for that base. In soliciting disposal and reuse inputs, the Air Force intends to consider all reasonable alternatives offered by any federal, state, or local government agency and any federally-sponsored or private entity or individual with an interest in acquiring available property at one of the listed closing bases. The resulting environmental impacts will be considered in making disposal decisions to be documented in the Air Force's final disposal plan for each base.

To ensure the Air Force will have sufficient time to consider public inputs on issues to be included in the EISs, and disposal alternatives to be included in the final disposal plans, comments and reuse proposals should be forwarded to the address listed below by December 1, 1991. However, the Air Force will accept comments at the address below at any time during the environmental impact analysis process.

For further information concerning the study of these base disposal and reuse EIS activities, contact:

Lt. Colonel Tom Bartol
AFCEE/ESE
Norton AFB, California 92409-6448

Note: Comment date was extended from December 1, 1991 to January 2, 1992 after processing and publication of this Notice of Intent.

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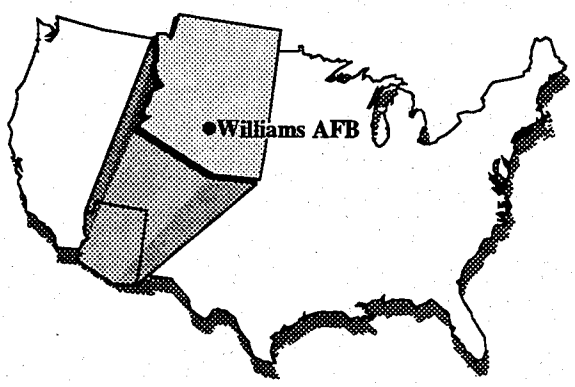

APPENDIX C

APPENDIX C

FINAL ENVIRONMENTAL IMPACT STATEMENT MAILING LIST

This list of recipients includes interested federal, state, and local agencies and individuals who have expressed an interest in receiving the document. This list also includes the governor of Arizona, as well as United States senators and representatives and state legislators.

ELECTED OFFICIALS

Federal Officials

U.S. Senate

The Honorable Dennis DeConcini
The Honorable John McCain

U.S. House of Representatives

The Honorable Sam Coppersmith
The Honorable Jim Kolbe

State of Arizona Officials

Governor

The Honorable Fife Symington

State Legislature

House of Representatives

The Honorable Mark W. Killian
The Honorable Brenda Burns
The Honorable Art Hamilton
The Honorable Leslie Whiting-Johnson
The Honorable Lela Steffey

State Senate

The Honorable John Greene
The Honorable Lester N. Pearce
The Honorable Tom Patterson
The Honorable Cindy L. Resnick

Local Officials

The Honorable Tom Damiano
Mayor of Apache Junction

Mr. Michael R. Lee
City Manager of Apache Junction

The Honorable Coy Payne
Mayor of Chandler

Mr. John Pinch
City Manager of Chandler

The Honorable Paul Johnson
Mayor of Phoenix

Mr. Frank Fairbanks
City Manager of Phoenix

The Honorable Harry E. Mitchell
Mayor of Tempe

Mr. Terry Zerkle
City Manager of Tempe

The Honorable Tom Rawles
Maricopa County Board of Supervisors

Mr. Roy D. Pederson
Maricopa County Manager

Mr. Barry Moehring
Maricopa County Board of Supervisors

Mr. William Mathieson
Chairman, Pinal County Board of Supervisors

The Honorable Wilburn Brown
Mayor of Gilbert

The Honorable Larry Morrison
Vice Mayor of Gilbert

Mr. Kent L. Cooper
City Manager, Town of Gilbert

Local Officials (Continued)

The Honorable Mark Schnepf
Mayor of Queen Creek

Mr. Michael McNulty
Town Administrator, Queen Creek

The Honorable Willie Wong
Mayor of Mesa

Mr. Charles K. Luster
City Manager of Mesa

Mr. Michael Hutchinson
Assistant City Manager, Mesa

GOVERNMENT AGENCIES

Federal Agencies

Advisory Council on Historic Preservation

Bureau of Prisons

Centers for Disease Control
Center for Environmental Health and Injury Control

Council of Economic Advisors

U.S. Department of Agriculture
Forest Service
Environmental Coordination Office

U.S. Department of Commerce
Economic Development Administration
Economic Adjustment Division

U.S. Department of Commerce
Office of Intergovernmental Affairs

U.S. Department of Education
Intergovernmental and Interagency Affairs

U.S. Department of Energy
Congressional, Intergovernmental, and
International Affairs (C1-1)

Federal Agencies (Continued)

U.S. Department of Health and Human Services
Office of Human Development Services

U.S. Department of Housing and Urban Development
Community Planning and Development Division

U.S. Department of the Interior
Office of Environmental Affairs

U.S. Department of Labor
Intergovernmental Affairs

U.S. Department of Transportation
Administrative Services and Property Management

U.S. Department of Veterans Affairs

U.S. Environmental Protection Agency

Federal Aviation Administration
Office of Environment and Energy

General Services Administration
Office of Real Estate Policy and Sales (FPRS)

Small Business Administration
Office of Procurement, Grant and Management

Department of Defense

Office of Economic Adjustment

Regional Offices of Federal Agencies

General Services Administration
San Francisco, CA

U.S. Department of Commerce
Economic Development Administration
Seattle, WA

Regional Offices of Federal Agencies (Continued)

U.S. Department of Education
San Francisco, CA

U.S. Department of Health and Human Services
San Francisco, CA

U.S. Department of Housing and Urban Development
Phoenix, AZ

Bureau of Indian Affairs
Phoenix, AZ

Bureau of Indian Affairs
Mr. Robert Donlevy, Pima Agency

Bureau of Indian Affairs
Fort Yuma Agency

U.S. Department of the Interior
Bureau of Land Management
Phoenix, AZ

U.S. Environmental Protection Agency
Office of Federal Activities
Region IX
San Francisco, CA

Federal Aviation Administration
Los Angeles, CA

U.S. Department of Agriculture
Soil Conservation Service
Arizona State Office
Mr. Donald W. Gohmert, State Conservationist

U.S. Department of Agriculture
Soil Conservation Service
Chandler Field Office
Mr. Dino DeSimone, District Conservationist

National Parks Service
Western Region
San Francisco, CA

Regional Offices of Federal Agencies (Continued)

U.S. Department of the Interior
Office of Environmental Affairs
San Francisco, CA

National Transportation Safety Board (Aviation)
Southwest Regional Office
Gardenia, CA

U.S. Fish and Wildlife Service
Region 2
Albuquerque, NM

U.S. Army Corps of Engineers
Los Angeles District
Arizona Area Office, Enforcement & Compliance Regulatory Branch
Phoenix, AZ

U.S. Army Corps of Engineers
Los Angeles District
Arizona Real Estate Office
Phoenix, AZ

State of Arizona Agencies

Phoenix Department of Commerce
Mr. Jim Marsh, Director

Arizona State Clearinghouse
Ms. Janice Dunn, Manager

Land Department
Ms. M. Jean Hassell, Land Commissioner

Economic Security Department
Ms. Linda Moore-Cannon, Director

Education Department
Ms. C. Diane Bishop, Superintendent of Public Instruction

Environmental Quality Department
Mr. Edward Fox, Director

Arizona Game and Fish Department
Mr. Duane L. Shroufe, Director

State of Arizona Agencies (Continued)

Arizona Historical Society
Dr. Michael Weber, Executive Director

Arizona State Parks
Outdoor Recreation Coordinating Commission
Mr. Don Meyers, Chief

Arizona State Parks
Mr. Kenneth E. Travous, Executive Director

Arizona State Parks
State Historic Preservation Office
Mr. Robert E. Gasser, Compliance Coordinator

Arizona Department of Real Estate
Mr. Jerry Holt, Commissioner

Strategic Planning and Budgeting
Mr. Peter Burns, Director

Public Safety Department
Col. F. J. Ayars, Director

Arizona Power Authority
Mr. Robert Casillas, Chairman

Water Resources Department
Ms. Elizabeth A. Rieke, Director

Department of Arizona Health Services
Ms. Althea O. Caldwell, Director

Arizona Geological Survey
Mr. Larry D. Fellows, Director and State Geologist

Commission of Indian Affairs
Mr. Tony Machukay, Executive Director

Arizona Air National Guard
Major General Donald L. Owens, Adjutant General

Arizona Department of Transportation
Aeronautics Division
Mr. Gary Adams, Director

State of Arizona Agencies (Continued)

Inter-Tribal Council of Arizona

County Agencies

Superintendent of Schools
Maricopa County
Ms. Sandra E. Dowling

Maricopa County Planning and Development Department
Mr. Dennis Zwagerman, Director
Ms. Debra Wilkins Start, Current Planning Supervisor
Mr. Douglas A. Williams, Advanced Planning Supervisor

Maricopa County Department of Transportation
Mr. Dan Sagramoso, Director

Health Services Department
Mr. Adolfo Echeveste, Assistant County Manager, Health Care

Transportation Development Agency
Mr. Lou Schmidt, Assistant County Manager

Maricopa Association of Governments
Transportation Planning Division
Mr. Tom Buick, Chief
Mr. Harry Wolfe, Socioeconomic Analysis Coordinator

Maricopa County, Air Quality Planning and Analysis Section
Bureau of Air Pollution Control
Ms. Jo Crumbaker, Manager

Pinal County Board of Supervisors
Ms. Sandie Smith, Supervisor

Pinal County Planning and Development Services Department
Mr. Phil C. Hogue, Director, Floodplain Administrator
Mr. Dennis L. Cady, Long Range Planning

Pinal County Highway Department

Pinal County, Air Quality Control District
Mr. Martin Godusi, Director

Local Government Agencies

Chandler City Council

Chandler Development and Community Service
Mr. Phil Testa, Director

Chandler Engineering and Development
Mr. Al Ptahl, Assistant Public Works Director

Chandler City Government
Mr. Ken Reinig, Public Information Officer

Chandler Municipal Airport
Mr. Tom Stanley, Manager

Phoenix Aviation Department
Mr. Neilson A. Bertholf, Jr., Aviation Director

Office of the City Council, Phoenix

Phoenix Planning Department
Mr. John R. Short, Director

Phoenix Public Information Office
Mr. Mark Hughes, Director

Phoenix Community and Economic Development
Mr. Denny Maus, Director

Phoenix Air National Guard
Col. William R. Sherer, Commander
Col. Charles D. Ralls

Tempe City Council

Tempe Public Works
Mr. Jim Jones, Director

Tempe Community Development
Mr. Terry Day, Director

Tempe Community Services
Mr. Ron Pies, Director

Tempe Public Information Office
Nachie Marquez, Public Information Officer

Local Government Agencies (Continued)

Mesa City Council

Mesa Community Development
Mr. Wayne Balmer, Manager

Mesa Department of Traffic and Streets
Mr. Ronald Krosting, Traffic Engineer

Mesa Public Works Administration
Mr. Bruce Crandall, Manager
Mr. Harry Kent, City Engineer

Mesa Airport/Falcon Field
Mr. Mark Myers, Director

Town of Gilbert
Mr. W. Scott Anderson, Planning Director

City of Apache Junction
Mr. James Nakagawa, Planning Division Manager

Apache Junction Chamber of Commerce
Ms. Carol Doty, Executive Director

Chandler Chamber of Commerce
Mr. Steven Vierck, Executive Director

Mesa Chamber of Commerce
Mr. Charles Deaton, Executive Director

Phoenix Chamber of Commerce
Mr. Kevin Keeley, President and CEO

Tempe Chamber of Commerce
Mr. Steve Snyder, Executive Director

Gilbert Chamber of Commerce
Mr. John Gibson, Executive Director

Queen Creek Chamber of Commerce
Mr. Paul Gardner, Executive Director

Libraries

Gilbert Public
Mesa Public
Phoenix City Public
Tempe Public
Apache Junction
Chandler Public
Queen Creek Public

OTHERS

Other Organizations/Individuals

Arizona State University
University Relations
Mr. Terry Isaacson
Mr. Rudy Campbell

Phoenix Military Affairs Committee
Mr. Paul Hammock, Chairman

Salt River Project
Mr. Jim Nelson, Director of Business Development

Williams Redevelopment Partnership
Mr. Lynn Kusy, Executive Director
Ms. Jan Dodson, Reuse Coordinator

Chandler Military Affairs Committee
Mr. Steve Grearick, Chairman

Gilbert Military Affairs Committee
Mrs. Rusty Bouvier, Chairman

Mesa Military Affairs Committee
Mr. Norman Fish, Chairman

Gilbert Unified School District
Mr. Walter J. Delecki, Superintendent

Ak-Chin Indian Community
Ak Chin Him Dak Eco-Museum
Ms. Elaine Peters, Representative

Other Organizations/Individuals (Continued)

Tohono O'odham Nation
Cultural Preservation Committee
Mr. Joseph Joaquin, Chairman

Gila River Indian Community
Department of Land and Water Resources
Mr. Fred Ringlaro, Acting Director of Land Use Planning

Gila River Indian Community
Mr. Cecil Antone, Lieutenant Governor

The Hopi Tribe
Hopi Cultural Preservation Office
Mr. Leigh Jenkins, Director

Salt River Pima-Maricopa Indian Community
Mr. Terrance Leonard, Special Projects Officer

The Earth Technology Corporation
Ms. Sandy Cuttino

Engineering Science, Inc.
Ms. Julia A. Schulten

Environmental Defense Fund
Executive Director

Environmental Policy Center/Institute

Friends of the Earth

National Audubon Society

Natural Resources Defense Council

National Wildlife Federation

Nature Conservancy

Sierra Club

Tetra Tech, Inc.
Raj Mathur, Ph.D.

Other Organizations/Individuals (Continued)

John Kelly Associates
Mr. Larry Gorenflo

Carter & Burgess, Inc.
Mr. Larry Bauman

SAIC
Mr. Robert Blakely

SWCA, Inc.
Mr. David Greenwald

Woodward Architectural Group
Mr. Jim Woodward

The Wilderness Society

American Operations Corporation
Ms. Kristi Field

Mr. Elliot Remler

Mr. John Harms

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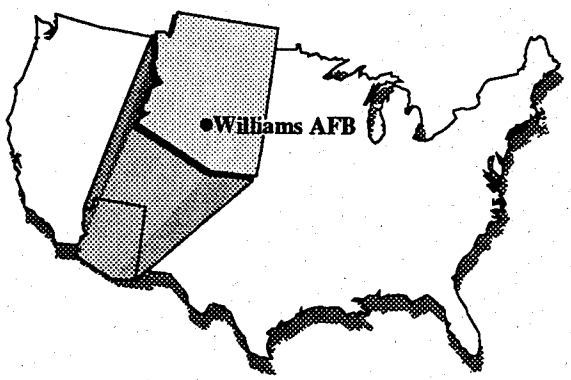

APPENDIX D

APPENDIX D

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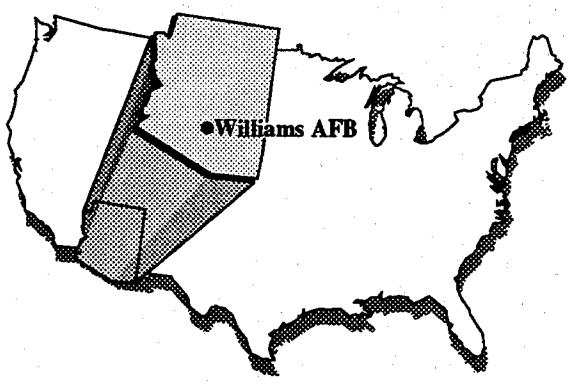


APPENDIX E

APPENDIX E

METHODS OF ANALYSIS

1.0 INTRODUCTION

This section describes the methods used in preparing this environmental impact statement (EIS). These methods were designed and implemented to evaluate the potential environmental impacts of disposal of Williams AFB and incident reuse. Since future reuse of the site is uncertain in its scope, activities, and timing, the analysis considered several alternative reuse scenarios and evaluated their associated environmental impacts. The reuse scenarios analyzed in this EIS were defined for this study to span the anticipated range of reuse activities that are reasonably likely to occur due to disposal of the base. They were developed based on proposals put forth by affected local communities, interested individuals, and the Air Force, and considered general land use planning objectives.

The various analysis methods used to develop this EIS are summarized here by resource. In some instances, more detail is included in another appendix. These instances are noted for each resource in its respective subsection below.

2.0 LOCAL COMMUNITY

2.1 COMMUNITY SETTING

The section on community setting was developed to provide the context within which other biophysical impacts could be assessed. Community setting impacts were based on projected direct and secondary employment and resulting population changes related to reuse of Williams AFB. These projections were used to quantify and evaluate changes in demand on community services, demand on transportation systems, air quality, and noise. A complete assessment of socioeconomic effects was conducted through a separate *Socioeconomic Impact Analysis Study (SIAS) for the Disposal and Reuse of Williams AFB*, which is the source for baseline and projected statistics used in this EIS.

The SIAS used information from sources including the U.S. Bureau of Economic Analysis, U.S. Bureau of the Census, U.S. Bureau of Labor Statistics, U.S. Council of Economic Advisors, Arizona Department of Economic Security, the Maricopa Association of Governments, and local county, city, and town agencies. The analysis used the Regional Interindustry Multiplier System (RIMS II) model to generate demographic and economic projections associated with the Proposed Action and alternatives.

2.2 LAND USE AND AESTHETICS

Potential land use impacts were projected based on compatibility of land uses associated with the Proposed Action and alternatives with adjacent land uses and zoning, consistency with general plans and other land use plans and regulations, and effects of aircraft noise and safety restrictions on land uses.

The region of influence (ROI) for the majority of direct land use impacts for this study consisted of Williams AFB, the City of Mesa, the towns of Gilbert and Queen Creek, Maricopa County, and portions of Pinal County. Noise-related land use impacts were determined by the extent of noise contours created by reuse alternatives and potentially included those areas exposed to noise levels of DNL 65 decibels (dB) within the City of Mesa, the towns of Gilbert and Queen Creek, and portions of Maricopa and Pinal counties.

Maps and windshield surveys were used to characterize on- and off-base land uses. Applicable policies, regulations, and land use restrictions were identified from the land use plans and ordinances of municipalities in the ROI as well as those from the Maricopa Association of Governments (MAG). The proposed and alternative reuse plans were compared to existing land use and zoning to identify areas of conflict as well as to local planning goals and objectives as set forth in community general plans. The other land use concepts were also examined for compatibility with adjacent land uses and with the Proposed Action and alternatives using the same process.

Alternatives incorporating airfield uses were examined for consistency with FAA regulations and recommended land uses in the vicinity of airfields. Impacts of airfield-generated noise were assessed by comparing the extent of noise-affected areas and receptors under different reuse alternatives against preclosure baseline conditions.

For the aesthetics analysis, the affected environment was described based upon the visual sensitivity of areas within and visible from the base. These areas were categorized as high-, medium-, and low-sensitivity. The Proposed Action and alternatives were then evaluated to identify land uses to be developed, visual modifications that would occur, and new areas of visual sensitivity and determine whether modification of unique or otherwise irreplaceable visual resources would occur and detract from the visual qualities or setting. Consistency with applicable plans that protect visual resources was also examined.

2.3 TRANSPORTATION

Potential impacts to transportation due to the Proposed Action and alternative reuse plans for Williams AFB focus on key roads, local airport use, and rail service in the area, including those segments of the

transportation networks in the region that serve as direct or mandatory indirect linkages to the base, and those that are commonly used by Williams AFB personnel. The need for improvements to on-base roads, off-base access, and regional arterials was considered. The analysis was derived using information from state and local government agencies, including the Arizona Department of Transportation, the Maricopa Association of Governments, Maricopa County, the Town of Gilbert, the U.S. Air Force, local airport authorities, and railroad companies. Other data sources used for the roadway analysis include the Institute of Transportation Engineers and the Transportation Research Board. The ROI for the transportation analysis includes the existing principal road, air, and rail networks in the Phoenix Metropolitan Statistical Area (MSA) with emphasis on the immediate area surrounding Williams AFB.

The number of vehicle trips expected as a result of specific land uses on the site was estimated for the years 1991 (preclosure), 1993 (closure), 1998, 2003, and 2013 on the basis of direct on-site jobs and other attributes of on-site land uses (such as the number of dwelling units, projected airport passenger volume, commercial and industrial development, and other factors). Trip generation data from the Institute of Transportation Engineers was used to determine vehicle trips. Vehicle trips were then allocated to the local road network using prior patterns and expected destinations and sources of trips. When appropriate, the local road network was adjusted to account for changes over time from presently planned road capacity improvements and improvements required by the proposed reuse scenarios. Traffic was assigned or removed from the most direct commuting routes based on changes in work and associated travel patterns. Freeway-bound traffic was determined as a percentage of total trips and then distributed to key regional roads based on trip length distribution. Changes in traffic volumes arising from reuse alternatives at Williams AFB were estimated and resulting volume changes on key local, regional, and on-base roadway segments were then determined.

The transportation network in the ROI was then examined to identify potential impacts to levels of service (LOS) arising from future baseline conditions (caretaker status of Williams AFB) and effects of reuse alternatives. Planning computations from the Highway Capacity Manual were used to determine the number of lanes required to provide for a given level of service. The planning application provided estimates of traffic and anticipated levels of service where the amount of detail and accuracy of information were limited. The planning procedures used in this analysis were based on forecasts of average annual daily traffic and on assumed traffic, roadway, and control conditions. The results provided a basic assessment of whether or not capacity would be exceeded for a given volume. The results provided an estimate of the changes in LOS ratings expected as a result of traffic volume changes on key local, regional, and on-base roadway segments.

Airspace use in the vicinity of an airport is driven primarily by such factors as runway alignment, surrounding obstacles and terrain, air traffic control and navigational aid capabilities, proximity of other airports/airspace uses in the area, and noise considerations. These same factors normally apply regardless of whether the airport is used for military or civil aircraft operations. For this reason, a preclosure reference was used in characterizing these factors related to airspace use at Williams AFB.

Historic data on military aircraft operations used to characterize airspace use at and around Williams AFB were obtained from the base. Airport owners/operators were contacted to obtain information on civil airport use. Aviation forecasts were derived from the reuse plans, and, where necessary, assumptions were made based on other similar airport operational environments.

The ROI for the airspace analysis consists of the area within a 30 nautical mile (NM) radius of Williams AFB that contains the airspace structure associated with the control of arrivals and departures at Williams AFB and arrivals and departures at other nearby airports. This airspace structure is comprised of controlled airspace areas with altitude limits that range from the surface up to 19,000 feet mean sea level (MSL), defense-related airspace with altitude limits that range from the surface to 35,000 MSL, and uncontrolled airspace that extends up to the base of the Continental Control Area which begins at 14,500 MSL. The airspace ROI also encompasses special use airspace including the Williams 1 Military Operating Area (MOA), the westernmost portion of the Williams 4 MOA, and Restricted Area R-2310. Other military use airspace within the ROI include segments of four military training routes (MTRs) (IR 272-273, IR 274, IR 273-274, and VR 267-268-269). This airspace area is within the control jurisdiction of the Federal Aviation Administration (FAA) terminal radar control (TRACON) facility located at Phoenix Sky Harbor International Airport.

The types and levels of aircraft operations projected for the Proposed Action and alternatives were evaluated and compared to the way airspace was configured and used under the preclosure reference. Potential effects on airspace use were assessed, based on the extent to which projected operations could (1) require modifications to the airspace structure or air traffic control systems and/or facilities; (2) restrict, limit, or otherwise delay other air traffic in the region; or (3) encroach on other airspace areas and uses. It was recognized throughout the analysis process that a more in-depth study would be conducted by the FAA to identify any impacts of the reuse activities and what actions would be required to support the projected aircraft operations. Therefore, this analysis was used only to consider the level of operations that could likely be accommodated under the existing airspace structure and to identify potential impacts if operational capacities were exceeded. Data addressing private, passenger, and cargo air service in

the region were acquired directly from representatives of airports serving the area and air transportation studies of the area.

Information regarding existing passenger rail transportation was obtained from AMTRAK. Projected effects of reuse alternatives on railroad transportation were based on projected populations using current passenger to population ratios. Population figures were used since none of the alternatives assumes direct use of local railroads. Information regarding existing rail freight transportation was obtained from Southern Pacific. Effects on freight rail transportation were based on projected population growth rates using current freight-to-population ratios.

2.4 UTILITIES

Utility usage was determined based on land uses and projected area population increases. The utility systems addressed in this analysis include the facilities and infrastructure used for potable water (pumping, treatment, storage, and distribution), wastewater (collection and treatment), solid waste (collection and disposal), and energy generation and distribution (electricity and natural gas). Historical consumption data, service curtailment data, peak-demand characteristics, storage and distribution capacities, and related information for base utilities (including projections of future utility demand for each utility provider's particular service area) were extracted from various engineering reports and demand projection studies developed by the local utilities. Information was also obtained from public and private utility purveyors and related county and city agencies.

The ROI for this analysis comprised the service areas of the local purveyors of potable water, wastewater treatment, and energy that serve Williams AFB and the surrounding area. It was assumed that these local purveyors would provide services within the area of the existing base after disposal/reuse.

Potential impacts were evaluated based on long-term projections of demand and population obtained from the various utility purveyors within the region (through 2015) for each of their respective service areas. Except for water and wastewater services which (until disposal and reuse) are provided by the base itself, purveyors provided the most recent comprehensive projections. These projections were then adjusted to reflect the decrease in demand associated with closure of Williams AFB and its subsequent operation under caretaker status. These adjusted forecasts were considered the closure baseline for comparison with potential reuse alternatives. For water and wastewater, Williams AFB provided projections that accounted for decreases in demand due to closure.

The potential effects of reuse alternatives were evaluated by estimating and comparing the additional direct and indirect demand associated with each

alternative to the existing and projected operating capabilities of each utility system. Estimates of direct utility demands on-site were used to identify the effects of the reuse activities on site-related utility systems. All changes to the utility purveyors' long-term forecasts were based on estimated project-related population changes in the region and the future rates of per capita demand explicitly indicated by each purveyor's projections or derived from those projections. It was assumed that the regional per-capita demand rates were representative of the reuse activities, based on assumed similarities between proposed land uses and existing or projected uses in the region. Projections in the utilities analysis include direct demand associated with activities planned on base property as well as resulting changes in domestic demand associated with population changes in the region.

3.0 HAZARDOUS MATERIALS AND HAZARDOUS WASTE MANAGEMENT

Two categories of hazardous materials and hazardous waste management issues were addressed for this analysis: (1) impacts of hazardous materials utilized and hazardous wastes generated by each reuse proposal and (2) residual impacts associated with past Air Force practices including delays due to Installation Restoration Program (IRP) site remediation. IRP sites were identified as part of the affected environment (Chapter 3) while remediation impacts associated with these sites were addressed as environmental consequences (Chapter 4). Impacts of wastes generated by each reuse proposal were also addressed in Chapter 4. Primary sources of data were existing published reports such as IRP documents, management plans for various toxic or hazardous substances (e.g., spill response, hazardous waste, asbestos), and survey results (e.g., radon, asbestos). Pertinent federal, state, and local regulations and standards were reviewed for applicability to the Proposed Action and alternatives. Hazardous materials and waste management plans and inventories were obtained from Williams AFB. Interviews with personnel associated with these on-base agencies provided the information necessary to fill any data gaps.

The ROI includes the current base property and all geographical areas that have been affected by an on-base release of a hazardous material or hazardous waste. The IRP sites are located within the base boundary.

Preclosure baseline conditions as defined for this study include current hazardous materials/waste management practices and inventories pertaining to the following areas: hazardous materials, hazardous waste, IRP sites, aboveground and underground storage tanks, asbestos, pesticides, polychlorinated biphenyls (PCBs), radon, and medical/biohazardous waste. The impact analysis considered (1) the amount and type of hazardous materials/waste currently associated with specific facilities and/or areas proposed under each reuse alternative, (2) the regulatory requirements or restrictions associated with property transfer and reuse, (3) delays to development due to IRP remediation activities, and (4) remediation activities

and schedules for specific hazardous materials/waste (e.g., PCBs, radon, asbestos) currently used by the Air Force.

4.0 NATURAL ENVIRONMENT

4.1 SOILS AND GEOLOGY

Evaluation of soils impacts addressed erosion potential, construction-related dust generation and other soils problems (low soil strength, expansive soils, etc.), and disturbance of unique soil types. Information was obtained from several federal, state, and local agencies including the U.S. Department of Agriculture Soil Conservation Service (SCS) and the Arizona Geological Survey. Assessment of potential impacts to geology from the reuse alternatives included evaluation of resource potential (especially aggregates), geologic hazards (particularly the potential for seismicity, liquefaction, and subsidence), and flooding potential.

The soils analysis was based on a review of SCS documents for soil properties. The soils in the ROI were then evaluated for erosion potential, permeability, evidence of hardpans, expansive soil characteristics, etc., as these relate to construction problems and erosion potential during construction. Mitigations were evaluated based on SCS recommendations. Common engineering practices were reviewed to determine poor soil characteristics and recommended mitigation measures.

The ROI for the geologic analysis included the region surrounding Williams AFB relative to seismic activity, aggregate resources, and flooding potential. The ROI for the soils analysis was limited to the base and specific areas designated for construction or renovation.

The geologic analysis was based on a review of existing literature for construction problems associated with geologic hazards, availability of construction aggregate, and whether reuse would impact the availability of known mineral resources.

4.2 WATER RESOURCES

Analysis of impacts of the reuse alternatives on water resources considered groundwater quality and quantity, surface water quality (effects from erosion or sedimentation and contamination), surface water drainage diversion, and non-point source surface runoff. Information was obtained from several federal, state, and local agencies including the U.S. Geological Survey, the Arizona Department of Water Resources, and the Maricopa County Flood Control Office. The ROI for water resources included the groundwater basin underlying the base, the surface drainages directly affected by runoff from the base, and the 100-year floodplain in the vicinity

of the base. It also encompassed areas beyond the base that would be affected by changes in resource usage.

Existing surface water conditions were evaluated for flood potential, non-point source discharge or transportation of contaminants, and surface water quality. The existing stormwater drainage system was evaluated based on available literature, and the impacts to this system from each of the reuse alternatives were determined. Groundwater resources were evaluated with regard to the availability of adequate water supplies for each of the reuse alternatives. It was assumed that water from the Central Arizona Project (CAP) would supplement existing water supplies to meet increased demands.

4.3 AIR QUALITY

The air quality resource is defined as the condition of the atmosphere, expressed in terms of the concentrations of air pollutants occurring in an area as the result of emissions from natural and/or man-made sources. Disposal/reuse alternatives have the potential to affect air quality depending on changes in the release of both gaseous and particulate matter emissions. The impact significance of these emissions was determined by comparing the resulting atmospheric concentrations to state and federal ambient air quality standards. This analysis drew from meteorological data, air quality monitoring data, baseline emission inventory information, construction scheduling projections, project-related source information, and transportation data. Principal sources for these data were the Arizona Department of Environmental Quality (ADEQ), the Maricopa County Bureau of Air Pollution Control (MCBAPC), the Maricopa Association of Governments (MAG), the Pinal County Air Quality Control District, the Arizona State University (ASU) Office of Climatology, the Williams AFB 82nd Civil Engineering Squadron, and modeling results.

The ROI was determined by emissions from sources associated with construction and operation of the disposal/reuse alternatives. For inert pollutant emissions (all pollutants other than ozone and its precursors), the measurable ROI is limited to a few miles downwind from the source (i.e., the immediate area of Williams AFB). The ROI for ozone impacts from project emissions includes the airshed surrounding Williams AFB.

Emissions predicted to result from each reuse alternative were compared to existing baseline emissions to determine the potential for adverse air quality impact. Impacts were also assessed by modeling, where appropriate, and compared to air quality standards and attainment levels for complying with these standards. Appendix K contains the projected emissions inventory information and methods. Background concentrations were added to the project impacts for comparison with the standards and attainment levels. Impacts were considered significant if project emissions would (1) increase

an off-site ambient pollutant concentration from below to above a federal, state, or local standard; (2) contribute a measurable amount to an existing or projected air quality standard exceedance; (3) be inconsistent with measures contained in the air quality attainment plans of the ADEQ or MAG; or (4) expose sensitive receptors (such as schools or hospitals) to substantial pollutant concentrations. All other air quality impacts were considered insignificant.

The Emissions Dispersion Modeling System (EDMS) Version 2.2 (Segal, 1991) was used to assess mobile source (aircraft and vehicular) air quality impacts associated with all reuse alternatives. EDMS was jointly developed by the U.S. Air Force and the Federal Aviation Administration (FAA) to assess air quality impacts near civilian and military airports. EDMS incorporates an emission model to calculate emissions inventories and a Graphical Input Microcomputer Model (GIMM) to calculate pollutant concentrations at specified receptors. The GIMM processes point, area, and line sources and operates in both a screening mode and a refined mode, accepting up to 170 sources and 200 receptors. EDMS was used in a screening mode to estimate concentrations from mobile source emissions. When screening mode results indicated an exceedance of an ambient air quality standard, the model was used in a refined mode to more accurately predict pollutant concentrations. All stationary source emissions were generated from worksheets, and the U.S. EPA SCREEN model (Brode, 1988) was used to estimate stationary source impacts resulting from fuel combustion, aircraft ground operations, and waste burning.

Input to the EDMS model is divided into three major emissions groups: an emissions source group, a meteorological data group, and a receptor group. The emissions source group contains aircraft flying operations and vehicular traffic. For motor vehicles, modeling inputs included road geometry, vehicle speed, vehicle volume, and cold start percentage. For aircraft, modeling inputs included the number of aircraft takeoffs and touch-and-goes by aircraft type and typical queue lengths.

Input to the SCREEN model included parameters such as stack height, stack inside diameter, flue gas exit temperature, and gas exit velocity. Typical and conservative stack data were used for these stack parameters as follows: stack height 5 meters, stack inside diameter 0.3 meters, flue gas temperature 100°C, and gas velocity 1 meter per second. An automated array of receptors, ranging from 10 meters to 10,000 meters, was selected for the modeling run. To conservatively estimate the impact concentration, all of the modeled stationary sources for the respective year and reuse alternative were collocated to one stack, using the stack parameters given above. Modeled concentrations at receptors located 500 meters from the collocated stack were used to assess impacts from the SCREEN model since this receptor location resulted in the highest predicted concentrations for the F-stability class and 1 meter per second wind speed used in the analysis.

These approaches are reasonable and conservative since the actual sources would be spread around the 3 km by 4 km site area.

The following assumptions were made in estimating the criteria pollutant emission levels associated with all of the reuse alternatives:

- The emission inventory associated with aircraft flying operations was based on the projected aircraft flying operations and the emissions determined by the EDMS model.

- The emission inventory for aircraft ground operations associated with civilian aircraft was based on the ratio of engine runups to flight operations, as defined by the Williams AFB *1990 Air Emissions Inventory* (U.S. Air Force, 1991). This is a conservative estimate since there is usually less engine testing for civilian aircraft than for military aircraft. Engine testing for commercial aircraft is not included since no engine testing for these aircraft is anticipated.

- Emission rates associated with aircraft ground equipment are based on the ratio of emissions to flight operations, as defined by the Williams AFB *1990 Air Emissions Inventory* data.

- Emission rates associated with fuel combustion are provided in Appendix K. Emission rates for residential fuel combustion were based on the ratio of 1989 Maricopa County residential fuel combustion emissions (Maricopa County Bureau of Air Pollution Control, 1992) to 1989 Maricopa County occupied housing units (Maricopa Association of Governments, 1992). Emissions of industrial and commercial/institutional fuel combustion were based on the ratio of Maricopa County industrial and commercial/institutional fuel combustion emissions to Maricopa County industrial and commercial/institutional employment, respectively.

- Emissions associated with waste burning, petroleum storage and transfer, solvent use, and non-construction/demolition related off-road vehicle emissions were based on the ratio of emissions for the respective source categories in Maricopa County in 1989 to total Maricopa County population in 1989.

- Emissions associated with industrial processes were based on the ratio of industrial process emissions in Maricopa County in 1989 to the industrial employment in Maricopa County in 1989.

- Emissions associated with construction/demolition were composed of two parts, fugitive dust emissions and heavy construction equipment emissions. Fugitive dust emissions are

based on construction area and emission factors from the U.S. EPA guidance document, *Compilation of Air Pollutant Emission Factors* (U.S. Environmental Protection Agency, 1992). The fugitive dust emission factor is 1.2 tons/acre/month. Assuming that 50 percent of fugitive emissions are PM_{10}, and that a month consists of 22 working days, the PM_{10} emission factor is about 55 lbs/acre/day. Construction disturbance was estimated to average four days, yielding an effective PM_{10} generation rate of approximately 220 lbs/acre. Heavy equipment emissions were based on the number of pieces of heavy construction/demolition equipment and emission factors for diesel-powered heavy construction equipment. The number of pieces of heavy construction equipment was assumed to be 5 percent of the number of construction workers. The number of pieces of heavy demolition equipment was assumed to be 40 percent of the number of demolition workers. These percentages were derived from *Means Square Foot Costs, 1992* (R.S. Means Company, 1991), based on the construction employment categories associated with the base reuse alternatives.

- Indirect air pollutant emissions associated with the operation of Williams AFB in 1990 were derived from the indirect employment data for Williams AFB and the similar air emissions projection methods used in calculating direct air pollutant emissions. The indirect employment data by emissions source category and land use category associated with operation of Williams AFB in 1990 were based on total employment data from the Economic Resource Impact Statement (U.S. Air Force, 1990) and the Regional Input-Output Modeling System (U.S. Bureau of Economic Analysis, 1992).

- On-road vehicle emissions were based on total projected on-base miles traveled and the emission factors from the U.S. EPA Mobile source emissions model, MOBILE 4 (NO_x, CO, and VOCs), and the EDMS model (SO_x and PM_{10}).

- For the EDMS screening mode modeling, a temporal factor of 15/24 was applied to all aircraft flying operation emissions to obtain annual emission rates (i.e., all aircraft operation emissions in a 24-hour period were concentrated into a 15-hour period). This factor is used to more accurately estimate the annual emissions by concentrating the hourly emissions during the periods of highest aviation activity; the daytime. For the EDMS refined mode modeling, aircraft flying operations were estimated directly by using peak hourly aircraft operations rates. These hourly rates were adjusted to 8-hour average

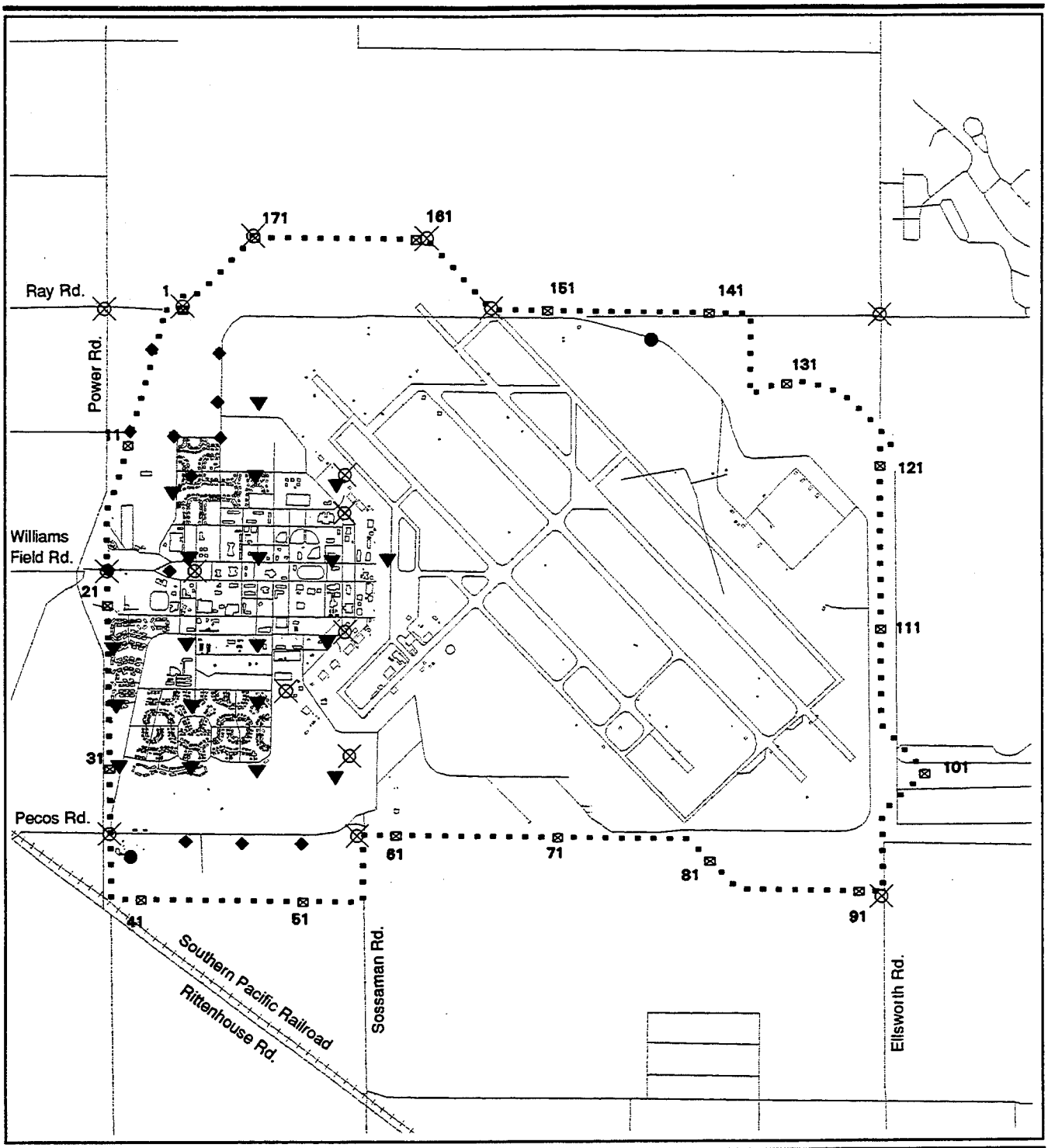
rates corresponding to the pollutant averaging period that was analyzed.

The projected employment/population data for each year and alternative analyzed were multiplied by the ratio of the 1989 Maricopa County emissions to 1989 Maricopa County employment/population data for the applicable pollutant and source category to obtain the respective emission levels. For the fuel combustion source category, short-term emissions were assumed to be three times the long-term emissions in order to predict short-term concentrations of air pollutants.

For the EDMS screening mode modeling, the meteorological data group contained a variety of "worst case" meteorological conditions which combine 1 meter per second wind speeds with F atmospheric stability class in conjunction with wind directions at 10 degree intervals. These "worst case" meteorological conditions were also used in the SCREEN model for the stationary source dispersion modeling. For the EDMS refined mode modeling, the meteorological data group consisted of one year of data from the Rittenhouse, AZ PRISMS Network Station. This meteorological station, located within 3 miles of Williams AFB, provides meteorological data which is representative of Williams AFB and was used because 24-hour data was not available from the base. Meteorological data from 1991 was used since it represents the most recent complete data set.

For the EDMS screening mode modeling receptor data group, a set of receptors along the base boundary or the reuse alternative boundary was used with receptor spacings of 200 meters. Receptors were also placed at locations on the base that would experience the highest levels of public access (e.g., terminals, parking lots) and at other sensitive locations (e.g., schools, hospitals). Figure E-1 presents the locations of the screening mode modeling receptors. For the EDMS refined mode modeling, a receptor array was selected based on locations having the highest predicted EDMS screening mode impacts and at other locations which were expected to result in peak concentrations. Figure E-2 presents the locations of the EDMS refined mode modeling receptors. The SCREEN model was used to determine the receptor location with the highest predicted concentration from stationary sources. This concentration was then summed with either the EDMS screening mode or refined mode predicted impacts to determine total reuse-related impacts.

Projected vehicle traffic impacts associated with each reuse alternative were assessed using the U.S. EPA MOBILE 4 and EDMS models. While an updated MOBILE 5 version is currently available, EDMS has not yet been updated with the MOBILE 5 emission factors. Consequently, MOBILE 4 was used for all analyses in this EIS. Input parameters associated with these models included road geometry, traffic volume data, state maintenance and inspection data, cold start percentage, and state anti-tampering data.



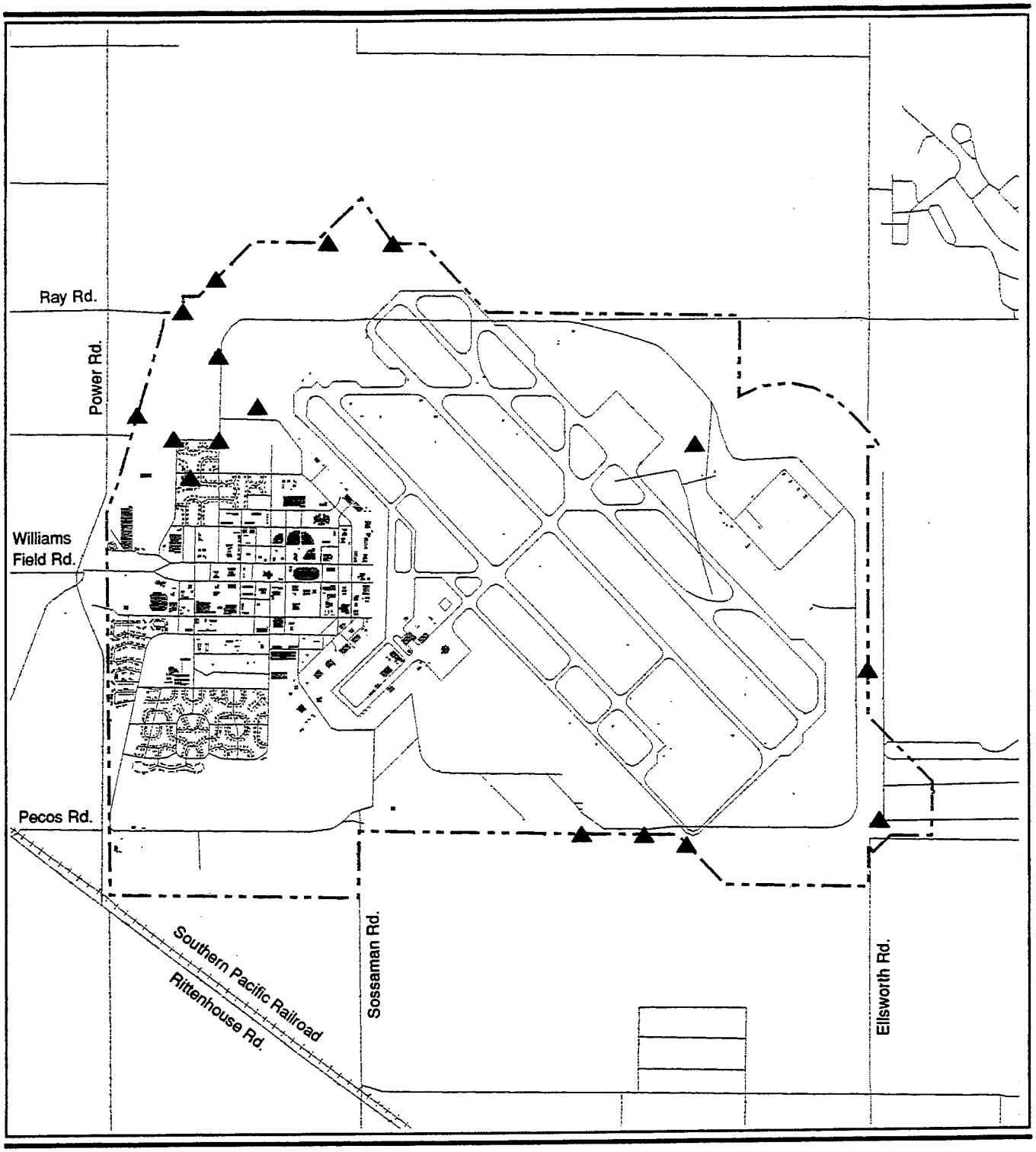
EXPLANATION

- Road Intersection Receptor
- Commercial Receptor
- Public/Recreation Receptor
- Institutional Receptor
- Boundary Receptor

EDMS Screening Mode Modeling Receptor Locations

0 750 1500 3000 Feet

Figure E-1



EXPLANATION

▲ Receptor Locations

- - - — Base Boundery

EDMS Refined Mode Modeling Receptor Locations

0 750 1500 3000 Feet

Figure E-2

MOBILE 4 includes vehicular fleet mix information that incorporates the more stringent emissions requirements resulting from the Clean Air Act Amendments of 1990. Emission factors obtained from MOBILE 4 include NO_x, CO, and VOCs. Emission factors of SO_x and PM_{10} were obtained from EDMS.

Air quality dispersion modeling was performed for each of the reuse alternatives for the years 1993, 1998, and 2003. Modeling of the No-Action Alternative was not necessary since the air emissions from the base are negligible for this alternative.

The predicted concentrations from either the EDMS screening mode or refined mode model results and the SCREEN model results were added to estimate the total impact concentrations for the respective receptor location for each year and reuse alternative. Short-term and long-term stationary emissions were used to assess respective short-term and long-term concentrations generated from the SCREEN model for fuel combustion sources.

4.4 NOISE

The noise analysis addressed potential noise impacts from reuse-generated aircraft operations, surface traffic, and other identified noise sources on communities surrounding Williams AFB. Most of the data were obtained from the aircraft operations and traffic data prepared for the reuse alternatives. Day-night levels (DNL) were used to determine noise impacts. A single-event noise analysis using sound exposure levels (SEL) was also performed. Scientific literature on noise effects was also referenced.

The ROI for noise was defined as the area within the DNL 65 dB contour, based on land use compatibility guidelines developed from FAA regulations (Federal Aviation Administration, 1989). The ROI for surface traffic noise impacts incorporated key road segments identified in the transportation analysis.

Noise levels from aircraft operations were estimated using the Air Force's approved Noise Exposure Model (NOISEMAP), version 6.1. This model was considered appropriate for the reuse alternatives under consideration since they involve both civilian and military aviation uses. NOISEMAP can simulate civilian and military aircraft operations.

Noise contours for DNL 65 dB and above were depicted. Noise levels due to surface traffic were estimated using the *Federal Highway Administration, Highway Traffic Noise Prediction Model* (U.S. Department of Transportation, 1978). Potential noise impacts were identified by overlaying the noise contours with land use and population information to determine the number of residents who would be exposed to DNL above 65 dB.

SELs related to reuse alternatives were provided for representative noise receptors exposed to aircraft noise from the Williams AFB airfield. The SELs presented were outdoor levels and took into account the location of the receptors relative to the various flight tracks and aircraft profiles used. Noise reduction effects for common construction were included in the analysis; however, evaluation of receptors relative to noise reduction levels of specific structures was not performed.

Methods used to analyze noise impacts under each reuse scenario are presented in detail in Appendix I of this EIS.

4.5 BIOLOGICAL RESOURCES

Biological resources addressed in relation to disposal and reuse of Williams AFB include vegetation, wildlife, threatened and endangered species, and sensitive habitats. Primary data sources for the analysis included published literature and reports, field reconnaissance of the base, and contacts with agencies such as the U.S. Fish and Wildlife Service, the Arizona Department of Game and Fish, and the Arizona Department of Agriculture and Horticulture (ADAH). The ROI for the biological resources assessment comprised Williams AFB itself, other areas directly affected by reuse alternatives, and an area extending approximately one mile around the base property.

The Arizona Native Plant Law (Arizona Revised Statutes, Chapter 7) protects native plant species, their seeds, and their fruits, from destruction or removal if growing wild on state, public, or privately owned land. The law is administered by the ADAH. Plant species are placed into five categories of protection:

1. Highly Safeguarded: Native plants or those plants whose prospects for survival are presently or in the foreseeable future in danger of extinction throughout all or parts of their range.

2. Salvage Restricted: Native plants which are subject to high potential for damage by theft or vandalism.

3. Export Restricted: Native plants that are subject to overdepletion if their export from the state is permitted.

4. Salvage Assessed: Native plants with sufficient value to be exported and that support the cost of salvage tags.

5. Harvest Restricted: Native plants that are subject to excessive harvesting or overcutting because of the value of their byproducts, fiber, or woody parts.

To ensure compliance with the Arizona Native Plant Law, consultation with the ADAH took place on June 2, 1992 at Williams AFB. A walk- and drive-over was performed by the ADAH. Additional consultation with the ADAH will need to occur prior to ground-disturbing activities.

Vegetation and sensitive biological resources (e.g., wetlands and protected species) on the base were mapped using aerial photographs and field observations made during a reconnaissance survey of the base during the week of June 1-5, 1992 to ground-truth the photos. Flora and fauna on the base and in the surrounding area were also identified during the survey. Wildlife was observed from morning to late evening by walking and driving the base and the surrounding county roads. A spotlighting survey was also conducted to identify nocturnal wildlife. Plants and sensitive habitats were also identified during the surveys. The potential presence of wetlands on the base was assessed using the methods set forth in the *Corps of Engineers Wetland Delineation Manual* (U.S. Army Corps of Engineers, 1987). The resulting maps were entered into the computerized geographical information system (GIS).

The impact analysis was performed by overlaying project land use maps for each alternative onto the biological resource maps using the GIS to calculate the overlap by land use. The computer output (figures and tabular data) was then combined with percent development factors within the 20-year study period and type of development proposed (e.g., new construction or reuse of existing facilities) for each land use to estimate the amount of habitat that could be affected. The proportion of disturbance associated with each land use category was determined based on accepted land use planning concepts. It was assumed that disturbance could occur at one or more sites within the land use polygon, unless designated as vacant land on the project maps. Disturbance of each habitat type present was considered to be in direct proportion to the development factor. These impacts were further divided into three development phases by visually comparing maps showing the proposed schedule of development with the resource maps. All other impacts were qualitatively assessed based on literature data and scientific expertise on the responses of plants and animals to project-related disturbances such as noise, landscaping, and vegetation maintenance.

4.6 CULTURAL RESOURCES

Cultural resources generally include three main categories: prehistoric resources, historic structures and resources, and traditional resources. For the purposes of this EIS, cultural resources were defined to also include paleontological resources: the fossil evidence of past plant and animal life. Prehistoric resources are places where human activity has measurably altered the earth or left deposits of physical remains. Historic structures and resources include standing structures and other physical remains of historic significance. Traditional resources are topographical areas, features,

habitats, plants, animals, minerals, or archaeological sites that contemporary Native Americans or other groups value presently, or did so in the past, and consider essential for the persistence of their traditional culture. Cultural resources of particular concern include properties listed on the National Register of Historic Places (NRHP), properties potentially eligible for the NRHP, and sacred Native American sites and areas.

Data used to compile information on these resources were obtained from existing environmental documents; material on file at Williams AFB; recent cultural resource reports pertaining to the base; interviews with individuals familiar with the history, archaeology, or paleontology of the area surrounding Williams AFB; and records of the Arizona State Historic Preservation Office (SHPO). The ROI for archaeological, historic, and Native American resources includes all areas within the boundaries of Williams AFB and off-base acreage which may be included in any of the reuse alternatives.

According to National Register criteria (36 CFR 60.4), the quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling and association and

a) that are associated with events that have made a significant contribution to the broad patterns of history; or

b) that are associated with the lives of persons significant in the past; or

c) that embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; possess high artistic value; or represent a significant and distinguishable entity whose components may lack individual distinction; or

d) that have yielded, or may be likely to yield, information important in prehistory or history.

To be listed in or considered eligible for listing in the National Register, a cultural resource must meet at least one of the above criteria and must also possess integrity of location, design, setting, materials, workmanship, feeling, and association. Integrity is defined as the authenticity of a property's historic identity, as evidenced by the survival of physical characteristics that existed during the property's historic or prehistoric occupation or use. If a resource retains the physical characteristics it possessed in the past, it has the capacity to convey information about a culture or people, historical patterns, or architectural or engineering design and technology.

Compliance with requirements of cultural resource laws and regulations ideally involves four basic steps: (1) identification of significant cultural resources that could be affected by the Proposed Action or its alternatives, (2) assessment of the impacts or effects of these actions, (3) determination of significance of potential historic properties within the ROI, and (4) development and implementation of measures to eliminate or reduce adverse impacts. The primary law governing cultural resources in terms of their treatment in an environmental analysis is the National Historic Preservation Act (NHPA), which addresses the protection of historic and cultural properties. In compliance with the NHPA, the Air Force is in the process of consultation with the SHPO, as required under Section 106 of the Act.

The EIS contains the most up-to-date information on cultural resources on Williams AFB. Based on an inventory conducted by Williams AFB, thirty-four (34) pre-1945 structures were identified. An assessment of significance of these structures was documented in the *Williams Air Force Base Historic Building Survey* (Woodward et al., 1993) and through consultations with the SHPO. For archaeological resources, a Class I overview consisting of a literature and records search at the State Historic Preservation Office and Williams AFB was conducted the week of June 8-12, 1992. A surface survey of undisturbed areas of Williams AFB was subsequently conducted to determine whether additional archaeological resources, beyond those identified during the Class I overview, may be present (Anduze et al., 1993). Cultural resources for which NRHP eligibility information was unavailable will be addressed as part of either a Programmatic Agreement (PA) or a Memorandum of Agreement (MOA) between the Air Force and the SHPO.

Adverse effects that may occur as a result of base reuse are those that have a negative impact on characteristics that make a resource eligible for listing on the NRHP. Actions that can diminish the integrity, research potential, or other important characteristics of a historic property include the following (36 CFR 800.9):

- Physical destruction, damage, or alteration of all or part of the property
- Isolating the property from its setting or altering the character of the property's setting when that character contributes to the property's qualification for the National Register
- Introduction of visual or auditory elements that are out of character with the property or that alter its setting
- Transfer or sale of a federally owned property without adequate conditions or restrictions regarding its preservation, maintenance, or use

- Neglect of a property, resulting in its deterioration or destruction.

Regulations for implementing Section 106 of the NHPA indicate that the transfer, conveyance, lease, or sale of a historic property are procedurally considered to be adverse effects, thereby ensuring full regulatory consideration in federal project planning and execution. However, effects of a project that would otherwise be found to be adverse may not be considered adverse if one of the following conditions exists:

- When the historic property is of value only for its potential contribution to archaeological, historical, or architectural research, and when such value can be substantially preserved through the conduct of appropriate research, and such research is conducted in accordance with applicable professional standards and guidelines

- When the undertaking is limited to the rehabilitation of buildings and structures and is conducted in a manner that preserves the historical and architectural value of the affected historic property through conformance with the Secretary's Standards for Rehabilitation and Guidelines for Rehabilitation of Historic Buildings

- When the undertaking is limited to the transfer, conveyance, lease, or sale of a historic property, and adequate restrictions or conditions are included to ensure preservation of the property's significant historic features.

The treatment of paleontological resources is governed by Public Law 74-292 (the National Natural Landmarks Program, implemented by 36 CFR 62). Only paleontological remains determined to be significant are subject to consideration and protection by a federal agency. Among the criteria used for National Natural Landmark designation are illustrative character, present condition, diversity, rarity, and value for science and education.

Criteria for assessing the importance of Native American resources are established through consultation with Native Americans according to the requirements of the American Indian Religious Freedom Act of 1978 (AIRFA) and Section 106 of the National Historic Preservation Act (NHPA). Since it is possible that prehistoric human remains may be impacted by subsurface testing to determine site eligibility for listing on the National Register of Historic Places, it is also necessary to conduct consultations in accordance with the Native American Graves Protection and Repatriation Act (NAGPRA). A listing of Native American contacts for Southern Arizona was provided by the SHPO. These representatives were contacted by telephone and a letter of notification was sent to each. Comments and suggestions relating to past occupation and religious activities on or near Williams AFB

were requested. In addition, meetings with representatives of concerned Native American tribal groups and communities were held to discuss prior claims to property located on Williams AFB and to ensure that resources sensitive to Native American culture are protected; these consultations are continuing.

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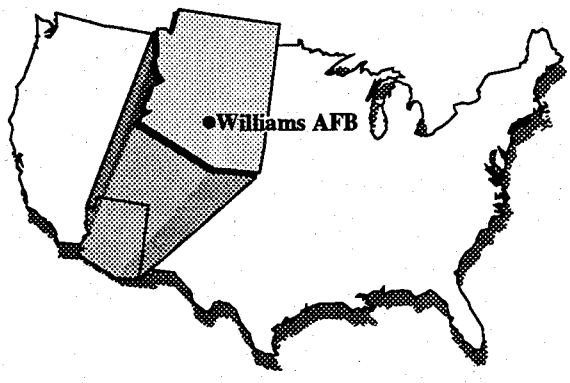


APPENDIX F

APPENDIX F
PERMITS

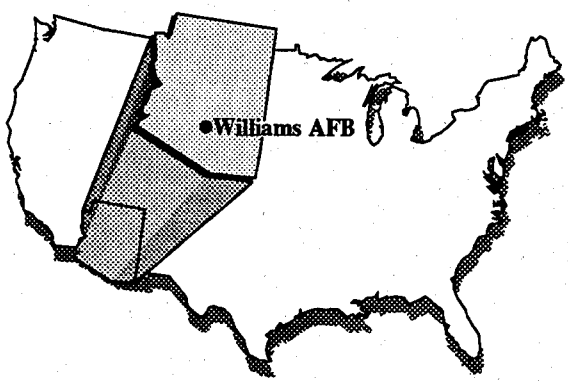
Permit No.	Permitted Facility/ Equipment	Issuing Agency	Original Date Issued	Date of Expiration
NPDES Permit: Wastewater/ Sewer Discharge				
AZ0110230	Wastewater Treatment Plant, Building 1011	U.S. EPA Region IX	October 29, 1989	October 29, 1994
RCRA (Part A) Permit: Interim Status Hazardous Waste Treatment, Storage, and Disposal				
AZ7570028582	Prime Beef Yard, Building 766	U.S. EPA Region IX	April 1982	Interim Status Expired in November 1992
Radioactive Material Permit				
02-10154-1AFP	Avionics Shop, Building 568	U.S. Air Force Radioisotope Committee, Office of the Surgeon General	Not Available	Expired April 30, 1993
Materials License				
42-27009-01	Calibration of Survey Instruments, and Calibration and Maintenance of Chemical Agent Detectors	U.S. Nuclear Regulatory Commission	Not Available	January 31, 1995
Air Emissions: Annual Permit to Operate				
A9200249	Bead Blaster Facility, Building 1541	Maricopa County Department of Health Services, Bureau of Air Pollution Control	April 15, 1992	November 30, 1992

PERMITS

Page 2 of 2

Permit No.	Permitted Facility/ Equipment	Issuing Agency	Original Date Issued	Date of Expiration
A8600402	Gasoline Non-Resale, Fuel Burning Generator, and Other Sources	Maricopa County Department of Health Services, Bureau of Air Pollution Control	Not Available	November 30, 1991*
Aquifer Protection Permit Application Submitted August 14, 1992	Golf Course Irrigation	Arizona Department of Environmental Quality	Issuance Pending	Not Applicable
Reclaimed Wastewater Reuse Permit Application Submitted November 21, 1990	Golf Course Irrigation	Arizona Department of Environmental Quality	Issuance Pending	Not Applicable

* Permit has expired and reissuance is pending.



APPENDIX G

APPENDIX G

AIR FORCE POLICY
MANAGEMENT OF ASBESTOS AT CLOSING BASES*

INTRODUCTION

Asbestos in building facilities is managed because of potential adverse human health effects. Asbestos must be removed or controlled if it is in a location and condition that constitutes a health hazard or a potential health hazard or it is otherwise required by law (e.g., schools). The hazard determination must be made by a health professional (in the case of the Air Force, a Bioenvironmental Engineer) trained to make such determinations. While removal is a remedy, in many cases management alternatives (such as encapsulation within the building) are acceptable and cost effective methods of dealing with asbestos. The keys to dealing with asbestos are knowing its location and condition and having a management plan to prevent asbestos containing materials that continue to serve their intended purpose from becoming a health hazard. There is no alternative to such management, because society does not have the resources to remove and dispose of all asbestos in all buildings in the United States. Most asbestos is not now nor will it become a health hazard if it is properly managed.

There are no laws applicable to closure bases that specifically mandate the removal or management of asbestos in buildings other than the law addressing asbestos in schools (P.L. 99-519). Statutory or regulatory requirements that result in removal or management of asbestos are based on human exposure or the potential for human exposure (i.e. National Emission Standards for Hazardous Air Pollutants (NESHAPS) = no visible emissions, OSHA = number of airborne fibers per cc). There are no statutory or other mandatory standards, criteria, or procedures for deciding what to do with asbestos. Thus, health professional judgement based on exposure levels or potential exposure levels must be the primary determinant of what should be done with asbestos. Apart from this professional and scientific approach, closing bases present the additional problem of obtaining an economic return to the Government for its property. Asbestos in closing base properties must also be analyzed to determine the most prudent course in terms of removal or remediation cost and the price that can be obtained as a result.

The following specific policies will apply to bases closed or realigned (so that there are excess facilities to be sold) under the base closure laws, P.L. 100-526 and P.L. 101-510.

1. Asbestos will be removed if:

   (a) The protection of human health as determined by the Bioenvironmental Engineer requires removal (e.g., exposed friable asbestos within a building) in accordance with applicable health laws, regulations, and standards

   (b) A building is unsalable without removal, or removal prior to sale is cost-effective; that is, the removal cost is low enough compared to value that would be received for a "clean" building that removal is a good

investment for the Government. Prior to the decision to remove asbestos solely for economic reasons, an economic analysis will be conducted to determine if demolition, removal of some types of asbestos but not others, or asbestos removal and sale would be in the best interests of the Government.

(c) A building is, or is intended to be, used as a school or child care facility.

2. When asbestos is present but none of the above applies, the asbestos will be managed using commonly accepted standards, criteria, and procedures to assure sufficient protection of human health and the environment, in accordance with applicable and developing health standards.

3. A thorough survey for asbestos (including review of facility records, visual inspection, and where appropriate as determined by the Bioenvironmental Engineer and the Base Civil Engineer, intrusive inspection) will be conducted by the Air Force prior to sale.

4. Appraisal instructions, advertisements for sale, and deeds will contain accurate descriptions of the types, quantities, locations, and condition of asbestos in any real property to be sold or otherwise transferred outside the Federal Government. Appraisals will indicate what discount the market would apply if the building were to be sold with the asbestos in place.

5. Encapsulated asbestos in a building structure, friable or not, is not regarded as hazardous waste by the Air Force, nor does encapsulation within the structure of a building constitute "storing" or "disposing of" hazardous waste. Asbestos incorporated into a building as part of the structure has not been "stored" or "disposed of."

6. Friable asbestos, or asbestos that will probably become friable, that has been stored or disposed of underground or elsewhere on the property to be sold will be properly disposed of, unless the location is a landfill or other disposal facility property permitted for friable asbestos disposal.

7. The final Air Force determination regarding the disposition of asbestos will be dependent on the plan for disposal and any reuse of the building. Decisions will take into account the proposed community reuse plan and the economic analysis of alternatives (see para 4). The course of action to be followed with respect to asbestos at each closing installation will be analyzed in the Disposal and Reuse Environmental Impact Statement and will be included in the record of decision (ROD). Any buildings or facilities where the proposed asbestos plan is controversial will be addressed in the ROD, either individually or as a class of closely related facilities.

8. Since other considerations must be taken into account at bases that are continuing to operate, this policy does not apply to them, nor is it necessarily a precedent for asbestos removal policy on them.

* The Air Force Policy on the Management of Asbestos at Closing Bases, dated November 6, 1990 and updated June 8, 1992, has been retyped for the purposes of clarity and legibility.

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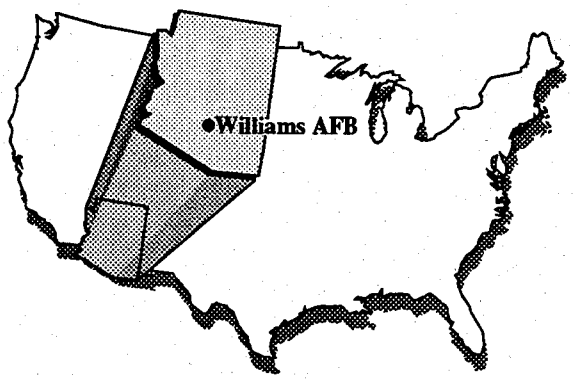

APPENDIX H

APPENDIX H
FARMLAND CONVERSION IMPACT RATING, FORM AD-1006

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U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*	Date Of Land Evaluation Request: September 17, 1992
Name Of Project: Williams Air Force Base Disposal and Reuse EIS	Federal Agency Involved: U.S. Air Force
Proposed Land Use: Aviation/Industrial/Educational	County And State: Maricopa County, Arizona (City of Mesa)
PART II *(To be completed by SCS)*	Date Request Received By SCS: 10-9-92

Does the site contain prime, unique, statewide or local important farmland? *(If no, the FPPA does not apply – do not complete additional parts of this form).*	Yes ☑	No ☐	Acres Irrigated: 306,000	Average Farm Size: 600 ac.

Major Crop(s): Cotton, alfalfa	Farmable Land In Govt. Jurisdiction: Acres: 306,000 5%	Amount Of Farmland As Defined in FPPA: Acres: 275,000 5%
Name Of Land Evaluation System Used: Field Office Technical Guide	Name Of Local Site Assessment System: —	Date Land Evaluation Returned By SCS: 11-4-92

PART III *(To be completed by Federal Agency)*	Alternative Site Rating: Site A 1	Site B 4	Site C 5	Site D 6
A. Total Acres To Be Converted Directly	0	0	263	25
B. Total Acres To Be Converted Indirectly	---	---	---	---
C. Total Acres In Site	0	0	263	25
PART IV *(To be completed by SCS)* Land Evaluation Information				
A. Total Acres Prime And Unique Farmland	0	0	135	0
B. Total Acres Statewide And Local Important Farmland	0	0	0	0
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted	0	0	.05%	0
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value	N/A	N/A	.05%	N/A
PART V *(To be completed by SCS)* Land Evaluation Criterion Relative Value Of Farmland To Be Converted *(Scale of 0 to 100 Points)*	N/A	N/A	100	N/A

PART VI *(To be completed by Federal Agency)* Site Assessment Criteria *(These criteria are explained in 7 CFR 658.5(b)*	Maximum Points				
1. Area In Nonurban Use	15			1	
2. Perimeter In Nonurban Use	10			9	
3. Percent Of Site Being Farmed	20			0	
4. Protection Provided By State And Local Government	20			0	
5. Distance From Urban Builtup Area	15			15	
6. Distance To Urban Support Services	15			10	
7. Size Of Present Farm Unit Compared To Average	10			0	
8. Creation Of Nonfarmable Farmland	10			10	
9. Availability Of Farm Support Services	5			5	
10. On-Farm Investments	20			10	
11. Effects Of Conversion On Farm Support Services	10			0	
12. Compatibility With Existing Agricultural Use	10			10	
TOTAL SITE ASSESSMENT POINTS	160			70	
PART VII *(To be completed by Federal Agency)*					
Relative Value Of Farmland *(From Part V)*	100	N/A	N/A	100	N/A
Total Site Assessment *(From Part VI above or a local site assessment)*	160			70	
TOTAL POINTS *(Total of above 2 lines)*	260	N/A	N/A	170	N/A

Site Selected:	Date Of Selection	Was A Local Site Assessment Used? Yes ☐ No ☐

Reason For Selection:

(See Instructions on reverse side)

Form AD-1006 (10-83)

STEPS IN THE PROCESSING THE FARMLAND AND CONVERSION IMPACT RATING FORM

Step 1 – Federal agencies involved in proposed projects that may convert farmland, as defined in the Farmland Protection Policy Act (FPPA) to nonagricultural uses, will initially complete Parts I and III of the form.

Step 2 – Originator will send copies A, B and C together with maps indicating locations of site(s), to the Soil Conservation Service (SCS) local field office and retain copy D for their files. (Note: SCS has a field office in most counties in the U.S. The field office is usually located in the county seat. A list of field office locations are available from the SCS State Conservationist in each state).

Step 3 – SCS will, within 45 calendar days after receipt of form, make a determination as to whether the site(s) of the proposed project contains prime, unique, statewide or local important farmland.

Step 4 – In cases where farmland covered by the FPPA will be converted by the proposed project, SCS field offices will complete Parts II, IV and V of the form.

Step 5 – SCS will return copy A and B of the form to the Federal agency involved in the project. (Copy C will be retained for SCS records).

Step 6 – The Federal agency involved in the proposed project will complete Parts VI and VII of the form.

Step 7 – The Federal agency involved in the proposed project will make a determination as to whether the proposed conversion is consistent with the FPPA and the agency's internal policies.

INSTRUCTIONS FOR COMPLETING THE FARMLAND CONVERSION IMPACT RATING FORM

Part I: In completing the "County And State" questions list all the local governments that are responsible for local land controls where site(s) are to be evaluated.

Part III: In completing item B (Total Acres To Be Converted Indirectly), include the following:

1. Acres not being directly converted but that would no longer be capable of being farmed after the conversion, because the conversion would restrict access to them.

2. Acres planned to receive services from an infrastructure project as indicated in the project justification (e.g. highways, utilities) that will cause a direct conversion.

Part VI: Do not complete Part VI if a local site assessment is used.

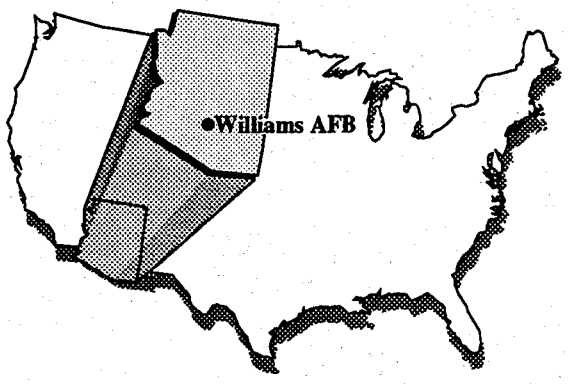
Assign the maximum points for each site assessment criterion as shown in §658.5(b) of CFR. In cases of corridor-type projects such as transportation, powerline and flood control, criteria #5 and #6 will not apply and will be weighed zero, however, criterion #8 will be weighed a maximum of 25 points, and criterion #11 a maximum of 25 points.

Individual Federal agencies at the national level, may assign relative weights among the 12 site assessment criteria other than those shown in the FPPA rule. In all cases where other weights are assigned, relative adjustments must be made to maintain the maximum total weight points at 160.

In rating alternative sites, Federal agencies shall consider each of the criteria and assign points within the limits established in the FPPA rule. Sites most suitable for protection under these criteria will receive the highest total scores, and sites least suitable, the lowest scores.

Part VII: In computing the "Total Site Assessment Points", where a State or local site assessment is used and the total maximum number of points is other than 160, adjust the site assessment points to a base of 160. Example: if the Site Assessment maximum is 200 points; and alternative Site "A" is rated 180 points:

$$\frac{\text{Total points assigned Site A}}{\text{Maximum points possible}} = \frac{180}{200} \times 160 = 144 \text{ points for Site "A."}$$



APPENDIX I

APPENDIX I

NOISE

1. DESCRIPTION OF PROPOSED ALTERNATIVES

1.1 PRECLOSURE

Typical noise sources on and around airfields usually include aircraft, surface traffic, and other human activities.

Military aircraft operations were the primary source of noise in the vicinity of Williams Air Force Base (AFB). The air operations and noise contours for preclosure are taken from the Air Installation Compatibility Use Zone Study (U.S. Air Force, 1984) for Williams AFB which are considered to be valid through 1992 (Adams, 1991). The contours for preclosure operations are shown in Figure 3.4-4 in the Affected Environment chapter of this EIS. In airport analyses, areas with a day-night average sound level (DNL) above 65 A-weighted decibels (dB) are considered in land use compatibility planning and impact assessment; therefore, the distances to areas with DNLs greater than 65 dB were of particular interest.

The baseline surface traffic noise levels in the vicinity of the base were established in terms of DNL by modeling the arterial roadways near the base using current traffic and speed characteristics. Average daily traffic (ADT) data were developed in the traffic engineering study presented in Section 3.2.3, Transportation, and were used to estimate preclosure noise levels. The traffic data used in the analysis are presented in Table I-1. The traffic mix was assumed to include 12 percent heavy trucks and 88 percent autos and other vehicles (Transportation Research Board, 1985). Fourteen percent of the traffic was assumed to be nighttime traffic, based on information from the Maricopa Association of Governments (Bresnahan, 1992) and previous experience. The noise levels generated by surface traffic were predicted using the model published by the Federal Highway Administration (Version OFA) (U.S. Department of Transportation, 1978). The noise levels are estimated as a function of distance from the centerline of the road.

1.2 CLOSURE BASELINE

At closure, it was assumed there would be some aircraft activity for each alternative except the Education and Planned Community Alternative and the No-Action Alternative. Closure year aircraft activity for each alternative

Table I-1. Surface Traffic Operations for Total Traffic Volumes - Preclosure and Closure Baseline (Project and Non-Project)

Roadway	ADT	Speed Assumed (mph)	Road Width Assumed (Lanes)
Preclosure			
Elliot Road	3,550	50	2
Ellsworth Road	3,974	50	2
Germann Road	681	50	2
Power Road	11,335	55	2
Rittenhouse Road	4,133	55	2
Williams Field Road	4,015	55	2
Closure			
Elliot Road	3,680	50	2
Ellsworth Road	4,570	50	2
Germann Road	920	50	2
Power Road	6,790	55	2
Rittenhouse Road	4,840	55	2
Williams Field Road	1,170	55	2

is discussed below. The noise levels projected for the closure baseline for surface traffic were calculated using the traffic projections at base closure. The ADTs used for the analysis are presented in Table I-1.

1.3 PROPOSED ACTION

The Proposed Action for the reuse of Williams AFB would result in a comprehensive reuse plan centered around a civilian aviation facility. Primary components of the aviation action include air passenger operations, general aviation operations, training, and maintenance operations. Non-aviation land uses include educational, residential, industrial, commercial, and recreational lands.

The proposed action would reuse 8,800 feet of existing Runway 12R/30L for general aviation uses and Runway 12L/30R would be extended to 10,500 feet for air cargo, passenger service, and commercial aviation uses. Support facilities for the general/commercial aviation airport would be developed in the northeast of the base. Air cargo facilities and other industrial areas with taxiway access would be developed on the east and west sides of the runways and on either side of the new terminal facilities. Industrial uses would be developed in the northeast corner of the base. Educational uses would reuse most of the existing buildings in the core of the base and the existing base housing. There would be no additional residential development. Relocation of the Arizona ANG 161st AREFG is included as part of the Proposed Action.

The fleet mix and annual aircraft operations for each of the modeled years are contained in Table I-2. The DNL contours for the proposed flight operations and the proposed flight tracks modeled are presented in Section 4.4.4, Noise. The day-night split for all aircraft operations is shown in Table I-3. Stage lengths for aircraft operations are given in Table I-4.

Engine runup operations were assumed to occur at the northeast side of the airfield next to the ANG area. The number of runup operations is presented in Table I-5. During typical runup operations, the engines would run for 5 minutes at idle power and 5 minutes at departure power. It was assumed that no noise suppression facilities would be available. The aircraft were assumed to have a heading of 360 degrees.

General aviation operations were divided into five types:

- Single-engine (COMSEP) - A composite single-engine propeller plane was modeled.
- Multi-engine - Beech Baron 58P assumed to be a typical multi-engine propeller plane.

TABLE I-2a
SCENARIO: Proposed Action
MODELED YEAR: 1993

Type of Aircraft	Number of Operations	Percent of Category	Total for Category	Category Percent of Total
Air Passenger (Air Carrier)			0	0
B-757 / A-320	0	0		
MD-83 (MD-80/MD-90)	0	0		
B-737-300/400	0	0		
Air Passenger (Commuter)			0	0
BAe-146	0	0		
Air Cargo			0	0
General Aviation			11,450	66
COMSEP (composite single-engine piston)	9,000	79		
Beech Baron 58P (twin-engine piston)	2,450	21		
Cessna Conquest (turboprop)	0	0		
Composite General Aviation Jet	0	0		
Hughes OH-6A (helicopter)	0	0		
Military			6,000*	34
KC-135E (B-707-320)	6,000*	100		
TOTAL			17,450	100

*3,000 touch-and-goes (6,000 operations).

TABLE I-2b
SCENARIO: Proposed Action
MODELED YEAR: 1998

Type of Aircraft	Number of Operations	Percent of Category	Total for Category	Category Percent of Total
Air Passenger (Air Carrier)			6,000	17
B-757 / A-320	0	0		
MD-83 (MD-80/MD-90)	1,500	25		
B-737-300/400	4,500	75		
Air Passenger (Commuter)			4,000	12
BAe-146	4,000	100		
Air Cargo			0	0
General Aviation			17,050	50
COMSEP (composite single-engine piston)	13,050	77		
Beech Baron 58P (twin-engine piston)	2,695	16		
Cessna Conquest (turboprop)	705	4		
Composite General Aviation Jet	600	3		
Hughes OH-6A (helicopter)	0	0		
Military			7,200*	21
KC-135R	7,200*	100		
TOTAL			34,250	100

*3,000 touch-and-goes (6,000 operations), plus an additional 1,200 operations if Arizona ANG 161st AREFG relocates to Williams AFB.

TABLE I-2c
SCENARIO: Proposed Action
MODELED YEAR: 2003

Type of Aircraft	Number of Operations	Percent of Category	Total for Category	Category Percent of Total
Air Passenger (Air Carrier)			13,150	30
B-757 / A-320	850	6		
MD-83 (MD-80/MD-90)	5,000	38		
B-737-300/400	7,300	56		
Air Passenger (Commuter)			1,000	2
BAe-146	1,000	100		
Air Cargo			0	0
General Aviation			23,050	52
COMSEP (composite single-engine piston)	17,100	74		
Beech Baron 58P (twin-engine piston)	2,940	13		
Cessna Conquest (turboprop)	1,410	6		
Composite General Aviation Jet	1,200	5		
Hughes OH-6A (helicopter)	400	2		
Military			7,200*	16
KC-135R	7,200*	100		
TOTAL			44,400	100

*3,000 touch-and-goes (6,000 operations), plus an additional 1,200 operations if the Arizona ANG 161st AREFG relocates to Williams AFB.

TABLE I-2d
SCENARIO: Proposed Action
MODELED YEAR: 2013

Type of Aircraft	Number of Operations	Percent of Category	Total for Category	Category Percent of Total
Air Passenger (Air Carrier)			44,930	51
B-757 / A-320	7,020	16		
MD-83 (MD-80/MD-90)	21,530	48		
B-737-300/400	16,380	36		
Air Passenger (Commuter)			1,870	2
BAe-146	1,870	100		
Air Cargo			0	0
General Aviation			34,250	39
COMSEP (composite single-engine piston)	25,200	74		
Beech Baron 58P (twin-engine piston)	3,430	10		
Cessna Conquest (turboprop)	2,820	8		
Composite General Aviation Jet	2,400	7		
Hughes OH-6A (helicopter)	400	1		
Military			7,200*	8
KC-135R	7,200*	100		
TOTAL			88,250	100

*3,000 touch-and-goes (6,000 operations), plus an additional 1,200 operations if the Arizona ANG 161st AREFG relocates to Williams AFB.

Table I-3. Day-Night Split of Aircraft Operations for Proposed Action and Alternatives

Aircraft Type	Percent Daytime	Percent Nighttime
Air Passenger	98	2
General Aviation	98	2
Air Cargo	98	2
Military	98	2

Table I-4. Stage Lengths* Assumed for Aircraft Operations for Proposed Action and Alternatives

Group	1993	1998	2003	2013
Air Carrier	2**	2**	2**	2**
Commuter	1	1	1	1
General Aviation	1	1	1	1
Air Cargo	-	5	5	5
Military***	-	6	6	6

* Stage length may affect operational parameters such as takeoff or landing profiles, engine thrust settings, and aircraft speed of some aircraft; these parameters may, in turn, affect aircraft noise exposure. Stage lengths correspond to the distance flown in increments of 500 miles (e.g., stage length 1 corresponds to flights between 1 and 500 miles; 2 corresponds to flights between 500 and 1,000 miles, etc.). The maximum stage length used in modeling is 7 (>4,500 miles).

** Default stage length for B-737 is 1.

*** Stage length 4 is assumed for touch-and-go operations for KC-135E (B-707-320) (year 1993); for touch-and-go operations for KC-135R (years 1998-2013) and for all F-16 operations, stage length is as represented in the standard takeoff profile used by NOISEMAP.

Table I-5. Number of Daily Engine Runup Operations for the Proposed Action and Alternatives*

Alternative	1993	1998	2003	2013
Proposed Action	0	0.4	0.4	0.4
General Aviation and Education Alternative	0	0	0	0
Commercial Aviation and Education Alternative	0	0	0	0
Education and Planned Community Alternative	0	0	0	0

*KC-135 runups.

- Turboprop - Cessna Conquest II assumed to be a typical turboprop.
- Turbofan - Composite General Aviation Jet assumed to be a typical turbofan.
- Helicopter - Hughes OH-6A assumed to be a typical helicopter.
- Other - Includes such aircraft as ultralights, gliders, and balloons; not modeled for noise purposes (this category only occurs in the General Aviation and Education Alternative).

The touch-and-go patterns and the initial departure and final approach flight tracks used in the modeling for the Proposed Action are shown in Figures I-1 and I-2. The existing flight paths associated with Williams AFB air traffic operations to the northwest provided the framework for defining the Williams aviation reuse flight paths. These paths were modified as described in Section 4.2.3.

Daily operations assigned to each flight track and time period for the Proposed Action are provided in Table I-6 for each of the study years. Assignments were made in a similar way for the other alternatives. Flight track designations consist of a four character code. The first two characters indicate the runway (1L, 1C, 1R indicate 12 left, 12 center, and 12 right, respectively; 3L, 3C, 3R indicate 30 left, 30 center, and 30 right, respectively; and 1H indicates a helicopter operation on 12 right). The third character indicates the type of operation (A and D for arrival and departure, respectively). The fourth character is a sequence number.

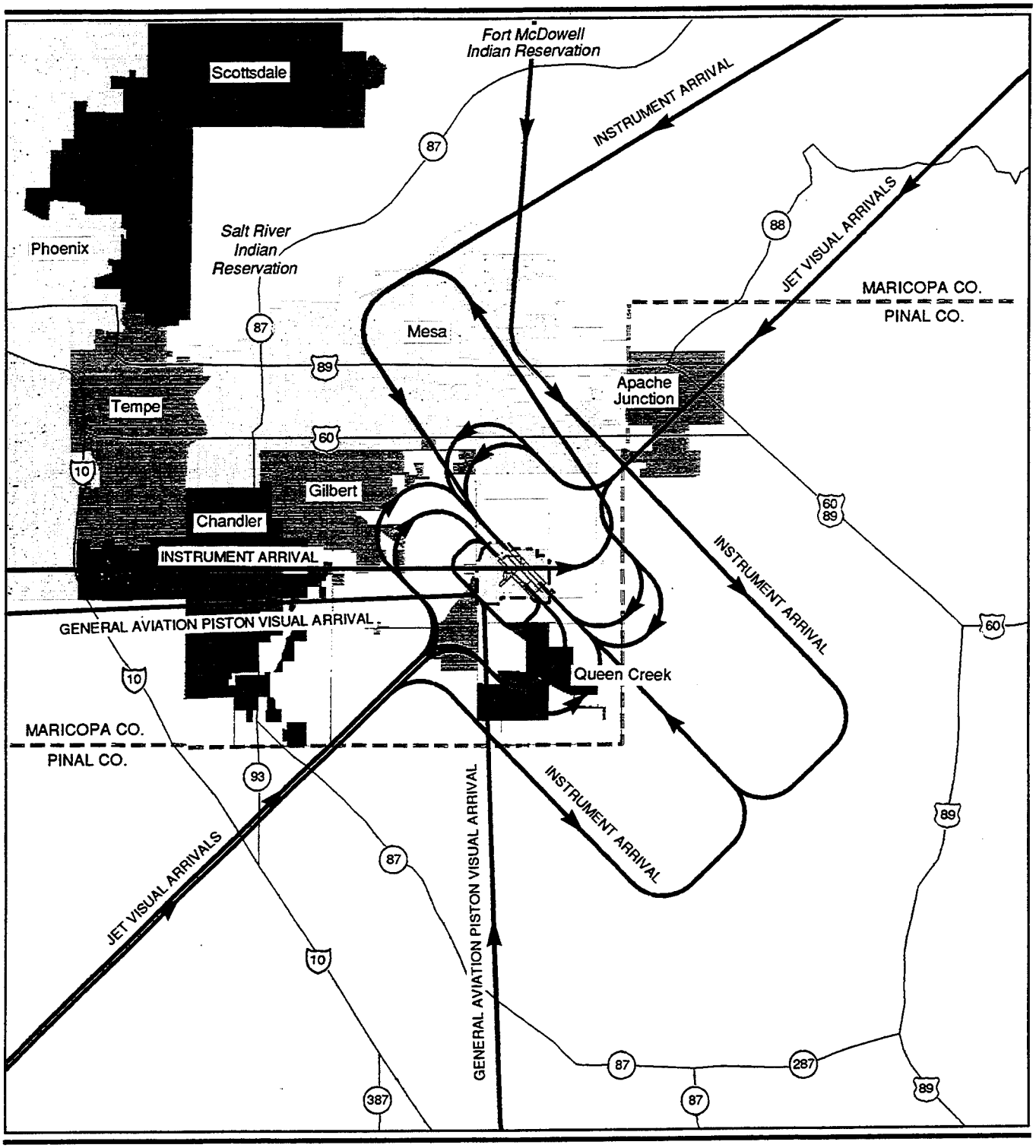
A standard 3-degree glide slope and the takeoff profiles provided by the Federal Aviation Administration's (FAA) Integrated Noise Model Database 3.9 were assumed for all commercial and general aviation aircraft.

Surface traffic data used in the modeling were developed from the project traffic study presented in Section 4.2.3, Transportation, and are shown in Table I-7.

1.4 GENERAL AVIATION AND EDUCATION ALTERNATIVE

Under the General Aviation and Education Alternative, as in the Proposed Action, the base airfield would be converted to civilian use. Primary components of the aviation action include general aviation operations and maintenance operations.

This alternative would reuse 9,250 feet of existing Runway 12C/30C. Industrial areas with taxiway access would be developed off the north end



EXPLANATION

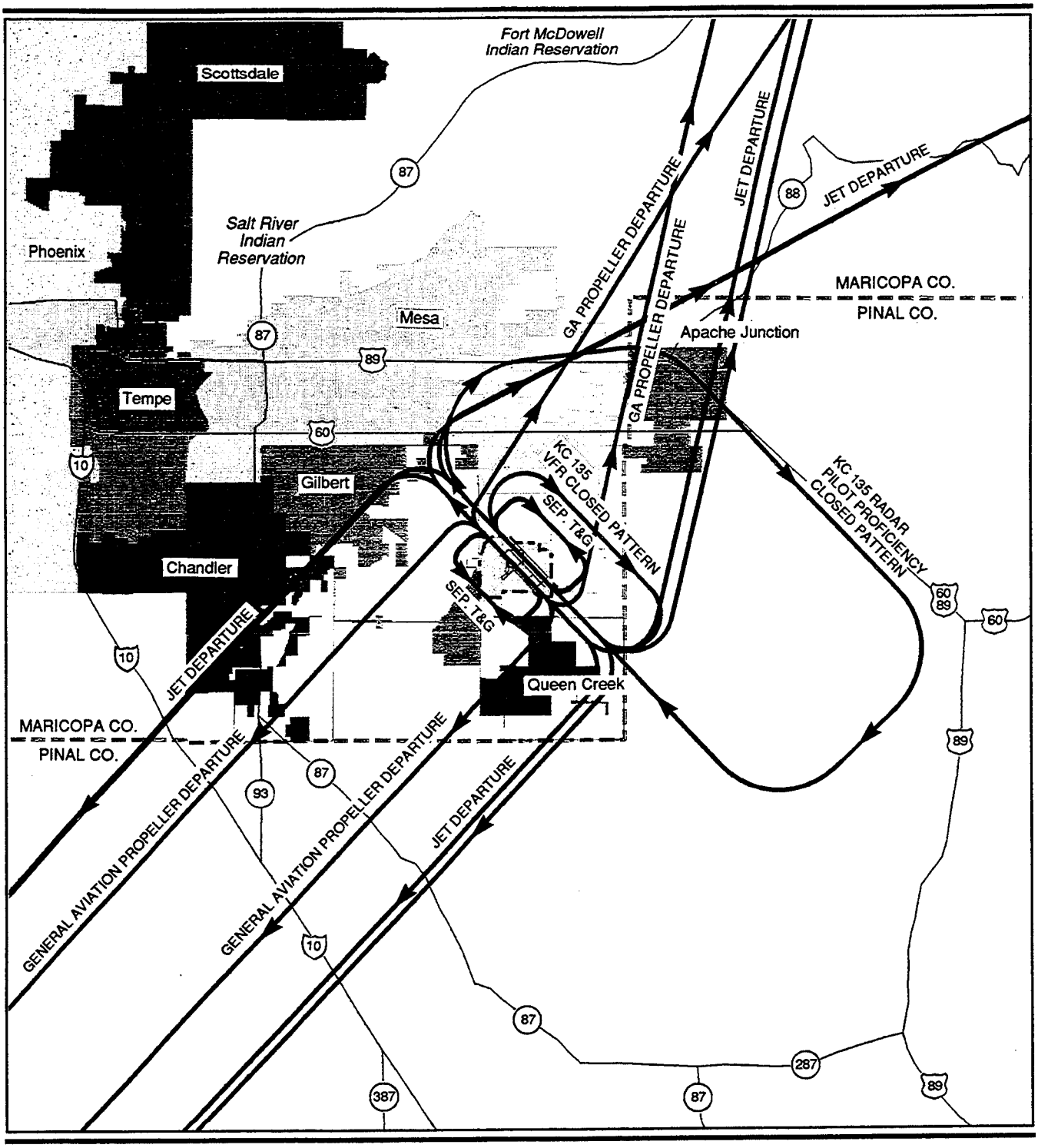
Direction of Travel on Flight Path

Base Boundary

Primary Flight Tracks - Proposed Action - Arrivals

0 3 6 Miles

Figure I-1



EXPLANATION

Direction of Travel on Flight Path

Base Boundary

0 3 6 Miles

Primary Flight Tracks - Proposed Action - Departures and Touch-and-Go

Figure I-2

Table I-6a. Assignment of Operations for the Proposed Action
Modeled Year: 1993
Page 1 of 3

Aircraft	Departure Flight Tracks																			
	1LD1		1LD2		1RD1		1RD2		1RD3		1RD4		3RD1		3RD2		3LD1		3LD2	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
B-757 / A-320	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MD-83 (MD-80/MD-90)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B-737-300/400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BAe-146	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COMSEP	-	-	-	-	-	-	-	-	0.2	0.0	0.3	0.0	-	-	-	-	-	-	-	-
Beech Baron 58P	-	-	-	-	-	-	-	-	0.1	0.0	0.2	0.0	-	-	-	-	-	-	-	-
Cessna Conquest (turboprop)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Composite GA Jet	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OH-6A Helicopter	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KC-135E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	0.3	0.0	0.5	0.0	-	-	-	-	-	-	-	-

Notes: Day = 7:00 a.m. to 10:00 p.m.
Night = 10:00 p.m. to 7:00 a.m.

Table I-6a. Assignment of Operations for the Proposed Action
Modeled Year: 1993
Page 2 of 3

Aircraft	Departure Flight Tracks						Arrival Flight Tracks													
							Instrument						Visual							
	3LD4		3LD5		1HD1		1CA1		3CA1		3CA2		1LA2		1LA3		1LA4		1RA1	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
B-757 / A-320	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MD-83 (MD-80/MD-90)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B-737-300/400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BAe-146	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COMSEP	1.8	0.0	2.7	0.1	-	-	-	-	0.2	0.0	0.3	0.0	-	-	-	-	-	-	0.4	0.0
Beech Baron 58P	1.2	0.0	1.8	0.0	-	-	-	-	0.1	0.0	0.2	0.0	-	-	-	-	-	-	0.3	0.0
Cessna Conquest (turboprop)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Composite GA Jet	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OH-6A Helicopter	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KC-135E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	3.0	0.0	4.5	0.1	-	-	-	-	0.3	0.0	0.5	0.0	-	-	-	-	-	-	0.7	0.0

Notes: Day = 7:00 a.m. to 10:00 p.m.
Night = 10:00 p.m. to 7:00 a.m.

Table I-6a. Assignment of Operations for the Proposed Action
Modeled Year: 1993
Page 3 of 3

Aircraft	Arrival Flight Tracks														Touch-and-Go					
	Visual																			
	1RA2		3LA1		3LA2		3RA4		3RA5		3RA6		1HA1		KC135 Radar		KC135 Visual		Single-engine Piston	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
B-757 / A-320	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MD-83 (MD-80/MD-90)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B-737-300/400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BAe-146	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COMSEP	-	-	4.1	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.3	0.3
Beech Baron 58P	-	-	2.7	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cessna Conquest (turboprop)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Composite GA Jet	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OH-6A Helicopter	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KC-135E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.0	0.1	4.0	0.1	-	-
					-	-	-	-	-	-	-	-	-	-	-	-			-	-
Total	-	-	6.8	0.2	-	-	-	-	-	-	-	-	-	-	4.0	0.1	4.0	0.1	14.3	0.3

Notes: Day = 7:00 a.m. to 10:00 p.m.
Night = 10:00 p.m. to 7:00 a.m.

Table I-6b. Assignment of Operations for the Proposed Action
Modeled Year: 1998
Page 1 of 3

Aircraft	Departure Flight Tracks																			
	1LD1		1LD2		1RD1		1RD2		1RD3		1RD4		3RD1		3RD2		3LD1		3LD2	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
B-757 / A-320	0.0	0.0	0.0	0.0	-	-	-	-	-	-	-	-	0.0	0.0	0.0	0.0	-	-	-	-
MD-83 (MD-80/MD-90)	0.1	0.0	0.1	0.0	-	-	-	-	-	-	-	-	0.7	0.0	1.1	0.0	-	-	-	-
B-737-300/400	0.2	0.0	0.4	0.0	-	-	-	-	-	-	-	-	2.2	0.0	3.3	0.1	-	-	-	-
BAe-146	0.2	0.0	0.3	0.0	-	-	-	-	-	-	-	-	1.9	0.0	2.9	0.1	-	-	-	-
COMSEP	-	-	-	-	-	-	-	-	0.3	0.0	0.4	0.0	-	-	-	-	-	-	-	-
Beech Baron 58P	-	-	-	-	-	-	-	-	0.1	0.0	0.2	0.0	-	-	-	-	-	-	-	-
Cessna Conquest (turboprop)	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.0	0.1	0.0	0.3	0.0	0.4	0.0
Composite GA Jet	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.0	0.1	0.0	0.2	0.0	0.3	0.0
OH-6A Helicopter	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KC-135R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	0.5	0.0	0.8	0.0	-	-	-	-	0.4	0.0	0.6	0.0	5.0	0.0	7.5	0.2	0.5	0.0	0.7	0.0

Notes: Day = 7:00 a.m. to 10:00 p.m.
Night = 10:00 p.m. to 7:00 a.m.

Table I-6b. Assignment of Operations for the Proposed Action
Modeled Year: 1998
Page 2 of 3

Aircraft	Departure Flight Tracks						Arrival Flight Tracks													
							Instrument						Visual							
	3LD4		3LD5		1HD1		1LA1		3RA1		3RA2		1LA2		1LA3		1LA4		1RA1	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
B-757 / A-320	-	-	-	-	-	-	0.0	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-
MD-83 (MD-80/MD-90)	-	-	-	-	-	-	0.1	0.0	0.4	0.0	0.6	0.0	-	-	0.1	0.0	0.0	0.0	-	-
B-737-300/400	-	-	-	-	-	-	0.3	0.0	1.2	0.0	1.8	0.0	-	-	0.2	0.0	0.1	0.0	-	-
BAe-146	-	-	-	-	-	-	0.3	0.0	1.1	0.0	1.6	0.0	-	-	0.1	0.0	0.1	0.0	-	-
COMSEP	2.6	0.1	3.9	0.1	-	-	0.1	0.0	0.2	0.0	0.3	0.0	-	-	-	-	-	-	0.6	0.0
Beech Baron 58P	1.3	0.0	2.0	0.0	-	-	0.0	0.0	0.1	0.0	0.2	0.0	-	-	-	-	-	-	0.3	0.0
Cessna Conquest (turboprop)	-	-	-	-	-	-	-	-	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-	-
Composite GA Jet	-	-	-	-	-	-	-	-	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-	-
OH-6A Helicopter	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KC-135R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	3.9	0.1	5.9	0.1	-	-	0.8	0.0	3.0	0.0	4.5	0.0	0.0	0.0	0.4	0.0	0.2	0.0	0.9	0.0

Notes: Day = 7:00 a.m. to 10:00 p.m.
Night = 10:00 p.m. to 7:00 a.m.

Table I-6b. Assignment of Operations for the Proposed Action
Modeled Year: 1998
Page 3 of 3

Aircraft	Arrival Flight Tracks														Touch-and-Go					
	Visual																			
	1RA2		3LA1		3LA2		3RA4		3RA5		3RA6		1HA1		KC135 Radar		KC135 Visual		Single-engine Piston	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
B-757 / A-320	-	-	-	-	-	-	-	-	0.0	0.0	0.0	0.0	-	-	-	-	-	-	-	-
MD-83 (MD-80/MD-90)	-	-	-	-	-	-	-	-	0.5	0.0	0.3	0.0	-	-	-	-	-	-	-	-
B-737-300/400	-	-	-	-	-	-	-	-	1.5	0.0	1.0	0.0	-	-	-	-	-	-	-	-
BAe-146	-	-	-	-	-	-	-	-	1.3	0.0	0.9	0.0	-	-	-	-	-	-	-	-
COMSEP	-	-	5.9	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.7	0.3
Beech Baron 58P	-	-	3.0	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cessna Conquest (turboprop)	0.1	0.0	-	-	0.5	0.0	0.3	0.0	-	-	-	-	-	-	-	-	-	-	-	-
Composite GA Jet	0.0	0.0	-	-	0.4	0.0	0.3	0.0	-	-	-	-	-	-	-	-	-	-	-	-
OH-6A Helicopter	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KC-135R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.8	0.1	4.8	0.1	-	-
Total	0.1	0.0	8.9	0.2	0.9	0.0	0.6	0.0	3.3	0.0	2.2	0.0	-	-	4.8	0.1	4.8	0.1	20.7	0.3

Notes: Day = 7:00 a.m. to 10:00 p.m.
Night = 10:00 p.m. to 7:00 a.m.

Table I-6c Assignment of Operations for the Proposed Action
Modeled Year: 2003
Page 1 of 3

Aircraft	Departure Flight Tracks																			
	1LD1		1LD2		1RD1		1RD2		1RD3		1RD4		3RD1		3RD2		3LD1		3LD2	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
B-757 / A-320	0.05	0.0	0.06	0.0	-	-	-	-	-	-	-	-	0.41	0.01	0.61	0.01	-	-	-	-
MD-83 (MD-80/MD-90)	0.25	0.0	0.39	0.0	-	-	-	-	-	-	-	-	2.39	0.05	3.61	0.07	-	-	-	-
B-737-300/400	0.41	0.0	0.59	0.0	-	-	-	-	-	-	-	-	3.56	0.09	3.56	0.09	-	-	-	-
BAe-146	0.05	0.0	0.05	0.0	-	-	-	-	-	-	-	-	0.48	0.0	0.74	0.0	-	-	-	-
COMSEP	-	-	-	-	-	-	-	-	0.34	0.0	0.54	0.0	-	-	-	-	-	-	-	-
Beech Baron 58P	-	-	-	-	-	-	-	-	0.17	0.0	0.26	0.0	-	-	-	-	-	-	-	-
Cessna Conquest (turboprop)	-	-	-	-	0.05	0.0	0.10	0.0	-	-	-	-	0.15	0.0	0.20	0.0	0.55	0.0	0.80	0.0
Composite GA Jet	-	-	-	-	0.05	0.0	0.10	0.0	-	-	-	-	0.10	0.0	0.15	0.0	0.45	0.0	0.70	0.0
OH-6A Helicopter	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KC-135R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	0.76	0.0	1.09	0.0	0.10	0.0	0.20	0.0	0.51	0.0	0.80	0.0	7.09	0.15	8.87	0.17	1.00	0.0	1.50	0.0

Notes: Day = 7:00 a.m. to 10:00 p.m.
Night = 10:00 p.m. to 7:00 a.m.

Table I-6c. Assignment of Operations for the Proposed Action
Modeled Year: 2003
Page 2 of 3

Aircraft	Departure Flight Tracks						Arrival Flight Tracks													
							Instrument						Visual							
	3LD4		3LD5		1HD1		1LA1		3RA1		3RA2		1LA2		1LA3		1LA4		1RA1	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
B-757 / A-320	-	-	-	-	-	-	0.06	0.0	0.22	0.0	0.34	0.01	-	-	0.04	0.0	0.02	0.0	-	-
MD-83 (MD-80/MD-90)	-	-	-	-	-	-	0.35	0.0	1.31	0.02	1.96	0.05	-	-	0.18	0.0	0.12	0.0	-	-
B-737-300/400	-	-	-	-	-	-	0.54	0.0	1.94	0.05	2.93	0.05	-	-	0.27	0.0	0.18	0.0	-	-
BAe-146	-	-	-	-	-	-	0.05	0.0	0.27	0.0	0.37	0.0	-	-	0.05	0.0	-	-	-	-
COMSEP	3.40	0.07	5.10	0.14	-	-	0.07	0.0	0.27	0.0	0.41	0.0	-	-	-	-	-	-	0.82	0.0
Beech Baron 58P	1.46	0.0	2.15	0.09	-	-	0.0	0.0	0.09	0.0	0.17	0.0			-	-	-	-	0.34	0.0
Cessna Conquest (turboprop)	-	-	-	-	-	-	-	-	0.05	0.0	0.10	0.0	0.05	0.0	-	-	-	-	-	-
Composite GA Jet	-	-	-	-	-	-	-	-	0.05	0.0	0.05	0.0	0.05	0.0	-	-	-	-	-	-
OH-6A Helicopter	-	-	-	-	0.6	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KC-135R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	4.86	0.07	7.25	0.23	0.6	0.0	1.07	0.0	4.20	0.07	6.33	0.11	0.10	0.0	0.54	0.0	0.32	0.0	1.16	0.0

Notes: Day = 7:00 a.m. to 10:00 p.m.
Night = 10:00 p.m. to 7:00 a.m.

Table I-6c. Assignment of Operations for the Proposed Action
Modeled Year: 2003
Page 3 of 3

Aircraft	Arrival Flight Tracks														Touch-and-Go					
	Visual																			
	1RA2		3LA1		3LA2		3RA4		3RA5		3RA6		1HA1		KC135 Radar		KC135 Visual		Single-engine Piston	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
B-757 / A-320	-	-	-	-	-	-	-	-	0.28	0.0	0.19	0.0	-	-	-	-	-	-	-	-
MD-83 (MD-80/MD-90)	-	-	-	-	-	-	-	-	1.66	0.02	1.10	0.02	-	-	-	-	-	-	-	-
B-737-300/400	-	-	-	-	-	-	-	-	2.48	0.0	1.62	0.05	-	-	-	-	-	-	-	-
BAe-146	-	-	-	-	-	-	-	-	0.32	0.0	0.21	0.0	-	-	-	-	-	-	-	-
COMSEP	-	-	7.82	0.14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	27.13	0.62
Beech Baron 58P	-	-	3.27	0.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cessna Conquest (turboprop)	0.10	0.0	-	-	0.95	0.0	0.65	0.0	-	-	-	-	-	-	-	-	-	-	-	-
Composite GA Jet	0.10	0.0	-	-	0.80	0.0	0.55	0.0	-	-	-	-	-	-	-	-	-	-	-	-
OH-6A Helicopter	-	-	-	-	-	-	-	-	-	-	-	-	0.6	0.0	-	-	-	-	-	-
KC-135R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.8	0.12	4.8	0.12	-	-
Total	0.20	0.0	11.09	0.23	1.75	0.0	1.20	0.0	4.74	0.07	3.12	0.07	0.6	0.0	4.8	0.12	4.8	0.12	27.13	0.62

Notes: Day = 7:00 a.m. to 10:00 p.m.
Night = 10:00 p.m. to 7:00 a.m.

Table I-6d. Assignment of Operations for the Proposed Action
Modeled Year: 2013
Page 1 of 3

Aircraft	Departure Flight Tracks																			
	1LD1		1LD2		1RD1		1RD2		1RD3		1RD4		3RD1		3RD2		3LD1		3LD2	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
B-757 / A-320	0.4	0.0	0.5	0.0	-	-	-	-	-	-	-	-	3.4	0.1	5.1	0.1	-	-	-	-
MD-83 (MD-80/MD-90)	1.1	0.0	1.7	0.0	-	-	-	-	-	-	-	-	10.4	0.2	15.7	0.3	-	-	-	-
B-737-300/400	0.9	0.0	1.3	0.0	-	-	-	-	-	-	-	-	7.9	0.2	7.9	0.2	-	-	-	-
BAe-146	0.1	0.0	0.1	0.0	-		-	-	-	-	-	-	0.9	0.0	1.4	0.0	-	-	-	-
COMSEP	-	-	-	-	-	-	-	-	0.5	0.0	0.8	0.0	-	-	-	-	-	-	-	-
Beech Baron 58P	-	-	-	-	-	-	-	-	0.2	0.0	0.3	0.0	-	-	-	-	-		-	-
Cessna Conquest (turboprop)	-	-	-	-	0.1	0.0	0.2	0.0	-	-	-	-	0.3	0.0	0.4	0.0	1.1	0.0	1.6	0.0
Composite GA Jet	-	-	-	-	0.1	0.0	0.2	0.0	-	-	-	-	0.2	0.0	0.3	0.0	0.9	0.0	1.4	0.0
OH-6A Helicopter	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KC-135R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	2.5	0.0	3.6	0.0	0.2	0.0	0.4	0.0	0.7	0.0	1.1	0.0	23.1	0.5	30.8	0.6	2.0	0.0	3.0	0.0

Notes: Day = 7:00 a.m. to 10:00 p.m.
Night = 10:00 p.m. to 7:00 a.m.

Table I-6d. Assignment of Operations for the Proposed Action
Modeled Year: 2013
Page 2 of 3

Aircraft	Departure Flight Tracks						Arrival Flight Tracks													
							Instrument						Visual							
	3LD4		3LD5		1HD1		1LA1		3RA1		3RA2		1LA2		1LA3		1LA4		1RA1	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
B-757 / A-320	-	-	-	-	-	-	0.5	0.0	1.8	0.0	2.8	0.1	-	-	0.3	0.0	0.2	0.0	-	-
MD-83 (MD-80/MD-90)	-	-	-	-	-	-	1.5	0.0	5.7	0.1	8.5	0.2	-	-	0.8	0.0	0.5	0.0	-	-
B-737-300/400	-	-	-	-	-	-	1.2	0.0	4.3	0.1	6.5	0.1	-	-	0.6	0.0	0.4	0.0	-	-
BAe-146	-	-	-	-	-	-	0.1	0.0	0.5	0.0	0.7	0.0	-	-	0.1	0.0	-	-	-	-
COMSEP	5.0	0.1	7.5	0.2	-	-	0.1	0.0	0.4	0.0	0.6	0.0	-	-	-	-	-	-	1.2	0.0
Beech Baron 58P	1.7	0.0	2.5	0.1	-	-	0.0	0.0	0.1	0.0	0.2	0.0	-	-	-	-	-	-	0.4	0.0
Cessna Conquest (turboprop)	-	-	-	-	-	-	-	-	0.1	0.0	0.2	0.0	0.1	0.0	-	-	-	-	-	-
Composite GA Jet	-	-	-	-	-	-	-	-	0.1	0.0	0.1	0.0	0.1	0.0	-	-	-	-	-	-
OH-6A Helicopter	-	-	-	-	0.6	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KC-135R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	6.7	0.1	10.0	0.3	0.6	0.0	3.4	0.0	13.0	0.2	19.6	0.4	0.2	0.0	1.8	0.0	1.1	0.0	1.6	0.0

Notes: Day = 7:00 a.m. to 10:00 p.m.
Night = 10:00 p.m. to 7:00 a.m.

Table I-6d. Assignment of Operations for the Proposed Action
Modeled Year: 2013
Page 3 of 3

Aircraft	Arrival Flight Tracks														Touch-and-Go					
	Visual																			
	1RA2		3LA1		3LA2		3RA4		3RA5		3RA6		1HA1		KC135 Radar		KC135 Visual		Single-engine Piston	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
B-757 / A-320	-	-	-	-	-	-	-	-	2.3	0.0	1.6	0.0	-	-	-	-	-	-	-	-
MD-83 (MD-80/MD-90)	-	-	-	-	-	-	-	-	7.2	0.1	4.8	0.1	-	-	-	-	-	-	-	-
B-737-300/400	-	-	-	-	-	-	-	-	5.5	0.1	3.6	0.1	-	-	-	-	-	-	-	-
BAe-146	-	-	-	-	-	-	-	-	0.6	0.0	0.4	0.0	-	-	-	-	-	-	-	-
COMSEP	-	-	11.5	0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	39.9	0.9
Beech Baron 58P	-	-	3.8	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cessna Conquest (turboprop)	0.2	0.0	-	-	1.9	0.0	1.3	0.0	-	-	-	-	-	-	-	-	-	-	-	-
Composite GA Jet	0.2	0.0	-	-	1.6	0.0	1.1	0.0	-	-	-	-	-	-	-	-	-	-	-	-
OH-6A Helicopter	-	-	-	-	-	-	-	-	-	-	-	-	0.6	0.0	-	-	-	-	-	-
KC-135R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.8	0.1	4.8	0.1	-	-
Total	0.4	0.0	15.3	0.3	3.5	0.0	2.4	0.0	15.6	0.2	10.4	0.2	0.6	0.0	4.8	0.1	4.8	0.1	39.9	0.9

Notes: Day = 7:00 a.m. to 10:00 p.m.
Night = 10:00 p.m. to 7:00 a.m.

Table I-7. Surface Traffic Operations for Total Traffic Volumes (Project and Non-Project)
Page 1 of 3

Alternative	1998		2003		2013		Road Width Assumed (No. of lanes)
	ADT	Speed (mph)	ADT	Speed (mph)	ADT	Speed (mph)	
Proposed Action							
Elliot Road	4,999	50	6,792	50	12,536	50	2
Ellsworth Road	5,788	50	7,331	50	11,761	50	2
Germann Road	1,768	50	3,396	50	12,534	50	2
Power Road	10,180	55	14,162	55	29,073	55	2
Rittenhouse Road	6,341	55	8,307	55	14,256	55	2
Williams Field Road	1,886	55	3,174	55	8,762	55	2
Ray Road (east of Power)	2,818	40	5,564	40	16,758	40	2
Williams Field Road (east)	456	40	1,616	40	6,946	40	2
General Aviation and Education							
Elliot Road	4,999	50	6,792	50	12,536	50	2
Ellsworth Road	6,218	50	8,717	50	14,569	50	2
Germann Road	1,768	50	3,396	50	12,534	50	2
Power Road	11,640	55	18,386	55	32,087	55	2*
Rittenhouse Road	6,341	55	8,307	55	14,256	55	2
Williams Field Road	2,078	55	2,974	55	8,526	55	2
Pecos Road	2,833	40	6,873	40	9,514	40	2
Hawes Road (extended to Sossaman)	1,102	40	1,724	40	5,683	40	2
Sossaman Road (extended to Hawes)	1,520	40	4,364	40	14,542	40	2
Williams Field Road (east)	816	40	1,614	40	6,944	40	2
Sossaman Road (Hawes to Ray)	5,578	40	11,678	40	27,420	40	2
Ray Road	2,104	40	3,945	40	13,172	40	2

Table I-7. Surface Traffic Operations for Total Traffic Volumes (Project and Non-Project)
Page 2 of 3

Alternative	1998 ADT	1998 Speed (mph)	2003 ADT	2003 Speed (mph)	2013 ADT	2013 Speed (mph)	Road Width Assumed (No. of lanes)
Commercial Aviation and Education							
Elliot Road	4,999	50	6,792	50	12,536	50	2
Ellsworth Road	5,810	50	8,455	50	15,885	50	2
Germann Road	1,768	50	3,396	50	12,534	50	2
Power Road	11,372	55	15,560	55	48,241	55	2*
Rittenhouse Road	6,341	55	8,307	55	14,256	55	2
Williams Field Road	2,878	55	4,198	55	6,938	55	2
Williams Field Road (east)	2,732	40	4,786	40	10,943	40	2
Ray Road	11,914	40	13,512	40	19,934	40	2
Education and Planned Community							
Elliot Road	4,999	50	6,792	50	12,536	50	2
Ellsworth Road	5,788	50	9,253	50	16,167	50	2
Germann Road	1,768	50	3,396	50	12,534	50	2
Power Road	9,690	55	13,630	55	27,061	55	2
Rittenhouse Road	6,341	55	8,307	55	14,256	55	2
Williams Field Road	2,556	55	9,850	55	24,710	55	2
Pecos Road	3,298	55	4,474	55	9,288	55	2
Hawes Road (extended)	2,532	40	5,798	40	6,924	40	2
Hawes Road (northern end)	12,528	40	29,966	40	28,210	40	2
Williams Field Road (east)	1,172	40	8,134	40	17,852	40	2
Sossaman Road (extended to Ray)	1,608	40	10,170	40	39,742	40	2*

Table I-7. Surface Traffic Operations for Total Traffic Volumes (Project and Non-Project)
Page 3 of 3

Alternative	1998 ADT	1998 Speed (mph)	2003 ADT	2003 Speed (mph)	2013 ADT	2013 Speed (mph)	Road Width Assumed (No. of lanes)
No-Action Alternative							
Elliot Road	4,999	50	6,792	50	12,536	50	2
Ellsworth Road	5,788	50	7,331	50	11,761	50	2
Germann Road	1,768	50	3,396	50	12,534	50	2
Power Road	9,586	55	13,532	55	26,971	55	2
Rittenhouse Road	6,341	55	8,307	55	14,256	55	2
Williams Field Road	1,262	55	1,360	55	1,582	55	2

*May be widened to 4 lanes to handle traffic volume.

of the runway and along the west side of the runway. Residential areas would be developed in the northeast corner of the base and southwest of the industrial area. Residential areas would be buffered from airport uses by open areas and industrial buildings. The educational campus would reuse existing buildings outside the flight line and existing on-base housing.

The fleet mix and annual operations for each of the modeled years are contained in Tables I-8a through I-8d. The DNL contours for the flight operations modeled are presented in Section 4.4.4, Noise. The flight tracks modeled are similar to the general flight tracks used for the Proposed Action with modifications to the visual approaches as shown in Figures I-3 and I-4. The day-night split for all aircraft operations are given in Table I-3. Stage lengths for air operations are given in Table I-4.

General aviation operations would be divided into the same five types as in the Proposed Action. It was assumed that 59 percent of the single-engine general aviation operations would be touch-and-go (or closed loop) activities.

A standard 3-degree glide slope and the takeoff profiles provided by the FAA's Integrated Noise Model Database 3.9 were assumed for all general aviation aircraft.

Surface traffic data used in the modeling were developed from the traffic analysis and are shown in Table I-7.

1.5 COMMERCIAL AVIATION AND EDUCATION ALTERNATIVE

The Commercial Aviation and Education Alternative for the reuse of Williams AFB is centered around a service airport with air cargo operations and an aviation training school. As in the Proposed Action, the airfield would be converted to civilian use. Primary components of the aviation action include commercial airport service, aviation training, air cargo service, and related maintenance areas. The aviation training facilities operate at a higher intensity than the Proposed Action. Some industrial uses would be developed, potentially aircraft related.

This alternative would reuse existing Runway 12L/30R and Runway 12R/30L. Runway 12L/30R would be extended to 12,500 feet. Runway 12C/30C would be converted to a taxiway sometime after 1993. Support services would reuse existing airfield support facilities, and new terminal facilities would be developed on the east side of the airfield. Air cargo operations would occupy areas on the west side of the airfield. Industrial and commercial areas would be developed in the northeast corner and on the southwest side of the base. Military training operations by the Arizona ANG 161st AREFG, which may relocate to Williams AFB, and training

TABLE I-8a
SCENARIO: General Aviation and Education Alternative
MODELED YEAR: 1993

Type of Aircraft	Number of Operations	Percent of Category	Total for Category	Category Percent of Total
General Aviation			32,170	84
COMSEP (composite single-engine piston)	26,900	84		
Beech Baron 58P (twin-engine piston)	4,400	14		
Cessna Conquest (turboprop)	470	1		
Composite General Aviation Jet	0	0		
Hughes OH-6A (helicopter)	400	1		
Military			6,000*	16
KC-135E (B-707-320)	6,000*	100		
TOTAL			38,170	100

*3,000 touch-and-goes (6,000 operations).

TABLE I-8b
SCENARIO: General Aviation and Education Alternative
MODELED YEAR: 1998

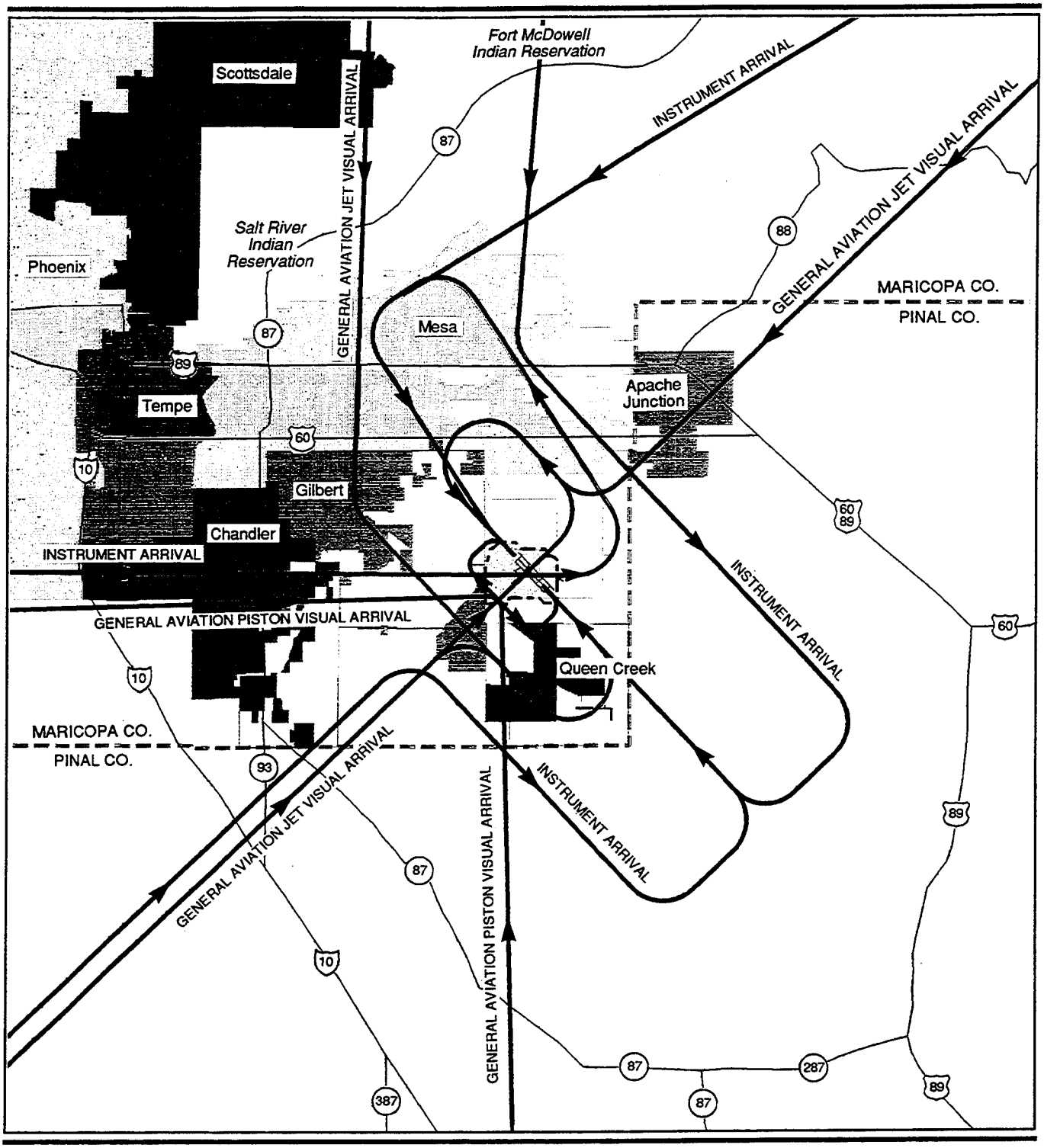
Type of Aircraft	Number of Operations	Percent of Category	Total for Category	Category Percent of Total
General Aviation			58,440	100
COMSEP (composite single-engine piston)	49,500	85		
Beech Baron 58P (twin-engine piston)	6,500	11		
Cessna Conquest (turboprop)	840	1		
Composite General Aviation Jet	400	1		
Hughes OH-6A (helicopter)	1,200	2		
Military			0	0
KC-135R	0	0		
TOTAL			58,440	100

TABLE I-8c
SCENARIO: General Aviation and Education Alternative
MODELED YEAR: 2003

Type of Aircraft	Number of Operations	Percent of Category	Total for Category	Category Percent of Total
General Aviation			81,300	100
COMSEP (composite single-engine piston)	69,100	85		
Beech Baron 58P (twin-engine piston)	8,700	11		
Cessna Conquest (turboprop)	1,200	1		
Composite General Aviation Jet	400	1		
Hughes OH-6A (helicopter)	1,900	2		
Military			0	0
KC-135R	0	0		
TOTAL			81,300	100

TABLE I-8d
SCENARIO: General Aviation and Education Alternative
MODELED YEAR: 2013

Type of Aircraft	Number of Operations	Percent of Category	Total for Category	Category Percent of Total
General Aviation			153,400	100
COMSEP (composite single-engine piston)	128,600	83		
Beech Baron 58P (twin-engine piston)	13,300	9		
Cessna Conquest (turboprop)	4,700	3		
Composite General Aviation Jet	4,000	3		
Hughes OH-6A (helicopter)	2,800	2		
Military			0	0
KC-135R	0	0		
TOTAL			153,400	100



EXPLANATION

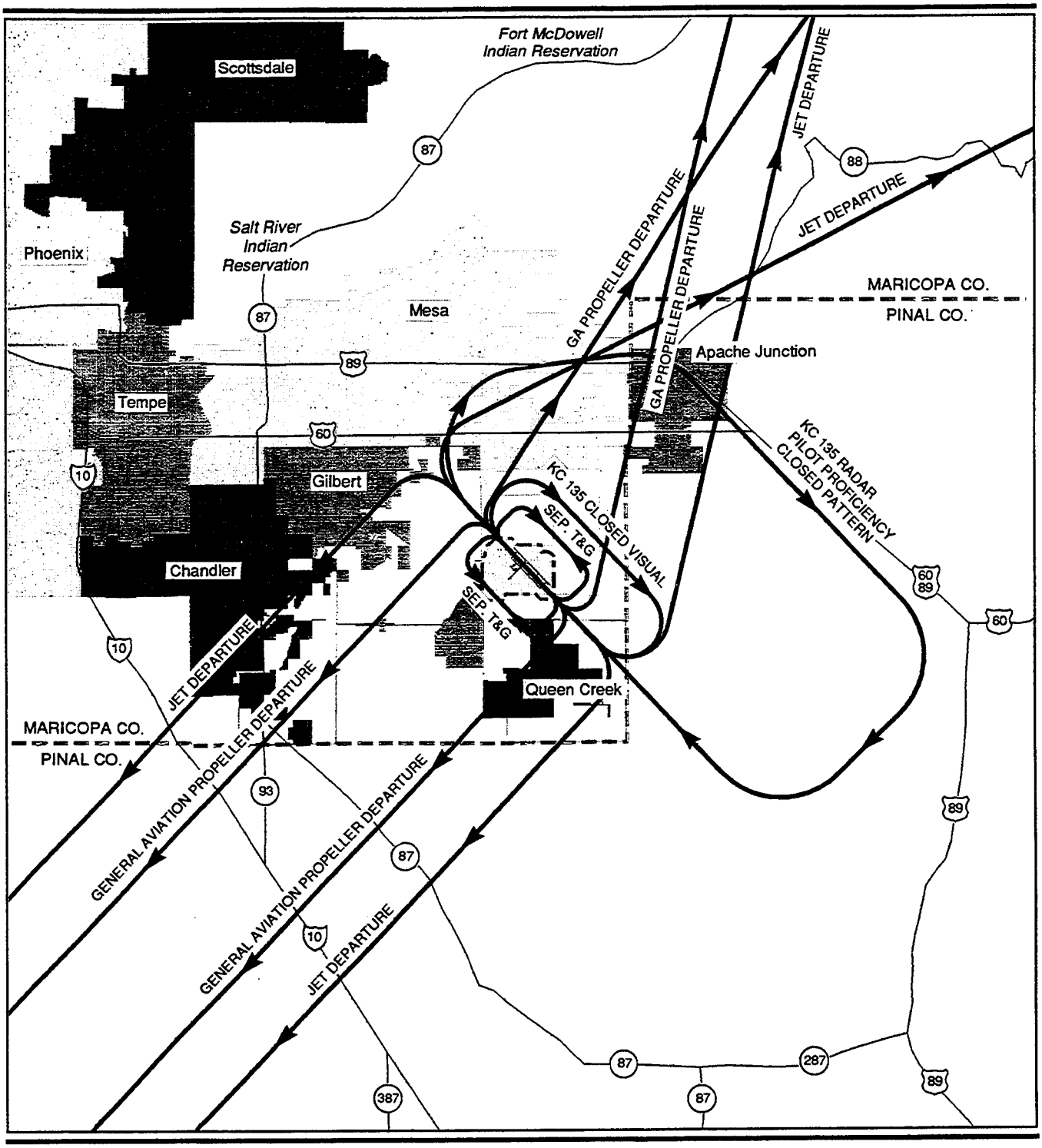
Direction of Travel on Flight Path

Base Boundary

Primary Flight Tracks - General Aviation and Education Alternative - Arrivals

0 3 6 Miles

Figure I-3



EXPLANATION

Direction of Travel on Flight Path

Base Boundary

0 3 6 Miles

Primary Flight Tracks - General Aviation and Education Alternative - Departures and Touch-and-Go

Figure I-4

operations by the Arizona ANG 162nd Fighter Group are included as part of this alternative. For the purpose of analysis, 10 percent of the F-16 training operations were assumed to use afterburners on departure.

The fleet mix and annual operations for each of the modeled years are contained in Tables I-9a through I-9d. The DNL contours for the flight operations modeled are presented in Section 4.4.4 of the main text. The flight tracks modeled are presented in Figures I-5 and I-6. The day-night split for all aircraft operations is given in Table I-3. Stage lengths for air operations are given in Table I-4.

No engine runup operations were included in the noise modeling for this alternative.

A standard 3-degree glide slope and the takeoff profiles provided by the FAA's Integrated Noise Model Database 3.9 were assumed for all commercial and general aviation aircraft.

Surface traffic data used in the modeling were developed from the project traffic study and are shown in Table I-7.

1.6 EDUCATION AND PLANNED COMMUNITY ALTERNATIVE

This alternative includes only non-aviation land uses. The airfield would be replaced with residential, commercial, and educational uses. Other land uses on the base would include educational, industrial, commercial, and recreational lands. Surface traffic data used in the modeling were developed from the project traffic study and are presented in Table I-7.

1.7 NO-ACTION ALTERNATIVE

The No-Action Alternative would result in the Air Force retaining ownership of the property after closure. The property would not be put to further use. A U.S. Air Force Base Conversion Agency Operating Location (OL) team would be provided to ensure base security and maintain the grounds and physical assets, including the existing utilities and structures. There would be no military activities/missions performed on the property identified for disposal. Surface traffic data used in the modeling were developed from the project traffic study and are presented in Table I-7.

2. NOISE METRICS

Noise, as used in this context, refers to sound pressure variations audible to the ear. The audibility of a sound depends on the amplitude and frequency of the sound and the individual's capability to hear the sound. Whether the sound is judged as noise depends largely on the listener's current activity and attitude toward the sound source as well as the amplitude and frequency of the sound. The range in sound pressures which the human ear can comfortably detect encompasses a wide range of amplitudes, typically a factor larger than a million. To obtain convenient measurements and sensitivities at extremely low and high sound pressures, sound is measured

TABLE I-9a
SCENARIO: Commercial Aviation and Education Alternative
MODELED YEAR: 1993

Type of Aircraft	Number of Operations	Percent of Category	Total for Category	Category Percent of Total
Air Passenger (Air Carrier)			0	0
B-757 / A-320	0	0		
MD-83 (MD-80/MD-90)	0	0		
B-737-300/400/500	0	0		
B-767	0	0		
Air Passenger (Commuter)			0	0
Beech 1900	0	0		
DHC-8	0	0		
Air Cargo			0	0
B-727	0	0		
DC8-70	0	0		
B-747-400	0	0		
General Aviation			115,900	87
COMSEP (composite single-engine piston)	89,200	77		
Beech Baron 58P (twin-engine piston)	22,000	19		
Cessna Conquest (turboprop)	3,500	3		
Composite General Aviation Jet	1,200	1		
Hughes OH-6A (helicopter)	0	0		
Military			17,400	13
F-16	12,000	69		
Hughes OH-6A (helicopter)	3,000	17		
KC-135E (B-707-320)	2,400	14		
TOTAL			133,300	100

TABLE I-9b
SCENARIO: Commercial Aviation and Education Alternative
MODELED YEAR: 1998

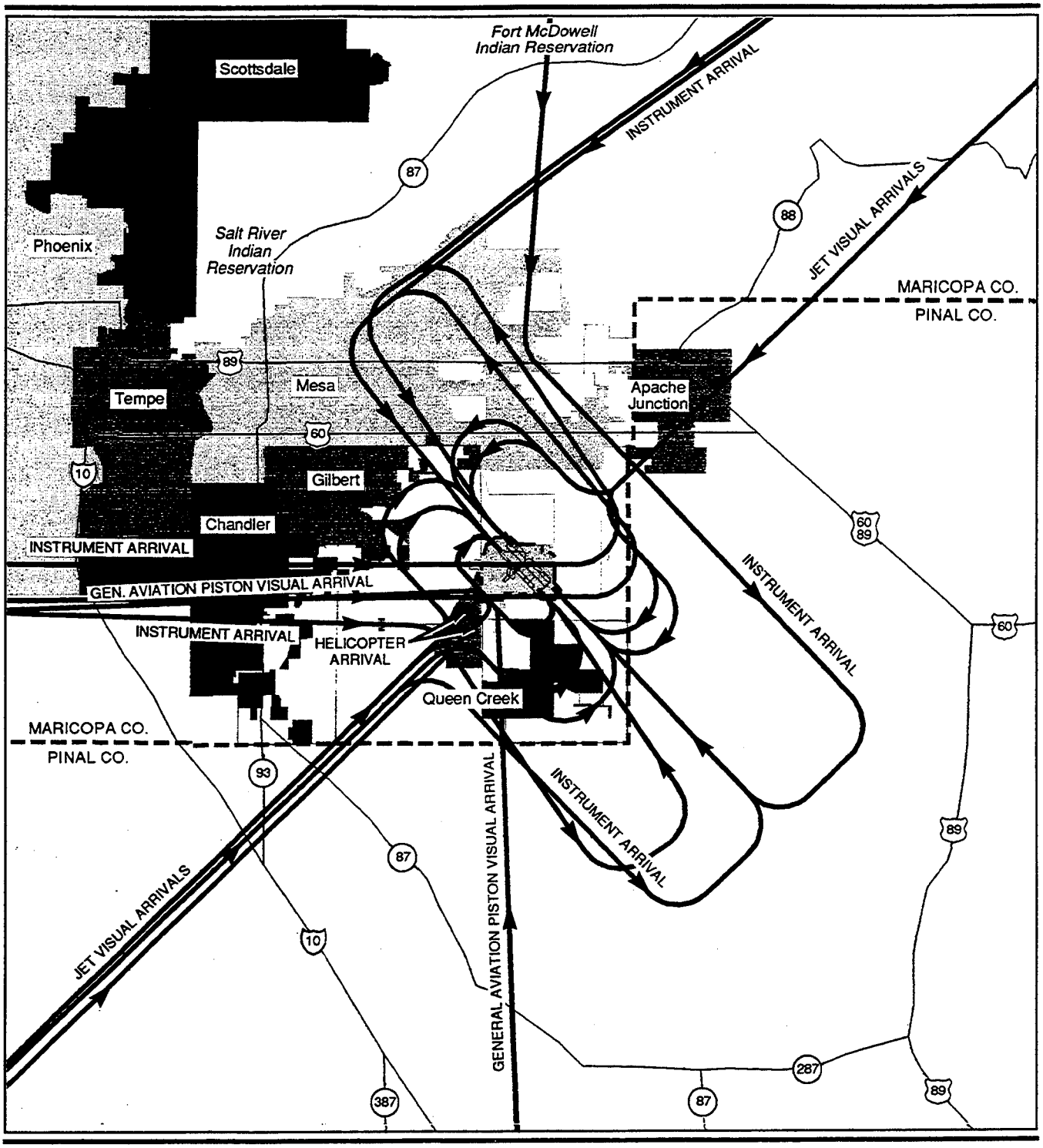
Type of Aircraft	Number of Operations	Percent of Category	Total for Category	Category Percent of Total
Air Passenger (Air Carrier)			7,100	3
B-757 / A-320	700	10		
MD-83 (MD-80/MD-90)	1,100	15		
B-737-300/400/500	5,300	75		
B-767	0	0		
Air Passenger (Commuter)			2,200	1
Beech 1900	500	23		
DHC-8	1,700	77		
Air Cargo			1,600	1
B-727	800	50		
DC8-70	800	50		
B-747-400	0	0		
General Aviation			195,400	83
COMSEP (composite single-engine piston)	138,600	71		
Beech Baron 58P (twin-engine piston)	38,300	19		
Cessna Conquest (turboprop)	11,800	6		
Composite General Aviation Jet	5,500	3		
Hughes OH-6A (helicopter)	1,200	1		
Military			29,100	12
F-16	20,000	69		
Hughes OH-6A (helicopter)	5,000	17		
KC-135R	4,100	14		
TOTAL			235,400	100

TABLE I-9c
SCENARIO: Commercial Aviation and Education Alternative
MODELED YEAR: 2003

Type of Aircraft	Number of Operations	Percent of Category	Total for Category	Category Percent of Total
Air Passenger (Air Carrier)			18,500	7
B-757 / A-320	1,900	10		
MD-83 (MD-80/MD-90)	6,600	36		
B-737-300/400/500	10,000	54		
B-767	0	0		
Air Passenger (Commuter)			3,400	1
Beech 1900	900	26		
DHC-8	2,500	74		
Air Cargo			3,000	1
B-727	1,500	50		
DC8-70	1,500	50		
B-747-400	0	0		
General Aviation			196,900	79
COMSEP (composite single-engine piston)	123,700	63		
Beech Baron 58P (twin-engine piston)	38,200	19		
Cessna Conquest (turboprop)	18,100	9		
Composite General Aviation Jet	11,400	6		
Hughes OH-6A (helicopter)	5,500	3		
Military			29,100	12
F-16	20,000	69		
Hughes OH-6A (helicopter)	5,000	17		
KC-135R	4,100	14		
TOTAL			250,900	100

TABLE I-9d
SCENARIO: Commercial Aviation and Education Alternative
MODELED YEAR: 2013

Type of Aircraft	Number of Operations	Percent of Category	Total for Category	Category Percent of Total
Air Passenger (Air Carrier)			44,700	16
B-757 / A-320	6,300	14		
MD-83 (MD-80/MD-90)	24,800	56		
B-737-300/400/500	12,600	28		
B-767	1,000	2		
Air Passenger (Commuter)			2,800	1
Beech 1900	1,100	39		
DHC-8	1,700	61		
Air Cargo			4,800	2
B-727	2,400	50		
DC8-70	2,200	46		
B-747-400	200	4		
General Aviation			199,900	71
COMSEP (composite single-engine piston)	100,300	50		
Beech Baron 58P (twin-engine piston)	37,200	19		
Cessna Conquest (turboprop)	33,200	17		
Composite General Aviation Jet	19,200	10		
Hughes OH-6A (helicopter)	10,000	5		
Military			29,100	10
F-16	20,000	69		
Hughes OH-6A (helicopter)	5,000	17		
KC-135R	4,100	14		
TOTAL			281,300	100



EXPLANATION

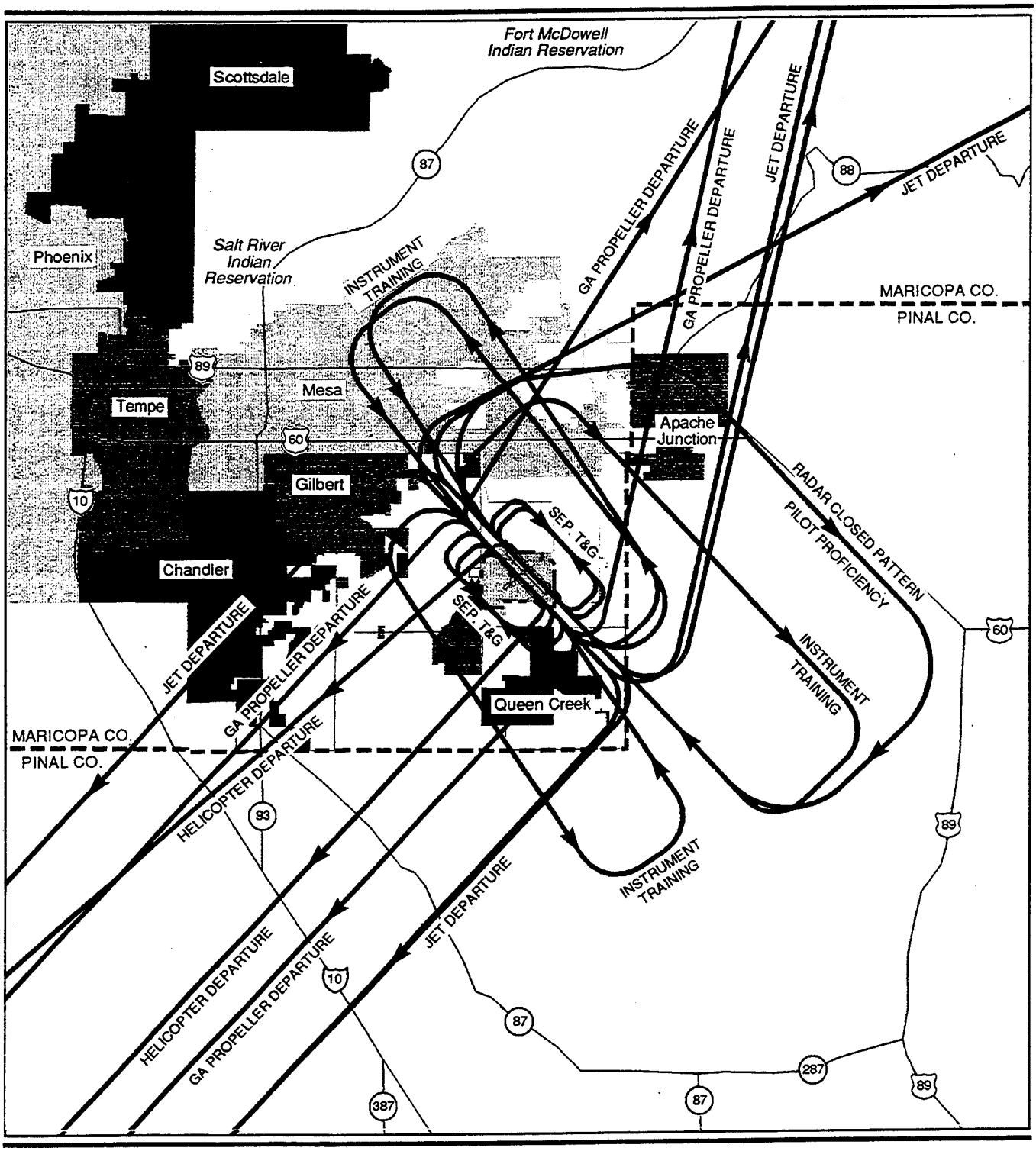
Direction of Travel on Flight Path

Base Boundary

Primary Flight Tracks - Commercial Aviation and Education Alternative - Arrivals

0 3 6 Miles

Figure I-5



EXPLANATION

Direction of Travel on Flight Path

Base Boundary

Primary Flight Tracks - Commercial Aviation and Education Alternative - Departures and Touch-and-Go

0 3 6 Miles

Figure I-6

in units of the decibel (dB). The dB is a dimensionless unit related to the logarithm of the ratio of the measured level to a reference level.

Because of the logarithmic nature of the decibel unit, sound levels cannot be added or subtracted directly. However, the following shortcut method can be used to combine sound levels:

Difference between two dB values	Add the following to the higher level
0 to 1	3
2 to 3	2
4 to 9	1
10 or more	0

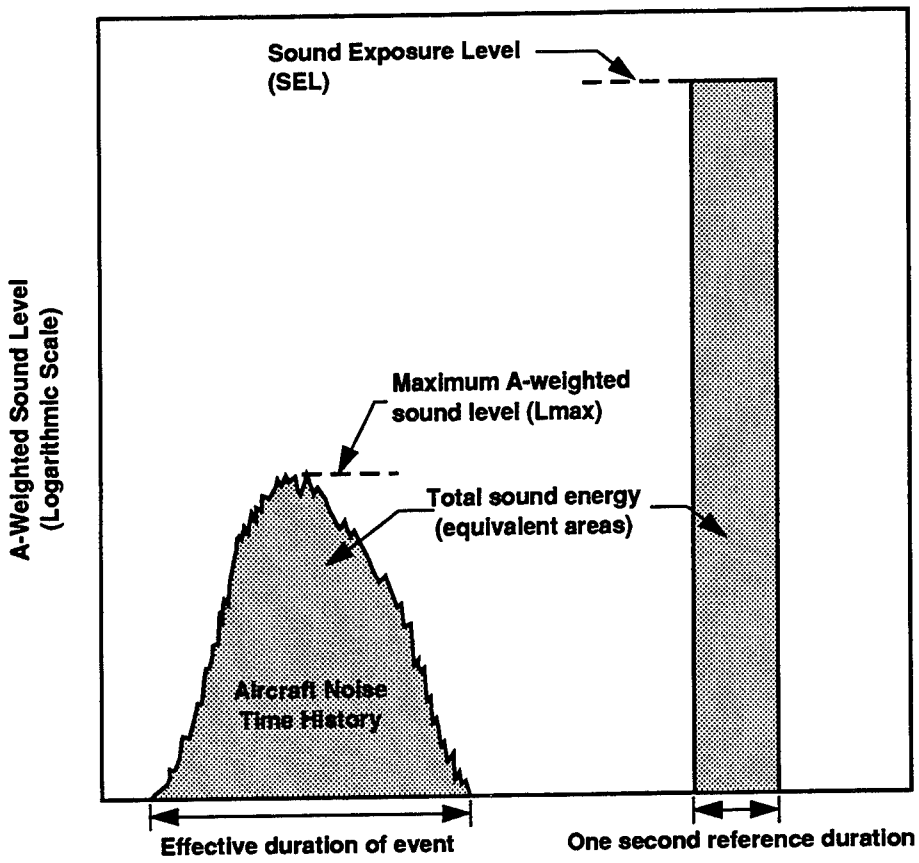
The ear is not equally sensitive to all frequencies of sound. At low frequencies, characterized as a rumble or roar, the ear is not very sensitive while at higher frequencies, characterized as a screech or a whine, the ear is most sensitive. The A-weighted level was developed to measure and report sound levels in a way which would more closely approach how people perceive the sound. All sound levels reported herein are in terms of A-weighted sound levels.

Environmental sound levels typically vary with time. This is especially true for areas near airports where noise levels will increase substantially as the aircraft passes overhead and afterwards diminish to typical community levels. Both the Department of Defense and the FAA have specified the following three noise metrics to describe aviation noise.

Day-Night Average Sound Level (DNL) is the 24-hour A-weighted equivalent sound level with a 10 dB weighting added to those levels occurring between 10 p.m. and 7 a.m. the following morning. The 10 dB weighting is a penalty representing the added intrusiveness of noise during normal sleeping hours. DNL is used to determine land use compatibility with noise from aircraft and surface traffic. The expression L_{dn} is often used in equations to designate day-night average sound level.

Maximum Sound Level (L_{max}) is the highest instantaneous sound level observed during a single noise event no matter how long the sound may persist (Figure I-7).

Sound Exposure Level (SEL) value represents the A-weighted sound level integrated over the entire duration of the event and referenced to a duration of 1 second. Hence, it normalizes the event to a 1-second event. Typically, most events (aircraft flyover) last longer than 1 second, and the SEL value will be higher than the maximum sound level of the event. Figure I-7 illustrates the relationship between the maximum sound level and SEL.



Sound Exposure Level (SEL) and Comparison to Aircraft Noise Time History

Figure I-7

3. NOISE MODELS

3.1 AIR TRAFFIC

The Air Force NOISEMAP model, Version 6.1 (Moulton, 1990), was used to predict aircraft noise levels. The NOISEMAP program incorporates the database for civilian aircraft developed by the FAA for the Integrated Noise Model (INM), Version 3.9 (Federal Aviation Administration, 1982). The NOISEMAP computer program is a comprehensive set of computer routines for calculating noise contours from aircraft flight and ground runup operations, using aircraft unique noise data for fixed-wing aircraft. The program requires specific input data, consisting of runway layout, aircraft types, number of operations, flight tracks, and noise performance data, to compute a grid of DNL values at uniform intervals. The grid is then processed by a contouring program which draws the contours at selected intervals. The program also provides noise level data for specific receptor locations.

3.2 SURFACE TRAFFIC

The Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (U.S. Department of Transportation, 1978) was used to predict surface traffic noise. The model uses traffic volumes, vehicular mix, traffic speed, traffic distribution, and roadway length to estimate traffic noise levels.

4. ASSESSMENT CRITERIA

Criteria for assessing the effects of noise include annoyance, speech interference, sleep disturbance, noise-induced hearing loss, possible nonauditory health effects, reaction by animals, and land use compatibility. These criteria are often developed using statistical methods. The validity of generalizing statistics derived from large populations are suspect when applied to small sample sizes as we have in this EIS. Caution should be employed when interpreting the results of the impact analysis.

4.1 ANNOYANCE DUE TO SUBSONIC AIRCRAFT NOISE

Noise-induced annoyance is an attitude or mental process with both acoustic and nonacoustic determinants (Fidell et al., 1988). Noise-induced annoyance is perhaps most often defined as a generalized adverse attitude toward noise exposure. Noise annoyance is affected by many factors including sleep and speech interference and task interruption. The level of annoyance may also be affected by many nonacoustic factors.

In communities in which the prevalence of annoyance is affected primarily by noise, reductions in exposure can be expected to lead to reductions in

prevalence of annoyance. In communities in which the prevalence of annoyance is controlled by nonacoustic factors, such as odor, traffic congestion, etc., there may be little or no reduction in annoyance associated with reductions in exposure. The intensity of community response to noise exposure may even, in some cases, be essentially independent of physical exposure. In the case of community response to actions, such as airport siting or scheduling of supersonic transport aircraft, vigorous reaction has been encountered at the mere threat of exposure, or minor increases in exposure.

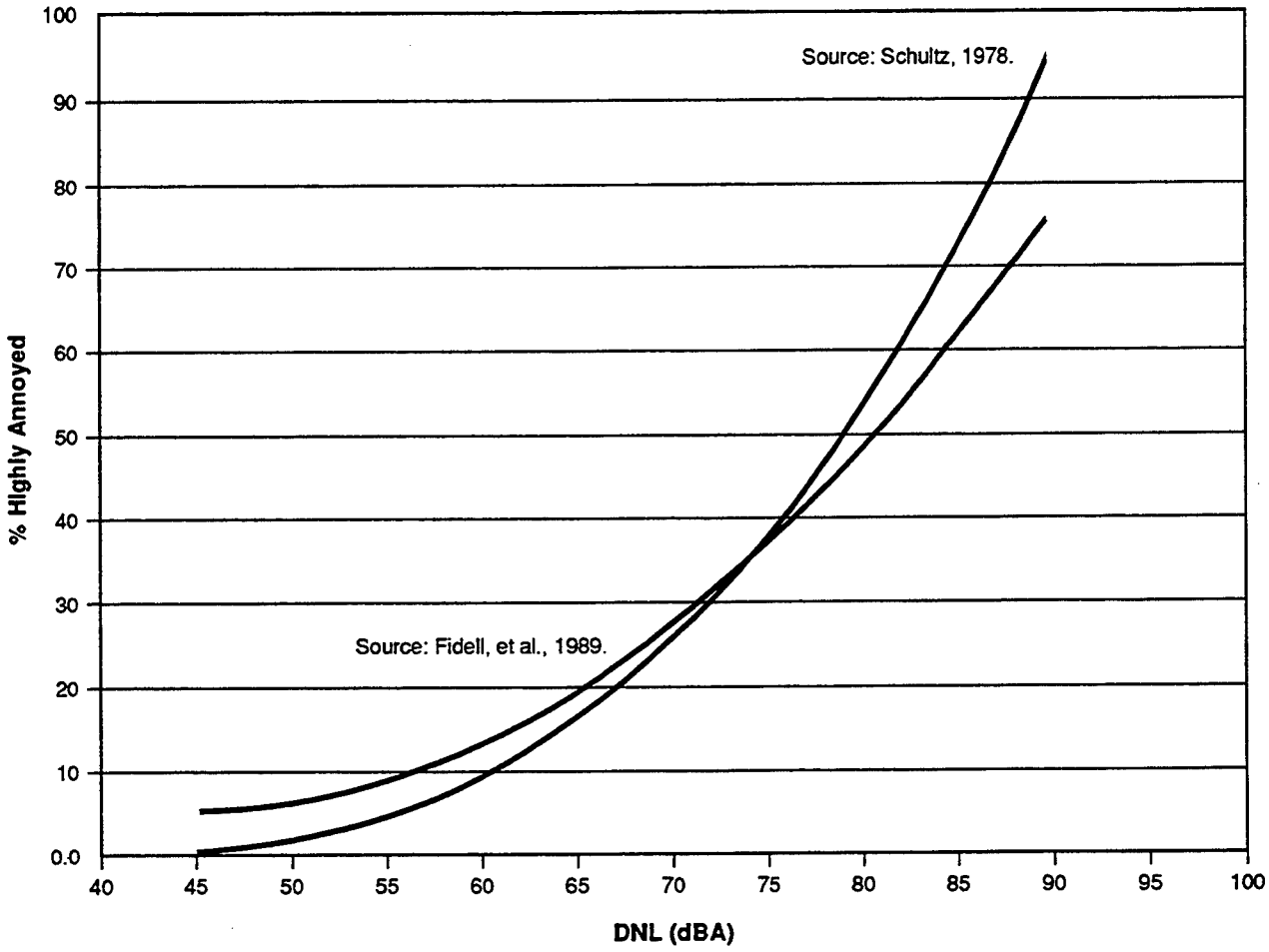
The standard method for determining the prevalence of annoyance in noise-exposed communities is by attitudinal survey. Surveys generally solicit self-reports of annoyance through one or more questions of the form "How bothered or annoyed have you been by the noise of (noise source) over the last (time period)?" Respondents are typically constrained in structured interviews to select one of a number of response alternatives, often named categories such as "Not At All Annoyed," "Slightly Annoyed," "Moderately Annoyed," "Very Annoyed," or "Extremely Annoyed." Other means are sometimes used to infer the prevalence of annoyance from survey data (for example, by interpretation of responses to activity interference questions or by construction of elaborate composite indices), with varying degrees of face validity and success.

Predictions of the prevalence of annoyance in a community can be made by extrapolation from an empirical dosage-effect relationship. Based on the results of a number of sound surveys, Schultz (1978) developed a relationship between percent highly annoyed and DNL:

$$\%\ \textit{Highly Annoyed} = 0.8553\ DNL - 0.0401\ DNL^2 + 0.00047\ DNL^3$$

Note that this relationship should not be evaluated outside the range of DNL = 45 to 90 dB. Figure I-8 presents this equation graphically. Less than 15 to 20 percent of the population would be predicted to be annoyed by DNL values less than 65 dB, whereas over 37 percent of the population would be predicted to be annoyed from DNL values greater than 75 dB. The relationship developed by Schultz was presented in the *Guidelines for Preparing Environmental Impact Statements on Noise* (National Academy of Sciences, 1977).

These results were recently reviewed (Fidell et al., 1989) and the original findings updated with results of more recent social surveys, bringing the number of data points used in defining the relationship to over 400. The findings of the new study differ only slightly from those of the original study.



Community Noise Annoyance Curves

Figure I-8

4.2 SPEECH INTERFERENCE AND RELATED EFFECTS DUE TO AIRCRAFT FLYOVER NOISE

One of the ways that noise affects daily life is by preventing or impairing speech communication. In a noisy environment, understanding of speech is diminished by masking of speech signals by intruding noises. Speakers generally raise their voices or move closer to listeners to compensate for masking noise in face-to-face communications, thereby increasing the level of speech at the listener's ear. As intruding noise levels rise higher and higher, speakers may cease talking altogether until conversation can be resumed at comfortable levels of vocal effort after noise intrusion ends.

If the speech source is a radio or television, the listener may increase the volume during a noise intrusion. If noise intrusions occur repeatedly, the listener may choose to set the volume at a high level so that the program material can be heard even during noise intrusions.

In addition to losing information contained in the masked speech material, the listener may lose concentration because of the interruptions and thus become annoyed. If the speech message is some type of warning, the consequences could be serious.

Current practice in quantification of the magnitude of speech interference and predicting speech intelligibility ranges from metrics based on A-weighted sound pressure levels of the intruding noise alone to more complex metrics requiring detailed spectral information about both speech and noise intrusions. There are other effects of the reduced intelligibility of speech caused by noise intrusions. For example, if the understanding of speech is interrupted, performance may be reduced, annoyance may increase, and learning may be impaired.

As the noise level of an environment increases, people automatically raise their voices. The effect does not take place, however, if the noise event were to rise to a high level very suddenly.

4.2.1 Speech Interference Effects from Time-Varying Noise

Most research on speech interference due to noise has included the study of steady state noise. As a result, reviews and summaries of noise effects on speech communications concentrate on continuous or at least long duration noises (Miller, 1974). However, noise intrusions are not always continuous or of long duration but are frequently transient in nature. Transportation noise generates many such noise intrusions, consisting primarily of individual vehicle pass-bys such as aircraft flyovers. Noise emitted by other vehicles (motorboats, snowmobiles, and off-highway vehicles) is also transient in nature.

It has been shown, at least for aircraft flyover noise, that accuracy of predictors of speech intelligibility are ranked in a similar fashion for both steady state and time-varying or transient sounds (Williams et al., 1971; Kryter and Williams, 1966). Of course, if one measures the noise of a flyover by the maximum A-weighted level, then intelligibility associated with this level would be higher than for a steady noise of the same value, simply because the level is less than the maximum for much of the duration of the flyover.

4.2.2 Other Effects of Noise Which Relate to Speech Intelligibility

Aside from the direct effects of reduction in speech intelligibility, related effects may occur that tend to compound the loss of speech intelligibility itself.

Learning. One of the environments in which speech intelligibility plays a critical role is the classroom. In classrooms of schools exposed to aircraft flyover noise, speech becomes masked or the teacher stops talking altogether during an aircraft flyover (Crook and Langdon, 1974). Pauses begin to occur when instantaneous flyover levels exceed 60 dB (A-weighted level). Masking of the speech of teachers who do not pause starts at about the same level.

At levels of 75 dB, some masking occurs for 15 percent of the flyovers and increases to nearly 100 percent at 82 dB. Pauses occur for about 80 percent of the flyovers at this noise level. Since a marked increase in pauses and masking occurs when levels exceed 75 dB, this level is sometimes considered as one above which teaching is impaired due to disruption of speech communication. The effect that this may have on learning is unclear at this time. However, one study (Arnoult et al., 1986) could find no effect of noise on cognitive tasks from jet or helicopter noise over a range from 60 to 80 dB (A-weighted level), even though intelligibility scores indicated a continuous decline starting at the 60 dB level. In a Japanese study (Ando et al., 1975), researchers failed to find differences in mental task performance among children from communities with different aircraft noise exposure.

Although there seems to be no proof that noise from aircraft flyovers affects learning, it is reported by Mills (1975) that children are not as able to understand speech in the presence of noise as are adults. It is hypothesized that part of the reason is due to the increased vocabulary which the adult can draw on as compared to the more limited vocabulary available to the young student. Also, when one is learning a language, it is more critical that all words be heard rather than only enough to attain 95 percent sentence intelligibility, which may be sufficient for general conversations. It was mentioned above that when the maximum A-weighted level for aircraft flyovers heard in a classroom exceeds 75 dB, masking of speech increases

rapidly. However, it was also noted that pausing during flyovers and masking of speech for those teachers who continue to lecture during a flyover start at levels around 60 dB (Pearsons and Bennett, 1974).

Annoyance. Klatt, Stevens, and Williams (1969) studied the annoyance of speech interference by asking people to judge the annoyance of aircraft noise in the presence and absence of speech material. The speech material was composed of passages from newspaper and magazine articles. In addition to rating aircraft noise on an acceptability scale (unacceptable, barely acceptable, acceptable, and of no concern), the subjects were required to answer questions about the speech material. The voice level was considered to represent a raised voice level (assumed to be 68 dB). In general, for the raised voice talker, the rating of barely acceptable was given to flyover noise levels (L_{max}) of 73 to 76 dB. However, if the speech level was reduced, the rating of the aircraft tended more toward unacceptable. The results suggested that if the speech level were such that 95 percent or better sentence intelligibility was maintained, then a barely acceptable rating or better could be expected. This result is in general agreement with the finding in schools that teachers pause or have their speech masked at levels above 75 dB (Crook and Langdon, 1974).

Hall, Taylor, and Birnie (1985) recently tried to relate various types of activity interference in the home, related to speech and sleeping, to annoyance. The study found that there is a 50 percent chance that people's speech would be interfered with at a level of 58 dB. This result is in agreement with the other results, considering that the speech levels in the school environment of the Cook study are higher than the levels typically used in the home. Also, in a classroom situation the teacher raises his or her voice as the flyover noise increases in intensity.

4.2.3 Predicting Speech Intelligibility and Related Effects Due to Aircraft Flyover Noise

It appears, from the above discussions, that when aircraft flyover noises exceed approximately 60 dB (L_{max}), speech communication may be interfered with either by masking or by pausing on the part of the talker. Increasing the level of the flyover noise to 80 dB would reduce the intelligibility to zero even if a loud voice is used by those attempting to communicate.

The levels mentioned above refer to noise levels measured indoors. The same noises measured outdoors would be 15 to 25 dB higher than these indoor levels during summer (windows open) and winter months (windows closed), respectively. These estimates are taken from U.S. Environmental Protection Agency (U.S. EPA) reviews of available data (U.S. Environmental Protection Agency, 1974).

Levels of the aircraft noise measured inside dwellings and schools near the ends of runways at airports may exceed 60 dB (L_{max}) inside (75 dB outside). During flyovers, speech intelligibility would be degraded. However, since the total duration is short, no more than a few seconds during each flyover, only a few syllables may be lost. People may be annoyed, but the annoyance may not be due to loss in speech communication but rather due to startle or sleep disturbance as discussed below.

4.3 SLEEP DISTURBANCE DUE TO NOISE

The effects of noise on sleep have long been a concern of parties interested in assuring suitable residential noise environments. Early studies noted background levels in people's bedrooms in which sleep was apparently undisturbed by noise. Various levels between 25 to 50 dB (A-weighted) were observed to be associated with an absence of sleep disturbance. The bulk of the research on noise effects on which the current relationship is based was conducted in the 1970s. The tests were conducted in a laboratory environment in which awakening was measured either by a verbal response or by a button push, or by brain wave recordings (EEG) indicating stages of sleep (and awakening). Various types of noise were presented to the sleeping subjects throughout the night. These noises consisted primarily of transportation noises including those produced by aircraft, trucks, cars, and trains. The aircraft noises included both flyover noises as well as sonic booms. Synthetic noises, including laboratory-generated sounds consisting of shaped noises and tones, were also studied.

Lukas (1975) and Goldstein and Lukas (1980) both reviewed data available in the 1970s on sleep-stage changes and waking effects of different levels of noise. Since no known health effects were associated with either waking or sleep-stage changes, either measure was potentially useful as a metric of sleep disturbance. However, since waking, unlike sleep-stage changes, is simple to quantify, it is often selected as the metric for estimating the effects of noise on sleep. These two reviews showed great variability in the percentage of people awakened by exposure to noise. The variability is not merely random error, but reflects individual differences in adaptation or habituation, and also interpretation of the meaning of the sounds. Such factors cannot be estimated from the purely acoustic measures in noise exposure.

Another major review, by Griefahn and Muzet (1978), provided similar information for effects of noise on waking. However, Griefahn and Muzet's results suggested less waking for a given level of noise than predicted by Lukas.

A recent review (Pearsons et al., 1989) of the literature related to sleep disturbance demonstrated that the relationship, based exclusively on laboratory studies, predicts greater sleep disturbance than that likely to

occur in a real-life situation in which some adaptation has occurred. The prediction relationships developed in this review should not be considered to yield precise estimates of sleep disturbance because of the great variability in the data sets from which they were developed. The relationships include only the duration and level components of "noise exposure." Increasing the precision of prediction would depend on quantification of some of the nonacoustic factors. Further, a recent review of field, as well as laboratory studies, suggests that habituation may reduce the effect of noise on sleep (Pearsons et al., 1989).

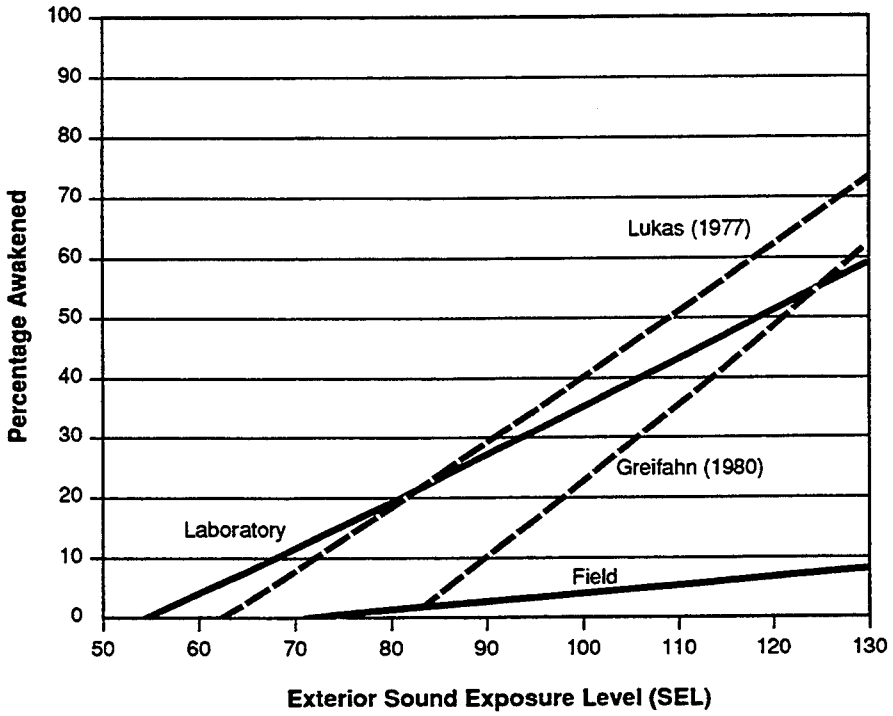
Noise must penetrate the home to disturb sleep. Interior noise levels are lower than exterior levels due to the attenuation of the sound energy by the structure. The amount of attenuation provided by the building is dependent on the type of construction and whether the windows are open or closed. The approximate national average attenuation factors are 15 dB for open windows and 25 dB for closed windows (U.S. Environmental Protection Agency, 1974).

Incorporating these attenuation factors, the percent awakened relationships previously discussed are presented in Figure I-9. In conclusion, the scientific literature does not provide a consensus on sleep disturbance. There is no recognized criteria or standard which provides guidance to assess sleep disturbance due to noise.

4.4 NOISE-INDUCED HEARING LOSS

Hearing loss is measured in decibels and refers to the permanent auditory threshold shift of an individual's hearing in an ear. Auditory threshold refers to the minimum acoustic signal that evokes an auditory sensation (i.e., the quietest sound a person can hear). When a threshold shift occurs a person's hearing is not as sensitive as before and the minimum sound that a person can hear must be louder. The threshold shift which naturally occurs with age is called presbycusis. Exposure to high levels of sound can cause temporary and permanent threshold shifts usually referred to as noise-induced hearing loss. Permanent hearing loss is generally associated with destruction of the hair cells of the inner ear.

The U.S. EPA (1974) and the Committee on Hearing, Bioacoustics, and Biomechanics (National Academy of Sciences, 1981) have addressed the risk of outdoor hearing loss. They have concluded that hearing loss would not be expected for people living outside the noise contour of DNL 75 dB. Several studies of populations near existing airports in the U.S. and the U.K. have shown that the possibility for permanent hearing loss in communities near intense commercial takeoff and landing patterns is remote. An FAA-funded study compared the hearing of the population near the Los Angeles International Airport to that of the population in a quiet area away from aircraft noise (Parnel and Cohen, 1972). A similar study was



Source: (Pearsons et al., 1989)

Sleep Disruption (Awakening)

Figure I-9

performed in the vicinity of London Heathrow Airport (Ward et al., 1972). Both studies concluded that there was no significant difference between the hearing loss of the two populations, and no correlation between the hearing level with the length of time people lived in the airport neighborhood.

4.5 NONAUDITORY HEALTH EFFECTS OF RESIDENTIAL AIRCRAFT NOISE

Based on summaries of previous research in the field (Thompson, 1981; Thompson and Fidell, 1989), predictions of nonauditory health effects of aircraft noise cannot be made. A valid predictive procedure requires: (1) evidence for causality between aircraft noise exposure and adverse nonauditory health consequences, and (2) knowledge of a quantitative relationship between amounts of noise exposure (dose) and specific health effects. Because results of studies of aircraft noise on health are equivocal, there is no sound scientific basis for making adequate risk assessments.

Alleged nonauditory health consequences of aircraft noise exposure which have been studied include birth defects, low birth weight, psychological illness, cancer, stroke, hypertension, sudden cardiac death, myocardial infarction, and cardiac arrhythmias. Of these, hypertension is the most biologically plausible effect of noise exposure. Noise appears to cause many of the same biochemical and physiological reactions, including temporary elevation of blood pressure, as do many other environmental stressors. These temporary increases in blood pressure are believed to lead to a gradual resetting of the body's blood pressure control system. Over a period of years, permanent hypertension may develop (Peterson et al., 1984).

Studies of residential aircraft noise have produced contradictory results. Early investigations indicated that hypertension was from two to four times higher in areas near airports than in areas located away from airports (Karagodina et al., 1969). Although Meecham and Shaw (1988) continue to report excessive cardiovascular mortality among individuals 75 years or older living near the Los Angeles International Airport, their findings cannot be replicated (Frerichs et al., 1980). In fact, noise exposure increased over the years while there was a decline in all cause, age-adjusted death rates and inconsistent changes in age-adjusted cardiovascular, hypertension, and cerebrovascular disease rates.

Studies which have controlled for multiple factors have shown no, or a very weak, association between noise exposure and nonauditory health effects. This observation holds for studies of occupational and traffic noise as well as for aircraft noise exposure. In contrast to the early reports of two- to six-fold increases in hypertension due to high industrial noise (Thompson and Fidell, 1989), the more rigorously controlled studies of Talbott et al. (1985) and van Dijk et al. (1987) show no association between hypertension and prolonged exposure to high levels of occupational noise.

In the aggregate, studies indicate no association exists between street traffic noise and blood pressure or other cardiovascular changes. Two large prospective collaborative studies of heart disease are of particular interest. To date, cross-sectional data from these cohorts offer contradictory results. Data from one cohort show a slight increase in mean systolic blood pressure (2.4 mm Hg) in the noisiest compared to the quietest area; while data from the second cohort show the lowest mean systolic blood pressure and highest high-density lipoprotein cholesterol (lipoprotein protective of heart disease) for men in the noisiest area (Babisch and Gallacher, 1990). These effects of traffic noise on blood pressure and blood lipids were more pronounced in men who were also exposed to high levels of noise at work.

It is clear from the foregoing that the current state of technical knowledge cannot support inference of a causal or consistent relationship, nor a quantitative dose-response, between residential aircraft noise exposure and health consequences. Thus, no technical means are available for predicting extra-auditory health effects of noise exposure. This conclusion cannot be construed as evidence of no effect of residential aircraft noise exposure on nonauditory health. Current findings, taken in sum, indicate only that further rigorous studies are needed.

4.6 DOMESTIC ANIMALS AND WILDLIFE

A recent study was published on the effects of aircraft noise on domestic animals which provided a review of the literature and a review of 209 claims pertinent to aircraft noise over a period spanning 32 years (Bowles et al., 1990). Studies since the late 1950s were motivated both by public concerns about what was at that time a relatively novel technology, supersonic flight, and by claims leveled against the U.S. Air Force for damage done to farm animals by very low-level subsonic overflights. Since that time over 40 studies of aircraft noise and sonic booms, both in the U.S. and overseas, have addressed acute effects, including effects of startle responses (sheep, horses, cattle, fowl), and effects on reproduction and growth (sheep, cattle, fowl, swine), parental behaviors (fowl, mink), milk letdown (dairy cattle, dairy goats, swine), and egg production.

The literature on the effects of noise on domestic animals is not large, and most of the studies have focused on the relation between dosages of continuous noise and effects. Chronic noises are not a good model for aircraft noise, which lasts only a few seconds, but which is often very startling. The review of claims suggest that a major source of loss was panics induced in naive animals.

Aircraft noise may have effects because it might trigger a startle response, a sequence of physiological and behavioral events that once helped animals avoid predators. There are good dose-response relations describing the

tendency to startle to various levels of noise, and the effect of habituation on the startle response.

The link between startles and serious effects (i.e., effects on productivity) is less certain. Here, an effect is defined as any change in a domestic animal that alters its economic value, including changes in body weight or weight gain, numbers of young produced, weight of young produced, fertility, milk production, general health, longevity, or tractability. At this point, changes in productivity are usually considered an adequate indirect measure of changes in well being, at least until objective legal guidelines are provided.

Recent focus on the effects on production runs counter to a trend in the literature toward measuring the relation between noise and physiological effects, such as changes in corticosteroid levels, and in measures of immune system function. As a result, it is difficult to determine the relation between dosages of noise and serious effects using only physiological measures. The experimental literature is inadequate to document long-term or subtle effects resulting from exposure to aircraft noise.

4.7 LAND USE COMPATIBILITY GUIDELINES

Widespread concern about the noise impacts of aircraft noise essentially began in the 1950s which saw the major introduction of high power jet aircraft into military service. The concern about noise impacts in the communities around airbases, and also within the airbases themselves, led the Air Force to conduct major investigations into the noise properties of jets, methods of noise control for test operations, and the effects of noise from aircraft operations in communities surrounding airbases. These studies established an operational framework of investigation and identified the basic parameters affecting community response to noise. These studies also resulted in the first detailed procedures for estimating community response to aircraft noise (Stevens and Pietrasanta, 1957).

Although most attention was given to establishing methods of estimating residential community response to noise (and establishing the conditions of noise "acceptability" for residential use), community development involves a variety of land uses with varying sensitivity to noise. Thus, land planning with respect to noise requires the establishment of noise criteria for different land uses. This need was met with the initial development of aircraft noise compatibility guidelines for varied land uses in the mid-1960s (Bishop, 1964).

In residential areas, noise intrusions generate feelings of annoyance on the part of individuals. Increasing degrees of annoyance lead to the increasing potential for complaints and community actions (most typically, threats of legal actions, drafting of noise ordinances, etc.). Annoyance is based largely upon noise interference with speech communication, listening to

radio and television, and sleep. Annoyance in the home may also be based upon dislike of "outside" intrusions of noise even though no specific task is interrupted.

Residential land use guidelines have developed from consideration of two related factors:

(a) Accumulated case history experience of noise complaints and community actions near civil and military airports;

(b) Relationships between environmental noise levels and degrees of annoyance (largely derived from social surveys in a number of communities).

In the establishment of land use guidelines for other land uses, the prime consideration is task interference. For many land uses, this translates into the degree of speech interference, after taking into consideration the importance of speech communication and the presence of non-aircraft noise sources related directly to the specific land use considered. For some noise-sensitive land uses where any detectable noise signals which rise above the ambient noise are unwanted (such as music halls), detectability may be the criterion rather than speech interference.

A final factor to be considered in all land uses involving indoor activities is the degree of noise insulation provided by the building structures. The land use guideline limits for unrestricted development within a specific land use assume noise insulation properties provided by typical commercial building construction. The detailed land use guidelines may also define a range of higher noise exposure where construction or development can be undertaken, provided a specified amount of noise insulation is included in the buildings. Special noise studies, undertaken by architectural or engineering specialists, may be needed to define the special noise insulation requirements for construction in these guideline ranges.

Estimates of total noise exposure resulting from aircraft operations, as expressed in DNL values, can be interpreted in terms of the probable effect on land uses. Suggested compatibility guidelines for evaluating land uses in aircraft noise exposure areas were originally developed by the FAA as presented in Section 3.4.4, Noise. Part 150 of the FAA regulations prescribes the procedures, standards, and methodology governing the development, submission, and review of airport noise exposure maps and airport noise compatibility programs. It prescribes the use of yearly DNL in the evaluation of airport noise environments. It also identifies those land use types which are normally compatible with various levels of noise exposure. Compatible or incompatible land use is determined by comparing the predicted or measured DNL level at a site with the values given in the table. The guidelines reflect the statistical variability of the responses of

large groups of people to noise. Therefore, any particular level might not accurately assess an individual's perception of an actual noise environment.

While the FAA guidelines specifically apply to aircraft noise, it should be noted that DNL is also used to describe the noise environment due to other community noise sources, including motor vehicles and railroads. The use of DNL is endorsed by the scientific community to assess land use compatibility as it pertains to noise (American National Standards Institute, 1990). Hence, the land use guidelines presented by the FAA can also be used to assess the noise impact from community noise sources other than aircraft.

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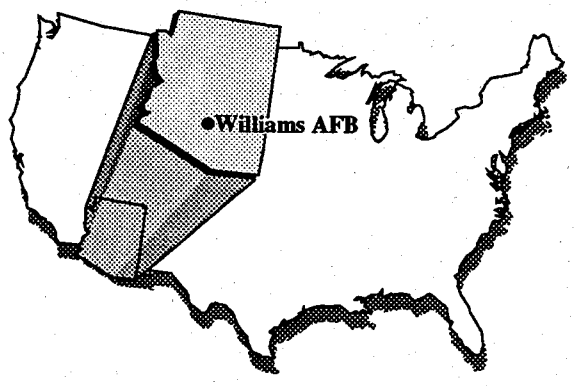


APPENDIX J

APPENDIX J

CULTURAL RESOURCES

1.0 INTRODUCTION

Cultural resources occurring on Williams AFB are divided into prehistoric sites and historic structures. There is one archaeological site listed on the National Register of Historic Places (NRHP), and 11 potentially eligible archaeological sites, on Williams AFB. The Midvale Site has been placed on the NRHP while the remaining 11 sites have been identified but not delineated at this time. The areal extent and eligibility status of these 11 sites will be determined by subsurface testing. There are 34 historic structures (pre-1945) on Williams AFB. These structures have been surveyed, and 14 have been found to be eligible for listing on the NRHP.

2.0 PRE-HISTORIC SITES ON WILLIAMS AFB

On June 8-12, 1992, a Class I Overview (Literature Search and Records Survey) was conducted to identify archaeological resources at Williams AFB. Archaeological resource reference materials were reviewed at the Arizona State Historic Preservation Office and Williams AFB. Locations of known archaeological sites on or near Williams AFB were transferred onto the Higley, AZ 7.5 minute USGS Quad Map. In addition, computer records, survey files, inventories, and archaeological reports on each identified site were reviewed for additional information. References identified in reports were also checked for additional information. Results of this Class I Overview identified three known archaeological sites on Williams AFB. The Midvale Site, AZ U:10:24 (ASU), and two unnamed sites, AZ U:10:20 (ASU) and AZ U:10:25 (ASU).

The Midvale Site occupies approximately 200 acres near the southwestern corner of Williams AFB and was officially listed on the NRHP in June 1990. Survey results in 1984 indicated that this site could yield valuable data concerning the prehistoric occupation of the area (Gasser et al., 1984). The Midvale Site is especially significant because it has survived with sufficient integrity to provide information on the Hohokam culture.

AZ U:10:20 (ASU) is located on the southern perimeter of Williams AFB to the south and adjacent to the Midvale Site. Sanitary landfill operations may have obliterated much of this site. Cultural material from the AZ U:10:20 site has been attributed to the Hohokam early Classic Period (about A.D. 1100 to 1300) (Gasser et al., 1984). AZ U:10:25 (ASU) is located in the southeast corner of the base. Much of the AZ U:10:25 site was disturbed during base construction and portions are overlain by runway pavement,

making delineation of this archaeological site difficult. Cultural material from this site has also been attributed to the Hohokam early Classic Period (Gasser et al., 1984).

A surface survey of approximately 2,000 undisturbed acres on Williams AFB was conducted December 21, 1992 through January 14, 1993. The survey was conducted to determine if there was surficial evidence of archaeological sites in addition to the two sites previously suspected from earlier survey efforts. As a result of this survey, nine additional archaeological sites were identified and recorded. The boundaries of the two previously suspected sites (AZ U:10:20 (ASU) and AZ U:10:25 (ASU)) were more accurately defined during this survey as well. The surface survey report recommended subsurface testing of all 11 sites to determine their areal extent and NRHP eligibility status (Anduze et al., 1993).

Table J-1 summarizes the results of the surface survey identifying the probable site size and type of material found during the survey. A non-specific map showing areas of cultural resource sensitivity is presented as Figure J-1. This cultural resource sensitivity area includes the Midvale Site as well as the 11 potentially eligible sites identified during the surface survey. The shape and areal extent of the sensitivity area will be adjusted after subsurface testing of these sites.

3.0 CULTURAL HISTORY OF WILLIAMS AFB AND QUEEN CREEK

The Hohokam, an aboriginal people of the American Southwest, inhabited the area which now encompasses Williams AFB. The following discussion, adapted from Noble (1991), presents an overview of the cultural history of the Hohokam (Figure J-2).

Believed to have begun inhabiting the area around A.D. 1, the Hohokam prospered in numerous agricultural villages along the Salt, Gila, and Santa Cruz rivers in the Phoenix Basin of south-central Arizona. The area that is now Williams AFB, located within the city limits of Mesa in eastern Maricopa County, is situated on a low plateau between the Salt and Gila River Valleys on a floodplain formed of erosional material from the Superstition Mountains. Queen Creek, the major drainage in this area, is about 2 miles south of Williams AFB (Gasser et al., 1984).

Previous study of the Hohokam has failed to define a firm chronological history of their development. The Hohokam are believed to have descended from early nomadic hunters and gatherers known as the Cochise who settled in small mountain villages by 1,000 B.C. Around A.D. 1, groups of the Cochise migrated to the lowlands in the area. They are thought to have been the first Hohokam. These early Hohokam people built villages along the rivers and began to experiment with water control systems as farming

Table J-1. Potentially Eligible Archaeological Sites on Williams AFB, AZ

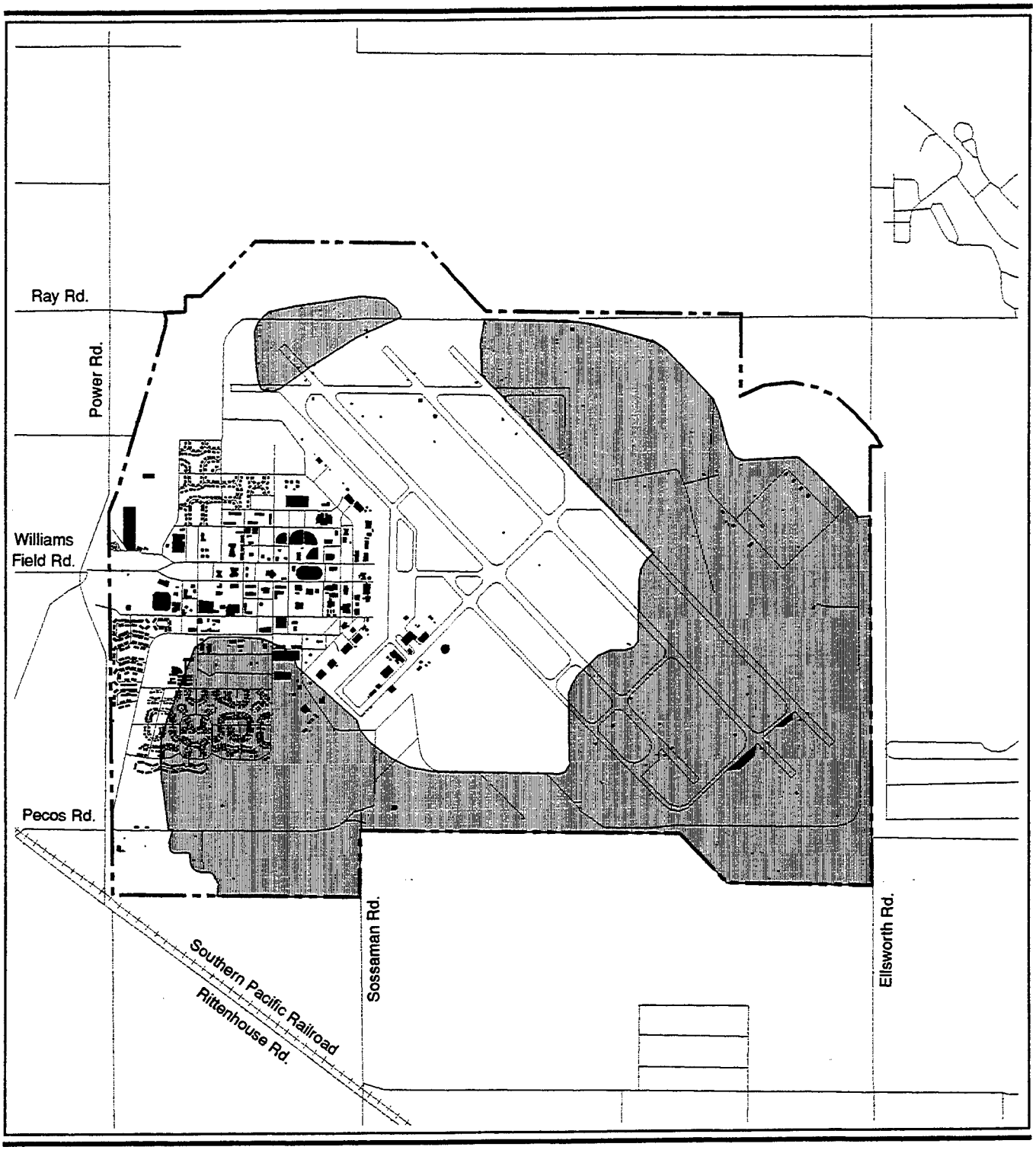
Site Number	Site Type	Site Size (acres)
AZ U:10:60 (ASM)	Artifact scatter	74
AZ U:10:61 (ASM)	Artifact scatter with possible canal	15
AZ U:10:62 (ASM)	Artifact scatter	<1
AZ U:10:63 (ASM)	Artifact scatter	3
AZ U:10:64 (ASM)	Artifact scatter, historic component	17
AZ U:10:65 (ASM)	Artifact scatter	16
AZ U:10:66 (ASM)	Artifact scatter with horno and rock piles	21
AZ U:10:67 (ASM)	Artifact scatter	20
AZ U:10:68 (ASM)	Artifact scatter	8
AZ U:10:20 (ASU)	Artifact scatter	81
AZ U:10:25 (ASU)	Artifact scatter with surface features	703

Source: Anduze et al., 1993.

and agriculture took precedence over foraging. During the Early Formative Period (A.D. 1 to 700), the Hohokam began producing simple ceramic vessels of a polished redware type to which they later added painted styles. Although the early Hohokam people were probably seasonal visitors to the Williams AFB area, no documentation has been found which indicates that the Hohokam settled there during this time period.

During the Late Formative Period (A.D. 700 to 1100), the Hohokam developed a more complex structure characterized by larger villages, population growth, more ceremonial activity, and increased trade. Their irrigation system became more extensive during this period. Hohokam farmers consolidated small canals into much larger irrigation networks which encompassed several villages. Along these canals the Hohokam grew the corn, beans, and squash on which their diet was so heavily reliant. They also cultivated tobacco and grew cotton as a source of textile fiber. Although plants were their primary food resource, the Hohokam also relied on the meat of rabbits, rodents, and birds.

By A.D. 800, the large earthen mounds which are associated with the Hohokam began to appear. Found in most major villages, these mounds



EXPLANATION

Cultural Resource Sensitivity Area

Cultural Resources

0 1500 3000 Feet

Figure J-1

YEAR	TRADITIONAL PERIODS	ALTERNATE PERIODS	PHASES	CHARACTERISTICS
1900	Historic	Historic		American reservation system, cash economy, reduced agriculture.
1850				
1750			Backwater	Spanish introduce livestock, wheat, metal tools. Warfare with Apaches.
1450		Protohistoric	Bachi	Development of Historic Pimas and Tohono O'odham (Papagos).
1350	Classic	Classic	Polvoron	Reduction of village size, ceremonial practices, and trade.
1250			Civano	Large irrigation-based communities. Big houses, compounds, polychrome pottery. Mounds include elite residences. Villages burned and some abandoned.
1150			Soho	Platform temple mounds and compounds dominant architectural style. Increasing social complexity.
1100			Santan	Many ancestral sites abandoned. Ball court system ends. New architectural styles developed. Polished Red Ware pottery popular. New ceremonies.
950	Sedentary	Late Formative	Sacaton	Expanded trade networks and irrigation. Increased village size.
850			Santa Cruz	Artistic florescence. Cremation ritual elaborated.
800	Colonial		Gila Butte	First ball courts built. Fewer figurines produced.
700			Snaketown	Canal irrigation. Increased village size. Red-on-buff pottery. First capped mounds.
600		Early Formative	Sweetwater	Expanding social interaction. Cotton production.
500			Estrella	Production of red-on-gray decorated pottery and turquoise mosaic.
400	Pioneer		Vahki	Appearance of community lodges, village plazas, clay figurines, polished Red Ware pottery. Improved agriculture.
300				
200			Red Mountain	Appearance of small villages. Expansion into Phoenix Basin. First pottery made. Extended burials. Economy based on farming, hunting, and gathering.
100				
AD				
BC		Western Archaic		Agricultural beginnings. Houses, storage pits, baskets, and grinding tools present.
100				
200				
300				

Hohokam Chronology

Source: Noble, 1991.

Figure J-2

were built from accumulated trash and soil and were used for social and ceremonial activity. The largest Hohokam villages of this period had several hundred to a thousand people. Living areas consisted of clusters of pit houses sharing large outdoor cooking ovens and trash mounds. The earliest permanent Hohokam settlements in the vicinity of Williams AFB were found in the Queen Creek area during this period.

During this Late Formative Period, the Hohokam developed a distinctive style of pottery, a bright red-on-buff ware with various shapes and designs. Early examples had painted designs consisting of thick lines in the form of chevrons and spirals. Over time, the designs became more refined and intricate. Small, geometric designs were painted repetitively in small areas on the pottery. This design has been called the "Hohokam alphabet" although there is no evidence that it represents linguistic expression. Pottery craftsmanship peaked around A.D. 900. After this date, population growth created such a high demand for pottery that detail and quality were sacrificed to increase production. In addition to ceramics, the Hohokam crafted objects from stone, wood, and fibers. They were particularly known for their carved shell ornaments: beads, pendants, bracelets, and rings.

The Hohokam population peaked during the Classic Period (Figure J-2) when more villages were settled. The Midvale archaeological site on Williams AFB dates to this period. Residential compounds, clustered around central platforms used for rituals and ceremonies, were enclosed by adobe walls. Some villages, such as Pueblo Grande and Los Muertos, had as many as two thousand individuals, although most villages were smaller. During this period, the Hohokam began producing a highly polished redware with a glossy black interior known as Salt Red.

Between 1350 and 1450 A.D., the Hohokam culture began to decline as villages were gradually abandoned. In addition to natural occurrences such as flooding and climatic change, cultural factors may have contributed to this decline. These include internal warfare, changing trade patterns, and shifting centers of power. By the time European settlers arrived, the Hohokam had completely abandoned the area. Ethnographers generally regard the Pima and the Tohono O'odham as the present-day groups most directly descended from the Hohokam.

4.0 PREVIOUS ARCHAEOLOGICAL RESEARCH AT WILLIAMS AFB

Documented study of the cultural resources in the vicinity of Williams AFB began in the 1920's with the work of Turney (Gasser et al., 1984). According to his report, an extensive system of canals existed along Queen Creek. He describes a main canal on the north bank of the creek, over 6 miles long. Ruins along the canal were characterized by red-on-buff decorated pottery of the Hohokam. Turney described prehistoric ruins located in the area that appears to be the Midvale Site. Two "elliptical pits"

were documented which Turney identified as pottery manufacturing areas due to the abundant presence of shards (Gasser et al., 1984).

The same year that Turney reported on his research, Winnifred and Harold Gladwin published a study on Hohokam remains in the Gila basin (Gladwin and Gladwin, 1929). The site locations from their study were analyzed in 1973 using current maps. It appears that the Gladwins' survey included the Midvale Site.

In 1940, Albert Schroeder surveyed sites in the vicinity of Williams AFB and trenched the Southwest Germann Site directly south of the base. Analysis of the redware ceramics recovered from that site were used to delineate the two phases of the Classic Period. This chronological refinement was especially relevant for analysis of events relating to Hohokam archaeology (Gasser et al., 1984).

Between 1929 and 1941, Frank Midvale made numerous trips to the Queen Creek area. In 1941, during the early construction stages of Williams AFB, Midvale made a detailed map based on the conclusions of his extensive study of the area. According to his 1941 map, the site contained two large "hollow mounds." Aerial photographs taken at the time show the mounds and the surrounding site area prior to the extensive activity associated with base construction. Midvale described other sites in the vicinity which were destroyed during construction and agricultural activity in the 1940's and 1950's (Schoenwetter et al., 1973).

An archaeological survey conducted by Arizona State University between 1968 and 1969 included an area approximately 6 miles northeast of Williams AFB. The survey discovered evidence of temporary gathering camps and small habitation sites. Ceramic analysis dated the heaviest occupation to the Sedentary Period with light occupation evidenced during the Colonial and Classic periods.

Extensive archaeological study on Williams AFB was done in 1973 by Arizona State University. The purpose of the study was to define and characterize the boundaries and content of the Midvale Site (AZ U:10:24) (Schoenwetter et al., 1973). The study concluded that the Midvale Site was occupied primarily during the Sedentary Period (A.D. 900 to 1100), with possible occupation during part of the Santa Cruz Phase of the Colonial Period (A.D. 500 to 900). The site may have been reoccupied during part of the Classic Period (A.D. 1100 to 1300).

Based on analysis of ceramic artifacts, the Arizona State University study identified three distinct sites. A site in the southeast quadrant of the base (AZ U:10:25) was found to be distinct in character from the Midvale Site. Surface collections on a site adjacent to the Midvale Site (AZ U:10:20) indicate a Classic Period occupation. The study did not provide a clear

delineation of the Midvale Site. Although its boundaries were not well defined, the Midvale Site was recommended as potentially eligible for listing on the NRHP based on its significance as a Hohokam settlement and the large quantity of archaeological data which could be recovered.

In 1974, the National Park Service conducted an intensive pedestrian survey of four parcels of land on Williams AFB (Gasser et al., 1984). Two of these parcels were located between the Midvale Site and AZ U:10:25 along the southern boundary of the base. Investigations in this area resulted in the discovery of considerable cultural material suggesting the existence of subsurface features. The other two parcels, located in the northeast corner of the base, did not yield evidence of cultural resources.

In 1984 the Museum of Northern Arizona (MNA) conducted a survey to determine the boundaries of the Midvale Site and report on the cultural resources within the survey area (Gasser et al., 1984). Criteria used in establishing boundaries of the Midvale Site included determining the density and configuration of surface and subsurface artifacts, the distribution of subsurface cultural features and diagnostic artifacts, and correlation with Frank Midvale's 1941 map of the site. Although the western boundary of the Midvale Site remained undefined after the study, testing of the site yielded a substantial quantity of significant information.

Although 46 percent of the area is covered with buildings and pavement, the Midvale Site was found to retain significant integrity. A total of 56 subsurface cultural features were found at the Midvale Site. One of the more interesting features reported was a reservoir in the northwest quadrant of the site. The reservoir had previously been identified by Frank Midvale as a "hollow mound."

Seven features were positively identified as pit houses. Six of the houses could be dated and were found to span the occupation period of the site. Two were from the Colonial Period, two were from late Colonial to Sedentary, and two were from the Sedentary Period. The seven pit houses were located at the center of the site indicating the most dense occupation of the area. Trash pits were the most widely distributed feature type, 18 in total, and were common within the site and along the edges. Preliminary analysis of botanical remains from the site reflect the importance of corn as a food resource. The Hohokam diet was also dependent upon a variety of wild plant foods.

Dating of the Midvale Site was based entirely on ceramic analysis. The data provide a general analysis of land use through time at the site. The study concludes Hohokam cultural affiliation with the occupation of the site began during the Colonial Period (about A.D. 550 to 700) and continued into the early Classic Period (between A.D. 1100 and 1350). This represents a longer period of occupation than had been previously reported. The

reservoir seems to have been a central part of the village and continually used during occupation of the site. The earliest dwellings were in the northern portion of the site. During the transition between the Colonial and Sedentary periods (A.D. 800 to 1000), the site expanded in size and complexity. A full range of household and economic activity took place in the village. Parameters of the site stabilized during the Sedentary Period. By the onset of the Classic Period (A.D. 1100) most occupants had abandoned the Midvale Site but continued to use it in a limited manner.

In 1989, an archaeological study was performed on an area located in the vicinity of the Midvale Site and site AZ U:10:20 (Dennis, 1989). The survey area was proposed as the relocation site for the 111th Air Traffic Control Flight facility. A pedestrian surface survey of approximately 40 acres was conducted. Although ground-disturbing activities had occurred in the area, impact to the archaeological resources was considered minimal. The survey revealed an abundance of surface artifacts, including ceramics, stone, and bone and shell fragments, with increased densities of artifact concentration in several areas. Several of these concentrated areas were associated with low, raised earth mounds. Ceramic types indicate prehistoric use of the area from the Sedentary Period into the Classic Period. The abundance of artifacts suggested the possibility of a Hohokam habitation site.

Results of the most recent archaeological study on Williams AFB were described in Section 2.0. This study (Anduze et al., 1993) represents the most comprehensive surface survey of undeveloped areas on Williams AFB.

Other surveys on Williams AFB not mentioned in the above discussion had failed to yield evidence of cultural resources. See: Clonts, 1974, 1975; Euler, 1988a and 1988b; Faught and Whittlesey, 1988; Gasser, 1981; Goodfellow, 1989; Mayberry and Brew, 1981; Neitzel, 1978; Scott, 1981; Sires, 1986; Stone, 1992.

5.0 HISTORIC BUILDING SURVEY

Thirty-four pre-1945 historic structures survive at Williams AFB and were surveyed for eligibility for nomination to the NRHP in September 1992.

An assessment of significance of the 34 historic properties documented in the *Williams Air Force Base Historic Building Survey* (Woodward et. al., 1992) was based on the National Register Criteria for Evaluation (36 CFR 60.4). The Criteria for Evaluation are stated below:

> "*National Register Criteria for Evaluation*. The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and

(a) that are associated with events that have made a significant contribution to the broad patterns of our history; or

(b) that are associated with the lives of persons significant in our past; or

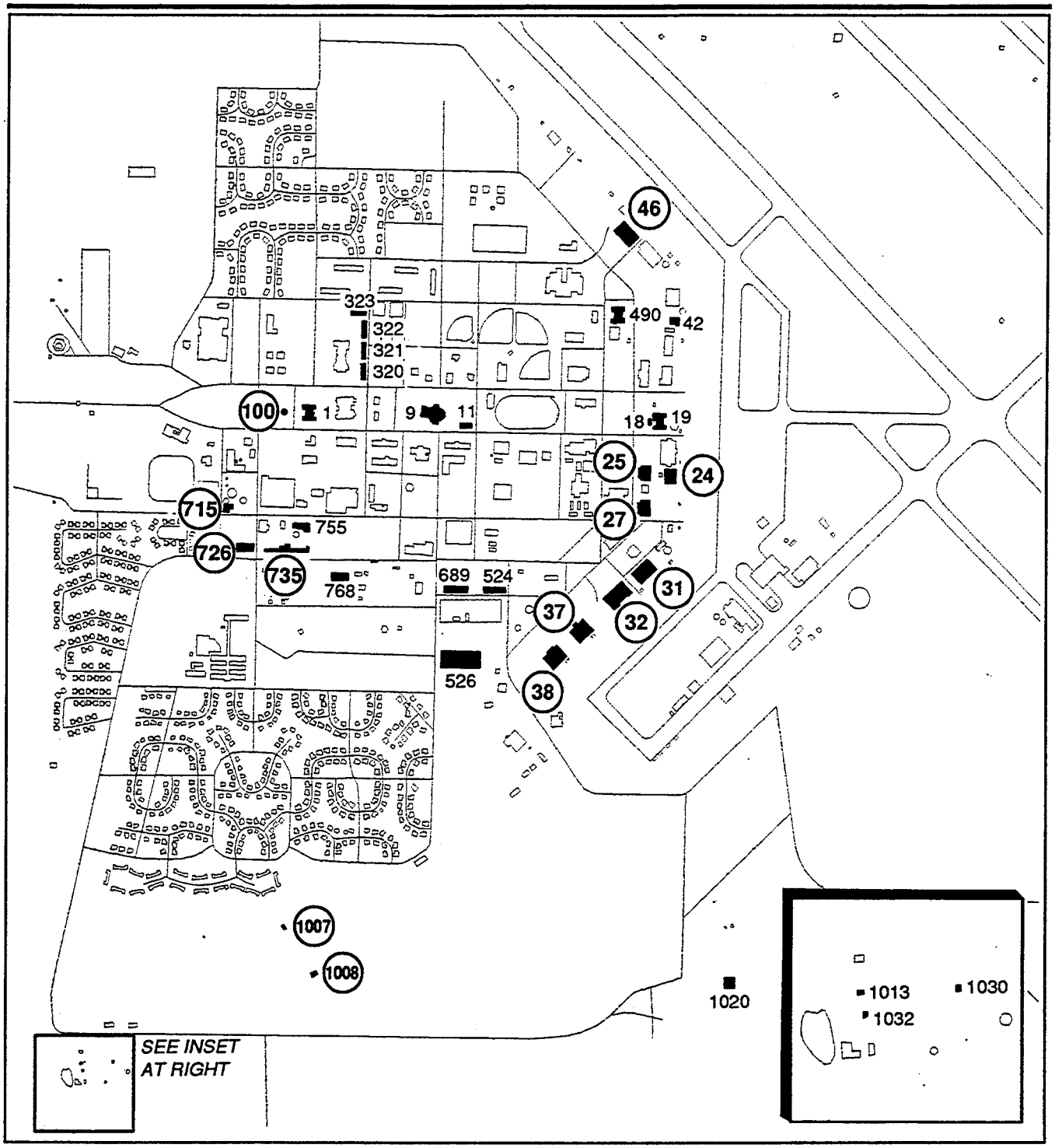
(c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

(d) that have yielded, or may be likely to yield, information important in prehistory or history."

Based on the Criteria for Evaluation and each building's relationship to the historic contexts associated with the early history and development of Williams AFB, the survey recommended that 12 of the 34 historic properties were potentially eligible for listing on the NRHP.

A field inspection of the 34 historic structures by the Air Force and the Arizona State Historic Preservation Office (SHPO) was conducted on February 18, 1993 to review these recommendations. As a result of this inspection, the Air Force concluded that one of the 12 properties recommended was not eligible because of significant alterations and additions while three other structures, not originally recommended, were potentially eligible. On March 23, 1993, the Air Force requested concurrence on the eligibility of 14 structures on Williams AFB from the SHPO. On April 8, 1993, the SHPO concurred that the 14 structures were eligible for inclusion on the National Register of Historic Places. In March 1994, NRHP nomination forms (Woodward et al., 1993) were forwarded to the Keeper of the National Register by the Air Force for a final determination of eligibility. Upon review and concurrence by the Keeper, the structures will be submitted for listing on the NRHP.

An inventory listing of pre-1945 structures is shown on Table J-2. Those structures determined to be eligible for nomination to the NRHP are shown with an asterisk (*). These structures are also shown on a location map, Figure J-3.



EXPLANATION

(38) Historic Structures found eligible for nomination to the National Register of Historic Places.

Pre-1945 Structures

0 375 750 1500 Feet

Figure J-3

Table J-2. Inventory of Pre-1945 Structures at Williams AFB
Page 1 of 2

Facility No.	Name	Location	Date of Construction
1	Base Headquarters	10th Street	1941
9	Base Exchange	5th and "D" Streets	1941/1943
11	Library	NW corner of 4th and "D" Streets	1941
18	Electrical Power Station	East of Front Street at "D" Street	1942
19	Base Operations	Middle Apron	1941
24	Aircraft Maintenance Hangar	Middle Apron	1942*
25	Aircraft Corrosion Control Hangar	Middle Apron and Front Street	1942*
27	Aircraft Maintenance Hangar	Middle Apron and Front Street	1942*
31	Demountable Maintenance Hangar	South Apron	1941*
32	Demountable Hangar	South Apron	1941*
37	Land Plane Hangar	South Apron	1942/1945*
38	Land Plane Hangar	South Apron	1942/1945*
42	Squadron Operations Building	Middle Apron	1941
46	Demountable Hangar	North Apron	1942*
100	Flagpole	10th Street between "D" and "E" Streets	1941*
320	Bachelor Officers Quarters	NW corner "E" and 7th Streets	1942
321	Bachelor Officers Quarters	7th Street	1942
322	Bachelor Officers Quarters	7th Street	1942
323	Bachelor Officers Quarters	SW Corner 7th and "G" Streets	1942

Table J-2. Inventory of Pre-1945 Structures at Williams AFB
Page 2 of 2

Facility No.	Name	Location	Date of Construction
490	Traffic Management	SE corner 1st and "G" Streets	1941
524	Warehouse	3rd and "A" Streets	1942
526	Open Storage, Base Supply	5th and Buchannon Streets	1942
689	Base Engineering Storage Warehouse	Corner of 5th and "A" Streets	1942
715	Water Pump Station and Water Tower	NE corner 12th and "B" Streets	1942*
726	Housing Storage Supply Warehouse	NW corner 11th and "A" Streets	1941*
735	Civil Engineering Maintenance Shop	NE corner 11th and "A" Streets	1941*
755	Civil Engineering Building	"B" Street	1942
768	Civil Engineering Maintenance Shop	"A" Street	1941
1007	Original Ammo Bunker	SE of Alaska Drive	1942*
1008	Original Ammo Bunker	SE of Alaska Drive	1942*
1013	Electrical Power Station	South 15th Street	1942
1020	Firing-in Buttress	South Perimeter Road	1942
1030	Waste Treatment Plant	South 15th Street	1942
1032	Waste Treatment Plant Lift Station	South 15th Street	1942

* Structure determined to be eligible for nomination to the National Register of Historic Places.

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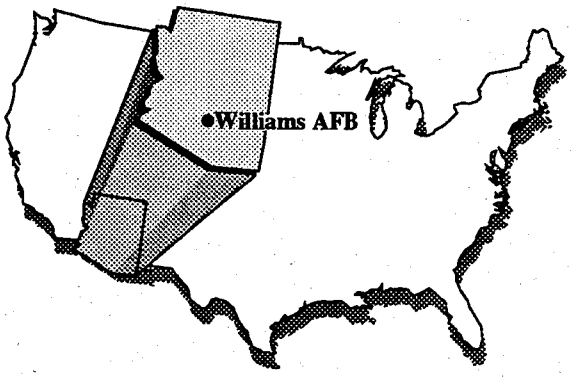

APPENDIX K

APPENDIX K

AIR EMISSIONS INVENTORY

INTRODUCTION

Tables K-1 through K-5 in this appendix contain the annual air pollutant emissions (in tons/year) of NO_x, CO, VOCs, SO_x, and PM_{10} associated with the Proposed Action and the other reuse alternatives analyzed in the EIS. Emissions are provided by source category for the years 1993, 1998, and 2003. A 1998A and a 1998B case were analyzed to assess differences in air quality impacts for the Proposed Action pending a decision to relocate the Arizona Air National Guard 161st AREFG to Williams AFB. The 1998A case assumes 1,200 additional takeoffs and landings for KC-135R aircraft. The 1998B case assumes 7,200 annual operations including 3,000 touch-and-goes (representing 6,000 operations) by KC-135R aircraft. A single 1998 case was analyzed for the Commercial Aviation and Education Alternative because this alternative does not differentiate options for based versus itinerant military operations. With the exception of aircraft operations emissions, the basic procedure used to calculate the emissions in these tables relied on the emissions inventory provided by Maricopa County (Maricopa County Bureau of Air Pollution Control, 1992). The Maricopa County emissions inventory includes air pollutant source categories such as combustion of fuels, waste burning, petroleum marketing and transportation, organic solvent usage, commercial and consumer solvent use, motor vehicles, miscellaneous industry, and other mobile sources.

Emission levels for criteria pollutants from the above-mentioned source categories were used as baseline data to project potential pollutant emissions. Other baseline data used include extrapolated 1989 Maricopa County population (Maricopa Association of Governments, 1992), 1989 employment data (U.S. Bureau of Economic Analysis, 1992), and projected Proposed Action and reuse alternatives population and employment data. The detailed methodology used to calculate emissions for each source category listed in the inventory table are explained in Appendix E and in footnotes to the emissions source category listed in this appendix.

Emissions from the aircraft flying operation category are calculated separately based directly on the fleet mix information proposed for each reuse alternative. These emissions are predicted by the Emission Dispersion Modeling System (EDMS), Version 2.2, using data on the estimated frequency of flight operations projected for each type of aircraft. The EDMS model contains a built-in database of the EPA's AP-42 emission factors (U.S. Environmental Protection Agency, 1991) for various types of aircraft. Emissions of all the other source categories listed in this appendix were

developed with spreadsheets and are premised on the baseline data mentioned previously.

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Table K-1. Williams AFB - Emissions Inventory for Nitrogen Oxides (tons/year)**
Page 1 of 2

	Proposed Action				General Aviation and Education Alternative		
Source	1993	1998A	1998B	2003	1993	1998	2003
Air. Flying Ops.[a]	24.264	75.652	64.222	111.338	24.815	1.213	1.660
Air. Ground Ops.[b]	0.001	2.363	0.005	2.367	0.002	0.006	0.007
Air. Ground Equip.[c]*	0.086	0.169	0.163	0.219	0.192	0.299	0.417
Fuel Combustion							
Residential[d1]	0.000	3.080	3.080	5.913	0.000	3.749	8.827
Industrial[d2]	0.000	15.565	15.565	28.683	0.000	14.899	32.888
Commercial/ Institutional[d3]	0.089	1.130	1.130	2.131	0.089	0.839	1.899
Waste Burning[e]	0.000	0.065	0.065	0.123	0.000	0.071	0.164
Solvent Use[f]*	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Pet. Handling[g]*	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Ind. Process[h]	0.000	0.304	0.304	0.560	0.000	0.291	0.642
Construction[i]*	0.000	35.216	35.216	8.398	0.000	70.947	41.849
On-Road Vehicles[j]	2.467	245.817	245.817	375.134	2.467	268.376	501.062
Off-Road Vehicles[k]*	ND	ND	ND	ND	ND	ND	ND
Air Stripping Operations[l]*	NA	NA	NA	NA	NA	NA	NA
Total	26.907	379.360	365.566	534.867	27.566	360.689	589.416

Table K-1. Williams AFB - Emissions Inventory for Nitrogen Oxides (tons/year)**
Page 2 of 2

	Commercial Aviation and Education Alternative			Education and Planned Community Alternative		
Source	1993	1998	2003	1993	1998	2003
Air. Flying Ops.[a]	61.894	248.911	468.543	0.000	0.000	0.000
Air. Ground Ops.[b]	1.067	2.417	3.213	0.000	0.000	0.000
Air. Ground Equip.[c]*	0.656	1.159	1.236	0.000	0.000	0.000
Fuel Combustion						
Residential[d1]	0.000	2.970	6.070	0.000	2.985	6.660
Industrial[d2]	0.000	16.172	33.705	0.000	2.223	5.001
Commercial/ Institutional[d3]	0.089	0.520	0.945	0.089	0.774	2.704
Waste Burning[e]	0.000	0.062	0.128	0.000	0.042	0.099
Solvent Use[f]*	0.000	0.000	0.000	0.000	0.000	0.000
Pet. Handling[g]*	0.000	0.000	0.000	0.000	0.000	0.000
Ind. Process[h]	0.000	0.316	0.658	0.000	0.043	0.098
Construction[i]*	0.000	59.075	7.253	0.000	151.647	123.494
On-Road Vehicles[j]	2.467	235.395	390.258	2.467	157.056	301.161
Off-Road Vehicles[k]*	ND	ND	ND	ND	ND	ND
Air Stripping Operations[l]*	NA	NA	NA	NA	NA	NA
Total	66.174	566.997	912.008	2.556	314.770	439.216

Table K-2. Williams AFB - Emissions Inventory for Carbon Monoxide (tons/year)
Page 1 of 2

	Proposed Action				General Aviation and Education Alternative		
Source	1993	1998A	1998B	2003	1993	1998	2003
Air. Flying Ops.[a]	75.059	165.475	145.402	202.471	190.421	304.784	415.564
Air. Ground Ops.[b]	0.670	1.494	0.867	1.691	1.467	2.441	3.326
Air. Ground Equip.[c]*	0.141	0.277	0.267	0.359	0.316	0.490	0.684
Fuel Combustion							
Residential[d1]	0.000	12.282	12.282	23.577	0.000	14.949	35.196
Industrial[d2]	0.000	3.891	3.891	7.171	0.000	3.725	8.222
Commercial/ Institutional[d3]	0.018	0.227	0.227	0.428	0.018	0.168	0.381
Waste Burning[e]	0.000	0.024	0.024	0.046	0.000	0.027	0.062
Solvent Use[f]*	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Pet. Handling[g]*	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Ind. Process[h]	0.000	0.669	0.669	1.232	0.000	0.640	1.413
Construction[i]*	0.000	18.954	18.954	4.520	0.000	38.185	22.524
On-Road Vehicles[j]	13.642	1370.911	1370.911	1981.395	13.642	1483.521	2634.896
Off-Road Vehicles[k]*	ND	ND	ND	ND	ND	ND	ND
Air Stripping Operations[l]*	NA	NA	NA	NA	NA	NA	NA
Total	89.531	1574.204	1553.494	2222.889	205.865	1848.930	3122.267

Table K-2. Williams AFB - Emissions Inventory for Carbon Monoxide (tons/year)
Page 2 of 2

	Commercial Aviation and Education Alternative			Education and Planned Community Alternative		
Source	1993	1998	2003	1993	1998	2003
Air. Flying Ops.[a]	2033.730	3636.188	3834.601	0.000	0.000	0.000
Air. Ground Ops.[b]	8.009	12.623	13.043	0.000	0.000	0.000
Air. Ground Equip.[c]*	1.078	1.903	2.028	0.000	0.000	0.000
Fuel Combustion						
Residential[d1]	0.000	11.840	24.201	0.000	11.900	26.552
Industrial[d2]	0.000	4.043	8.426	0.000	0.556	1.250
Commercial/ Institutional[d3]	0.018	0.104	0.190	0.018	0.155	0.543
Waste Burning[e]	0.000	0.023	0.048	0.000	0.016	0.037
Solvent Use[f]*	0.000	0.000	0.000	0.000	0.000	0.000
Pet. Handling[g]*	0.000	0.000	0.000	0.000	0.000	0.000
Ind. Process[h]	0.000	0.695	1.448	0.000	0.096	0.215
Construction[i]*	0.000	31.795	3.904	0.000	81.620	66.467
On-Road Vehicles[j]	13.642	1305.051	2057.320	13.642	868.169	1583.689
Off-Road Vehicles[k]*	ND	ND	ND	ND	ND	ND
Air Stripping Operations[l]*	NA	NA	NA	NA	NA	NA
Total	2056.478	5004.266	5945.209	13.660	962.511	1678.753

Table K-3. Williams AFB - Emissions Inventory for VOCs (tons/year)**
Page 1 of 2

	Proposed Action				General Aviation and Education Alternative		
Source	1993	1998A	1998B	2003	1993	1998	2003
Air. Flying Ops.[a]	2.891	6.293	5.859	9.669	4.792	5.511	7.372
Air. Ground Ops.[b]	0.009	0.034	0.016	0.042	0.022	0.038	0.052
Air. Ground Equip.[c]*	0.010	0.019	0.018	0.024	0.021	0.033	0.046
Fuel Combustion							
Residential[d1]	0.000	1.925	1.925	3.695	0.000	2.343	5.515
Industrial[d2]	0.000	0.304	0.304	0.560	0.000	0.291	0.642
Commercial/ Institutional[d3]	0.005	0.059	0.059	0.111	0.005	0.044	0.099
Waste Burning[e]	0.001	0.194	0.194	0.368	0.001	0.213	0.493
Solvent Use[f]*	0.947	143.008	143.008	271.104	0.947	156.706	363.193
Pet. Handling[g]*	55.987	158.057	147.137	234.777	47.013	59.904	133.363
Ind. Process[h]	0.000	398.963	398.963	735.226	0.000	381.895	843.005
Construction[i]*	0.000	2.963	2.963	0.707	0.000	5.969	3.521
On-Road Vehicles[j]	1.205	122.698	122.698	176.255	1.205	132.324	233.253
Off-Road Vehicles[k]*	ND	ND	ND	ND	ND	ND	ND
Air Stripping Operations[l]*	0.548	0.548	0.548	0.548	0.548	0.548	0.548
Total	61.604	835.065	823.692	1433.086	54.554	745.819	1591.102

Table K-3. Williams AFB - Emissions Inventory for VOCs (tons/year)**
Page 2 of 2

	Commercial Aviation and EducationAlternative			Education and Planned Community Alternative		
Source	1993	1998	2003	1993	1998	2003
Air. Flying Ops.[a]	36.114	138.820	225.074	0.000	0.000	0.000
Air. Ground Ops.[b]	0.990	0.419	0.611	0.000	0.000	0.000
Air. Ground Equip.[c]*	0.073	0.128	0.137	0.000	0.000	0.000
Fuel Combustion						
Residential[d1]	0.000	1.855	3.792	0.000	1.865	4.161
Industrial[d2]	0.000	0.316	0.658	0.000	0.043	0.098
Commercial/ Institutional[d3]	0.005	0.027	0.049	0.005	0.040	0.141
Waste Burning[e]	0.001	0.186	0.383	0.001	0.125	0.296
Solvent Use[f]*	0.947	137.282	282.402	0.947	91.706	218.295
Pet. Handling[g]*	101.260	511.592	685.100	0.327	31.665	75.375
Ind. Process[h]	0.000	414.529	863.948	0.000	56.983	128.188
Construction[i]*	0.000	4.970	0.610	0.000	12.758	10.389
On-Road Vehicles[j]	1.205	116.538	182.623	1.205	77.437	140.195
Off-Road Vehicles[k]*	ND	ND	ND	ND	ND	ND
Air Stripping Operations[l]*	0.548	0.548	0.548	0.548	0.548	0.548
Total	141.144	1327.211	2245.937	3.034	273.169	577.688

Table K-4. Williams AFB - Emissions Inventory for Oxides of Sulfur (tons/year)
Page 1 of 2

	Proposed Action				General Aviation and Education Alternative		
Source	1993	1998A	1998B	2003	1993	1998	2003
Air. Flying Ops.[a]	2.136	5.219	4.493	7.661	2.182	0.143	0.185
Air. Ground Ops.[b]	0.000	0.080	0.001	0.081	0.000	0.001	0.001
Air. Ground Equip.[c]*	0.001	0.002	0.002	0.003	0.002	0.004	0.005
Fuel Combustion							
Residential[d1]	0.000	0.040	0.040	0.076	0.000	0.048	0.114
Industrial[d2]	0.000	0.061	0.061	0.112	0.000	0.058	0.128
Commercial/ Institutional[d3]	0.001	0.008	0.008	0.014	0.001	0.006	0.013
Waste Burning[e]	0.000	0.008	0.008	0.015	0.000	0.009	0.021
Solvent Use[f]*	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Pet. Handling[g]*	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Ind. Process[h]	0.000	0.243	0.243	0.448	0.000	0.233	0.514
Construction[i]*	0.000	3.926	3.926	0.936	0.000	7.909	4.665
On-Road Vehicles[j]	0.002	0.312	0.312	0.592	0.002	0.342	0.792
Off-Road Vehicles[k]*	ND	ND	ND	ND	ND	ND	ND
Air Stripping Operations[l]*	NA	NA	NA	NA	NA	NA	NA
Total	2.140	9.971	9.094	9.939	2.187	8.752	6.438

Table K-4. Williams AFB - Emissions Inventory for Oxides of Sulfur (tons/year)
Page 2 of 2

	Commercial Aviation and Education Alternative			Education and Planned Community Alternative		
Source	1993	1998	2003	1993	1998	2003
Air. Flying Ops.[a]	3.884	17.113	34.798	0.000	0.000	0.000
Air. Ground Ops.[b]	0.058	0.092	0.141	0.000	0.000	0.000
Air. Ground Equip.[c]*	0.008	0.015	0.016	0.000	0.000	0.000
Fuel Combustion						
Residential[d1]	0.000	0.038	0.078	0.000	0.038	0.086
Industrial[d2]	0.000	0.063	0.132	0.000	0.009	0.020
Commercial/ Institutional[d3]	0.001	0.004	0.006	0.001	0.005	0.018
Waste Burning[e]	0.000	0.008	0.016	0.000	0.005	0.012
Solvent Use[f]*	0.000	0.000	0.000	0.000	0.000	0.000
Pet. Handling[g]*	0.000	0.000	0.000	0.000	0.000	0.000
Ind. Process[h]	0.000	0.253	0.527	0.000	0.035	0.078
Construction[i]*	0.000	6.586	0.809	0.000	16.906	13.767
On-Road Vehicles[j]	0.002	0.300	0.616	0.002	0.200	0.476
Off-Road Vehicles[k]*	ND	ND	ND	ND	ND	ND
Air Stripping Operations[l]*	NA	NA	NA	NA	NA	NA
Total	3.953	24.470	37.139	0.003	17.198	14.457

Table K-5. Williams AFB - Emissions Inventory for PM_{10} (tons/year)
Page 1 of 2

	Proposed Action				General Aviation and Education Alternative		
Source	1993	1998A	1998B	2003	1993	1998	2003
Air. Flying Ops.[a]	2.441	0.363	0.331	0.493	2.661	0.555	0.761
Air. Ground Ops.[b]	0.001	0.004	0.002	0.005	0.003	0.004	0.006
Air. Ground Equip.[c]*	0.005	0.010	0.010	0.013	0.012	0.018	0.025
Fuel Combustion							
Residential[d1]	0.000	1.945	1.945	3.733	0.000	2.367	5.572
Industrial[d2]	0.000	0.365	0.365	0.672	0.000	0.349	0.771
Commercial/ Institutional[d3]	0.003	0.034	0.034	0.065	0.003	0.025	0.058
Waste Burning[e]	0.001	0.121	0.121	0.230	0.001	0.133	0.308
Solvent Use[f]*	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Pet. Handling[g]*	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Ind. Process[h]	0.000	0.243	0.243	0.448	0.000	0.233	0.514
Construction[i]*	0.000	49.514	49.514	3.572	0.000	36.525	12.302
On-Road Vehicles[j]	0.014	2.074	2.074	3.930	0.014	2.268	5.256
Off-Road Vehicles[k]*	0.003	0.485	0.485	0.920	0.003	0.532	1.233
Air Stripping Operations[l]*	NA	NA	NA	NA	NA	NA	NA
Total	2.468	55.159	55.124	14.081	2.696	43.009	26.805

Table K-5. Williams AFB - Emissions Inventory for PM_{10} (tons/year)
Page 2 of 2

	Commercial Aviation and Education Alternative			Education and Planned Community Alternative		
Source	1993	1998	2003	1993	1998	2003
Air. Flying Ops.[a]	7.633	12.497	16.376	0.000	0.000	0.000
Air. Ground Ops.[b]	0.075	0.067	0.078	0.000	0.000	0.000
Air. Ground Equip.[c]*	0.040	0.071	0.075	0.000	0.000	0.000
Fuel Combustion						
Residential[d1]	0.000	1.875	3.831	0.000	1.884	4.204
Industrial[d2]	0.000	0.379	0.790	0.000	0.052	0.117
Commercial/ Institutional[d3]	0.003	0.016	0.029	0.003	0.024	0.082
Waste Burning[e]	0.001	0.117	0.240	0.001	0.078	0.185
Solvent Use[f]*	0.000	0.000	0.000	0.000	0.000	0.000
Pet. Handling[g]*	0.000	0.000	0.000	0.000	0.000	0.000
Ind. Process[h]	0.000	0.253	0.527	0.000	0.035	0.078
Construction[i]*	0.000	56.551	3.805	0.000	39.777	33.871
On-Road Vehicles[j]	0.014	1.988	4.091	0.014	1.327	3.159
Off-Road Vehicles[k]*	0.003	0.466	0.959	0.003	0.311	0.741
Air Stripping Operations[l]*	NA	NA	NA	NA	NA	NA
Total	7.769	74.279	30.800	0.020	43.487	42.438

Appendix K Notes:
Page 1 of 2

(a) Emissions are based on modeling results from EDMS.

(b) Emissions are based on the ratio of aircraft ground operations to aircraft flying operations, as defined in the Williams AFB *1990 Air Emissions Inventory* (U.S. Air Force, 1991), times the projected aircraft flying operations.

(c) Emissions are based on the ratio of aircraft ground equipment emissions to aircraft flying operations, as defined in the Williams AFB *1990 Air Emissions Inventory* (U.S. Air Force, 1991), times the projected aircraft flying operations.

(d1) Emissions are based on the projected residential housing units times the ratio of 1989 Maricopa County residential fuel combustion emissions to 1989 Maricopa County total occupied housing units (Maricopa Association of Governments, 1992).

(d2) Emissions are based on the projected industrial employment times the ratio of 1989 industrial fuel combustion emission in Maricopa County to the total 1989 Maricopa County industrial employment.

(d3) Emissions are based on the projected commercial/institutional employment times the ratio of 1989 commercial fuel combustion emissions in Maricopa County to the total 1989 Maricopa County commercial/institutional employment.

(e) Emissions are based on the projected total population/employment times the ratio of 1989 total waste burning emissions in Maricopa County to 1989 total population in Maricopa County.

(f) Emissions are based on the projected total population/employment times the ratio of 1989 total solvent use emissions in Maricopa County to 1989 total population in Maricopa County.

(g) Emissions are based on the emission factors in *Compilation of Air Pollutant Emission Factors* (U.S. Environmental Protection Agency, 1992) and estimated throughput for aviation gasoline and evaporation loss of mobile gasoline. Mobile gasoline evaporation loss is based on the projected total employment/population times the ratio of 1989 Maricopa County total auto tank filling loss, tank truck filling loss, and underground tank loss to 1989 Maricopa County total population. Aviation gasoline evaporation loss is based on projected aviation gasoline throughput and emission factors from the Williams AFB *1990 Air Emissions Inventory* (U.S. Air Force, 1991) and *Compilation of Air Pollutant Emission Factors* (U.S. Environmental Protection Agency, 1992).

(h) Emissions are based on the projected industrial employment times the ratio of 1989 industrial emissions in Maricopa County to total 1989 Maricopa County industrial employment.

(i) Emissions are based on the average emission factors of heavy-duty, diesel-powered construction equipment and emission factors of construction-related fugitive dust emission from *Compilation of Air Pollutant Emission Factors* (U.S. Environmental Protection Agency, 1992). The operating hours of heavy construction equipment for construction and demolition of buildings are based on *Building Construction Cost Data* (R. S. Means Company, 1991).

(j) Emissions are based on the sum of vehicle emissions on roadways and vehicle emissions from parking lots. Vehicle emissions on roadways are based on the total average daily traffic in the ROI times the number of days in a year (365) times the average travel distance per car times the emission factors developed by the Maricopa Association of Governments using MOBILE 4.0 CO, NO_x, and VOCs) (Hays, 1992) and emission factors of SO_x and PM_{10} in the EDMS model for the respective air pollutants. Vehicle emissions from parking lots were developed in a similar way to roadways emissions except that the average travel distance and daily traffic are different.

(k) Emissions are based on the projected total population/employment times the ratio of 1989 total off-road emissions in Maricopa County to 1989 total population in Maricopa County. No data are available for VOCs, NO_x, SO_x, and CO from the 1989 Maricopa County emission inventory (Maricopa County Bureau of Air Pollution Control, 1992).

(l) Air stripping operations are associated with remediation of the Liquid Fuel Storage Area (IRP Site ST-12).

* Dispersion modeling was not performed for this source category.

** Dispersion modeling was not performed for NO_x and VOCs.

NA Not applicable.

ND No data.

Calculation of totals may vary slightly due to rounding.

REFERENCES

Hays, T., 1992. Personal communication/fax from Todd Hays, Maricopa Association of Governments, Transportation and Planning Office, to Steven Liu, Halliburton NUS, October 6.

Maricopa Association of Governments, 1992. Update of the Population and Socioeconomic Database for Maricopa County, Arizona, revised February.

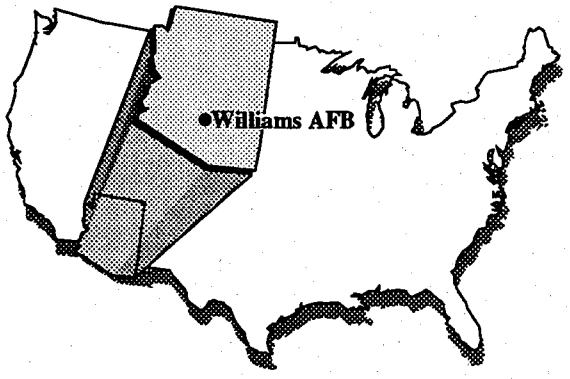
Maricopa County Bureau of Air Pollution Control, 1992. Nonattainment Area of Maricopa County, Arizona, 1989 Emissions Summary.

R.S. Means Company, Inc., 1991. Means Building Construction Cost Data, 1992, 50th annual edition, Kingston, Massachusetts.

U.S. Air Force, 1991. 1990 Air Emissions Inventory, Environmental Protection Committee, Williams AFB, August 12.

U.S. Bureau of Economic Analysis, 1992. Full-time and Part-time Employees by Major Industry.

U.S. Environmental Protection Agency, 1992. Compilation of Air Pollutant Emission Factors Volume 1, Stationary Point and Area Sources, AP-42, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina, as revised through Supplement E.



APPENDIX L

APPENDIX L
AGENCY LETTERS AND CERTIFICATIONS

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DEPARTMENT OF THE AIR FORCE
AIR FORCE CENTER FOR ENVIRONMENTAL EXCELLENCE (AFCEE)
BROOKS AIR FORCE BASE, TEXAS 78235-5000

Mr. Donald W. Gohmert
State Conservationist
U.S.D.A. Soil Conservation Service
201 E. Indianola Avenue
Suite 200
Phoenix, Arizona 85012

26 FEB 1992

Dear Mr. Gohmert:

The United States Air Force Center for Environmental Excellence (AFCEE) at Brooks Air Force Base is preparing an Environmental Impact Statement (EIS) on the disposal and reuse of Williams Air Force Base (AFB) in Mesa, Arizona, pursuant to the Base Closure and Realignment Act. The AFCEE has hired the HALLIBURTON NUS Environmental Corporation to collect data in support of the EIS. A Notice of Intent (NOI) to prepare this EIS was published in the October 9, 1991 Federal Register (56 FR 50863). A copy of the NOI is provided in Attachment A to this letter.

To assist in compliance with the Farmland Preservation Policy Act, the AFCEE requests a determination indicating whether farmland under jurisdiction of the Act is contained within the boundaries of Williams AFB. The boundaries of the base are indicated on that portion of the USGS topographic map shown in Attachment B. The AFCEE also requests a copy of any soil surveys that include all or part of Williams AFB. If farmland under jurisdiction of the Act does occur within the base, the AFCEE will work closely with the Soil Conservation Service to ensure that the disposal and reuse of the base is performed in accordance with criteria established in 7 CFR 658.5.

Thank you very much for your attention. We would appreciate receiving your response within 30 days from receipt of this letter. If you have any further questions, please contact Bob Reynolds of the AFCEE at (512) 536-3805 or Peyton Doub of the HALLIBURTON NUS Environmental Corporation at (301) 258-8798.

Sincerely,

GARY P. BAUMGARTEL, Lt Col, USAF
Chief, Environmental Planning Division

Atchs
Notice of Intent
USGS Topographical Map

cc: HALLIBURTON NUS
Mr. Giannino
Mr. Dubberly

United States Department of Agriculture

Soil Conservation Service

201 East Indianola Avenue
Suite 200
Phoenix, Arizona 85012-2054

March 6, 1992

Lt. Col. Gary P. Baumgartel
Chief, Environmental Planning
Division
Department of the Air Force
Air Force Center for Environmental
Excellence
Brooks Air Force Base, Texas 78235-5000

Dear Lt. Col. Baumgartel:

This letter is in response to your letter of February 26, 1992, regarding the environmental impact statement on Williams Air Force Base in Mesa, Arizona.

The local contact point for information on the soil survey and the Farmland Preservation Policy Act is Dino DeSimone, District Conservationist at 33 East Comstock Drive, Suite 7, Chandler, Arizona 85225-1108, phone (602) 926-3631.

There is soil survey information on the base. I am asking Dino DeSimone to forward this to you under separate cover.

Our District Conservationist has informed us that the Williams Air Force Base is not currently being farmed, so it is not subject to the Farmland Preservation Policy Act.

Please feel free to contact us for additional information.

Sincerely,

Donald W. Gohmert

DONALD W. GOHMERT
State Conservationist

cc: w/encl
Dino DeSimone, District Conservationist, SCS, Chandler, AZ

Mr. Dino DeSimone
District Conservationist
Soil Conservation Service
33 East Comstock Drive Suite 7
Chandler, AZ 85225-1108

Dear Mr. DeSimone:

The United States Air Force Center for Environmental Excellence (AFCEE) at Brooks AFB is preparing an Environmental Impact Statement (EIS) on the disposal and reuse of Williams Air Force Base (AFB) in Mesa, Arizona pursuant to the Base Closure and Realignment Act. The AFCEE has hired HALLIBURTON NUS Environmental Corporation to collect data in support of this EIS. This letter is a follow up to a letter which was submitted to Mr. Donald Gohmert at the state Soil Conservation Service (SCS) office in Phoenix on February 26, 1992 which requested a determination whether farmland subject to the Farmland Protection Policy Act (FPPA) is contained within the boundaries of Williams AFB. Mr. Gohmert responded on March 6, 1992 that no farmland subject to the FPPA occurs on Williams AFB.

The AFCEE now requests a determination whether farmland subject to the provisions of the FPPA occurs within the off-base areas that may be impacted by the 6 reuse alternatives to be considered in this EIS. We also specifically request a listing of soil mapping units in the immediate vicinity of the base that meet the criteria of prime farmland. Unfortunately, the reuse alternatives were in a draft state of development when the AFCEE initiated its agency consultations back in February such that these alternatives were not included in the original request for a FPPA determination.

Two of the original 6 reuse alternatives (alternatives 2 and 3) have been eliminated from further consideration in the EIS. The remaining alternatives (Nos. 1, 4, 5, and 6), for which AFCEE requests a determination, are described in the attachments to this letter. Attachment A contains a map which shows the soils in the immediate vicinity of Williams AFB as well as land use maps for alternatives 1, 4, 5, and 6. Attachment B contains copies A, B, and C of the completed Farmland Conversion Impact Rating Form (AD-1006). While alternatives 1 and 4 do not require the acquisition of off-base acreage and are not believed to impact prime farmland as none exists on the base (per SCS letter of March 6, 1992), alternatives 5 and 6 require the acquisition of 263 and 25 acres, respectively, for airfield and clear zone extensions off-base. If farmland under the jurisdiction of the FPPA does occur within the areas that may potentially be impacted, the AFCEE will work closely with the SCS to ensure that the disposal and reuse of the base is performed in accordance with criteria established in 7 CFR 658.5. In addition, any such impacts will be quantified and assessed in the EIS.

We would very much appreciate receiving your response to this request within 30 days from receipt of this letter. If you have any questions, please contact Mr. Robert Lopez of the AFCEE at (512) 536-3751 or Mr. Kevin T. Folk of HALLIBURTON NUS at (301) 258-8522. Thank you for your time and assistance in this matter.

Sincerely,

Gary P. Baumgartel, Lt. Col, USAF
Chief, Environmental Planning Division

Attachments

cc: Mr. Giannino (HALLIBURTON NUS)
Mr. Dubberley (HALLIBURTON NUS)

United States Department of Agriculture
Soil Conservation Service
Chandler Field Office
33 E. Comstock Dr., Suite 7
Chandler, AZ 85225
(602) 926-3631

November 4, 1992

Lt. Col. Gary P. Baumgartel
Chief, Env. Planning Div.
Air Force Center for Environmental Excellence
Brooks Air Force Base, TX

Dear Lt. Col. Baumgartel:

As requested, attached is Form AD-1006 regarding the Williams AFB reuse and disposal alternatives. You will note that only alternative 5 would impact on prime farmland. Approximately 135 acres would be impacted, with the remaining acreage consisting of desert.

Also attached is a potential prime farmland map unit list for this area. Please note that in Arizona these map units are only determined to be prime farmland if there is an existing dependable water supply, among other conditions. If you have any questions, please let me know.

Sincerely,

Dino DeSimone
District Conservationist

Rec'd 09 NOV 1992

DEPARTMENT OF THE AIR FORCE
AIR FORCE CENTER FOR ENVIRONMENTAL EXCELLENCE (AFCEE)
BROOKS AIR FORCE BASE, TEXAS 78235-5000

26 FEB 1992

U.S. Fish and Wildlife Service
Region 2
Dennis Chavez Federal Building
500 Gold Avenue SW
Albuquerque, New Mexico 87102

Dear Director:

The United States Air Force Center for Environmental Excellence (AFCEE) at Brooks Air Force Base is preparing an Environmental Impact Statement (EIS) on the disposal and reuse of Williams Air Force Base (AFB) in Mesa, Arizona, pursuant to the Base Closure and Realignment Act. The AFCEE has hired the HALLIBURTON NUS Environmental Corporation to collect data in support of the EIS. A Notice of Intent (NOI) to prepare this EIS was published in the October 9, 1991 Federal Register (56 FR 50863). A copy of the NOI is provided in Attachment A to this letter.

To prepare sections of the EIS addressing biological resources, the AFCEE requests a determination indicating whether Federally listed endangered, threatened or candidate species or critical habitats could potentially occur within the boundaries of Williams AFB. The boundaries of the base are indicated on that portion of the USGS topographic map shown in Attachment B. If this early consultation indicates that listed species or critical habitats could occur within the base, the AFCEE will seek a biological opinion pursuant to the Endangered Species Act concerning the potential impacts of the base disposal and reuse alternatives.

Thank you very much for your attention. We would appreciate receiving your response within 30 days from receipt of this letter. If you have any further questions, please contact Bob Reynolds of the AFCEE at (512) 536-3805 or Peyton Doub of the HALLIBURTON NUS Environmental Corporation at (301) 258-8798.

Sincerely,

GARY P. BAUMGARTEL, Lt Col, USAF
Chief, Environmental Planning Division

Atchs
Notice of Intent
USGS Topographical Map

cc: HALLIBURTON NUS
Mr. Giannino
Mr. Dubberly

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
ECOLOGICAL SERVICES
3616 W. Thomas, Suite 6
Phoenix, Arizona 85019 2-21-92-I-333

March 24, 1992

Lt. Colonel Gary P. Baumgartel
Department of the Air Force
Air Force Center for
Environmental Excellence
Brooks Air Force Base, Texas
78235-5000

Dear Colonel Baumgartel:

This letter is in response to your request of February 26, 1992, for a list of candidate and Federally-listed species and critical habitats potentially occurring on the Williams Air Force Base in Mesa, Maricopa County, Arizona, as part of an Environmental Impact Statement for the Base Closure and Realignment Act.

There is no designated or proposed critical habitat in the vicinity of Williams AFB. However, our data indicate that the following endangered and candidate species may occur in the area:

Endangered

Lesser long-nosed bat (Leptonycteris curasoae yerbabuenae)
(formerly Sanborn's long-nosed bat)

Category 2

Chuckwalla (Sauromalus obesus)
Loggerhead shrike (Lanius ludovicianus)
California leaf-nosed bat (Macrotus californicus)
Yavapai Arizona pocket mouse (Perognathus amplus amplus)

Endangered species are protected under the Endangered Species Act and must be considered prior to initiation of any project. Candidate species are those which may be considered for listing as endangered or threatened in the future. Category 2 candidates are those which the Fish and Wildlife Service is concerned about, but does not have sufficient information to support proposing to list. While candidate species are not protected under the Endangered Species Act, we would appreciate your consideration of them during the development of any projects on Williams Air Force Base. We would also like to receive any information that you may collect on these species.

The state of Arizona provides protection to other species in addition to the Federally listed species. We encourage you to contact the Arizona Game and Fish Department for a list of sensitive or State-listed species in the area. Before any land disturbance begins, we recommend that you contact the Arizona Department of Agriculture to determine if permits will be required under the Arizona Native Plant Law.

In further communications on this subject, please refer to 2-21-92-I-333. If we may be of further assistance, contact Julie Fulkerson or Ren Lohoefener (Telephone 602/379-4720 or FTS 261-4720).

Sincerely,

Ren Lohoefener

for Sam F. Spiller
Field Supervisor

cc: Regional Director, Fish and Wildlife Service, Albuquerque, New Mexico (AWE)
Director, Arizona Game and Fish Department, Phoenix, Arizona

DEPARTMENT OF THE AIR FORCE
AIR FORCE CENTER FOR ENVIRONMENTAL EXCELLENCE (AFCEE)
BROOKS AIR FORCE BASE, TEXAS 78235-5000

26 FEB 1992

Arizona Game and Fish Department
2221 West Greenway Road
Phoenix, Arizona 85023-4399

Dear Department Director:

The United States Air Force Center for Environmental Excellence (AFCEE) at Brooks Air Force Base is preparing an Environmental Impact Statement (EIS) on the disposal and reuse of Williams Air Force Base (AFB) in Mesa, Arizona, pursuant to the Base Closure and Realignment Act. The AFCEE has hired the HALLIBURTON NUS Environmental Corporation to collect data in support of the EIS. A Notice of Intent (NOI) to prepare this EIS was published in the October 9, 1991 Federal Register (56 FR 50863). A copy of the NOI is provided in Attachment A to this letter.

To prepare sections of the EIS addressing biological resources, the AFCEE requests a determination indicating whether Arizona listed endangered, threatened or candidate species or critical habitats could potentially occur within the boundaries of Williams AFB. The boundaries of the base are indicated on that portion of the USGS topographic map shown in Attachment B. If such species could potentially occur within the base, the AFCEE will work closely with the Arizona Game and Fish Department to minimize impacts resulting from the base disposal and reuse alternatives.

Thank you very much for your attention. We would appreciate receiving your response within 30 days from receipt of this letter. If you have any further questions, please contact Bob Reynolds of the AFCEE at (512) 536-3805 or Peyton Doub of the HALLIBURTON NUS Environmental Corporation at (301) 258-8798.

Sincerely,

GARY P. BAUMGARTEL, Lt Col, USAF
Chief, Environmental Planning Division

Atchs
Notice of Intent
USGS Topographical Map

cc: HALLIBURTON NUS
Mr. Giannino
Mr. Dubberly

THE STATE OF ARIZONA

GAME & FISH DEPARTMENT

2221 West Greenway Road, Phoenix, Arizona 85023-4312 (602) 942-3000

Governor
Fife Symington

Commissioners:
Phillip W. Ashcroft, Eagar, Chairman
Gordon K. Whiting, Klondyke
Larry Taylor, Yuma
Elizabeth T. Woodin, Tucson
Thomas G. Woods, Jr., Phoenix

Director
Duane L. Shroufe

Deputy Director
Thomas W. Spalding

March 30, 1992

Lt. Col. Gary P. Baumgartel, Chief
Environmental Planning Division
Department of the Air Force
Air Force Center for Environmental Excellence
Brooks Air Force Base, Texas 78235-5000

Dear Lt. Col. Baumgartel:

Re: Special Status Species; Williams Air Force Base (AFB), Arizona

The Arizona Game and Fish Department has reviewed your letter of February 26, 1992, regarding the presence of special status species or critical habitats which could potentially occur within the boundaries of Williams AFB, and the following comments are provided.

The Department's Heritage Data Management System has been accessed and current records do not indicate the presence of any Endangered, Threatened or other special status species in the vicinity of the area described in your letter. Our database does not currently track critical habitat, however, we do not believe that any formal critical habitat status has been establish in the vicinity of Williams AFB.

Thank you for the opportunity to provide this information. If you have any questions, please contact me at (602) 789-3605.

Sincerely,

Ron Christofferson

Ron Christofferson
Habitat Evaluation Specialist
Habitat Branch

RAC:rc

cc: Kelly Neal, Regional Supervisor, Mesa Regional Office
Robin Summerhill, Halliburton NUS Environmental Corp, Maryland

KEITH KELLY
Director

DAN F. RICE
Associate Director

Arizona Department of Agriculture

1688 West Adams, Phoenix, Arizona 85007
(602) 542-4373 FAX (602) 542-5420
PLANT SERVICES DIVISION

June 22, 1992

Robert Reynolds
Department of the Air Force
Air Force Center for Environmental Excellence
Brooks AFB, TX 78235-5000

RE: Native Plant Survey at Williams AFB

Dear Mr. Reynolds:

On June 2, 1992, I conducted a protected native plant survey at Williams Air Force Base to determine if there were State protected plants on the base. Robin Summerhill of Halliburton NUS showed me the areas of concern.

I found only two plant species that are protected by the State of Arizona.

1. Mesquite tree - Prosopis pubescens
2. Crucifixion thorn - Castela emoryi

The Crucifixion thorn are few and in bad condition, and therefore, plant salvage is not recommended. The Mesquite trees are also few and scattered. The condition of the trees is better than the Crucifixion thorn, but again, plant salvage is not recommended.

Other plants such as the Creosote Bush (Larrea tridentata) and Desert Broom (Baccharis sarothroides), which are not protected by the State, were found to be abundant.

Plants found in landscaped areas include protected native plants, and salvage is recommended of the following plants if these areas are disturbed.

1. Saguaro cacti (Carnegiea gigantea)
2. Barrel cacti (Ferocactus wislizenii, Ferocactus acanthodes)
3. Ocotillo (Fouquieria splendens)

4. Prickly pear (Opuntia phaeacantha)
5. Soto (Dasylirion wheeleri)
6. Ironwood (Olneya tesota)
7. Palo Verde (Cercidium floridum & Cercidium microphyllum)
8. Strawberry hedgehog (Echinocereus engelmannii)

The above-mentioned plants are protected species, but are exempt from the law since they were brought in and used as landscaping. Again, recommendation is that consideration be made to preserve these plants if their location is going to be disturbed. These plants are in excellent condition and are fine specimens of their species.

Other plants that are in landscape areas that could be salvaged but have no protective status are:

1. Ornamental citrus sp.
2. Golden barrel cactus
3. Yucca sp. none native
4. Mulberry (Moraceae sp.)
5. Pine (Pinaceae sp.)
6. Desert Willow (Chilopsis linearis)
7. Red Bird of Paradise (Caesalpinia pulcherrima)
8. Palms (Palmae sp.), fan: Washingtonia
9. Olive trees (Olea europaea)
10. Eucalyptus (Eucalyptus sp.)
11. Elm (Ulmaceae sp.)
12. Mexican blue agave (Agave americana)
13. Prickly pear (Opuntia lindheimeri)
14. Oleander (Nerium oleander)

Conclusion:

The undisturbed areas I was shown contain no salvageable protected plants. All prime specimens of protected plants are found in landscaped areas of the base. For removal of those plants to be transported outside of the air base, the Arizona Department of Agriculture is to be consulted to reduce any problem that may arise.

If you have any questions, please contact me at (602) 542-0981.

Sincerely,

Larry M. Richards
Native Plant Law Investigator

LMR:clw

CC: Robin Summerhill

DEPARTMENT OF THE AIR FORCE
AIR FORCE CENTER FOR ENVIRONMENTAL EXCELLENCE (AFCEE)
BROOKS AIR FORCE BASE, TEXAS 78235-5000

26 FEB 1992

John F.W. Rogers
Advisory Council on Historic Preservation
1100 Pennsylvania Ave., NW
Washington, DC 20004

Dear Mr. Rogers:

The United States Air Force Center for Environmental Excellence (AFCEE) at Brooks Air Force Base is preparing an Environmental Impact Statement (EIS) on the disposal and reuse of Williams Air Force Base (AFB) in Mesa, Arizona, pursuant to the Base Closure and Realignment Act. The AFCEE has hired the HALLIBURTON NUS Environmental Corporation to collect data in support of the EIS. A Notice of Intent (NOI) to prepare this EIS was published in the October 9, 1991 Federal Register (56 FR 50863). A copy of the NOI is provided in Attachment A to this letter.

Issues concerning the archeological and historic properties on the base will be addressed in the EIS. In compliance with Section 106 of the National Historic Preservation Act, the AFCEE will contact Dr. Shereen Lerner, the Arizona State Historic Preservation Officer, to request an evaluation of these properties. Upon completion of the SHPOs evaluation, a Preliminary Case Report will be prepared for your review. The boundaries of the base are indicated on that portion of the USGS topographic map shown in Attachment B. Any input, comments or suggestions that you may have at this time would be appreciated.

Thank you very much for your attention. We would appreciate receiving your response within 30 days from receipt of this letter. If you have any further questions, please contact Bob Reynolds of the AFCEE at (512) 536-3805 or Peyton Doub of the HALLIBURTON NUS Environmental Corporation at (301) 258-8798.

Sincerely,

GARY P. BAUMGARTEL, Lt Col, USAF
Chief, Environmental Planning Division

Atchs
Notice of Intent
USGS Topographical Map

cc: HALLIBURTON NUS
Mr. Giannino
Mr. Dubberly

Advisory Council On Historic Preservation

The Old Post Office Building
1100 Pennsylvania Avenue, NW, #809
Washington, DC 20004

Reply to: 730 Simms Street, #401
Golden, Colorado 80401

April 7, 1992

Gary P. Baumgartel, Lt. Col.
Chief, Environmental Planning Division
Department of the Air Force
Air Force Center for
Environmental Excellence (AFCEE)
Brooks Air Force Base, TX 78235-5000

RE: Environmental Impact Statement (EIS) on disposal and reuse of Williams Air Force Base (AFB) in Mesa, Arizona.

Dear Colonel Baumgartel:

On March 4, 1992, we received your request for Council's comments or suggestions regarding development of the above referenced EIS. Thank you for providing us this opportunity to comment on this undertaking. Council encourages agencies to coordinate the research and consultation completed under NEPA with compliance with Section 106 of the National Historic Preservation Act. Coordinating these two legislative mandates requires completion of cultural resource inventories needed to determine if historic properties are in the area of potential effect, consulting with the State Historic Preservation Officer, Native American Tribes and other interested parties, and considering options for avoidance or mitigation of effects to historic properties before a decision has been reached on project alternatives.

It appears from your letter that you intend to initiate consultation in compliance with Section 106 in the near future, through contacting the Arizona State Historic Preservation Officer and assessing the eligibility of archeological and historic properties located on the base. We therefore have no comments at present, but request that we be provided an opportunity to review the draft EIS when it becomes available.

If you have any questions or require the further assistance of the Council, please feel free to contact Carol Gleichman of our staff at (303) 231-5320 or FTS 554-5320.

Sincerely,

Claudia Nissley
Director, Western Office
of Project Review

DEPARTMENT OF THE AIR FORCE
AIR FORCE CENTER FOR ENVIRONMENTAL EXCELLENCE (AFCEE)
BROOKS AIR FORCE BASE, TEXAS 78235-5000

26 FEB 1992

Dr. Shereen Lerner
State Historic Preservation Officer
Historic Preservation Office
800 West Washington, Suite 415
Phoenix, Arizona 85007

Dear Dr. Lerner:

The United States Air Force Center for Environmental Excellence (AFCEE) at Brooks Air Force Base is preparing an Environmental Impact Statement (EIS) on the disposal and reuse of Williams Air Force Base (AFB) in Mesa, Arizona, pursuant to the Base Closure and Realignment Act. The AFCEE has hired the HALLIBURTON NUS Environmental Corporation to collect data in support of the EIS. A Notice of Intent (NOI) to prepare this EIS was published in the October 9, 1991 Federal Register (56 FR 50863). A copy of the NOI is provided in Attachment A to this letter.

Issues concerning the archeological and historic properties on the base will be addressed in the EIS. In compliance with Section 106 of the National Historic Preservation Act, the AFCEE is requesting a records review of these properties to identify significant cultural resources. The AFCEE and HALLIBURTON NUS Environmental Corporation are collecting additional data to identify and evaluate these properties and will provide assistance in records review activities as requested. Any input, comments or suggestions you may have at this time would be appreciated.

Thank you very much for your attention. We would appreciate receiving your response within 30 days from receipt of this letter. If you have any further questions, please contact Bob Reynolds of the AFCEE at (512) 536-3805 or Peyton Doub of the HALLIBURTON NUS Environmental Corporation at (301) 258-8798.

Sincerely,

GARY P. BAUMGARTEL, Lt Col, USAF
Chief, Environmental Planning Division

Atchs
Notice of Intent
USGS Topographical Map

cc: HALLIBURTON NUS
Mr. Giannino
Mr. Dubberly

ARIZONA STATE PARKS

800 W. WASHINGTON
SUITE 415
PHOENIX, ARIZONA 85007
TELEPHONE 602-542-4174

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STATE LAND COMMISSIONER

KENNETH E. TRAVOUS
EXECUTIVE DIRECTOR

COURTLAND NELSON
DEPUTY DIRECTOR

March 30, 1992

Gary P. Baumgartel, Lt Col, USAF
Chief, Environmental Planning Division
Air Force Center for Environmental Excellence (AFCEE)
Brooks Air Force Base, Texas 78235-5000

RE: Williams Air Force Base, Proposed Closure, DOD-AF

Dear Colonel Baumgartel:

Thank you for your letter advising us that your office is preparing an Environmental Impact Statement (EIS) for the proposed disposal and reuse of Williams AFB and that your office has hired Halliburton Nus in Gaithersburg, Maryland to assist in the preparation of the EIS. For your information, Halliburton Nus has been trying to contact me but to date we have not connected.

You asked us about issues concerning the archaeological and historic properties at Williams AFB. I have been in close contact with Ms. Kay Pepper at Williams AFB regarding these matters and she is well aware of concerns that this office and the Air Force have regarding cultural resources. Ms. Pepper has developed a draft Historic Preservation Plan (HPP) for the proposed closure that addresses historic preservation issues. I recommend that Ms. Pepper be involved in future consultations since she is knowledgeable about such issues.

There are three known archaeological sites at Williams AFB. One of these is the Midvale site that is listed on the National Register of Historic Places. The two remaining archaeological sites have not yet been evaluated for the National Register; we are also not sure of their boundaries. We asked the Air Force to evaluate all buildings and structures at the base that date to World War II. I understand that the base has hired a local consultant to evaluate the historic facilities.

I am sure that you are aware that the final treatment of historic properties at Williams AFB will depend on who acquires the facility and what the ultimate reuse will be.

We look forward to continuing our consultations on this undertaking. If you have any questions, please do not hesitate to contact me.

Sincerely,

Robert E. Gasser
Compliance Coordinator

for Shereen Lerner, Ph.D.
State Historic Preservation Officer

cc: Kay Pepper, Williams AFB
Jeffrey Rikhoff, Halliburton Nus

DEPARTMENT OF THE AIR FORCE
AIR FORCE CENTER FOR ENVIRONMENTAL EXCELLENCE (AFCEE)
BROOKS AIR FORCE BASE, TEXAS

23 MAR 1993

James Garrison
Chief, Historic Preservation Section
Arizona State Parks
800 W Washington, Suite 45
Phoenix, AZ 85007

Dear Mr Garrison

Reference the 22 Dec 92 letter from Ms Diana Thomas and the 18 Feb 93 meeting with you and members of your staff, Bob Gasser and Diana Thomas, and our Robert L. Lopez and Bill Metz concerning the Williams Air Force Base (AFB) Historic Building Survey Report. The report documented and assessed the significance of 34 remaining pre-1945 buildings located at Williams AFB. It also provided an evaluation of each historic building and made eligibility recommendations for listing on the National Register of Historic Places.

The report recommended 12 of the historic properties potentially eligible for listing on the National Register. After the 18 Feb 93 meeting, we concluded that one out of the 12 properties (Bldg S-9, Base Exchange) was not eligible because of significant alterations and additions. In addition, we agreed that three additional structures were eligible. These were the Civil Engineering Maintenance Shop (Bldg S-735) and two Original Ammo Bunkers (S-1007 and S-1008). The Water Tower associated with Building S-715 was also recommended to be potentially eligible.

We have determined that 14 properties (see attachment 1) are eligible to be included for listing on the National Register. In accordance with Sections 106 and 111 of the National Historic Preservation Act, we request your concurrence or objections to this determination.

If you have any comments concerning the above, please call Mr Robert L. Lopez at (210) 536-3183 or Mr Bill Metz (210) 536-4203.

Sincerely

BRUCE R. LEIGHTON, P.E.
Technical Assistant
Environmental Planning Division

1 Atch
Eligible Sites

Eligible Properties

Inventory Number	Name	Location
S-24	Aircraft Maintenance Hangar	Middle Apron
S-25	Aircraft Corrosion Control Hanger	Middle Apron and Front Streets
S-27	Aircraft Maintenance Hanger	Middle Apron and Front Streets
S-31	Demountable Hanger	South Apron
S-32	Demountable Hanger	South Apron
S-37	Land Plane Hangar	South Apron
S-38	Land Plane Hanger	South Apron
S-46	Demountable Hangar	North Apron
S-100	Flagpole	10th St between "D" and "E" Streets
S-715	Water Pump Station and Water Tower	NE corner 12th and "B" Streets
S-726	Housing Storage Supply Warehouse	NW corner 11th and "A" Streets
S-735	Civil Engineering Maintenance Shop	NE corner 11th and "A" Streets
S-1007	Original Ammo Bunker	SE of Alaska Dr
S-1008	Original Ammo Bunker	SE of Alaska Dr

ARIZONA STATE PARKS

800 W. WASHINGTON
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TELEPHONE 602-542-4174

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DEAN M. FLAKE
SNOWFLAKE

M. JEAN HASSELL
STATE LAND COMMISSIONER

KENNETH E. TRAVOUS
EXECUTIVE DIRECTOR

April 8, 1993

Mr. Bruce R. Leighton, P.E.
Environmental Planning Division
Department of the Air Force
Brooks Air Force Base, Texas

Dear Mr. Leighton:

Thank you for your letter dated 23 March 1993 concerning the Williams Air Force Base Historic Building Survey Report. This office concurs with your determination that the 14 properties outlined on the attachment (1) are eligible for inclusion on the National Register of Historic Places.

Thank you for your cooperation in meeting the requirements of Sections 106 and 110 of the National Historic Preservation Act. If you have any comments or questions, do not hesitate to contact me or James Garrison, Chief, Historic Preservation Section at 542-4009.

Sincerely,

Diana Thomas

Diana Thomas
Architectural Historian

DEPARTMENT OF THE AIR FORCE
AIR FORCE CENTER FOR ENVIRONMENTAL EXCELLENCE (AFCEE)
BROOKS AIR FORCE BASE, TEXAS 78235-5000

16 JUN 1992

Mr Cecil Antone
Dept of Land & Water Resources
Gila River Indian Community
P.O. Box 97
Sacaton, AZ 85247

Dear Mr Antone

The United States Air Force Center for Environmental Excellence (AFCEE) at Brooks Air Force Base (AFB) is preparing an Environmental Impact Statement (EIS) on the disposal and reuse of Williams AFB in Mesa, Arizona, pursuant to the Base Closure and Realignment Act. The AFCEE has hired HALLIBURTON NUS Environmental Corporation to collect data in support of the EIS. A Notice of Intent (NOI) to prepare this EIS was published in the October 9, 1991 Federal Register (56 FR 50863). A copy of the NOI is provided as Attachment 1 to this letter.

Issues concerning Native American cultural resources on the base will be addressed in the EIS. To ensure compliance with the American Indian Religious Freedom Act (AIRFA), the AFCEE is requesting comments from Native American religious leaders to determine past traditional affiliations with religious activities on or near Williams AFB. Any input, comments, or suggestions you may have at this time would be welcome. We would appreciate receiving your response within 15 days from receipt of this letter. Please address your comments to the undersigned, attention Mr Robert Lopez.

In addition, a representative of HALLIBURTON NUS Environmental Corporation will be contacting you to arrange, if you desire, an interview and meeting with Air Force personnel. In the meantime, if you have any questions, please contact Mr Lopez at (512) 536-3751 or Ms Sandra Robinson of HALLIBURTON NUS Environmental Corporation at (301) 258-8751.

Sincerely,

GARY P. BAUMGARTEL, Lt Col, USAF
Chief, Environmental Planning Division

2 Atch
1. NOI
2. USGS Topographical Map

cc: HALLIBURTON NUS
Mr. Giannino
Mr. Dubberley

GILA RIVER INDIAN COMMUNITY
SACATON, AZ. 85247

DEPARTMENT OF LAND & WATER RESOURCES

Contracts Administration
Surveying & Engineering
Construction Services
Water & Sanitation
Facilities Maintenance
Pesticide Control
Irrigation Rehabilitation
Land Use Planning & Zoning

POST OFFICE BOX E
(602) 562-3301
FAX (602) 562-3811

July 28, 1992

Gary P. Baumgartel, Lt. Col, USAF
Chief Environmental Planning Division
Department of the Air Force
Air Force Center for Environmental Excellence (AFCEE)
Brooks Air Force Base, Texas 78235-5000

Dear Lt. Col. Baumgartel:

We, the Gila River Indian Community, have received your request for comments concerning Native American cultural resources in reference to the closing of Williams Air Force Base.

Comments were submitted to Major Smith (see attached letter) last February 7, 1991, in regard to the same concerns that you have. Those comments remain the same particularly when addressing Prehistoric Hohokam and Pima human remains.

We would be happy to discuss any clarification concerning those comments with your consultants, HALLIBURTON NUS Environmental Corporation. Mr. Clarence M. Chiago, our Tribal Archaeological Licensing Officer, or myself can be contacted to answer any questions you may have regarding cultural resources at Williams AFB.

Our telephone number is (602)562-3301

Sincerely,

Cecil F. Antone, Director
Land Use Planning & Zoning

CC/ Thomas R. White, Governor/GRIC
Mary V. Thomas, Lt. Governor/GRIC
Edmund Lee Thompson, Director/DL&WR
File

GILA RIVER INDIAN COMMUNITY
SACATON, AZ. 85247

DEPARTMENT OF LAND & WATER RESOURCES

Contracts Administration
Surveying & Engineering
Construction Services
Water & Sanitation
Facilities Maintenance
Pesticide Control
Irrigation Rehabilitation
Land Use Planning & Zoning

POST OFFICE BOX E
(602) 562-3301
FAX (602) 562-3811

February 7, 1992

Emmitt G. Smith, Maj, USAF
Department of the Air Force
Headquarters 82nd Flying Training Wing
Williams Air Force Base, Arizona 85240

Dear Major Smith:

The Gila River Indian Community (Tribe) is in receipt of your notification for comment on "DRAFT, HISTORIC PRESERVATION PLAN FOR WILLIAMS AIR FORCE BASE, ARIZONA" by Kay Pepper, Community Planner.

The DRAFT address all concerns that our Tribe has regarding the protection of cultural resources. There are a few items that we would like to address however. Prior to the closing of your Base, perferrable we would like to see that all prehistoric sites related to Hohokam and Pima cultures be fully cleared through testing, and data recovery programs. Unless, assurance can be made to Native Americans that future tennants of the property perform the recovery programs, with proper notification under Federal requirements stated in Section 4 of the DRAFT. Also, please add the following federal requirement signed on November 16, 1990: "Native American Graves Protection and Repatriation Act", Pulic Law 101 601.

With respect to NAGPRA, any Hohckam and Pima burials that may be encountered during recovery programs on your Base, our Tribe request that all burials be handled with dignity and respect and to immediately contact all Native American claimants involved. And if any of the above remains be found our Tribe is prepared to make claim of affinity for repatriation.

With no further comments, we appreciate the opportunity to comment on the DRAFT. If you have any questions, please call me at (602)562-3301.

Sincerely,

Cecil F. Antone, Director
Land Use Planning & Zoning
Department of Land & Water Resources

DEPARTMENT OF THE AIR FORCE
AIR FORCE CENTER FOR ENVIRONMENTAL EXCELLENCE (AFCEE)
BROOKS AIR FORCE BASE, TEXAS 78235-5000

16 JUN 1992

Mr Leigh Jenkins
Hopi Cultural Preservation Office
The Hopi Tribe
P.O. Box 123
Kykotsmovi, AZ 86039

Dear Mr Jenkins

The United States Air Force Center for Environmental Excellence (AFCEE) at Brooks Air Force Base (AFB) is preparing an Environmental Impact Statement (EIS) on the disposal and reuse of Williams AFB in Mesa, Arizona, pursuant to the Base Closure and Realignment Act. The AFCEE has hired HALLIBURTON NUS Environmental Corporation to collect data in support of the EIS. A Notice of Intent (NOI) to prepare this EIS was published in the October 9, 1991 Federal Register (56 FR 50863). A copy of the NOI is provided as Attachment 1 to this letter.

Issues concerning Native American cultural resources on the base will be addressed in the EIS. To ensure compliance with the American Indian Religious Freedom Act (AIRFA), the AFCEE is requesting comments from Native American religious leaders to determine past traditional affiliations with religious activities on or near Williams AFB. Any input, comments, or suggestions you may have at this time would be welcome. We would appreciate receiving your response within 15 days from receipt of this letter. Please address your comments to the undersigned, attention Mr Robert Lopez.

In addition, a representative of HALLIBURTON NUS Environmental Corporation will be contacting you to arrange, if you desire, an interview and meeting with Air Force personnel. In the meantime, if you have any questions, please contact Mr Lopez at (512) 536-3751 or Ms Sandra Robinson of HALLIBURTON NUS Environmental Corporation at (301) 258-8751.

Sincerely,

GARY P. BAUMGARTEL, Lt Col, USAF
Chief, Environmental Planning Division

2 Atch
1. NOI
2. USGS Topographical Map

cc: HALLIBURTON NUS
Mr. Giannino
Mr. Dubberley

THE HOPI TRIBE

Vernon Masayesva
CHAIRMAN

Patrick C. Dallas
VICE-CHAIRMAN

Gary P. Baumgartel, Lt. Col.
Chief, Environmental Planning Division
Center for Environmental Excellence
Department of the Air Force
Brooks Air Force Base, Texas 78235-5000
Atten: Mr. Robert Lopez

July 1, 1992

RE: AIRFA CONSULTATION FOR WILLIAMS AFB CLOSURE, MESA, ARIZONA

Dear Mr. Baumgartel:

The Hopi Cultural Preservation Office has received and reviewed your request for information concerning Hopi traditional cultural and sacred property concerns in the Williams Air Force Base, Mesa, Arizona area. This base is selected to be closed pursuant to the Base Closure and Realignment Act.

This office is unaware of any traditional cultural properties that may be affected by the project. Please be aware that because of the nature of knowledge about Hopi traditional cultural properties, this office cannot guarantee that, for the above referenced project, every person with potential knowledge about these areas has been consulted. Such an effort would require a specific and comprehensive ethnographic survey of traditional practitioners within Hopi.

We assume that a part of the EIS to be prepared by Halliburton NUS Environmental Corporation will be a comprehensive cultural resource inventory of the base property. Part of the process of identifying traditional cultural concerns of the Hopi people utilizes information of all identified archaeological sites located within the project areas. Therefore, the Hopi Cultural Preservation Office requests copies of the site forms and maps for all cultural resources identified in the course of the pedestrian inventory for the above project. Once we have this information, the Hopi Cultural Preservation Office will be able to more effectively identify traditional cultural concerns of the Hopi people and thereby provide Halliburton NUS with the information requested. Also, a site visit by knowledgeable Hopi traditional practitioners may illuminate concerns that would otherwise remain unknown. Halliburton NUS is requested to contact our office to discuss the possibility for such a visit.

If historic properties are identified which will be impacted, then we request that the Hopi Tribe be notified of

any testing or data recovery that would require reassessment by the Tribe for any potential impacts to traditional or cultural properties, as provided for under the Archaeological Resources Protection Act of 1979.

Thank you for contacting our office in this matter. We look forward to working with you in the future. If you have any questions regarding our response, please contact me at 734-2441, extension 202.

Sincerely,

Leigh Jenkins, Director
Cultural Preservation Office

DEPARTMENT OF THE AIR FORCE
AIR FORCE CENTER FOR ENVIRONMENTAL EXCELLENCE (AFCEE)
BROOKS AIR FORCE BASE, TEXAS 78235-5000

Mr Terrance Leonard
Cultural Resources Officer
Salt River Pima-Maricopa Indian Community
Route 1, Box 216
Scottsdale, AZ 85256

16 JUN 1992

Dear Mr Leonard

The United States Air Force Center for Environmental Excellence (AFCEE) at Brooks Air Force Base (AFB) is preparing an Environmental Impact Statement (EIS) on the disposal and reuse of Williams AFB in Mesa, Arizona, pursuant to the Base Closure and Realignment Act. The AFCEE has hired HALLIBURTON NUS Environmental Corporation to collect data in support of the EIS. A Notice of Intent (NOI) to prepare this EIS was published in the October 9, 1991 Federal Register (56 FR 50863). A copy of the NOI is provided as Attachment 1 to this letter.

Issues concerning Native American cultural resources on the base will be addressed in the EIS. To ensure compliance with the American Indian Religious Freedom Act (AIRFA), the AFCEE is requesting comments from Native American religious leaders to determine past traditional affiliations with religious activities on or near Williams AFB. Any input, comments, or suggestions you may have at this time would be welcome. We would appreciate receiving your response within 15 days from receipt of this letter. Please address your comments to the undersigned, attention Mr Robert Lopez.

In addition, a representative of HALLIBURTON NUS Environmental Corporation will be contacting you to arrange, if you desire, an interview and meeting with Air Force personnel. In the meantime, if you have any questions, please contact Mr Lopez at (512) 536-3751 or Ms Sandra Robinson of HALLIBURTON NUS Environmental Corporation at (301) 258-8751.

Sincerely,

GARY P. BAUMGARTEL, Lt Col, USAF
Chief, Environmental Planning Division

2 Atch
1. NOI
2. USGS Topographical Map

cc: HALLIBURTON NUS
Mr. Giannino
Mr. Dubberley

Salt River

PIMA-MARICOPA INDIAN COMMUNITY

ROUTE 1, BOX 216 / SCOTTSDALE, ARIZONA 85256-9722 / PHONE (602) 941-7277

July 16, 1992

Gary P. Baumgartel, Lt Col, USAF
Chief, Environmental Planning Division
Department of the Air Force
Air Force Center for Environmental Excellence (AFCEE)
Brooks Air Force Base, Texas 78235-5000

Dear Colonel Baumgartel:

Reference your letter of June 16, 1992, the Salt River Indian Community is interested in discussing the cultural resources issue for the Environmental Impact Statement.

As you may know, the Community along with the Gila River, Ak-Chin and Tohono O'Odham Indian Community have filed claims of affinity to the Hohokam culture which included areas of Williams Air Force base.

I am advised that our Archaeological Office has contacted Mr. Robert Lopez of Halliburton NUS Environmental Corporation who request this notice.

In that regard please feel free to contact Mr. Terrance F. Leonard or Roger Evans at 941-7340 to arrange for a meeting.

Sincerely yours,

Merna L. Lewis

Merna L. Lewis
Vice-President

cs

cc: Administration
William Jolly
Terry F. Leonard
Roger Evans

DEPARTMENT OF THE AIR FORCE
AIR FORCE CENTER FOR ENVIRONMENTAL EXCELLENCE (AFCEE)
BROOKS AIR FORCE BASE, TEXAS 78235-5000

16 JUN 1992

Mr John Lewis
Inter-Tribal Council of Arizona
4205 North 7th Ave, Suite 200
Phoenix, AZ 85013

Dear Mr Lewis

The United States Air Force Center for Environmental Excellence (AFCEE) at Brooks Air Force Base (AFB) is preparing an Environmental Impact Statement (EIS) on the disposal and reuse of Williams AFB in Mesa, Arizona, pursuant to the Base Closure and Realignment Act. The AFCEE has hired HALLIBURTON NUS Environmental Corporation to collect data in support of the EIS. A Notice of Intent (NOI) to prepare this EIS was published in the October 9, 1991 Federal Register (56 FR 50863). A copy of the NOI is provided as Attachment 1 to this letter.

Issues concerning Native American cultural resources on the base will be addressed in the EIS. To ensure compliance with the American Indian Religious Freedom Act (AIRFA), the AFCEE is requesting comments from Native American religious leaders to determine past traditional affiliations with religious activities on or near Williams AFB. Any input, comments, or suggestions you may have at this time would be welcome. We would appreciate receiving your response within 15 days from receipt of this letter. Please address your comments to the undersigned, attention Mr Robert Lopez.

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Sincerely,

GARY P. BAUMGARTEL, Lt Col, USAF
Chief, Environmental Planning Division

2 Atch
1. NOI
2. USGS Topographical Map

cc: HALLIBURTON NUS
Mr. Giannino
Mr. Dubberley

DEPARTMENT OF THE AIR FORCE
AIR FORCE CENTER FOR ENVIRONMENTAL EXCELLENCE (AFCEE)
BROOKS AIR FORCE BASE, TEXAS 78235-5000

16 JUN 1992

Mr David King, President
Fort McDowell Tribal Council
P.O. Box 17779
Fountain Hills, AZ 85269

Dear Mr King

The United States Air Force Center for Environmental Excellence (AFCEE) at Brooks Air Force Base (AFB) is preparing an Environmental Impact Statement (EIS) on the disposal and reuse of Williams AFB in Mesa, Arizona, pursuant to the Base Closure and Realignment Act. The AFCEE has hired HALLIBURTON NUS Environmental Corporation to collect data in support of the EIS. A Notice of Intent (NOI) to prepare this EIS was published in the October 9, 1991 Federal Register (56 FR 50863). A copy of the NOI is provided as Attachment 1 to this letter.

Issues concerning Native American cultural resources on the base will be addressed in the EIS. To ensure compliance with the American Indian Religious Freedom Act (AIRFA), the AFCEE is requesting comments from Native American religious leaders to determine past traditional affiliations with religious activities on or near Williams AFB. Any input, comments, or suggestions you may have at this time would be welcome. We would appreciate receiving your response within 15 days from receipt of this letter. Please address your comments to the undersigned, attention Mr Robert Lopez.

In addition, a representative of HALLIBURTON NUS Environmental Corporation will be contacting you to arrange, if you desire, an interview and meeting with Air Force personnel. In the meantime, if you have any questions, please contact Mr Lopez at (512) 536-3751 or Ms Sandra Robinson of HALLIBURTON NUS Environmental Corporation at (301) 258-8751.

Sincerely,

GARY P. BAUMGARTEL, Lt Col, USAF
Chief, Environmental Planning Division

2 Atch
1. NOI
2. USGS Topographical Map

cc: HALLIBURTON NUS
Mr. Giannino
Mr. Dubberley

DEPARTMENT OF THE AIR FORCE
AIR FORCE CENTER FOR ENVIRONMENTAL EXCELLENCE (AFCEE)
BROOKS AIR FORCE BASE, TEXAS

01 DEC 1992

Cecil F. Antone, Director of Land Use Planning
Department of Land and Water Resources
Gila River Indian Community
P.O. Box E
Sacaton, AZ 85247

RE: Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) Consultation at Williams AFB, AZ

Dear Mr Antone

The United States Air Force Center for Environmental Excellence (AFCEE) at Brooks Air Force Base (AFB) is preparing an Environmental Impact Statement (EIS) on the disposal and reuse of Williams AFB in Mesa, Arizona, pursuant to the Base Closure and Realignment Act.

As part of the EIS process, AFCEE is required to evaluate impacts of base reuse options on archaeologically significant sites which may be present on base property. Halliburton NUS Environmental Corporation is assisting the AFCEE in this process. In turn, Halliburton NUS will subcontract a qualified local archaeological firm to conduct two archaeological investigations on Williams AFB:

1. A Class III intensive surficial archaeological survey of the base areas not previously investigated.

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There is a possibility that cremations or inhumations will be encountered during the subsurface testing that may represent Hohokam habitations. Under the authority of the NAGPRA, the Air Force proposes to enter into a Memorandum Of Understanding (MOU) addressing the treatment and disposition of human remains, associated funerary objects, sacred objects and objects of cultural patrimony which may be discovered as a result of the proposed testing at the two sites mentioned above. A draft MOU is enclosed for your review and comments. We would appreciate receiving your comments within 15 days from receipt of this letter.

This letter has been sent to representatives of those Native American groups claiming cultural affiliation of the lands now occupied by Williams AFB. Documentation is currently being prepared which will identify cultural affiliation. This work is progressing concurrently to satisfy requirements under the American Indian Religious Freedom Act of 1978. Documentation will be supplied at a later date upon your request.

Upon receipt of your comments on the MOU, we would like to have a meeting with you at Williams AFB to discuss the draft language and to provide you with a tour of the two sites. We will notify you of the time and date of the meeting. If you have any questions concerning the above, please contact Mr Robert L. Lopez at (512) 536-3751.

Sincerely

SIGNED

BRUCE R. LEIGHTON, P.E.
Technical Assistant
Environmental Planning Division

1 Atch
Draft MOU

cc: SHPO

GILA RIVER INDIAN COMMUNITY

SACATON, AZ. 85247

DEPARTMENT OF LAND & WATER RESOURCES
Central Arizona Project Planning
Surveying & Engineering
Tribal Ranger Program
Community Fire Protection
Water & Sanitation
Facilities Maintenance
Public Works
Pesticide Control
Irrigation Rehabilitation
Land Use Planning & Zoning

POST OFFICE BOX E
(602) 562-3301
Fax (602) 562-4008

December 10, 1992

Bruce R. Leighton, P. E. Technical Assistant
Environmental Planning Division
Department of the Air Force
Air Force Center for Environmental Excellence (AFCEE)
Brooks Air Force Base, Texas

RE: Williams Air Force Base Reuse/Native American Graves Protection and Repatriation Act of 1990 Consultations

Dear Mr. Leighton,

The Gila River Indian Community is in receipt of your documentation regarding the preparation of an Environmental Impact Statement (EIS) for the base closure of Williams Air Force Base.

I have reviewed the draft M.O.U. and wish to complement the Air Force for making a diligent effort to consult indian tribes.

The Four Southern tribes consisting of: Gila River Indian Community, Ak-Chin Indian Community, Salt River-Maricopa Indian Community and the Tohono O'odham Nation have a definite cultural affiliation to the land and to the people who once occupied Williams Air Force Base.

In verbally discussing your proposed testing of areas located within the base complex with the other three tribes, it was felt that Gila River Indian Community would be the lead consulting party. However, the three tribes would remain participants in the consultation process and provide comments as necessary.

In addition, the Gila River Indian Community would request that we be allowed to extend our comments in reference to the draft M.O.U. The process that we follow in order to be reviewed by the appropriate committees does take some time. At the very least, our comments would be completed by January 6, 1992 and forwarded to you by January 7, 1992.

This letter is to respond to the 15 day time frame and provide you preliminary comments to your proposed project. Should you have any questions, please call me at the above phone number.

Sincerely,

Cecil F. Antone, Director
Land Use Planning

XC Governor Thomas R. White
Lt. Governor Mary V. Thomas
File

DEPARTMENT OF THE AIR FORCE
AIR FORCE CENTER FOR ENVIRONMENTAL EXCELLENCE (AFCEE)
BROOKS AIR FORCE BASE, TEXAS

Leigh Jenkins, Director
Cultural Preservation Office
The Hopi Tribe
P.O. Box 123
Kykotsmovi, AZ 86039

01 DEC 1992

RE: Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) Consultation at Williams AFB, AZ

Dear Mr Jenkins

The United States Air Force Center for Environmental Excellence (AFCEE) at Brooks Air Force Base (AFB) is preparing an Environmental Impact Statement (EIS) on the disposal and reuse of Williams AFB in Mesa, Arizona, pursuant to the Base Closure and Realignment Act.

As part of the EIS process, AFCEE is required to evaluate impacts of base reuse options on archaeologically significant sites which may be present on base property. Halliburton NUS Environmental Corporation is assisting the AFCEE in this process. In turn, Halliburton NUS will subcontract a qualified local archaeological firm to conduct two archaeological investigations on Williams AFB:

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This letter has been sent to representatives of those Native American groups claiming cultural affiliation of the lands now occupied by Williams AFB. Documentation is currently being prepared which will identify cultural affiliation. This work is progressing concurrently to satisfy requirements under the American Indian Religious Freedom Act of 1978. Documentation will be supplied at a later date upon your request.

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Sincerely

SIGNED

BRUCE R. LEIGHTON, P.E.
Technical Assistant
Environmental Planning Division

1 Atch
Draft MOU

cc: SHPO

THE HOPI TRIBE

Vernon Masayesva
CHAIRMAN

Patrick C. Dallas
VICE-CHAIRMAN

December 18, 1992

Mr. Bruce R. Leighton, P.E.
Technical Assistant
Environmental Planning Division
Department of the Air Force
Air Force Center for Environmental Excellence
Brooks Air Force Base, Texas

RE: ***Hopi Comments on the Proposed Memorandum of Understanding Regarding the Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) Consultation for Williams Air Force Base, Arizona.***

Dear Mr. Leighton:

The Hopi Tribe has received and reviewed the submitted document entitled *Memorandum Of Understanding Regarding Native American Human Remains And Associated Materials Encountered As A Result Of The Archaeological Survey At Williams Air Force Base* and have the following comments.

1. It is the understanding of the Hopi Tribe that the United States Air Force (USAF) is sponsoring a Class III archaeological survey of those areas not previously investigated that constitute the Williams Air Force Base and to additionally conduct subsurface testing for the purposes of defining boundaries at sites AZ U:10:20 (ASM) and AZ U:10:25 (ASM). Therefore, this should be specifically delineated in the title of the MOU. Moreover, each Native American Tribe or group who chooses to participate in this consultation and agreement should be specifically identified in the title and not lumped together as "Tribal Groups" out of respect for their individual sovereignty.

2. Page 1, paragraph 2: Similarly, this paragraph should be changed to reflect the above. Additionally, the phrase ". . .discovery through excavation of cultural resources,. . " is redundant if testing of the two archaeological sites is referenced. The Hopi

P.O. BOX 123 — KYKOTSMOVI, ARIZONA — 86039 — (602) 734-2441

Tribe suggests the following language change:

> **WHEREAS, the United States Air Force is sponsoring an archaeological surevy and testing project to determine the extent of archaeological remains at Williams AFB involving the potential discovery of Native American Human Remains, associated funerary objects, sacred items, and objects of cultural patrimony, and**

3. Page 1, paragraph 3: insert comma after "identification", delete the following word "and", insert "**and consultation**" between the words "protection" and "of".

4. Page 1, paragraph 4: Identify each Native American group participating in this agreement individually and perhaps thereafter to be refered to as "**TRIBES**". Under the NAGPRA legislation a Native American group does not have to provide evidence of traditional residency, rather claims can be made based on cultural affiliation. The Hopi Tribe suggests the deletion of the term "traditionally resided" and perhaps the insertion of **"claims of cultural or ancestral affiliation".**

5. Page 1, paragraph 6: The Hopi Tribe suggests that this paragraph serves no purpose for the intent of this agreement and similarly does nothing to facilitate the USAF's compliance with the NAGPRA legislation. Therefore, this paragraph should be deleted from the agreement.

Similarly, page 1, paragraph 7, the Hopi Tribe's position, at this point in time, is that the religious beliefs and scientific interests of the consulting Tribes should have preference over any ancillary research interests, especially in the light that no research interests or questions, at this time, have been generated that address the treatment of any identified human remains, associated funerary objects, sacred items, or objects of cultural patrimony.

6. Page 2, paragraph 1: The term "avoid any additional damage" suggests that the parties to this agreement have already been in some way a part of damaging the referenced items. The Hopi Tribe does not agree with this statement. Similarly, the USAF cannot guarantee that these items can be "left undisturbed in place". The very act of testing a site and the associated identification of a burial *in situ* results in disturbance and in most cases damage to the burial. Additionally, once a burial is identified, it is impossible to "return the earth to its original condition". These inconsistencies need to be addressed.

7. Page 2, paragraph 3: This paragraph is better served in the first part of this agreement, possibly integrate this paragraph with the fourth paragraph on page one.

8. Stipulation I.3. The use of the word "discovery" in this manner does not conform with its use in Section 3.d. of NAGPRA, nor does it conform with the use of the word discovery in 36 CFR 800.11. The Hopi Tribe suggests consistency with the use of the word "discovery" in this MOU as it is defined in NAGPRA and 36 CFR 800.11. Moreover, the Hopi Tribe suggests that the intentional excavation associated with the testing of these two sites and the subsequent removal of Human Remains, associated funerary object, sacred items, and objects of cultural patrimony be identified as such (as in NAGPRA Section 3.c.).

9. Stipulation I.4. This definition is not acceptable to the Hopi Tribe. Context is not the issue here. The remains are either human or they are not human. The Hopi Tribe suggests the following definition:

Human Remains are any physical remains of a human being.

10. Stipulation II.1. Insert **"after consultation and in accordance with"** between "implemented" and "the".

11. Stipulation II.3. Insert "**and testing**" after Archaeological Survey. Also insert "**agreed upon**" between the words "the" and "treatment".

12. Stipulation II.4. The distinction needs to be made between an actual discovery situation as defined by NAGPRA Section 3.d (see above) and the intentional excavation that maybe associated with the testing of the sites AZ U:10:20 and AZ U:10:25. Additionally, cite either federal regualtions or guidelines established by a professional archaeological organization when referencing professional archaeological standards. This way there will be no confusion over these standards.

In archaeological venacular "data recovery" implies a certain level of excavation associated with mitigative measures as defined within the guidelines of 36 CFR 800. Therefore, if the term data recovery is to be used in this paragraph then it should also be specified that this is a "survey and testing project".

Insert "**the Tribes**" between the terms "U.S. Air Force," and "and the State Historic Preservation Officer".

13. Stipulation II.4.a,b,&c. The identification, treatment, and

level of analysis of any identified and/or recovered Remains in this section is far too general. The Hopi Tribe requests that the following issues require further delineation:

a) The steps that the USAF will perform to reasonably assure the protection of identified burials;

b) The specific level of scientific analysis and documentation that will be implemented upon discovery of a burial;

c) The identifying and subsequent citing of the appropriate federal regulation or stated standard for archaeological documentation either from the Society for American Archaeology or the Society of Professional Archaeologists;

d) The identificaton of the point of completion of the Williams AFB Archaeological Survey and Testing Project at which time the 90 day reinterment period will begin.

e) The identification and delineation of the specific procedures to follow during consultation with the tribes when human remains are recovered. Additionally, due to the nature of prehistoric interments in the general area of Williams AFB, there is a great potential that during archaeological site testing one will encounter numerous cremated human remain fragments. Therefore, the nature and extent of consultation at every instance a fragment of a human bone is identified needs to be specifically delineated.

f) The Hopi Tribe requests a definition of the minimum acceptable professional qualifications for the individuals who will perform excavation and/or analysis of any human remains identified. Specifically, the Hopi Tribe would request demonstrated experience in human osteological analysis and professional training as a Physical Anthropologist.

14. Stipulation II.6. Delete the last sentence in this section, as it is the position of the Hopi Tribe that it is unnecessary to state that representatives of the Tribes need not be present to perform the archaeological field work.

15. Stipulation II.7. Please insert "**and Testing**" between the words "Survey" and "in", and insert "**Sacred Objects**" after "Associated Funerary Objects".

16. Stipulation II. 8. The Hopi Tribe suggests changing the term "Tribal Cultural Preservation Officer" to **Tribal Chairman's Designated Representative**, because this term may not be appropriate

for the majority of the consulting Tribes. Additionally, the Hopi Tribe suggests the deletion of the phrase ". . . designation of Tribal representatives to assure" and replace with the word **and**. This would in the opinionof the Hopi Tribe eliminate the redundancy in this section.

17. Stipulation II. 11. It is the understanding of the Hopi Tribe that all the land that comprises the Williams AFB is under the jurisdiction of the United States Government. Therefore, the Hopi Tribe questions the appropriateness of the first clause in this section.

18. Stipulation III. Insert **and Testing** between the words "Survey" and "as".

19. Section V. The Hopi Tribes suggests the insertion of the phrase "**claiming lineal descent or cultural affiliation**" between the words "Tribes" and "may".

20. AGREEMENT ON JOINT CLAIMS UNDER NAGPRA AND A.R.S. 41-844 AND 41-865. The Hopi Tribe feels that this document is redundant and serves no purpose. The Tribes that become signatories to the Memorandum of Understanding agree to the terms and conditions contained therein and it is unnecessary to have them sign a similar agreement between the Tribes. Additionally, if this document is to indicate compliance with A.R.S. 41-844 and 41-865, then these pieces of legislation should be identified as being complied with in a WHEREAS clause in the Memorandum of Understanding.

The Hopi Tribe cannot adequately respond in the 15 day period requested for review of this draft Memorandum of Understanding. At the very least the Hopi Tribe requests a 30 day comment period for review of all future documentation concerning this agreement.

Finally, the Hopi Tribe appreciates the opportunity to comment on this proposed draft document and should you have any questions regarding our comments please contact me or Mr. Kurt Dongoske, Tribal Archaeologist, at 602/734-6636 or 602/734-2441, extension 202.

Sincerely,

Leigh Jenkins, Director
Cultural Preservation Office
The Hopi Tribe

XC: Ms. Delia M. Carlyle, Chair, Ak-Chin Indian Community, 42507 W. Peters & Nail Road, Maricopa, Arizona 85239
Mr. Cecil Antone, Gila River Indian Community, P.O. Box 97, Sacaton, Arizona 85247
Mr. Josiah Moore, Chair, Tonhono O'Odham, P.O. Box 837, Sells, Arizona 85634
Mr. L.J. Glorenflo, RDN,Inc., 2111 Wilson Boulevard, Suite 700, Arlington, VA 22201
Mr. Jeffery Rikhoff, Halliburton NUS, 910 Clopper Road, Gaithersburg, Maryland 20877
Mr. William M. Metz, US Air Force Center for Environmental Excellence, Brooks Air Force Base, Bldg. 1155, San Antonio, TX 78235
Mr. Robert L. Lopez, US Air Force Center for Environmental Excellence, Brooks Air Force Base, San Antonio, TX 78235
Mr. David Greenwald, SWCA, Inc., 23 East Fine, Flagstaff, Arizona 86001

DEPARTMENT OF THE AIR FORCE
AIR FORCE CENTER FOR ENVIRONMENTAL EXCELLENCE (AFCEE)
BROOKS AIR FORCE BASE, TEXAS

01 DEC 1992

Joseph Joaquin, Chairman
Cultural Preservation Committee
Tohono O'odham Nation
P.O. Box 837
Sells, AZ 85634

RE: Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) Consultation at Williams AFB, AZ

Dear Mr Joaquin

The United States Air Force Center for Environmental Excellence (AFCEE) at Brooks Air Force Base (AFB) is preparing an Environmental Impact Statement (EIS) on the disposal and reuse of Williams AFB in Mesa, Arizona, pursuant to the Base Closure and Realignment Act.

As part of the EIS process, AFCEE is required to evaluate impacts of base reuse options on archaeologically significant sites which may be present on base property. Halliburton NUS Environmental Corporation is assisting the AFCEE in this process. In turn, Halliburton NUS will subcontract a qualified local archaeological firm to conduct two archaeological investigations on Williams AFB:

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This letter has been sent to representatives of those Native American groups claiming cultural affiliation of the lands now occupied by Williams AFB. Documentation is currently being prepared which will identify cultural affiliation. This work is progressing concurrently to satisfy requirements under the American Indian Religious Freedom Act of 1978. Documentation will be supplied at a later date upon your request.

Upon receipt of your comments on the MOU, we would like to have a meeting with you at Williams AFB to discuss the draft language and to provide you with a tour of the two sites. We will notify you of the time and date of the meeting. If you have any questions concerning the above, please contact Mr Robert L. Lopez at (512) 536-3751.

Sincerely

SIGNED

BRUCE R. LEIGHTON, P.E.
Technical Assistant
Environmental Planning Division

1 Atch
Draft MOU

cc: SHPO

DEPARTMENT OF THE AIR FORCE
AIR FORCE CENTER FOR ENVIRONMENTAL EXCELLENCE (AFCEE)
BROOKS AIR FORCE BASE, TEXAS

01 DEC 1992

Terrance Leonard, Special Projects Officer
Salt River Pima-Maricopa Indian Community
Route 1, Box 216
Scottsdale, AZ 85256

RE: Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) Consultation at Williams AFB, AZ

Dear Mr Leonard

The United States Air Force Center for Environmental Excellence (AFCEE) at Brooks Air Force Base (AFB) is preparing an Environmental Impact Statement (EIS) on the disposal and reuse of Williams AFB in Mesa, Arizona, pursuant to the Base Closure and Realignment Act.

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SIGNED

BRUCE R. LEIGHTON, P.E.
Technical Assistant
Environmental Planning Division

1 Atch
Draft MOU

cc: SHPO

DEPARTMENT OF THE AIR FORCE
AIR FORCE CENTER FOR ENVIRONMENTAL EXCELLENCE (AFCEE)
BROOKS AIR FORCE BASE, TEXAS

01 DEC 1992

Charles Carlyle, Director
Ak Chin Him Dak Eco-Museum
Ak Chin Indian Community
P.O. Box 897
47685 N. Eco Museum Road
Maricopa, AZ 85239

RE: Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) Consultation at Williams AFB, AZ

Dear Mr Carlyle

The United States Air Force Center for Environmental Excellence (AFCEE) at Brooks Air Force Base (AFB) is preparing an Environmental Impact Statement (EIS) on the disposal and reuse of Williams AFB in Mesa, Arizona, pursuant to the Base Closure and Realignment Act.

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SIGNED

BRUCE R. LEIGHTON, P.E.
Technical Assistant
Environmental Planning Division

1 Atch
Draft MOU

cc: SHPO

DEPARTMENT OF THE AIR FORCE
AIR FORCE CENTER FOR ENVIRONMENTAL EXCELLENCE (AFCEE)
BROOKS AIR FORCE BASE, TEXAS

01 DEC 1992

Roger Anyon, Tribal Archaeologist
Zuni Archaeological Program
The Zuni Tribe
P.O. Box 339
Zuni, NM 87327

RE: Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) Consultation at Williams AFB, AZ

Dear Mr Anyon

The United States Air Force Center for Environmental Excellence (AFCEE) at Brooks Air Force Base (AFB) is preparing an Environmental Impact Statement (EIS) on the disposal and reuse of Williams AFB in Mesa, Arizona, pursuant to the Base Closure and Realignment Act.

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Sincerely

SIGNED

BRUCE R. LEIGHTON, P.E.
Technical Assistant
Environmental Planning Division

1 Atch
Draft MOU

cc: SHPO

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR FORCE CENTER FOR ENVIRONMENTAL EXCELLENCE
BROOKS AIR FORCE BASE TEXAS

HQ AFCEE/ESE
8106 Chennault Rd
Brooks AFB TX 78235-5318

18 OCT 1993

Mr. Roger Herzog
Engineer Manager
MAG-TPO
2901 West Durango
Phoenix, AZ 85009

Dear Mr. Herzog

Reference your conversation with Mr. Robert L. Lopez of my staff concerning the Environmental Assessment (EA) for the interim lease of the Airfield Area and Associated Facilities at Williams Air Force Base.

The Department of the Air Force is working with the Williams Redevelopment Partnership (hereafter referred to as the Partnership) to develop a long-term plan for the reuse of the base and its facilities. The Partnership has requested a one year interim lease of the west and center runways and 19 facilities to the west of 12R/30L. The purpose of this action is to allow the use of the airfield runways and parking aprons for commercial aviation activities and operations associated with aircraft maintenance in order to replace the economic benefits that will be lost due to base closure. In addition, the lease will help the Partnership get started in their overall plan of reusing the base as a commercial aviation airport, air cargo operations, general aviation, and aviation training facilities. This planned reuse is discussed in detail as an alternative in our Draft Environmental Impact Statement (DEIS) for the Disposal and Reuse of Williams AFB. The DEIS is currently undergoing public comment and the final EIS will be due on 17 Feb 94.

In accordance with § 176 (c) of the Clean Air Act (CAA), the Air Force must determine that the proposed action conforms to the purpose of the State Implemenation Plan (SIP) for attainment of the National Ambient Air Quality Standards (NAAQS). It is our understanding that the Phoenix and Maricopa County Urban Planning area (PMCUPA) does not have an EPA-approved SIP with which to base such an analysis on. Therefore, in accordance with § 93.158 (a)(iv) of EPA's proposed General Conformity Rule, we have determined conformity by comparing emissions from the proposed action to baseline, pre-closure emission levels (see attached excerpts from our EA). This comparison shows that baseline emissions are not exceeded by the proposed interim reuse, and therefore conforms.

Although we have determined conformity for the interim reuse of the airfield, the Air Force still must make a long term conformity determination for reuse of the entire property to be disposed of. This can be accomplished through mitigations carried out by the Partnership, which may lead to limitations on redevelopment, or growth allowances in the SIP's emissions budget. Therefore, we strongly recommend that SIP revisions prepared for the PMCUPA specifically include reuse of Williams AFB in their emissions budget. Estimates of these emissions are contained in our Disposal and Reuse Draft Environmental Impact Statement dated September, 1993, which has also been provided to your organization.

Request your concurrence with our conformity determination for the one year lease of the airfield. In addition, any information you can provide us on the status of the SIP, which may assist us in making the long term conformity determination. Your timely response to this letter will be greatly appreciated. If you have any additional questions concerning the above, please contact Mr. Robert L. Lopez at 210-536-5137.

Sincerely

SIGNED

GARY P. BAUMGARTEL, Lt Col, USAF
Chief, Environmental Planning Division
Environmental Services

1 Atch
EA Excerpts

MARICOPA•ASSOCIATION•OF•GOVERNMENTS
Transportation & Planning Office
2901 West Durango Street
Phoenix, Arizona 85009
(602) 506-4117
FAX (602) 506-6008

November 3, 1993

Lt. Col. Gary P. Baumgartel, USAF
Chief, Environmental Planning Division
HQ AFCEE/ESE
3106 Chennault Road
Brooks AFB Texas 78235-5318

Dear Lt. Col. Baumgartel:

In response to your letter of October 13, 1993 concerning Williams Air Force Base we are providing relevant portions of the following documents:

- 1990 Base Year Carbon Monoxide Emission Inventory, Maricopa County, August 1993:
  - Section 1: Background and Emissions Summary;
  - Section 4: Non-road Mobile Sources;
- 1990 Base Year Ozone Emission Inventory, Maricopa County, July 1993:
  - Section 1: Background and Emissions Summary;
  - Section 4: Non-road Mobile Sources;
- Revised Technical Support Document: Carbon Monoxide Modeling in Support of the 1993 State Implementation Plan for Maricopa County, Arizona, Systems Applications International, September 1993:
  - Appendix B: Summary of Data Provided by Other Organizations - 1992, 1995, and 2005 Baseline Projection Growth Factors for CO Emissions, Maricopa County. August 1993;
  - Appendix C: Base Case Carbon Monoxide Emission Inventory Development for Maricopa County, Arizona;

- Draft Report Technical Support Document: Photochemical Modeling of the Maricopa County Ozone Nonattainment Area, Systems Applications International, September 1993:

  - Appendix B: 1992, 1996, and 2005 Baseline Projection Growth Factors for Ozone Precursor Emissions, Maricopa County, August 1993;

  - Appendix E: Preparation of Emission Inventories for Photochemical Modeling of the Maricopa County Ozone Nonattainment Area.

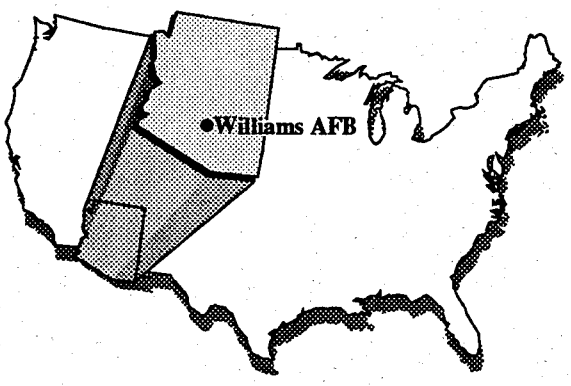
The above information is included in the Draft State Implementation Plans (SIPs) for carbon monoxide and ozone anticipated to be submitted on November 15, 1993. Until these plans are approved by the U.S. Environmental Protection Agency (EPA), the applicable air quality plans for the MAG region are the Federal Implementation Plan (FIP) for Carbon Monoxide promulgated by EPA in January, 1991 and for ozone the Nonattainment Area Plan for Carbon Monoxide and Photochemical Oxidants, Maricopa County Planning Area, which was prepared in 1978. In addition, MAG does not currently have an EPA-approved particulate plan for PM-10 or Total Suspended Particulates (TSP).

If you have any questions or need further assistance, please do not hesitate to call me or Doug Eberhart at (602) 506-4117.

Sincerely,

Roger Herzog
Engineering Manager

cc: Jo Crumbaker, DAPC
Joe Gibbs, ADEQ
Lynn Kusy, Williams Redevelopment Partnership



APPENDIX M

APPENDIX M

BIOLOGICAL RESOURCES

M-1. Plant Species Observed on Williams AFB, June 1 - 5, 1992
Page 1 of 3

Common Name	Scientific Name	Form	Habitat	Occurrence
Barnyard grass	*Echinochloa crusgalli*	Grass	Mowed	Infrequent
Barrel cactus	*Ferocactus wislizenii*	Cactus	Scrub-shrub	Infrequent
Bermuda grass	*Cynodon dactylon*	Grass	Mowed	Dominant
Blue palo verde	*Cercidium floridum*	Tree	Riparian	Occasional
Broad-leaved cattail	*Typha latifolia*	Herb	Riparian	Infrequent
Canotia	*Canotia holacantha*	Shrub	Scrub-shrub	Occasional
Charlock	*Brassica kaber*	Herb	Riparian, Scrub-shrub	Occasional
Common sunflower	*Helianthus annuus*	Herb	Scrub-shrub	Occasional
Coulter globe mallow	*Sphaeralcea coulteri*	Herb	Scrub-shrub	Infrequent
Cowpen daisy	*Verbesina encelioides*	Herb	Scrub-shrub	Infrequent
Creosote bush	*Larrea tridentata*	Shrub	Scrub-shrub	Dominant
Deer vetch	*Lotus humistratus*	Herb	Riparian	Infrequent
Desert broom	*Baccharis sarathroides*	Shrub	Riparian Scrub-shrub	Dominant Occasional
Filaree	*Erodium cicutarium*	Herb	Riparian	Occasional
Flatsedge	*Cyperus* sp.	Sedge	Riparian	Infrequent
Fleabane	*Erigeron* sp.	Herb	Scrub-shrub	Infrequent

M-1. Plant Species Observed on Williams AFB, June 1 - 5, 1992
Page 2 of 3

Common Name	Scientific Name	Form	Habitat	Occurrence
Goldenrod	*Solidago* sp.	Herb	Riparian	Infrequent
Green bristlegrass	*Setaria viridis*	Grass	Riparian	Infrequent
Isocoma	*Isocoma acradenia*	Shrub	Riparian Scrub-shrub	Dominant Occasional
Johnson grass	*Sorghum halapense*	Grass	Scrub-shrub	Infrequent
Mexican palo verde	*Parkinsonia aculeata*	Shrub	Scrub-shrub	Infrequent
Mustard	*Brassica* sp.	Herb	Scrub-shrub	Infrequent
Polygonum	*Polygonum* sp.	Herb	Riparian	Scattered
Red brome	*Bromus rubens*	Grass	Riparian Scrub-shrub	Dominant Occasional
Russian thistle	*Salsola iberica*	Herb	Scrub-shrub	Occasional
Sacred datura	*Datura meteloides*	Herb	Scrub-shrub	Infrequent
Salt cedar	*Tamarix pentandra*	Shrub	Riparian	Infrequent
Saltbush	*Atriplex* sp.	Shrub	Scrub-shrub Riparian	Dominant Occasional
Schismus	*Schismus* sp.	Grass	Mowed	Dominant
Silverleaf nightshade	*Solanum elaeagnifolium*	Herb	Riparian	Infrequent
Thistle	*Cirsium neomexicanum*	Herb	Scrub-shrub, riparian	Occasional
Twist flower	*Streptanthus arizonicus*	Herb	Riparian	Infrequent
Mesquite	*Prosopis* sp.	Tree	Riparian Scrub-shrub	Dominant Occasional

M-1. Plant Species Observed on Williams AFB, June 1 - 5, 1992
Page 3 of 3

Common Name	Scientific Name	Form	Habitat	Occurrence
Western ragweed	*Ambrosia psilostachya*	Herb	Riparian Mowed	Dominant Dominant in ditches
White-flowered gilia	*Ipomopsis longiflora*	Herb	Scrub-shrub	Infrequent
Wild heliotrope	*Phacelia distans*	Herb	Scrub-shrub	Infrequent
Wolfberry	*Lycium* sp.	Shrub	Scrub-shrub	Occasional

Source for scientific and common names: Lehr, J. H., 1978. A Catalogue of the Flora of Arizona, Phoenix, AZ: Desert Botanical Gardens.

Table M-2. Mammal Species Which May Occur On or In the Vicinity of Williams AFB
Page 1 of 2

Common Name	Scientific Name	Habitat
Badger	*Taxidea taxus*	Open grassland, desert
Big freetail bat	*Tadarida molossa*	Buildings, caves
Big brown bat	*Eptesicus fuscus*	Caves, buildings
Black-tailed jackrabbit*	*Lepus californicus*	Open prairies and sparsely vegetated areas
Brush mouse	*Peromyscus boylei*	Arid and semi-arid country
Cactus mouse	*Peromyscus eremicus*	Low deserts with sandy soils
California myotis	*Myotis californicus*	Loose rocks, buildings
Coyote*	*Canis latrans*	Prairies, brushy or boulder-strewn areas
Deer Mouse	*Peromyscus maniculatus*	Dry land habitats
Desert cottontail*	*Sylvilagus auduboni*	Open plains, grass
Desert kangaroo rat	*Dipodomys deserti*	Low desert areas, sandy areas with sparse vegetation
Fringed myotis	*Myotis thysanodes*	Caves, buildings
Gray shrew	*Sorex crawfordi*	Arid areas
Hispid cotton rat*	*Sigmodon hispidus*	Tall grass, moist areas (golf courses)
Javelina*	*Pecari angulatus*	Semi-desert, mesquite
Kit fox	*Vulpes macrotis*	Open level sandy areas, low desert
Little brown myotis	*Myotis lucifugus*	Caves, buildings
Long-legged myotis	*Myotis volans*	Buildings, rock ledges
Merriam shrew	*Sorex merriami*	Arid areas
Mexican freetail bat	*Tadarida brasiliensis*	Buildings, caves
Mule deer	*Odocoileus hemionus*	Desert shrub
Ord kangaroo rat*	*Dipodomys ordi*	Sandy soils
Pallid bat	*Antrozous pallidus*	Buildings, caves
Pronghorn	*Antilocapra americana*	Open prairies
Rock squirrel	*Citellus variegatus*	Rocky canyons and boulder-strewn slopes

Table M-2. Mammal Species Which May Occur On or In the Vicinity of Williams AFB
Page 2 of 2

Common Name	Scientific Name	Habitat
Round-tailed ground squirrel	*Citellus tereticaudus*	Low desert, mesquite, creosote bush
Silky pocket mouse	*Perognathus flavus*	Shortgrass prairie
Southern grasshopper mouse	*Onchyomys torridus*	Open country, sandy soils
Spotted skunk	*Spilogale putoris*	Prairies, brushy areas
Spotted bat	*Euderma maculata*	Arid country
Striped skunk	*Mephitis mephitis*	Semi-open country
Valley pocket gopher*	*Thomomys bottae*	Sandy or rocky areas, low valleys
Western harvest mouse	*Reithrodontomys megalotis*	Grassland, open desert, weed patches
Western big-eared bat	*Plecotus townsendi*	Caves, buildings
White throat woodrat	*Neotoma albigula*	Brushland and rocky cliffs

*Observed on-base.

Table M-3. Bird Species Which May Occur On or In the Vicinity of Williams AFB
Page 1 of 3

Common Name	Scientific Name	Season W	S	M	Habitat
Albert's towhee*	*Pipilo aberti*	X	X	X	SS,RP
American kestrel	*Falco sparvenius*	X	X	X	UG,LS
Ash-throated flycatcher	*Myiarchus cinerascens*		X	X	SS,RP
Barn owl	*Tyto alba*	X	X	X	LS,UG
Bendire's thrasher	*Toxostoma bendirei*		X		SS
Black-chinned hummingbird*	*Archilochus alexandri*		X		LS,UG,RP
Black-necked stilt*	*Himantopus mexicanus*			X	OW,WT
Black-throated sparrow*	*Amphispiza bilineata*		X	X	SS
Brown-headed cowbird*	*Molothrus ater*	X	X	X	LS,RP,UG
Bufflehead	*Bucephala albeola*	X			OW,WT
Burrowing owl*	*Athene cunicularia*		X	X	UG
Cactus wren*	*Campylorhynchus brunneicapillus*	X	X	X	SS
Canada goose	*Branta canadensis*	X		X	OW,WT,UG
Cedar waxwing	*Bombycilla cedrorum*	X			RP,LS
Cliff swallow*	*Hirundo pyrrhonota*		X		RP,LS
Costa's hummingbird	*Calypte costae*		X		LS,UG,RP
Curve-billed thrasher*	*Toxostoma curvirostre*	X	X	X	SS
Eastern meadowlark	*Sturnella magna*	X	X	X	UG
Ferruginous hawk	*Buteo regalis*	X		X	UG
Gadwall	*Anas Strepera*	X			OW,WT
Gambel's quail*	*Callipepla gambelli*	X	X	X	UG,RP
Gila woodpecker	*Melanerpes uropygialis*	X	X	X	RP
Golden eagle	*Aquila chrysaetos*	X	X	X	UG (Foraging)
Great horned owl*	*Bubo virginianus*	X	X	X	RP,LS,UG
Great-tailed grackle*	*Quiscalus mexicanus*		X		LS
Greater roadrunner*	*Geococcyx californianus*	X	X	X	UG
Green-winged teal	*Anas crecca*	X			OW,WT
Ground dove	*Columbina passerina*	X	X	X	UG,RP,LS

Table M-3. Bird Species Which May Occur On or In the Vicinity of Williams AFB
Page 2 of 3

Common Name	Scientific Name	Season W	Season S	Season M	Habitat
Harris' hawk*	*Parabuteo unicinctus*	X	X	X	RP,SS
Horned lark*	*Eremophila alpestris*	X	X	X	LS,UG
House sparrow*	*Passer domesticus*	X	X	X	LS
House finch*	*Carpodacus mexicanus*	X	X	X	LS,RP
Inca dove*	*Columbina inca*	X	X	X	LS
Killdeer*	*Charadrius vociferus*	X	X	X	WT,UG,LS
Ladder-backed woodpecker	*Picoides scalaris*	X	X	X	RP
Lesser scaup	*Aythya affinis*	X			OW,WT
Lesser nighthawk*	*Chordeiles acutipennis*		X		RP,UG,WT
Loggerhead shrike*	*Lanius ludovicianus*	X	X	X	RP,UG
Mallard*	*Anas platyrhynchos*	X	X	X	LS,OW,WT
Mockingbird*	*Mimus polyglottos*	X	X	X	LS
Mourning dove*	*Zenaida macroura*		X		LS,UG,RP
Northern shoveler	*Anas clypeata*	X			OW,WT
Northern pintail	*Anas acuta*	X			OW,WT,LS
Pied-billed grebe	*Podilymbus podiceps*		X	X	OW
Prairie falcon	*Falco mexicanus*	X	X	X	UG
Pyrrhuloxia*	*Cardinalis sinuatus*	X	X	X	SS
Red-tailed hawk*	*Buteo jamaicensis*	X	X	X	UG
Red-winged blackbird*	*Agelaius phoeniceus*		X		WT,UG,RP
Redhead	*Aythya americana*			X	OW,WT
Rock dove*	*Columba liva*	X	X	X	LS
Ruddy duck	*Oxyura jamaicensis*	X		X	OW,WT
Sage thrasher	*Oreoscoptes montanus*	X			SS
Sandhill crane	*Grus canadensis*	X		X	LS,RP,UG
Say's phoebe*	*Sayornis saya*	X	X	X	UG,RP,LS
Snow goose	*Chen caerulescens*			X	OW,WT
Spotted sandpiper	*Actitis macularia*	X		X	WT,RP

Table M-3. Bird Species Which May Occur On or In the Vicinity of Williams AFB
Page 3 of 3

Common Name	Scientific Name	Season W	Season S	Season M	Habitat
Starling*	*Sturnus vulgaris*	X	X	X	LS
Swainson's hawk	*Buteo swainsoni*		X		UG
Turkey vulture*	*Cathartes aura*		X	X	UG
Verdin*	*Auriparus flaviceps*	X	X	X	SS,UG
Vermilion flycatcher	*Pyrocephalus rubinus*	X	X	X	RP,UG,SS
Western meadowlark*	*Sturnella neglecta*	X	X	X	UG
Western kingbird*	*Tyrannus verticalis*		X		UG,LS,RP
White winged dove*	*Zenaida asiatica*		X	X	RP,SS
White-crowned sparrow	*Zonotrichia leucophrys*	X			SS,RP

Notes: *Observed on-base during field investigation.
W = Winter
S = Summer
M = Migrant
OW = Open Water
WT = Wetland
RP = Riparian
LS = Landscaped
UG = Upland Grassland (Mowed/Maintained)
SS = Scrub-Shrub

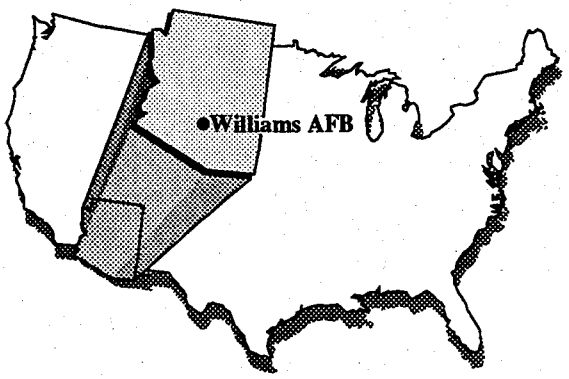
Table M-4. Reptiles and Amphibians Which May Occur On or In the Vicinity of Williams AFB
Page 1 of 2

Common Name	Scientific Name	Habitat
Bullfrog*	*Rana catesbeiana*	Desert oases, lakes, ponds
Chuckwalla	*Sauromalus obesus*	Rocky crevices, deserts
Coachwhip	*Masticophis flagellum*	Desert, scrubland
Collared lizard*	*Crotaphytus collaris*	Rock dwelling, sparsely vegetated areas
Colorado River toad*	*Bufo alvarius*	Mesquite-creosote bush
Common kingsnake	*Lampropeltis getulus*	Desert prairie
Couch spadefoot*	*Scaphiopus couchii*	Mesquite, creosote
Desert horned lizard	*Phrynosoma platyrhinos*	Arid areas, washes
Desert tortoise	*Gopherus agassizii*	Desert oases, washes
Desert spiny lizard*	*Sceloporus magister*	Arid regions, creosote
Glossy snake	*Arizona elegans*	Desert, grassland
Gopher snake	*Pituophis melanoleucus*	Desert, grassland
Great Plains toad*	*Bufo cognatus*	Prairies, deserts, temporary ponds
Large spotted lizard	*Gambelia wislizenii*	Creosote bush, semi-arid
Leopard frog*	*Rana pipiens*	Grassland, ponds
Lesser earless lizard	*Holbrookia maculata*	Mesquite, washes
Long tailed bush snake	*Urosaurus graciosus*	Loose sand, mesquite, creosote
Lyre snake	*Trimorphodon biscutatus*	Rock areas, creosote
Many-lined skink	*Eumeces multivirgatus*	Creosote bush, desert
Mojave rattlesnake*	*Crotalus scutulatus*	Upland desert
Night snake	*Hypsiglena torquata*	Grassland, deserts
Red-spotted toad*	*Bufo punctatus*	Desert streams and oases, grassland
Regal horned lizard	*Phrynosoma solare*	Gravelly arid areas
Side-blotched lizard	*Uta stansburiana*	Arid and semi-arid areas
Sidewinder	*Crotalus cerastes*	Creosote bush, desert
Speckled rattlesnake	*Crotalus mitchellii*	Creosote bush, desert scrub
Spotted leaf-nosed snake	*Phyllorhynchus decurtatus*	Sandy and gravelly desert

Table M-4. Reptiles and Amphibians Which May Occur On or In the Vicinity of Williams AFB
Page 2 of 2

Common Name	Scientific Name	Habitat
Subspieces of the Western whiptail*	*Cnemidophorus tigris*	Deserts, semi-arid areas
Tree lizard	*Urosaurus ornatus*	Mesquite
Western shovel-nosed snake	*Chionactis occipitalis*	Desert, rock areas
Western coral snake	*Micruroides euryxanthus*	Desert brushland
Western blind snake	*Leptotyphlops humilis*	Desert, rocky hillsides
Western patch-nosed snake	*Salvadora hexalepis*	Desert scrub, grassland
Western diamondback rattlesnake	*Crotalus atrox*	Arid and semi-arid areas
Western banded gecko	*Coleonyx variegatus*	Creosote bush, rocky crevices
Woodhouse's toad*	*Bufo woodhousei*	Grassland, desert streams, irrigation ditches
Zebra-tailed lizard*	*Callisaurus draconoides*	Washes, rocky areas

*Observed on-base.



APPENDIX N

APPENDIX N

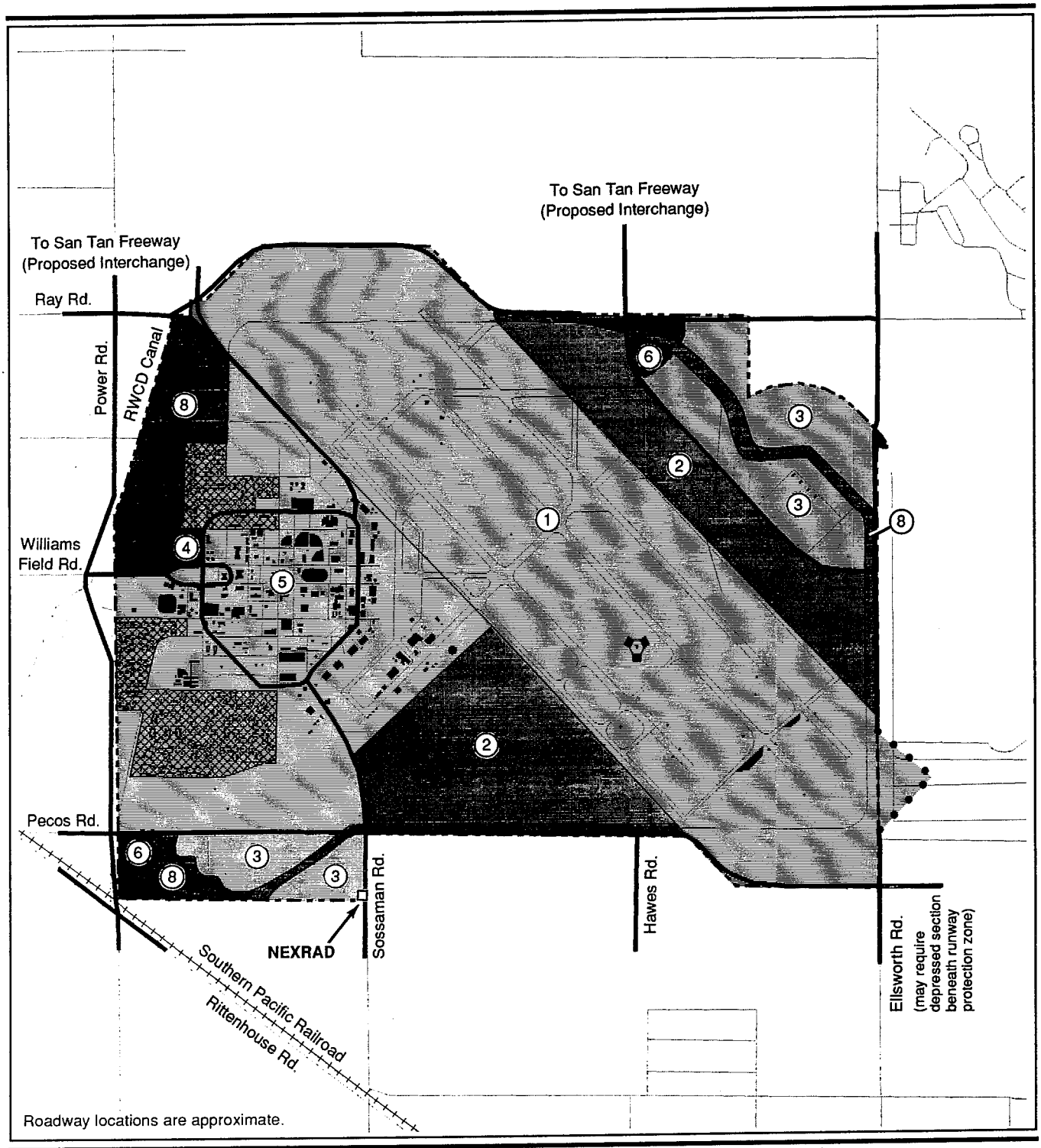
ENVIRONMENTAL IMPACTS OF WILLIAMS AFB REUSE BY LAND USE CATEGORY

The purpose of this appendix is to quantify the environmental impacts of each land use category identified for the four alternatives, including the Proposed Action, evaluated in this environmental impact statement (EIS) (Figures N-1 through N-4). The data in Tables N-1 through N-17 present the impacts of individual land use activities, such as industrial, commercial, or institutional, on their respective region of influence as well as compare the impacts of the Proposed Action and alternatives for three benchmark years, 1998, 2003, and 2013, where applicable.

Tables N-1 through N-4 present data on the influencing factors (factors that drive environmental impacts); Tables N-5 through N-17 list the impacts on individual environmental resources evaluated in the EIS. These resources include transportation, utilities, hazardous materials and hazardous waste management, soils and geology, air quality, noise, biological resources, and cultural resources. Included in this appendix is at least one table for each resource area, except water resources. Data on water demand are presented as part of the utilities analysis; the effects on surface and groundwater resources in and around the base have not been quantified in the EIS and have not been disaggregated in this appendix.

No quantification is provided in Table N-11 because the quantities of hazardous materials used and hazardous wastes generated will depend on the type and intensity of industrial and commercial activities developed on the site. Table N-11 presents a generalized description of the hazardous materials used under individual land use categories. Table N-12 summarizes the number of Installation Restoration Program (IRP) sites identified on the base as of 1992 but does not give the likely status of these sites in 1998, 2003, and 2013. It is expected that most of the sites will be remediated by the first benchmark year, 1998.

A number of factors and assumptions were used in desegregating the total impacts of an alternative to individual land use categories. These are presented as footnotes on the relevant tables.



EXPLANATION

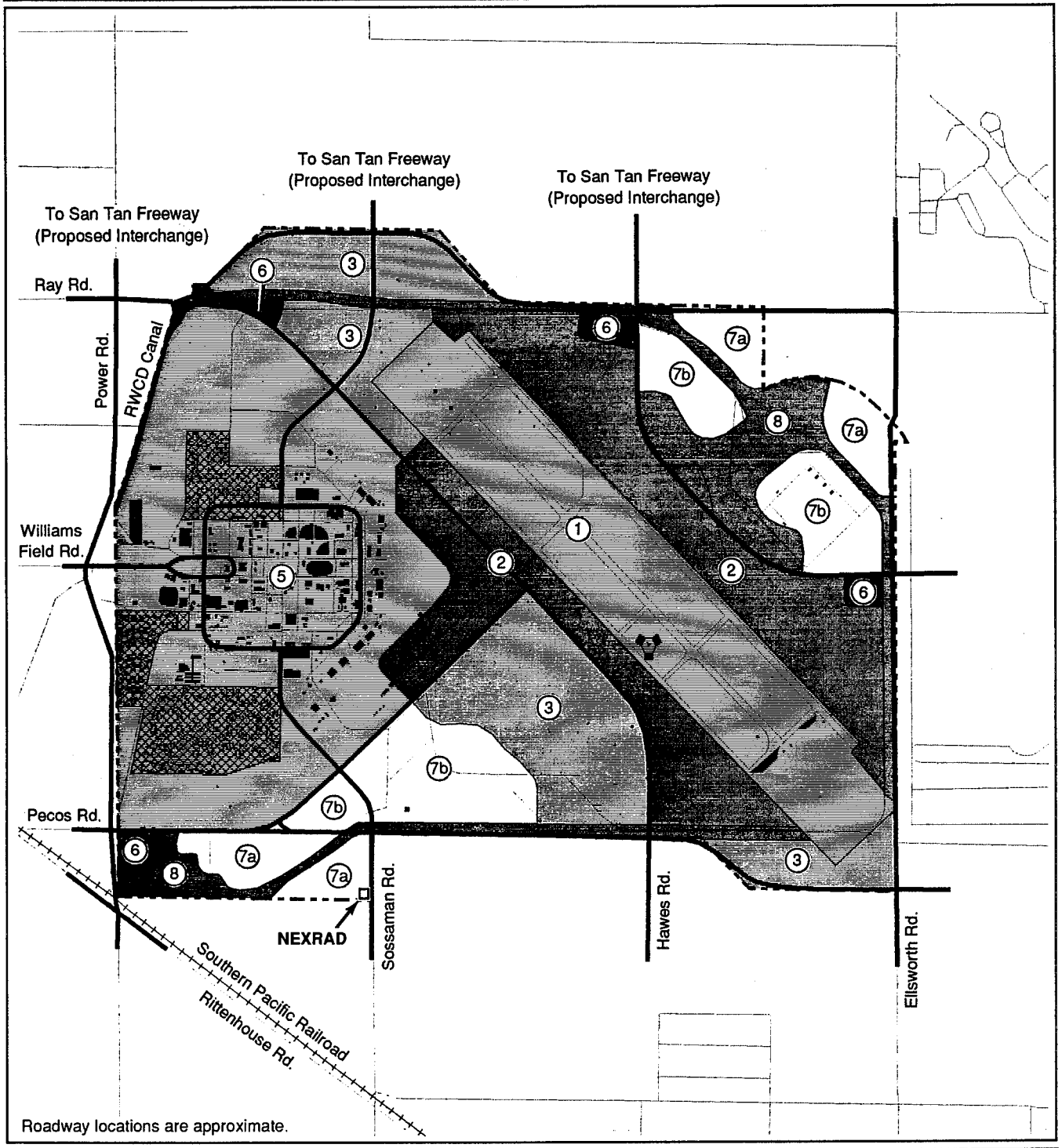
- (1) Airfield - 1,675 ac.
- (2) Aviation Support - 633 ac.
- (3) Industrial - 358 ac.
- (4) Institutional (Medical) - 11ac.
- (5) Institutional (Education) - 1,013 ac.
- (6) Commercial - 40 ac.
- (7) Residential *
- (8) Public/Recreation - 312 ac.
- (9) Agriculture *
- (10) Vacant Land *
- (11) Military Land *
- Campus Residential Housing
- Willie VORTAC
- Base Boundary
- Off-Base Extension

0 750 1500 3000 Feet

* Not Applicable

Land Use Categories – Proposed Action

Figure N-1



EXPLANATION

- (1) Airfield - 611 ac.
- (2) Aviation Support - 729 ac.
- (3) Industrial - 602 ac.
- (4) Institutional (Medical) *
- (5) Institutional (Education) - 1,157 ac.
- (6) Commercial - 50 ac.
- (7) Residential † - 531 ac.
- (8) Public/Recreation - 362 ac.
- (9) Agriculture *
- (10) Vacant Land *
- (11) Military Land *
- Campus Residential Housing
- Willie VORTAC
- Base Boundary
- Off-Base Extension *

0 750 1500 3000 Feet

* Not Applicable
† 7a - Medium Density; 7b - High Density

Land Use Categories – General Aviation and Education Alternative

Figure N-2

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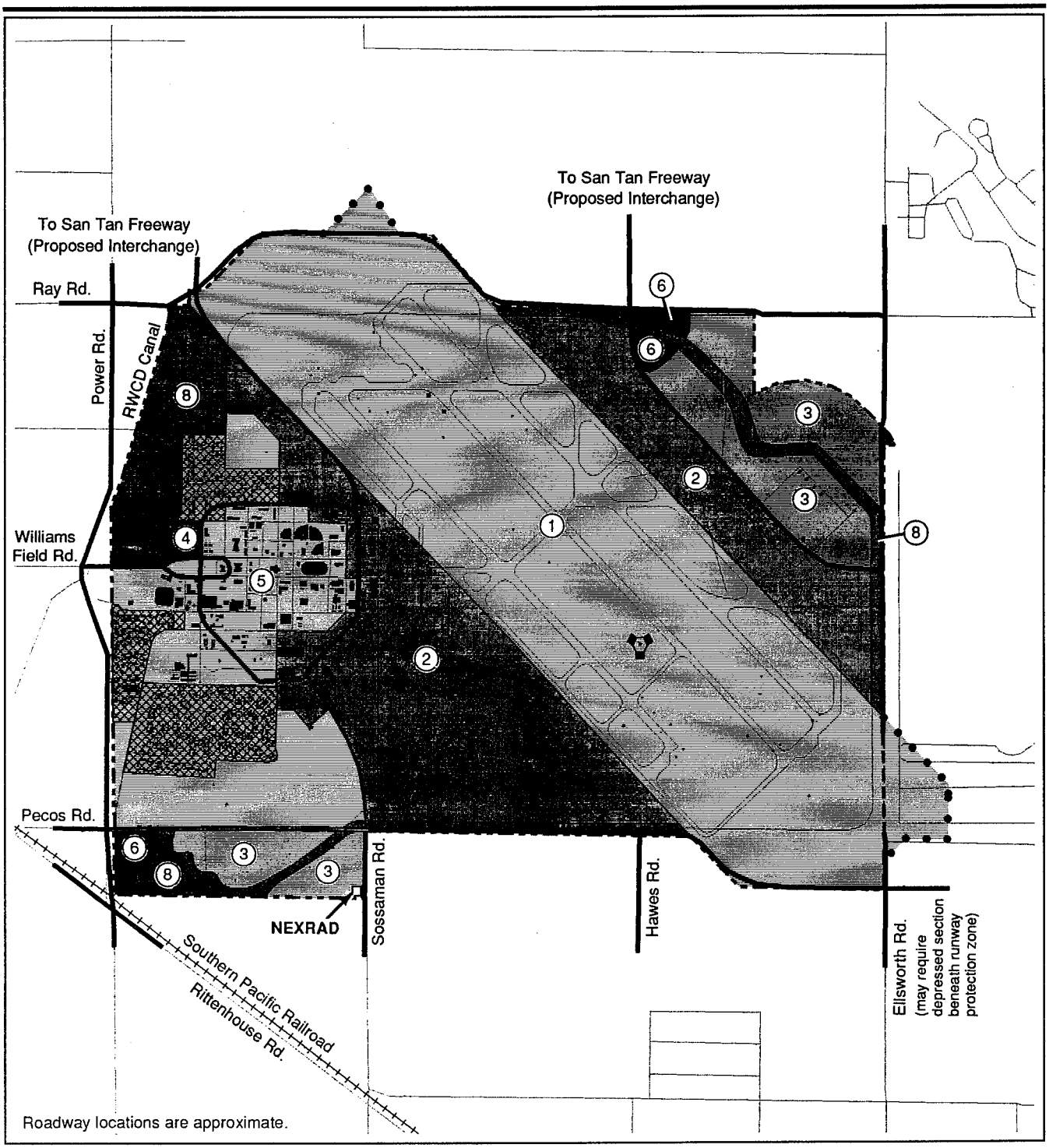

EXPLANATION

- (1) Airfield - 1,675 ac.
- (2) Aviation Support - 962 ac.
- (3) Industrial - 358 ac.
- (4) Institutional (Medical) - 11 ac.
- (5) Institutional (Education) - 480 ac.
- (6) Commercial - 40 ac.
- (7) Residential *
- (8) Public/Recreation - 312 ac.
- (9) Agriculture *
- (10) Vacant Land *
- (11) Military Land *
- Campus Residential Housing
- Willie VORTAC
- Base Boundary
- Off-Base Extension

0 750 1500 3000 Feet

* Not Applicable

Land Use Categories – Commercial Aviation and Education Alternative

Figure N-3

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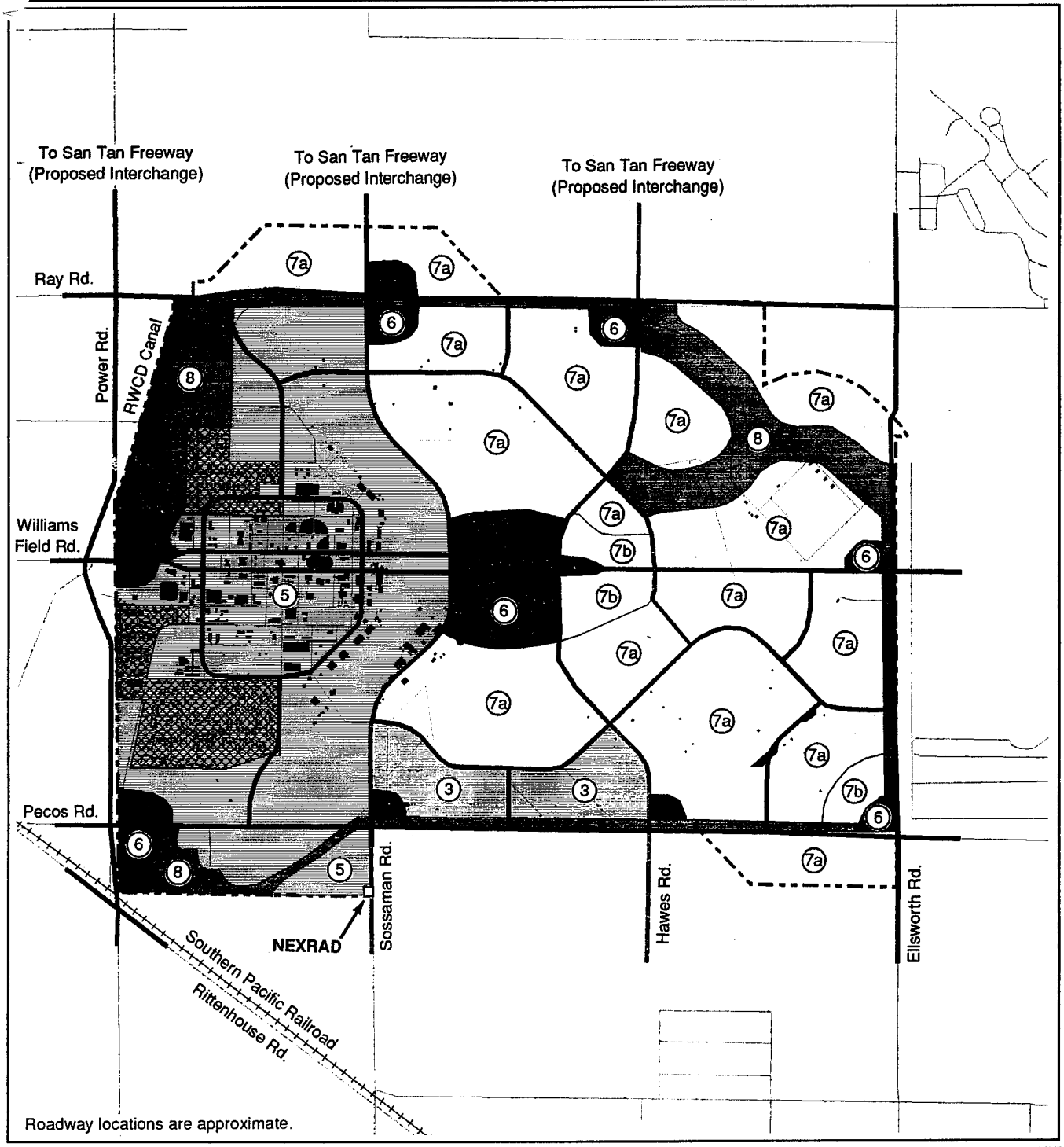

EXPLANATION

- (1) Airfield *
- (2) Aviation Support *
- (3) Industrial - 162 ac.
- (4) Institutional (Medical) *
- (5) Institutional (Education) - 1,225 ac.
- (6) Commercial - 261 ac.
- (7) Residential † - 1,874 ac.
- (8) Public/Recreation - 520 ac.
- (9) Agriculture *
- (10) Vacant Land *
- (11) Military Land *
- Campus Residential Housing
- Willie VORTAC *
- Base Boundary
- Off-Base Extension *

0 750 1500 3000 Feet

* Not Applicable
† 7a - Medium Density; 7b - High Density

Land Use Categories – Education and Planned Community Alternative

Figure N-4

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Table N-1
Direct Employment by Land Use Category, Williams AFB Reuse

	1998				2003				2013			
Land Use Category	**P.A.**	**Alt. 1**	**Alt. 2**	**Alt. 3**	**P.A.**	**Alt. 1**	**Alt. 2**	**Alt. 3**	**P.A.**	**Alt. 1**	**Alt. 2**	**Alt. 3**
Airfield	0	0	0	0	0	0	0	0	0	0	0	0
Aviation Support	2,716	1,972	2,857	0	4,576	4,185	5,951	0	10,454	8,822	12,002	0
Industrial	734	1,224	734	799	1,638	2,744	1,638	1,794	3,449	5,788	3,449	3,787
Institutional (Medical/ Education)	739	530	330	115	1,371	1,163	449	231	4,032	3,824	3,006	2,789
Commercial	48	59	48	564	261	327	261	1,969	687	863	686	4,778
Residential	0	278	0	811	0	304	0	1,001	0	131	0	138
Public/Recreation	10	0	10	10	10	0	10	10	10	0	10	10
Vacant Land	0	0	0	0	0	0	0	0	0	0	0	0
Total:	**4,247**	**4,063**	**3,979**	**2,299**	**7,856**	**8,723**	**8,309**	**5,005**	**18,632**	**19,428**	**19,153**	**11,502**

Notes: P.A. = Proposed Action.
Alt. 1 = General Aviation and Education Alternative.
Alt. 2 = Commercial Aviation and Education Alternative.
Alt. 3 = Education and Planned Community Alternative.

Table N-2
Total Employment* by Land Use Category, Williams AFB Reuse

	1998				2003				2013			
Land Use Category	**P.A.**	**Alt. 1**	**Alt. 2**	**Alt. 3**	**P.A.**	**Alt. 1**	**Alt. 2**	**Alt. 3**	**P.A.**	**Alt. 1**	**Alt. 2**	**Alt. 3**
Airfield	0	0	0	0	0	0	0	0	0	0	0	0
Aviation Support	6,861	5,295	7,292	0	11,810	11,330	14,594	0	26,826	23,912	30,160	0
Industrial	1,899	3,170	1,899	1,247	4,245	7,114	4,245	2,795	8,942	15,009	8,942	5,894
Institutional (Medical/ Education)	1,366	1,016	593	234	2,242	1,892	745	379	6,408	6,059	4,766	4,400
Commercial	87	101	87	1,067	437	525	437	3,290	1,139	1,375	1,137	7,736
Residential	0	771	0	2,251	0	844	0	2,776	0	363	0	385
Public/Recreation	16	0	16	16	16	0	16	16	16	0	16	16
Vacant Land	0	0	0	0	0	0	0	0	0	0	0	0
Total:	**10,229**	**10,353**	**9,887**	**4,815**	**18,750**	**21,705**	**20,037**	**9,256**	**43,331**	**46,718**	**45,021**	**18,431**

Notes: *Total employment includes direct and secondary employment.
P.A. = Proposed Action.
Alt. 1 = General Aviation and Education Alternative.
Alt. 2 = Commercial Aviation and Education Alternative.
Alt. 3 = Education and Planned Community Alternative.

Table N-3
Population Inmigration by Land Use Category, Williams AFB Reuse

	1998				2003				2013			
Land Use Category	**P.A.**	**Alt. 1**	**Alt. 2**	**Alt. 3**	**P.A.**	**Alt. 1**	**Alt. 2**	**Alt. 3**	**P.A.**	**Alt. 1**	**Alt. 2**	**Alt. 3**
Airfield	0	0	0	0	0	0	0	0	0	0	0	0
Aviation Support	7,144	5,442	7,605	0	12,299	12,078	15,368	0	28,020	25,534	31,648	0
Industrial	1,968	3,284	1,979	1,406	4,416	7,635	4,430	3,174	9,326	16,144	9,339	6,720
Institutional (Medical/ Education)	1,491	1,100	650	242	2,530	2,205	841	426	7,287	7,110	5,430	5,002
Commercial	95	111	95	1,087	490	612	491	3,612	1,281	1,609	1,282	8,675
Residential	0	723	0	2,096	0	819	0	2,602	0	353	0	362
Public/Recreation	18	0	18	18	18	0	18	18	18	0	18	18
Vacant Land	0	0	0	0	0	0	0	0	0	0	0	0
Total:	**10,716**	**10,660**	**10,347**	**4,849**	**19,753**	**23,349**	**21,148**	**9,832**	**45,932**	**50,750**	**47,717**	**20,777**

Notes: P.A. = Proposed Action.
Alt. 1 = General Aviation and Education Alternative.
Alt. 2 = Commercial Aviation and Education Alternative.
Alt. 3 = Education and Planned Community Alternative.

Table N-4
Land Use Impacts* by Land Use Category, Williams AFB Reuse
(acres)

	1998				2003				2013			
Land Use Category	P.A.	Alt. 1	Alt. 2	Alt. 3	P.A.	Alt. 1	Alt. 2	Alt. 3	P.A.	Alt. 1	Alt. 2	Alt. 3
Airfield	1,675	611	1,675	0	1,675	611	1,675	0	1,675	611	1,675	0
Aviation Support	213	115	447	0	282	215	531	0	420	416	699	0
Industrial	40	68	40	18	92	155	92	41	196	330	196	88
Institutional (Medical/ Education)	515	469	308	304	515	469	308	304	738	767	531	527
Commercial	2	2	2	12	11	13	11	70	29	35	29	186
Residential	0	245	0	800	0	445	0	1,783	0	531	0	1,874
Public/Recreation	312	362	312	520	312	362	312	520	312	362	312	520
Vacant Land	1,285	2,170	1,258	2,388	1,155	1,772	1,113	1,324	672	990	600	847
Total:	**4,042**	**4,042**	**4,042**	**4,042**	**4,042**	**4,042**	**4,042**	**4,042**	**4,042**	**4,042**	**4,042**	**4,042**

Notes: *Different absorption rates have been assumed for each land use category.
P.A. = Proposed Action.
Alt. 1 = General Aviation and Education Alternative.
Alt. 2 = Commercial Aviation and Education Alternative.
Alt. 3 = Education and Planned Community Alternative.

Table N-5
Transportation Impacts by Land Use Category, Williams AFB Reuse
(average daily trips)

	1998				2003				2013			
Land Use Category	**P.A.**	**Alt. 1**	**Alt. 2**	**Alt. 3**	**P.A.**	**Alt. 1**	**Alt. 2**	**Alt. 3**	**P.A.**	**Alt. 1**	**Alt. 2**	**Alt. 3**
Airfield	11,549	0	0	0	16,241	0	0	0	53,734	0	0	0
Aviation Support[1]	5,476	5,813	15,965	0	10,095	12,539	40,691	0	19,387	26,459	91,264	0
Industrial[2]	2,186	2,186	2,186	2,402	4,916	8,245	4,916	5,407	10,385	17,438	10,385	11,426
Institutional (Medical[3]/ Education)[4]	4,140	3,219[8]	4,510	781	10,362	9,441[8]	6,428	2,109	34,648	33,727[8]	42,469	25,464
Commercial[5]	812	1,360	812	7,568	4,755	8,060	4,755	47,693	12,660	21,425	12,660	112,942
Residential[6]	0	6,351	0	16,439	0	16,109	0	35,409	0	19,941	0	39,767
Public/Recreation[7]	206	0	206	206	206	0	206	206	206	0	206	206
Vacant Land	0	0	0	0	0	0	0	0	0	0	0	0
Total:	**24,369**	**18,929**	**23,679**	**27,396**	**46,575**	**54,394**	**56,996**	**90,824**	**131,020**	**118,990**	**156,984**	**189,805**

Notes: P.A. = Proposed Action.
Alt. 1 = General Aviation and Education Alternative.
Alt. 2 = Commercial Aviation and Education Alternative.
Alt. 3 = Education and Planned Community Alternative.

[1] Aviation Support land use category includes 3.02 daily trips per employee.
[2] Industrial land use category includes 3.02 daily trips per employee.
[3] Institutional (Medical) land use category includes 5.17 daily trips per medical employee.
[4] Institutional (Education) land use category includes 9.13 daily trips per college employee and 2.67 daily trips per laboratory employee.
[5] Commercial land use category includes 25 daily trips per employee.
[6] Residential land use category includes 7.44 daily trips per dwelling unit.
[7] Public/Recreation land use category includes 20.63 daily trips per golf course employee.
[8] Under this alternative, the Institutional (Education) land use category includes the golf course.

Table N-6
Water Demand* by Land Use Category, Williams AFB Reuse
(million gallons per day)

	1998				2003				2013			
Land Use Category	**P.A.**	**Alt. 1**	**Alt. 2**	**Alt. 3**	**P.A.**	**Alt. 1**	**Alt. 2**	**Alt. 3**	**P.A.**	**Alt. 1**	**Alt. 2**	**Alt. 3**
Airfield	0	0	0	0	0	0	0	0	0	0	0	0
Aviation Support	0.652	0.497	0.648	0	1.123	1.103	1.338	0	2.559	2.331	2.815	0
Industrial	0.180	0.300	0.169	0.128	0.403	0.697	0.385	0.290	0.851	1.474	0.830	0.614
Institutional (Medical/ Education)	0.136	0.101	0.055	0.022	0.231	0.202	0.073	0.039	0.665	0.650	0.483	0.457
Commercial	0.009	0.010	0.008	0.099	0.045	0.056	0.043	0.330	0.117	0.147	0.114	0.792
Residential	0	0.066	0	0.191	0	0.075	0	0.237	0	0.032	0	0.033
Public/Recreation	0.002	0	0.002	0.002	0.002	0	0.002	0.002	0.002	0	0.002	0.002
Vacant Land	0	0	0	0	0	0	0	0	0	0	0	0
Total:	**0.979**	**0.974**	**0.882**	**0.442**	**1.804**	**2.133**	**1.841**	**0.898**	**4.194**	**4.635**	**4.244**	**1.898**

Notes: * Water demand is based on per capita requirements of inmigrant population.
P.A. = Proposed Action.
Alt. 1 = General Aviation and Education Alternative.
Alt. 2 = Commercial Aviation and Education Alternative.
Alt. 3 = Education and Planned Community Alternative.

Sources: Borrego, J., 1992. Personal communication/fax from Jacqi Borrego, Salt River Project Electric, Corporate Economics and Forecasting, to Todd C. Miller. Halliburton NUS, August 11.
Cattanach, J., 1992. Personal communication/fax from Jamie Cattanach, Southwest Gas Corporation, Las Vegas, Nevada, to Todd C. Miller, Halliburton NUS, August 19.
Maricopa Association of Governments, 1991. Regional Waste Stream Study, May.
Maricopa Association of Governments, 1991. Update of the Population and Socioeconomic Database for Maricopa County, Arizona, revised February.

Table N-7
Wastewater Generation* by Land Use Category, Williams AFB Reuse
(million gallons per day)

	1998				2003				2013			
Land Use Category	**P.A.**	**Alt. 1**	**Alt. 2**	**Alt. 3**	**P.A.**	**Alt. 1**	**Alt. 2**	**Alt. 3**	**P.A.**	**Alt. 1**	**Alt. 2**	**Alt. 3**
Airfield	0	0	0	0	0	0	0	0	0	0	0	0
Aviation Support	0.283	0.216	0.282	0	0.488	0.479	0.581	0	1.112	1.013	1.223	0
Industrial	0.078	0.130	0.073	0.056	0.175	0.303	0.168	0.126	0.370	0.641	0.361	0.267
Institutional (Medical/ Education)	0.059	0.044	0.024	0.010	0.100	0.088	0.032	0.017	0.289	0.282	0.210	0.199
Commercial	0.004	0.004	0.003	0.043	0.019	0.024	0.018	0.143	0.051	0.064	0.050	0.344
Residential	0	0.029	0	0.083	0	0.033	0	0.103	0	0.014	0	0.014
Public/Recreation	0.001	0	0.001	0.001	0.001	0	0.001	0.001	0.001	0	0.001	0.001
Vacant Land	0	0	0	0	0	0	0	0	0	0	0	0
Total:	**0.425**	**0.423**	**0.383**	**0.193**	**0.783**	**0.927**	**0.800**	**0.390**	**1.823**	**2.014**	**1.845**	**0.825**

Notes: * Wastewater generation is based on per capita generation by inmigrant population.
P.A. = Proposed Action.
Alt. 1 = General Aviation and Education Alternative.
Alt. 2 = Commercial Aviation and Education Alternative.
Alt. 3 = Education and Planned Community Alternative.

Table N-8
Solid Waste Generation* by Land Use Category, Williams AFB Reuse
(tons per year)

	1998				2003				2013			
Land Use Category	**P.A.**	**Alt. 1**	**Alt. 2**	**Alt. 3**	**P.A.**	**Alt. 1**	**Alt. 2**	**Alt. 3**	**P.A.**	**Alt. 1**	**Alt. 2**	**Alt. 3**
Airfield	0	0	0	0	0	0	0	0	0	0	0	0
Aviation Support	8,586	6,541	9,141	0	14,831	14,565	18,533	0	33,684	30,691	38,042	0
Industrial	2,365	3,947	2,379	1,690	5,326	9,208	5,343	3,827	11,208	19,405	11,226	8,077
Institutional (Medical/ Education)	1,793	1,323	781	290	3,052	2,659	1,014	515	8,757	8,552	6,527	6,014
Commercial	115	133	114	1,307	591	738	592	4,355	1,540	1,934	1,541	10,426
Residential	0	869	0	2,520	0	988	0	3,137	0	421	0	435
Public/Recreation	22	0	22	22	21	0	22	23	22	0	21	22
Vacant Land	0	0	0	0	0	0	0	0	0	0	0	0
Total:	**12,881**	**12,813**	**12,437**	**5,829**	**23,821**	**28,158**	**25,504**	**11,857**	**55,211**	**61,003**	**57,357**	**24,974**

Notes: * Solid waste production is based on per capita production by inmigrant population.
P.A. = Proposed Action.
Alt. 1 = General Aviation and Education Alternative.
Alt. 2 = Commercial Aviation and Education Alternative.
Alt. 3 = Education and Planned Community Alternative.

Table N-9
Electricity Demand* by Land Use Category, Williams AFB Reuse
(MWH per day)

	1998				2003				2013			
Land Use Category	P.A.	Alt. 1	Alt. 2	Alt. 3	P.A.	Alt. 1	Alt. 2	Alt. 3	P.A.	Alt. 1	Alt. 2	Alt. 3
Airfield	0	0	0	0	0	0	0	0	0	0	0	0
Aviation Support	127.8	97.4	136.1	0	214.2	210.3	267.6	0	468.8	427.1	529.5	0
Industrial	35.2	58.8	35.4	25.1	76.9	133.0	77.1	55.3	156.0	270.1	156.2	112.4
Institutional (Medical/ Education)	26.7	19.7	11.7	4.3	44.1	38.4	14.7	7.4	121.9	119.0	90.8	83.7
Commercial	1.7	2.0	1.7	19.5	8.5	10.7	8.6	62.9	21.4	26.9	21.5	145.1
Residential	0	12.9	0	37.5	0	14.3	0	45.3	0	5.9	0	6.0
Public/Recreation	0.3	0	0.3	0.3	0.3	0	0.3	0.3	0.3	0	0.3	0.3
Vacant Land	0	0	0	0	0	0	0	0	0	0	0	0
Total:	**191.7**	**190.8**	**185.2**	**86.7**	**344.0**	**406.7**	**368.3**	**171.2**	**768.4**	**849.0**	**798.3**	**347.5**

Notes: * Electricity demand is based on per employee demand on base plus per capita demand by inmigrant population.
P.A. = Proposed Action.
Alt. 1 = General Aviation and Education Alternative.
Alt. 2 = Commercial Aviation and Education Alternative.
Alt. 3 = Education and Planned Community Alternative.

Table N-10
Natural Gas Demand* by Land Use Category, Williams AFB Reuse
(therms per day)

	1998				2003				2013			
Land Use Category	**P.A.**	**Alt. 1**	**Alt. 2**	**Alt. 3**	**P.A.**	**Alt. 1**	**Alt. 2**	**Alt. 3**	**P.A.**	**Alt. 1**	**Alt. 2**	**Alt. 3**
Airfield	0	0	0	0	0	0	0	0	0	0	0	0
Aviation Support	2,824	2,151	3,007	0	4,733	4,649	5,915	0	10,368	9,447	11,710	0
Industrial	778	1,299	783	556	1,699	2,939	1,705	1,223	3,450	5,974	3,455	2,485
Institutional (Medical/ Education)	590	435	257	96	976	848	324	165	2,696	2,632	2,009	1,851
Commercial	38	44	37	430	188	236	189	1,389	474	595	474	3,210
Residential	0	286	0	830	0	316	0	1,001	0	130	0	134
Public/Recreation	7	0	7	7	7	0	7	7	7	0	7	7
Vacant Land	0	0	0	0	0	0	0	0	0	0	0	0
Total:	**4,237**	**4,215**	**4,091**	**1,919**	**7,603**	**8,988**	**8,140**	**3,785**	**16,995**	**18,778**	**17,655**	**7,687**

Notes: * Natural gas demand is based on per capita demand by inmigrant population.
P.A. = Proposed Action.
Alt. 1 = General Aviation and Education Alternative.
Alt. 2 = Commercial Aviation and Education Alternative.
Alt. 3 = Education and Planned Community Alternative.

Table N-11
Hazardous Materials Usage* by Land Use Category, Williams AFB Reuse, 1998-2013

Land Use Category	Proposed Action	General Aviation & Education	Commercial Aviation & Education	Education & Planned Community
Airfield	Aviation fuels, propylene glycol, ethylene glycol, heating oils, motor fuels	Same as Proposed Action	Same as Proposed Action	NA
Aviation Support	Fuels; solvents; paints; petroleum, Soil and lubricants (POL); hydraulic fluids; degreasers; corrosives; heavy metals; reactives; thinners; paints; glycols; ignitables; heating oils; plating waste; cyanides; laboratory waste	Same as Proposed Action	Same as Proposed Action	NA
Industrial	Solvents, heavy metals, POL, corrosives, catalysts, aerosols, fuels, heating oils, ignitables, pesticides	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Institutional (Medical/ Education)	Laboratory waste, corrosives, ignitables, solvents, heating oils, lubricants, cleaners, pesticides, paints, thinners, pharmaceuticals, medical biohazardous waste, chemotherapeutic drugs, radiological sources, heavy metals	Same as Proposed Action except for medical usage	Same as Proposed Action	Same as Proposed Action except for medical usage
Commercial	Fuels, solvents, corrosives, POL, ignitables, heating oils, pesticides, dry cleaning wastes	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Residential	NA	Pesticides, fertilizers, fuels, waste oils, chlorine, household wastes	NA	Same as General Aviation & Education Alternative
Public/Recreation	Pesticides, fertilizers, chlorine, heating oils, paints, thinners, cleaners, solvents, aerosols, POL	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action

Notes: * Quantities of hazardous materials used will depend on specific reuse development activities and are not reported here.
NA = Not Applicable.

Table N-12
Number of Installation Restoration Program Sites* by Land Use Category, Williams AFB Reuse

	1992			
Land Use Category	**P.A.**	**Alt. 1**	**Alt. 2**	**Alt. 3**
Airfield	1	0	1	NA
Aviation Support	1	3	7	NA
Industrial	2	0	2	1
Institutional (Medical/Education)	9	7	5	11
Commercial	0	0	0	0
Residential	NA	3	NA	1
Public/Recreation	2	1	2	2
Total:	**15**	**14**	**17**	**15**

Notes: * Summarized above are identified Installation Restoration Program sites as of 1992. There are 14 sites; totals vary because some sites occur in more than one land use category for some alternatives.
The number of sites over the 1992-2013 period would change as remediation measures are implemented for individual sites.
P.A. = Proposed Action.
Alt. 1 = General Aviation and Education Alternative.
Alt. 2 = Commercial Aviation and Education Alternative.
Alt. 3 = Education and Planned Community Alternative.
NA = Not Applicable.

Table N-13
Soils and Geology Impacts* by Land Use Category, Williams AFB Reuse, 1998-2013
(acres of soil disturbed)

Land Use Category	P.A.	Alt. 1	Alt. 2	Alt. 3
Airfield	1,675	611	1,675	0
Aviation Support	420	400	661	0
Industrial	196	330	196	88
Institutional (Medical/Education)	110	110	144	110
Commercial	29	35	29	186
Residential	0	531	0	1,874
Public/Recreation	186	362	186	394
Total:	**2,616**	**2,379**	**2,891**	**2,652**

Notes: * Disturbance of soils would depend upon the construction schedules of various facilities on-base. Therefore, no breakdown is provided for the benchmark years 1998, 2003, and 2013.
P.A. = Proposed Action
Alt. 1 = General Aviation and Education Alternative.
Alt. 2 = Commercial Aviation and Education Alternative.
Alt. 3 = Education and Planned Community Alternative.

Table N-14
Air Quality Impacts by Land Use Category, Williams AFB Reuse*
(total emissions in tons/year)

	1998A				1998B				2003			
Land Use Category	**P.A.**	**Alt. 1**	**Alt. 2**	**Alt. 3**	**P.A.**	**Alt. 1**	**Alt. 2**	**Alt. 3**	**P.A.**	**Alt. 1**	**Alt. 2**	**Alt. 3**
Airfield	295.8	339.5	4,110.5	0.0	263.1	339.5	4,110.5	0.0	335.5	432.5	4,579.4	0.0
Aviation Support	1,178.9	851.8	1,422.6	0.0	1,171.4	851.8	1,422.6	0.0	1,709.9	1,574.5	2,312.0	0.0
Industrial	320.9	515.7	407.4	202.4	319.7	515.7	407.4	202.4	608.7	990.0	664.4	388.1
Institutional (Medical/ Education)	206.5	161.1	86.8	97.3	205.7	161.1	86.8	97.3	214.5	171.7	81.5	35.0
Commercial	11.0	12.2	13.1	138.4	10.8	12.2	13.1	138.4	42.4	48.6	48.1	325.0
Residential	835.1	1,118.9	950.6	1,162.7	830.7	1,118.9	950.6	1,162.7	1,301.7	2,118.1	1,483.3	2,002.8
Public/Recreation	6.0	8.0	6.4	10.5	6.0	8.0	6.4	10.5	1.5	0.0	1.7	1.4
Vacant Land	0.0	0.0	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total:	**2,854.2**	**3,007.1**	**6,997.5**	**1,611.3**	**2,807.3**	**3,007.1**	**6,997.5**	**1,611.3**	**4,214.3**	**5,335.4**	**9,170.3**	**2,752.3**

Notes: * The 1998A and 1998B cases only differ for the Proposed Action.
For 1998A, it is assumed that the Air National Guard would conduct 7,200 aircraft flying operations at the base, including 3,000 touch-and-goes (representing 6,000 operations).
For 1998B, it is assumed that the Air National Guard would conduct 3,000 touch-and-goes only (representing 6,000 operations) at the base.
Due to the uncertainties of the parameters associated with air pollutant emissions, emissions levels are not projected for year 2013.
P.A. = Proposed Action.
Alt. 1 = General Aviation and Education Alternative.
Alt. 2 = Commercial Aviation and Education Alternative.
Alt. 3 = Education and Planned Community Alternative.
Calculation of totals may vary slightly due to rounding.

Table N-15
Expected Noise Levels by Land Use Category, Williams AFB Reuse, 1998-2013
(typical DNL in dB)

Land Use Category	P.A.	Alt. 1	Alt. 2	Alt. 3
Airfield	65-75*	65-75*	65-75*	NA
Aviation Support	65-70*	65-70*	65-75*	NA
Industrial	50-70	50-75*	50-75*	50-70
Institutional (Medical/Education)	50-65	50-65	50-65*	50-65
Commercial	50-70	50-70	50-70*	50-70
Residential	NA	50-65	NA	50-65
Public/Recreation	50-65	50-65	50-75*	50-65

Notes: P.A. = Proposed Action
Alt. 1 = General Aviation and Education Alternative.
Alt. 2 = Commercial Aviation and Education Alternative.
Alt. 3 = Education and Planned Community Alternative.
NA = Not Applicable.
*Outer limit of DNL range influenced by airfield operations.

Table N-16
Biological Resource Impacts by Land Use Category, Williams AFB Reuse, 1998-2013
(acres of habitat disturbed)

Land Use Category	P.A.	Alt. 1	Alt. 2	Alt. 3
Airfield	1,675	625	1,675	NA
Aviation Support	420	410	695	NA
Industrial	195	330	200	90
Institutional (Medical/Education)	730	755	535	530
Commercial	35	35	30	190
Residential	NA	530	NA	1,875
Public/Recreation	310	365	310	520
Total:	**3,365**	**3,050**	**3,445**	**3,205**

Notes: P.A. = Proposed Action
Alt. 1 = General Aviation and Education Alternative.
Alt. 2 = Commercial Aviation and Education Alternative.
Alt. 3 = Education and Planned Community Alternative.
NA = Not Applicable.

Table N-17
Cultural Resources Impacts by Land Use Category, Williams AFB Reuse, 1998-2013

Land Use Category	Proposed Action	General Aviation & Education	Commercial Aviation & Education	Education & Planned Community
Airfield	Potential archaeological sites AZ U:10:25, 10:62, 10:63, 10:64, 10:66, and 10:68.	Potential archaeological site AZ U:10:25.	Potential archaeological sites AZ U:10:25, 10:63, 10:68, 10:66, 10:64, and 10:62.	NA
Aviation Support	Potential archaeological sites AZ U:10:25, 10:60, 10:61, 10:64, 10:65, 10:66, and 10:67.	Potential archaeological sites AZ U:10:25, 10:67, 10:66, 10:64, and 10:61.	Potential archaeological sites AZ U:10:25, 10:67, 10:66, 10:64, 10:65, 10:61, and 10:60. Historic structures may be affected; however, avoidance is possible through maintenance and reuse.	NA
Industrial	Potential archaeological sites AZ U:10:20 and 10:61.	Potential archaeological sites AZ U:10:25, 10:62, 10:60, and 10:68.	Potential archaeological sites AZ U:10:20 and 10:61.	Potential archaeological sites AZ U:10:25 and 10:60.
Institutional (Medical/ Education)	NRHP site AZ U:10:24 and potential archaeological site AZ U:10:20. Historic structures may be affected; however, avoidance is possible through maintenance and reuse except for demolition of buildings 38, 726, 735, 1007, and 1008.	NRHP site AZ U:10:24 and potential archaeological site AZ U:10:63. Historic structures may be affected; however, avoidance is possible through maintenance and reuse except for demolition of buildings 38, 726, 735, 1007, and 1008.	NRHP site AZ U:10:24 and potential archaeological site AZ U:10:20. Historic structures may be affected; however, avoidance is possible through maintenance and reuse except for demolition of buildings 726, 735, 1007, and 1008.	NRHP site AZ U:10:24 and potential archaeological sites AZ U:10:20 and 10:63. Historic structures will be affected; however, avoidance is possible through maintenance and reuse except for demolition of buildings 24, 25, 27, 31, 32, 37, 38, 46, 726, 735, 1007, and 1008.
Commercial	None	Potential archaeological site AZ U:10:67.	None	Potential archaeological sites AZ U:10:25, 10:68, 10:67, and 10:60.
Residential	NA	NRHP site AZ U:10:24 and potential archaeological sites AZ:U:10:20, 10:60, and 10:61.	NA	Potential archaeological sites AZ U:10:25, 10:62, 10:68, 10:67, 10:66, 10:65, 10:64, and 10:61.
Public/ Recreation	Potential archaeological sites AZ U:10:20, 10:60, and 10:25.	Potential archaeological sites AZ U:10:25, 10:60, 10:20, 10:64, 10:65, 10:66, and 10:68.	Potential archaeological sites AZ U:10:20, 10:60, and 10:25.	Potential archaeological sites AZ U:10:20, 10:25, 10:68, 10:65, 10:64, 10:61, and 10:60.

NA = Not Applicable.

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