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WILLIAMS GATEWAY AIRPORT
Mesa, Arizona

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NOISE COMPATIBILITY STUDY UPDATE

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NOISE EXPOSURE MAPS

INTRODUCTION

This is the Noise Exposure Maps document for Williams Gateway Airport, owned and operated by the Williams Gateway Airport Authority.

The Noise Exposure Maps document-ation for the airport presents current aircraft noise impacts and anticipated impacts in five years. The documentation contains sufficient information so that reviewers unfamiliar with local conditions and the local public unfamiliar with the technical aspects of aircraft noise can understand the findings.

The Noise Exposure Maps document includes the first three chapters of the F.A.R. Part 150 Noise Compatibility Study. Chapter One, Inventory, presents an overview of the airport, airspace, aviation facilities, existing land use, and local land use policies and regulations.
Chapter Two, Aviation Noise, presents existing and forecast aircraft noise based on the assumption of no additional noise abatement efforts. This provides baseline data for evaluating potential noise abatement strategies in the second part of the study.

Chapter Three, Noise Impacts, analyzes the impact of the baseline aircraft noise defined in Chapter Two on noise sensitive land uses and the residential population. It also includes an analysis of potential residential development trends in the study area.

The official Noise Exposure Maps are presented in this section following page vi. For the convenience of FAA reviewers, FAA's official Noise Exposure Map checklist is presented on pages ii through vi.

F.A.R. PART 150
NOISE EXPOSURE MAP CHECKLIST

AIRPORT NAME: ***Williams Gateway Airport***
Mesa, Arizona

REVIEWER: _____

		Yes/No/NA	Page No./ Other Reference
I.	**IDENTIFICATION AND SUBMISSION OF MAP DOCUMENT:**		
	A. Is this submittal appropriately identified as one of the following, submitted under F.A.R. Part 150:		
	1. a NEM only?	Yes	Title Page, p. i
	2. a NEM and NCP?	No	
	3. a revision to NEMs which have previously been determined by FAA to be in compliance with Part 150?	No	
	B. Is the airport name and the qualified airport operator identified?	Yes	Title Page, p. i
	C. Is there a dated cover letter from the airport operator which indicates the documents are submitted under Part 150 for appropriate FAA determination?	Yes	
II.	**CONSULTATION: [150.21(b), A150.105(a)]**		
	A. Is there a narrative description of the consultation accomplished, including opportunities for public review and comment during map development?	Yes	Appendix B; and supplemental volume, Supporting Information on Project Coordination and Local Consultation
	B. Identification:		
	1. Are the consulted parties identified?	Yes	Appendices A and B; and supplemental volume, Supporting Information on Project Coordination and Local Consultation
	2. Do they include all those required by 150.21(b) and A150.105(a)?	Yes	Appendices A and B; and supplemental volume, Supporting Information on Project Coordination and Local Consultation
	C. Does the documentation include the airport operator's certification, and evidence to support it, that interested persons have been afforded adequate opportunity to submit their views, data, and comments during map development and in accordance with 150.21(b)?	Yes	p. vi; Appendix B, and supplemental volume, Supporting Information on Project Coordination and Local Consultation
	D. Does the document indicate whether written comments were received during consultation and, if there were comments, that they are on file with the FAA region?	Yes	Appendix B, and supplemental volume, Supporting Information on Project Coordination and Local Consultation

F.A.R. PART 150
NOISE EXPOSURE MAP CHECKLIST

AIRPORT NAME: ***Williams Gateway Airport***
Mesa, Arizona

REVIEWER: _____

	Yes/No/NA	Page No./ Other Reference
III. **GENERAL REQUIREMENTS: [150.21]**		
A. Are there two maps, each clearly labeled on the face with year (existing condition year and 5-year)?	Yes	See NEM Maps, Exhibits 1 & 2 after p. vi
B. Map currency:		
1. Does the existing condition map year match the year on the airport operator's submittal letter?	Yes	Current year is labeled 1999, based on actual operations from July 1998 through June 1999.
2. Is the 5-year map based on reasonable forecasts and other planning assumptions and is it for the fifth calendar year after the year of submission?	Yes	See 2004 NEM after p. vi; Chapter Two, pp. 2-8 - 2-9, pp. 2-11 - 2-12
3. If the answer to 1 & 2 above is no, has the airport operator verified in writing that data in the documentation are representative of existing condition and 5-year forecast conditions as of the date of submission?	N/A	
C. **If the NEM and NCP are submitted together:**		
1. Has the airport operator indicated whether the 5-year map is based on 5-year contours without the program vs. contours if the program is implemented?	N/A	
2. If the 5-year map is based on program implementation:		
a. are the specific program measures which are reflected on the map identified?	N/A	
b. does the documentation specifically describe how these measures affect land use compatibilities depicted on the map?	N/A	
3. If the 5-year NEM does not incorporate program implementation, has the airport operator included an additional NEM for FAA determination after the program is approved which shows program implementation conditions and which is intended to replace the 5-year NEM as the new official 5-year map?	N/A	

F.A.R. PART 150
NOISE EXPOSURE MAP CHECKLIST

AIRPORT NAME: ***Williams Gateway Airport***
Mesa, Arizona

REVIEWER: _____

	Yes/No/NA	Page No./ Other Reference
IV. **MAP SCALE, GRAPHICS, AND DATA REQUIREMENTS: [A150.101, A150.103, A150.105, 150.21(a)]**		
A. Are the maps sufficient scale to be clear and readable (they must not be less than 1" to 8,000'), and is the scale indicated on the maps?	Yes	See NEM Maps after p. vi
B. Is the quality of the graphics such that required information is clear and readable?	Yes	
C. Depiction of the airport and its environs.		
1. Is the following graphically depicted to scale on both the existing conditions and 5-year maps:		
a. airport boundaries?	Yes	
b. runway configurations with runway end numbers?	Yes	
2. Does the depiction of the off-airport data include:		
a. a land use base map depicting streets and other identifiable geographic features?	Yes	
b. the area within the 65 Ldn (**or beyond, at local discretion**)?	Yes	
c. clear delineation of geographic boundaries and the names of all jurisdictions with planning and land use control authority within the 65 Ldn (or beyond, at local discretion)?	Yes	
D. 1. Continuous contours for at least the 65, 70, and 75 Ldn?	Yes	
2. Based on current airport and operational data for the existing condition year NEM, and forecast data for the 5-year NEM?	Yes	Chapter Two, pp. 2-8 - 2-9, pp. 2-11 - 2-12
E. Flight tracks for the existing condition and 5-year forecast timeframes (these may be on supplemental graphics which must use the same land use base map as the existing condition and 5-year NEM), which are numbered to correspond to accompanying narrative?	Yes	Chapter Two, Exhibits 2G, 2H, and 2J after p. 2-16
F. Locations of any noise monitoring sites (these may be on supplemental graphics which must use the same land use base map as the official NEMs)	Yes	Chapter Two, Exhibit 2A after p. 2-4
G. Noncompatible land use identification:		
1. Are noncompatible land uses within at least the 65 Ldn depicted on the maps?	Yes	See NEM Maps after p. vi.
2. Are noise-sensitive public buildings identified?	Yes	

F.A.R. PART 150
NOISE EXPOSURE MAP CHECKLIST

AIRPORT NAME: ***Williams Gateway Airport***
Mesa, Arizona

REVIEWER: _____

	Yes/No/NA	Page No./ Other Reference
3. Are the noncompatible uses and noise-sensitive public buildings readily identifiable and explained on the map legend?	Yes	
4. Are compatible land uses, which would normally be considered noncompatible, explained in the accompanying narrative?	N/A	
V. NARRATIVE SUPPORT OF MAP DATA: [150.21(a), A150.1, A150.101, A150.103]		
A. 1. Are the technical data, including data sources, on which the NEMs are based adequately described in the narrative?	Yes	Chapter Two, pp. 2-7 - 2-17
2. Are the underlying technical data and planning assumptions reasonable?	Yes	Chapter Two, pp. 2-7 - 2-17
B. Calculation of Noise Contours:		
1. Is the methodology indicated?	Yes	Chapter Two, p. 2-7
a. is it FAA approved?	Yes	Chapter Two, p. 2-7
b. was the same model used for both maps?	Yes	Chapter Two, p. 2-1, p. 2-7
c. has AEE approval been obtained for use of a model other than those which have previous blanket FAA approval?	N/A	
2. Correct use of noise models:		
a. does the documentation indicate the airport operator has adjusted or calibrated FAA-approved noise models or substituted one aircraft type for another?	No	Chapter Two, pp. 2-8 - 2-12. No calibrations done. Some composite aircraft descriptors used.
b. if so, does this have written approval from AEE?	N/A	All aircraft INM designators used are on AEE's pre-approved list of substitutions.
3. If noise monitoring was used, does the narrative indicate that Part 150 guidelines were followed?	Yes	Our measurement program is discussed in Chapter Two and can be described as a "survey type" program. Please see FAA AC 150/5020-1, Noise Control and Compatibility Planning for Airports, pp. 12-17. Our results indicate reasonable agreement between measurements and INM predictions. Where the measured values deviated from INM predictions, it was explained by operations differing from average annual conditions

F.A.R. PART 150
NOISE EXPOSURE MAP CHECKLIST

AIRPORT NAME: ***Williams Gateway Airport***
Mesa, Arizona

REVIEWER: _____

	Yes/No/NA	Page No./ Other Reference

	4. For noise contours below 65 Ldn, does the supporting documentation include explanation of local reasons? (Narrative explanation is highly desirable but not required by the Rule.)	Yes	Chapter Three, pp. 3-2 - 3-4, T.I.P., Noise and Land Use Compatibility Guidelines
	C. Noncompatible Land Use Information:		
	1. Does the narrative give estimates of the number of people residing in each of the contours (Ldn 65, 70, and 75 at a minimum) for both the existing condition and 5-year maps?	Yes	Chapter Three, pp. 3-4 - 3-6, pp. 3-10 - 3-12
	2. Does the documentation indicate whether Table 1 of Part 150 was used by the airport operator?		Chapter Three, pp. 3-2 - 3-3
	a. If a local variation to Table 1 was used;		
	(1) does the narrative clearly indicate which adjustments were made and the local reasons for doing so?	N/A	
	(2) does the narrative include the airport operators complete substitution for Table 1?	N/A	
	3. Does the narrative include information on self-generated or ambient noise where compatible/noncompatible land use identification consider non-airport/aircraft sources?	No	
	4. Where normally noncompatible land uses are not depicted as such on the NEMs, does the narrative satisfactorily explain why, with reference to the specific geographic areas?	N/A	
	5. Does the narrative describe how forecasts will affect land use compatibility?	Yes	Chapter Three, pp. 3-7 - 3-14
VI.	**MAP CERTIFICATIONS: [150.21(b), 150.21(e)]**		
	A. Has the operator certified in writing that interested persons have been afforded adequate opportunity to submit views, data, and comments concerning the correctness and adequacy of the draft maps and forecasts?	Yes	Certification statements on NEM Maps and p. vi
	B. Has the operator certified in writing that each map and description of consultation and opportunity for public comment are true and complete?	Yes	Certification statements on NEM Maps and p. vi

SPONSOR'S CERTIFICATION

The Noise Exposure Maps and accompanying documentation for Williams Gateway Airport, including the description of consultation and opportunity for public involvement, submitted in accordance with F.A.R. Part 150, and hereby certified as true and complete to the best of my knowledge and belief. It is hereby certified that adequate opportunity has been afforded interested persons to submit views, data, and comments on the Noise Exposure maps and forecasts. It is further certified that the 1999 Noise Exposure Map and supporting data are fair and reasonable representations of existing conditions at the airport.

_____ _____

Date of Signature

Lynn F. Kusy
Executive Director
Williams Gateway Airport Authority

99SP09-1-12/08/99

Projected Aircraft Operations - 1999

Air Carrier/Cargo	317
Air Taxi	4,888
General Aviation	
Itinerant	50,658
Local	123,114
Military	
Itinerant	7,307
Local	42,638
Nighttime Operations	10,450
Total	239,372

SPONSOR'S CERTIFICATION

The Noise Exposure Maps and accompanying documentation for Williams Gateway Airport, including the description of consultation and opportunity for public involvement, submitted in accordance with F.A.R. Part 150, are hereby certified as true and complete to the best of my knowledge and belief. It is hereby certified that adequate opportunity has been afforded interested persons to submit views, data, and comments on the Noise Exposure Maps and forecasts.

Date of Signiture

Lynn F. Kusy
Executive Director
Willaims Gateway
Airport Authority

LEGEND

- Detailed Land Use Study Area
- County Boundary
- Municipal Boundary
- Airport Property
- Planned Santan Freeway
- DNL Contours, Marginal Effect
- DNL Contours, Significant Effect
- Rural Residential (0-2 du/ac)
- Low Density Residential (2.1-5 du/ac)
- Medium Density Residential (5.1-15 du/ac)
- High Density Residential (15+ du/ac)
- Mobile and Trailer Homes
- Mixed Use
- Noise Sensitive Institutions
- Place of Worship
- School

Source: Coffman Associates Analysis August 1999.

NORTH

0 8000

SCALE IN FEET

WILLIAMS GATEWAY AIRPORT

Exhibit 1
1999 NOISE EXPOSURE MAP

99SP09-2-12/08/99

Broadway Rd.

Main St./Apache Trail

Southern Ave

Baseline Rd.

Elliot Rd.

Warner Rd.

Ray Rd.

Williams Field Rd.

Pecos Rd

Pecos Road Realignment

Germann Rd.

Queen Creek Rd.

Ocotillo Rd.

Riggs Rd.

Gilbert Rd.

Lindsay Rd.

Val Vista Drive

Higley Rd.

Recker Rd.

Hawes Rd.

Ellsworth Rd.

Signal Butte Rd.

Meridian Rd.

Sossaman Rd.

Crimson Rd.

Vineyard Rd.

La Palma Rd.

Schnepf Rd.

Rittenhouse Road

Southern Pacific Railroad

60

65

70

75

Gilbert

Mesa

Queen Creek

Projected Aircraft Operations - 2004

Air Carrier/Cargo	6,720
Air Taxi	3,700
General Aviation	
Itinerant	58,902
Local	130,400
Military	
Itinerant	5,000
Local	28,000
Nighttime Operations	85,002
Total	317,724

SPONSOR'S CERTIFICATION

The Noise Exposure Maps and accompanying documentation for Williams Gateway Airport, including the description of consultation and opportunity for public involvement, submitted in accordance with F.A.R. Part 150, are hereby certified as true and complete to the best of my knowledge and belief. It is hereby certified that adequate opportunity has been afforded interested persons to submit views, data, and comments on the Noise Exposure Maps and forecasts.

Date of Signiture

Lynn F. Kusy
Executive Director
Willaims Gateway
Airport Authority

LEGEND

- Detailed Land Use Study Area
- County Boundary
- Municipal Boundary
- Airport Property
- Planned Santan Freeway
- DNL Contours, Marginal Effect
- DNL Contours, Significant Effect
- Rural Residential (0-2 du/ac)
- Low Density Residential (2.1-5 du/ac)
- Medium Density Residential (5.1-15 du/ac)
- High Density Residential (15+ du/ac)
- Mobile and Trailer Homes
- Mixed Use
- Noise Sensitive Institutions
- Place of Worship
- School
- Potentially Available for Residential Development
- Potentially Available for Noise Sensitive Institutions
- Proposed School

Source: Coffman Associates Analysis August 1999.

NORTH

0 8000

SCALE IN FEET

WILLIAMS GATEWAY AIRPORT

Exhibit 2

2004 NOISE EXPOSURE MAP

Chapter One
INVENTORY

This chapter presents an overview of Williams Gateway Airport and its relationship to the surrounding communities. The background information in this chapter, which will be used in later stages of the noise compatibility planning process, is as follows:

- A description of the setting, local climate, and historical perspective of the airport.
- A description of airspace and air traffic control.
- A description of key airport facilities and navigational aids.
- A description of existing land uses in the study area.
- A discussion of the local land use planning and regulatory framework within the study area.

This noise study involves the preparation of two official documents: the Noise Exposure Maps (NEM) and the Noise Compatibility Program (NCP). The NEM document is a baseline analysis showing existing and potential future noise conditions at the airport. It will include Chapters One, Two, and Three of this Study. The NCP document, which will include Chapters Four, Five, and Six, presents a plan for effectively dealing with adverse noise impacts based on a three-part perspective. First, it will address steps to abate or reduce aircraft noise. Second, it will address noise mitigation techniques to reduce the impact of

noise on sensitive land uses in the area. Third, it will address land use planning to encourage future development that is compatible with the airport.

A glossary in the section titled "Technical Information Papers" at the back of this document provides a description of airport terms and acronyms.

JURISDICTIONS AND RESPONSIBILITIES

Reduction of aircraft noise impacts is a complex issue, with several parties sharing in the responsibility: the federal government, state and local governments and planning agencies, the airport proprietor, military and civilian airport users, shippers of cargo, and local residents. All interests must be considered in the noise compatibility planning process.

FEDERAL

Aviation plays a vital role in interstate commerce. Recognizing this, the federal government has assumed the role of coordinator and regulator of the nation's aviation system. Congress has assigned administrative authority to the Federal Aviation Administration (FAA). Specific responsibilities of the FAA include:

- The regulation of air commerce in order to promote its development, safety and to fulfill the requirements of national defense.

- The promotion, encouragement and development of civil aeronautics.

- The control of the use of navigable airspace and the regulation of civil and military aircraft operations to promote the safety and efficiency of both.

- The development and operation of a common system of air traffic control and navigation for both military and civil aircraft.

The FAA also administers a program of federal grants-in-aid for the development of airport master plans, the acquisition of land and for the planning, design and construction of eligible airport improvements. In addition, Congress has passed legislation and the FAA has established regulations governing the preparation of noise compatibility programs. They have also created laws and regulations requiring the conversion of the commercial aircraft fleet to quieter aircraft.

F.A.R. Part 150
Noise Compatibility Studies

The *Aviation Safety and Noise Abatement Act of 1979* (ASNA, P.L. 96-193), signed into law on February 18, 1980, was enacted, ". . . to provide and carry out noise compatibility programs, to provide assistance to assure continued safety in aviation, and for other purposes." The FAA was vested with the authority to implement and administer the Act.

Federal Aviation Regulation (F.A.R.) Part 150, the administrative rule promulgated to implement the Act, sets requirements for airport operators who choose to undertake an airport noise compatibility study with federal funding assistance. Part 150 provides for the development of two final documents: noise exposure maps and a noise compatibility program.

Noise Exposure Maps. The noise exposure maps document (NEM) shows existing and future noise conditions at the airport. It can be thought of as a baseline analysis defining the scope of the noise situation at the airport. It includes maps of noise exposure for the current year and a five-year forecast. The noise contours are shown on a land use map to reveal areas of non-compatible land use. The document includes detailed supporting information explaining the methods used to develop the maps.

Part 150 requires the use of standard methodologies and metrics for analyzing and describing noise. It also establishes guidelines for the identification of land uses which are incompatible with noise of different levels. Airport proprietors are required to update noise exposure maps when changes in the operation of the airport would create any new, substantial non-compatible use. This is defined as an increase in the Yearly Day-Night Average Sound Level (DNL) of 1.5 decibels over noncompatible land uses.

The ASNA Act provides that "constructive knowledge" shall be attributed to any person if a copy of the noise exposure map was provided to him at the time of property acquisition, or if notice of the existence of the noise exposure map was published three times in a newspaper of general circulation in the area. In addition, Part 150 defines "significant increase" as an increase of 1.5 DNL. For purposes of this provision, FAA officials consider the term "area surrounding an airport" to mean an area within the 65 DNL contour. (See F.A.R. Part 150, Section 150.21 (d), (f) and (g).)

A limited degree of legal protection can be afforded to the airport proprietor through preparation and submission of noise exposure maps. Section 107(a) of the ASNA Act provides that:

> *No person who acquires property or an interest therein . . . in an area surrounding an airport with respect to which a noise exposure map has been submitted . . . shall be entitled to recover damages with respect to the noise attributable to such airport if such person had actual or constructive knowledge of the existence of such noise exposure map unless . . . such person can show --*
>
> *(i) A significant change in the type or frequency of aircraft operations at the airport; or*
>
> *(ii) A significant change in the airport layout; or*
>
> *(iii) A significant change in the flight patterns; or*
>
> *(iv) A significant increase in night-time operations occurred after the date of acquisition of such property.*

Acceptance of the noise exposure maps by the FAA is required before it will approve a noise compatibility program for the airport.

Noise Compatibility Program. A noise compatibility program includes provisions for the abatement of aircraft noise through aircraft operating procedures, air traffic control procedures, airport regulations, or airport facility modifications. It also includes provisions for land use compatibility planning and may include actions to mitigate the impact of noise on noncompatible land uses. The program must contain provisions for updating and periodic revision.

F.A.R. Part 150 establishes procedures and criteria for FAA evaluation of noise compatibility programs. Among these, two criteria are of particular importance: the airport proprietor may take no action that imposes an undue burden on interstate or foreign commerce, nor may the proprietor unjustly discriminate between different categories of airport users.

With an approved noise compatibility program, an airport proprietor becomes eligible for funding through the Federal Airport Improvement Program to implement the eligible items of the program.

In 1998, the FAA established a new policy for Part 150 approval and funding of noise mitigation measures. This policy increases the incentives for airport operators to discourage the development of new noncompatible land uses around airports and to assure the most cost-effective use of Federal funds spent on noise mitigation measures.

The FAA will not approve measures in Noise Compatibility Programs proposing corrective noise mitigation actions for new noncompatible development that is allowed to occur in the vicinity of airports after October 1, 1998, the effective date of this policy. As of the same effective date, AIP funding under the noise set-aside will be determined using criteria consistent with this policy. Specifically, corrective noise mitigation measures for new noncompatible development that occurs after October 1, 1998 will not be eligible for AIP funding under the noise set-aside regardless of previous FAA approvals under Part 150. The new policy does not affect funding under the Airport Improvement Program for noise mitigation projects that do not require Part 150 approval, that can be funded with Passenger Facility Charges (PFC) revenue, or that are included in FAA-approved environmental documents for airport development.

F.A.R. Parts 36 And 91
Federal Aircraft Noise Regulations

The FAA has required reduction of aircraft noise at the source through certification, modification of engines, or replacement of aircraft. F.A.R. Part 36 prohibits the further escalation of noise levels of subsonic civil turbojet and transport category aircraft. It also requires new airplane types to be markedly quieter than earlier models. Subsequent amendments have extended the noise standards to include small, propeller-driven airplanes and supersonic transport aircraft.

F.A.R. Part 36 has three stages of certification. Stage 3 is the most rigorous and applies to aircraft certificated since November 5, 1975. Stage 2 applies to aircraft certificated between December 1, 1969 and November 5, 1975. Stage 1 includes all previously certificated aircraft.

F.A.R. Part 91, Subpart I, known as the "Fleet Noise Rule," mandated a compliance schedule under which Stage 1 aircraft were to be retired or refitted with hush kits or quieter engines by January 1, 1988. A very limited number of exemptions have been granted by the U.S.

Department of Transportation for foreign aircraft operating into specified international airports.

Pursuant to the Congressional mandate in the *Airport Noise and Capacity Act of 1990*, FAA has established amendments to F.A.R. Part 91 by setting December 31, 1999 as the date for discontinuing use of all Stage 2 aircraft exceeding 75,000 pounds. FAA may grant an airline an extension of the deadline to December 31, 2003 if, by July 1, 1999, their fleets include no more than 15 percent Stage 2 aircraft. The Part 91 amendments also provide for two alternative phase-out schedules through the 1990s. The first is described in terms of the phase-out of Stage 2 aircraft; the second in terms of the phase-in of Stage 3 aircraft.

Under the first alternative, an airline must have eliminated or retrofitted 25 percent of its Stage 2 fleet by the end of 1994, 50 percent by the end of 1996, and 75 percent by the end of 1998. Under the second alternative, an airline must have a fleet of no less than 55 percent Stage 3 aircraft by the end of 1994, 65 percent by the end of 1996, and 75 percent by the end of 1998.

In order to implement noise or access restrictions on Stage 2 aircraft, the airport operator must provide public notice of the proposal and provide at least a 45-day comment period. This includes notification of FAA and publication of the proposed restriction in the *Federal Register*. An analysis must be prepared describing the proposal, alternatives to the proposal, and the costs and benefits of each.

Noise or access restrictions on Stage 3 aircraft can be implemented only after receiving FAA approval. Before granting approval, the FAA must find that six conditions specified in the statute, and listed below, are met.

Neither F.A.R. Part 36 nor Part 91 apply to military aircraft. Never-theless, many of the advances in quiet engine technology are being used by the military as they upgrade aircraft to improve performance and fuel efficiency.

F.A.R. Part 91 does not apply to aircraft under 75,000 pounds, including most business jets, and propeller driven aircraft.

F.A.R. Part 161
Regulation Of Airport Noise
And Access Restrictions

F.A.R. Part 161 sets forth requirements for notice and approval of local restrictions on aircraft noise levels and airport access. Part 161 was developed in response to the *Airport Noise and Capacity Act of 1990*. It applies to local airport restrictions that would have the effect of limiting operations by Stage 2 or 3 aircraft. These include direct limits on maximum noise levels, nighttime curfews, and special fees intended to encourage changes in airport operations to lessen noise.

(1) The restriction is reasonable, non-arbitrary and nondiscriminatory.

(2) The restriction does not create an undue burden on interstate or foreign commerce.

(3) The proposed restriction maintains safe and efficient use of the navigable airspace.

(4) The proposed restriction does not conflict with any existing federal statute or regulation.

(5) The applicant has provided adequate opportunity for public comment on the proposed restriction.

(6) The proposed restriction does not create an undue burden on the national aviation system.

In its application for FAA review and approval of the restriction, the airport operator must include an environmental assessment of the proposal and a complete analysis addressing the six conditions. Within 30 days of the receipt of the application, the FAA must determine whether the application is complete. After a complete application has been filed, the FAA publishes a notice of the proposal in the Federal Register. It must approve or disapprove the restriction within 180 days of receipt of the completed application.

Airport operators that implement noise and access restrictions in violation of F.A.R. Part 161 are subject to termination of eligibility for airport grant funds and authority to impose and collect passenger facility charges.

Air Traffic Control

The FAA is responsible for the control of navigable airspace and the operation of air traffic control systems at the nation's airports. Airport proprietors have no direct control over airspace management and air traffic control, although they can propose changes in procedures.

The FAA reviews any proposed changes in flight procedures, such as flight tracks or runway use programs, proposed for noise abatement on the basis of safety of flight operations, safe and efficient use of the navigable airspace, management and control of the national airspace and traffic control systems, effect on security and national defense, and compliance with applicable laws and regulations. Typically, FAA implements and regulates flight procedures pertaining to noise abatement through the local air traffic control manager.

STATE AND LOCAL

Control of land use in noise-impacted areas around airports is a key tool in limiting the number of citizens exposed to noise. The FAA encourages land use compatibility in the vicinity of airports and F.A.R. Part 150 has guidelines relating to land use compatibility based on varying levels of noise exposure. Nevertheless, the federal government has no direct legal authority to

regulate land use. That responsibility rests exclusively with state and local governments.

State

Although the State of Arizona does not directly implement and administer general purpose land use regulations, it has vested cities, towns, and counties with that power through enabling legislation. *Arizona Revised Statutes* do not mandate the establishment of planning commissions, agencies or departments in municipalities; however, where such appointments are made, the municipality is required to prepare and adopt a long-range general plan, and may regulate zoning, subdivision and land development, consistent with the plan.

The Arizona Department of Transportation (ADOT) is required by state law A.R.S. 28-1598 Section I to reassess the State's aviation needs every five years. ADOT adopted its first Arizona *State Aviation Needs Study* (SANS) in 1985, with subsequent updates in 1990 and 1995. The SANS serves as a guide for meeting the future air transportation needs of the region. The SANS provides state decision makers with a full assessment of the state's existing and future aviation needs, direction for meeting projected demand levels, and projected system costs for maintaining the State's aviation network. State officials can then budget state-allotted funds for projected system wide expenditures.

The State of Arizona also provides for the disclosure of aviation activities to prospective buyers of real estate. In 1997, the state adopted legislation allowing airport sponsors to identify Airport Influence Areas (AIA) around public and commercial use airports. The establishment of an AIA is voluntary and requires a public hearing. The boundary of the AIA must be recorded with the County.

The establishment of an AIA was proposed for Williams Gateway Airport in 1998. This was met with objection from area residents due to a disclosure statement which would subsequently be included in their property title report. This disclosure statement was seen as having an adverse effect on property values. Subsequent to a public hearing in February 1998, the proposed AIA was tabled by the Williams Gateway Airport Authority Board in lieu of alternative ways to ensure notification such as avigation easements, realtor education, and House Bill 2404 (the predecessor to Arizona Revised Statute §28-8464) which requires builders of new homes to advise buyers they are in the vicinity of an airport.

In 1999, Arizona Revised Statute §28-8464 (Public Airport Disclosure) was added requiring the disclosure of public use airports to prospective purchasers of real estate within the airport "vicinity" ("vicinity" is defined as the area within the 60 DNL contour and traffic pattern airspace). Under this law, a map will be made available upon request to prospective buyers showing areas designated to be within the disclosure area. In addition, all developers of subdivisions or undivided lands must, in their public report, provide a map showing the location

of the property and its proximity to area airports. If the property is determined to be within an airport's "vicinity", then this information will be provided to prospective buyers.

City/Town and County

In the Williams Gateway Airport Study Area, Maricopa and Pinal Counties, the cities of Mesa and Apache Junction, and the Towns of Gilbert and Queen Creek share responsibilities for land use regulation.

Maricopa and Pinal Counties are each administered by a County Board of Supervisors, made up of representatives of five and three voting districts, respectively. The Towns of Gilbert and Queen Creek, and the Cities of Mesa and Apache Junction have a council/manager form of government. The Council for each City/Town is composed of six members plus the mayor who is elected directly by the voters.

In addition to regulating land use, local governments may acquire property to mitigate or prevent airport noise impacts or may sponsor sound insulation programs for this purpose. They are also eligible to apply for FAA grants under Part 150 if they are designated as a sponsor of a project in an approved noise compatibility program.

Maricopa Association of Governments

The Maricopa Association of Governments (MAG), serves as the designated Metropolitan Planning Organization (MPO) for all jurisdictions within Maricopa County, Arizona. MAG is a regional planning agency consisting of 24 cities and towns, Maricopa County, the Gila River Indian Community, and ADOT for transportation related issues.

As the MPO, MAG is responsible for conducting regional transportation planning and preparing air and water quality plans. It is also responsible, in accordance with *FAA Order 5100.38*, for sponsoring regional aviation system planning studies. MAG adopted its first *Regional Aviation System Plan* (RASP) in 1979, with updates in 1986 and 1993. The RASP serves as a guide for meeting the future air transportation needs of the region.

AIRPORT PROPRIETOR

Williams Gateway Airport is owned and operated by the Williams Gateway

Airport Authority (WGAA). The Authority is comprised of the City of Mesa, Town of Gilbert, Town of Queen Creek, and the Gila River Indian Community. A four-member Board of Directors, consisting of a representative from each of these governing bodies, provides policy direction for the authority. An executive director and professional staff conduct the day-to-day activities of the Authority.

As airport proprietor, the WGAA has limited power to control what types of civil aircraft use its airport and to impose curfews or other use restrictions. This power is limited by the rules of F.A.R. Part 161, described earlier. Airport proprietors may not take actions that (1) impose an undue burden on interstate or foreign commerce, (2) unjustly discriminate between different categories of airport users and (3) involve unilateral action in matters preempted by the federal government.

The Authority may take steps to control on-airport noise by installing sound barriers and acoustical shielding and by controlling the times when aircraft engine maintenance run-up operations may take place. Within the limits of the law and financial feasibility, airport proprietors may acquire land or partial interests in land, such as air rights, easements, and development rights, to assure the use of property for purposes which are compatible with airport operations.

AIRPORT SETTING

Weather plays an important role in the operational capabilities of an airport. Temperature is an important factor in determining runway length required for aircraft operations. The percentage of time that visibility is impaired due to cloud coverage is a major factor in determining the use of instrument approach aids. Wind speed and direction determine runway selection and operational flow.

The National Plan of Integrated Airport Systems (NPIAS), as established by the FAA, identifies the 3,660 airports that are important to national trans-portation. Williams Gateway Airport is identified as a general aviation reliever airport. Reliever airports are designated to provide general aviation pilots with an attractive alternative to using congested hub airports. There are approximately 290 reliever airports in the nation. Williams Gateway is one of eight reliever airports in Arizona and is joined by Scottsdale, Glendale, Chandler, Falcon Field and Deer Valley as the reliever airports for Phoenix Sky Harbor International Airport. **Exhibit 1A** depicts the airport in its regional and national setting.

LOCALE

Williams Gateway Airport encompasses 3,019 acres of the former Williams Air Force Base. Located in the southeastern portion of the Phoenix Metropolitan Area, Williams Gateway Airport is within the jurisdictional boundaries of the City of Mesa. The airport is located approximately 20 miles east of the City of Phoenix in an area commonly referred to as the East Valley. **Exhibit 1A** depicts the location of Williams Gateway Airport within the Phoenix Metropolitan Area and local vicinity.

CLIMATE

The regional climate is typical of south-central Arizona: warm, dry desert. The normal daily minimum temperature ranges from 41 degrees Fahrenheit in January to 81 degrees Fahrenheit in July. The normal daily maximum temperature ranges from 66 degrees Fahrenheit in January to 106 degrees Fahrenheit in July. July is usually the

hottest month with a mean maximum temperature of 108.4 degrees Fahrenheit.

The region can expect approximately 7.6 inches of precipitation annually. Clear skies predominate in this climate. On average, there are 210 clear days each year, 85 partly cloudy days, and 70 days with cloudy skies.

Winds are generally calm in this region with an average annual wind speed of 6.2 miles per hour from the east-south-east.

AIRPORT HISTORY

Williams Gateway Airport is a component of the reuse of the former Williams Air Force Base. Williams Air Force Base served as a pilot training base for more than 52 years. The site was first developed as an Army Air Corps Advanced Flying School in 1941 to train combat pilots for World War II. In February 1942, the facility was designated Williams Field in honor of an Arizona-born pilot. The facility was renamed Williams Air Force Base in 1948 and remained that until it was closed in 1993. From 1941 to 1993 more than 26,000 men and women earned their wings at the Base.

Williams Air Force Base was recommended for closure in 1991 by the Base Closure and Realignment Commission (BRAC). In response to this action, the Williams Air Force Base Economic Reuse Advisory Board was established by the Governor in 1991 to develop a long range plan for the reuse of Williams Air Force Base. The resulting Economic Reuse Plan recommended that the former air base be redeveloped as an aerospace, educational, and training facility with the airport serving as a reliever for Phoenix Sky Harbor International Airport.

Williams Air Force Base closed in September 1993 and Williams Gateway Airport opened in March 1994. After operating four years under a lease agreement, the Williams Gateway Airport Authority obtained ownership of the airport facilities by Quit Claim Deed on April 14, 1998.

The Williams Educational, Research and Training (ERT) Campus encompasses approximately 734-acres of the former air base. The Arizona State University East campus and Chandler-Gilbert Community Campus are located on the Williams Campus. The Williams Campus is primarily owned and operated by Arizona State University East and the Maricopa Community College District.

AIRPORT FACILITIES

Airfield facilities influence the utilization of airspace and are important to the noise compatibility planning process. These facilities include the runway and taxiway systems and aircraft and terminal activity areas. Current airfield facilities are depicted on **Exhibit 1B.**

RUNWAYS

The existing airfield configuration at Williams Gateway Airport includes three parallel runways generally aligned in an northwest-southeast orientation and designated as Runway 12L-30R, 12C-30C, and 12R-30L. Runway 12L-30R is 9,301 feet long and 150 feet wide. This runway recently received a 15 inch concrete overlay to the existing runway surface. This runway is will serve as the primary heavy aircraft runway. Runway 12C-30C is 10,201 feet long, 150 feet wide, and serves as the primary instrument runway. Runway 12C-30C was rehabilitated in 1997. Runway 12R-30L is 10,401 feet long by 150 feet wide and serves as the primary general aviation training runway. There are 1,000-foot paved overruns available at each end of Runways 12R/30L and 12C/30C. Runway 12L/30R has a 400-foot overrun at each end.

Table 1A summarizes runway information for Williams Gateway Airport. Runway pavement strengths are expressed in terms of aircraft landing gear configurations. Single wheel (SW) refers to the design of certain aircraft landing gear which has a single wheel on each main landing gear strut. Dual wheel (DW) refers to the design of certain aircraft landing gear which have two wheels on each main landing gear strut. Dual Tandem Wheel (DTW) refers to aircraft landing gear struts with a tandem set of dual wheels (four wheels) on each main landing gear strut. Double Dual Tandem Wheel (DDTW) refers to the aircraft landing gear with dual sets of dual tandem wheels (eight wheels on each strut).

TAXIWAYS

Taxiway A is the primary taxiway providing access between the runway ends and apron area and includes two partial parallel taxiway segments. Taxiways G, H, K, L, N, and P are connecting taxiways providing access from the runways and apron to parallel Taxiway A. Taxiway V provides direct access from mid-field to the apron area.

Holding aprons are available at the ends of Runways 30L, 30C, 30R, and 12R. Holding aprons provide an area for aircraft to prepare for departure without blocking other taxiing aircraft. The existing taxiway system is shown on **Exhibit 1C**.

AIRFIELD LIGHTING

Airfield lighting systems extend an airport's usefulness into periods of darkness and/or poor visibility. A variety of lighting systems are installed at the airport for this purpose. These lighting systems, categorized by function, are summarized as follows:

Identification Lighting: The location of an airport at night is universally indicated by a rotating beacon. A rotating beacon projects two beams of light, one white and one green, 180 degrees apart. The rotating beacon is located on top of the airport traffic control tower.

TABLE 1A
Runway Information

	Runway 12L-30R	Runway 12C-30C	Runway 12R-30L
Runway Length (feet)	9,301	10,201	10,401
Runway Width (feet)	150	150	150
Runway Surface Material	Concrete	Concrete/asphalt	Concrete
Runway Load Bearing Strength (pounds)			
SW	75,000	55,000	55,000
DW	180,000	95,000	95,000
DTW	350,000	185,000	185,000
DDTW	850,000	550,000	550,000
Lighting			
Runway Pavement Edge	Medium Intensity	Medium Intensity	Medium Intensity
Approach	PAPI	PAPI	None
Runway Markings	Precision	Precision	Precision
Instrument Approach Procedures	None	ILS Runway 30C GPS Runway 30C VOR or TACAN Runway 30C	None
Traffic Pattern	Left 12L Right 30R	Left 12C Right 30C	Right 12R Left 30L

Source: Airport Facility Directory, Southwest U.S., August 13, 1998; U.S. Terminal Procedures, Southwest Volume 2, August 13, 1998; Williams Gateway Airport Authority

Notes:
SW - Single Wheel Aircraft
DW - Dual Wheel Aircraft
DTW - Dual Tandem Wheel Aircraft
DDTW - Double-Dual Tandem Wheel Aircraft
VOR - Very High Frequency Omnidirectional Range
PAPI - Precision Approach Path Indicator
ILS - Instrument Landing System
GPS - Global Positioning System
TACAN - Tactical Air Navigation Aid

Runway and Taxiway Lighting: Runway and taxiway lighting utilizes light fixtures placed near the pavement edge to define the lateral limits of the pavement. This lighting is essential for maintaining safe operations at night and/or during times of poor visibility in order to maintain safe and efficient access from the runway and aircraft parking areas. Medium intensity pavement edge lighting is provided along Runways 12R-30L and 12C-30C. The lighting for runways 12R-30L and 12C-30C was recently replaced by the WGAA and included new cabling, conduit, transformers, and light fixtures. Medium intensity pavement edge lighting will be installed on Runway 12L-30R and connecting taxiways as part of the reconstruction project. Runway threshold lighting identifies each runway end.

A project to install taxiway and runway identification signage was recently completed. Taxiway and runway identification signage assists pilots in locating their position on the airfield and directing them to their desired location.

Visual Approach Lighting: A Precision Approach Path Indicator (PAPI) is installed at the ends of Runways 12L, 12C, 30R, and 30C. The PAPI consist of a series of four lights located near the runway threshold. When interpreted by the pilot they give him or her a detailed indication of being above, below, or on the designed descent path until touchdown on the runway. A PAPI system has a range of five miles during the day and up to nearly 20 miles during nighttime operations.

PASSENGER TERMINAL COMPLEX

The Williams Gateway Airport Authority has initiated site improvements and remodeling plans for a new passenger terminal complex in Building 15. The new passenger terminal complex will encompass airline ticketing, security screening and a baggage claim area. In addition, the final complex will include an addition of 362 parking spaces for passengers and rental cars. This project is expected to be completed in the year 2000. The location of Building 15 is depicted on **Exhibit 1C**.

GENERAL AVIATION COMPLEX

General aviation amenities are contained within Building 19. These include a pilot's lounge, flight planning room, pilot shop, and a restaurant. The airport currently has 52 based private and instructional aircraft.

OTHER FACILITIES

A number of additional aviation facilities and services are offered at the airport. These include but are not limited to:

- Aircraft fueling
- Flight training
- Fire services (contracted with the City of Mesa F.D.)
- Aircraft towing
- Wash rack
- Line services.

A number of additional facilities and services are being planned for the airport in both the short and long term planning horizons. These are illustrated on **Exhibit 1C**.

AIRSPACE AND AIR TRAFFIC CONTROL

The Federal Aviation Administration (FAA) Act of 1958 established the FAA as the responsible agency for the control and use of navigable airspace within the United States. The FAA Western-Pacific Region, with offices in Lawndale, CA, controls the airspace in Arizona.

The FAA has established the National Airspace System (NAS) to protect persons and property on the ground and to establish a safe and efficient airspace environment for civil, commercial, and military aviation. The NAS covers the common network of U.S. airspace, including air navigation facilities; airports and landing areas; aeronautical charts; associated rules, regulations, and procedures; technical information; personnel and material. The system also includes components shared jointly with the military.

AIRSPACE STRUCTURE

Since the inception of aviation, nations have set up procedures within their territorial boundaries to regulate the use of airspace. Prior to 1993, airspace classifications in the United States were inconsistent with those in other countries. Since then, the FAA has reclassified all airspace within the United States to provide consistency with international standards. Although airspace classifications have changed, the basic premise of the use of airspace in the United States remains the same, and airspace is still broadly classified as either "controlled" or "uncontrolled."

The difference between controlled and uncontrolled airspace relates primarily to requirements for pilot qualifications, ground to air communications, navigation and air traffic services, and weather conditions. Six classes of airspace have been designated. **Exhibit 1D** shows the airspace classifications and terminology. Airspace designated as Class A, B, C, D, or E is considered controlled airspace. Aircraft operating within controlled airspace are subject to varying requirements for positive air traffic control. Several types of controlled airspace exist in the Williams Gateway area:

- Class A, formerly known as the Positive Control Area.
- Class B airspace, formerly known as the Terminal Control Area (TCA), associated with Phoenix Sky Harbor International Airport.
- Class D airspace, formerly known as control zones and airport traffic areas for airports with air traffic control towers.
- Class E airspace, formerly known as transition areas and control zones for airports without air traffic control towers.
- Class G airspace under the new system covers uncontrolled airspace.

The airspace for the study area is depicted on **Exhibit 1E.**

Class A Airspace

Class A airspace includes all airspace from 18,000 feet above mean sea level (MSL) to Flight Level 600 (approximately 60,000 feet MSL). This airspace is designated in FAR Part 71.193 for positive control of aircraft. The Positive Control Area allows flights governed only under Instrument Flight Rules (IFR) operations. The aircraft must have special radio and navigation equipment and the pilot must obtain clearance from an Air Traffic Control (ATC) facility to enter Class A airspace. In addition, the pilot must possess an instrument rating.

Class B Airspace

Class B airspace has been established at 29 high density airports in the United States as a means of regulating air traffic activity in those areas. They are established on the basis of a combination of enplaned passengers and volume of operations.

Class B airspace is designed to regulate the flow of uncontrolled traffic above, around and below the arrival and departure airspace required for high performance, passenger-carrying aircraft at major airports. Class B airspace is the most restrictive controlled airspace routinely encountered by pilots operating under Visual Flight Rules (VFR) in an uncontrolled environment.

In order to fly through Class B airspace, the aircraft must have special radio and navigation equipment and must obtain an air traffic control clearance. In addition, to operate within Class B Airspace, a pilot must have at least a private pilot's certificate or be a student pilot who has met the requirements of FAR 61.95, requiring special ground and flight training for the Class B airspace. Helicopters do not need special navigation equipment or a transponder if they operate at or below 1,000 feet and have made prior arrangements in the form of a Letter of Agreement with the FAA controlling agency. Aircraft are also required to have and utilize a Mode C transponder within a 30 nautical mile (NM) range of the center of the Class B airspace.

Williams Gateway Airport is situated beneath the Phoenix Sky Harbor International Airport Class B Airspace. The base of this airspace begins at 5,000 feet MSL southeast of the airport, steps down to 4,000 feet MSL northwest of the airport, and has a ceiling of 10,000 feet MSL. This configuration allows aircraft to utilize Williams Gateway without entering Class B Airspace.

Class D Airspace

Class D airspace is controlled airspace surrounding airports with an Air Traffic Control Tower (ATCT). The Class D airspace typically constitutes a cylinder with a horizontal radius of four or five nautical miles from the airport, extending from the surface up to a designated vertical limit, typically set at approximately 2,500 feet above the airport elevation. If an airport has an instrument approach or departure, the Class D airspace extends along the approach or departure path.

Williams Gateway is located under Class D airspace. The Class D airspace extends outward from the airport to a radius of five nautical miles, and from the surface to 3,900 feet MSL. Aircraft operating in this airspace are required to contact the Williams Gateway ATCT prior to entering. When the ATCT is closed, this airspace reverts to Class E Airspace.

Class E Airspace

The Class E airspace consists of controlled airspace designed to contain IFR operations during portions of the terminal operation and while transitioning between the terminal and enroute environments. The airspace extends upward from 700 feet above the surface when established in conjunction with an airport which has an instrument approach procedure, or from 1,200 feet above the surface when established in conjunction with airway route structures or segments. Unless otherwise specified, Class E Airspace terminates at the base of the overlying airspace. Only aircraft operating under IFR are required to be in contact with air traffic control when operating in Class E airspace. At Williams Gateway Airport, Class E airspace (from the surface to Class A and/or Class B Airspace) extends outward from the designated Class D Airspace radius.

Class G Airspace

Airspace not designated as Class A, B, C, D, or E is considered uncontrolled, or Class G, In addition, there are several restricted areas related to wildlife around the Williams Gateway area. These areas include the Salt River Bald Eagle Breeding Area located 11 miles north of the airport, the Superstition Wilderness Area located 12 miles northeast, the Fort McDowell Bald Eagle Breeding Area located 15 miles north, airspace. Air traffic control does not have the authority or responsibility to exercise control over air traffic within this airspace. Class G airspace lies between the surface and the overlaying Class E Airspace (700 to 1,200 feet Above Ground Line (AGL)). Additional FAA rules regulate flight altitudes over congested residential areas, National Parks, and outdoor recreational areas, which are often located under Class G airspace. The overall amount of Class G Airspace is continuing to decline due to the need for more coordinated air traffic activity.

Special Use Airspace

Special Use Airspace is defined as airspace where activities must be confined because of their nature or where limitations are imposed on aircraft not taking part in those activities. There are several Military Operations Areas (MOA's) in the Williams Gateway Airport area. These areas are reserved for military use and are designed to separate nonparti-cipating aircraft from military training operations. The closest MOA to Williams Gateway is the Outlaw MOA located 13 miles east of the airport.

There is a multi-level restricted area designated as R-2310A/B/C located 16 miles south east of Gateway Airport. Restrictions in this area are intermittent and are broadcast as a Notice to Airmen (NOTAM) when active. Restrictions can be in effect at varying altitudes from the surface to Flight Level (FL) 350 (approximately 35,000 feet MSL).

the Four Peaks Wilderness Area located 18 miles to the northeast, and the Verde River Bald Eagle Breeding Area located 26 miles north. All aircraft are requested to maintain a minimum altitude of 2,000 Above Ground Level (AGL) over these restricted areas. FAA Advisory Circular 91-36C defines the "surface" as the

highest terrain within 2,000 feet laterally of the route of flight or the upper-most rim of a canyon or valley. Areas of special use airspace in the vicinity of Williams Gateway Airport are depicted on **Exhibit 1E.**

ENROUTE NAVIGATIONAL AIDS

Enroute navigational aids (NAVAIDS) are established for the purposes of accurate enroute air navigation. Various devices use ground-based transmission facilities and on-board receiving instruments. Enroute NAVAIDS often provide navigation to more than one airport as well as to aircraft traversing the area. Enroute NAVAIDS that operate in the study area are discussed below and depicted on **Exhibit 1E**.

The VOR (Very High Frequency Omnidirectional Range) provides course guidance to aircraft by means of a Very High Frequency (VHF) radio frequency. TACAN (Tactical Air Navigation), primarily a military-oriented facility, is often collocated with a VOR station. TACAN provides both course guidance and line-of-sight distance measurement from a Ultra High Frequency (UHF) transmitter. A properly equipped aircraft translates the VORTAC signals into a visual display of both azimuth and distance. Distance measuring equipment (DME) is also sometimes collocated with VOR facilities. DME emits signals enabling pilots of properly equipped aircraft to determine their line-of-sight distance from the facility. There are four VORTAC facilities offering navigational assistance in the vicinity of Williams Gateway Airport. These include Phoenix, Willie, Stanfield, and Tucson.

VORs define low-altitude (Victor) and high altitude airways (Jet Routes) through the area. Most aircraft enter the Williams Gateway area via one of these numerous federal airways. Aircraft assigned to altitudes above 18,000 feet MSL use the Jet Route system. Other aircraft use the low altitude airways. Radials off VORs define the centerline of these flight corridors.

As illustrated on **Exhibit 1E**, there are seven Victor Airways in the immediate vicinity of the airport; V105-257, V327-562-567, V528, V190, V16, V105, and V95 all originate from the Phoenix VORTAC.

The non-directional beacon (NDB) transmits non-directional signals whereby the pilot of an aircraft equipped with direction-finding instrument can determine a bearing to or from the radio beacon. There are four NDB facilities in the area: Scottsdale to the northeast, Falcon Field to the east, Chandler to the south east, and Glendale to the northwest. Each NDB transmits a continuous two-letter identifier code in International Morse Code.

AREA AIRPORTS

There are ten public use airports, ten private, one active and one closed military airport within 30 nautical miles (NM) of Williams Gateway Airport. The following ten airports are open to the public: **Scottsdale Airport** (SDL) located 21 NM northwest, is served by Runway 3-21, which is 8,251 feet long, and an airport traffic control tower; **Chandler Municipal Airport** (CHD) seven NM west which is served by parallel runways with 4L-22R providing the greatest runway length (4,850 feet long by 75 feet wide); **Mesa Falcon Field** (FFZ), eight NM northwest, with a 5,100-foot paved runway and a 3,800-foot paved runway; **Stellar Airpark** (P19), 12 NM west, with a 4,000-foot paved runway; **Superior Municipal** (E81), 25 NM east provides a 3,500-foot dirt runway; **Estrella Sailport** is a privately owned public use airport situated 28 NM southwest of Williams Gateway Airport provides four unpaved runways (three of which are parallel runways); **Eloy Municipal** (E60), is 29 NM southeast and served by a 3,900-foot paved runway; **Casa Grande Municipal**, located 20 NM south with a 5,200 foot paved runway; **Coolidge Municipal**, which provides a 5,500 foot paved runway is located 24 NM southeast; and **Phoenix Sky Harbor International**, the largest airport in the state, is located 18 NM northwest and is served by two parallel runways, the longest of which is 11,001 feet long. An additional runway is currently under construction. **Exhibit 1E**, illustrates the location of these and other area airports.

INSTRUMENT APPROACHES

Instrument approaches are defined using electronic and visual navigational aids to assist pilots in landing when visibility is reduced below specified minimums. While these are especially helpful during poor weather, they often are used by commercial pilots when visibility is good. Instrument approaches are classified as precision and nonprecision. Both provide runway alignment and course guidance, while precision approaches also provide glide slope information for the descent to the runway.

Precision Instrument Approaches

Most precision approaches in use in the United States today are instrument landing systems (ILS). An ILS provides an approach path for exact alignment and descent of an aircraft on final approach to a runway. The system provides three functions: *guidance*, provided vertically by a glide slope (GS) antenna and horizontally by a localizer (LOC); *range*, furnished by marker beacons or distance measuring equipment (DME); and *visual alignment*, supplied by approach light systems and runway edge lights.

Williams Gateway Airport has one published precision approach. Runway 30C is equipped with an ILS consisting of a localizer and glide slope antenna. This is depicted on **Exhibit 1F**.

The Runway 30C ILS utilizes a nonstandard 2.5 degree glide slope. (A

standard glide slope is 3 degrees). The glide slope is expected to be adjusted to 3 degrees in November 1999. The approach to Runway 30C can be flown down to Category I standards, when cloud ceilings are 1,880 feet MSL or greater and visibility is three-quarters of a mile or greater.

Nonprecision Approaches

The localizer antenna used for the Runway 30C ILS approach can also be used for a nonprecision approach to Runway 30C without the aid of the glideslope. This can be flown when cloud ceilings are 1,880 feet MSL or greater and visibility is one mile for aircraft with approach speeds of up to 121 knots, 1-1/4 miles for aircraft with approach speeds up to 141 knots, 1-1/2 miles for aircraft with approach speeds up to 166 knots, and 1-3/4 miles for aircraft with approach speeds of 166 knots or greater.

The VOR/TACAN approach to Runway 30C is the second published nonprecision approach at Williams Gateway. VOR signals from the Williams Gateway VORTAC (Willie) define the approach and are used with signals from other area VORs and/or DME fixes to ensure adequate terrain and obstruction clearance during final approach to the runway. The VOR/TACAN approach to Runway 30C can be flown when cloud ceilings are 1,880 feet MSL or greater and visibility is one mile for aircraft with approach speeds of up to 121 knots, 1-1/4 miles for aircraft with approach speeds up to 141 knots, 1-1/2 miles for aircraft with approach speeds up to 166 knots, and 1-3/4 miles for aircraft approaching with speeds of 166 knots or greater.

Aircraft utilizing DME on the VOR/TACAN 30C approach are given slightly improved approach minimums. These aircraft are allowed to fly this approach when cloud ceilings are 1,700 feet M.S.L. or greater and visibility is one mile or greater with approach speeds up to 166 knots, and 1-1/4 miles with approach speeds above 166 knots.

A Global Position System (GPS) nonprecision approach is also available for Runway 30C at Williams Gateway Airport. GPS approaches are defined by a series of waypoints established by satellite signals. The Runway 30C GPS approach consist of three waypoints at varying distances apart ending at the end of Runway 30C. This GPS approach can be flown when cloud ceilings are 1,800 feet MSL or greater and visibility is one mile for aircraft with approach speeds of up to 121 knots, 1-1/2 miles for aircraft with approach speeds up to 166 knots, and 1-3/4 miles for aircraft with approach speeds in excess of 166 knots.

CUSTOMARY ATC AND FLIGHT PROCEDURES

Flights to and from Williams Gateway Airport are conducted using both IFR and VFR. Instrument Flight Rules are those that govern the procedures for conducting instrument flight. VFR govern the procedures for conducting flight under visual conditions (good weather). Most air carrier, military, and general aviation jet operations are conducted under IFR regardless of the weather conditions.

Visual Flight Rule Procedures

Under VFR conditions, the pilot is responsible for collision avoidance and will typically contact the tower when approximately 10 miles from the airport for sequencing into the traffic pattern. While VFR aircraft arriving and departing Williams Gateway Airport are not required to contact the Phoenix TRACON, they may do so to expedite their progress through the area.

Typically, VFR general aviation traffic stays clear of the more congested airspace and follows recommended VFR flyways in the area. **Exhibit 1G** illustrates a view of Williams Gateway vicinity airspace with the recommended VFR routes. Typically, VFR aircraft departing the airport are directed to intercept the nearest VFR route.

Instrument Flight Rule Procedures

The Phoenix Terminal Radar Approach Control (TRACON) handles all IFR traffic to and from Williams Gateway Airport. IFR arrival traffic is transferred to the TRACON by the Air Route Traffic Control Center (ARTCC) as traffic enters TRACON airspace.

Five published Standard Terminal Arrival Routes (STAR) can be used to direct pilots to the Williams Gateway area. A STAR is a planned IFR arrival procedure which provides transition from the enroute structure to an outer fix or an instrument approach fix in the terminal area. ARILIN ONE, FERER FOUR, FOSSIL FOUR, KARLO SEVEN and SUNSS TWO, are STARs which may be used for arrival to Pilots operating at Williams Gateway Airport are encouraged to avoid overflights of nearby residential areas whenever possible. To aid these efforts, a number of recommended procedures have been developed as part of the airport's adopted "Fly Friendly" program:

Williams Gateway Airport. ARLIN ONE directs pilots arriving from the west over the AMBER, ALEYS, and TUKEE intersections then direct to the Willie VORTAC followed by an published approach procedure.

The FERER FOUR is reserved for non-turbine powered aircraft when being used for approach to Williams Gateway. This arrival procedure directs pilots arriving from the north over the FERER, and RADOM intersections then direct to the Phoenix VORTAC followed by a published approach procedure to Williams Gateway Airport.

The FOSSIL FOUR arrival requires pilots arriving from the northeast to fly over the FOSSIL, PIINE, MAZAT, and TONTO intersections followed by vectors to Williams Gateway.

KARLO SEVEN is utilized by aircraft arriving from the northwest. This arrival requires pilots to fly over the KARLO, COOPR, and PLSNT intersections followed by vectors via Williams Gateway.

The SUNSS TWO arrival is used by aircraft arriving from the south and southwest. This arrival directs pilots over the SUNSS, and HOOPS intersections then direct to the Phoenix VORTAC followed by a chosen published approach into Williams Gateway Airport.

NOISE ABATEMENT PROCEDURES

- As a means to reduce low approaches over residential areas northwest of the airfield, Runway 30 has been designated as the calm wind runway for up to a 5 knot tailwind.

- Aircraft departing the airport are encouraged to use the best rate of climb, consistent with safety.

- Light aircraft are requested to use Runway 12R/30L for pattern operations.

- Heavy aircraft are to utilize Runways 12C/30C and 12L/30R for operations to keep noise away from residential areas north of the airfield. When departing Runways 30C and 30R, aircraft should start their crosswind as soon as practicable, preferably before the power lines ½ mile north of Elliot Road.

- Jet aircraft are requested to use NBAA Standard Noise Departure Procedures or those recommended by the air craft manufacturer.

- Propeller aircraft are requested to use AOPA Noise Awareness Steps.

- Arriving/departing rotor wing aircraft are requested to use a southwest corridor to avoid overflights of the Williams Campus and residential areas.

In addition to those proposed in the "Fly Friendly" Program, airline training flights are requested to remain east of the airfield. This will keep the noise associated with these, mostly nighttime, training operations over agricultural land east of the airport.

STUDY AREA

Exhibit 1H depicts the selected study area, encompassing approximately 176 square miles including portions of the Cities of Mesa and Apache Junction, Towns of Gilbert and Queen Creek, and the unincorporated areas of Maricopa and Pinal Counties. The study area is bounded by Val Vista Drive on the west; Riggs Road on the south; Schnepf and Tomahawk Roads on the east: and by Broadway Road on the north. This is the area where most of the detailed noise and land use analysis is expected to occur.

The study area defines the area within which detailed existing land use information is presented. It is intended to contain the area expected to be impacted by present and future aircraft noise of 65 DNL or greater.

It should be emphasized that this area is for the presentation of detailed background data -- it is not a definition of the noise impact area. The study area is primarily for statistical convenience and can be modified later in the study if necessary. Areas adversely affected by aircraft noise will be defined in later analyses.

EXISTING LAND USE

Exhibit 1J shows existing land use in the study area. This map was developed through the interpretation of aerial photography taken on March and April, 1999. Other sources were consulted including existing land use maps developed by local jurisdictions, U.S. Geological Survey maps, published street maps, and consultant field studies conducted in April 1999. The land uses depicted on the map were selected to conveniently fit the requirements of noise and land use compatibility planning. **Table 1B** lists the land use categories shown on the existing land use map.

Virtually the entire northern portion of the study area is developed. This area is dominated by small-lot residential (2-15 du/ac.), with intermixed islands of rural residential (0-2 du/ac.) mall areas of commercial and industrial uses are situated along the Superstition Freeway corridor. The vast majority of noise sensitive institutions such as schools and places of worship are located in the northern portion of the study area.

General Motors Proving Grounds, TRW, and several other industries dominate the land use east of the airfield. Small islands of rural and small lot residential uses are also present. The remaining portion of the study area east of the airport resides in Pinal County. To date, this area of Pinal County is dominated by undeveloped desert.

The south and west section of the study area is traversed by the Union Pacific Railroad and Roosevelt Conservation District Canal. This area is currently dominated by agricultural uses consisting primarily of dairy operations and irrigated crops. An increasing number of large upscale subdivisions are under development in this area. The Williams Campus, containing both residential and noise sensitive institutions, is located immediately west of the airfield.

SCHOOL DISTRICTS

There are six school districts with jurisdiction in the Williams Gateway Airport Study Area: Apache Junction Unified School District #43, Chandler Unified School District #80, Higley School District #60, Gilbert Unified School District #41, Mesa Unified School District #4, and Queen Creek Unified School District #95. These districts administer a total of 29 schools within the study area with a number of additional schools currently being planned.

In addition, the Arizona Boys Ranch is located approximately 2 miles south of the airport. This is a nonprofit juvenile rehabilitation facility housing approximately 550 boys ages 8 to 18.

Williams Campus

The Williams Air Force Base Economic Reuse Plan (1992) initiated the prospect for the establishment of a consortium based campus, encompassing a variety of educational institutions. In 1994, the Williams ERT (Education, Research and Training) Campus Master Plan, defined a 753-acre multi-institutional campus. The primary objective of this proposal was the utilization of existing facilities remaining from the closed Williams Air Force Base.

TABLE 1B
Land Use Categories Shown on Existing Land Use Map

Category	Land Uses Included
Agriculture	Cultivated fields Orchards
Rural Residential	Single-Family < 1 and ≤ 2 dwelling / acre
Low Density Residential	Single-Family > 2 and ≤ 5 dwelling / acre
Medium Density Residential	Single-Family > 5 and ≤ 15 dwelling / acre Duplexes, Townhouses, Apartment and Condominium buildings
High Density Residential	Single-Family ≥ 15 dwelling / acre, Duplexes, Townhouses, Apartment and Condominium buildings
Mobile and Trailer Homes	Manufactured/Mobile homes Trailer homes
Mixed Use	Apartments, Condominiums, and Town homes Local commercial Local retail
Hotels, Motels, Resorts	Hotels, Motels, Resorts
Commercial and Office	Businesses Parks Offices Neighborhood retail Community retail Regional retail
Industrial, Transportation and Utilities	Warehouses Distribution centers Industrial uses
Parks and Open Space	Parks Golf courses Cemeteries Ponds Nature preserves
Public Facilities	Airports
Public/Quasi-Public Facilities	Recreational facilities Government buildings/Complexes
Undeveloped	Vacant lots Open parcels of land
Noise-Sensitive Institutions	Places of worship Schools Nursing homes Residential group quarters Hospitals Community centers

As a result of this plan, several educational institutions have established themselves at the Williams Campus. These include:

Arizona State University (ASU) - East Campus - This institution provides baccalaureate educational programs in the University's School of Technology and Applied Science and the Morrison School of Agribusiness. Additional degrees in Education and Business Administration will be offered beginning Fall 1999.

Maricopa Community College at Williams - Maricopa Community College offers a number of occupational programs resulting in associate degrees or certificates. Programs offered focus mostly on aviation related studies such as aircraft maintenance and flight technology. Additional programs are expected to be offered which will benefit local, regional, and international development in eastern Maricopa County.

University of North Dakota (UND) Aerospace - UND has campuses established at 6 flight training centers around the country. The UND Aerospace Flight Training Center located at Williams Gateway Airport offers bachelor degree programs in Aviation Science, preparing students for careers in various facets of the aviation industry.

Maricopa Regional Schools - East Valley School - This institution offers students in grades K-12 "alternative" primary and secondary education.

The Williams Campus Master Plan established a long-term plan for a thriving campus consisting of:

- Campus Community Park and Recreation Area
- Campus Commercial Center
- Campus Conferencing Center
- Campus Dormitory Expansion
- Campus Remote Parking Areas

FOREIGN TRADE ZONE

Foreign Trade Zone (FTZ) #221, granted to the City of Mesa, is a General Purpose FTZ located on 800 acres at Williams Gateway Airport. FTZ are established to promote international trade and foster economic development.

FTZ #221, like all FTZ's, is considered to be outside U.S. Customs territory for product entry procedures. This offers tremendous advantages to companies operating within this zone. Foreign goods entering the United States via an FTZ are exempt from duty or excise taxes while the product remains within the boundary of the FTZ. Since the goods are still considered foreign commerce while remaining in the FTZ, they may be manipulated to make them more marketable. The final product, if exported from the United States, will be exempt from duty or excise taxes.

If the final product is imported into the United States, duty and excise taxes are levied at a reduced rate. Only the material leaving the FTZ is taxed, leaving scrap, defective merchandise and goods consumed within the zone free from duty. The location of Foreign Trade Zone #221 at Williams Gateway Airport is depicted on **Exhibit 1 K**.

Goods entering an FTZ are generally subject to only minimal Customs procedures. This allows goods to be moved to a factory or warehouse with no clearance delay as well as reducing paperwork. Companies are therefore given the opportunity to improve cash flow and profitability by expediting goods to market.

Goods being held in a Foreign Trade Zone have not been granted entrance into the United States market. U.S. Customs provides security measures to prevent illegal distribution, thereby reducing the risk of theft.

In addition, the State of Arizona offers an 80 percent reduction in real and personal property taxes for companies located within an FTZ.

HISTORIC AND ARCHEOLOGICAL RESOURCES

According to the Arizona State Historic Preservation Office(SHPO), there are 14 historic properties within the Williams Gateway study area. These sites include five historic buildings and nine archeological sites. The buildings are located on the airfield. One building has been listed and four buildings have been nominated for inclusion in the National Register of Historic Places due to their significance as hangers during World War II.

The nine archeological sites are described as "prehistoric" and have all been listed in the National Register. In order to avoid disruption of these sites by future airport development, additional field work and testing is expected. Due to the sensitive nature of these sites, they are not depicted on an exhibit.

LAND USE PLANNING POLICIES AND REGULATIONS

The primary non-regulatory policy document which influences development is the General Plan. The General Plan provides the basis for the zoning ordinance and sets forth guidelines for future development.

In most cities and counties, the chief land use regulatory document is the zoning ordinance which regulates the types of uses, building height, bulk, and density permitted in various locations. Subdivision regulations are another important land use tool, regulating the platting of land. Local communities also regulate development through building codes. An additional document is the capital improvements program. This is typically a short-term schedule for constructing and improving public facilities, such as streets, sewers and water lines.

The following paragraphs describe each of the above areas as a means towards understanding the land use planning policies and regulations impacting the study area.

REGULATORY FRAMEWORK

In the Williams Gateway Airport Study Area, the cities of Mesa and Apache Junction, the towns of Queen Creek and Gilbert, and the counties of Pinal and Maricopa share the responsibility for land use regulation. Each jurisdiction administers zoning ordinances, subdivision regulations, and building codes.

Arizona state law requires counties to prepare a comprehensive, generalized land use plan for development of their area of jurisdiction. The county also provides for zoning and the delineation of zoning districts. The county is also responsible for regulating the subdivision of all lands within its jurisdiction, except subdivisions which are regulated by municipalities. Both Maricopa and Pinal Counties regulate unincorporated areas within the Study Area.

Arizona state law permits cities and towns to prepare, adopt and implement comprehensive, long-range, generalized land use plans for land both under their current jurisdiction and for unincorpo-rated (extraterritorial) sections of the county which are likely to be annexed by the city/town. General land use plans include plans and policies explaining the community's goals, objectives, principles, and standards for overall growth and development.

Local governments are required to regulate the subdivision of all lands within their corporate limits and may also prepare and adopt zoning Like many municipalities in the Phoenix metropolitan area, Apache Junction began to experience tremendous growth pressures by the mid 1980's. As a means to direct growth and maintain a desired urban environment the City Council adopted the Apache Junction General Plan in 1987.

ordinances and building codes. Zoning must be consistent with the General Plan, where one has been prepared.

Within the Williams Gateway Airport Study Area, all the municipalities have prepared and adopted general plans, zoning ordinances, subdivision regulations and building codes. These planning and development tools are described below.

GENERAL PLANS

Comprehensive, long-range plans serve as a guide to individual communities and jurisdictions to provide quality growth and development. The plans represent a generalized guideline, as opposed to a precise blueprint, for locating future development. The plan generally consists of elements which examine existing land uses and designates proposed future land uses and facilities. By illustrating preferred land use patterns, including extraterritorial areas, a general plan can be used by community decision-makers and staff, developers, investors, and citizens to assist them in evaluating future development opportunities. **Exhibit 1L,** depicts the proposed future land uses for the study area, as contemplated by the individual jurisdictions in their general plans.

Apache Junction General Plan

The Land Use Element of this plan designates eight land use districts: Five residential districts, one commercial district, one Industrial district, and one open space district. This plan does not make reference to Williams Gateway Airport, Williams Air Force Base or aviation related noise

within the planning environment. The City of Apache Junction, however, is in the process of preparing a new General Plan which is expected to be adopted by September 1999.

Mesa General Plan

The Mesa General Plan (1996) is designed to define the direction of growth and the type of development that is desired and expected to occur in Mesa over the next 20 years. The Mesa General Plan establishes land use, circulation, and economic development plans, as well as specific strategies for the community to implement those plans.

Future land use designation in the General Plan within the study area are a mixture of residential, commercial, industrial, and open space. Development immediately surrounding the airport has been designated for future commercial and industrial uses. These uses would create a buffer between the airport and existing and future noise sensitive land uses. Land use compatibility policies such as overflight overlay zoning, the prohibition of residential development within the 65 DNL, and fair disclosure statements are discussed in reference to Williams Gateway Airport.

Although the Gilbert General Plan does not make specific reference to noise produced by aircraft operations at Williams Gateway Airport, the town does adhere to planning recommend-ations presented in the Williams Regional Planning Study.

Queen Creek General Plan

As a means to maintain it's rural characteristics, the Town of Queen Creek, adopted it's first

Gilbert General Plan

The Gilbert *General Plan Policy Guide* was last updated in 1994 (Town of Gilbert, 1994). The Plan provides for eight land use classifications: four are varying densities of residential development; the other four are commercial and "employment" land uses. Employment land uses include "quality planned office and industrial uses." These uses are encouraged in designated areas to "provide employ-ment opportunities and to help raise the Town's tax base." The Gilbert General Plan encourages multi-use development areas in the vicinity of the Santan Freeway corridor and Williams Gateway Airport.

Exhibit 1L shows that the Gilbert portion of the study area on either side of the San Tan Freeway Corridor is designated for "multi-use employment." North of Pecos Road, the future land use is designated as low-density residential. A multi-use commercial area is designated at the corner of Williams Field and Gilbert Roads. The General Plan also proposes a system of open space and trails along the Eastern Canal.

General Plan in 1991. This plan was subsequently updated in 1996 and in 1999. The General Plan is comprised of nine elements: Land Use, Circulation, Economic, Public Facilities and Services, Town Center, Open Space and Trails, and Growth Areas.

The Land Use element of the General Plan (Section D.5) focuses on the adoption of implementation strategies proposed in the Williams Regional Planning Study. These strategies establish methods for the mitigation of

incompatible land uses in the vicinity of Williams Gateway Airport. The Plan recommends the implementation of 3 Airport Overflight Districts containing the following provisions:

- Prohibition of residential development within the 65 DNL contour associated with Williams Gateway Airport.
- Property located within the 60-65 DNL should require notification to potential property buyers of the existence of the airport.
- Encourage the use of noise attenuating construction methods.

The General Plan also establishes areas of future compatible land uses within the vicinity of the airport. Areas found to be within ½ mile of the 65 DNL contour, established in the Williams Regional Planning Study, are reserved for proposed industrial uses. Additional compatible uses are to be established as a buffer between the airport and current and proposed residential areas.

Pinal County Comprehensive Plan

For planning purposes, Pinal County is divided into four sub-areas. Part of the Williams Gateway Airport study area is situated in Planning Area One. This region includes Apache Junction, Queen Creek, Santan, Gold Canyon, Florence, and Queen Valley. The Pinal County Comprehensive Plan for Area 1 was adopted by the Pinal County Board of Supervisors in 1988.

The Comprehensive Plan makes several references to the potential for high levels of aircraft noise emanating from the airports located west of Planning Area, including the former Williams Air Force Base. Residential development is discouraged in airport approach zones due to adverse levels of noise. In addition, coordination with local, state and federal noise nuisance control programs and standards are encouraged.

Maricopa County Land Use Plan

The Maricopa County Land Use Plan is divided into 15 separate Area Plans.

The Queen Creek Land Use Plan, adopted in 1992, covers the unincorporated portions of the Williams Gateway study area. This plan is segregated into four elements: Inventory and Analysis, Residential Issue Identification, Goals and Policies, and Queen Creek Land Use Plan. Three of these element specifically address the issue of noise emanating from Williams AFB.

The Inventory element identifies existing conditions in the planning area and evaluates how these conditions may affect planning future policies. A portion of the inventory section concentrates on existing noise generated by Williams AFB. In addition, this section identifies the Air Installation Compatible Use Zone (AICUZ) Study (1984 Williams AFB) and the Eastside Joint Land Use Study (1988 Maricopa Association of Governments) as the foundational guiding studies identifying areas of noise exposure and compatible land uses around Williams AFB.

The Goals and Policies element establishes the objectives on which the land use plan is based. One such goal is to: "*permit developments which are compatible with natural environmental features and do not lead to its destruction*". Two of the policy objectives associated with this goal focus on the mitigating land uses which would be adversely affected by excessive noise levels:

Policy A-1 - "*Encourage compatible land use relationships with sources of excessive noise*". Policy A-1.1 - "*Encourage land development which will not be adversely impacted by noise generated by Williams Air Force Base relative to Military Airport Zoning*".

The Land Use Plan Element provides for ten land use classifications: four encompass various densities of residential development, three are reserved for commercial areas, two for employment centers containing mixed and industrials uses, and one open space classification. This element specifically discourages residential development in the vicinity of Williams AFB.

Although the plan was adopted before the establishment of Williams Gateway Airport, it does acknowledge the expected closing of Williams A.F.B. in 1993. The reuse of the airbase after closing is expressed in the plan as possessing potential positive economic benefits for the area. The plan does not however, address the potential need for land use compatibility after the airbase closing.

Maricopa County
Comprehensive Plan

The Maricopa County Board of Supervisors, on October 20 1997, adopted the Maricopa County Comprehensive Plan entitled "Eye to the Future 2020". This plan provides guidance for development in the unincorporated areas of Maricopa County. This plan is separated into four elements: Land Use, Transportation, Environmental, and Economic Development. Two of these elements, Land Use and Environmental, address the minimization of noise impacts within the county.

The "Goal" of the Land Use Element is to "Promote efficient land development that is compatible with adjacent land uses, is well integrated with the transportation system, and is sensitive to the natural environment". One objective and subsequent policies under this goal

specifically address and provide guidance for compatible land use in the vicinity of airports:

- Objective L4 - "Provide for the coexistence of urban and rural land uses."
    - Policy L4.1 - "Encourage appropriate buffers to mitigate conflicting land uses."
    - Policy L4.3 - "Encourage development pattern and standards compatible with the continuing operation of military and civilian airports and other major noise generating employment centers."

The "Environment Element" addresses four environmental resource issues including the mitigation of "noise pollution" under a section entitled "Air Resources". This section acknowledges increased concerns pertaining to a number of noise sources, including aircraft. "Goal Two" of the Environmental Element, "Improve air quality and reduce noise impacts",

- Policy L1.6 - "Use the adopted general plan and standards of municipalities as a guideline for development in the General Plan Development Area contingent upon such plans having been updated or reviewed within five years and with evidence that the effected residents, property owners and improvement districts have been involved in the process to update the general plan."

Although the municipal plans provide development guidelines for these unincorporated areas of the county, zoning entitlements are required by state statute to be granted through the County Board of Supervisors.

addresses the topic of noise. The "Objective" and subsequent "Policy" pertaining to aircraft noise under this goal are as follows:

- Objective 2E2 - "Minimize vehicle traffic noise on sensitive land uses."
    - Policy 2E2.2 - "Encourage the consideration of noise impacts on site planning."

In the Williams Gateway Airport region, the unincorporated areas of the county fall under the General Plan Development Area (GPDA) land use designation, set forth by the Maricopa County Comprehensive Plan . Areas under the GPDA are expected to be annexed by an adjacent city or town in the future. These areas have been included within the adjacent municipality's general plan. "Policy L1.6" of the Maricopa County Comprehensive Plan provides the guidelines for the use of a municipality's general plan for land use decisions within these areas.

WILLIAMS REGIONAL PLANNING STUDY

In March of 1996, the Williams Gateway Airport Authority completed the Williams Regional Planning Study (WRPS) with the aid of a professional consultant. This study focuses on three objectives:

- Maximizing the economic development potential of Williams Gateway Airport and the surrounding area;

- Minimize potential land use conflicts around the airport including the encroachment of incompatible uses;

- Create guiding principles for consistent regional land use across jurisdictions within the vicinity of the airport.

The WGAA appointed an eight member steering committee of professionals representing the jurisdictions of Apache Junction, Chandler, Mesa, Gilbert, Queens Creek, Maricopa, Pinal and the Maricopa Association of Governments (MAG). Through research and the incorporation of numerous public workshops, two fundamental recommendations were incorporated into the Williams Regional Planning Study: The establishment of an Airport Overflight Zoning District, and General Plan and Zoning Amendments. These two recommendations are discussed below.

Airport Overflight Zoning District

- **Public Disclosure of Potential Noise Impacts.** - *"No person shall sell, nor offer for sale, or rent/lease any residential property within Airport Overflight Area 2 unless the prospective buyer or renter has been notified of the fact that the property is within the Airport Overflight Area 2 and that the property therein is subject to potential noise impacts from Williams Gateway Airport (WGA)*"

- **Notification of Plat or Title** - All residential plats recorded within Airport Overflight Area 2 shall be inscribed with the following: *"These properties, due to their proximity to Williams Gateway Airport, are likely to experience aircraft overflights, which could generate noise levels which may be of concern to some individuals."*

The airport Overflight Zoning District, depicted in **Exhibit 1M**, is separated into three subdistricts containing the following recommended guidelines:

AIRPORT OVERFLIGHT AREA 1

The area at or within the 65 DNL contour.

- **Prohibition of new residential development.** - All types of residential development are to be prohibited in Airport Overflight Zoning District One. This area is defined by the 65 DNL contour as presented in the Williams Gateway Regional Planning Study and is deemed as having a significant impact on residential land uses.

AIRPORT OVERFLIGHT AREA 2

The area established between the 60 and 65 DNL contours. This area is slightly expanded by adding an additional ½mile "squared -off" boundary for ease of enforcement.

- **Noise Attenuation** - *"The construction, alteration, moving, partial demolition, repair and use of any building or structure within the Airport Overflight Area 2 shall comply with the Sound Attenuation Standards in order to achieve an exterior to interior Noise Level Reduction (NLR) of 20 decibels."*

- **Avigation Easements** - An avigation easement is an agreement signed by the property owner that acknowledges that an

airport is located nearby and aircraft to/from that airport have the right to fly over the property. In addition, through the recording of this easement, future property owners will be made aware of the easements existence, and hence aircraft overflights, prior to purchase of the property.

AIRPORT OVERFLIGHT AREA 3

This area is designated as the region outside the 60 DNL contour area as defined by Airport Overflight Area 2. This area extends to an area which is considered to be influenced by aircraft operations. This area is also "squared-off" for ease of enforcement.

- **Public Disclosure of Potential Noise Impacts.** - Residential plats recorded within Airport Overflight Area 3 shall note the following: *"These properties, due to their proximity to Williams Gateway Airport, are likely to experience aircraft overflights, which could generate noise levels which may be of concern to some individuals"*

- **Notification of Plat or Title** - Knowledge of potential aircraft noise impacts should be made to users of residential properties through a Aircraft Noise Disclosure Statement. This statement is similar to that presented for Overflight Area 2.

General Plan
And Zoning Amendments

As a means to protect the airport environment, this plan recommends that area jurisdictions adopt or amend their General Land Use Plans to be consistent with the WRPS. In addition, these jurisdictions are recommended to incorporate the following statements into their respective zoning ordinances: "*Land uses that produce visual hazards, such as smoke and glare, or produce*

electronic interference shall be prohibited within Airport Overflight Areas", "Sanitary landfills, which can encourage birds to concentrate, should be prohibited within the Airport Overflight Areas."

The Williams Regional Planning Study has been adopted as a planning guideline by the City of Mesa, the towns of Gilbert and Queen Creek, and the County of Maricopa.

ZONING

While general land use plans are land use policy guidelines, cities and counties actually control land use through zoning ordinances. In the study area, all jurisdictions have established zoning ordinances.

This section summarizes the zoning ordinances in each jurisdiction in the airport vicinity. This information will be used in subsequent chapters to identify zoning districts which provide a compatible land use buffer and those that allow encroachment by noise-sensitive land uses. For zoning districts which permit noise-sensitive land uses, this information will provide insights into how the district regulations may be amended to promote noise-compatible development.

City of Mesa

In 1988, the city of Mesa established an Airfield Overlay District (AOD). The objective of this ordinance is to minimize public exposure to crash hazards and high noise levels associated with public, private and military airfields through the promotion of future development which is compatible with airfield operations. The AOD is separated into eight "sub-districts" which are delineated by specific parameters established in the 1988 MAG Eastside Joint Land Use Study for Williams AFB.

The Mesa Zoning Ordinance was revised in 1998 and contains 25 basic zoning districts: One agricultural district, ten residential districts, four commercial districts, three industrial districts, six town center districts, one public facilities district. In addition, the ordinance establishes seven overlay districts including one pertaining to Williams AFB, which is divided into eight sub-districts.

The Bonus Intensity (BIZ), Planned Area Development (PAD), and Development Master Plan (DMP) Overlay Districts provide for flexibility in development conditions such as building height, setbacks and other amenities. Although these districts must conform to the uses established in the underlying district, they offer the ability to increase development density including that associated with residential uses.

The Age Specific District (AS) overlay zone is keyed to developments for the retired. This district is intended to be designed and provide for the physical and social needs of older individuals.

The Historic Landmarks (HL) and Historic Preservation (HP) Overlay Districts are intended to preserve the historic and cultural character of the city. Development within these districts are required to conform to specific architectural design standards which reflect the character of the neighborhood. In addition, structures found to meet certain criteria for historical significance cannot undergo demolition.

A listing of the various zoning districts in Mesa is shown in **Table 1C,** along with the noise-sensitive uses permitted in those zones and the permissible maximum residential development densities.

TABLE 1C
Summary of Zoning Provisions:
City of Mesa

	Noise-Sensitive Uses		
Zoning Districts	**Permitted**	**Conditional, Subject to Special or Council Use Permit**	**Minimum Lot Size or Density Units/Acre**
AGRICULTURE DISTRICT			
AG, Agriculture	Single-family dwelling Foster homes Group homes for the disabled Day care group home Schools Places of worship	Animal hospitals & clinics Day care centers in conjunction with place of worship Accessory living quarters	0.1 DU/Acre
SINGLE RESIDENCE DISTRICTS			
R1-90, Single Residence	Single dwelling Foster homes Residential facilities for the developmentally disabled Schools Places of worship Group homes for the handicapped Adult care home Day care group homes	Day care centers in conjunction with places of worship Accessory living quarters	0.48 DU/Acre
R1-43, Single Residence	Same as R1-90	Same as R1-90	1 DU/Acre
R1-35, Single Residence	Same as R1-90	Same as R1-90	1.25 DU/Acre
R1-15, Single Residence	Same as R1-90	Same as R1-90	2.90 DU/Acre
R1-9, Single Residence	Same as R1-90	Same as R1-90	4.84 DU/Acre
R1-7, Single Residence	Same as R1-90	Same as R1-90	6.22 DU/Acre
R1-6, Single Residence	Same as R1-90 to include: Manufactured Home Subdivisions	Same as R1-90	7.26 DU/Acre
MULTIPLE RESIDENCE DISTRICTS			
R-2, Restricted Multiple Residence	Single and Multiple residence Boarding homes Group homes for handicapped Group foster homes Residential facilities for the developmentally disabled Bed and breakfast Schools Places of worship Day care centers Day group homes	Day care center in conjunction with places of worship Boarding homes Group homes for the handicapped Assisted living facilities Recovery homes	7.26 DU/Acre

TABLE 1C (Continued)
Summary of Zoning Provisions:
City of Mesa

	Noise-Sensitive Uses		
Zoning Districts	**Permitted**	**Conditional, Subject to Special or Council Use Permit**	**Minimum Lot Size or Density Units/Acre**
MULTIPLE RESIDENCE DISTRICTS (Continued)			
R-3, Limited Multiple Residence	Same as R-2	Same as R-2	7.26 DU/Acre
R-4, General Multiple Residence	Same as R-2 to include Fraternities, sororities, service and social clubs, and lodges Manufactured home and recreational vehicle parks	Same as R-2 to include Hospitals (with accessory group medical centers, nursing and convalescent homes, and hospice) Social service facilities	7.26 DU/Acre
COMMERCIAL DISTRICTS			
O-S, Office-Service	Medical offices and clinics Studios for fine arts Nursing and convalescent homes, residential and out-patient care and rehabilitation centers, and hospice Schools Places of worship Day care centers (with outdoor play area) Reception centers	Accessory dwelling units Wedding or reception centers Assisted living facilities	7.26 DU/Acre
C-1, Neighborhood Commercial	Same as O-S to include Fraternities, sororities, service and social clubs, and lodges Hospitals (with accessory medical centers)	Same as O-S to include Social service facilities	N/A
C-2, Limited Commercial	Same as C-1 to include Movie theaters Performing art centers Hotels and motels Vocational schools	Accessory dwelling units Wedding or reception center Social service facilities	N/A
C-3, General Commercial	Same as C-2	Same as C-2	N/A
INDUSTRIAL, MANUFACTURING AND EMPLOYMENT DISTRICTS			
M-1, Limited Industrial	Same as C-3 to include: Hotels and motels Accessory dwelling units Industrial trade schools	None	N/A
M-2, General Industrial	Same as M-1	None	N/A

TABLE 1C (Continued)
Summary of Zoning Provisions:
City of Mesa

	Noise-Sensitive Uses		
Zoning Districts	**Permitted**	**Conditional, Subject to Special or Council Use Permit**	**Minimum Lot Size or Density Units/Acre**
INDUSTRIAL, MANUFACTURING AND EMPLOYMENT DISTRICTS (Continued)			
PEP, Planned Employment Park	Same as C-3 to include: Hotels and motels	None	N/A

	Reception centers		
TOWN CENTER DISTRICTS			
TAR-1, Town Center Residence	Single residence Foster homes Schools Places of worship Group homes for the handicapped Adult care homes Day care group homes	None	7.26 DU/Acre
TAR-2, Town Center Residence	Same as TAR-1 to include Multiple residence Boarding homes Assisted living facilities Bed and Breakfast Group foster homes	Day care centers Day group homes	7.26 DU/Acre
TAR-3, Town Center Residence	Same as TAR-2	Same as TAR-2	7.26 DU/Acre
T.B.-1, Town Center Business	Movie theaters Medical offices and clinics Day care centers (with outdoor play area) Day care group homes General education Vocational schools Hotels, motels, and resorts Studios for fine arts Residential uses allowed in TAR-3 Nursing and convalescent homes, and hospice Fraternities, sororities, service and social clubs, and lodges Schools Places of worship Wedding and reception centers	Social service facilities	N/A

TABLE 1C (Continued)
Summary of Zoning Provisions:
City of Mesa

	Noise-Sensitive Uses		
Zoning Districts	**Permitted**	**Conditional, Subject to Special or Council Use Permit**	**Minimum Lot Size or Density Units/Acre**
TOWN CENTER DISTRICTS (Continued)			
TAC-2, Town Center Business	Movie theaters Medical offices and clinics Studios for fine arts Day care centers (with outdoor play area) Vocational schools Hospitals (with accessory group medical centers, nursing and convalescent homes, and hospice) Small animal hospitals Fraternities, sororities, service and social clubs, and lodges Schools	Social service facilities Accessory dwelling units Industrial trade schools	N/A

	Places of worship Wedding and reception centers		
TAC, Town Center Core	Cultural and civic halls Galleries Auditoriums and arenas Studios for fine arts Medical offices Hotels, motels, and resorts Day care centers Vocational schools Multiple residence (minimum 20 unit/acres) Fraternities, sororities, service and social clubs, and lodges Schools Places of worship Wedding or reception centers	Social service facilities Accessory dwelling unit	N/A
PUBLIC FACILITIES DISTRICT			
PF, Public Facilities	Facilities owned, leased or operated by City, County, State, or Federal Governments, or agencies thereof, or school districts	None	10 Acres
OVERLAY ZONING DISTRICT			
BIZ, Bonus Intensity Zone	Same as those specified in the underlying zoning district	Same as those specified in the underlying zoning district	N/A

TABLE 1C (Continued)
Summary of Zoning Provisions:
City of Mesa

	Noise-Sensitive Uses		
Zoning Districts	**Permitted**	**Conditional, Subject to Special or Council Use Permit**	**Minimum Lot Size or Density Units/Acre**
OVERLAY ZONING DISTRICT Continued)			
PAD, Planned Area Development	Same as those specified in the underlying zoning district	Same as those specified in the underlying zoning district	5 acres
D.P., Development Master Plan	Same as those specified in the underlying zoning district	Same as those specified in the underlying zoning district	40 Acres
AIR FIELD OVERLAY DISTRICT			
ADD-I, Airfield Sub-district one	None	Same as those specified in the underlying zoning district	N/A
ADD-II, Airfield Sub-district two	None	Same as those specified in the underlying zoning district	N/A

ADD-III, Airfield Sub-district three	None	Same as those specified in the underlying zoning district	N/A
ADD-IV, Airfield Sub-district four	None	Same as those specified in the underlying zoning district	N/A
ADD-V, Airfield Sub-district five	Single or multiple residential uses, subdivisions, hotels, or motels (established prior to 1/19/89 with 30 db NCR) Educational service, cultural centers, places of worship, and medical and health services (with 30 db NCR)	Same as those specified in the underlying zoning district	N/A
ADD-VI, Airfield Sub-district six	Single or multiple residential uses, hotels, and motels (established prior to 1/19/89 with 25 db NCR) Educational service, cultural centers, places of worship, and medical health services (with 25 db NCR) All other uses permitted within base zoning district except for residential use (with 0 db NCR)	Same as those specified in the underlying zoning district	N/A

TABLE 1C (Continued)
Summary of Zoning Provisions:
City of Mesa

	Noise-Sensitive Uses		
Zoning Districts	**Permitted**	**Conditional, Subject to Special or Council Use Permit**	**Minimum Lot Size or Density Units/Acre**
AIR FIELD OVERLAY DISTRICT (Continued)			
ADD-VII, Airfield Sub-district seven	Single or multiple residential uses (with 20 db NCR) All other uses permitted within base zoning district (with 0db NCR)	Same as those specified in the underlying zoning district	N/A
ADD-VIII, Airfield Sub-district eight	Same as ADD-VII	Same as those specified in the underlying zoning district	N/A
AGE SPECIFIC OVERLAY ZONING DISTRICT			
AS, Age Specific Overlay Zoning	Same as those specified in the underlying zoning district	Special use permit to allow anyone under the age of 18 to reside in the area over a 90 day period	N/A
HISTORIC PRESERVATION OVERLAY DISTRICTS			

HP, Historic Preservation	Must meet State Historic Preservation or National Register of Historic Places criteria	None	40+ contiguous Acres
HL, Historic Landmark	Must meet State Historic Preservation or National Register of Historic Places criteria	None	N/A

City of Apache Junction

City Ordinance No. 71 adopts and established the City of Apache Junction zoning. Enforcement and interpretation is the responsibility of the Department of Development Services. Conditional Use Permits are granted by the Planning and Zoning Commission.

The Apache Junction Zoning Ordinance contains 19 basic districts and one overlay district. Eleven districts are residential zones, six are commercial zones, and two are industrial zones. The overlay zone is for areas requiring a greater degree of flexibility which would not be available in conventional zoning districts. This district, therefore, encourages the application of creative design and planning techniques.

Within the basic districts, some noise-sensitive uses are permitted as a matter of right while others are permitted only with a Conditional Use Permit. **Table 1D** outlines the City of Apache Junction zoning districts and their important characteristics for this study.

TABLE 1D
Summary of Zoning Provisions:
City of Apache Junction

	Noise-Sensitive Uses		
Zoning Districts	**Permitted**	**Conditional, Subject to Special or Council Use Permit**	**Minimum Lot Size or Density Units/Acre**
RESIDENTIAL DISTRICTS			
GR, General Rural Zone	Single-family dwellings Places of worship Museums Libraries Community service agencies Schools & Colleges Public parks Playgrounds Athletic fields Recreation clubs Hospitals/Sanatoriums Riding stables	None	1.25 Acres
R1-43, Single-family Residence	Single-family dwellings Mobile homes *(R1-43(MH) district only)* Public parks/ recreation areas Public schools	Places of worship Private educational institutions Private recreation areas	1 Acre
CR-1, Single-family Residence	Same as R1-43 Mobile home *(CR-1(MH) district only)*	Same as R1-43 Same as R1-43(MH)	20,000 sq.ft.
CR-2, Single-family Residence	Single-family dwellings Mobile homes *(CR-2(MH) district only)* Public parks Public recreation areas Public Schools	Same as R1-43 Same as R1-43(MH)	11,000 sq.ft.
R1-8, Single-family Residence	Same as CR-2 Mobile homes *(R1-8(MH) district only)*	Same as R1-43 Same as R1-43(MH)	8,000 sq.ft.
CR-3, Single-family Residence	Same as R1-8 Mobile homes *(CR-3(MH) district only)*	Same as R1-43 Same as R1-43(MH)	7,000 sq.ft.
R-1, Duplex Residence	Single-family dwellings Duplex dwellings	Same as R1-43 Same as R1-43(MH)	4,000 sq.ft.

TABLE 1D (Continued)
Summary of Zoning Provisions:
City of Apache Junction

	Noise-Sensitive Uses		
Zoning Districts	**Permitted**	**Conditional, Subject to Special or Council Use Permit**	**Minimum Lot Size or Density Units/Acre**
RESIDENTIAL DISTRICTS			
CR-4, Single-family Residence	Single-family dwellings Duplex dwellings Multi-family dwellings Public parks Public recreation areas Public schools	Places of worship Private educational institutions Private recreation facilities Day care centers Private clubs, fraternities, sororities, lodges. Residential health care facilities Boarding houses Condominiums Townhouses	3,500 sq.ft.
CR-5, Multi-family Residential	Duplex dwellings Multi-family dwellings Public parks Public recreation areas Public schools Victim shelters	Same as CR-4 to include: Single-family dwellings Preschools	2,000 sq.ft.
TH, Trailer Homesite	Same as CR-3 to include: Mobile home parks Recreational vehicle parks Mobile home subdivisions	None	3,000 sq.ft. 1,000 sq.ft (In recreational vehicle parks)
TR, Transitional	Same as CR-3, CR-4, CR-5 to include: Hotels Trailer Courts Clubs Colleges Community service agencies Libraries Museums Playgrounds Private Schools Guest Ranches Hospitals, clinics, dispensaries, sanitariums	None	10,000 sq.ft.

TABLE 1D (Continued)
Summary of Zoning Provisions:
City of Apache Junction

	Noise-Sensitive Uses		
Zoning Districts	**Permitted**	**Conditional, Subject to Special or Council Use Permit**	**Minimum Lot Size or Density Units/Acre**
COMMERCIAL DISTRICTS			
CB-1, Local Business	Same as TR to include: Places of Worship Clubs and lodges Clinics and hospitals Day nursery or child care center Hotels Libraries Museums Religious rescue missions Trade schools Indoor Theaters Mobile homes	None	1,000 sq.ft.
CB-2, General Business	Same as TR and CB-1 to include: Auditorium or assembly hall Clubs School or college Drive-in-theater Veterinary hospital or kennel	None	1,000 sq.ft.
C-1, Neighborhood Commercial/Convenience	Single family dwellings Clinic services Libraries and cultural exhibits Day care/schools Places of worship Medical services	Mobile homes for caretakers Group care facilities Lodges, fraternities and civic assemblages	6,000 sq.ft.
C-2, Local Commercial	Residential as permitted in C-1 Civic uses as permitted in C-1 Group care facilities Schools Veterinary clinics(small animals)	Veterinary clinics (Large animals)	15,000 sq.ft.

TABLE 1D (Continued)
Summary of Zoning Provisions:
City of Apache Junction

	Noise-Sensitive Uses		
Zoning Districts	**Permitted**	**Conditional, Subject to Special or Council Use Permit**	**Minimum Lot Size or Density Units/Acre**
C-3, General Commercial	Residential Planned development Civic and Commercial uses as permitted in C-2 Day cares Vocational and trade schools Lodges, fraternities and civic assemblages Veterinary clinics(Large animals) Indoor sports Hotels	Caretakers residence Outdoor sport complexes	20.000 sq.ft.
C-4, Heavy Commercial	Residential Planned development Civic uses as permitted in C-3 Commercial uses as permitted in C-3	Caretakers residence Drive-in-theaters	20,000 sq.ft.
INDUSTRIAL DISTRICTS			
CI-1, Light Industrial and Warehouse	Places of Worship Clubs and lodges Clinics and hospitals Day nursery or child care center Hotels Libraries Museums Religious rescue missions Trade schools Indoor Theaters Trailer courts Veterinary dog or cat hospital or kennel Motion picture studio	None	N/A
CI-2, Heavy Industrial	Same as CI-1	None	N/A
PLANNED DEVELOPMENT DISTRICTS			
PD, Planned Development	All use shall comply with the base zoning district/s	All use shall comply with the base zoning district/s	All development must comply with the base zoning districts

Town of Queen Creek

The Town of Queen Creek Zoning Ordinance was established by Town Ordinance No. 142-98. The ordinance is periodically amended through the powers of the Town Council. The Zoning Administrator (Planning Director) interprets and enforces the zoning ordinance. Appeals are made to the Board of Adjustment, as are requests for variances. The Planning Commission provides review and approves or denies site plans and use permits.

The Queen Creek Zoning Ordinance provides for 24 fixed districts and five overlay districts. Overlay districts are offered as a means for increased planning and design options, and for the special protection of property and/or environmental resources. "Permitted" and "conditional" noise sensitive uses allowed in the various districts are depicted in **Table 1E**.

TABLE 1E
Summary of Zoning Provisions
Town of Queen Creek

	Noise-Sensitive Uses		
District	**Permitted**	**Conditional, Subject to Special or Council Use Permit**	**Minimum Lot Size or Density Units/Acre**
AGRICULTURAL DISTRICTS			
A-1, Agricultural	Single-family dwellings Assisted Living Facilities Group Care Homes for the Handicapped Museums Libraries Places of Worship Public/private schools	College/university Day care centers Boarding schools Public/private schools Bed & Breakfast Camps Resorts, Cabins & Lodges Guest ranches Auditoriums	10 Acres
RURAL DEVELOPMENT DISTRICTS			
R1-190, Rural Development	Same as A-1	Same as A-1	5 Acres
R1-145, Rural Development	Same as A-1	Same as A-1	3.33 Acres
R1-108, Rural Development	Same as A-1	Same as A-1	2.5 Acres
R1-54, General Rural	Same as A-1	Same as A-1	1.25 Acres
R1-43, Rural Estate	Same as A-1	Same as A-1	1 Acre
SUBURBAN RESIDENTIAL DISTRICTS			
R1-35, Suburban Residential Type A	Same as A-1	College/university Day care centers Boarding schools Public/private schools Camps Resorts, Cabins & Lodges Guest ranches	35,000 sq.ft.
R1-18, Suburban Residential Type B	Single-family dwellings Assisted Living Facilities Group Care Homes for the Handicapped Places of Worship Public/private schools	Day care centers Boarding schools Public/private schools Museums Libraries	18,000 sq.ft.
R1-15, Suburban Residential Type B	Same as R1-18	Day care centers Boarding schools Public/private schools	15,000 sq.ft.
R1-12, Suburban Residential Type B	Same as R1-18	Same as R1-15	12,000 sq.ft.

TABLE 1E (Continued)
Summary of Zoning Provisions
Town of Queen Creek

	Noise-Sensitive Uses		
District	**Permitted**	**Conditional, Subject to Special or Council Use Permit**	**Minimum Lot Size or Density Units/Acre**
URBAN RESIDENTIAL DISTRICTS			
R1-9, Urban Residential Type A	Same as R1-18	Same as R1-15 to include Medical Clinics	9,000 sq.ft.
R1-8, Urban Development Type A	Same as R1-18	Same as R1-9	8,000 sq.ft.
R1-7, Urban Development Type A	Same as R1-18	Same as R1-9	7,000 sq.ft.
R1-6, Urban Development Type A	Same as R1-18	Same as R1-9	6,000 sq.ft.
COMMERCIAL DISTRICTS			
B-1, Neighborhood Commercial/Office	Boarding/rooming houses Multi-family dwellings Assisted living facilities Group care homes for the handicapped Day care centers Medical clinics Adult day care centers Dance/art/music schools Elementary schools Charter/private/parochial schools Hotels Bed & Breakfasts	Single-family dwellings Other household living Treatment facilities Museums Libraries Day care centers Nursery schools Counseling centers Places of worship Boarding schools Riding academies Secondary schools	6,000 sq.ft.

TABLE 1E (Continued)
Summary of Zoning Provisions
Town of Queen Creek

	Noise-Sensitive Uses		
District	**Permitted**	**Conditional, Subject to Special or Council Use Permit**	**Minimum Lot Size or Density Units/Acre**
TC, Town Center	Single-family dwellings Multi-family dwellings Group care homes for the handicapped Colleges/Universities Vocational schools Museums Libraries Day care centers Nursery schools Counseling centers Secondary schools Medical clinics Adult dy care centers Dance/art/music schools Elementary schools Charter/private/parochial schools Hotels Bed & Breakfasts Auditoriums Clubs/lodges	Boarding/rooming houses Other household living Assisted living facility Treatment facility Hospitals Places of worship Boarding schools Veterinary hospitals	N/A
C-1, Light Commercial	Group care homes for the handicapped Colleges/universities Vocational schools Day care centers Medical clinics Adult day care centers Dance/art/music schools Elementary schools Charter/private/parochial Hotels Bed & Breakfasts	Boarding/rooming houses Multi-family dwellings Other household living Assisted living facility Treatment facility Museums Libraries Nursery schools Honor camps Counseling centers Hospitals Places of worship Boarding schools Riding academies Secondary schools Auditoriums	1 Acre

TABLE 1E (Continued)
Summary of Zoning Provisions
Town of Queen Creek

	Noise-Sensitive Uses		
District	**Permitted**	**Conditional, Subject to Special or Council Use Permit**	**Minimum Lot Size or Density Units/Acre**
C-2, General Commercial	Group care homes for the handicapped Vocational schools Museums Libraries Day care centers Nursery schools Medical clinics Adult day care centers Counseling centers Places of worship Dance/art/music schools Elementary schools Charter/private/parochial Riding academies Secondary schools Hotels Bed & Breakfasts Clubs/lodges	Multi-family dwellings Other household living Assisted living facility Treatment facility Honor camps Counseling centers Hospitals Physical and mental rehabilitation centers Boarding schools Auditoriums Veterinary hospitals	1 Acre
INDUSTRIAL DISTRICTS			
I-1, Office/Industrial Park	Group care homes for the handicapped Vocational schools	Other household living Medical clinics Adult day care centers Counseling centers Hospitals Physical and mental rehabilitation centers Resorts/cabins/lodges Veterinary hospitals	1 Acre
I-2, General Industrial	Same as I-1	Other household living Counseling centers Physical and mental rehabilitation centers Resorts/cabins/lodges Veterinary hospitals	1 Acre
RECREATION AND CONSERVATION DISTRICTS			
RC, Recreation and Conservation	Group care homes for the handicapped	Other household living Resorts/cabins/lodges	5 Acres

TABLE 1E (Continued)
Summary of Zoning Provisions
Town of Queen Creek

	Noise-Sensitive Uses		
District	**Permitted**	**Conditional, Subject to Special or Council Use Permit**	**Minimum Lot Size or Density Units/Acre**
OVERLAY DISTRICTS			
PAD, Planned Area Development Overlay	Dependent upon the underlying zoning district	Dependent upon the underlying zoning district	Density dependent upon underlying district
HP, Hillside Preservation Overlay	Same as those specified in the underlying zoning district	Same as those specified in the underlying zoning district	Density dependent upon underlying district
CR, Critical Area Overlays	Same as those specified in the underlying zoning district	Same as those specified in the underlying zoning district	Density dependent upon underlying district

Town of Gilbert

The Gilbert *Unified Land Development Code* includes zoning provisions, subdivision regulations, and design standards for new development. The Code provides for 25 zoning districts, including 12 residential use districts, seven commercial districts, and four industrial districts. The Unified Land Development Code also includes a Planned Area Development (PAD) Overlay district. Within this district, a wide variety of land uses are permitted subject to an approved development plan.

The key provisions of the ordinance relating to noise compatibility planning are summarized in **Table 1F.** Noise-sensitive land uses are permitted in all but one zoning district (the I-3 General Industry district). In most of the other commercial and industrial districts, various noise-sensitive institutions are permitted. For the most part, housing is permitted only in the residential districts. Exceptions are provided for residential facilities and residential hotels which are permitted in commercial districts.

TABLE 1F
Zoning Provisions for Noise-Sensitive Uses
Town of Gilbert

Zoning District	Noise-Sensitive Uses: Permitted	Noise-Sensitive Uses: Conditional, Subject to Special or Council Use Permit	Minimum Lot Size or Density Units/Acre
SINGLE FAMILY RESIDENTIAL DISTRICTS			
AG, Agriculture	Single-family, Churches, Group homes, Temporary Outdoor Events	None	10 Acres
R-43, Rural Residential	Single-Family, Schools, Group homes, Bed and Breakfast, Temporary Outdoor Events	None	1 Acre
R-35, Single Family Residential	Single-Family, Schools, Group homes, Bed and Breakfast	None	35,000 sq.ft.
R1-20, Single Family Residential	Same as R1-35	None	20,000 sq.ft.
R1-15 Single-family Residential	Same as R1-35	None	18,000 sq.ft.
R1-10 Single-family Residential	Same as R1-35	None	10,000 sq.ft.
R1-8 Single-family Residential	Same as R1-35	None	8,000 sq.ft.
R1-7 Single-family Residential	Same as R1-35	None	7,000 sq.ft.
R1-5 Single-family Residential	Single-Family, Schools, Group homes	None	5,000 sq.ft.
MULTI-FAMILY RESIDENTIAL DISTRICTS			
[1] R-2 Two Family Duplex Residential	Same as R1-35, Two family dwellings	None	3,000 sq.ft.
R-3 Multiple-family Residential	Same as R1-35, Two family dwellings, Multi-family dwellings	Boarding Houses, Hospitals, Nursery Schools, Day Care Centers	18 DU/Acre
R-4 Multiple-family Residential	Same as R-3	Hotels, medical clinics	22 DU/Acre
[2] R-TH Townhouse Residential	Same as, R1-35, Buildings or Dwelling Groups of Individual Ownership	None	3,600 sq.ft.
COMMERCIAL DISTRICTS			
N-S Neighborhood Service	Libraries, Museums, Places of Worship, Schools, Residential Facility	None	N/A
[3] NCC, Neighborhood Convenience	Day Care Centers, Libraries, Museums, Places of Worship, Schools, Residential Facility	Nursing Home	N/A
C-1, Light Commercial	Accessory Apartment, Day Care Center, Libraries, Museums, Nursing Homes, Places of Worship, Schools, Residential Development, Residential Facility	None	N/A
C-2 General Commercial	Same as C-1, Hospital, Indoor Places of Public Assembly, Residential Hotels	Outdoor Places of Public Assembly	N/A

TABLE 1F (Continued)
Zoning Provisions for Noise-Sensitive Uses
Town of Gilbert

Zoning District	Noise-Sensitive Uses: Permitted	Noise-Sensitive Uses: Conditional, Subject to Special or Council Use Permit	Minimum Lot Size or Density Units/Acre
PSC-1, Planned Neighborhood Shopping Center	Same as C-1	None	N/A
PSC-2, Planned Shopping Center	Same as C-1, Hospitals, Indoor Places of Assembly, Residential Development, Residential Hotel	None	N/A
ER, Entertainment/ Recreation	Libraries, Museums, Indoor/Outdoor Places of Assembly, Schools, Residential Hotel	None	N/A
INDUSTRIAL DISTRICTS			
I-B, Industrial Buffer	Indoor Places of Assembly	Places of Worship	N/A
I-1, Garden Industry	Trade Schools, Colleges, Day Care Centers, Libraries, Museums, Indoor Places of Assembly	Nursing Home, Places of Worship	N/A

[1] May be referenced as R-5 on the official zoning map.
[2] May be referenced as RCC on the official zoning map.
[3] May be referenced as R1PH on the official zoning map.
N/A -- not applicable.
du -- dwelling unit

Pinal County

The Zoning Ordinance of the County of Pinal controls development in the unincorporated areas of the County. The Zoning Ordinance was last amended and adopted on September 29, 1994. Enforcement of the Ordinance is provided by the County Zoning Inspector under the direction of the Planning Commission. Requests for variances are granted by the County Board of Adjustment.

The Pinal County Zoning Ordinance provides for 22 districts compromised of four rural districts, 11 residential districts, two business districts, three industrial districts, and two overlay districts. The code allows uses in specific districts by a permitted use status only; no conditional uses are offered. **Table 1G** summarizes the provisions of the Pinal County Zoning Ordinance as they apply to airport compatibility planning.

TABLE 1G
Zoning Provisions for Noise-Sensitive Uses
Pinal County

	Noise Sensitive Uses		
Zoning District	**Permitted**	**Conditional, Subject to Special or Council Use Permit**	**Minimum Lot Size or Density Units/Acre**
RURAL DISTRICTS			
CAR, Commercial Agricultural Zone	Single Family dwellings Manufactured or mobile homes	None	4 Acres
SR, Suburban Ranch	Single-family dwellings Manufactured or mobile homes Guest ranches Public or parochial schools Places of worship Colleges Libraries Museums Hospitals or sanatoriums Clinics Resort hotels	None	144,000 sq.ft.
SH, Suburban Homestead	Same as SR to include: Duplexes	None	2 Acres
GR, General Rural	Single family dwellings Manufacture or mobile homes Places of worship Clubs Museums Libraries Schools Colleges Hospitals, clinics or sanitariums Housing for farm labor	None	1.25 Acres
RESIDENTIAL DISTRICTS			
CR-1A, Single Family Residence	Single family dwelling Public or parochial schools Place of worship	None	1 Acre
CR-1, Single Family Residence	Single Family dwellings Public or parochial schools Places of worship	None	20,000 sq.ft.
CR-2, Single Family Residence	Same as CR-1	None	12,000 sq.ft.

TABLE 1G
Zoning Provisions for Noise-Sensitive Uses
Pinal County

CR-3, Single Family Residence	Same as CR-1	None	7,000 sq.ft.
CR-4, Multiple Residence	Same as CR-3 to include: Duplexes Multiple family dwelling units	None	7,000 sq.ft.
CR-5, Multiple Residence	Same as CR-4 to include: Private clubs or lodges Colleges Libraries Museums Private schools Guest ranches Hospitals, dispensaries, clinics, and sanitariums	None	7,000 sq.ft.
MH, Manufactured/Mobile Home	Manufactured or mobile homes Places of worship	None	8,000 sq.ft.
RV, Recreational Vehicle Homesite	Travel trailers Places of worship	None	6,000 sq.ft.
MHP, Manufactured/Mobile Home Park	Manufactured or mobile homes Recreational vehicles	None	4,000 sq.ft.
PM/RVP, Park Model/ Recreational Vehicle Park	Park Models Recreational vehicles	None	1,500 sq.ft.
TR, Transitional	Same as CR-5	None	10,000 sq.ft.
BUSINESS DISTRICTS			
CB-1, Local Business	Same as TR to include: Places of worship Clinics Clubs or lodges Day care or child care centers Hotels Libraries Religious rescue missions Trade schools Theaters	None	7,500 sq.ft.
CB-2, General Business	Same as CB-1 to include: Assembly halls Instructional and trade schools Drive-in theaters	None	3,500 sq.ft.
INDUSTRIAL DISTRICTS			

TABLE 1G
Zoning Provisions for Noise-Sensitive Uses
Pinal County

CI-B, Industrial Buffer	Commercial trade schools or business colleges		10,000 sq.ft.
CI-1, Light Industrial and Warehouse	Same as CB-2 to include: Mobile or manufactured home in conjunction with permitted use.	None	N/A
CI-2, Industrial	Same as CI-1	None	N/A
OVERLAY DISTRICTS			
PAD, Planned Area Development	Same as those specified in the underlying zoning district	Same as those specified in the underlying zoning district	Density dependent upon underlying district
DRO, Design Review Overlay	Same as those specified in the underlying zoning district	Same as those specified in the underlying zoning district	Density dependent upon underlying district

Maricopa County

Portions of the unincorporated study area are zoned by Maricopa County. The Zoning Ordinance for the unincorporated area of Maricopa County is administered by the Maricopa County Department of Planning and Development and enforced by the County Zoning Inspector. Appeals, variances and use permits are handled by the Board of Adjustment. Special Use permits may be granted in any zone, after public hearing, by the Board of Supervisors for certain noise-sensitive uses which are otherwise prohibited. Those uses include: drive-in theaters, group care facilities, guest ranches, mobile home parks and subdivisions, resort hotels, travel trailer and RV parks, residential health care facilities, and single and multi-family homes (in C-1, C-2, and C-3 zones).

The Maricopa County Zoning Ordinance contains 21 basic districts, including three rural residential, ten residential, five commercial, and three industrial districts. Additionally, there are four overlay zones, including a senior citizen development zone, a manufactured house zone, a hillside zone, and a planned development zone. The noise-sensitive use aspects of these districts are summarized in **Table 1H**.

The 1978 Military Airport Zoning Ordinance for the Unincorporated Area of Maricopa County

The 1978 Military Airport Zoning Ordinance for the Unincorporated Area of Maricopa County was established to encourage land uses in the vicinity of military airfields which would reduce exposure to crash potential and high noise levels. Although Williams AFB no longer exists, this ordinance is still enforced around Williams Gateway Airport, as depicted on **Exhibit 1N**. The allowable land use standards around a military airfield are set forth in six airport zoning districts. In the vicinity of Williams Gateway Airport, three of these districts are enforced:

Airport District One (AD-I)

Airport District One is situated immediately adjacent to runway ends of the airfield. This district extends as a rectangular area one-thousand feet wide to a point three-thousand feet beyond the end of each runway.

Airport District One is the most restrictive district contained within the ordinance. The only allowable land use is agriculture. Industrial, Commercial, Residential, and Recreational uses are all prohibited within this district.

Airport District Two (AD-II)

Airport District Two extends from the terminus of Airport District One for a distance of five thousand feet and a width of one thousand five hundred feet from the extended centerline of each runway.

This district allows for industrial and commercial uses which utilize a non-intensive labor force. Permitted uses include storage facilities, raw manufacturing, and wholesale activities. The overall exposure of individuals to noise and aviation accident risks are designed to be minimal.

A limited number of outdoor recreation and resource production uses are also permitted. These uses include golf courses, feedlots, and mining.

Airport District Three (AD-III)

Airport District Three extends an additional seven thousand feet beyond AD-II. Allowable land uses in this district include industrial, commercial, business, outdoor recreational, and resource production uses.

Identical industrial uses are permitted as those in AD-II. These uses benefit from the permission of a higher labor

force concentration. Commercial uses allowed in AD-II are also permitted to include specific types of retail establishments. Uses such as grocery and clothing retailers are prohibited.

A limited number of business service actives are permitted. These include professional offices, financial institutions, and repair establishments.

Additional land uses relating to outdoor recreation and resource production mimic those permitted in AD-II.

TABLE 1H
Summary of Zoning Provisions:
Maricopa County

	Noise-Sensitive Uses		
Zoning Districts	**Permitted**	**Conditional, Subject to Special or Council Use Permit**	**Minimum Lot Size or Density Units/Acre**
RESIDENTIAL DISTRICTS			
Rural-190	Single-family dwellings Churches Schools Libraries Museums	Group Homes	0.23 DU/Acre
Rural-70	Same as Rural-190	Same as Rural-190	0.62 Du/Acre
Rural-43	Same as Rural-190	Same as Rural-190	1 DU/Acre
R1-35, Single-family Residential	Same as Rural-190	Same as Rural-190	1.25 DU/Acre
R1-18 Single-family Residential	Same as Rural-190	Same as Rural-190	2.42 DU/Acre
R1-10, Single-family Residential	Same as Rural-190	Same as Rural-190	4.36 DU/Acre
R-1-8,Single-family Residential	Same as Rural-190	Same as Rural-190	5.45 DU/Acre
R1-7, Single Family Residential	Same as Rural-190	Same as Rural-190	6.22 DU/Acre
R1-6, Single-family Residential	Same as Rural-190	Same as Rural-190	7.26 DU/Acre
R-2, Limited Multiple-family Residential	Same as Rural-190 Duplexes Multi-family	Same as Rural-190	10.89 DU/Acre
R-3, Multiple-family Residential	Same as R-2	Same as Rural-190	14.52 DU/Acre
R-4, Multiple-family Residential	Same as R-2	Same as Rural-190	21.78 DU/Acre
R-5, Multiple-family Residential	Same as R-2	Same as Rural-190	43.56 DU/Acre

SC, Senior Citizen Overlay	Single-family Duplex Multi-family	-	5 Acres

TABLE 1H (Continued)
Summary of Zoning Provisions:
Maricopa County

	Noise-Sensitive Uses		
Zoning Districts	**Permitted**	**Conditional, Subject to Special or Council Use Permit**	**Minimum Lot Size or Density Units/Acre**
RESIDENTIAL DISTRICTS (Continued)			
MHR, Manufactured House Residential Overlay	Manufactured Housing	None	Same as the primary zoning district
COMMERCIAL DISTRICTS			
C-S, Planned Shopping Center	Uses permitted in original Rural or Residential underlying zone	None	5 Acres
C-O, Commercial Office	None	None	3.63 DU/Acre
C-1 Neighborhood Commercial	Schools Day nurseries Nursery schools Churches	None	7.26 DU/Acre
C-2, Intermediate Commercial	Same as C-1 Theaters	None	7.26 DU/Acre
C-3, General Commercial	Same as C-2	None	7.26 DU/Acre
INDUSTRIAL DISTRICTS			
IND-1, Planned Industrial	None	None	1.25 DU/Acre
IND-2, Light Industrial	Caretakers residence	None	7.26 DU/Acre
IND-3, Heavy Industrial	None	None	7.26 DU/Acre
PLANNING DISTRICTS			
PD, Planned Development Overlay	Same as underlying zoning district	None	Same as underlying zoning district

Summary of
Zoning Classifications

Exhibit 1N shows the generalized zoning pattern in the area. The various zoning districts of each jurisdiction have been combined into generalized zoning categories. **Table 1J** summarizes the grouping of actual zoning districts within the Study Area for purposes of the exhibit. The "Residential" category applies to districts with varying densities of single and multifamily dwelling units. The "Commercial" and "Industrial" categories include commercial and industrial districts, respectively. The 'Resort" category applies to districts permitting resort facilities. The "Open Space" category includes districts which permit only open space uses or very non-intensive development and has been used here to indicate where golf courses or parks have been built or planned.

TABLE 1J
Classification of Zoning Districts

Generalized Zoning Category	City of Mesa	City of Apache Junction	Town of Queen Creek	Town of Gilbert	Pinal County	Maricopa County
Rural Residential (0-1 du/ac)	R1-90, R1-43	GR, R1-43	A-1, R1-190, R1-145, R1-108, R1-54, R1-43	AG, R-43	CAR, SR, SH, GR, CR-1A	Rural-190, Rural-70, Rural-43
Large Lot Residential (1.1-2 du/ac)	R1-35		R1-35	R-35		R1-35
Small Lot Residential (2.1-5 du/ac.)	R1-15, R1-9	CR-1, CR-2,	R1-18, R1-15, R1-12, R1-9	R1-20, R1-15, R1-10	CR-1A, CR-1, CR-2,	R1-18, R1-10
Medium Density Residential (5.1-15 du/ac.)	R1-6, R1-7, R-2, R-3, R-4	R1-8, CR-3, R-1, CR-4	R1-8, R1-7, R1-6, R-2, R-3, R-4	R1-8, R1-7, R1-5, R-2, R-TH	CR-3, CR-4, MH, RV, MHP	R1-8, R1-7, R1-6, R-2, R-3
High Density Residential (15+ du/ac.)		CR-5, TH		R-3, R-4	CR-5, PM/RVP	R-4, R-5
Hotel, Motel, & Resort		TR		ER		
Commercial	O-S, C-1, C-2, C-3	CB-1, CB-2, C-1, C-2, C-3, C-4	B-1, TC, C-1, C-2	NCC, C-1, C-2, PSC-1, PSC-2	CB-1, CB-2	C-S, C-O, C-1, C-2, C-3
Industrial and	M-1, M-2	CI-1, CI-2	I-1, I-2	I-B, I-1, I-2,	CI-B, CI-1,	IND-1, IND-2,

Transportation				I-3	CI-2	IND-3
Open Space	N/A	N/A	RC	N/A	N/A	N/A

Source: Coffman Associates Analysis

SUBDIVISION REGULATIONS

Subdivision regulations apply in cases where a parcel of land is proposed to be divided into lots or tracts. They are established to ensure the proper arrangement of streets, adequate and Subdivision regulations can be used to enhance noise-compatible land development by requiring developers to plat and develop land so as to minimize noise impacts or reduce the noise sensitivity of new development. The regulations can also be used to protect the airport proprietor from litigation for noise impacts at a later date. The most common requirement is the dedication of a noise or avigation easement to the local government by the land subdivider as a condition of development approval. The easement releases the city, public, and airfield from damage or annoyance caused by noise, dust, fuel or other effects caused by aircraft operations from an airport. It also acts as a notification to prospective buyers of potential effects from aviation related activities in the area. The City of Mesa is the only jurisdiction in the study area which has adopted subdivision regulations which specifically address aviation-related noise.

BUILDING CODES

Building codes regulate the construction of buildings, ensuring that they are built to safe convenient open space, efficient movement of traffic, adequate and properly-located utilities, access for fire-fighting apparatus, avoidance of congestion, and the orderly and efficient layout and use of land.

standards. Building codes may be used to require sound insulation in new residential, office, and institutional buildings when warranted by existing or potential high aircraft noise levels. Mesa, Apache Junction, Gilbert, and Queen Creek have adopted versions of the Unified Building Code (UBC). In the study area, the City of Mesa requires noise attenuation construction practices enabling a 25 dBA reduction pertaining to the interior noise level for areas under the city's Airfield Overlay zone. None of the other jurisdictions have adopted additional regulations related to noise in the vicinity of Williams Gateway.

CAPITAL IMPROVEMENT PROGRAMS

Capital improvements programs (CIP) are multi-year plans, typically covering five or six years, which list major capital improvements planned to be undertaken by a particular jurisdiction during each year. The CIP does not include facility improvements that are proposed to be funded entirely by developers.

Most capital improvements have no direct bearing on noise compatibility;

few municipal capital improvements are noise-sensitive. The obvious exceptions to this are schools and, in certain circumstances, libraries, medical facilities and cultural/recreational facilities. The noise compatibility planning process includes a review of planned facilities of these types as a matter of course.

Some capital improvements, however, may have an indirect, but more profound, relationship to noise compatibility. For instance, sewer and water facilities may open up large vacant areas for private development of noise-sensitive residential uses. In contrast, the same types of facilities, sized for industrial users, could permit industrial development in the same noise-impacted area that might otherwise be attractive for residential development on septic tanks.

The following is a brief description of the capital improvement projects planned within the study area:

Santan Freeway

The Arizona Department of Transportation is preparing to construct the Santan Corridor portion of Arizona Highway 202 connecting Superstition Highway (U.S. Highway 60) and Arizona Highway 101. This multi-year project is expected to begin in 2003 and be completed by 2007. The Williams Gateway portion of this project, by-passing the airport to the north and west from Power Road to Williams Field Road, is expected to be completed by 2007.

Wastewater Pumping Station

A new wastewater pumping station has been installed near the intersection of Ocotillo and Greenfield Roads. This is part of an effort by Maricopa County to reduce the number of residences utilizing in ground septic systems. This facility will pump effluent from northern Queen Creek to the Mesa waste water treatment plant via the Town of Gilbert. All new development north of the Queen Creek will be required to be connected to this system.

Road Projects

The Maricopa County Department of Transportation (MCDOT) Capital Improvements Program has slated Ellsworth, Ray, and Sossaman Roads for construction projects within the five-year planning horizon.

Ellsworth Road - Ellsworth Road is expected to be reconstructed and widened from two to four lanes between Baseline and Germann Roads. This project is scheduled to begin in 2001 and is anticipated to be completed in 2002.

Ray Road - Ray Road is to traverse the northern property boundary of Williams Gateway Airport. Currently, Ray Road terminates at Sossaman Road north of the airport. This project is expected to begin and be completed in 2002 and is being performed as part of an Inter-Governmental Agreement (IGA) between the City of Mesa and Maricopa County.

Sossaman Road - During a three phase roadway extension project, Sossaman Road is ultimately being extended from Ray Road to Pecos Road. During Phase One, a four lane section of Sossaman Road was extended from Ray Road to the intersection of Sossaman and Tahoe Avenue on the airport. This phase has been completed with the exception of landscaping and signage.

Phase two will continue Sossaman Road past the new terminal parking lot. Construction on this phase is expected to begin in Winter 1999.

Phase three is expected to continue Sossaman Road to Pecos Road, south of the airport.

Funding for the Sossaman Road project includes a $4 million grant from the U.S. Economic Development Administration and $5.8 million in infrastructure funding from the State of Arizona.

Pecos Road - Pecos Road is expected to be extended and realigned in order to provide access to the southern portion of the airport. A Special Improvement District is under discussion with the City of Mesa as a potential funding mechanism. This project is expected to be completed within the airports five year (short term) planning horizon.

Exhibit 1P shows the location of these projects in the study area.

ADDITIONAL PROGRAMS

Williams Gateway Community Outreach and Public Relations Program

Beginning in 1995, Williams Gateway Airport has been involved in a Community Outreach and Community Relations Program. This program is aimed at increasing community awareness of the airport through the installation of various projects described below:

Distribution of Public Information - A public information packet is distributed through various mediums to community leaders and the general public. This packet outlines past, present, and future activities at the airport.

Newsletter - A quarterly newsletter pertaining to Williams Gateway activities is distributed to community leaders, business leaders, and homeowner associations.

Public Speaking Engagements - Airport staff conduct informational speeches for various organizations such as realty groups and civic organizations.

Airport Tours - Tours are conducted on a continuing basis as a means to introduce various interested parties to the inner workings of Williams Gateway Airport.

Air Shows - The airport has held two air shows a year for the past five years. Participants in such air shows include the U.S. Navy Blue Angels and the U.S. Air Force Thunderbirds. Such shows have attracted between 50,000 and 75,000 spectators annually.

Media Relations - Williams Gateway has made a concerted effort to publicize airport activities through both broadcast media and newspapers.

Website - Since 1997, Williams Gateway Airport has sponsored a website (www.flywga.org). The site includes various types of information about the airport including employment opportunities, news releases, and general information.

Community Meetings - Airport staff and a consultant has meet with groups of area residents to address community concerns pertaining to the airport.

Community Response - Airport staff is made available to respond to various inquiries and information requests. Between 3 and 5 inquiries are responded to daily.

Noise Call Response - Williams Gateway Airport has established an automated telephone noise response line (929-7902) capturing noise complaint information including; time, date, aircraft type, location, and the nature of the complaint. Noise complaints are responded to with follow-up calls, upon request, in order to gather additional complaint information.

SUMMARY

The information discussed in this chapter provides a foundation upon which the remaining elements of the study planning process will be constructed. Information on current airport facilities and utilization serve as a basis for the development of aircraft noise analyses during the next phase of the study. The land use information in the airport environs will allow the assessment of the of airport noise on local residents. This information will,

in turn, provide guidance for the assessment of potential noise abatement and land use management procedures necessary to reduce the impact of aircraft noise on existing and potential future residents of the study area.

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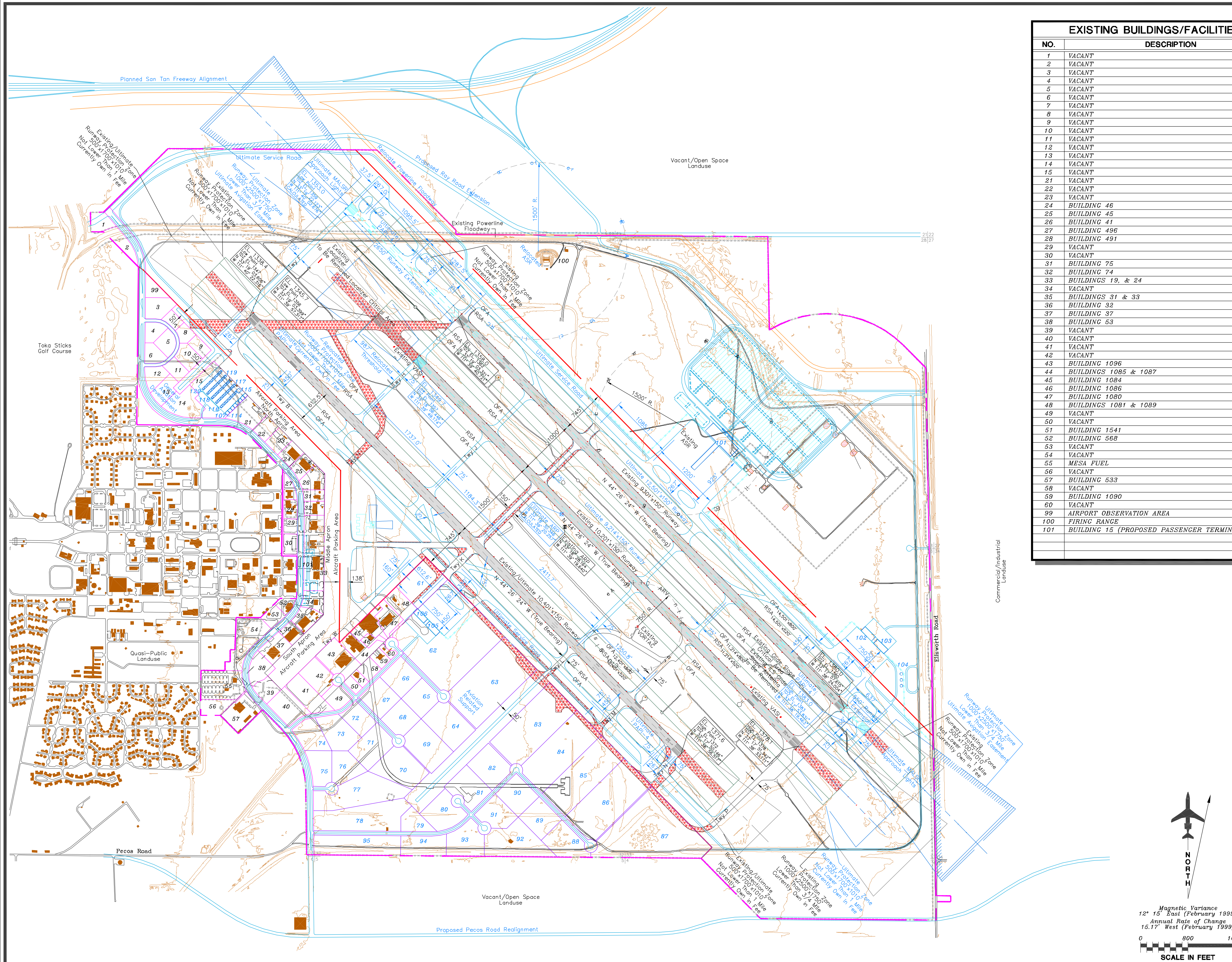
99SP09-1C-12/08/99



EXISTING BUILDINGS/FACILITIES

NO.	DESCRIPTION
1	VACANT
2	VACANT
3	VACANT
4	VACANT
5	VACANT
6	VACANT
7	VACANT
8	VACANT
9	VACANT
10	VACANT
11	VACANT
12	VACANT
13	VACANT
14	VACANT
15	VACANT
21	VACANT
22	VACANT
23	VACANT
24	BUILDING 46
25	BUILDING 45
26	BUILDING 41
27	BUILDING 496
28	BUILDING 491
29	VACANT
30	VACANT
31	BUILDING 75
32	BUILDING 74
33	BUILDINGS 19, & 24
34	VACANT
35	BUILDINGS 31 & 33
36	BUILDING 32
37	BUILDING 37
38	BUILDING 53
39	VACANT
40	VACANT
41	VACANT
42	VACANT
43	BUILDING 1096
44	BUILDINGS 1085 & 1087
45	BUILDING 1084
46	BUILDING 1086
47	BUILDING 1080
48	BUILDINGS 1081 & 1089
49	VACANT
50	VACANT
51	BUILDING 1541
52	BUILDING 568
53	VACANT
54	VACANT
55	MESA FUEL
56	VACANT
57	BUILDING 533
58	VACANT
59	BUILDING 1090
60	VACANT
99	AIRPORT OBSERVATION AREA
100	FIRING RANGE
101	BUILDING 15 (PROPOSED PASSENGER TERMINAL)

ULTIMATE BUILDINGS/FACILITIES

NO.	DESCRIPTION
61	VACANT
62	VACANT
63	VACANT
64	VACANT
65	VACANT
66	VACANT
67	VACANT
68	VACANT
69	VACANT
70	VACANT
71	VACANT
72	VACANT
73	VACANT
74	VACANT
75	VACANT
76	VACANT
77	VACANT
78	VACANT
79	VACANT
80	VACANT
81	VACANT
82	VACANT
83	VACANT
84	VACANT
85	VACANT
86	VACANT
87	VACANT
88	VACANT
89	VACANT
90	VACANT
91	VACANT
92	VACANT
93	VACANT
94	VACANT
95	VACANT
101	TERMINAL BUILDING
102	CARGO BUILDING
103	CARGO BUILDING
104	FUEL FARM
105	CARGO BUILDING
106	CARGO BUILDING
107	EXECUTIVE HANGAR
108	EXECUTIVE HANGAR
109	EXECUTIVE HANGAR
110	EXECUTIVE HANGAR
111	EXECUTIVE HANGAR
112	EXECUTIVE HANGAR
113	EXECUTIVE HANGAR
114	EXECUTIVE HANGAR
115	COVERED WASH RACK
116	T-HANGAR
117	T-HANGAR
118	T-HANGAR
119	T-HANGAR
120	T-HANGAR

LEGEND

EXISTING	ULTIMATE	DESCRIPTION
		ABANDONED PAVEMENT
		AIRPORT PROPERTY LINE
		AIRPORT REFERENCE POINT (ARP)
		AIRPORT ROTATING BEACON
		AVIGATION EASEMENT (if applicable)
		BUILDING ABANDONMENT
		BUILDING CONSTRUCTION
	BRL	BUILDING RESTRICTION LINE (BRL)
		DIRT ROAD
		DRAINAGE
		FACILITY CONSTRUCTION
		FENCING
VASI-4	VASI-4	NAVIGATIONAL AID INSTALLATION
		RUNWAY EDGE LIGHTS
		RUNWAY END IDENTIFICATION LIGHTS (REIL)
		RUNWAY THRESHOLD LIGHTS
		SEGMENTED CIRCLE/WIND INDICATOR
34 35 / 3 2		SECTION CORNER
1080		TOPOGRAPHIC CONTOURS
		WIND INDICATOR (Lighted)

Source: Williams Gateway Master Plan, 1999.

WILLIAMS GATEWAY AIRPORT

Exhibit 1C
AIRPORT LAYOUT PLAN

99SP09-1L-12/08/99

Broadway Rd.
Main St./Apache Trail
Southern Ave
Superstition Freeway
Baseline Rd.
Ironwood Drive
Idaho Rd.
Tomahawk Rd.
Apache Junction
Guadalupe Rd.
Gilbert
Gilbert Rd.
Lindsay Rd.
Hawes Rd.
Mesa
Elliot Rd.
Recker Rd.
Warner Rd.
Ellsworth Rd.
Signal Butte Rd.
Meridian Rd.
Ray Rd.
Williams Field Rd.
Pecos Rd
Higley Rd.
Pecos Road Realignment
Germann Rd.
Val Vista Drive
Roosevelt Water Conservation District Canal
Power Rd.
Ritbenhouse Road
Southern Pacific Railroad
Chandler
Greenfield Rd.
Sossaman Rd.
Crimson Rd.
Queen Creek Rd.
Vineyard Rd.
Ocotillo Rd.
Queen Creek
La Palma Rd.
Schnepf Rd.
Chandler Height Rd.
Riggs Rd.

LEGEND

- Detailed Land Use Study Area
- County Boundary
- Municipal Boundary
- Airport Property
- Planned San Tan Freeway
- Rural Residential (0-2 du/ac)
- Low Density Residential (2.1-5 du/ac)
- Medium Density Residential (5.1-15 du/ac)
- High Density Residential (15+ du/ac)
- Mobile and Trailer Homes
- Mixed Use
- Planned Area Development
- Hotels, Motels, and Resorts
- Commercial/Office
- Industrial, Transportation & Utilites
- Parks and Open Space
- Water
- Public Facilities
- Noise Sensitive Institutions
- Place of Worship
- School
- Proposed School

Source: Maricopa County Land Use Plan, 1992, Pinal County Comprehensive Plan, 1988, p. 147; City of Mesa, General Plan, 1996, City of Apache Junction, General Plan, 1987, p. 91, Town of Queen Creek, General Plan, 1996, Exhibit 4, Town of Gilbert, General Plan Land Use Map, 11/15/1999.

NORTH

0 8000

SCALE IN FEET

WILLIAMS GATEWAY AIRPORT

Exhibit 1L

GENERALIZED LAND USE PLANS

99SP09-IM-12/08/99

Broadway Rd.
Main St./Apache Trail
Southern Ave
Superstition Freeway
Baseline Rd.
Ironwood Drive
Idaho Rd.
Tomahawk Rd.
Apache Junction
Guadalupe Rd.
Gilbert
Gilbert Rd.
Lindsay Rd.
Hawes Rd.
Mesa
Elliot Rd.
Recker Rd.
Warner Rd.
Ellsworth Rd.
Signal Butte Rd.
Meridian Rd.
Ray Rd.
Williams Field Rd.
Val Vista Drive
Pecos Rd.
Higley Rd.
Pecos Road Realignment
Rittenhouse Road
Southern Pacific Railroad
Germann Rd.
Chandler
Gilbert
Power Rd.
Greenfield Rd.
Roosevelt Water Conservation District Canal
Sossaman Rd.
Crimson Rd.
Queen Creek Rd.
Vineyard Rd.
Ocotillo Rd.
La Palma Rd.
Schnepf Rd.
Queen Creek
Chandler Height Rd.
Riggs Rd.

LEGEND

- Detailed Land Use Study Area
- County Boundary
- Municipal Boundary
- Airport Property
- 60 DNL Contour
- Airport Overflight Area I
  1. Residential Development Prohibited
- Airport Overflight Area II
  1. Notification of aircraft related noise on plat and title.
  2. Maintain interior noise level of 45 dBa through noise attenuation construction
  3. Avigation Easements.
  4. Public Disclosure of Potential Noise Impact.
- Airport Overflight Area III
  1. Notification of aircraft related noise on plat and title.
  2. Public Disclosure of Potential Noise Impact.

Source: Williams Regional Planning Study, 1996.

NORTH

0 8000

SCALE IN FEET

WILLIAMS GATEWAY AIRPORT

Exhibit 1M

OVERFLIGHT DISTRICTS

Chapter Two
AVIATION NOISE

This chapter describes the noise exposure maps for Williams Gateway Airport. Noise contour maps are presented for three study years: 1999, 2004, and 2020. The 1999 noise contour map shows the current noise levels based on estimated operations for the latest twelve months of activity provided by the air traffic control tower. The 2004 map is based on forecast operation levels from the recently completed Master Plan Study. The 1999 and 2004 maps are the basis for the official "Noise Exposure Maps" required under F.A.R. Part 150.

One additional noise contour map has been developed to present a long term view of potential future noise exposure at Williams The noise analysis presented in this chapter relies on complex analytical methods and uses numerous technical terms. A Technical Information Paper included in the last section of this document, *The Measurement and Analysis of Sound*, presents helpful background information on noise measurement and analysis.

Gateway. Based on forecasts developed in the Master Plan Study for the year 2020, they can be helpful in providing guidance for long term land use planning. That subject is dealt with at a later point in the Part 150 Study process.

These noise contour maps are considered as baseline analyses. They assume operations based on the existing procedures at Williams Gateway. No additional noise abatement procedures have been assumed in these analyses. These noise contour maps will serve as baselines against which potential noise abatement procedures will be compared at a later point in the study.

AIRCRAFT NOISE MEASUREMENT PROGRAM

A noise measurement program was conducted over a five-day period from May 14, 1999 through May 18, 1999. The field measurement program was designed and undertaken to provide real data for comparisons with the computer-predicted values. These comparisons provide insights into the actual noise conditions around the airport and can serve as a guide for evaluating the assumptions developed for the computer modeling.

It must be recognized that field measurements made over a 24-hour period are applicable only to that period of time and may not -- in fact in many cases, do not -- reflect the average conditions present at the site over a much longer period of time. The relationship between field measurements and computer-generated noise exposure forecasts is analogous to the relationship between weather and climate. While an area may be characterized as having a cool climate, many individual days of high temperatures may occur. In other words, the modeling process derives overall average annual conditions (climate), while field measurements reflect daily fluctuations (weather).

Information collected during the noise monitoring program included 24-hour measurements for comparison with computer-generated DNL Four sets of acoustical instrumentation, the components of which are listed in **Table 2A**, were used to measure noise. Each set consisted of a high quality microphone connected to a 24-hour environmental noise monitor unit. Each unit was calibrated to assure consistency between measurements at different locations. A calibrator, with an accuracy of 0.5 decibels, was used for all measurements. At the completion of each field measurement, the calibration was rechecked, the accumulated output data was downloaded to a portable computer, and the data memories were cleared before placement at a new site.

values. DNL -- day-night sound level -- is a measure of cumulative sound energy during a 24-hour period. In addition, all noise occurring from 10:00 p.m. to 7:00 a.m. is assigned a 10 dB penalty because of the greater annoyance typically caused by nighttime noise. Use of the DNL noise metric in airport noise compatibility studies is required by F.A.R. Part 150. Additional information collected on single event measurements is used as an indicator of typical dBA and Sound Exposure Levels (SEL) within the study area as well as comparative ambient noise measurements in areas affected by aircraft noise.

ACOUSTICAL MEASUREMENTS

This section provides a technical description of the acoustical measurements which were performed for the Williams Gateway Airport F.A.R. Part 150 Noise Compatibility Study. Described here are the instrumentation, calibration procedures, general maturement procedures, and related data collection items and procedures.

Instrumentation

The equipment indicated in the table was supplemented by accessory cabling, windscreens, tripods, security devices, etc., as appropriate to each measurement site.

TABLE 2A
Acoustical Measurement Instrumentation

1	Metrosonics dB-604 Portable Noise Monitors
1	Gen Rad Model 1962 - 9600 "Electrical - Condenser Microphone
1	Gen Rad Model 1972 - 9600 Preamplifier/Adapter
1	Gen Rad Model 1987 Minical Sound-Level Calibrator
3	Larson Davis 820 Portable Noise Monitors and Preamplifiers
3	Larson Davis Model 2559 - "Microphones
1	Model CA250 Sound Level Calibrator
1	Portable Computer

Measurement Procedures

Two methods were used to attempt to minimize the potential for non-aircraft noise sources to unduly influence the results of the measurements. First, for single-event analysis, minimum noise thresholds of five to ten decibels (dB) greater than ambient levels were programmed. This procedure resulted in the requirement that a single noise event exceed a threshold of 60 dB at each site. Second, a minimum event duration longer than the time associated with ambient single events above the threshold (for example, road traffic) was set (generally at five seconds). The combination of these two factors limited the single events analyzed in detail to those which exceeded the preset threshold for longer than the preset duration. In spite of these efforts, contamination of the single event data is always possible.

Aircraft Noise

Although only selected single events were specially retained and analyzed, the monitors do, however, cumulatively consider all noise present at the site, regardless of its level, and provide hourly summations of Equivalent Noise Levels (Leq). Additionally, the equipment optionally provides information on the hourly maximum decibel level, SEL values for each event which exceeds the preset threshold and duration, and distributions of decibel levels throughout the measurement period.

Weather Information

The noise measurements taken during this study were obtained during a period of average spring weather for Williams Gateway. Conditions were generally clear throughout the program. Winds were generally light and from the north in the mornings, switching to the south in the afternoons. Daily temperatures ranged from highs over 100 degrees to lows in the 60s and 70s.

Measurement Sites

Noise measurement sites are shown on **Exhibit 2A**. They were selected on the basis of background information, local observation during the field effort, and suggestions from the Airport

Management based on noise complaint history. Specific selection criteria include the following:

- Emphasis on areas of marginal or greater than marginal aircraft noise exposure according to earlier evaluations.

- Screening of each site for local noise sources or unusual terrain characteristics which could affect measurements.

- Location in or near areas from which a substantial number of complaints about aircraft noise were received, or where there are concentrations of people exposed to significant aircraft overflights.

While there is no end to the number of locations available for monitoring, the selected sites fulfill the above criteria and provide a representative sampling of the varying noise conditions in the airport vicinity. One site was measured for 72-hours, one for 48-hours, and two sites for 24-hour periods. Noise monitors were placed in two other locations during the monitoring period. However, technical difficulties with the equipment prevented the equipment from retaining the data in the monitors' data banks.

Site B is located at 8744 Waterford in Mesa. This home is approximately 4,500 feet south of the airport. The area is a single-family residential area of contemporary homes on large lots. There is a large open area immediately west of a workshop located behind the home. The site is in an area that would likely receive regular touch-and-go over-flights.

The equipment was set up at the rear of the house in the large open area with a clear view to the airport. A single engine piston aircraft flow over the site during the monitor setup and registered a peak noise level of 66.6 dBA.

• 72-HOUR MEASUREMENT SITE

Site A is located at 157 Joshua Tree Lane in Gilbert. This home is approximately 13,000 feet northwest of the airport. The area is a single-family residential area of contemporary homes on small lots. The site is in an area that would likely receive regular arrival and departure overflight noise from all three runways.

The equipment was set up at the rear of the house. During the equipment setup, two helicopters flew over the area and registered a peak noise event (Lmax) of 76.4 dBA on the noise monitor.

The 24-hour equivalent sound level (Leq) for the first day at Site A was 43.8, 45.8 for the second day, and 47.3 for the third day. The DNL level for this site was computed for the first day at 45.2, 49.0 for the second day, and 50.8 for the third day. The mode noise level, that is, the most commonly recorded level, was 44.0 for the 72-hour measurement period.

• 48-HOUR MEASUREMENT SITE

The 24-hour Leq for the first day at Site B was 49.3 and 50.0 for the second day. The DNL level for this site was computed to be 54.8 for the first day and 55.0 for the second day of the measurement period. The mode noise level was 44.0 for the 48-hour measurement period.

• 24-HOUR MEASUREMENT SITES

Site C is located at 7063 E. Medina Avenue approximately 16,000 feet north of the airport. The area is a large single-family residential area of contemporary homes on small lots.

The equipment was set up at the rear of the house. A swimming pool was located approximately 20 feet from the noise monitor location. A large dog was also present during the monitor setup. There were no aircraft overflights during the monitor setup.

The 24-hour Leq for Site C was 52.5. The DNL level for this site was computed to be 54.3 for the measurement period. The most commonly recorded level was 56.0 for the 24-hour measurement period which would indicate a fairly high background noise level.

Site D is located at 9302 East Plant Avenue. This home is approximately 14,000 feet northeast of the airport. The area is a single-family residential area of contemporary homes on small lots.

The home is located on a corner lot with an open view to the airport. The equipment was set up in the side yard of the house. There is a paved road approximately 20 feet from the noise monitor location. There were no aircraft overflights during the monitor setup, however there were several delivery/construction trucks observed during the setup of the noise monitoring equipment.

The 24-hour Leq for Site D was 55.3. The DNL level for this site was computed to be 55.9 for the measurement period. The most common record level was 44.0 for the 24-hour period.

MEASUREMENT RESULTS SUMMARY

The noise data collected during the measurement period are presented in **Table 2B**. The information includes the average 24-hour Leq for each site. The Leq metric is derived by accumulating all noise during a given period and logarithmically averaging it. It is similar to the DNL metric except that no extra weight is attached to nighttime noise.

Three DNL values are presented for each site. DNL(24) represents the DNL from all noise sources. DNL(t) is developed only from noise exceeding the loudness and duration thresholds defined at each measurement site. The DNL(t) is a reasonable approximation of

TABLE 2B
Measurement Results Summary
Williams Gateway Airport

	Site A			Site B		Site C	Site D
	Day 1	Day 2	Day 3	Day 1	Day 2	Day 1	Day 1
Measurement Dates	5/16 - 5/17	5/17 - 5/18	5/18 - 5/19	5/14 - 5/15	5/15 - 5/16	5/15 - 5/16	5/17 - 5/18
Cumulative Data							

LEQ(24)	43.8	45.8	47.3	49.3	50.0	52.5	55.3
DNL(24)	45.2	49.0	50.8	54.8	55.0	54.3	55.9
DNL(t)	45.0	48.2	50.2	51.7	51.7	54.2	53.1
DNL(b)	31.7	41.3	41.9	51.9	52.3	37.9	52.7
MODE dB	44.0	44.0	44.0	44.0	44.0	56.0	44.0
L(50)	44.0	44.0	44.0	45.0	45.0	56.0	45.0
Single Event Data							
L(max)	82.1	80.3	69.9	65.3	73.3	89.2	83.5
SEL(max)	87.0	87.5	91.7	81.6	82.9	94.1	97.7
Max Duration (sec)	42.3	209	363	35	44	66	229
Number of Single Events above 60 dB (Lmax)	62	86	71	35	36	216	170
Number of Single Events Above							
SEL 70 dB SEL	35	56	35	25	27	128	94
SEL 80 dB	5	7	5	4	4	20	31
SEL 90 dB	0	0	2	0	0	2	7
SEL100 dB	0	0	0	0	0	0	0

Source: Coffman Associates Analysis

the DNL attributable to aircraft noise alone. Aircraft noise events are usually the only ones exceeding these thresholds if the site and the thresholds are carefully selected. It is this DNL(t) value against which modeled noise may be compared to assess the adequacy of the computer predictive model in describing actual conditions. DNL(b) provides a measure of the residual background noise resulting from subtracting the DNL(t) value from the DNL(24) value.

In addition, the L(50) values for each site are presented. These values represent the sound levels above which 50 percent of the samples were recorded. All of the cumulative data For comparative purposes, normal conversation is generally at a sound level of 60 decibels while a busy street is approximately 70 decibels along the adjacent sidewalk.

The program resulted in a total of one 72-hour period, one 48-hour period, and two 24-hour periods from four sites around the airport. A total of 676 single events were recorded during the program and 168 average hourly sound levels were calculated and recorded.

presented represents the average values for the duration of the measurements at each site.

The table also presents data on other measures of noise that may be useful for comparisons. These include:

- Maximum recorded noise level in dB (Lmax);
- Maximum recorded sound exposure level (SELmax);
- Longest single-event duration in seconds (Dur max);
- Most frequently recorded decibel level (Mode dB);
- Number of single events above sound exposure levels (SEL) 70, 80, 90, and 100.

AIRCRAFT NOISE ANALYSIS METHODOLOGY

The standard methodology for analyzing the prevailing noise conditions at airports involves the use of a computer simulation model. The Federal Aviation Administration (FAA) has approved two models for use in F.A.R. Part 150 Noise Compatibility Studies -- NOISEMAP and the

Integrated Noise Model (INM). NOISEMAP is used most often at military airports, while the INM is most commonly used at civilian airports.

The latest versions of the INM are quite sophisticated, accounting for such variables as airfield elevation, temperature, headwinds, and local topography in predicting noise levels at a given location. INM Version 5.2a was used to prepare noise exposure maps for the Williams Gateway noise analyses.

Inputs to the INM include runway configuration, flight track locations, aircraft fleet mix, stage length (trip length) for departures, and numbers of daytime and nighttime operations by aircraft type. The INM provides a database for the commercial, military, and general aviation aircraft which commonly operate at Williams Gateway. **Exhibit 2B** depicts the INM input assumptions.

The INM computes typical flight profiles for aircraft operating at the assumed airport location, based upon the field elevation and lapse rate temperature, and flight procedure data provided by aircraft manufacturers. The INM will also accept user-provided input, although the FAA reserves the right to accept or deny the use of such data depending upon its statistical validity.

The INM predicts noise levels at a set of grid points surrounding an airport. The numbers and locations of grid points are established during the INM run to determine noise levels in the areas where operations are concentrated, depending upon the tolerance and level of refinement specified by the user. The noise level values at the grid points are used to prepare noise contours, which connect points of equal noise exposure. INM will also calculate the noise levels at a user-specified location, such as noise monitoring sites.

INM INPUT

AIRPORT AND STUDY AREA DESCRIPTION

The runways were input into the INM in terms of latitude and longitude, as well as elevation. As previously mentioned, the INM computes typical flight profiles for aircraft operating at the airport location, based upon the field elevation, lapse rate temperature,

and flight procedure data provided by aircraft manufacturers. The Williams Gateway Airport field elevation is 1,382 feet above mean sea level (MSL). The lapse rate temperature, the change in temperature with altitude, is calculated by multiplying the International Standard Atmosphere (ISA) temperature lapse rate of 0.003566 degrees Fahrenheit by the airport field elevation (1,382 feet MSL) and subtracting this value from the INM's standard day temperature of 59 degrees. This equates to a lapse rate temperature of 54.1 degrees Fahrenheit for Williams Gateway.

It is also possible to incorporate a topographic database into the INM, which allows the INM to account for the changes in distances from aircraft in flight to elevated receiver locations. However, the topographic data, while obtained from the U.S. Geographical Survey, are of relatively low resolution, and experience has shown that these data can produce erroneous results in predicting noise levels where airports are located on relatively flat terrain. Thus the topographic database was not employed for this study, as the terrain surrounding Williams Gateway is essentially level where most people live. Exceptions may occur for homes located on hills, but the magnitude of the expected differences in noise levels at those receivers is expected to be less than 1 dB.

ACTIVITY DATA

For this analysis, current aircraft operations (takeoffs and landings) data and forecasts of future (2004 and 2020) activity prepared for this study and presented in Chapter Two of the 1999 Master Plan Study were used for noise modeling. The operations forecast prepared for the Master Plan Study are prepared under the assumption that no constraining factors (limited hangar space, runway capacity, etc.) will inhibit the growth of airport operations. **Table 2C** summarizes the existing and forecast operation levels.

Average daily aircraft operations were calculated by dividing total annual operations by 365 days. The distribution of these operations among various categories, users, and types of aircraft is critical to the development of the input model data.

FLEET MIX

The selection of individual aircraft types is important to the modeling process because different aircraft types generate different noise levels. The noise footprints presented in **Exhibit 2C**, **Exhibit 2D,** and **Exhibit 2E** illustrate this concept graphically. The footprints represent the noise pattern generated by one departure and one arrival of the given aircraft type. The aircraft illustrated are some of those commonly found at Williams Gateway. Additionally, noise footprints for aircraft that are anticipated to operate at Williams Gateway in the future are illustrated.

TABLE 2C
Operations Summary
Williams Gateway Airport

		FORECASTS	
Operations	**Existing 1999[1]**	**2004[2]**	**2020[2]**

Itinerant	63,171	73,800	135,400
Local	165,752	158,400	202,800
Estimated Nighttime	10,450	10,681	15,557
Total	239,373	242,881	353,757

[1] Estimate based on actual operations from July 1998 through June 1999. Used as a projection of 1999 operations for noise modeling.

[2] Williams Gateway Master Plan Update, Chapter Two, Table 2V, p. 2-29

The military, turbojet, and turboprop fleet mix were developed based on airport landing reports and on air traffic control tower (ATCT) observations as well as the airport staff.

The twin and single-engine piston aircraft mix were developed by using the percentages of based aircraft by type to divide up the operations at the airport.

Table 2D summarizes the fleet mix data input into the noise analysis by annual aircraft operations.

DATABASE SELECTION

The FAA aircraft substitution list indicates that the general aviation single-engine variable pitch propeller model, the GASEPV, represents a number of single-engine general aviation aircraft. Among others these include the Beech Bonanza, Cessna 177 and 180, Piper Cherokee Arrow, Piper PA-32, and the Mooney. The general aviation single-engine fixed pitch propeller model, the GASEPF, also represents several single-engine general aviation aircraft. These include the Cessna 150 and 172, Piper Archer, Piper PA-28-140 and 180, and the Piper Tomahawk.

The INM describes several different versions of the B-727 and B-737 aircraft. INM designators 727Q15 and 727EM2 represent the B-727-200 and hushkitted B-727 aircraft. The model's 737QN was used for the 737-100/200, with the 737300 used for B-737-300, and the 737400 used for the B-737-400 series. The 757RR and 767300 designators were used to represent the B-757 and B-767aircraft, respectively, in the fleet mix. The A300 and A320 designators were used to represent the A-300 and A-320 operations, respectively. The DC-10 series aircraft was modeled with the DC1040 INM designator. These choices are in accordance with the Pre-Approved Substitution List published by the FAA Office of Environment and Energy (AEE) branch in Washington.

The FAA's substitution list recommends the BEC58P, the Beech Baron, to represent the light twin-engine aircraft such as the Piper Navajo, Beech Duke, Cessna 31, and others. The CNA441 effectively represents the light turboprop and twin-engine piston aircraft such as the King Air, Cessna 402, Gulfstream Commander, and others. The DHC6 represents the heavier turboprop and twin-engine piston aircraft such as the Super King Air aircraft.

The INM provides data for most of the business turbojet aircraft in the national fleet. The LEAR35 effectively represents the Lear 30 and

50 series, the Sabreliner 65, the Falcon 10, 50, and 200, and the Hawker 700 and 800 series. The CNA500 represents the Cessna Citation I and SP and the Mitsubishi Diamond MU300. The LEAR25 designator represents the Lear 2x series aircraft, the Sabreliner 40-60-70-75, the HS125, and the Jetstar 1.

General aviation helicopter operations are modeled using the Jet Ranger. The Jet Ranger helicopter data was extracted from the FAA's Heliport Noise Model (HNM).

Military operations are a major portion of the traffic at Williams Gateway. To model these operations, the KC135B was selected to represent the KC-135 and the C130 represents the C-130. The single jet engine attack aircraft were represented by the F16A. The LEAR25 represents the Lear 25 series military aircraft and is also the approved substitute for the T-38 aircraft. The INM designator DHC6 represents the C-12 aircraft in the military fleet.

All substitutions are commensurate with published FAA guidelines.

TIME-OF-DAY

The time-of-day at which operations occur is important as input to the INM due to the 10 decibel weighting of nighttime (10:00 p.m. to 7:00 a.m.) flights. In calculating airport noise exposure, one operation at night has the same noise emission value as 10 operations during the day by the same aircraft. The Air Traffic Control Tower (ATCT) at Williams Gateway operates from 6:00 a.m. to 9:00 p.m. seven days a week. Consequently, ATC counts for nighttime operations are not available. However, ATCT staff estimate nighttime aircraft operations at approximately 4.6 percent of the total annual operations. The nighttime operations by aircraft type are presented in **Table 2D**. This percentage was applied to both future forecast scenarios.

RUNWAY USE

Runway usage data is another essential input to the INM. For modeling purposes, wind data analysis usually determines runway use percentages. Aircraft will normally land and takeoff into the wind. However, wind analysis provides only the directional availability of a runway and does not consider pilot selection, primary runway operations, or local operating conventions. At Williams Gateway, the parallel runway configuration offers

TABLE 2D
Fleet Mix And Operational Data

		EXISTING		FORECAST			
		1999		2004		2020	
	INM Designator	Itinerant	Local	Itinerant	Local	Itinerant	Local
Daytime Operations							
AIR CARRIER/CARGO							
Stage 2							
B-727-200	727Q15	53	0	0	0	0	0
B-737-200	737QN	182	0	0	0	0	0
DC-8	DC8QN	82	0	0	0	0	0
Stage 3							
Regional Jet	CL601	0	0	270	0	3,632	0
B-727-EM2 (Hush kit)	727EM2	0	0	280	0	0	0
B-737-300	737300	0	0	1,512	0	15,890	0
B-757	757RR	0	0	1,350	0	11,350	0
B-767	767300	0	0	1,188	0	11,350	0
A-300	A300	0	0	0	0	560	0
DC-10	DC1040	0	0	810	0	908	0
Propeller							
Single Engine Piston	GASEPV	0	0	520	0	1,040	0
Large Turboprop	SF340	0	0	270	0	2,270	0
AIR TAXI							
Light Single-Fixed	GASEPF	1,045	0	555	0	795	0
Light Single-Var.	GASEPV	1,045	0	555	0	795	0
Light Twin	BEC58P	1,045	0	740	0	1,060	0
Twin Turboprop	CNA441	999	0	925	0	1,325	0
Large Turboprop	DHC8	32	0	0	0	0	0
Large Multi Piston Engine	DC3	62	0	0	0	0	0
Stage 2 Business Jet	LEAR25	384	0	370	0	0	0
Stage 3 Business Jet	LEAR35	276	0	555	0	1,325	0
GENERAL AVIATION							
Light Single-Fixed	GASEPF	12,640	109,000	18,510	114,000	21,230	155,800
Light Single-Var.	GASEPV	15,067	11,000	10,314	12,400	16,348	14,000
Light Twin	BEC58P	16,870	3,114	17,770	4,000	24,082	5,000
Twin Turboprop	CNA441	3,475	0	9,465	0	12,645	0
Jets							
LEAR-35	LEAR35	869	0	947	0	1,265	0
Citation	CNA500	869	0	947	0	1,265	0
Rotorcraft:							
Jet Ranger	JRNGR	869	0	947	0	1,265	0
MILITARY							
KC-135	KC135B	0	7,492	0	7590	0	7,590
C-130	C130	0	999	0	990	0	990
Single Engine Attack Jet	F16A	0	10,488	0	13860	0	13,860
T-38	LEAR25	2,497	0	3,020	3580	3,020	3,580
Lear 25	LEAR25	2,497	0	1,980	0	1,980	0
C-12	DHC6	2,313	23,659	0	1980	0	1,980
Subtotal Daytime		63,171	165,752	73,800	158,400	135,400	202,800

TABLE 2D (Continued)
Fleet Mix And Operational Data

	EXISTING	FORECAST

	INM Designator	1999 Itinerant	1999 Local	2004 Itinerant	2004 Local	2020 Itinerant	2020 Local
Nighttime							
Light Single-Fixed	GASEPF	2,,717	0	2,777	0	4,045	0
Light Single-Var.	GASEPV	2,613	0	2,670	0	3,889	0
Light Twin	BEC58P	1,672	0	1,709	0	2,489	0
Twin Turboprop	CNA441	418	0	482	0	700	0
Stage 2 Business Jet	LEAR25	52	0	53	0	78	0
Stage 3 Business Jet	LEAR35	52	0	53	0	78	0
Large Turbo prop	SF340	52	0	53	0	78	0
Large Multi Piston Engine	DC3	638	0	641	0	933	0
A-320	A320	960	0	961	0	1,400	0
B-737-400	737400	209	0	214	0	311	0
B-757	757RR	1,066		1,068		1,556	
Subtotal Nighttime		10,450	0	10,681	0	15,557	100.0
Total		73,621	165,752	84,481	158,400	150,957	202,800

only two directions of choice. The airport management at Williams Gateway has designated Runway 30 L/C/R as the "calm wind runway." Winds five (5) knots and below are considered calm winds. Pilots in aircraft under 12,500 pounds in weight will generally only take up to a 5 knot tail wind on departure. Consequently, this is the direction of choice in most conditions where winds allow a northwest flow. According to wind data, the designation of Runway 30 L/C/R as the calm wind runway is favored up to 70 percent of the time.

Runway utilization can be reflected by showing the percentage of time that air traffic activities occur in either a northwest or southeast flow configuration. When the airport operates in a north flow configuration, arriving and departing traffic use Runway 12 L/C/R. When a south flow configuration is used, arriving and departing traffic use Runway 30 L/C/R.

Continuous records of the runway usage at Williams Gateway Airport were not directly available; however, the ATCT staff provided an estimate of runway use. Runway 12L-30R was closed during the inventory phase of the study which is reflected in the 1999 existing conditions runway use depicted in **Table 2E**. In the short term the ATCT indicated that 20 percent of the military and commercial/cargo arrivals, 4 percent of the departures, and 80 percent of the touch and go activity would shift to Runway 12L-30R when it reopened. Planned terminal development on the east side of the airport and relocating the instrument landing system (ILS) to Runway 30R is projected to change the runway use. The military and commercial/air cargo is projected to increase to 80 percent

arrivals, 80 percent of the departures, and 75 percent of the touch-and-go on Runway 12L-30R. Runway 12R-30L is projected to remain the general aviation runway in during the study. **Tables 2E and 2F** summarize the runway use percentages for the existing and future conditions.

FLIGHT PROFILES

One of the variables which affects single event noise levels at a given measurement location is the actual flight profile of the aircraft as it passes overhead. In the INM, a flight profile is comprised of three parameters: thrust, speed and altitude. The thrust value bears a direct linear relationship to the expected noise level, as the INM contains tables of noise levels as a function of thrust values for each aircraft type. The speed of the aircraft affects the Sound Exposure Level (SEL) by affecting the duration of the noise event; *i.e.*, the slower the aircraft, the longer the noise event, and the higher the SEL value. The INM applies a standard correction for speed differences using a logarithmic function.

Altitude affects the predicted noise levels in that an aircraft which is closer to an observer is generally louder than an aircraft which is farther away. The INM tables of noise levels and thrust values are also tied to specific distances, from which the INM interpolates the noise level at the observer, again using a logarithmic function. In general, the small variations in speeds and altitudes typically observed close to the airport have relatively small effects on predicted noise levels. Differences in thrust settings can have more pronounced effects.

There is no data currently available which report the thrust values used by a given aircraft type. Actual thrust settings may vary as a result of specific local conditions during a flight, such as load, weather, and airline-specific flight procedures. The INM estimates the thrust settings from standard flight procedures reported by the aircraft manufacturers.

The INM database provides separate departure profiles (altitude at a specified distance from the airport with associated velocity and thrust settings) for each type of aircraft using the airport. In the case of commercial jet aircraft, the INM typically stores several standard profiles that account for variations in departure weight. These profiles are delineated in the database by destination stage lengths (travel distance). This accounts for the increased aircraft takeoff weight due to the additional fuel required to fly longer distances. A majority of the commercial/cargo destinations are within 1,000 nautical miles (considered Stage 2 in the INM). Therefore these aircraft were modeled with Stage 2 lengths.

The standard arrival profile normally used in INM analysis is a three-degree approach (or approximately 300 feet per nautical mile). The instrument approach to Runway 30C is set to 2.5-degrees; therefore, all baseline year aircraft approaches assigned to Runway 30C were programmed with a 2.5 degree approach slope. Since the ILS glide slope is expected to be aligned to

three degrees in November 1999, all potential future Runway 30C aircraft operations were programmed with a standard three degree glide slope. The standard approach included in the model was deemed acceptable for use in modeling approaches to all other runways.

TABLE 2E
Existing Runway Use

Runway	General Aviation	Commercial/Cargo/ Business Jet	Military
Arrivals (Existing Condition)			
12L	0.0%	0.0%	0.0%
30R	0.0%	0.0%	0.0%
12C	6.0%	25.0%	21.0%
30C	14.0%	60.0%	49.0%
12R	24.0%	5.0%	9.0%
30L	56.0%	10.0%	21.0%
Departures (Existing Condition)			
12L	0.0%	0.0%	0.0%
30R	0.0%	0.0%	0.0%
12C	5.0%	21.0%	15.0%
30C	10.0%	49.0%	35.0%
12R	25.0%	9.0%	15.0%
30L	60.0%	21.0%	35.0%
Touch-And-Go's (Existing Condition)			
12L	0.0%	0.0%	0.0%
30R	0.0%	0.0%	0.0%
12C	6.0%	30.0%	30.0%
30C	14.0%	70.0%	70.0%
12R	24.0%	0.0%	0.0%
30L	56.0%	0.0%	0.0%

The military F-16 aircraft occasionally practice an overhead approach maneuver at Williams Gateway. This maneuver requires the pilot to fly a standard approach from the southeast until reaching the runway threshold, do a climbing 360-degree turn to 9,000 feet MSL, cutback the thrust at 9,000 feet MSL, and do 360-degree approach back to the same runway. Because the F-16 aircraft do not touchdown on the runway, this procedure was designed as an overflight in the INM. Thrust levels, turn procedures, and altitudes were provided by the chief pilot from the Tucson Air National Guard Unit.

FLIGHT TRACKS

Local and regional air traffic control procedures, input from the ATCT staff, and actual radar flight track data were used to develop consolidated flight

TABLE 2F
Future Runway Use

Runway	General Aviation	Commercial/Cargo/ Business Jet	Military
Arrivals (Short Term Future)			
12L	**5.0%**	**10.0%**	**10.0%**
30R	**15.0%**	**10.0%**	**10.0%**
12C	**6.0%**	**25.0%**	**11.0%**
30C	**14.0%**	**40.0%**	**39.0%**
12R	**24.0%**	**5.0%**	**9.0%**
30L	**35.0%**	**10.0%**	**21.0%**
Departures (Short Term Future)			
12L	**2.0%**	**2.0%**	**2.0%**
30R	**2.0%**	**2.0%**	**2.0%**
12C	**5.0%**	**21.0%**	**15.0%**
30C	**6.0%**	**45.0%**	**6.0%**
12R	**25.0%**	**9.0%**	**15.0%**
30L	**60.0%**	**21.0%**	**60.0%**
Touch-And-Go's (Short Term Future)			
12L	11.0%	30.0%	30.0%
30R	10.0%	50.0%	50.0%
12C	6.0%	30.0%	30.0%
30C	14.0%	20.0%	20.0%
12R	24.0%	0.0%	0.0%
30L	35.0%	0.0%	0.0%
Arrivals (Long Term Future)			
12L	3.0%	24.0%	24.0%
30R	7.0%	56.0%	56.0%
12C	5.0%	6.0%	6.0%
30C	15.0%	14.0%	14.0%
12R	21.0%	0.0%	0.0%
30L	49.0%	0.0%	0.0%
Departures (Long Term Future)			
12L	3.0%	24.0%	24.0%
30R	7.0%	56.0%	56.0%
12C	5.0%	6.0%	6.0%
30C	15.0%	14.0%	14.0%
12R	21.0%	0.0%	0.0%
30L	49.0%	0.0%	0.0%
Touch-And-Go's (Long Term Future)			
12L	3.0%	25.0%	25.0%
30R	7.0%	60.0%	60.0%

12C	5.0%	5.0%	5.0%
30C	15.0%	10.0%	10.0%
12R	21.0%	0.0%	0.0%
30L	49.0%	0.0%	0.0%

tracks. The result is consolidated flight tracks describing the average corridors that lead to and from the Williams Gateway Airport.

For developing flight tracks for input into the INM, five days of radar flight track data, from April 23 and May 15-18, 1999, were used. Initially, the five days of radar data were to correspond with the noise monitoring period. However, it was learned after the noise monitoring was scheduled that the 161st Air Refueling unit that frequently trains at the airport was activated and sent overseas. Because these aircraft have been a source of complaint, it was deemed necessary to obtain radar flight track data of these operations to better understand how they operate at Williams Gateway Airport. A review of noise complaint data and landing reports indicated that KC-135 aircraft were operating April 23, 1999. The remaining flight track data corresponds with the noise monitoring period. **Exhibit 2F** depicts the five days of radar flight track data for Williams Gateway Airport.

As seen on **Exhibit 2F**, there are three areas were the radar flight track data is heavily concentrated: around Williams Gateway Airport; around Chandler Municipal Airport to the southwest; and Phoenix Sky Harbor activity to the northwest. Radar flight track data is Touch-and-go activity is done by all aircraft types at Williams Gateway Airport. Generally, larger turbojet aircraft flown by the commercial airlines and military operate in a much larger touch-and-go pattern than the smaller general aviation aircraft due to the operational capabilities of each aircraft type. In addition, large turbojet aircraft tend to practice instrument landings requiring a long stable approach to the runway end. General

concentrated on both sides of the parallel runways as well as a solid stream on the extended runway centerline to the southeast.

Exhibit 2G depicts the consolidated departure flight tracks developed for the aircraft for input into the INM. INM consolidated flight tracks are developed by piloting the centerline of a concentrated group of tracks and then dispersing the consolidated track into multiple sub-tracks that conform to the radar flight track data. The yellow, red, and green colored lines on **Exhibit 2G** are the radar track data. The wider blue lines represent the centerline or spine of each group of radar track data. The thinner blue lines are the sub-tracks from each track spine.

Arrival tracks at Williams Gateway Airport are generally concentrated on the runway centerline of each runway due to the precision needed to safely land an aircraft. However, the small general aviation aircraft are able to make shorter approaches to the airport. **Exhibit 2H** depicts the arrival stream and consolidated flight tracks at Williams Gateway Airport. Because Runway 30C has an instrument approach system, the arrival stream has a tighter concentration of aircraft on the extended runway centerline than the other runways.

aviation aircraft are generally concentrated near the airport in an oval-shaped pattern on either side of the airport. **Exhibit 2J** depicts the radar and INM consolidated touch-and-go flight tracks at Williams Gateway Airport.

The magenta flight track on **Exhibit 2J** depicts the F-16 maneuver previously discussed. This track provides a long stable approach from the

southeast, two 360-degree turns and a departure route away from Williams Gateway for the F-16 maneuver.

The radar flight track data was taken during a period when Runway 12L-30R was closed. It was assumed that Runway 12L-30R would operate similar to Runway 12C-30C for future scenarios.

ASSIGNMENT OF FLIGHT TRACKS

The final step in developing input data for the INM model is the assignment of aircraft to specific flight tracks. Prior to this step, specific flight tracks, runway utilization, and operational statistics for the various aircraft models using Williams Gateway Airport were evaluated.

The radar flight track data was used to determine flight track percentages for each aircraft type. The radar flight tracks that formed the consolidated tracks and sub-tracks were first counted. Then each consolidated track was then assigned a percentage based on the total number of tracks for each runway.

To determine the specific number of aircraft assigned to any one flight track, a long series of The shape and extent of the contours reflect the underlying flight track assumptions. The outermost noise contour represents the 60 DNL. The 60 DNL contour is asymmetrical off the ends of the runway reflecting the uneven distribution of traffic to the northwest and southeast. The long slender shape of the contour to the southeast reflects the dominance of arrivals to Runways 30 L/C/R. The bulges in the contours to the northwest reflect the departure turns. The next contour is the 65 DNL contour, and it also is influenced by runway use and flight

calculations was performed. This included a number of specific aircraft of one group factored by runway utilization and flight track percentage.

INM OUTPUT

Output data selected for calculation by the INM were annual average noise contours in DNL. F.A.R. Part 150 requires that 65, 70, and 75 DNL contours must be mapped in the official Noise Exposure Maps. In addition, the 60 DNL noise contour is also mapped in this study as a guideline for future noise abatement and land use planning. This is consistent with previous noise studies at Williams Gateway. This section presents the results of the contour analysis for current and forecast noise exposure conditions, as developed from the Integrated Noise Model.

1999 NOISE EXPOSURE CONTOURS

Exhibit 2K presents the plotted results of the INM contour analysis for 1999 conditions using input data described in the preceding pages. The areas within each contour are presented in **Table 2G**.

tracks. The inner noise contours from 70 DNL to 75 DNL generally encompass the parallel runway system.

The 60 DNL contour extends about 8,000 feet from the airport property over Warner Road to the north. To the south the 60 DNL contour extends about 11,000 feet away from airport property. The western edge of the contour parallels the runways and covers small portions of the Williams Campus. The eastern side of the contour remains on airport property.

The 65 DNL noise contour is smaller and similar in general shape to the 60 DNL contour to the north. To the north, the 65 DNL contour extends 3,000 feet from the airport property, just short of Power Road. On the south side, the 65 DNL contour extends about 5,000 feet south of the airport property to just short of Germann Road. The east and west edges of the contour remain on airport property.

The 70 and 75 DNL noise contours remain close to the runway. The 70 DNL contour has a small extension along the extended runway centerline off airport property to the north and south. The 75 DNL contour remains on airport property.

2004 NOISE
EXPOSURE CONTOURS

The 2004 noise contours represent the estimated noise conditions based on the forecasts of future operations with Runway 12L-30R open. This analysis provides a near-future baseline which can subsequently be used to judge the effectiveness of proposed noise abatement procedures. **Exhibit 2L** presents the plotted results of the INM contour analysis for 2004 conditions using input data that has been described in the preceding pages.

The 2020 noise contours are similar to the 2004 noise contours. The increase in turbojet activity on Runway 12L-30R creates more of a spike shape to the 60 and 65 DNL contours to the southeast. This activity also pushes the noise contours further east toward the General Motors proving grounds. The contours extend off the extended runway centerline slightly more than the 1999 and 2004 noise contours.

Generally the 2004 noise contours are similar in shape to their 1999 counterparts. This is due to the use of similar modeling input assumptions for the consistency of the baseline case. The contours are slightly wider and more elongated than the 1999 contours due to the reopening of Runway 12L-30R and forecast increase in operations.

The surface areas of the 2004 noise exposure are presented for comparison in **Table 2G**.

2020 NOISE
EXPOSURE CONTOURS

The 2020 noise contours represent the estimated noise conditions based on the forecasts of future operations. Runway use percentages, depicted on **Table 2F** on page 2-15, were adjusted to reflect the planned development of terminal facilities on the east side of the airport. The analysis provides a long term future baseline which can also be used to judge the effectiveness of proposed noise abatement procedures and land use planning recommendations. **Exhibit 2M** presents the plotted results of the INM contour analysis for 2020 conditions using input data described in the preceding pages.

TABLE 2G
Comparative Areas Of Noise Exposure
Williams Gateway Airport

	Area In Square Miles		

DNL Contour	1999	2004	2020
60	6.8	7.7	7.8
65	3.7	4.4	4.2
70	2.1	2.7	2.5
75	1.1	1.5	1.2

COMPARATIVE MEASUREMENT ANALYSIS

A comparison of the measured versus the computer-predicted cumulative DNL noise values for each measurement site has been developed. In this case, it is important to remember what each of the two noise levels indicates. The computer-modeled DNL contours are analogous to the climate of an area and represent the noise levels on an average day of the period under consideration. In contrast, the field measurements reflect only the noise levels on the specific day of measurement. Additionally, the field measurements consider all of the noise events that exceed a prescribed threshold and duration (DNL(t)), while the computer model only calculates the noise due to the aircraft events. As previously discussed, the field measurements can easily be contaminated by ambient noise sources other than aircraft around the measurement sites. With this understanding in mind, it is useful to evaluate the comparative aircraft DNL levels of the measurement sites.

DNL Comparison

This analysis provides a direct comparison of the measured and predicted average daily DNL values for each 72-hour, 48-hour, and 24-hour noise measurement site. In order to facilitate such a comparison, it is necessary to ensure that the computer model input is representing the observed reality as accurately as possible within the capabilities of the model.

During the measurements, the airport operated in both a south flow and a north flow. The flow tended to vary throughout the day during the program. Consequently, in order to evaluate the INM based on this field data, it is reasonable to look at the average annual noise contours developed as a requirement of F.A.R. Part 150.

A difference of three to four DNL is generally not considered a significant deviation between measured and calculated noise, particularly at levels above 65 DNL. Additional deviation is expected at levels below 65 DNL. For comparison, the average human ear cannot distinguish changes in sound levels of less than two or three decibels. The measured and predicted noise levels are presented for each aircraft noise measurement site in **Table 2H**.

For the most part, the measurements reflect the predicted sound levels in the area surrounding the airport. As seen in **Table 2H**, in all but one case the predicted sound levels fall within the three to four decibel deviation. Measured values at Site A were below the INM predicted values ranging from 6.4 to 11.6 DNL. As previously discussed, Site A is located on the extended runway centerline northwest of the airport and is likely to see low overflights from aircraft on approach. However, due to the reduced level of military training during the monitoring period, the measured noise levels in this area are less than predicted.

TABLE 2H
Noise Measurement vs. Predicted DNL Values

	Site #A Day 1	Site #A Day 2	Site #A Day 3	Site #B Day 1	Site #B Day 2	Site #C Day 1	Site #D Day 1
INM-Predicted Values	56.6	56.6	56.6	54.1	54.1	53.3	53.5
Measured Values	45.0	48.2	50.2	51.7	51.7	54.2	53.1
Difference	+11.6	+8.4	+6.4	+2.5	+2.5	-0.9	+0.2

Source: Coffman Associates Analysis

It must be recognized that field measurements made over a one to three-day period are applicable only to that period of time and may not -- in fact, in many cases, do not -- reflect the average conditions at the site over a much longer period of time. The relationship between field measure-ments and computer-generated noise exposure forecasts is analogous to the relationship between weather and climate. The computer-modeled contours represent noise levels on an average day of the year. In contrast, the measurements reflect only the noise levels present at the time of measurement. In other words, the modeling process derives overall average annual conditions (climate), while field measurements reflect daily fluctuations (weather).

SUMMARY

The information presented in this chapter defines the noise patterns for current and future aircraft activity, without additional abatement measures, at Williams Gateway Airport. It does not, however, make an attempt to evaluate or otherwise include that activity over which the airport has no control -- such as other aircraft transiting the area and not stopping at the airport.

The current contours are based on an average day's activity for the June 1998 to May 1999 operational period and are presented as the 1999 noise exposure contours. The 2004 and 2020 forecasts of noise exposure levels around the airport can be expected to increase slightly as the airport becomes busier in the future. In the long-term (20-year) future, the noise exposure is expected to have a wider dispersion with the shift of a majority of the larger turbojet activity to Runway 12L-30R.

It is stressed that DNL contour lines drawn on a map do not represent absolute boundaries of acceptability or unacceptability in personal response to noise, nor do they represent the actual noise conditions present on any specific day, but rather the conditions of an average day derived from annual average information.

99SP09-2F-12/08/99

Broadway Rd.
Main St./Apache Trail
Southern Ave.
Superstition Freeway
Baseline Rd.
Ironwood Drive
Idaho Rd.
Tomahawk Rd.
Guadalupe Rd.
Gilbert Rd.
Elliot Rd.
Ray Rd.
Meridian Rd.
Vineyard Rd.
La Palma Rd.
Schnepf Rd.
Crimson Rd.
Ocotillo Rd.
Chandler Height Rd.
Riggs Rd.
Higley Rd.
Power Rd.
Sossaman Rd.
Greenfield Rd.
Val Vista Drive
Roosevelt Water Conservation District Canal
Kitchen Creek Wash
Pecos Rd.

LEGEND

- Detailed Land Use Study Area
- County Boundary
- Municipal Boundary
- Airport Property
- Planned Santan Freeway
- Air Carrier/Cargo Arrival
- Air Carrier/Cargo Departure
- General Aviation Arrival
- General Aviation Departure
- General Aviation Touch & Go
- Military Arrival
- Military Departure
- Military Touch & Go
- Rural Residential (0-2 du/ac)
- Low Density Residential (2.1-5 du/ac)
- Medium Density Residential (5.1-15 du/ac)
- High Density Residential (15+ du/ac)
- Mobile and Trailer Homes
- Mixed Use
- Noise Sensitive Institutions
- Place of Worship
- School

Source: Radar Flight Track Data from Phoenix TRACON April 23, 1999 and May 15-18, 1999. Flight Track Data from 5,000 MSL to ground level.

NORTH

0 8000

SCALE IN FEET

WILLIAMS GATEWAY AIRPORT

Exhibit 2F

RADAR FLIGHT TRACKS

Chapter Three
NOISE IMPACTS

The impacts of aircraft noise on existing and future land use and population are examined in this chapter. The effects of noise on people include hearing loss, other ill health effects, and annoyance. While harm to physical health is generally not a problem in neighbor-hoods near airports, annoyance is a common problem. Annoyance is caused by sleep disruption, interruption of conversations, interference with radio and television listening, and disturbance of quiet relaxation.

Individual responses to noise are highly variable, thus making it very difficult to predict how any person is likely to react to environmental noise. The average response among a large group of people, however, is much less variable and has been found to correlate well with cumulative noise dosage metrics such as Leq and DNL. The development of aircraft noise impact analysis techniques has been based on this relationship between average community response and cumulative noise exposure.

For more detailed information on the effects of noise exposure, refer to the **Technical Information Paper (T.I.P.), Effects of Noise Exposure**, located in the back of this book.

The major sections in this chapter include the following:

- Land Use Compatibility
- Noise Complaints
- Current Noise Exposure
- Potential Growth Risk
- 2004 Noise Exposure
- 2020 Noise Exposure

LAND USE COMPATIBILITY

The degree of annoyance which people suffer from aircraft noise varies depending on their activities at any given time. People rarely are as disturbed by aircraft noise when they are shopping, working, or driving as when they are at home. Transient hotel and motel residents seldom express as much concern with aircraft noise as do permanent residents of an area.

The concept of "land use compatibility" has arisen from this systematic variation in human tolerance to aircraft noise. Studies by governmental agencies and private researchers have defined the compatibility of different land uses with varying noise levels. (A review of these guidelines is presented in the **T.I.P., Noise and Land Use Compatibility Guidelines**.) The FAA has established guidelines for defining land use compatibility for use in F.A.R. Part 150 studies.

F.A.R. PART 150 GUIDELINES

The FAA adopted land use compatibility guidelines when it promulgated F.A.R. Part 150 in the early 1980's. (Note: the Interim Rule was adopted on January 19, 1981; the Final Rule was adopted on December 13, 1984, was published in the Federal Register on December 18, and became effective on January 18, 1985.) These The FAA guidelines in **Exhibit 3A** show that residential development, including standard construction, mobile homes and transient lodging, are incompatible with noise above 65 DNL. Standard construction homes and transient lodgings may be considered compatible where local communities determine these uses are permissible; however, sound insulation measures are recommended. Schools and other public use facilities are also generally incompatible with noise between 65 and 75 DNL, but, again, the guidelines note that, where local communities were based on earlier studies and guidelines developed by federal agencies (FICUN, 1980). These land use compatibility guidelines are only advisory; they are not regulations. Part 150 explicitly states that determinations of noise compatibility and regulation of land use are purely local responsibilities. (See Section A150.101(a) and (d) and explanatory note in Table 1 of F.A.R. Part 150.) **Exhibit 3A** lists the FAA guidelines.

FAA uses the Part 150 guidelines as the basis for defining areas within which noise compatibility projects may be eligible for federal funding through the noise set aside of the Airport Improvement Program (AIP). In general, noise compatibility projects must be within the 65 DNL contour to be eligible for federal funding. According to the AIP Handbook, "Noise compatibility projects usually must be located in areas where noise measured in day-night average sound level (DNL) is 65 decibels (dB) or greater" (FAA Order 5100.38A, Chapter 7, paragraph 710.b). Funding is permitted outside the 65 DNL contour only where the airport sponsor has determined that non-compatible land uses exist at lower levels and the FAA has explicitly concurred with that determination.

determine that these uses are permissible, sound insulation measures should be used.

Outdoor music shells and amphi-theaters are considered incompatible at levels exceeding 65 DNL. Several other uses, including hospitals, nursing homes, places of worship, auditoriums, concert halls, livestock breeding, amusements, resorts, and camps are considered incompatible at levels above 75 DNL.

Many uses are considered compatible in areas subject to noise between 65 DNL and 75 DNL if

prescribed levels of noise level reduction can be achieved through sound insulation. These include hospitals, nursing homes, places of worship, auditoriums, and concert halls.

LAND USE GUIDELINES AT WILLIAMS GATEWAY AIRPORT

For purposes of the F.A.R. Part 150 Noise Compatibility Study at Williams Gateway Airport, the FAA's land use compatibility guidelines will be used as the basis for making determinations about land use compatibility in the airport area.

While the FAA considers 65 DNL as the threshold of significant impact on noise-sensitive uses, the noise analysis at Williams Gateway goes down to the 60 DNL level. This is partly in response to a federal report which has recommended the need to examine potential noise impacts below 65 DNL in environmental documents where significant increases in noise While these uses are not officially considered as "noncompatible," they should be considered "noise-sensitive." It is not uncommon to find that some occupants of these uses are disturbed by noise levels below 65 DNL. This is especially true in suburban or rural areas with quiet background sound levels, such as portions of the Williams Gateway Study Area. While research has shown that significantly fewer people are affected as noise decreases below 65 DNL, aircraft noise continues to be a problem for at least some people at even extremely low DNL levels. This is indicated in the two graphs illustrated on **Exhibit 3B** which relate annoyance to DNL levels. (See also the **T.I.P., Noise and Land Use Compatibility Guidelines**.)

NOISE COMPLAINTS

may be expected (FICON, 1992, p. 3-5) and partly in response to local experience which indicates that residents outside of the 65 DNL noise contour are annoyed by existing aircraft noise levels. Documented complaints have been received from areas all around the airport.

For purposes of this Part 150 Study, Williams Gateway Airport is considering noise between 60 and 65 DNL to have a marginal effect on the following noise-sensitive land uses:

- Residential, including mobile home parks;
- Schools;
- Hospitals and nursing homes;
- Places of worship, auditoriums, and concert halls; and
- Outdoor music shells and amphitheaters.

Transient lodgings should be considered compatible with noise below 70 DNL, provided that sound insulation is installed to achieve a noise level reduction of 25 dB.

Before assessing the exposure of local land use and population to existing aircraft noise levels, it is valuable to review recent noise complaints. By themselves, complaints cannot be taken as a complete assessment of a noise problem at an airport. Many unpredictable variables can influence whether a person chooses to file a noise complaint. Many people who are annoyed may find it inconvenient or intimidating to call and complain. Others who decide to complain may be unusually sensitive to noise or be especially anxious about aircraft over-flights. Others who complain may be motivated by unusual events rather than by a chronic, long-term situation. Despite the limits of complaint information, it can aid in understanding the geographic pattern of concern about the airport.

Williams Gateway Airport has a system for recording and responding to noise complaints. The system requires the caller to provide their name, address and a telephone number where they can be reached, as well as the nature of their complaint, and the date and time it occurred. The airport does contact those individuals who log complaints, if requested, in order to gather additional information regarding the noise event. Calls are not logged when the caller is not willing to provide this information. Callers are also offered an informational packet explaining the airport's role in the community and future development plans.

The overall number of noise complaints have continued to steadily increase for all area jurisdictions since 1997. Callers from the City of Mesa have logged the overwhelming majority of all noise complaints. A tabulation of the number of calls logged at Williams Gateway Airport since 1997 is listed in **Table 3A**.

The 60 DNL contour, described as having a marginal effect, extends approximately 8,000 feet north and 12,000 feet south of the airport property boundary. To the north, the contour extends beyond the intersection of Warner and Power Roads. To the south, the contour extends to within 1,000 feet of Queen Creek Road. This contour affects an area of mixed use development, several areas of low density residential, and a place of worship. Currently, this area remains largely undeveloped.

CURRENT NOISE EXPOSURE

This section describes the exposure of existing noise-sensitive land uses and population to 1999 aircraft noise above 60 DNL.

LAND USES EXPOSED TO 1999 NOISE

Exhibit 3C shows the location of existing noise-sensitive land uses and the 1999 noise contours at Williams Gateway Airport. Noise-sensitive uses shown on the exhibit are based on the F.A.R. Part 150 land use compatibility guidelines reviewed earlier and include uses considered incompatible with noise above 65 DNL and marginally compatible with noise between 60 and 65 DNL.

The 65 DNL contour extends approximately 4,000 feet beyond the northern airport property boundary. The contour crosses over the location of the future San Tan Freeway and ends just short of Warner Road. To the south, the contour extends beyond the airport property for approximately 5,000 feet. No noise sensitive land uses are affected by the 65 DNL contour.

TABLE 3A
Noise Complaint Summary 1997-1999
Williams Gateway Airport

City	1997		1998		1999[1]	
	Callers	Complaints	Callers	Complaints	Callers	Complaints
Apache Junction	1	1	2	2	0	0
Chandler	1	1	2	4	3	3

Florence	0	0	1	1	0	0
Fountain Hills	1	1	0	0	0	0
Gilbert	4	4	14	17	6	6
Higley	5	5	14	19	7	7
Mesa	9	11	24	69	72	72
Queen Creek	2	2	23	27	7	7
Subtotal	23	25	80	139	95	95
Origin Unknown	3	3	4	4	0	0
Total	26	28	84	143	95	95

Source: Williams Gateway Airport, Noise Complaint Data Base.
[1] Data tabulated as of 5/99.

The 70 DNL contour extends beyond the airport property by nearly 1,000 feet both north and south of the airport. These areas are currently undeveloped. Two small islands created by the 70 DNL contour exist in the center of the airfield. No noise sensitive land uses are affected.

The current 75 DNL contour is contained within the airport property. This is aided by the concentration of the 1999 noise contours on the center runway. Runway 12C-30C was used as the primary heavy and jet aircraft runway while Runway 12R-30L was closed for construction. This greatly concentrated aircraft noise to the center of the airfield. No noise sensitive land uses are affected.

Noise-sensitive land uses impacted by current aircraft noise levels are shown in **Table 3B.**

TABLE 3B
Noise-Sensitive Land Uses Exposed to 1999 Aircraft Noise
Williams Gateway Airport

	DNL CONTOUR				TOTALS	
LAND USE	**60-65**	**65-70**	**70-75**	**75+**	**60+**	**65+**
Existing Residential						
Total Existing Single-Family Dwelling Units	35	0	0	0	35	0
Noise-Sensitive Institutions						
Places of Worship	1	0	0	0	1	0
Schools	0	0	0	0	0	0
Total Noise-sensitive Institutions	1	0	0	0	1	0

POPULATION EXPOSED TO 1999 NOISE

In assessing community noise impacts, the number of people exposed and the level of noise to which they are exposed must be considered. While lower noise levels cover a larger area and usually affect more people, they are less annoying than higher noise levels. To assess the intensity of the impact, it is helpful to have a way of jointly considering both population and noise level. The level-weighted population (LWP) methodology provides such an approach.

The LWP methodology assumes that increasing proportions of people are annoyed as noise increases. In the 60-65 DNL range, it is assumed that 20.5 percent of people are annoyed by noise. In the 65-70 DNL range, 37.6 percent; 70-75 DNL range, 64.4 percent; and above 75 DNL, 100 percent of people are annoyed by noise. A detailed description of this methodology is provided in the **T.I.P., Measuring the Impact of Noise on People**.

The affected population is calculated by counting the number of dwelling units within a given contour range and multiplying that number by the average household size (2.66) for Maricopa County as estimated by the county's Special Census of 1995 and provided by Maricopa Association of Governments (MAG). **Table 3C** indicates the population, expressed in both absolute numbers and level-weighted population (LWP), exposed to existing noise. In 1999 the total population exposed to noise between 60 and 65 DNL is 94. This corresponds to an LWP value of 20. No noise-sensitive land uses, hence no individuals, are currently affected by aircraft noise above 65 DNL.

TABLE 3C
Population Exposed to 1999 Aircraft Noise
Williams Gateway Airport

	DNL CONTOUR				Total Above 60 DNL		Total Above 65 DNL	
	60-65	65-70	70-75	75+	Residents	LWP	Residents	LWP
Existing Population	94	0	0	0	94	20	0	0

Notes: LWP = Level-weighted population; an estimate of the number of people actually annoyed by aircraft noise. It is derived by multiplying the population in each DNL contour range by the appropriate LWP response factor. The factors used are as follows: 0.205 for 60-65 DNL, 0.376 for 65-70 DNL, 0.644 for 70-75 DNL, and 1.000 for 75+ DNL.

Source: Coffman Associates analysis.

POTENTIAL GROWTH RISK

Before evaluating the impact of future aircraft noise, the likelihood of future noise-sensitive development in the area must be understood. Development trends in the vicinity of the airport are critical to noise compatibility planning. Future residential growth can constrain the operation of the airport if it occurs beneath aircraft flight tracks and within areas subject to high noise levels. The following paragraphs describe population growth and potential residential development within the study area in order to determine the potential growth risk. The focus of discussion includes population projections, residential growth, residential land use trends, residential development projects, and other noise-sensitive development.

POPULATION PROJECTIONS

Population projections for the study area, acquired from the Arizona Department of Economic Security, indicate that the population is expected to continue to increase throughout the near-term (2004) and long-term (2020) planning horizons. Based on the data presented in **Table 3D**, the population within Maricopa County, including all municipalities, is expected to increase nearly 16 percent between 1999 and 2005 (no projections are available for the year 2004), resulting in an average annual increase of 2.22 percent. New residential developments are expected to be established in the study area to accommodate the anticipated growth. During the same seven-year period, the State of Arizona is expected to grow by almost 15 percent (2.08 percent average annual increase).

GROWTH RISK ANALYSIS

The growth risk analysis focuses on undeveloped or nearly undeveloped land which is planned and zoned for noise-sensitive uses. Additional development may also occur through in-filling of existing areas of residential development. New residential development is expected to occur throughout the study area. The majority of the in-fill development is occurring and expected to continue north of the airport in the City of Mesa. **Exhibit 3D** identifies areas of on-going and potential future development. The remaining growth risk areas are vacant or undeveloped lots planned or zoned for residential use scattered throughout the

study area. In addition, a number of future schools have been proposed within the study area and will likely be needed to accommodate residential growth.

TABLE 3D
State and County Population

Year	Arizona[1]	Percentage Increase	Maricopa County[1]	Percentage Increase
1980	2,716,546	3.4%	1,509,175	3.8%
1981	2,810,108	2.8%	1,566,036	2.9%
1982	2,889,860	2.7%	1,611,847	3.2%
1983	2,968,924	3.3%	1,663,973	4.4%
1984	3,067,134	3.8%	1,736,952	5.3%
1985	3,183,539	3.9%	1,828,748	4.2%
1986	3,308,261	3.9%	1,905,504	4.5%
1987	3,437,103	2.9%	1,991,400	2.9%
1988	3,535,183	2.5%	2,048,441	2.6%
1989	3,622,184	1.6%	2,101,787	1.4%
1990	3,680,800	2.3%	2,130,400	2.3%
1991	3,767,000	2.4%	2,179,975	2.5%
1992	3,858,850	2.6%	2,233,700	2.6%
1993	3,958,875	2.8%	2,291,200	2.8%
1994	4,071,650	5.8%	2,355,900	7.3%
1995	4,307,150	3.6%	2,528,700	4.2%
1996	4,462,300	3.1%	2,634,625	3.3%
1997	4,600,275	3.6%	2,720,575	3.1%
1998	4,764,025	1.7%	2,806,100	5.3%
1999	4,842,987	2.5%	2,879,492	2.6%
Forecasts[2]				
2000	4,961,953	11.9%	2,954,157	12.7%
2005	5,553,849	10.6%	3,329,561	11.4%
2010	6,145,108	9.8%	3,709,566	10.6%
2015	6,744,754	9.2%	4,101,784	10.1%
2020	7,363,604	N.A.	4,515,090	N.A.

Source:
[1] Arizona Department of Economic Security Population Estimates (as of 7/99).
[2] Arizona Department of Economic Security, Research Administration, Population Statistics Unit.

In order to identify new growth and in-fill areas within the study area, a review of the officially adopted community general plans, existing zoning, and special area plans that encourage new residential development projects were conducted. In addition, material from each school district, institution of higher education, and the City of Mesa Economic Development Department was reviewed and incorporated into the analysis.

By comparing the Generalized Existing Land Use (Exhibit 1J), Future Land Use Plan (Exhibit 1L) and Generalized Zoning (Exhibit 1N), it is apparent that there is a significant amount of land within the study area which is available for

residential development. Future residential development will be influenced by the zoning in the area, the physical constraints of individual sites, the availability of sewer and water, and the market for residences in various locations around the study area. The determination of the number of dwelling units per acre is computed using the highest density allowed in a given zoning district and land use plan designation, minus 33% for such amenities as roads, sidewalks, and utilities.

Growth has been, and is expected to remain steady with a relatively strong population in-migration. The Phoenix metropolitan area is a popular destination due to its warm dry climate and high quality of living opening it to wide spread development speculation.

Exhibit 3D depicts existing and potential residential development and noise-sensitive land uses within the study area. Areas identified for future residential use are classified into four groups depending on how likely they are to be developed over the next five years. The probability of development occurring was determined through evaluating current development projects, pending development projects, and zoning and future land use designations.

High Probability - This category includes land within the study area involving projects that have been approved and which are under development. It also includes areas where significant in-fill is occurring.

Areas in this category are located north and southwest of the airport, in the cities of Mesa and Gilbert. One such area under development is Power Ranch, a planned development located approximately one mile southwest of the airport in the Town of Gilbert.

Medium Probability - This category includes areas which have proposed development plans or are awaiting jurisdictional approval. These areas are generally expected to be developed over the five-year planning period.

Areas in this category are located east, west, and south of the airport.

Potentially Available for Residential Development - While no residential development is currently proposed, areas designated in this category includes those where zoning and current and/or future land use plans designate the potential for residential development.

Potentially Available for Noise-Sensitive Institutions - This category includes areas where plans for future noise-sensitive development (schools, hospitals, and places of worship) have been proposed or land exists which is owned by noise-sensitive institutions. The largest area in this category is the Williams Campus which is adjacent to the airport. Several learning institutions are currently located on the campus, yet the objective of the Williams

Campus Master Plan is to capitalize on the existing facilities remaining from the former Williams Air Force Base. (*Refer to Chapter One for additional information pertaining to the Williams Campus Plan*).

2004 NOISE EXPOSURE

This section describes the exposure of existing and potential future noise-sensitive land uses and population to aircraft noise in 2004.

LAND USES EXPOSED TO 2004 NOISE

Exhibit 3E illustrates the forecast 2004 noise contours with both existing and potential noise-sensitive land uses within the study area. These contours are similar to the 1999 contours; however, they are slightly larger and have shifted northeastward due to the reopening of Runway 12L-30R.

The 60 DNL contour, determined to be an area marginally affected by aircraft noise, extends approximately 8,000 feet to the northwest and 11,200 feet to the southeast of the airport property. This contour encompasses small areas of mixed use, low density, and rural residential. In addition, a portion of the Williams Campus and a place of worship located along Power Road are affected.

The area encompassed by the 60 DNL contour to the north of the airport is zoned for rural residential and a limited amount of hotels/motels/resorts, and industrial uses. The General Land Use Plans for this area indicate planned uses of commercial, industrial, mixed use, and a small amount of park and open space. South of the airport, the 60 DNL contour extends into an area which is zoned for a combination of agricultural, rural residential, and industrial uses. According to the City of Mesa and Town of Queen Creek Land Use Plans, this area is exclusively reserved for industrial uses.

The 65 DNL contour extends approximately 3,200 feet beyond the northern airport property boundary, and just crosses the Roosevelt Water Conservation District Canal. To the southeast, the 65 DNL contour extends approximately 5,000 feet beyond airport property, nearly reaching Germann Road.

Although no existing dwelling units are affected by the 2004 65 DNL noise contour, approximately 718 potential dwelling units could be affected between the 65 and 70 DNL contour range in 2004. The majority of these units are located north of the airport near the proposed San Tan Freeway. In addition, a small area of potential residential development is affected by the 65 DNL contour southeast of the airport. The contour also touches the Williams Campus.

The 70 DNL contour is clearly centered on Runway 12L-30R. The contour extends approximately 2,400 feet beyond the airport property both north and south of the airport. The northern portion of the contour extends into an area of potential future residential development due to its current zoning classification, and reaches slightly

beyond the future San Tan Freeway corridor. To the south of the airport, the contour remains on property with current and proposed industrial uses. The contour would affect an area of residential development if the General Motors (GM) Proving Grounds is developed per current zoning.

The 75 DNL is divided into two sections. One section is associated with Runways 12L-30R and 12C-30C while the other surrounds Runway 12R-30L. Only the contour associated with the two eastern most runways deviates from the southern airport property boundary for approximately 500 feet into the GM Proving Grounds. The northern portion of this contour touches but does not leave the airport property. No existing noise-sensitive land uses are affected. Approximately one potential future dwelling unit would be exposed to noise above 75 DNL if the proving grounds became open to residential development.

Table 3E tabulates the impact of 2004 aircraft noise contours on existing and future residential and noise-sensitive land uses.

TABLE 3E
Noise-Sensitive Land Uses Exposed to 2004 Aircraft Noise
Williams Gateway Airport

	DNL CONTOUR				TOTALS	
LAND USE	**60-65**	**65-70**	**70-75**	**75+**	**60+**	**65+**
Existing Residential						
Total Existing Single-Family Dwelling Units	41	0	0	0	41	0
Potential Additional Residential						
Total Additional Dwelling Units	2,909	718	318	1	3,946	1,037
Total Potential Dwelling Units	2,950	718	318	1	3,987	1,037
Noise-Sensitive Institutions						
Places of Worship	1	0	0	0	1	0
Schools	0	0	0	0	0	0
Total Noise-sensitive Institutions	1	0	0	0	1	0

POPULATION EXPOSED TO 2004 NOISE

The total existing population exposed to noise above 60 DNL in 2004 increases to 109. This corresponds to a 2004 LWP of 23. There are no residents affected by aircraft noise above 65 DNL. **Table 3F** shows the impact of the 2004 noise on the local population.

Due to the growth risk for the area, it is possible for additional residences and population to be exposed to aircraft noise levels in the future.

Approximately 10,499 additional residents could be exposed to noise above 60 DNL in 2004. This corresponds to a LWP of 2,853. The majority of the future potential population will fall within the 60 and 65 DNL noise contour range (7,741). Approximately 1,909 potential residents could be added between the 65 and 70 DNL noise contours and 847 added between the 70 and 75 DNL contours. Additional growth in the study area could allow approximately two persons to be exposed to noise levels above 75 DNL. **Table 3F** provides an estimate of the number of potential residents which may be exposed to 2004 aircraft noise.

TABLE 3F
Population Exposed to 2004 Aircraft Noise
Williams Gateway Airport

	DNL CONTOUR				Total Above 60 DNL		Total Above 65 DNL	
	60-65	65-70	70-75	75+	Residents	LWP	Residents	LWP
Existing Population	109	0	0	0	109	23	0	0
Potential Population	7,741	1,909	847	2	10,499	2,853	2,758	1,266
Total Future Population	7,850	1,909	847	2	10,608	2,874	2,758	1,266

Notes: LWP = Level-weighted population; an estimate of the number of people actually annoyed by aircraft noise. It is derived by multiplying the population in each DNL contour range by the appropriate LWP response factor. The factors used are as follows: 0.205 for 60-65 DNL, 0.376 for 65-70 DNL, 0.644 for 70-75 DNL, and 1.000 for 75+ DNL.
Source: Coffman Associates analysis.

2020 NOISE EXPOSURE

This section describes the exposure of existing and potential future noise-sensitive land uses and population to aircraft noise in 2020.

LAND USES EXPOSED TO 2020 NOISE

Exhibit 3F illustrates the forecast 2020 noise contours with both existing and potential noise-sensitive land uses within the study area. The 2020 noise contours have shifted northeast due to the incorporation of Runway 12L-30R as the primary heavy aircraft/jet runway.

Marginally affected noise levels associated with the 60 DNL contour continues to extend well beyond the airport property in 2020. The contour extends nearly 9,000 feet north and 13,000 feet south of the airport. The overall contour has shifted to the northeast as a result of increased use of Runway 12L-30R by turbojet aircraft.

The shifting of aircraft noise to the northeast has moved several areas of existing noise-sensitive land uses outside this contour. An area of

existing mixed use to the north and several small areas of rural residential to the south of the airfield are affected.

The longest spike of the 65 DNL contour extends about 4,400 feet northwest of the airport property to the Roosevelt Water Conservation Canal. To the southeast, the 65 DNL contour extends about 6,000 feet beyond the airport. No existing noise-sensitive land uses are contained within the 65-70 DNL contours.

The 70 DNL contour extends beyond both the northwest and southeast airport property boundaries, approxi-mately 3,000 and 2,000 feet, respectively. No existing noise-sensitive land uses are affected.

While remaining primarily within airport property, the 75 DNL contour extends almost 1,000 feet north, reaching the San Tan Freeway corridor. The 75 DNL range is divided into three separate contours. One contour focuses primarily on the northeast runway while two small contours are concentrated around the thresholds of Runway 12R-30L.

Noise-sensitive land uses potentially impacted by noise in 2020 are shown in **Table 3G**.

TABLE 3G
Noise-Sensitive Land Uses Exposed to 2020 Aircraft Noise
Williams Gateway Airport

	DNL CONTOUR				TOTALS	
LAND USE	**60-65**	**65-70**	**70-75**	**75+**	**60+**	**65+**
Existing Residential						
Total Existing Single-Family Dwelling Units	23	0	0	0	23	0
Potential Additional Residential						
Total Additional Dwelling Units	2,192	689	336	40	3,257	1,065
Total Potential Future Dwelling Units	2,215	689	336	40	3,280	1,065
Noise-Sensitive Institutions						
Places of Worship	0	0	0	0	0	0
Schools	0	0	0	0	0	0
Total Noise-sensitive Institutions	0	0	0	0	0	0

POPULATION EXPOSED TO 2020 NOISE

The total existing population exposed to aircraft noise still remains between the 60 and 65 DNL noise contour range. This population decreases from 109 in 2004 to 61 in due to the shifting of the noise contours to the northeast. This equates to a LWP of 13.

No persons are affected above 65 DNL. **Table 3H** shows the impact of the 2020 noise on the existing and potential future local population.

Approximately 2,833 residents could be exposed to noise above 65 DNL. This is an increase of 75 residents over the 2004 estimate. Individuals are also expected to be affected within the 65-70 (1,832); 70-75 (894); and above the 75 DNL contour (107). The majority of the future potential population will remain within the 60 and 65 DNL noise contours (5,832). This is a significant decrease from that estimated for 2004 (7,741). This is due primarily to the expected shifting of heavy aircraft use to Runway 12L-30R. The noise generated by these aircraft would be moved eastward towards an area of limited development potential. This area is currently slated for current and future industrial uses in addition to the General Motors Proving Grounds.

TABLE 3H
Population Exposed to 2020 Aircraft Noise
Williams Gateway Airport

	DNL CONTOUR				Total Above 60 DNL		Total Above 65 DNL	
	60-65	65-70	70-75	75+	Residents	LWP	Residents	LWP
Existing Population	61	0	0	0	61	13	0	0
Potential Population	5,832	1,832	894	107	8,665	2,568	2,833	1,372
Total Future Population	5,893	1,832	894	107	8,726	2,580	2,833	1,372

Notes: LWP = Level-weighted population; an estimate of the number of people actually annoyed by aircraft noise. It is derived by multiplying the population in each DNL contour range by the appropriate LWP response factor. The factors used are as follows: 0.205 for 60-65 DNL, 0.376 for 65-70 DNL, 0.644 for 70-75 DNL, and 1.000 for 75+ DNL.

Source: Coffman Associates analysis.

SUMMARY

This chapter has analyzed the impacts of aircraft noise on existing and future land use and population in the vicinity of Williams Gateway Airport. While the near and long range forecasts show an increase in the number of aircraft operations at the airport, the size of the noise contours remain relative-ly constant. Fewer existing land uses are expected to be affected by significant levels of aircraft noise due to the shifting of the primary runway from the center to outboard Runway 12L-30R.

Given current zoning and planned land uses within the study area, there is a potential for a significant amount of future residential development exposed to aircraft noise in 2004 and 2020.

99SP09-3D-12/08/99

Broadway Rd.
Main St./Apache Trail
Southern Ave
Superstition Freeway
Baseline Rd.
Ironwood Drive
Idaho Rd.
Tomahawk Rd.
Apache Junction
Guadalupe Rd.
Gilbert
Gilbert Rd.
Lindsay Rd.
Elliot Rd.
Hawes Rd.
Mesa
Recker Rd.
Warner Rd.
Ellsworth Rd.
Signal Butte Rd.
Meridian Rd.
Ray Rd.
Williams Field Rd.
Val Vista Drive
Higley Rd.
Pecos Rd.
Pecos Road Realignment
Rittenhouse Road
Power Rd.
Southern Pacific Railroad
Germann Rd.
Chandler
Greenfield Rd.
Roosevelt Water Conservation District Canal
Sossaman Rd.
Crimson Rd.
Queen Creek Rd.
Ocotillo Rd.
Vineyard Rd.
La Palma Rd.
Schnepf Rd.
Chandler Height Rd.
Riggs Rd.

LEGEND

- Detailed Land Use Study Area
- County Boundary
- Municipal Boundary
- Airport Property
- Planned Santan Freeway
- Rural Residential (0-2 du/ac)
- Low Density Residential (2.1-5 du/ac)
- Medium Density Residential (5.1-15 du/ac)
- High Density Residential (15+ du/ac)
- Mobile and Trailer Homes
- Mixed Use
- Noise Sensitive Institutions
- Place of Worship
- School
- Potentially Available for Residential Development
- Potentially Available for Noise Sensitive Institutions
- Proposed School
- High Probability of Being Developed
- Medium Probability of Being Developed

Source: Coffman Associates Analysis
August 1999.

NORTH

0 8000
SCALE IN FEET

WILLIAMS GATEWAY AIRPORT

Exhibit 3D
EXISTING AND POTENTIAL

NOISE COMPATIBILITY PROGRAM

INTRODUCTION

This is the Noise Compatibility Program (NCP) document for Williams Gateway Airport, owned and operated by the Williams Gateway Airport Authority. The NCP is the second of two parts required in a Federal Aviation Regulation (F.A.R.) Part 150 Noise Compatibility Study. It includes Chapters Four, Five, and Six of the study in addition to five appendices. The first volume, the Noise Exposure Maps, which includes the first three chapters of the study, was published in December 1999.

Chapter Six presents the Noise Compatibility Program. This includes the City's noise compatibility policies. The plan is organized into three elements: noise abatement, land use management, and program manage-ment. The first two elements are based on the findings of Chapters Four and Five. The program management element includes measures to administer, refine, and update the overall program as needed in the future.

Chapter Four of the Noise Compatibility Program, Noise Abatement Alternatives, discusses and analyzes potential methods of reducing or shifting aircraft noise away from noise sensitive areas.

Chapter Five, Land Use Alternatives, analyzes potential land use planning and zoning techniques to prevent the development of new noise-sensitive land uses in areas exposed to aircraft noise.

Appendix A lists the members of the Planning Advisory Committee (PAC) who were consulted throughout the planning process.

Appendix B-Coordination, Consultation, and Public Involvement summarizes the planning process, local coordination, and public involvement process.

Appendix C provides materials for implementing the Noise Compatibility Program.

Appendix D is a supplemental noise measurement program from August 25, 1999 through August 26, 1999.

The Arizona Revised Statues pertaining to Public Airport Disclosure and Airport Influence Areas are presented in Appendix E.

For the convenience of FAA reviewers, the FAA's official Noise Compatibility Program Checklist is presented on pages iii through viii. The City's certification statement is on page ix.

F.A.R. PART 150
NOISE COMPATIBILITY PROGRAM CHECKLIST

AIRPORT NAME: ***Williams Gateway Airport*** ***REVIEWER:*** _____
Mesa, Arizona

	Yes/No/NA	Page No./ Other Reference
I. **IDENTIFICATION AND SUBMISSION OF PROGRAM:**		
A. Submittal is properly identified:		
1. F.A.R. 150 NCP?	Yes	Title Page; p. i
2. NEM and NCP together?	No	
3. Program revision?	No	
B. Airport and Airport Operator's name identified?	Yes	Title Page, p. i
C. NCP transmitted by airport operator cover letter?	Yes	
II. **CONSULTATION: [150.23]**		
A. Documentation includes narrative of public participation and consultation process?	Yes	Appendix B; supplemental volume, "Supporting Information on Project Coordination and Local Consultation"
B. Identification of consulted parties:		
1. all parties in 150.23(c) consulted?	Yes	Appendices A & B; and supplemental volume, "Supporting Information on Project Coordination and Local Consultation"
2. public and planning agencies identified?	Yes	Appendices A & B; and supplemental volume, "Supporting Information on Project Coordination and Local Consultation"
3. agencies in 2, above, correspond to those indicated on the NEM?	Yes	Appendices A & B; and supplemental volume, "Supporting Information on Project Coordination and Local Consultation"
C. Satisfies 150.23(d) requirements?		
1. documentation shows active and direct participation of parties in B, above?	Yes	Appendices A & B; supplemental volume, "Supporting Information on Project Coordination and Local Consultation"
2. active and direct participation of general public?	Yes	Appendix B; supplemental volume, "Supporting Information on Project Coordination and Local Consultation"
3. participation was prior to and during development of NCP and prior to submittal to FAA?	Yes	Appendix B; supplemental volume, "Supporting Information on Project Coordination and Local Consultation"

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NOISE COMPATIBILITY PROGRAM CHECKLIST

AIRPORT NAME: ***Williams Gateway Airport*** ***REVIEWER:*** _____
Mesa, Arizona

	Yes/No/NA	Page No./ Other Reference
4. indicates adequate opportunity afforded to submit views, data, etc.?	Yes	Appendix B; supplemental volume, "Supporting Information on Project Coordination and Local Consultation"
D. Evidence included of notice and opportunity for a public hearing on NCP?	Yes	Appendix B; supplemental volume, "Supporting Information on Project Coordination and Local Consultation"
E. Documentation of comments: 1. includes summary of public hearing comments, if hearing was held?	Yes	Supplemental volume, "Supporting Information on Project Coordination and Local Consultation"
2. includes copy of all written material submitted to operator?	Yes	Supplemental volume, "Supporting Information on Project Coordination and Local Consultation"
3. includes operator's responses/disposition of written and verbal comments?	Yes	Supplemental volume, "Supporting Information on Project Coordination and Local Consultation"
F. Informal agreement received from FAA on flight procedures?	A qualified yes	Local tower manager indicated qualified acceptance of noise abatement measures and was involved in Planning Advisory Committee (PAC) meetings.

F.A.R. PART 150
NOISE COMPATIBILITY PROGRAM CHECKLIST

AIRPORT NAME: ***Williams Gateway Airport*** ***REVIEWER:*** _____
Mesa, Arizona

	Yes/No/NA	Page No./ Other Reference
III. **NOISE EXPOSURE MAPS: [150.23, B150.3, 150.35(f)]** (This section of the checklist is not a substitute for the Noise Exposure Map Checklist. It deals with maps in the context of the Noise Compatibility Program submission.)		
A. Inclusion of NEMs and supporting documentation:		
1. Map documentation either included or incorporated by reference?	N/A	
2. Maps previously found in compliance by FAA?	N/A	
3. Compliance determination still valid?	N/A	
4. Does 180-day period have to wait for map compliance finding?	N/A	
B. Revised NEMs submitted with program: (Review using NEM checklist if map revisions included in NCP submittal)		
1. Revised NEMs included with program?	N/A	
2. Has airport operator requested FAA to make a determination on the NEM(s) when NCP approval is made?	N/A	
C. If program analysis uses noise modeling:		
1. INM, HNM, or FAA-approved equivalent?	N/A	
2. Monitoring in accordance with A150.5?	N/A	
D. Existing condition and 5-year maps clearly identified as the official NEMs?	N/A	
IV. **CONSIDERATION OF ALTERNATIVES: [B150.7, 150.23(e)]**		
A. At a minimum, are the alternatives below considered?		
1. land acquisition and interests therein, including air rights, easements, and development rights?	Yes	Chapter 5, pp. 5-20 - 5-23
2. barriers, acoustical shielding, public building soundproofing?	Yes	Chapter 4, pp. 4-19 - 4-22; Chapter 5, pp. 5-23 - 5-24
3. preferential runway system?	Yes	Chapter 4, pp. 4-4-4 -5
4. flight procedures?	Yes	Chapter 4, pp. 4-6 - 4-10, 4-15 - 4-19
5. restriction on type/class of aircraft (at least one restriction below must be checked)	Yes	Chapter 4, pp. 4-10 - 4-15
a. deny use based on Federal standards?	Yes	Chapter 4, p. 4-13
b. capacity limits based on noisiness?	Yes	Chapter 4, pp. 4-13-4-14
c. noise abatement takeoff/approach procedures?	Yes	Chapter 4, pp. 4-15-4-19
d. landing fees based on noise or time of day?	Yes	Chapter 4, p. 4-12
e. nighttime restrictions?	Yes	Chapter 4, p. 4-12
6. other actions with beneficial impact?	Yes	Chapter 4, pp. 4-23 - 4-30
7. other FAA recommendations?	N/A	

F.A.R. PART 150
NOISE COMPATIBILITY PROGRAM CHECKLIST

AIRPORT NAME: ***Williams Gateway AirportREVIEWER: _____***
Mesa, Arizona

		Yes/No/NA	Page No./ Other Reference
B.	Responsible implementing authority identified for each considered alternative?	Yes	Chapter 4, pp. 4-23 - 4-30
C.	Analysis of alternative measures:		
	1. measures clearly described?	Yes	Chapter 4, pp. 4-23 - 4-30; Chapter 5, pp. 5-2 -5-24
	2. measures adequately analyzed?	Yes	Chapter 4, pp. 4-3 - 4-30; Chapter 5, pp. 5-2 - 5-24
	3. adequate reasoning for rejecting alternatives?	Yes	
D.	Other actions recommended by the FAA: Should other actions be added? (list separately or on back of this form actions and discussions with airport operator to have them included prior to the start of the 180-day cycle)	N/A	
V.	**ALTERNATIVES RECOMMENDED FOR IMPLEMENTATION: [150.23(e), B150.7(c); 150.35(b), B150.5]**		
A.	Document clearly indicates:		
	1. alternatives recommended for implementation?	Yes	Chapter 6, pp. 6-2 -6-21, Table 6D, p. 6-25
	2. final recommendations are airport operators, not those of consultant or third party?	Yes	Sponsor's Certification, p. viii
B.	Do all program recommendations:		
	1. relate directly or indirectly to reduction of noise and noncompatible land uses?	Yes	Chapter 6, pp. 6-2 - 6-21
	2. contain description of contribution to overall effectiveness of program?	Yes	Chapter 6, pp. 6-2 - 6-21
	3. noise/land use benefits quantified to extent possible?	Yes	Chapter 4, pp. 4-23-4-30, Chapter 6, pp. 6-2 - 6-21
	4. include actual/anticipated effect on reducing noise exposure within noncompatible area shown on NEM?	Yes	Chapter 6, pp. 6-22-6-23 Exhibits 6G, 6H
	5. effects based on relevant and reasonable expressed assumptions?	Yes	Chapter 4, pp. 4-23-4-30
	6. have adequate supporting data to support its contribution to noise/land use compatibility?	Yes	Chapter 6, pp. 6-2 - 6-30 Chapters 4, 5, 6
C.	Analysis appears to support program standards set forth in 150.35(b) and B150.5?	Yes	Chapters 4, 5, 6

F.A.R. PART 150
NOISE COMPATIBILITY PROGRAM CHECKLIST

AIRPORT NAME: ***Williams Gateway AirportREVIEWER: _____***
Mesa, Arizona

		Yes/No/NA	Page No./ Other Reference
D.	When use restrictions are recommended:		
	1. are alternatives with potentially significant noise/compatible land use benefits thoroughly analyzed so that appropriate comparisons and conclusions can be made?	N/A	No use restrictions recommended
	2. use restrictions coordinated with APP-600 prior to making determination on start of 180-days?	N/A	
E.	Do the following also meet Part 150 analytical standards:		
	1. formal recommendations which continue existing practices?	Yes	Chapter 6, pp. 6-2 - 6-6
	2. new recommendations or changes proposed at end of Part 150 process?	Yes	Chapter 6, pp. 6-6 - 6-21
F.	Documentation indicates how recommendations may change previously adopted plans?	N/A	
G.	Documentation also:		
	1. identifies agencies which are responsible for implementing each recommendation?	Yes	Chapter 6, pp. 6-2 -6-21; Table 6D, p. 6-25
	2. indicates whether those agencies have agreed to implement?	Yes	Sponsor's Certification on p. viii. By approving NCP, Airport Authority has agreed to implement the measures for which it has sole responsibility, provided that funding is available. It has also agreed to encourage other organizations and agencies to take any required actions.
	3. indicates essential government actions necessary to implement recommendations?		Chapter 6, pp. 6-2 - 6-21
H.	Timeframe:		
	1. includes agreed-upon schedule to implement alternatives?	Yes	Chapter 6, pp. 6-2 -6-21; Table 6D, p. 6-25
	2. indicates period covered by the program?	Yes	Chapter 6, p.6-1, Table 6D, p. 6-25
I.	Funding/Costs:		
	1. includes costs to implement alternatives?	Yes	Chapter 6, pp. 6-2 -6-21; Table 6D, p. 6-25
	2. includes anticipated funding sources?	Yes	Chapter 6, pp. 6-2 -6-21; Table 6D, p. 6-25
VI.	**PROGRAM REVISION [150.23(e)(9)] Supporting documentation includes provision for revision?**	Yes	Chapter 6, pp. 6-20- 6-21

SPONSOR'S CERTIFICATION

It is hereby certified that this document is the Williams Gateway Airport Authority's official Noise Compatibility Program for Williams Gateway Airport. It is further certified that adequate opportunity has been afforded interested persons to submit their views, data, and comments concerning the correctness and adequacy of the Noise Compatibility Program and the supporting documentation and forecasts.

_____ _____

Date of Signature

Lynn F. Kusy
Executive Director
Williams Gateway Airport Authority

Chapter Four
NOISE ABATEMENT ALTERNATIVES

The DOT/FAA Aviation Noise Abatement Policy of 1976, the Airport Safety and Noise Abatement Act of 1979, and the Airport Noise and Capacity Act of 1990 outline the framework needed to assure a coordinated approach to tackling the difficult task of aircraft noise abatement and mitigation of aircraft noise impacts. Responsibilities are shared among the airport users, aircraft manufacturers, airport proprietors, federal, state, and local governments, and residents of communities near the airport. The following is a brief outline of each participant's unique role and responsibility in this effort.

- The federal government has the authority and responsibility to control aircraft noise sources, implement and enforce flight operational procedures, and manage the air traffic control system.

- The aircraft manufacturers have the responsibility for incorporating quiet engine technology into new aircraft designs in order to meet federal noise standards.

- Airport proprietors are responsible for planning and implementing airport development actions designed to reduce noise. These include noise abatement ground procedures and improvements in airport design. These may also involve restrictions on airport use that do not unjustly discriminate against any user, impede the federal interest in safety and management of the air

navigation system, unreasonably interfere with interstate commerce, or otherwise conflict with federal law.

- Local government and planning agencies have the responsibility for providing land use planning, zoning, and housing regulation that will encourage development or redevelopment of land that is compatible with present and projected airport operations.

- General aviation operators have the responsibility to use proper aircraft maintenance and good neighbor flying techniques to minimize their noise output.

- Air travelers and shippers generally should bear the cost of noise reduction, consistent with established federal economic and environmental policy which states that the adverse environmental consequences of a service or product should be reflected in its price.

- Residents and prospective residents in areas surrounding airports should seek to understand the aircraft noise problem and what steps can and cannot be taken to minimize its effect on people. Prospective residents of areas impacted by aircraft noise should be aware of the effect of noise on their quality of life and make their locational decisions with that in mind.

To reduce the overall noise levels around the airport, it is necessary to reduce the total sound energy emitted by the aircraft. This can be accomplished through either the modification of aircraft operating procedures or the imposition of restrictions on the number or type of aircraft allowed to operate at the airport. Special aircraft operating procedures are often difficult to implement and enforce as they can erode aircraft operational safety margins. Airport operating restrictions are also difficult to implement given the formidable analytical requirements of F.A.R. Part 161 and the need to avoid conflicts with FAA grant assurances and the constitutional bans on unjust discrimination and undue interference with interstate commerce.

Consequently, it is often more effective and less disruptive to try to move the noise to areas that are either compatible or contain a minimum of noise-sensitive areas. This opportunity is usually realized through runway use and flight routing techniques or airport facility development.

The development of a noise abatement program has three primary objectives:

1. To reduce the noise in the study area, within practical cost constraints.

2. To minimize, where practical, the exposure of the local population to noise events of very high levels. These high levels, which are often manifested by single event noise levels outside of the DNL contours, can be an annoyance to airport neighbors and warrant attention.

3. To insure maximum compatibility of existing and future land uses with noise generated by aircraft using the airport.

This chapter is concerned with measures which would alter the use or configuration of air space, flight tracks, and airport facilities so as to reduce or shift the location of noise. These potential measures are listed in **Exhibit 4A**. The techniques tend to either reduce the overall size of the noise contours or to move the noise to other areas.

The subsequent sections of this chapter will review and evaluate a variety of potential noise abatement techniques. In order to judge the effectiveness and appropriateness of a particular technique, it is important to consider the magnitude of the noise impacts around the Williams Gateway Airport.

Chapter Three of the Noise Exposure Maps document evaluated the impact of noise on the population around the airport. Based on the current conditions, 94 persons are exposed to aircraft noise above 60 DNL. No one is exposed to aircraft noise above 65 DNL or greater. In the future, the population exposed to noise is expected to increase. This is partially due to anticipated increases in operations at Williams Gateway Airport, and partially to the residential growth potential around the airport. When considering this future growth, the population exposed to noise above 60 DNL could increase to as many as 10,608 persons in the year 2004. As many as 2,758 of these individuals would be impacted at the significant noise levels of 65 DNL and higher. These increases are largely due to the potential for residential growth around the airport, as the five-year noise contours are only slightly larger than the current contours. In 2020, due to a shifting of large aircraft operations to Runway 12L/30R, the number of persons affected by noise above 60 DNL decreases to 8,726, however the number of persons exposed to noise above 65 DNL increases to 2,833.

The FAA is most concerned with noise impacts at the 65 DNL level and higher in evaluating the acceptability of any proposed noise abatement measures. The FAA only considers the current and five-year noise contours when evaluating noise abatement recommendations.

The current noise exposure around Williams Gateway Airport indicates a need for concern and proper planning. Although no one is currently impacted by noise above 65 DNL, the five-year forecast shows the potential for a significant number of individuals that could be impacted by high levels of aircraft noise.

POTENTIAL NOISE ABATEMENT MEASURES

A variety of measures for noise abatement merit investigation and should be reviewed for possible application at Williams Gateway Airport. As part of the analysis leading to the preparation of this chapter, the consultant held a technical conference to brainstorm potential noise abatement measures and troubleshoot preliminary ideas identified by the Consultant. The conference was on November 17, 1999. Those attending the conference included aviation professionals responsible for the administration, control, and operation of aircraft and facilities at the airport. They included professional pilots, representatives of airlines and flight departments of companies using the airport, air traffic controllers, representatives from aviation organizations, and airport admini-strators. The insights from this discussion have been incorporated into the subsequent alternatives analysis.

This discussion provides a comprehensive evaluation of all reasonable noise abatement techniques which deserve consideration. The extent to which these measures might apply at Williams Gateway depends on the probable noise reduction over developed or developing areas, the extent to which the measures would likely compromise safety margins and the ability of the airport to perform its intended function, and their apparent ability to be implemented considering the legal, political and financial climate of the area.

If a measure fails to be viable for one of the above reasons, its inclusion in a final program at Williams Gateway would not be warranted.

All analyses of noise abatement alternatives are conducted for the year 2004 to provide a consistency of evaluation and a look at the worst case future conditions within the FAA's five-year planning scope for a Part 150 document.

Noise abatement measures considered in this study are procedures which have the potential to reduce the noise exposure for persons living in the airport environs. The evaluation of most of these alternatives is required under F.A.R. Part 150, even though they may have little utility for local application. These measures fall into four categories:

- Runway Use and Flight Routing
- Airport Regulations
- Aircraft Operating Procedures
- Airport Facilities Development

Measures in the first three categories generally may be implemented within a relatively short period of time, while those in the last category usually require a longer time to implement due to environmental assessment and construction activities.

RUNWAY USE AND FLIGHT ROUTING

The pattern of land use around the airport provides clues to the design of arrival and departure patterns for noise abatement. By redirecting air traffic over areas with more compatible land uses, noise effects may often be significantly reduced.

Williams Gateway Airport is surrounded by residential and other noise-sensitive development to the north, west, and south. Additional residential and noise-sensitive development is proposed on nearly all sides of the airport including significant in-fill development north, west and south of the airport.

Runway Use Programs

Runway use programs for noise abatement refer to the use of selected runways by aircraft. There are two types of runway use programs, rotational and preferential. Rotational runway use is intended to distribute aircraft noise equally off all runway ends. Preferential runway use programs are intended to direct as much aircraft noise as possible in one direction.

FAA Order 8400.9 describes national safety and operational criteria for establishing runway use programs. It defines two classes of programs: informal and formal. A formal program must be defined and acknowledged in a Letter of Understanding between FAA's Flight Standards Division and Air Traffic Service, the airport proprietor, and the airport users. Once established, participation by aircraft operators is mandatory. Formal programs can be extremely difficult to establish, especially at airports with many different users.

An informal program is an approved runway use system which does not require the Letter of Understanding. Informal programs are typically implemented through a Tower Order and publication of the procedure in the Airport/Facility Directory. Participation in the program is voluntary.

Currently Williams Gateway Airport utilizes an informal preferential runway use program that designates Runways 30 L/C/R as the calm wind runways. The airport operates in a northwest flow configuration approximatley70 percent of the time. This program allows lower and slower approaching aircraft arrive over less concentrated noise-sensitive areas southeast of the airport. However, this configuration does cause aircraft to depart in the direction of large concentrations of noise-sensitive land uses northwest of the airport.

Aircraft approaching the airport for landing are confined over a narrower corridor as they line up on the runway. This causes the concentration of aircraft overflights on finite areas in line with the runway centerline. Departing aircraft however, establish a pattern of irregular flight tracks after takeoff due to their varied destinations. Although aircraft departure noise is often seen as the more disruptive, the effects and overall impacts are less concentrated.

Williams Gateway Airport also uses a program by which heavy and turbojet aircraft are kept on the eastern two runways (Runways 12C/L and 30C/R) whenever possible. Runway 12R/30L is primarily reserved for light piston powered aircraft. This configuration of runway use provides relief from aircraft arrival and departure noise for noise-sensitive areas west of the airport including the Williams Campus. In addition, Runway 12C/30C is the only runway offering instrument approaches and is therefore often used by jet aircraft operating under IFR or conducting instrument flight training. Runway 12L/30R is the best use option for large aircraft since it possesses the greatest runway load bearing strength of all three runways.

Conclusion: The current informal preferential calm wind runway program reduces the number of approaching aircraft over residential and noise-sensitive areas northwest of the airport. However, the effectiveness of this program in reducing overall noise impacts versus informally designating Runways 12 L/C/R as the calm wind runways should be analyzed.

The use of the eastern two runways for louder aircraft will aid in distancing these aircraft operations from the greater concentration of noise-sensitive development west of the airport. The use of Runway 12C/30C and 12L/30R by large aircraft should be continued and does not require additional evaluation.

Departure Turns

The turning of departing aircraft to avoid populated areas is an accepted method of noise abatement which has been implemented in numerous areas. At Williams Gateway Airport, with noise-sensitive development areas located to the north, west, and south, noise abatement departure turns away from populated areas might be beneficial for noise impact reduction.

In order for any flight routing procedures to be effective at reducing noise impacts, there must be a noise compatible corridor for aircraft to fly over. While conditions that constitute noise compatibility vary, generally an area with little or no noise-sensitive development can be used as an effective overflight corridor. The value of such a corridor largely depends on three factors: (1) the likelihood of future noise-sensitive development; (2) the size of the corridor ; and (3) the location of the corridor relative to the airport.

Williams Gateway is fortunate to have areas of undeveloped land immediately northeast, east, and southeast of the airport. In addition, a new freeway is planned north of the airport. These areas hold potential as overflight corridors since they contain minimal amounts of noise-sensitive development.

A set of power lines traverse east-west approximately three miles north of the airport. The area between the power lines and the airport has remained relatively free from dense residential development and is largely undeveloped or agricultural. This area continues into an area east of the airport containing the General Motors Proving Grounds and a largely undeveloped area of rural Pinal County. Although there is a small amount of noise-sensitive development between the proving grounds and Pinal County, this area may be viable as a noise abatement corridor for eastern and southern departures turning east from the airport.

The area southeast of the airport currently contains a significant amount of agricultural land in addition to some industrial and commercial development. Development pressure has foreseen the possibility for future nodes of residential development in this area. However, this area still holds promise as a viable noise abatement corridor.

Currently, Williams Gateway Airport utilizes many of these aforementioned noise abatement corridors as part of an informal noise abatement program. As part of this program, heavy aircraft (greater than 12,500 lbs.) departing Runways 30C/R are requested to turn right prior to the power lines ½ mile north of Elliot Road. This procedure helps prevent overflights of residential and noise-sensitive areas north of the airport by departing aircraft. KC-135 aircraft from the Arizona Air National Guard 161st Air Refueling Wing have successfully used this departure turn procedure to remain south of residential areas.

While smaller jet and most military aircraft are able to complete requested departure turns prior to overflights of noise-sensitive areas, large transport category aircraft are unable to turn steep enough. The excessive angle between the runways and the present noise compatible corridors would require turns in excess of 150-degrees and the use of steep bank angles. In addition, typical airline departure policy limits turns in excess of 120-degrees and bank angles in excess of 15-degrees until the aircraft is in a "clean" configuration (landing gear and flaps retracted). Therefore, departure turns needed to avoid noise-sensitive areas north and northeast of the airport would often exceed FAA standards or airline policy.

The location of Williams Gateway Airport in relation to the Phoenix Class B airspace limits the area in which unrestricted VFR flights can

operate. Class B airspace is designed to regulate the flow of uncontrolled traffic above, below, and around the arrival and departure airspace used by passenger aircraft at major airports. The Class B airspace surrounding Williams Gateway has a ceiling of 5,000 feet MSL (Mean Sea Level) over the airport and steps down to 4,000 feet MSL less than two miles northwest of the airport. This configuration greatly restricts departures to the northwest. A chart depicting the airspace around Williams Gateway is depicted on Exhibit 1E, following page 1-14, in Chapter One of the Nose Exposure Maps document.

Conclusion: Areas containing limited amounts of noise-sensitive development located north, east, and southeast of the airport could prove valuable as potential noise abatement corridors. The current informal procedure requesting departing aircraft on Runways 30C/R to follow a portion of this corridor should reduce the number of overflights north of the airport. Given the limited distance between the airport and noise-sensitive areas north of the airport, some larger commercial aircraft will be unable to comply with northeast departure turns due to aircraft operating limitations. Informal letters of agreement between specific aircraft operators such as the Arizona Air National Guard 161st Air Refueling Wing and the air traffic control tower could be an effective method for establishing this noise abatement procedure.

Given the relatively large amount of undeveloped land southeast of the airport, the establishment of an informal nose abatement procedure for aircraft departing Runways 12C/L should also be evaluated. This would help reduce overflights, hence noise impacts, of current noise-sensitive development south of the airport. Such a procedure is discussed later in this chapter and merits further study.

Visual Approach Procedures

Approaches involving turns relatively close to the airport can sometimes be defined over noise-compatible corridors. These approaches would be used by aircraft operating under VFR (visual flight rules). In designing special noise abatement approach routes, a straight-

in final approach of at least one mile should be provided. If large and fast aircraft are involved, a longer straight-in final approach of two to three miles is required.

At Williams Gateway, the dense residential development north and northwest of the airport provides no viable noise abatement corridor long enough for a stable two or three mile final approach. Although the primary areas of residential development north of the airport are approximately three miles from the runway threshold, the relative angle of Runways 12 L/C/R to these developed areas would require aircraft to turn steeply in order to establish a final approach. This type of maneuver is not practical from an operational or safety perspective.

Approaches made from the southeast would affect less noise-sensitive development. The closest concentration of residential development is nearly five miles from the threshold of Runways 30C/R and three miles from Runway 30L. This provides more opportunity for straight-in visual final approaches without affecting large areas of noise-sensitive development.

Although not a major source of noise at Williams Gateway, several helicopters are based at the airport in addition to occasional itinerant operations. Currently, rotor wing aircraft are requested to approach/depart in a southwest corridor to avoid overflight of the Williams Campus and residential development. A number of additional potential noise abatement corridors exist for helicopters including the Roosevelt Canal, Southern Pacific Railroad, and the General Motors Proving Grounds. In addition, visual check points could be established to assist both pilots and the air traffic control tower in following noise abatement corridors.

Large military helicopters create large amounts of down-wash turbulence disturbing large amounts of dust. Therefore, these aircraft fly a straight-in visual approach to Runways 30L. Consideration should be given to maintaining this procedure. Potential helicopter arrival/departure routes with corresponding checkpoints are depicted on **Exhibit 4B.**

Conclusion: Visual approach procedures would provide little benefit for arrivals to Runways 12L/C due to the lack of a viable noise abatement corridor and therefore do not merit further study. A viable noise abatement corridor exists southeast of the airport and merits further study. In addition, a number of potential noise abatement corridors and corresponding checkpoints for rotor wing aircraft merits additional consideration.

Instrument Approach Procedures

Williams Gateway Airport has one precision and two non-precision approach procedures. All instrument approaches are designated for Runway 30C. The only precision approach, ILS Runway 30C, is straight-in with a 3.0 degree glide slope (realigned from 2.5-degrees in November 1999). The two non–precision approaches are also straight-in and utilize either the Willie very-high frequency omnidirectional range tactical air navigation (VOR/TAC) station or global positioning system (GPS) technology.

These approaches cause aircraft to arrive over or near current and proposed residential and non-compatible development areas southeast of the airport. Although these areas are situated between three and five miles from the runway thresholds, it may be beneficial to move arriving aircraft farther east, away from developed areas. This could be done through the relocation of instrument approaches to Runway 30R.

Conclusion: Relocating the ILS from Runway 30C to Runway 30R would be effective in moving aircraft approaches further east. This should reduce aircraft noise over non-compatible uses southeast of the airport and therefore deserves further study.

Traffic Pattern Changes

The current traffic pattern altitude is 1,213 feet above field level (AFL) for all fixed wing aircraft. This is 213 feet higher than a standard traffic pattern altitude (a standard traffic pattern altitude is 1,000 feet AFL). This additional altitude offers greater distance between aircraft and noise-sensitive development which may experience traffic pattern overflights.

Raising the traffic pattern altitude results in a larger pattern due to the increased distance needed to climb and descend form the designated altitude. The net result of raising the traffic pattern altitude would be to extend the pattern over noise-sensitive areas. Therefore increasing the traffic pattern altitude is not suggested.

Conclusion: Given that the traffic pattern altitude at Williams Gateway is higher than a standard traffic pattern altitude and raising the pattern altitude would increase the size of the traffic pattern, adjustment to the traffic pattern altitude at Williams Gateway need not be discussed further.

In order to reduce overflights of residential areas west of the airport aircraft using the western

Current noise abatement procedures have established Runway 12L-30R for use by light propeller powered aircraft performing pattern operations. So as not to conflict with operations on Runways 12C-30C and Runway 12L-30R, the light aircraft traffic pattern is flown to the west of the airfield. This pattern does not create aircraft overflights of current noise-sensitive areas other than the Williams Campus. The majority of noise-sensitive development is situated west of the Southern Pacific Rail Road, essentially paralleling the traffic pattern. Aircraft using the western traffic pattern could be requested to remain east of the Southern Pacific Railroad during the "downwind leg", therefore avoiding residential overflights.

Heavy and turbojet aircraft primarily use the two eastern runways. A majority of large aircraft using Williams Gateway Airport are performing flight training operations requiring an instrument approach (ILS, VORTAC, or GPS). These are currently available for Runway 30C. As a means to establish these aircraft on subsequent approaches, they must fly an extended traffic pattern. Due to the large amount of undeveloped land east of the airport, these flights are routed in an eastern traffic pattern. Similar types of aircraft performing standard touch-and-go operations utilize a traffic pattern over the General Motors Proving Grounds. This pattern keeps the loudest aircraft away from high concentrations of noise-sensitive development west of the airport.

traffic pattern could be requested to remain east of the Southern Pacific Railroad during the "downwind leg". This option deserves additional consideration.

The airport's current procedure of establishing the heavy and turbojet aircraft traffic pattern east of the airport works well by keeping these aircraft

away from populated areas west of the airport and should be maintained.

AIRPORT REGULATIONS

The courts traditionally have recognized the right of airport proprietors to reduce their liability for aircraft noise by imposing restrictions that are reasonable, nondiscriminatory, and do not interfere with interstate commerce or violate a contractual agreement with the FAA made as a condition of receiving federal aid.

With the passage of the Airport Noise and Capacity Act of 1990, Congress not only established a national phase-out policy for large Stage 2 aircraft over 75,000 pounds, but it also set forth the analytical requirements that must be met in order for an airport to establish noise or access restrictions on Stage 2 or Stage 3 aircraft beyond the national policy. Although the act does not require the phase-out of Stage 2 aircraft under 75,000 pounds it does specifically require special analysis for any measure that restricts these aircraft. The requirements that must be met by an individual airport to further restrict these aircraft are set forth in F.A.R. Part 161.

The actions required by F.A.R. Part 161 in order to establish a local restriction on Stage 2 aircraft include the following:

- The restriction does not conflict with any existing federal statute or regulation.
- The restriction does not create an undue burden on the national aviation system.
- A technical analysis that evaluates costs and benefits of the proposed restriction, alternative restrictions, and alternative measures that do not include restrictions.
- Notice of the proposed restriction and opportunity for comment on the analysis.

These requirements clearly indicate that restrictions on either Stage 2 or Stage 3 aircraft are considered as methods of last resort for noise abatement. The analytical requirements alone ensure that all other noise abatement alternatives should be exhausted before pursuing these types of restrictions. Since virtually any regulatory alternative at Williams Gateway Airport would result in limiting either Stage 2 or Stage 3 aircraft access, it is certain that the requirements in Part 161 would have to be met.

While implementation of a Stage 2 aircraft operating restriction does not require FAA approval, the FAA does determine whether adequate analysis and notification have been conducted.

In order to establish a local restriction on Stage 3 aircraft, Part 161 requires a much more rigorous analysis as well as final FAA approval of the restriction. The conditions for approval of a Stage 3 restriction require that the analysis provide evidence of the following:

- The restriction is reasonable, nonarbitrary, and nondiscrim-inatory.
- The restriction does not create an undue burden on interstate or foreign commerce.
- The restriction maintains safe and efficient use of navigable airspace.

The relationship of F.A.R. Part 150 to Part 161 deserves some explanation. Part 150 specifically requires that airport operators discuss the potential use of operating restrictions for noise abatement purposes in noise compatibility studies. If, through the Part 150 process, an airport operator decides to pursue an airport operating restriction, the proper procedure is to describe it

as a proposed noise abatement measure, noting that a Part 161 study would have to be undertaken before the restriction could be implemented. The FAA will then review the final noise compatibility plan, which includes the proposed restriction. If the FAA decides that adequate documentation is provided to show that the proposed restriction has merit, it may approve the proposed restriction for purposes of Part 150. A Part 150 approval is not sufficient to implement the restriction. It merely represents the clearing of the first hurdle. Completion of a Part 161 study then becomes the next step.

The FAA has made it clear that the approval of an operating restriction in an F.A.R. Part 150 document would be predicated on the noise abatement benefit of the restriction at noise levels of 65 DNL or higher. These benefits would have to be demonstrated for the current or five-year conditions that are officially required in the document. Since no persons are currently exposed to noise levels of 65 DNL or higher, and the significant number of individuals exposed in the five-year contours are due to encroaching development, not an increase in size or shifting of the contours, operating restrictions are unlikely to be approved by the FAA at Williams Gateway Airport.

Despite the extremely remote possibility that operating restrictions at Williams Gateway could be approved by the FAA, F.A.R. Part 150 requires that restrictions be discussed in noise compatibility studies. Types of operating restrictions include the following:

- Nighttime curfews.
- Landing fees based on noise or time of arrival.
- Airport capacity limitations based on relative loudness.
- Restriction of aircraft based on F.A.R. Part 36 noise levels.
- Restrictions on engine run-ups.
- Restrictions on training activity.

Curfews

FAA Advisory Circular 150/5020-1 indicates that curfews may be an effective though potentially costly method of controlling airport noise. Since unwanted noise intrusions are most pronounced in the late evening or early morning hours, curfews are usually implemented to restrict operations during those periods.

Curfews are not without costs. They can have economic impacts upon airport users, upon those providing airport-related services, and upon the community as a whole.

A blanket prohibition on air traffic during the noise-sensitive hours can place undue constraints on users of the airport who are not major contributors to the noise contours. Not only would the loudest operations be prohibited, but operations by quiet aircraft also would be banned.

Commercial airliners performing training are the predominate nighttime user of Williams Gateway Airport. The training operations of these aircraft are restricted to nighttime hours due to daytime scheduling conflicts of pilots and aircraft. Flight crew training is necessary to maintain the integrity of the national aviation system.

Conclusion: Noise impact reductions in the 65 DNL noise contour or higher would be the measure of acceptability by the FAA for this restriction. Given that there are no impacts within the 65 DNL contour and higher, approval of a restriction would be questionable. Therefore, this restriction should not be considered further.

Landing Fees

Differential landing fees based on either the noise level or the time of arrival have been used at some airports as incentives to use quieter aircraft or to operate at less sensitive times. A variable schedule of landing fees would be established based on the relative loudness of the aircraft, with arrivals by loud aircraft at night being charged the most and arrivals by quiet aircraft during the day being charged the least. To avoid being discriminatory, the fee must relate to both the time of day and certificated approach noise levels. Fees from such a program can finance noise abatement activities. This restriction does not provide a noise abatement benefit unless the fees are high enough to actually discourage use of the airport by the loudest aircraft.

While Williams Gateway does not impose landing fees on general aviation aircraft, it has established a hierarchal landing fee schedule based on weight, beginning with aircraft in excess of 12,500 pounds. The majority of these aircraft operate at night and are involved in airline training. The administration of additional landing fees based upon noise would be futile since these aircraft consist of quieter Stage3 jet aircraft. In addition, it would be difficult to monitor nighttime airport activity without nighttime air traffic control tower hours or the establishment of a permanent noise monitoring system.

Although the loudest aircraft utilizing Williams Gateway are military and other government aircraft, these aircraft are not assessed landing fees. Legally, the airport authority can only

charge "reasonable" landing fees "proportional to use" to United States Government aircraft when aircraft operational levels exceed "substantial" levels. These fees are levied to offset "costs of operating and maintaining facilities" In addition, military aircraft only utilize Williams Gateway during daytime hours when noise levels have a less significant impact.

Conclusion: While aircraft in excess of 12,500 pounds are charged a landing fee, this fee is based on weight as apposed to noise levels. Since the majority of nighttime operations are done by quieter Stage 3 aircraft, landing fees based on noise would provide limited benefits. In addition, without a permanent noise monitoring system and nighttime air traffic control tower hours, a noise based landing fee would be difficult to administer. Landing fees imposed on military aircraft are limited to aircraft operational volume for the support of airport maintenance and operating costs, and are not slated to act as a deterrent or to finance noise abatement activities. Given these factors, and a lack of impacts within the 65 DNL contour, a differential landing fee schedule is unlikely to be implemented and therefore does not warrant further consideration.

Capacity Limitations

Capacity limits based on either total operations or the relative loudness of aircraft have been used by severely impacted airports as a method of controlling the total cumulative noise exposure. Since all operations at Williams Gateway are unscheduled, the airport could not enforce a capacity limit to control noise.

Conclusion: Given the impracticality of enforcing capacity limits due to unscheduled aircraft operations and the lack of impacts within the 65 DNL contour, capacity limits do not deserve further consideration at Williams Gateway.

Restrictions Based On F.A.R. Part 36

Outright restrictions on the use of aircraft exceeding certain noise levels can reduce cumulative noise exposure at an airport. Aircraft producing noise above certain thresholds, as defined in F.A.R. Part 36, could be prohibited from operating at the airport at all or certain times of the day. A variation is to impose a non-addition rule, prohibiting the addition of new flights by aircraft exceeding the threshold level at all or certain times of the day. These restrictions would be subject to the special analysis procedures of F.A.R. Part 161. Any restrictions affecting Stage 3 aircraft would have to receive FAA approval.

Noise limits based on F.A.R. Part 36 certification levels have the virtue of being fixed national standards understood by all in the industry. They are average values, however, and do not consider variations in noise levels based on different methods of operating the aircraft. As an alternative, restrictions could be based on measured noise levels at the airport. This has the advantage of focusing on noise produced in a given situation and, in theory, gives aircraft operators increased flexibility to comply

with the restrictions by designing special approach and departure procedures to minimize noise. It has the disadvantage of requiring the installation of noise monitoring equipment and extra administrative effort to design testing procedures, monitor tests, interpret monitoring data, and design the restrictions.

Conclusion: At Williams Gateway Airport, military aircraft only operate during hours when the airport's tower is operational, between the hours of 6 a.m. and 9 p.m. In addition, military aircraft are not subject to F.A.R. Part 36 and their operations can't be restricted per a condition in the airport's deed stating that the airport must "make available all facilities at the property or developed with Federal aid, and all those useable for the landing and taking off of aircraft, to the United States at all times." The majority of nighttime operations at the airport involve Stage-3 commercial aircraft. Restrictions on Stage-3 aircraft would require a F.A.R. Part 161 study and FAA approval. Restrictions of this type would certainly impede on Williams Gateway Airport's attempt to become a viable commercial and cargo service airport. Given the likelihood of FAA disapproval due to the lack of impacts within the 65 DNL contour, restrictions based on Part 36 will not be considered further.

Engine Run-up Restrictions

Engine run-ups are a necessary and critical part of aircraft operation and maintenance. Engine run-ups are often more annoying than aircraft overflight noise because they are more unpredictable and usually last longer than overflights.

Although there are no large scale aircraft maintenance facilities at Williams Gateway, the Boeing Company performs aircraft systems modifications at two locations on the airfield. These modifications, primarily performed on the military T-38 aircraft and the large transport MD-10 aircraft, occasionally require engine run-ups. This activity is not prevalent enough to warrant restrictions on run-up activity. Currently, T-38 run-ups are performed outside Hanger 1084 on the southwest side of the airfield. MD-10 aircraft modifications are performed on the ramp area outside building 75 where reduced power run-ups are possible. Due to their large size and substantial jet blast, MD-10's are taxied to a runway where a full power run-up procedure is performed.

Conclusion: Maintenance run-up activity has not been prevalent at Williams Gateway and current run-up procedures have not generated a reason for concern. Thus, restrictions on run-ups are not warranted. Maintenance operations should make every effort to perform maintenance run-up activity away from noise-sensitive areas whenever possible.

Touch-and-Go Restrictions

Restrictions on touch-and-go or multiple approach operations can be effective in reducing noise when those operations are extremely noisy, unusually frequent, or occur at very noise-sensitive times of the day. At many airports, touch-and-goes are associated with primary pilot training, although this type of operation is also done by licensed pilots practicing approaches.

Touch-and-goes and multiple approaches are frequently done at Williams Gateway Airport. The majority of these operations, are performed by local light single or twin engine general aviation aircraft.

Williams Gateway is also used by the military and commercial airlines for training, usually involving touch-and-go operations. These aircraft are primarily based at other airports in the region and come to Williams Gateway for training purposes. Military aircraft only operate during hours when the airport's tower is operational. Due to scheduling constraints, commercial airline training flights are often performed at night.

Several flight schools are currently based at Williams Gateway. A prohibition on touch-and-go operations could negatively impact the viability of these schools. Touch-and-go operations are an integral part of student flight training. The prohibition of these operations might also have legal ramifications as it could conflict with the terms of local fixed base operator leases. Additionally, as stated earlier, a condition of the deed transferring the airport from the United States Government to the City of Mesa states that the airport must "make available all facilities at the property or developed with Federal aid, all those usable for the landing and taking off of aircraft, to the United States at all times". Therefore, the restriction of military aircraft operations is prohibited.

Conclusion: Given that no individuals are impacted within the 65 DNL contour, the FAA would probably not approve such restrictions. Due to a number of additional factors, including the viability of airport related businesses and deed

In fact, aircraft operators often use reduced thrust departures to conserve fuel, minimize engine wear, and abate noise when the safe use of the procedure is indicated. Additional efforts by airport management to encourage the use of

restrictions, this option will not receive further consideration.

AIRCRAFT OPERATING PROCEDURES

Aircraft operating procedures that may reduce noise impacts may apply to either departures or arrivals. They include:

- Reduced thrust takeoffs.
- Thrust cutbacks after takeoff.
- Maximum climb departures.
- Minimum approach altitude.
- Use of minimum flaps during approaches.
- Steeper approach angles.
- Limits on the use of reverse thrust during landings.

Reduced Thrust Takeoffs

Reduced thrust takeoffs involve the use of a reduced power setting throughout both takeoff roll and climb. Use of the procedure depends upon aircraft weight, weather and wind conditions, pavement conditions and available runway length. Since these conditions vary considerably, it is not possible to safely mandate the use of reduced thrust departures.

deeper thrust reductions are unlikely to yield significant noise abatement benefits.

Requiring takeoff thrust settings to be reduced beyond the normal settings appropriate for the aircraft type, weight, temperature, etc., not only

can erode safety margins but also tend to drag noise out further from the airport.

Conclusion: Because of the safety implications of these procedures, they are best left to the discretion of aircraft operators. An airport policy mandating the use of reduced thrust takeoffs is not considered an effective noise abatement measure for Williams Gateway Airport.

Thrust Cutbacks For Business Jets

As a service to the general aviation industry, the National Business Aviation Association (NBAA) prepared a series of noise abatement takeoff and arrival procedures for its membership in 1967. This program has virtually become an industry standard for operators of business jet aircraft since that time. The departure procedures are of two types: the standard departure procedure and the close-in departure procedure. The selection of the applicable noise abatement departure procedure depends on the proximity of the nearest noise-sensitive area.

The NBAA standard departure procedure calls for a thrust cutback at 1,000 feet above ground level (AGL) and a 1,000 feet per minute climb to 3,000 feet altitude during acceleration and clean-

Conclusion: At Williams Gateway Airport, with no current noise impacts within the 65 DNL level and a relatively low level of business jet operations, aggressive implementation efforts of these thrust cutback procedures is not necessary; however, the airport should continue to encourage and remind pilots to use quiet flying procedures whenever possible.

Thrust Cutbacks For Large Jets

Throughout the 1980's and 1990's the FAA and the airlines did considerable work in studying noise abatement departure procedures. In 1993, the FAA published an advisory circular (91-53A) describing general parameters for two alternate noise abatement departures. Both procedures involve thrust reductions after takeoff, but at an altitude not less than 800 feet AGL. The procedures differ as to when the flaps should be retracted. The "close-in"procedure is used to reduce noise near the runway end and involves a thrust reduction followed by flap retraction. A second "distant" procedure can be instituted to reduce noise effects further from the airport. This involves preceding a reduction in thrust with the retraction of flaps.

up. The close-in procedure is similar but calls for a thrust cutback at 500 feet AGL. **Exhibit 4C** depicts both standard and close-in departure procedures. While both procedures are effective in reducing noise impacts on surrounding land uses, the locations of the reduction vary with each. The standard procedure will result in lower noise levels over down-range locations, while the close-in procedure will result in lower noise levels near the airport. Since most noise-sensitive development is located one to two miles from the airport, the "standard procedure would be more beneficial. Williams Gateway Airport does currently encourage operators of business aircraft to use NBAA Standard Noise Departure Procedures whenever possible. Neither NBAA procedure is intended to supplant a procedure recommended by the manufacturer, when one is included in the aircraft operating manual.

An attempt to actively enforce a procedure of this nature requires some type of verification by the airport management. In order to ensure the promised changes in noise exposure, a permanent system of noise and flight track data acquisition is necessary. These systems typically cost in the $500,000 to $1,000,000 range and are also expensive to maintain. Additionally, a specialized staff is necessary to analyze and interpret the data, again, a substantial cost.

The airlines have implemented the AC 91-53A guidelines, although specific details of noise abatement departures vary by airline operating guidelines and system needs. The airlines routinely use noise abatement departure procedures in accordance with AC 91-53A. **Exhibit 4D** shows a typical airline noise abatement departure procedure based on AC 91-53A.

Conclusion: The lack of noise impacts within the 65 DNL level makes aggressive implementation efforts of noise abatement departure procedures for large jets unnecessary. The airport should however, encourage and remind airline pilots performing training operations at Williams Gateway to use quiet flying procedure whenever possible.

Maximum Climb Departures

The use of maximum climb, or best angle, departure procedures can, in some cases, help reduce noise exposure over populated areas some distance from the airport. The procedure requires the use of maximum thrust with no cutback on departure. Consequently, the potential noise reductions in the outlying areas are at the expense of dramatic noise increases closer to the airport. This type of procedure can also be costly to aircraft operators. The use of maximum climb procedures increases fuel usage leading to air pollution and can cause greater wear and tear on engines and equipment.

Airspace conflicts with Phoenix Sky Harbor Class B airspace are also a concern when considering maximum climb departures at Williams Gateway. The Class B airspace starts 5,000 feet MSL (3,618 AFL) and descends to 4,000 feet MSL (2,618 AFL) less than two miles northwest of the airport. In order to fly through Class B airspace, aircraft must have special radio and navigation equipment and must obtain an air traffic control clearance. **Exhibit 4E** depicts the relation of Phoenix Class B airspace as it pertains to maximum climb departure procedures.

Conclusion: The increased fuel usage, air pollution, aircraft engine wear, and conflicts with Phoenix Sky Harbor Class B airspace make this procedure impractical. In addition, noise created near the airport by this type of procedure would adversely affect the Williams Campus. Therefore, maximum climb procedures have been dropped from further consideration.

Minimum Approach Altitudes

A minimum approach altitude procedure would entail an air traffic control requirement that all positively-controlled aircraft approaches be conducted at a specified minimum altitude until the aircraft must begin its descent to land. Currently the pattern altitude at Williams Gateway Airport is 2,595 feet MSL, about 1,213 (AFL). Minimum altitudes would apply to aircraft some distance from the airport and well outside the noise contour area.

Increases in approach altitude can yield only small reductions in noise. It would require the doubling of the altitude of an aircraft in a downwind or circling approach to achieve a noise reduction of four to six decibels. Raising the pattern altitude would also enlarge the pattern as departing aircraft have to extend their upwind and crosswind legs to achieve the pattern altitude as they turn on the downwind leg of the pattern. Additionally, aircraft altitudes is the vicinity of Williams Gateway are restricted due to the presence of Phoenix Class B airspace. This airspace is located only 3,618 feet AFL over Williams Gateway and steps down to 2,618 feet AFL approximately two miles northwest of the airport. Therefore the option of increasing

aircraft approach altitudes is not an available option.

Conclusion: Implementation of minimum approach altitude procedures is difficult to verify and does not significantly reduce cumulative noise levels because takeoff noise normally dominates the situation. In addition, regional airspace conflicts greatly restrict the application of minimum approach altitudes. Thus, the measure is not considered further.

Noise Abatement Approach Procedures

Approach procedures to reduce noise impacts were attempted in the early days of noise abatement, but are no longer favorably received. The procedures include the minimal use of flaps in order to reduce power settings and airframe noise, the use of increased approach angles, and two-stage descent profiles. Follow-up studies have found that all of these techniques cause concern for safety because they are nonstandard and require an aircraft to be operated outside of its optimal safe operating configurations. Some of these procedures actually were found to increase noise because of power applications required to arrest high sink rates.

Conclusion: The increase of an approach slope angle requires that the aircraft be landed at more than optimal approach speed. These higher sink rates and faster speeds associated with steeper descent approaches can reduce pilot reaction time and erode safety margins. This is particularly a concern with inexperienced student pilots who commonly operate aircraft at Williams Gateway. Noise abatement approach procedures for Williams Gateway Airport are not considered further.

Reverse Thrust Restrictions

Thrust reversal is routinely used to slow jet aircraft immediately after touchdown. This is an important safety procedure that has the added benefit of reducing brake wear. Restrictions on the use of thrust reversal can reduce noise impacts off the sides of the runways, although they would not significantly reduce the size of the noise contours. Enforced restrictions on the use of reverse thrust, however, are not considered fully safe.

Given the location of noise-sensitive uses in the Williams Gateway Airport vicinity, a restriction on thrust reversal would not result in significant benefits. Reverse thrust restrictions tend to erode landing safety margins, increase runway occupancy time, and increase brake wear on aircraft.

Conclusion: Limitations on the use of reverse thrust are inadvisable at Williams Gateway because of the likelihood for minimal benefits and decreased safety margins.

Additional Aircraft Operating Considerations

Although not a generator of significant levels of aircraft noise, small single and multi-engine piston powered aircraft are frequent users of Williams Gateway Airport. Recognizing this, the airport, as part of it's "Fly Friendly" program, recommends a series of quiet and neighborly aircraft operating procedures established by the Aircraft Owners and Pilots Association (AOPA). These "Noise Awareness Steps", focusing on operations of small piston powered aircraft, contain recommend-ations on how to fly aircraft, and where and when to fly. Most steps provide guidance on pilot technique when maneuvering near noise-sensitive areas.

Conclusion: The airport should continue to encourage and remind pilots of piston powered aircraft operating at Williams Gateway to become familiar with and use AOPA quiet flying procedures whenever possible.

AIRPORT FACILITIES DEVELOPMENT

The development of on-airport facilities to improve off-airport noise levels is an accepted technique in noise abatement. Airport facilities can be constructed or modified to reduce aircraft noise or shift it to compatible areas. Other facility changes which may offer some degree of noise abatement are displaced runway thresholds and acoustical barriers or shielding.

Runway Extensions And New Runways

New runways aligned with compatible land development, or runway extensions shifting aircraft operations further away from residential areas are a proven means of noise abatement. New runways are most effective where there are large compatible areas near an airport, and existing runways are aligned with residential areas. Runway extensions are usually beneficial where there is substantial residential development very close to one end of a runway and not the other.

At Williams Gateway Airport, with municipalities located on three sides, it would be impossible to align the runways in order avoid overflights of noise-sensitive development. In addition, the limited amount of development southeast of the airport offers an easily accessible noise compatible corridor for aircraft operations with the current runway configuration.

The recently completed Airport Master Plan recommends lengthening Runway 12L/30R from its current length of 9,300 feet to an ultimate length of 12,500 feet in its long term horizon (11-20 years). This would entail extending the runway by 2,650 feet north and 550 feet south. This is proposed to meet the needs of typical air carrier and air cargo aircraft. Any additional noise from this proposed extension would be negligible since noise-sensitive development does not abut airport property.

Conclusion: Residential and noise-sensitive development to the north, west, and south of the airport prevents the alignment of runways in order to reduce noise impacts. The current runway configuration is aligned to allow aircraft to arrive/depart over relatively undeveloped land southeast of the airport. In addition, runway extensions would offer no benefit at Williams Gateway Airport since noise-sensitive land uses do not abut airport property. Therefore, additional runway development for noise abatement does not merit further consideration.

Displaced And Relocated Thresholds

A displaced threshold can provide some measure of noise abatement. To displace a threshold means that the touchdown zone for landing aircraft is moved further down the runway. The determination of the amount of displacement must consider the required runway lengths for landing as well as the amount of noise reduction associated with the displacement. For example, if the threshold of a runway were displaced 1,000 feet, the altitude of an aircraft along the approach path would be increased by only 50 feet. The single event noise levels associated with displaced thresholds would decrease slightly beneath the approach path. These areas, however, are much more impacted by departure noise.

Threshold relocation, where the point of touchdown and the point of takeoff are both shifted, can offer some small additional noise benefits to areas near a runway end by shifting takeoff noise associated with the start of the takeoff roll away from the former runway end.

Because there is no close-in residential development near the runway ends along the centerline, displaced or relocated thresholds would be of little benefit at Williams Gateway.

Conclusion: Threshold displacement and relocation generally offer only small noise reduction benefits. They are most helpful to residential areas located very near the end of the runway. Displaced or relocated runway thresholds would provide little or no benefit at Williams Gateway Airport and are not considered further.

Approach Lighting

Approach lighting is primarily used to aid pilots making the transition from

instrument flight conditions to a visual landing. However, these lighting systems can also be used by pilots operating under VFR conditions to maintain an appropriate glide slope on approach for landing during both day and nighttime operations. These lighting systems are available in a host of configurations depending upon there intended application. For most general aviation operations, there are two basic types of approach lighting systems available:

The Visual Approach Slope Indicator (VASI) lighting systems is the most common approach lighting system and offers basic glide slope information to the pilot. This system consist of a series of between two to 12 individual lights set at a predetermined glide slope angle, usually three-degrees. The pilots interpretation of these lights can verify the aircrafts position as either "above", "below", or "on" the designed glide slope. VASI systems are limited in that they do not provide detailed glide slope to aircraft touchdown.

Precision Approach Path Indicator (PAPI) lighting systems are considered the "next generation" of visual approach lighting systems. The PAPI consists of a series of four lights (PAPI-4) relaying detailed information to the approaching pilot. The PAPI system is able to inform a pilot of the aircrafts relation to the glide slope in increments of being "slightly above" or "slightly below" the designed glide slope. (**Exhibit 4F** describes a PAPI-4 approach lighting system, and how it is interpreted by the pilot.) An additional benefit of the PAPI is that it can be utilized by the pilot until aircraft touchdown. The installation of these systems are becoming more commonplace and often replace existing VASI systems.

Approach lighting systems, if properly used by approaching pilots, can aid in the reduction of aircraft noise generated on approach. (**Exhibit 4F** depicts aircraft noise variations by glide slope positioning.) While pilots are trained to visually follow an appropriate decent path on approach, usually approximating three-degrees, variations such as runway length, width, and pilot experience can alter the aircraft's true approach course. Aircraft on final approach for a runway that are "too high" will need to expedite their decent in order to land. This requires slowing the aircraft to the appropriate approach and landing speed often requiring the use of full flaps, and premature lowering of the landing gear. The use of these items causes excessive airframe noise due to the friction created from the slowing aircraft. In addition, aircraft landing at higher speeds will often use engine thrust reversers to reduce brake wear.

Aircraft that approach "below" the glide slope do not have the benefit of excess altitude to maintain aircraft approach speeds. Low approaches often result in numerous engine power fluctuations in order to maintain a proper approach and landing speed. In addition, these approaches result in low altitude overflights which increase noise levels.

The use of visual approach lighting systems allows a pilot to maintain a proper glide slope for landing. Aircraft are often able to follow a three-degree glide slope with little or no power adjustments or excess flap settings. In addition, a pilot receives timely information pertaining to an aircrafts deviation from the glide slope allowing for subtle power and flap adjustments, reducing the overall level of aircraft approach noise.

PAPI-4 lighting systems are installed and available to pilots on Runways 12L/30R and 12C/30C at Williams Gateway. Runway 12R/30L is currently without a visual approach lighting system. Since this runway is often used by inexperienced student pilots, visual approach lighting may prove beneficial in maintaining a proper aircraft approach glide slope from a noise abatement and safety perspective.

Conclusion: The use of visual approach lighting systems, particularly PAPI-4's can help reduce some aircraft approach noise in addition to increasing safety. Consideration should be given to installing a PAPI-4 lighting system on Runway 12R/30L.

Acoustical Barriers

Acoustical barriers include noise walls, berms, and hush houses or run-up pens for containing engine maintenance run-up noise. Acoustical barriers are only useful for attenuating noise from aircraft activity on the ground. They have very limited application in special situations, act best over relatively short distances, and their benefits are greatly affected by surface topography and wind conditions. Furthermore, the effectiveness of a barrier is directly related to the distance of the noise source from the receiver and the distance of each from the barrier itself, as well as the angle between the ends of the berm and the receiver.

While noise berms and noise walls can attenuate noise, they can also be criticized by airport neighbors because they obstruct views. Another Three alternatives have been selected for detailed noise analysis. The noise analysis for each alternative was based on a 2004 operational forecast. Noise contours for each alternative are compared to contours for a 2004 baseline scenario which assumes the continuation of all possible complaint is that airport noise can become more alarming, particularly noise from unusual events, because people are unable to see the cause of the noise.

At Williams Gateway, noise berms or walls would be largely ineffective for the attenuation of aircraft noise. Given the distance and location of residential and most noise-sensitive development around the airport, there are no suitable areas for the effective placement of such a barrier.

Conclusion: Since noise berms and walls do not offer noise reduction benefits to aircraft overflights or noise-sensitive areas not adjacent to the airport, these devices would offer no benefit and will not receive additional consideration.

SELECTION OF MEASURES FOR DETAILED EVALUATION

Preliminary analysis of the complete list of noise abatement techniques indicated that some measures may be potentially effective in the Williams Gateway area. The measures analyzed in more detail in this section involve runway use, departure turns, and visual and instrument approaches. They present real possibilities for noise abatement yet still permit relatively flexible and efficient operation of the airport.

EVALUATION CRITERIA

existing air traffic control and noise abatement procedures at the airport.

The alternatives are evaluated using the following criteria:

Noise Reduction Effects. The purpose of this evaluation is to reduce aircraft noise on people. Whether a reduction in noise impacts over noise-sensitive areas occurred was determined.

Operational Issues. The effects of the alternative on the operation of aircraft, the airport, and local airspace are considered. Potential airspace conflicts and air traffic control (ATC) constraints, and the means by which they could be resolved, are discussed. Potential impacts on operating safety are also addressed. FAA regulations and procedures will not permit aircraft operation and pilot workload to be handled other than in a safe manner, but within this limitation, differences in safety margins occur. A significant reduction in safety margins will render an abatement procedure unacceptable.

Costs. Both the cost of operating aircraft to comply with the noise abatement measure and the cost of construction or operation of noise abatement facilities are considered. The difference in flight time between the potential noise abatement procedures and current operational procedures is evaluated. Estimated capital costs of implementation of the noise abatement alternative, where relevant, are also presented.

Environmental Issues. Environ-mental factors related to noise are of primary concern in a F.A.R Part 150 analysis. The impacts, if any, of a noise abatement measure on other environmental issues, such as air and water quality, should be considered in the potential for its implementation.

Implementation Factors. The agency responsible for implementing the noise abatement procedure is identified. Any difficulties in implementing the procedure are discussed. This is based on the extent to which it departs from accepted standard operating procedures; the need for changes in FAA procedures, regulations, or criteria; the need for changes in airport administrative procedures; and the likelihood of community acceptance.

Upon completion of a review of each measure based on the above criteria, an assessment of the feasibility of each measure and the strategies required for its implementation are presented. At the end of the section a summary comparison of the noise impacts of each alternative is presented. Recommendations as to alternatives which deserve serious consideration are finally presented.

ALTERNATIVE 1 - TEST EFFECTIVENESS OF CALM WIND RUNWAY PROGRAM

Goals

This alternative seeks to evaluate the effectiveness of the current noise abatement procedure designating Runway 30 as the calm wind runway (for up to a five knot tailwind).

Procedure

Aircraft noise was modeled with Runway 12 as the designated calm wind runway. Currently, the calm wind runway program uses Runway 30 for approximately 70-percent of airport operations.

For noise modeling purposes, the 2004 baseline input was modified to reflect a 70 percent usage of Runway 12. This usage was based on a wind rose analysis of calm wind conditions and winds favoring Runway 12. This procedure would apply to all single engine and larger aircraft. This would be an informal procedure and would be observed at pilots discretion as not to jeopardize safety.

Noise Reduction Effects

The noise contours presented in **Exhibit 4G** illustrate the effects of this procedure. The size and shape of the alternative noise contours changes moderately when compared to the 2004 baseline contours. The 60 and 65 DNL contours become elongated and constricted northeast of the airport consistent with an increase in approaching aircraft from this direction. The increase in departures to the southeast cause all contour ranges to widen along the departure portion of Runways 12. Fortunately, much of the areas where the alternative contours have experienced expansion have been into areas not currently developed, zoned or planned for noise-sensitive land uses.

Table 4A presents the population impacts for this alternative. This alternative impacts 1,690 fewer people than the 2004 baseline condition. Decreases are experienced in all contour ranges. The Level Weighted Population (LWP), an estimate of the number of people actually annoyed by noise, decreases from 2,874 to 2,171, a decrease of 703 persons, with this procedure.

TABLE 4A
Population Impacted by Noise
Alternative 1 - Calm Wind Runway Use Program

DNL Range	2004 Baseline	Alternative 1
60-65	7,850	6,983
65-70	1,909	1,892
70-75	847	43
75+	2	0
Total	10,608	8,918
LWP*	2,874	2,171

* LWP – level-weighted population – is an estimate of the number of people actually annoyed by aircraft noise. It is computed by multiplying the population in each DNL range by the appropriate LWP response factor:60-65 DNL = .205; 65-70 DNL = 0.376; 70-75DNL = 0.644; 75+ DNL = 1.000. See the **Technical Information Paper, *Measuring the Impact of Noise on People***, at the back of the *Noise Exposure Maps* document.

Costs

No additional costs are anticipated with this alternative.

Operational Issues

Since the airport's instrument approaches all use Runway 30C, the use of Runway 12 as the calm wind runway would reduce the usability of these approaches and potentially reduce airport efficiency during instrument meteorological conditions (IMC).

Environmental Issues

There are no environmental issues associated with this alternative.

Implementation

This procedure would primarily be implemented by ATC. A tower order would designate an aircraft's arrival or departure runway. Pilot's would still retain the option to use which ever runway would best meet safe flying conditions and compliance with traffic avoidance. Information regarding the procedure also could be published in a Notice to Airmen (NOTAM), and local pilots guides.

Preliminary Recommendations

Although the evaluation of this alternative reveals a significant reduction in the number of potential persons impacted by aircraft noise,

additional concerns are raised. Aircraft on approach must line up on a runway on a relatively finite approach track. This does not allow for the aircraft dispersion, creating a concentration of aircraft overflights over residential and other noise-sensitive areas northwest of the airport. The absence of a noise compatible corridor along this approach area makes aircraft overflights inevitable. While some smaller aircraft may be able to follow the noise compatible corridor immediately north and northeast of the airport and turn on a short final to Runway 12, large aircraft would be unable to complete such a steep turn and often require a two to three mile final approach.

The majority of aircraft departing using Runway 30 as the current preferential calm wind runway can often turn to avoid noise-sensitive areas north of the airport. Larger aircraft, while not always able to completely avoid these areas can disperse their overall flight tracks so as not to concentrate aircraft overflights over a particular area.

The concentration of approaching aircraft northwest of the airport coupled with the availability of current noise compatible approach corridors southeast of the airfield greatly reduce the perceived benefits of this alternative. In addition, the usability of the airport's instrument approaches would greatly be reduced. While these could potentially be moved to Runway 12, conflicts with Phoenix Class B airspace and costs associated with relocating navigational aids and approach development could exceed any perceived benefits.

ALTERNATIVE 2 - RUNWAY 12L/C DEPARTURE PROCEDURE.

Goals

This alternative seeks to reduce the impact of aircraft noise on noise-sensitive areas south of the airport. By slightly adjusting the departure corridor for Runways 12C/L and delaying on course departure turns, overflights of current and proposed areas of noise-sensitive development south of the airport can be reduced.

Procedure

This alternative would apply to turbojet or large aircraft (in excess of 12,500 pounds) departing Runways 12L/C. Departing aircraft would be requested to turn to a heading of 110-degrees (10-degree left turn) upon reaching the end of the runway. Aircraft with western destinations would turn on course upon reaching Ocotillo Road or five DME from the Willie VORTAC. Aircraft with eastern destinations would turn on course as soon as practicable.

For noise modeling purposes, the 2004 baseline input was modified to reflect the new procedure. Large and turbojet aircraft traffic departing Runway 12C/L were assigned percentages reflecting current operations with 75 percent of aircraft departing on a 110-degree heading. The remaining 25 percent were dispersed upon departure, not utilizing the departure procedure.

Noise Reduction Effects

The noise contours presented in **Exhibit 4H** illustrate the effects of this procedure. The size and shape of the alternative noise contours is similar to the 2004 baseline contours except for a very slight shift in the 60 and 65 DNL contours southeast of the airport. This shift reflects the alternative aircraft departure tracts from Runways 12C and 12L.

Table 4B presents the population impacts for this alternative. This alternative impacts 62 fewer people than the 2004 baseline condition. Decreases are seen in both the 60-65 DNL and 65-70 DNL contours of 49 and 13 persons respectively. The Level Weighted Population (LWP), an estimate of the number of people actually annoyed by noise, decreases from 2,874 to 2,859 with this procedure.

TABLE 4B
Population Impacted by Noise
Alternative 2 - Runway 12L/C Departure Turns

DNL Range	2004 Baseline	Alternative 2
60-65	7,850	7,801
65-70	1,909	1,896
70-75	847	847
75+	2	2
Total	10,608	10,546
LWP*	2,874	2,859

* LWP – level-weighted population – is an estimate of the number of people actually annoyed by aircraft noise. It is computed by multiplying the population in each DNL range by the appropriate LWP response factor:60-65 DNL = .205; 65-70 DNL = 0.376; 70-75DNL = 0.644; 75+ DNL = 1.000. See the **Technical Information Paper, *Measuring the Impact of Noise on People***, at the back of the *Noise Exposure Maps* document.

Operational Issues

This procedure could reduce ATC flexibility by sustaining aircraft in the departure corridor. This could slightly reduce peak airport capacity by requiring additional aircraft separation.

An advantage of this procedure is that it is simple enough to be used by aircraft without newer generation avionic and navigational equipment and doesn't require the development and publication of a Standard Instrument Departure Procedure (SID).

Costs

The only operational costs of this procedure might be slightly increased flight times and fuel consumption by aircraft delaying their turn on course. During especially busy periods, departure delays could increase due to separation requirements.

Environmental Issues

There are no environmental issues associated with this alternative.

Implementation

This procedure would primarily be implemented by ATC. A tower order would inform pilots of their departure procedure per the appropriate destination direction. Information regarding the procedure also could be published in a Notice to Airmen (NOTAM) and depicted on local pilots guides.

Preliminary Recommendation

This alternative is moderately effective in reducing aircraft noise impacts southeast of the airport. It deserves further consideration.

ALTERNATIVE 3 - RELOCATE INSTRUMENT LANDING SYSTEM TO RUNWAY 30R

Goals

This alternative seeks to reduce noise impacts of landing aircraft on noise-sensitive areas west of the airport. The relocation of the ILS could move noise contours east into unpopulated areas.

Procedure

This alternative would relocate the ILS on Runway 30C to Runway 30R. This involves the relocation of all ground based equipment (localizer and glide slope antennas) defining the approach. In addition, the new approach would need to be designed and published by the FAA.

For noise modeling purposes operational percentages reflected those for the year 2020, which had previously been modeled with the relocation of the ILS to Runway 30R. These percentages correspond to 80 percent of arrivals, 80 percent of departures, and 75 percent of touch-and-go activity on Runway 12L/30R by military and commercial/air cargo aircraft. Runway 12L/30R was projected to remain the general aviation runway during this period.

Noise Reduction Effects

The noise contours presented in **Exhibit 4J** illustrate the effects of this procedure. The size and shape of the alternative noise contours are similar to the 2004 baseline contours. All of the contours elongate slightly to the southeast, off the approach end of Runway 30R, reflecting increased aircraft approaches to this runway due to the relocation of the ILS. Northeast of the airport, the 60, 65, and 70 DNL noise contours shift very slightly east consistent with a shift in touch-and-go operations by aircraft utilizing the ILS.

Table 5B presents the population impacts for this alternative. This alternative impacts 371 fewer people than the 2004 baseline condition. A decrease is experienced in all contour ranges except 75 DNL and above. The Level Weighted Population (LWP), an estimate of the number of people actually annoyed by noise, decreases from 2,874 to 2,768 with this procedure.

TABLE 4C
Population Impacted by Noise
Alternative 3 - Relocation of ILS to Runway 30R

DNL Range	2004 Baseline	Alternative 3
60-65	7,850	7,650
65-70	1,909	1,741
70-75	847	844
75+	2	2
Total	10,608	10,237
LWP*	2,874	2,768

* LWP – level-weighted population – is an estimate of the number of people actually annoyed by aircraft noise. It is computed by multiplying the population in each DNL range by the appropriate LWP response factor:60-65 DNL = .205; 65-70 DNL = 0.376; 70-75DNL = 0.644; 75+ DNL = 1.000. See the **Technical Information Paper, *Measuring the Impact of Noise on People***, at the back of the *Noise Exposure Maps* document.

Costs

The cost of this alternative would entail expenses incurred in the relocation of ground based navigational equipment and the design and publishing of the new approach. The cost to move such a system is estimated at about $200,000. Slight costs to aircraft operator may be include additional fuel usage due to increased taxi distance to the ramp.

Operational Issues

No additional operational issues should result from this alternative other than an increased taxi distance to the ramp.

Environmental Issues

There are no environmental issues associated with this alternative.

Implementation

The new approach would need to be designed and published. The removal of the ILS from Runway 30C should be published in a Notice to Airmen (NOTAM). The change should also be broadcast in an ATIS message to notify inbound pilots.

Preliminary Recommendations

This procedure is effective in reducing the number of people impacted by aircraft noise both southeast and northwest of the airport, although it is quite costly. Since no individuals are currently impacted within the 65 DNL contour, the cost of relocation for noise abatement purposes would be the responsibility of the airport authority. This alternative does however, merit further consideration.

SUMMARY

Table 4D summarizes the alternatives analyzed in this chapter. This table lists the costs, operational issues, and requirements for the implementation of each alternative. These are preliminary recommendations and all alternatives must be reviewed by the Planning Advisory Committee, airport officials, local citizens, and other local interests before they can be made final. Noise abatement measures alone cannot resolve noise issues at an airport. The next chapter addresses noise issues thought the evaluation of various land use management techniques. Final recommendations will be presented in Chapter Six, the Noise Compatibility Program.

TABLE 4D
Summary of Noise Abatement Alternatives Selected for Detailed Analysis
Williams Gateway Airport

Alternative	Advantages	Disadvantages/ Costs	Implementation Action
1. Runway 12L/C/R Calm Wind Runway Use Program.	- Reduces the number of approaches over noise-sensitive areas northwest of the airport.	- Reduces ATC flexibility by restricting arrivals and departures in the same direction. - Concentrates low approaches over concentrated residential areas.	- Tower order - Issue Notice to Airmen (NOTAM) - Publish in local Pilots Guide
2. Runway 12L/C Departure Turn.	- Reduces aircraft overflights of noise-sensitive areas south of the airport.	- Reduces ATC flexibility by sustaining aircraft in the departure corridor. - Reduces peak time airport efficiency by requiring additional aircraft separation. - Slight increase in fuel use and travel time due to elongated departure.	- Tower order - Issue Notice to Airmen (NOTAM) - Publish in local Pilots Guide
3. Relocate Instrument Landing System to Runway 30R.	- Reduces overflights of noise-sensitive areas south and southeast of the airport by shifting aircraft further east.	- Relocate localize and glide slope antennas. Approximate cost: $200,000 - Slight increase in fuel consumption and taxi time due to increased taxi distance.	- FAA needs to design new approach - Publish approach plate. - Identify change in Notice to Airmen (NOTAM) and ATIS message.

TABLE 4D (Continued)
Noise Abatement Measures Deserving Additional Consideration
Williams Gateway Airport

Alternative	Advantages	Disadvantages/ Costs	Implementation Action
4. Departure Procedure for KC-135 Aircraft Flown By Arizona Air National Guard, 161st Air Refueling Wing.	- Standardize departure procedure for air guard pilots and ATC staff. - Avoid departures overflights over noise-sensitive areas north and northeast of the airport.	None	- Informal letter of agreement between 161st Refueling Wing, ATC, and the Airport Authority.
5. Helicopter Reporting Points and Arrival and Departure Routes.	- Standardize helicopter arrival and departure routes for pilots and ATC staff. - Avoid arrival and departure overflights over noise-sensitive areas in the airport vicinity.	- Potentially increased fuel consumption and flight time.	- Issue Notice to Airmen (NOTAM) - Publish in local Pilots Guide
6. Request Aircraft Using Runway 12R/30L Traffic Pattern to Remain East of the Southern Pacific Railroad During Downwind Leg.	- Reduces aircraft overflights over noise-sensitive areas west of the airport.	None	- Publish in local Pilots Guide
7. Encourage Use of NBAA Noise Abatement Procedures.	- Reduces departure and approach noise.	None	- Publish in local Pilots Guide - Install taxiway signage
8. Encourage Use of AC 91.53A Noise Abatement Departure Procedures By Air Carrier Jets.	- Reduces departure noise.	None	-Promote use to air carrier aircraft users.
9. Encourage Use of AOPA Noise Awareness Steps.	- Reduces aircraft overflights of noise-sensitive areas in the airport vicinity.	None	- Publish in local Pilots Guide. - Install taxiway signage.

TABLE 4D (Continued)
Noise Abatement Measures Deserving Additional Consideration
Williams Gateway Airport

Alternative	Advantages	Disadvantages/ Costs	Implementation Action
10. Install PAPI-4 Lighting on Runway 12R/30L.	- Reduces low approaches, power fluctuations, and airframe noise.	- Cost of PAPI-4 lighting system including installation: $40,000 per runway end. - Additional cost for maintenance needs.	- Secure funding. - Promote use to local pilots.

99SP09-4B-01/21/00

Broadway Rd.
Main St./Apache Trail
Southern Ave.
Superstition Freeway
Baseline Rd.
Apache Junction
Guadalupe Rd.
Gilbert
Elliot Rd.
Mesa
Warner Rd.
Ray Rd.
Williams Field Rd.
IWA/AIRPORT
General Motors Proving Grounds
Pecos Road Realignment
Pecos Rd.
Mesa
Germann Rd.
Chandler
Gilbert
Queen Creek
Queen Creek Rd.
Ocotillo Rd.
Chandler Heights Rd.
Riggs Rd.
Val Vista Drive
Higley Rd.
Greenfield Rd.
Lindsay Rd.
Recker Rd.
Ellsworth Rd.
Signal Butte Rd.
Meridian Rd.
Idaho Rd.
Tomahawk Rd.
Hawes Rd.
Power Rd.
Crismon Rd.
Vineyard Rd.
Schnepf Rd.
Water Conservation District Canal
Roosevelt
Kitchen House Canal
Southern Pacific Railroad
Maricopa County Line
Pinal County Line

LEGEND

- Detailed Land Use Study Area
- County Boundary
- Municipal Boundary
- Airport Property
- Planned San Tan Freeway
- Very High Frequency Omnidirectional Range Station, with Tactical Air Navigation Equipment
- Helicopter Check Points
- Alternative Helicopter Tracks
- Existing Military Helicopter Tracks
- Rural Residential (0–2 du/ac)
- Low Density Residential (2.1–5 du/ac)
- Medium Density Residential (5.1–15 du/ac)
- High Density Residential (15+ du/ac)
- Mobile and Trailer Homes
- Mixed Use
- Noise Sensitive Institutions
- Place of Worship
- School
- High Probability of Being Developed
- Medium Probability of Being Developed

NORTH

0 8000

SCALE IN FEET

WILLIAMS GATEWAY AIRPORT

Exhibit 4B
ALTERNATIVE HELICOPTER ARRIVAL AND DEPARTURE ROUTES

99SP09-4G-01/21/00

Broadway Rd.
Main St./Apache Trail
Southern Ave.
Superstition Freeway
Baseline Rd.
Apache Junction
Guadalupe Rd.
Gilbert
Mesa
Elliot Rd.
Warner Rd.
Ray Rd.
Williams Field Rd.
Pecos Rd.
Pecos Road Realignment
Germann Rd.
Queen Creek Rd.
Ocotillo Rd.
Chandler Heights Rd.
Riggs Rd.
Chandler
Queen Creek
Power Rd.
Meridian Rd.
Vineyard Rd.
Ironwood Dr.
Idaho Rd.
Tomahawk Rd.
Gilbert Rd.
Lindsay Rd.
Val Vista Drive
Higley Rd.
Greenfield Rd.
Hawes Rd.
Ellsworth Rd.
Signal Butte Rd.
Crismon Rd.
Sossaman Rd.
Ft. Lehi Rd.
Southern Pacific Railroad
Maricopa County Line
Pinal County Line
Roosevelt Water Conservation District Canal
La Palma Rd.
Sonoqui Rd.

60
65
70
75

General Motors Proving Grounds

LEGEND

- Detailed Land Use Study Area
- County Boundary
- Municipal Boundary
- Airport Property
- Planned Santan Freeway
- 2004 DNL Contours, Marginal Effect
- 2004 DNL Contours, Significant Effect
- Alternative 1 DNL Contours, Marginal Effect
- Alternative 1 DNL Contours, Significant Effect
- Rural Residential (0–2 du/ac)
- Low Density Residential (2.1–5 du/ac)
- Medium Density Residential (5.1–15 du/ac)
- High Density Residential (15+ du/ac)
- Mobile and Trailer Homes
- Mixed Use
- Noise Sensitive Institutions
- Place of Worship
- School
- Potentially Available for Residential Development
- Potentially Available for Noise Sensitive Institutions
- Proposed School

Source: Coffman Associates Analysis August 1999.

NORTH

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SCALE IN FEET

WILLIAMS GATEWAY AIRPORT

Exhibit 4G
ALTERNATIVE 1 CALM WIND
RUNWAY USE PROGRAM

99SP09-4H-01/21/00

Broadway Rd.
Main St./Apache Trail
Southern Ave.
Superstition Freeway
Baseline Rd.
Apache Junction
Guadalupe Rd.
Gilbert
Mesa
Elliot Rd.
Warner Rd.
Ray Rd.
60
65
70
75
General Motors Proving Grounds
Williams Field Rd.
Pecos Rd.
Pecos Road Realignment
Chandler
Gilbert
Queen Creek
Ocotillo Rd.
Chandler Heights Rd.
Riggs Rd.
Meridian Rd.
Signal Butte Rd.
Ellsworth Rd.
Hawes Rd.
Power Rd.
Ironhorse Road
Southern Pacific Railroad
Maricopa County Line
Pinal County Line
Vineyard Rd.
Schnepf Rd.
Queen Creek Rd.
Val Vista Drive
Hidley Rd.
Greenfield Rd.
Roosevelt Water Conservation District Canal
Sossaman Rd.
Crismon Rd.
Lindsay Rd.
Gilbert Rd.
Recker Rd.
Tomahawk Rd.
Idaho Rd.
Bermann Rd.
La Palma Rd.

LEGEND

- Detailed Land Use Study Area
- County Boundary
- Municipal Boundary
- Airport Property
- Planned Santan Freeway
- 2004 DNL Contours, Marginal Effect
- 2004 DNL Contours, Significant Effect
- Alternative 2 DNL Contours, Marginal Effect
- Alternative 2 DNL Contours, Significant Effect
- Alternative Departure Track
- Rural Residential (0–2 du/ac)
- Low Density Residential (2.1–5 du/ac)
- Medium Density Residential (5.1–15 du/ac)
- High Density Residential (15+ du/ac)
- Mobile and Trailer Homes
- Mixed Use
- Noise Sensitive Institutions
- Place of Worship
- School
- Potentially Available for Residential Development
- Potentially Available for Noise Sensitive Institutions
- Proposed School

Source: Coffman Associates Analysis
August 1999.

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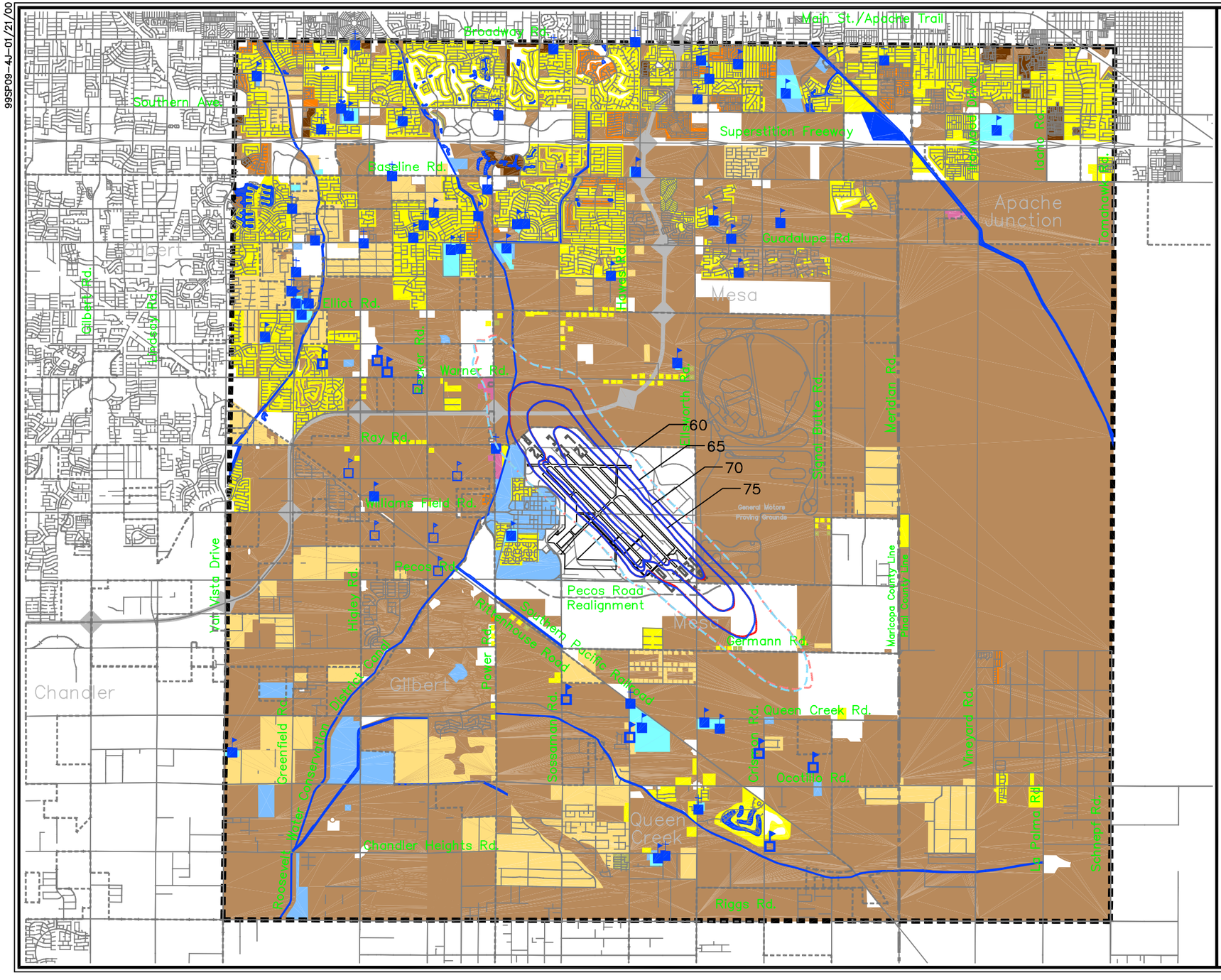
WILLIAMS GATEWAY AIRPORT

Exhibit 4H
ALTERNATIVE 2 RUNWAY 12L/C
DEPARTURE PROCEDURE

99SP09-4J-01/21/00



LEGEND

- Detailed Land Use Study Area
- County Boundary
- Municipal Boundary
- Airport Property
- Planned Santan Freeway
- 2004 DNL Contours, Marginal Effect
- 2004 DNL Contours, Significant Effect
- Alternative 3 DNL Contours, Marginal Effect
- Alternative 3 DNL Contours, Significant Effect
- Rural Residential (0–2 du/ac)
- Low Density Residential (2.1–5 du/ac)
- Medium Density Residential (5.1–15 du/ac)
- High Density Residential (15+ du/ac)
- Mobile and Trailer Homes
- Mixed Use
- Noise Sensitive Institutions
- Place of Worship
- School
- Potentially Available for Residential Development
- Potentially Available for Noise Sensitive Institutions
- Proposed School

Source: Coffman Associates Analysis August 1999.

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WILLIAMS GATEWAY AIRPORT

Exhibit 4J
ALTERNATIVE 3 RELOCATE INSTRUMENT LANDING SYSTEM TO RUNWAY 30R

Chapter Five
LAND USE ALTERNATIVES

INTRODUCTION

The evaluation of noise abatement alternatives in Chapter Four resulted in tentative proposals to promote aircraft noise abatement measures in the area of Williams Gateway Airport. Even if such measures are implemented, however, there will continue to be land around the airport impacted by aircraft noise.

This chapter discusses land use management alternatives intended to prevent or reduce future noise impacts. It begins by identifying planning issues to be addressed by the land use The current situation at Williams Gateway is quite favorable since no noise-sensitive land uses are within the 65 DNL or greater noise exposure contours. Some homes northwest and south of the airport, however, are exposed to noise above 60 DNL. The noise abatement analysis in Chapter Four discussed potential alternatives to reduce noise exposure in these residential areas. management plan. Alternative land use management techniques are then evaluated to determine their potential usefulness in the Williams Gateway Airport study area. Finally, preliminary recommendations are presented, to be reviewed by the Planning Advisory Committee and local citizens. The final land use management and noise abatement recommendations will be presented in Chapter Six, Noise Compatibility Plan.

LAND USE ISSUES

From a practical standpoint, no federally-funded land use management alternatives are available to mitigate the impacts of noise in these areas. (In order to be eligible for FAA funding for sound insulation or other noise mitigation actions, the property would have to be inside the 65 DNL contour based on 1999 or 2004 noise.)

Residential development pressure has intensified on all sides of the Williams Gateway Airport over the past several years. Ideally, all areas inside the 60 DNL contour and under the primary flight pattern should be designated for compatible commercial, office, industrial, or recreational development. The analysis of land use alternatives in this Chapter will consider possible land use planning options for these areas. If residential development is found to be the only practical alternative development option in these areas, methods of ameliorating potential noise impacts through development regulations will be considered.

In addition to these concerns, some areas outside the noise contours are exposed to relatively low and frequent aircraft overflights. According to noise complaint records, the presence of low-flying aircraft has been found to disturb residents in the vicinity of the Williams Gateway Airport. While the cumulative noise levels are not significant, individual overflights can be loud, and the mere presence of large numbers of aircraft can disturb some people. Methods of informing In 1997, the Arizona Legislature enacted a law authorizing the State or cities and counties operating airports to designate "airport influence areas" (AIA) around their airports. The law is permissive; it does not mandate the establishment of airport influence areas. The boundaries of the airport influence area are to be determined by the airport owner based on a consideration of the area exposed to aircraft noise and overflights. If the local government or airport authority decides to establish an airport influence area, it must "file a record of the airport influence area in the office of the county recorder. . . The record shall be sufficient to notify owners or potential purchasers of property in the airport influence area that property in the area is currently subject to aircraft noise and aircraft overflights." (See House Bill 2491, 43rd Legislature, First Regular Session, 1997.)

prospective residents of the presence of aircraft and the proximity of the airport will be considered in this Chapter. The intent would be to ensure that accurate information about the airport and air traffic is available to prospective homeowners and renters in the area influenced by the airport.

AIRPORT INFLUENCE AREA

In considering potential land use compatibility planning measures, it is necessary to define the areas within which those policies should apply. The challenge is to define the area within which the airport historically, currently, and in the future may exert, a significant influence on local residents and potentially noise-sensitive land uses. In making this judgement, the historic, existing, and forecasted noise contours and the pattern of frequent aircraft overflights (or flight tracks) are important. The resulting area is here referred to as the *airport influence area*.

While aircraft noise contours are of obvious value in defining an airport influence area, the information they provide is not entirely clear cut. As the noise contours presented in Chapters Two and Four demonstrate, they may change over time, depending on the volume of traffic, the mix of aircraft, and aircraft operating procedures. Keeping in mind that an important purpose of defining an airport influence area is to promote compatible land use planning, and recognizing that land development is a high consequence event which is very expensive, and often virtually impossible to reverse, it makes sense to use a reasonable "worst case" set of noise contours to help in defining an airport influence area.

In this study, the combination of the 2015 noise exposure contour from the 1993 Williams Gateway Airport Master Plan and noise contours developed using the 1999 Williams Gateway Airport Master Plan high range 2020 forecasts were used to develop a "planning scenario noise contour". The Planning Scenario noise contour, illustrated on **Exhibit 5A**, represents a reasonable estimate of the largest area which is at risk of being exposed to aircraft noise above the threshold level of 60 DNL. The boundaries of the land use planning 60 DNL have been squared off to the nearest road or quarter section line to make it easier to reference.

Another critical consideration in defining an airport influence area is the location of flight tracks in the vicinity of the airport. These flight tracks are illustrated on Exhibits 2E, 2F, and 2G in Chapter Two of the Noise Exposure Maps While each of these factors needs to be considered in determining the boundaries of the airport influence area for Williams Gateway Airport, each will not be considered equally in determining land use management measures for the area. The area within the 65 DNL noise contour will be given the greatest emphasis in obtaining land use compatibility. The area between the 60 and 65 DNL contours will be considered as a secondary priority area for obtaining land use compatibility. The area between the 60 DNL contour and the boundary of the airport influence area will be considered primarily for fair disclosure measures to notify future residents of the area of the vicinity of the airport and the likelihood of aircraft noise and overflights.

A potential airport influence area is shown on **Exhibit 5A**. The exhibit also shows radar flight tracks and a composite land use planning scenario noise exposure contours.

document. Aircraft on arrival tend to be relatively low since they are approaching the runway on a relatively flat glide slope, typically about 3 degrees or 20 to 1. On the other hand, aircraft on departure, while higher, are louder than arriving aircraft. In addition, aircraft in the pattern are executing a series of maneuvers and, typically, maintain a lower altitude than aircraft performing itinerant operations. These lower altitudes often result in greater annoyance and concern to residents in the area.

For purposes of showing the areas commonly overflown by aircraft, all the radar flight track data used to determine flight tracks for noise modeling are shown on **Exhibit 5A**. As with the 60 DNL contour, the areas that are most commonly overflown by aircraft have been squared off to the nearest street or quarter section line.

LAND USE MANAGEMENT TECHNIQUES

Land use management techniques to promote noise compatibility are discussed in this section. These techniques are grouped under three headings: **policy** and **regulatory** techniques that guide future development, and **expenditure** techniques which involve potential payments for mitigation assistance. They are listed on **Exhibit 5B.**

The potential suitability of each technique is discussed in this chapter and evaluated based on effectiveness and feasibility. The criteria for judging effectiveness include near and long-term effectiveness in addressing the land use issue discussed at the beginning of this chapter.

If a technique appears to be effective and does not create undesirable side effects, the feasibility of implementing it is evaluated. The feasibility criteria include cost to local governments and citizens, eligibility for FAA financial aid, political acceptability, state statutory authorization, and administrative ease or complexity.

POLICY TECHNIQUES

Policy techniques which can be used to guide future development include:

- General Planning
- Project Review Guidelines

General Planning

A General Plan establishes policies for the development and improvement of the community. It provides the basis for the local zoning ordinance, the regulations governing the use and development of land.

The General Plans of Mesa, Gilbert, Queen Creek, Apache Junction, and Maricopa and Pinal Counties were reviewed in Chapter One and shown in Exhibit 1L. The General Plans currently promote airport-compatible development in most of the undeveloped areas around the airport within the Planning Scenario 60 DNL noise contour.

The City of Gilbert recently completed the Gilbert Gateway Plan. The Plan updates the Gilbert General Plan for an area approximately seven square miles immediately west of the Williams Gateway Airport. **Exhibit 5C** shows the Land Use Plan for the Gilbert Gateway Plan. It also shows the future land use designations from the Mesa, Queen Creek, Apache Junction, Maricopa County and Pinal County in the rest of the study area.

Most of the area within the Planning Scenario 60 DNL contours continues to be designated in the Gilbert Gateway Plan for compatible use, including commercial, industrial, public/semi-public facilities, and parks and open space. However, the Gilbert Gateway Plan proposes four school sites, increases the residential density, and reduces the amount of planned compatible land use buffer along Power Road adjacent to the 60 DNL planning scenario contour and directly under the primary flight pattern for Runway 12R-30L. The current Gilbert General Plan designations (discussed in Chapter 1) between Power, Warner, Recker, and Rittenhouse Roads provide a better level of land use compatibility with aircraft noise than proposed designation from the Gilbert Gateway Plan. This area is hatched on **Exhibit 5C**. Therefore, it is recommended that the General Plan designations within this area remain unchanged.

Large areas of mixed-use which allow residential development north and west of the airport within Mesa and Gilbert is also a concern. Developing a new mixed use category that does not allow residential within the planned mixed use areas inside the planning scenario 60 DNL boundary should be considered.

In addition, one area within Mesa and one area in Queen Creek that are currently undeveloped within the Planning Scenario 60 DNL noise contours, but are planned for non-compatible land uses, should be changed to a compatible land use. These areas are located just north of Guadalupe Road and near the intersection of Meridian and Ocotillo Roads. These areas are depicted on **Exhibit 5C**.

Mesa, Gilbert, Queen Creek, Maricopa County and Pinal County should consider amending their general plans to reflect the updated noise contours at Williams Gateway Airport. For land use planning purposes, the airport noise scenario they use should reflect the area at risk of noise exposure. For that reason, they should use the composite of the 2015 noise exposure contour from the 1993 Williams Gateway Airport Master Plan and noise contours developed using the 1999 Williams Gateway Airport Master Plan high range 2020 forecasts as a "planning scenario noise contour." (The composite noise contours are shown in **Exhibits 5A** and **5C**.) In some areas, the 2015 noise exposure contour from the 1993 Williams Gateway Airport Master Plan noise contours are larger than the noise contours developed using the 1999 Williams Gateway Airport Master Plan high range 2020 forecasts, and vice versa. A combination of both sets of contours would define a total noise exposure area based on recent noise contour development efforts as well as the most up-to-date information.

The cities and the counties also could consider amending their general plans to show the proposed airport influence area around Williams Gateway Airport (as shown in **Exhibits 5A** and **5C**.)

Conclusion: The General Plans for Mesa, Gilbert, and designated undeveloped areas within the Planning Scenario 60 DNL contour for future compatible development. These noise compatibility policies and land use designations should be continued in the future. In addition, a new mixed use category that does not allow residential within the planned mixed use areas inside the Planning Scenario 60 DNL boundary should be considered.

Consideration should be given to maintaining the current Gilbert General Plan designations between Power, Warner, Recker, and Rittenhouse Roads. In addition, two areas (one in Gilbert and one in Queen Creek) that are currently undeveloped within in the planning scenario noise contours, but are planned for non-compatible land uses, should be changed to a compatible land use.

Mesa, Gilbert, Queen Creek, and Maricopa County should consider using the combined 2015 noise exposure contour from the 1993 Williams Gateway Airport Master Plan and noise contours developed using the 1999 Williams Gateway Airport Master Plan high range 2020 forecasts as a "planning scenario noise contour" in their general plans. Mesa, Gilbert, Queen Creek, and both Maricopa and Pinal Counties should also consider showing the airport influence area in their general plans.

Project Review Guidelines

Planning commissions and local governing bodies are often required to use their own discretion and judgement in making recommendations and decisions on community development issues such as general plan amendments, rezonings, variances, conditional use applications, subdivision applications, and proposed public improvement projects. The exercise of this discretion is constrained by the legal requirements of the applicable ordinances. Where opportunities remain for planning commissions and governing bodies to use their own discretion in the review of development proposals, it may be appropriate to adopt procedures ensuring the consideration of noise compatibility issues in their deliberations.

Mesa, Gilbert, Queen Creek, and Maricopa County could consider adopting airport land use compatibility guidelines for discretionary review of development projects within the Planning Scenario 60 DNL contour. These would be most appropriately contained in the general plans. This process would add little cost or administrative burden to the review process. A simple checklist could be prepared listing the important factors to consider in reviewing development proposals within the Planning Scenario 60 DNL noise contour. The following criteria are suggested:

A. Determine the sensitivity of the subject land use to aircraft noise levels. The F.A.R. Part 150 land use compatibility table can be used for this purpose. (See Exhibit 3A in Chapter Three.)

B. Advise the airport management of development proposals involving noise-sensitive land uses within the Planning Scenario 60 DNL noise contour.

C. Locate noise-sensitive public facilities outside the Planning Scenario 60 DNL contour, if possible. Otherwise, require building construction to provide an outdoor to indoor noise level reduction of 25 decibels within the 60-65 DNL range. Also, require the dedication of noise and avigation easements to the Williams Gateway Airport Authority as airport proprietor and the recording of a fair disclosure agreement and covenant noting the proximity of the airport and the existing and projected airport noise contours.

D. Discourage the approval of rezonings, exceptions, variances, and conditional uses which introduce noise-

sensitive development into areas exposed to noise exceeding 60 DNL.

E. Where noise-sensitive development within the Planning Scenario 60 DNL contour must be permitted, encourage developers to incorporate the following measures into their site designs.

(1) Where noise-sensitive uses will be inside a larger, mixed use building, locate noise-sensitive activities on the side of the building opposite the airport or, if the building is beneath a flight track, opposite the prevailing direction of aircraft flight.

(2) Where noise-sensitive uses are part of a larger mixed use development, use the height and orientation of compatible uses, and the height and orientation of landscape features such as natural hills, ravines and manmade berms, to shield noise-sensitive uses from ground-noise generated at the airport.

Conclusion: Mesa, Gilbert, Queen Creek, and Maricopa County could consider adopting airport land use compatibility guidelines for review of development projects within the Planning Scenario 60 DNL contour. These would be appropriately included in each jurisdiction's general plan.

REGULATORY TECHNIQUES

Regulatory techniques are land use and development controls established through local legislation. These include:

- Compatible Use Zoning
- Zoning Changes/Residential Density
- Noise Overlay Zoning
- Subdivision Regulations
- Building Codes
- Transfer of Development Rights
- Environmental Zoning
- Fair Disclosure Regulations

Compatible Use Zoning

The most common zoning technique in noise compatibility planning is to eliminate residential zoning from the noise-impacted area and replace it with commercial, industrial, open space, or other compatible zoning designation.

In some zoning ordinances, residential and other noise-sensitive uses are permitted in commercial or industrial districts. In Chapter One, the zoning ordinances of Mesa, Gilbert, Queen Creek, Apache Junction, Maricopa County, and Pinal County were summarized. These jurisdictions permit at least some noise-sensitive uses in commercial or industrial zoning districts, but, in general, they do not permit substantial residential development in those districts. Commercial and industrial zoning in the vicinity of the airport cannot guarantee that all noise-sensitive uses will be avoided, although large-scale residential development would be effectively prohibited.

A potential limitation of compatible use zoning is the need to balance the supply of industrial and commercial-zoned land with demand. If the market for commercial or industrial land is weak, and if the property owners perceive that they are unable to develop or use their land, they can exert political pressure or, in extreme cases, sue in

court to force rezoning of their land. This could occur if the total supply of commercial and industrial land vastly exceeds demand, or if the land which has been zoned for commercial and industrial use is not suited for that use because of site problems, such as poor access or inadequate water and sewer service.

In making rezoning decisions, the impact of the proposed zoning on the neighboring area must also be recognized. Problems can occur where the vacant land being considered for commercial or industrial zoning is near an established residential area. The residents may strongly object to the intrusion of non-residential uses into their neighborhood.

There are several areas within the Planning Scenario 60 DNL boundary and within the airport influence area that are currently zoned for compatible use. When possible, the areas that are zoned for compatible use should be maintained. These areas are depicted on **Exhibit 5D**.

Conclusion: Large tracts of undeveloped land in the noise-impacted area around the airport are designated in local general plans for compatible use. Mesa, Gilbert, Queen Creek, and Maricopa County all could require that future development conform with the future land use designations of the general plans and that no rezonings contrary to the general plans would be approved in the airport influence area without appropriate revisions to the general plans. In addition, Mesa, Gilbert, Queen Creek, Maricopa County Pinal County could consider rezoning several large tracts of land planned and zoned for non-compatible land use within the Planning Scenario 60 DNL boundary.

Zoning Changes -- Residential Density

Exhibit 5D also depicts several areas within the Planning Scenario 60 DNL boundary and within the airport influence area that are designated for compatible land uses in each respective general plan, but are zoned for non-compatible land uses. These areas are identified on **Exhibit 5D** with a blue crosshatch. Consideration should be given to rezoning these areas to compatible land uses (commercial or industrial) as specified in the general plans.

Consideration should be given to rezoning several large tracts of land planned and zoned for non-compatible land use within the Planning Scenario 60 DNL boundary northwest and southeast of the Airport to a compatible land use. The large tracts of land northwest of the Airport near the intersection of Elliot and Recker Roads are currently zoned for a combination of rural, medium, and high density residential. The large tracts of land southeast of the Airport near the intersection of Ocotillo and Meridian Roads are currently zoned for a combination of rural and low density residential. These areas are identified on **Exhibit 5D** with green hatch.

Another way of using conventional zoning to promote noise compatibility is to reduce the permitted housing density in an undeveloped area exposed to noise, thus reducing the number of future residents, rather than preventing residential development altogether. This is definitely a second-best approach and should be used only if compatible use planning and zoning are not feasible.

"Planned unit development" (PUD) is another technique which may offer some of the benefits of low-density (or large-lot) zoning. It allows development without having to follow the standard lot layout and siting requirements of the zoning ordinance. Planned unit developments can involve the clustering of buildings and the reservation of open space, as long as the overall

dwelling unit density in the development is basically the same as the density permitted in the underlying zoning district. In addition, a variety of housing types, including townhouses, apartments, and condominiums, are often permitted. This could conceivably allow open space and parking areas to be placed within the noise impact area and housing to be clustered outside the area.

As mentioned in the previous section, there are several large tracts of land within the Planning Scenario 60 DNL boundary northwest and southeast of the Airport that are planned and zoned for non-compatible land uses. These areas are identified on **Exhibit 5D** with a green hatch. If rezoning these areas to a compatible land use is not possible, changing the density of residential should be considered.

In the highly developed area near the intersection of Elliot and Recker Roads, the City of Gilbert could consider increasing the residential density and clustering the dwellings away from runway centerline. In the largely undeveloped area near the intersection of Ocotillo and Meridian Roads, the Town of Queen Creek could consider reducing the general plan areas to low density residential and zoned areas to rural residential.

Conclusion: As second best alternative to rezoning to compatible use designations, consideration could be given to changing the residential densities northwest and southeast of the Airport. The City of Gilbert could consider increasing the density and clustering residential development away from runway centerline for several large areas near the intersection of Elliot and Recker Roads. The Town of Queen Creek could consider reducing residential dwelling density to rural residential near the intersection of Ocotillo and Meridian Roads.

Noise Overlay Zoning

Overlay zoning (sometimes called "combining zoning") is intended to provide a layer of special purpose regulations to address special environmental constraints or problems by setting performance standards to protect the public. Overlay zoning involves the creation of one or more special zoning districts that supplement or combine with the regulations of the general purpose zoning districts.

Noise overlay zoning is used around many airports in the country to establish special land

use controls to protect the public health, safety, and welfare from conflicts which may arise between aviation and urban development. These controls often are used, for example, to regulate the height of structures within runway approach areas and in other areas near the airport, or to promote development which is compatible with aircraft noise levels.

Noise overlay zoning regulations are usually established as "combining" regulations in that the underlying zoning, (i.e., residential, commercial, industrial, etc.) remains in place and is supplemented by the noise overlay zone. The land within the noise overlay zone is subject to the requirements of two zoning districts -- the underlying zone and the overlay zone. The strictest requirements of both zones apply to the affected property.

Noise overlay zoning is intended to avoid the problems associated with incompatible development in high noise areas. Regulations in noise overlay zones can prohibit noise-sensitive uses, as long as the underlying zone permits enough other land uses to provide an opportunity for the economically viable use of the land. The In the Williams Gateway Airport area, only the City of Mesa and Maricopa County currently has airport noise overlay zoning. (These regulations are summarized in Chapter One, Table 1C.) The Mesa Zoning Ordinance establishes an Airfield Overlay District. Eight subdistricts are designated within that area based on military safety zones and military aircraft noise contours. Districts AOD-1 through AOD-3 are very close to the runway ends and are shaped by military safety criteria. The remaining five Airfield Overlay Districts are shaped by the Williams Air Force Base military activity noise contours. The AOD-4 district area represents the area within the 75 DNL contour, the AOD-5 represents the area between the 75 and 70 DNL contours, the AOD-6 represents the area between the 70 and 65 DNL contours, the AOD-7 represents the

regulations also can require sound insulation in the construction of noise-sensitive uses.

The boundaries of noise overlay zones are usually determined by the critical noise contours based on local perceptions -- often the 65, 70, and 75 DNL contours, but with increasing emphasis on the 60 DNL contour. The boundary may follow the actual contours or, for the sake of simplified administration, nearby streets, property lines, or natural features.

Noise overlay zoning is administered by the local land use regulatory agency. In areas where noise crosses jurisdictional boundary lines, as in the Williams Gateway Airport area, it is helpful to local developers if the jurisdictions cooperate with a unified approach to overlay zoning.

Among the advantages of noise overlay zoning are the simplicity of the required amendments, the simplicity of administration, the clear relationship of the regulations to their purpose, and the minimal impact of the regulations on the application of the zoning ordinance in other parts of the community.

area between the 65 and 60 DNL contours, and AOD-8 represents the area between the 60 and 55 DNL contours. The City of Mesa does not enforce Airfield Overlay Districts 4 through 8 due to the conversion of Williams Air Force Base to a civilian airport and a significant drop in the level of military activity. The safety zones, however, are still enforced.

Maricopa County also enforces the same three Airport Overlay Districts Mesa enforces within the unincorporated areas around Williams Gateway Airport.

While both overlay district types previously mentioned provide for compatible land use around the airport, the Mesa and Maricopa County overlay zoning districts described in their

respective ordinances are based upon the military safety zones of an active military air force base. Therefore, these zones are based on criteria that does not represent the current or proposed future operational status of the airport. In addition, these overlay zoning districts stop at the corporate boundaries of Gilbert and Queen Creek and therefore have no capability to provide land use protection in these communities.

In addition to the overlay zoning districts specified in Mesa and Maricopa County zoning ordinances, Mesa, Gilbert, Queen Creek, and Maricopa County have adopted Williams Regional Planning Study (WRPS) Overflight Zoning Districts as a planning guideline. The WRPS Overflight Zoning District is separated into three subdistricts: Overflight Area 1 which encompasses the 65 DNL noise contour; Overflight Area 2 which encompasses a squared-off area between the 60 and 65 DNL noise contour; and Overflight Area 3 which encompasses an area outside the 60 DNL but still influenced by aircraft operations.

The WRPS Overflight Zoning Districts, however, are based on a dominate civil aircraft presence and are recognized by Mesa, Gilbert, Queen Creek, and Maricopa County. These communities could consider revising, broadening and adopting the standards of the WRPS Overflight Zoning Districts. Eight issues should be considered.

1. Consider expanding the current 60 and 65 DNL boundaries to include areas from the high range forecast noise contours that fall outside the WRPS contours (this would be the same as the Planning Scenario noise contour).

2. Consider reducing the size of the Airport Influence Area boundary to the north side of the Superstition Freeway.

3. Consider adding Runway Protec-tion overlay zones to protect the approaches to each runway end.

4. Consider increasing exterior to interior noise level reduction from 20 to 30 for residential development within the 60 DNL boundary or AOZ-2 zone.

5. Consider prohibiting all noise-sensitive land uses within the Planning Scenario 65 DNL contour.

6. Consider expanding noise level reduction efforts to other land use categories.

7. Consider adopting overflight districts as part of zoning ordinance for Mesa, Gilbert, Queen Creek, Maricopa County and Pinal County.

Exhibit 5E depicts the recommended Airport Overflight Zoning (AOZ) Districts. **Table 5A** shows a suggestion for revised AOZ district requirements for Mesa, Gilbert, Queen Creek, Maricopa County and Pinal County.

TABLE 5A
Potential Revised Noise Compatibility Matrix for the Overflight Zoning District
Mesa, Gilbert, Queen Creek, Maricopa County, and Pinal County

	RPZ[8]	***AOZ-1 65 + DNL***	***AOZ-2 60-65 DNL***	**AOZ-3 60-AIA**
RESIDENTIAL				
Single-family, duplex, multi-family, manufactured housing	N	N	Y[***1***,2,4,9]	Y[***1***,2]
Recreational vehicle parks	N	N	Y[***1***,2,4,9]	Y[***1,2***]
Other residential	N	N	Y[***1***,2,4,9]	Y[***1,2***]
PUBLIC FACILITIES				
Education facilities	N	N	N	Y[***1***]
Religious facilities, libraries, museums, galleries, clubs and lodges	N	***N***	Y[***1***,4]	Y[***1***]
Outdoor sport events, entertainment and public assembly, except amphitheaters	N	N	N	Y[***1***]
Indoor recreation, amusements, athletic clubs, gyms and spectator events	N	Y[***1,5***]	Y[***1***,4]	Y[***1***]
Neighborhood parks	N	Y[***1***]	Y[***1***]	Y[***1***]
Community and regional parks	N	Y[***1***]	Y[***1***]	Y[***1***]
Outdoor recreation: tennis, golf courses, riding trails, etc.	N	Y[***1***]	Y[***1***]	Y[***1***]
Cemeteries	N	Y[***1***]	Y[***1***]	Y[***1***]
COMMERCIAL				
Hotels/motels	N	Y[***1,5***]	Y[***1***,4]	Y[***1***]
Hospitals and other health care services	N	N	N	Y[***1***]
Services: finance, real estate, insurance, professional and government offices	N	Y[***1***,4]	Y[***1,3***]	Y[***1***]
Retail sales: building materials, farm equipment, automotive, marine, mobile homes, recreational vehicles and accessories	N	Y[***1***,4]	Y[***1,3***]	Y[***1***]
Restaurants, eating and drinking establishments	N	Y[***1***,4]	Y[***1,3***]	Y[***1***]
Retail sales: general merchandise, food, drugs, apparel, etc.	N	Y[***1***,4]	Y[***1,3***]	Y[***1***]
Personal services: barber and beauty shops, laundry and dry cleaning, etc.	N	Y[***1***,4]	Y[***1,3***]	Y[***1***]
Automobile service stations	N	Y[***1***]	Y[***1***]	Y[***1***]
Repair services	N	Y[***1***]	Y[***1***]	Y[***1***]

TABLE 5A (Continued)
Potential Revised Noise Compatibility Matrix for the Overflight Zoning District
Mesa, Gilbert, Queen Creek, Maricopa County, and Pinal County

	RPZ[8]	***AOZ-1 65+ DNL***	***AOZ-2 60-65 DNL***	**AOZ-3 60-AIA**
INDUSTRIAL				
Processing of food, wood and paper products; printing and publishing, warehouses, wholesale and storage activities	N	Y[***1,6***]	Y[***1,6***]	Y[***1***]
Refining, manufacturing and storage of chemicals, petroleum and related products, manufacturing and assembly of electronic components, etc.	N	Y[***1,6***]	Y[***1,6***]	Y[***1***]
Manufacturing of stone, clay, glass, leather, gravel and metal products; construction and salvage yards; natural resource extraction and processing, agricultural, mills and gins	N	Y[***1***,6]	Y[***1***,6]	Y[***1***]
AGRICULTURE				
Animal husbandry; livestock farming, breeding and feeding; plant nurseries (excluding retail sales)	N	Y[***1***]	Y[***1***]	Y[***1***]
Farming (except livestock)	7	Y	Y	Y
MISCELLANEOUS				
Transportation terminals, utility and communication facilities	N	Y[***1***]	Y[***1***]	Y[***1***]
Vehicle parking	N	Y[***1***]	Y[***1***]	Y[***1***]
Signs	N	Y	Y	Y

KEY TO TABLE 5A

Y	Land use is compatible and is permitted.
N	Land use is incompatible and is not permitted.
1	A fair disclosure agreement and covenant shall be recorded as a condition of development approval for all permitted uses in the AIA Zoning Overlay District.
2	All plats recorded shall be inscribed with the following: "*These properties, due to their proximity to Williams Gateway Airport, are likely to experience aircraft overflights, which could generate noise levels that may be of concern to some individuals.*"
3	The land use or activity is permitted. The developer shall be encouraged to incorporate features into the design and construction of buildings where people live, work, or are otherwise received to achieve an outdoor-to-indoor noise level reduction (NLR) of 25 decibels.
4	The land use or activity is permitted; however, an outdoor-to-indoor noise level reduction (NLR) of 25 decibels must be incorporated into the design and construction of those buildings where people live, work, or are otherwise received.
5	The land use or activity is permitted; however, an outdoor-to-indoor noise level reduction (NLR) of 30 decibels must be incorporated into the design and construction of those buildings where people live, work, or are otherwise received.
6	Uses which produce air pollutants that may obscure vision in any way, or which involve raw materials, products or by-products that pose a potential explosive hazard, are not permitted.
7	Structures are not permitted in the runway protection zone.
8	In order to minimize public exposure to accident hazard and crash potential as generated by aircraft operations, no building shall be located within any portion of a runway protection zone as defined and designated by this Code. However, such on-site improvements as vehicle parking, storm water retention, landscaping, and yard set-backs, as otherwise required by this Code or other city regulation, may be permitted within the designated runway protection zones. No element of any landscaping shall be allowed to penetrate any runway protection zone slope or other approach surface.
9	Avigation easements are required which acknowledges that an airport is located nearby and aircraft to/from the airport have a right to fly over the property.

Conclusion: Mesa, Gilbert, Queen Creek, and Maricopa County, should consider revising their Overflight Zoning District standards to reflect additional areas within the high range forecast noise contours developed in this study as well as broaden the level of airport land use compatibility protection. Consideration should be given to amending the zoning ordinance for each entity to include the Overflight Zoning Districts. Pinal County also should consider amending their zoning ordinance to include the Overflight Zoning Districts.

Subdivision Regulations

Subdivision regulations control the platting of land by setting standards for site planning, lot layout, and the design of utilities and public improvements. They can encourage compatible development around an airport by requiring the consideration of aircraft noise during the plat review by public officials. This might take the form of requiring further noise attenuation features in the site plan or a decrease or shift in the density of portions of the development.

Subdivision regulations are not well-suited to addressing needs for noise attenuation although they can be used to inform prospective future property owners of the risk of aircraft noise. In some communities, noise levels are shown on the final subdivision plats either by drawing the noise contours on the plats or by assigning noise levels to the lots. This makes the noise information a matter of public record. An important disadvantage is that, while the plat is recorded and on file forever, noise levels can change. Another approach is to write a note on the plat, or record a covenant with the plat, stating that the property is subject to potentially disruptive aircraft noise and advising consultation with local planning officials and the airport proprietor to get current information about the noise situation. As a practical matter, however, buyers of property rarely look at the plats.

Subdivision regulations can help protect the airport from the risk of noise damage suits while providing for notice to potential buyers of property by requiring, as a condition of subdivision approval, the dedication of noise and avigation easements and non-suit covenants in high-noise areas. This is similar to requirements for the dedication of street right-of-way or utility easements usually found in subdivision regulations.

An easement is a limited right to use property owned by another. A noise and avigation easement gives the airport, as owner of the easement, the right to direct aircraft over the property and thus to make noise. These easements serve notice that the property is subject to significant aircraft noise which may, at times, infringe on a resident's enjoyment of property and may, depending on the degree of acoustical treatment of the dwelling and the individual's sensitivity to noise, affect his or her well-being. The easement should state clearly that noise levels might increase in the future and that flight patterns or operating times might change. A noise and avigation easement often includes a covenant waiving the property owner's right to sue the airport proprietor for disturbances caused by aircraft noise.

A supplementary provision to the City of Mesa Zoning Ordinance requires the dedication of an avigation easement on any proposed subdivision plan or lot split within a Mesa's Airfield Overlay District. This provision also requires prospective buyers to be notified that the property is contained within one of these districts. It would be reasonable to reflect these requirements in the Mesa subdivision regulations as an extra measure to ensure that they are not overlooked during the subdivision review and approval process. The remaining jurisdictions including Gilbert, Queen Creek, and counties of Maricopa and Pinal have not adopted subdivision regulations pertaining to impacts of aircraft overflights.

Conclusion: Mesa, Gilbert, Queen Creek, Maricopa County and Pinal County could consider amending their subdivision regulations to require the recording of fair disclosure agreements and covenants within the airport influence area and dedication of noise and overflight easements within the Planning Scenario 60 DNL contour boundary. These would inform prospective buyers of potential for significant aircraft noise impacts and protect the airport authority from potential noise damage law suits. Inclusion of these updated provisions into its subdivision regulations will provide insurance against these requirements being overlooked in the subdivision review and approval process.

Because the City of Apache Junction and Pinal County would have no areas above 60 DNL within their jurisdiction, they would not need to enact special subdivision regulations.

While the zoning proposals discussed previously would greatly reduce the risk of future noise-sensitive development in the study area, special sound insulation measures may be appropriate in case scattered noise-sensitive development should occur. In fact, as part of the City of Mesa Zoning Ordinance, "any structures requiring a certificate of occupancy or designed for habitation", located within an airfield overlay district will be denied a building permit unless certain noise level reduction (NLR) standards are met. The amount of noise reduction required is determined by two factors; (1) the airport overlay district the structure is within, and (2) what activity will take place within the structure.

Building Codes

Building codes regulate the construction of buildings, setting standards for materials and construction techniques to protect the health, welfare, and safety of residents. Codes address structural concerns, ventilation, and insulation, each of which influences the noise attenuation capabilities of a building. Building codes commonly apply to both new construction and major alterations.

Building codes can require sound insulation in the construction of noise-sensitive uses in areas subject to high aircraft noise levels. Although they are sometimes used within the 60 DNL contour, requirements for sound insulation customarily are applied within the 65 DNL contour with increasingly stringent standards in the 70 and 75 DNL contours. Most sound insulation code standards describe in detail the required improvements needed to achieve a given level of noise reduction. The building inspector must see that the improvements have been properly made. If so, the builder is presumed to have met the sound insulation target without being required to do any special noise measurement tests.

Building codes apply throughout the Williams Gateway study area to ensure construction of safe buildings. All study area jurisdictions have adopted a version of the Uniform Building Code (UBC). While this code establishes uniform thermal insulation standards for new construction, it has no special sound insulation standards to provide protection from external noise sources.

As mentioned previously, the City of Mesa does not enforce the majority of it's airfield overlay zones since they are based on only operations by military aircraft. In turn, Mesa uses noise attenuating construction standards that are set forth in the Williams Regional Planning Study. This requires noise attenuating construction methods able to maintain a exterior to interior noise level reduction of 20 dBA for any new or remodeled building contained within Airfield Overlay Area II. This area is reviewed in Chapter One and depicted on Exhibit 1M. This area should be further refined to follow the squared off 60 DNL "planning scenario noise contour" boundary established by the Gateway Airport Master Plan high range 2020 forecast. Not only should the city's zoning ordinance be updated to reflect these requirements, related standards in the building code would help with the implementation of these requirements. This would require the adoption of a local amendment to the Uniform Building Code currently in use. Gilbert, Queen Creek and Maricopa County could also consider sound insulation standards for new noise-sensitive development since they also have some areas of jurisdiction within the noise contours.

Sound insulation standards would be an effective way to enhance land use compatibility in the airport area, especially if used as part of a comprehensive land use management approach. The noise overlay zoning ordinance could declare which noise-sensitive uses should be sound-insulated within each noise overlay zone. The specific construction standards would be described in the building code. It would be the duty of the local building inspectors to ensure that sound insulation is properly installed.

The additional administrative burdens posed by sound insulation standards should not be severe. Local communities already have a building inspections process. It is possible that a need for additional inspections could increase the costs to local regulatory agencies. If so, these costs should be covered through inspection fees. Proper administration of these requirements is critical. It would require careful inspections and special training of building inspectors.

Sound insulation may cost local builders more than conventional construction. Most of the additional cost would be for acoustical windows, where they are necessary. Other sound insulation construction techniques should result in only very minor, if any, cost increase as they involve primarily special installation techniques with a minimum of unusual or expensive materials. Of course, not only is a properly sound-insulated home quieter, it is also highly energy-efficient. Any additional costs are buying real value for the future homeowner; therefore, the additional costs of sound insulation may be able to be recouped through the marketing process.

At least three approaches may be taken to setting specific sound insulation standards: (1) using prescriptive standards; (2) using flexible standards; or (3) using performance standards. These are discussed in the following sections.

Prescriptive Standards: This is perhaps the most commonly used approach to sound insulation standards. The building code could be amended to set forth specific construction standards intended to achieve a given level of noise reduction. It would be the duty of the local building inspectors to ensure that the correct materials are used and construction is done properly. After installation and a successful inspection, the building is presumed to be able to achieve the targeted level of noise reduction.

Flexible Code Standards: This alternative would describe the required "sound transmission class" (STC) rating of all building components. STC is a system for rating the effectiveness of

partitions, floors, ceilings, windows, and doors in attenuating the transmission of sound. The ratings are determined through standardized laboratory tests of sound transmission at various frequencies. The higher the STC rating, the better the sound reduction. A builder would be free to use any materials desired as long as evidence is provided that the required STC rating has been met.

Jurisdictions desiring to undertake such an approach should retain the assistance of a qualified acoustical engineer in developing the standards. The objective of the regulations should be to specify the STC ratings of various building components needed to achieve an overall noise level reduction of 25 to 30 decibels, depending on the noise contour where the proposed development is located.

Performance Standards: A performance-based standard would focus on the final result to be achieved by the construction. The standard would describe the required outdoor-to-indoor noise reduction. The builder could use any materials or techniques he desires as long as he can certify that the plans and final construction meet the standard. This would require the assistance of an acoustical engineer in designing the building and checking construction. It would also require testing the building after construction.

The performance standards could be set in the zoning ordinance and would be particularly easy to administer in the case of conditional uses, special uses and planned developments. These kinds of developments are already subject to special reviews and performance standards.

The advantage of this approach is that the builder has the flexibility to design the building as he deems best. It also avoids the complexity of drafting, adopting, and administering special sound insulation building code amendments. In addition, verification

of compliance with the requirements is the responsibility of the builder and his engineer. The disadvantage is that the cities would have to verify the certifications made by the builder and the engineer. Builders also may lack confidence in regulations which are subject to case-by-case verification and approval.

Conclusion: The City of Mesa Zoning Ordinance sets noise level standards for noise-sensitive construction within the airfield overlay zones. While many of these zones are no longer enforced, Mesa does use the boundaries set forth in the Williams Regional Planning Study. All new construction and major alterations to existing building require the use of sound attenuation standards to create a exterior to interior noise level reduction of 20 dBA. Consideration should be given to updating the boundary to reflect the 60 DNL "planing scenario noise contour" and increasing the exterior to interior noise level reduction from 20 dBA to 30 dBA. Gilbert, Queen Creek, Maricopa County and Pinal County should also consider adopting these standards and along with the City of Mesa, incorporate them as revisions to their respective building codes. Because the City of Apache Junction would have no areas above 60 DNL within their jurisdiction, they would not need to enact special noise level reduction standards in their building codes.

Transfer of Development Rights

Land ownership actually includes a bundle of rights to the use of that land. These include rights of access, mineral rights, rights to the airspace above the land, and rights to develop the land. Transfer of development rights (TDR) is based on the idea that each right has a market value which can be separated and sold without selling the entire property.

TDR was developed as a way to preserve environmentally important areas without having to buy them with public funds. The technique begins by dividing the municipality into sending and receiving zones. The sending zones are areas where environmental preservation and minimal development are desired, and the receiving zones are areas where additional development is preferred. Development rights, measured in terms of development density, are assigned through the zoning ordinance. If developers in the receiving areas can get additional development rights, they are allowed to build to higher densities than normally allowed by the zoning ordinance. They would buy these rights from landowners in the sending zones. In this way, the public can benefit from preserving environmentally valuable land, the owner of that land can be paid for preserving it, and developers can reap higher profits.

Based on experience with these programs around the country, several conditions for the successful use of TDR have been identified. The receiving districts must be capable of immediate development, the regulatory process must have integrity and be trusted by developers, the regulatory agency must be able to inform and help property owners and developers, and programs must be as simple as possible and facilitate the self-interest of all involved parties. (See "Making TDR Work," by Peter J. Pizor, in the *Journal of the American Planning Association*, Vol. 52, No. 2, Spring 1986.)

A variation of TDR is density transfer zoning. This allows developers of several large tracts of land to move their allotted densities among tracts to reduce densities in areas worthy of preservation. This differs from TDR because only one owner is involved in the transfer, and a system for sale and purchase of development rights is not required. Density transfer zoning

often can be achieved through creative use of the planned unit development process.

In rapidly growing areas with large amounts of vacant land, TDR can be an effective tool for airport land use compatibility planning. At no cost to the taxpayers, it can neatly deal with the problem of what to do with land in high noise zones when there are no practical alternatives to residential development.

TDR is a very complicated technique that is difficult to justify solely for the purposes of airport land use compatibility. If a local jurisdiction is already using or considering TDR, airport compatibility criteria could be included with other environmental criteria in the design of the program.

Conclusion: TDR is not currently being used in the Williams Gateway Airport area nor is it needed for airport compatibility purposes. As discussed in previous sections, current land use planning, in addition to potential revisions to conventional land use regulations, can adequately meet the need for compatible development in the airport area. This technique does not deserve further consideration.

Environmental Zoning

Special zoning regulations to preserve environmentally sensitive areas or protect development from environ-mental hazards also can promote land use compatibility near airports. Floodplain overlay zoning, which restricts or prohibits development in all or part of the floodplain, is the most common form of environmental zoning. Other environmental zoning regulations may include steep slope zoning requiring low development densities and special construction standards, wetland preservation zoning limiting densities and the design of drainage facilities, and groundwater recharge zones limiting building density and lot coverage. All can be used to restrict the development of noise-sensitive uses in environmentally sensitive areas that are also impacted by aircraft noise.

Conclusion: Given the local environment (no significant flood plains, wetlands, etc.) various forms of environmental zoning regulations in the local area do not directly lend themselves to also promoting airport noise compatibility. This technique does not deserve further consideration.

Fair Disclosure Regulations

Fair disclosure regulations are not actually land use regulations. They are intended to ensure that prospective buyers of property are informed that the property is or will be exposed to potentially disruptive aircraft noise. It is not uncommon around even major airports for newcomers to report having bought property without having been informed about airport noise levels.

At the most formal level, fair disclosure can be implemented through regulations requiring the seller or his agent to provide a notice of aircraft noise exposure on the real estate listing sheet and at the time that a sales contract is executed. In addition, any easements should be revealed at the time of closing. Although these measures are intended to protect buyers of property from being unaware of aircraft noise, a potential problem is that they can be difficult to enforce.

Fair disclosure regulations can place a serious responsibility on real estate agents and lenders. If the regulations are properly drafted, however, the responsibilities of real estate agents and sellers are clearly defined and should be limited simply to disclosing the airport noise levels or overlay districts affecting the property and directing buyers to airport officials for more information.

Another approach to fair disclosure is to require the recording of a fair disclosure agreement and covenant at the time of rezoning or subdivision plat approval. The agreement would require the property owner to disclose the airport noise situation to prospective buyers. As a covenant running with the land, this requirement would bind all future property owners.

A less direct approach to fair disclosure is to require the dedication of avigation easements or noise and overflight easements as a condition of development approval within high-noise areas. The easements become a restriction on the deed to the property that must be revealed at the closing on subsequent sales. A more limited approach to fair disclosure is to require the recording of a notice with the plats of new As mentioned previously, the City of Mesa has established polices for both fair disclosure and the establishment of avigation easements as part of it's Airfield Overlay Zoning. Although Mesa no longer enforces the majority of these overlay districts, Mesa does recognize and use both fair disclosure and avigation easement recording as established in the Williams Regional Planning Study. Gilbert, Queen Creek, and Maricopa and Pinal Counties currently do not implement fair disclosure policies.

Conclusion: Arizona law authorizes the establishment and recording of airport influence areas as well as disclosure of public use airports. Mesa, Gilbert, Queen Creek, and Maricopa and Pinal counties should consider using these laws. These laws fall short, however, of an air-tight subdivisions in the noise-impacted area. It would identify the subdivision as potentially impacted by aircraft noise and would advise that local planners and airport officials be contacted for the most recent information about noise levels impacting the property. These approaches have been discussed in the noise overlay zoning and subdivision regulations sections.

As noted near the beginning of the chapter, Arizona law authorizes municipal and county airport operators to establish airport influence areas and record maps of these areas to make the potential for airport-related impacts a matter of public record. This helps to achieve the fair disclosure objective.

Arizona law recently authorized a second method of fair disclosure. This requires the disclosure of public use airports to prospective purchasers of real estate within the airport "vicinity" (vicinity is defined as the area within 60 DNL contour and traffic pattern airspace). The benefit of this law, however, is limited to only the first time buyer. It is suggested that if this option is considered the Planning Scenario noise contours be used.

guarantee of the disclosure of airport noise and overflight conditions in areas near an airport, especially in the early phase of the sales process.

If Mesa, Gilbert, Queen Creek, and Maricopa and Pinal Counties are interested in more complete disclosure than would be provided for by simply establishing an airport influence area and real estate map, they could consider taking additional actions. A previous section on airport noise overlay zoning discussed the possibility of requiring the recording of fair disclosure agreements and covenants for new development within the airport influence area. This measure would help promote fair disclosure of the potential for airport impacts, supplementing the State laws.

EXPENDITURE TECHNIQUES

Land use management techniques involving direct expenditures include the following:

- Property Acquisition
- Noise and Avigation Easement Purchase
- Development Rights Acquisition
- Purchase Assurance
- Sales Assistance
- Sound Insulation

These measures are usually considered as a last resort because they are expensive, often disruptive, and sometimes controversial. They are most often justified when aircraft noise impacts are severe and cannot be mitigated through noise abatement alone. These measures are potentially eligible for FAA funding assistance through the noise set-aside of the Airport ***Conclusion:*** Because no noise sensitive uses are located inside the 65 DNL contour based on 1999 or 2004 noise levels, none of these Federal expenditure techniques are appropriate at William Gateway Airport.

When funding becomes available under the Growing Smarter program, this may provide another alternative to development within the 65 DNL noise contour. However, without the grant program in place and the uncertainty of the amount of funding available, conventional land use planning and zoning techniques continue to be the most practical methods for land use management.

Improvement Program if they are part of an FAA-approved Part 150 Noise Compatibility Program. In general, to be eligible for FAA approval these programs can apply only within the 65 DNL contour based on existing conditions or the five-year forecast condition.

An opportunity may exist to purchase development rights with State grant money instead of Federal money. Purchasing development rights has been recommended within the Growing Smarter legislation framework as a method of providing buffers for military bases and training ranges. The Growing Smarter Commission recommended a statewide competitive grant program open to private land owners, state agencies, special districts, local governments, and land trusts. The state or local government would, however, hold or retain ownership of the development rights.

PRELIMINARY LAND USE ALTERNATIVES

Table 5C shows the preliminary list of land use management alternatives deserving serious consideration. These are to be reviewed by the Planning Advisory Committee, the airport management, and the public. Refinements to these preliminary measures may be necessary before the final plan is developed. In addition, more detailed consideration of the implementation of these recommend-ations is necessary.

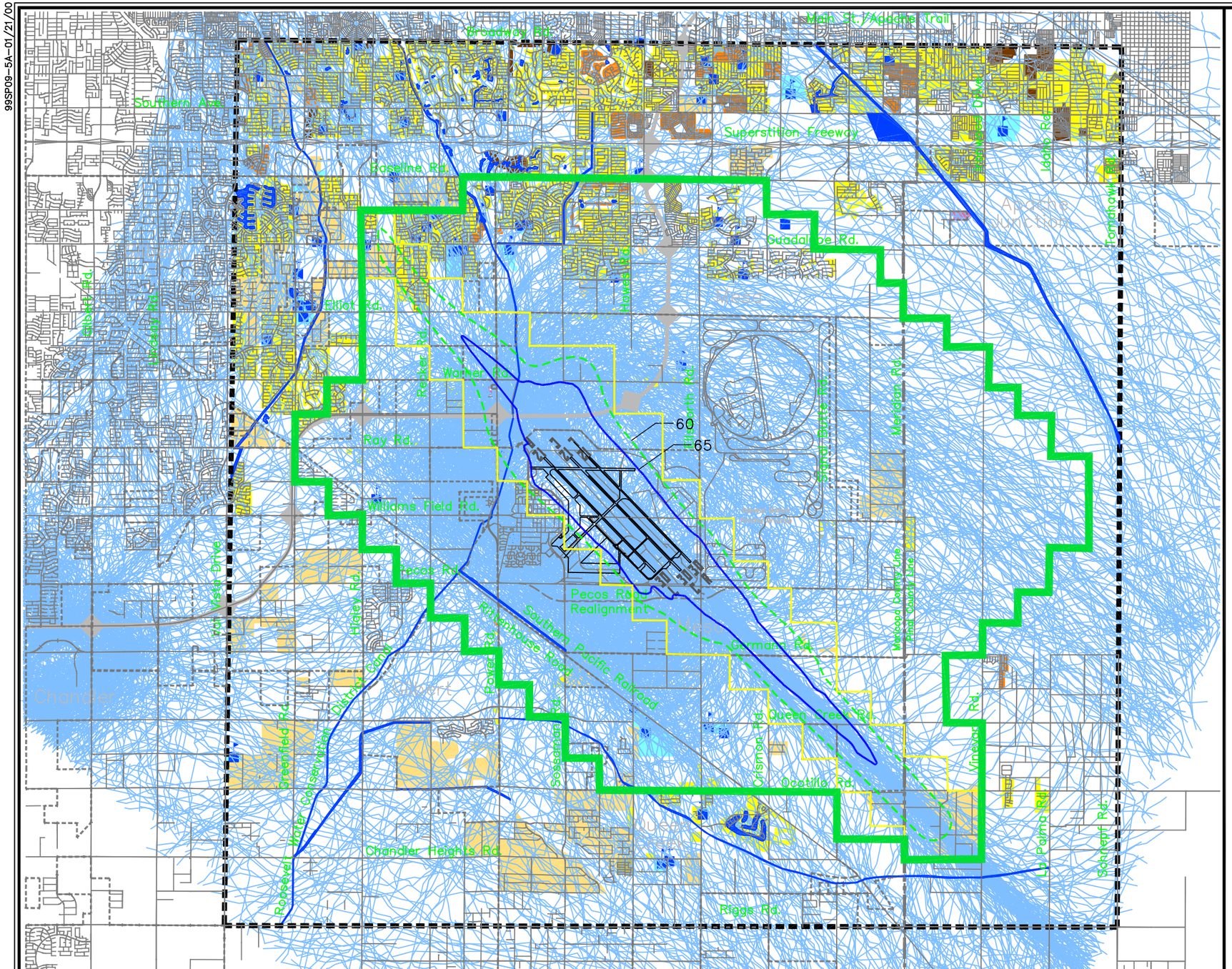
TABLE 5C
Land Use Management Alternatives Deserving Further Consideration
Williams Gateway Airport

Description	Cost	Implementing Agency
1. Establish airport influence area and record it with County Recorder according to State law.	Administrative	Mesa, Gilbert, Queen Creek, Maricopa County, and Pinal County
2. General Plan Amendment: Update General Plans to reflect the noise contours from Part 150 Study. Use a combination of the 2015 noise contours from the 1993 Master Plan and the 2020 high range forecast contours developed as part of this study as "land use planning scenario."	Administrative	Mesa, Gilbert, Queen Creek, Maricopa County, and Pinal County
3. General Plan Amendment: Note that the goal of Mesa, Gilbert, and Queen Creek is to retain compatible land use designations for undeveloped land within the Airport Influence Area.	Administrative	Mesa, Gilbert, and Queen Creek.
4. General Plan Amendment: Designate all undeveloped land within the Planning Scenario 60 DNL boundary for future noise-compatible development. Amend Mixed Use designations within the Planning Scenario 60 DNL boundary to prohibit residential land uses.	Administrative	Mesa, Gilbert, Queen Creek, Maricopa County, and Pinal County
5. General Plan Amendment: Enact guidelines specifying noise compatibility criteria for the review of development projects within the Planning Scenario 60 DNL boundary.	Administrative	Mesa, Gilbert, Queen Creek, Maricopa County, and Pinal County
6. Zoning Amendments: Amend Zoning Map to reflect compatible land uses within Planning Scenario 60 DNL boundary or as an alternative change the residential densities.	Administrative	Mesa, Gilbert, and Queen Creek. Maricopa County
7. Airport Overflight Zoning Amendment: Amend Zoning Map to reflect Planning Scenario noise contours and airport influence area. Revise ordinance text to broaden noise compatibility standards, provide for fair disclosure agreements and covenants. (See Table 5A.)	Administrative	Mesa, Gilbert, Queen Creek, Maricopa County, and Pinal County
8. Airport Noise Overlay Zoning: Enact overlay zoning to provide noise compatibility land use standards near Airport. (See Table 5A.)	Administrative	Mesa, Gilbert, Queen Creek, Maricopa County, and Pinal County

TABLE 5C (Continued)
Land Use Management Alternatives Deserving Further Consideration
Williams Gateway Airport

Description	Cost	Implementing Agency
9. Subdivision Regulations Amendment: Require recording of fair disclosure agreements and covenants within airport influence area. Require noise and overflight easements within AIA District.	Administrative	Mesa, Gilbert, Queen Creek, Maricopa County, and Pinal County
10. Building Code Amendment: Enact construction standards for achieving outdoor-to-indoor noise level reductions of 30 decibels within the Planning Scenario 60 DNL boundary.	Administrative	Mesa, Gilbert, Queen Creek, Maricopa County, and Pinal County
11. Real Estate Fair Disclosure: Establish "airport vicinity" map using the airport influence area and Planning Scenario contours.	Administrative	William Gateway Airport Authority.

99SP09-5A-01/21/00



LEGEND

- Detailed Land Use Study Area
- County Boundary
- Municipal Boundary
- Airport Property
- Planned Santan Freeway
- Potential Airport Influence Area
- 60 DNL–Planning Scenario Boundary
- 60 DNL–Planning Scenario Contour
- 65 DNL–Planning Scenario Contour
- Radar Flight Track Data
- Rural Residential (0–2 du/ac)
- Low Density Residential (2.1–5 du/ac)
- Medium Density Residential (5.1–15 du/ac)
- High Density Residential (15+ du/ac)
- Mobile and Trailer Homes
- Mixed Use
- Noise Sensitive Institutions
- Place of Worship
- School

Source: Coffman Associates Analysis
August 1999.

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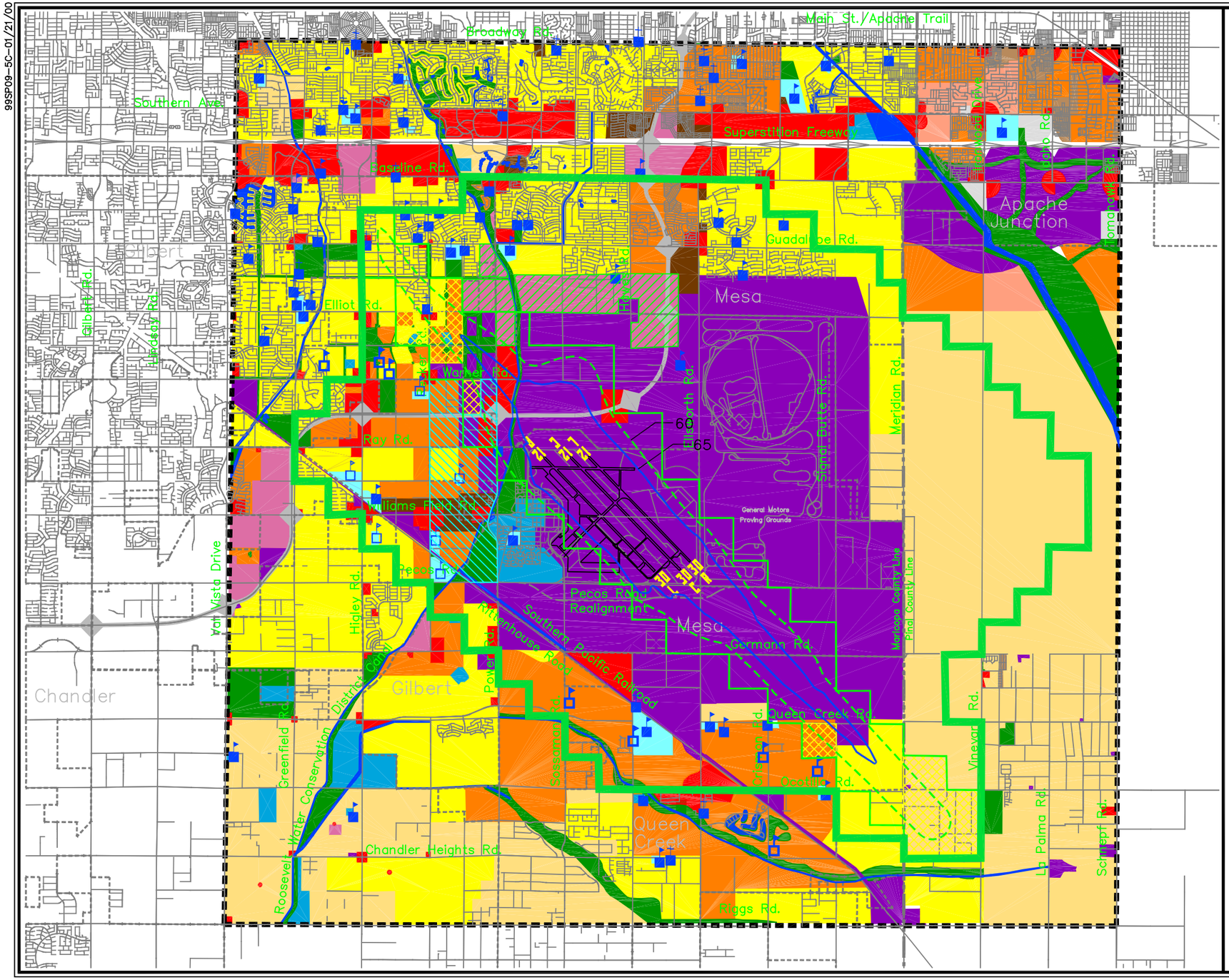
SCALE IN FEET

WILLIAMS GATEWAY AIRPORT

Exhibit 5A
POTENTIAL AIRPORT
INFLUENCE AREA

99SP09-5C-01/21/00



LEGEND

- Detailed Land Use Study Area
- County Boundary
- Municipal Boundary
- Airport Property
- Planned San Tan Freeway
- Potential Airport Influence Area
- 60 DNL–Planning Scenario Boundary
- 60 DNL–Planning Scenario Contour
- 65 DNL–Planning Scenario Contour
- Rural Residential (0–2 du/ac)
- Low Density Residential (2.1–5 du/ac)
- Medium Density Residential (5.1–15 du/ac)
- High Density Residential (15+ du/ac)
- Mobile and Trailer Homes
- Mixed Use
- Planned Area Development
- Hotels, Motels, and Resorts
- Commercial/Office
- Industrial, Transportation & Utilites
- Parks and Open Space
- Water
- Public Facilities
- Noise Sensitive Institutions
- Place of Worship
- School
- Proposed School
- Mixed Use General Plan Amendments
- General Plan Amendments
- Maintain Current General Plan Designations

Source: Maricopa County Land Use Plan, 1992; Pinal County Comprehensive Plan, 1988, p. 147; City of Mesa, General Plan, 1996; City of Apache Junction, General Plan, 1987, p. 91; Town of Queen Creek, General Plan, 1996, Exhibit 4; Town of Gilbert, General Plan Land Use Map, 11/15/1999.

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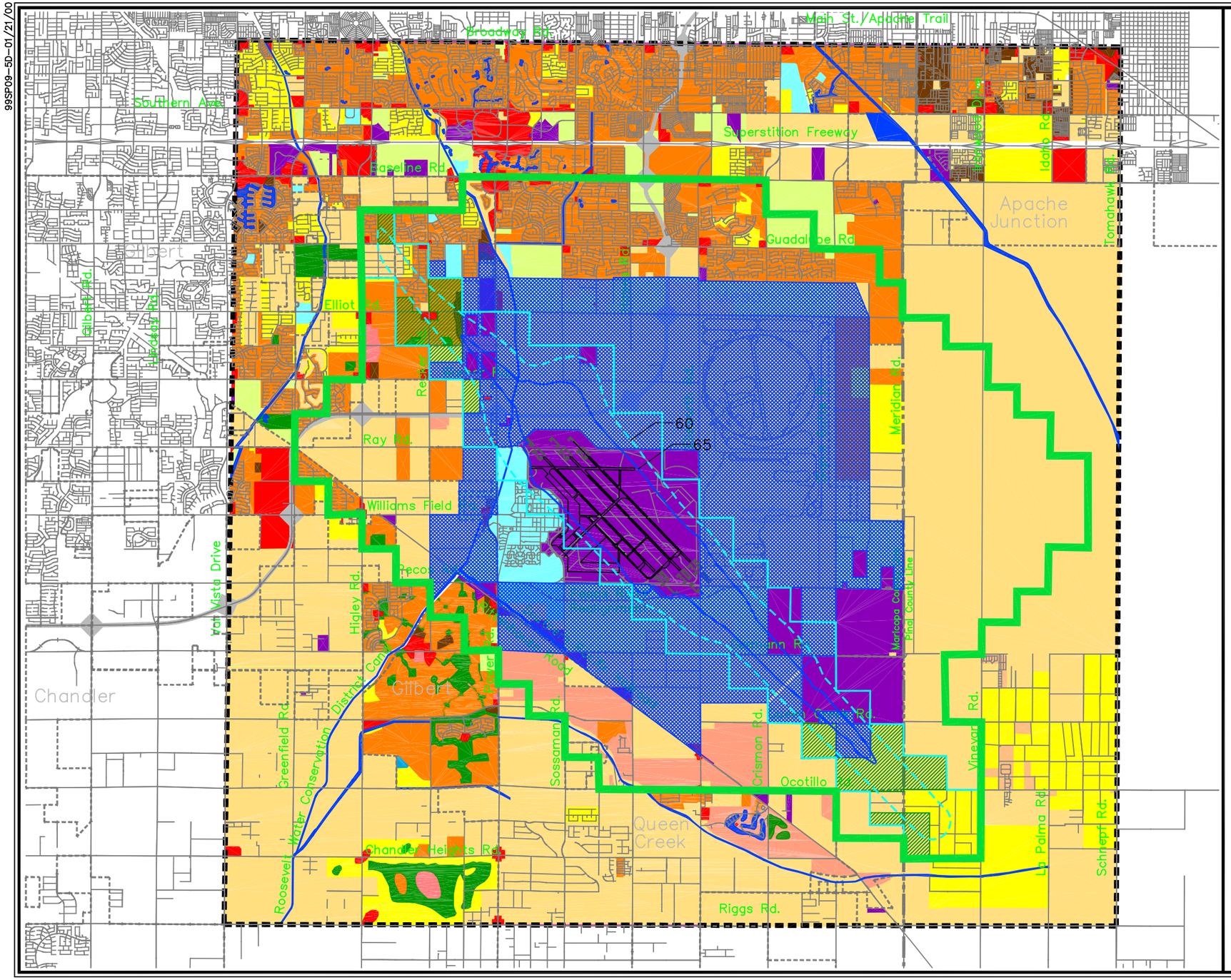
SCALE IN FEET

WILLIAMS GATEWAY AIRPORT

Exhibit 5C

GENERAL PLANS AMENDMENT CONSIDERATIONS

99SP09-5D-01/21/00



LEGEND

- Detailed Land Use Study Area
- County Boundary
- Municipal Boundary
- Airport Property
- Planned San Tan Freeway
- Potential Airport Influence Area
- 60 DNL–Planning Scenario Boundary
- 60 DNL–Planning Scenario Contour
- 65 DNL–Planning Scenario Contour
- Agriculture
- Rural Residential (0–2 du/ac)
- Low Density Residential (2.1–5 du/ac)
- Medium Density Residential (5.1–15 du/ac)
- High Density Residential (15+ du/ac)
- Mobile and Trailer Homes
- Planned Area Development
- Hotels, Motels, and Resorts
- Commercial/Office
- Industrial
- Parks and Open Space
- Noise Sensitive Institutions
- Public
- Rezone for Compatible Use
- Rezone to Match General Plan

Source: City of Mesa Zoning Map, June 1998; Town of Gilbert Zoning Map, 7/12/1999; City of Apache Junction Zoning Map, March 1985; Town of Queen Creek Zoning Map; Pinal County Comprehensive Plan, January 1988.

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SCALE IN FEET

WILLIAMS GATEWAY AIRPORT

Exhibit 5D

ZONING AMENDMENT CONSIDERATIONS

99SP09-5E-01/21/00

Broadway Rd.
Main St./Apache Trail
Southern Ave.
Superstition Freeway
Baseline Rd.
Apache Junction
Guadalupe Rd.
Gilbert
Mesa
Elliot Rd.
AOZ-2
AOZ-3
AOZ-1
Ray Rd.
Warner Rd.
Williams Field Rd.
General Motors Proving Grounds
Pecos Rd.
Pecos Road Realignment
AOZ-1
AOZ-3
Germann Rd.
Southern Pacific Railroad
Chandler
Gilbert
Queen Creek Rd.
Ocotillo Rd.
AOZ-2
Queen Creek
Chandler Heights Rd.
Riggs Rd.
Val Vista Drive
Higley Rd.
Power Rd.
Rittenhouse Road
Greenfield Rd.
Water Conservation District Canal
Roosevelt
Sossaman Rd.
Crismon Rd.
Vineyard Rd.
La Palma Rd.
Schnepf Rd.
Meridian Rd.
Signal Butte Rd.
Ellsworth Rd.
Recker Rd.
Lindsay Rd.
Gilbert Rd.
Hawes Rd.
Idaho Rd.
Tomahawk Rd.
Lost Dutchman Blvd.
Maricopa County Line
Pinal County Line

LEGEND

- Detailed Land Use Study Area
- County Boundary
- Municipal Boundary
- Airport Property
- Planned San Tan Freeway
- Runway Protection Zones
- Airport Overflight Zone 1 (AOZ-1)
- Airport Overflight Zone 2 (AOZ-2)
- Airport Overflight Zone 3 (AOZ-3)
- Maricopa County
- Pinal County
- City of Mesa
- Town of Gilbert
- Town of Queen Creek

NORTH

0 8000

SCALE IN FEET

WILLIAMS GATEWAY AIRPORT

Exhibit 5E

RECOMMENDED AIRPORT NOISE OVERLAY ZONING DISTRICT BOUNDARIES

Chapter Six
NOISE COMPATIBILITY PROGRAM

The Noise Compatibility Program for Williams Gateway Airport includes measures to abate aircraft noise, control land development, and implement and update the program. F.A.R. Part 150 requires that the plan apply to a period of no less than five years into the future, although it may apply to a longer period if the sponsor so desires. This Noise Compatibility Program has been developed based on a 20-year planning period.

The objective of the noise compatibility planning process has been to improve the compatibility between aircraft operations and noise-sensitive land uses in the area, while allowing the airport to continue to serve its role in the community, state, and nation. The Noise Compatibility Program includes three elements which are aimed at satisfying this objective.

- The **Noise Abatement Element** includes noise abatement measures selected from the alternatives evaluated in Chapter Four, Noise Abatement Alternatives.

- The **Land Use Management Element** includes measures to mitigate or prevent noise impacts on existing noise-impacted land uses and future land use development in the airport environs. Potential land use management techniques were evaluated in Chapter Five, Land Use Alternatives.

- The **Program Management Element** includes procedures and documents for implementing the recommended noise abatement and land use measures, monitoring the progress of the program, and updating the Noise Compatibility Program.

Each measure of the Noise Compatibility Program is summarized in **Table 6D** at the end of the chapter. The table includes a brief description of the noise abatement, land use, and program management measures, the entity responsible for implementing each measure, the cost of each measure, the proposed timing for implementation of each measure, and potential sources of funding.

NOISE ABATEMENT AND LAND USE MEASURES DROPPED FROM CONSIDERATION

Several noise abatement and land use alternatives were evaluated in this study. These were discussed with the Planning Advisory Committee, local citizens, and government officials. As a result of the public review process, and consultation with the airport staff, 11 noise abatement and eight land use measures are recommended.

Before describing the selected noise abatement and land use measures, it is appropriate to discuss the measures which deserved further consideration in Chapters Four and Five but were subsequently eliminated in the review process.

Chapter Four considered the possibility of establishing a departure turn from Runways 12L/C to the southeast. This measure was evaluated as Alternative 2 in Chapter Four. The noise impact analysis indicated that it is only marginally effective at reducing impacts at lower noise levels and would concentrate noise closer to existing noise sensitive land uses to the southeast of the airport. Consequently this measure is not included in the final noise compatibility program.

Chapter Five considered the adoption of an Airport Influence Area for Williams Gateway Airport (Revised Arizona Statute Section 28-8485). A recent revision (May 2000) of Revised Arizona Statute Section 28-8486, Public Airport Disclosure, requires the recording of a public airport disclosure map in the office of the county recorder in each county that contain property in the territory in the vicinity of the public airport. This map is therefore sufficient to notify ***current owners*** and ***potential purchasers*** that the property of interest is located in or outside of a territory in the vicinity of a public airport. Thus, the revision to Arizona Revised Statute 28-8486 eliminates the need to establish an Airport Influence Area under Arizona Revised Statute Section 28-8485.

NOISE ABATEMENT ELEMENT

The recommended noise abatement measures are described in this section.

1. Continue Calm Wind Runway 30 L/C/R Use Program.

Description. Currently Williams Gateway Airport utilizes an informal preferential runway use program that

designates Runways 30 L/C/R as the calm wind runways. Calm winds generally consist of winds up to 5 knots. The airport operates in a northwest flow configuration approximately 70 percent of the time. This program allows lower and slower approaching aircraft to arrive over less concentrated noise-sensitive areas southeast of the airport.

Aircraft approaching the airport for landing are confined over a narrower undeveloped corridor as they line up with the runway. This causes the concentration of aircraft overflights over undeveloped areas in line with the runway centerline. Departing aircraft fly on varied flight tracks after takeoff as they head to their destinations. Although aircraft departure noise is often seen as the more disruptive, the effects and overall impacts are less because departures are more dispersed and, therefore, not confined to one particular residential area to the north of the airport.

Implementation Actions. Since this is an existing policy, no specific implementation actions are necessary. The Airport Authority should continue to reflect this policy in the "Fly Friendly" program and in future published pilots guides.

Cost and Funding. As an existing policy, no additional costs would be borne by the airport users. The Airport Authority will incur normal administrative costs for informational efforts.

Timing. This is an existing policy which is recommended to continue.

3. Continue to Encourage use of NBAA Noise Abatement Procedures.

Description. The Airport Authority should actively encourage business jet operators to use the National Business Aviation Association (NBAA) Approach and Landing Procedure and

2. Continue using Runway 12R-30L for Light Piston Aircraft and Runways 12C/L-30C/R for Large Turbojet Aircraft Operations.

Description. Currently Williams Gateway Airport encourages heavy and turbojet aircraft to use the eastern two runways (Runways 12C/L and 30C/R) whenever possible. Light piston powered aircraft are encouraged to use Runway 12R-30L. This configuration of runway use provides relief from aircraft arrival and departure noise over noise-sensitive areas west of the airport including the Williams Campus. In addition, Runway 12C/30C is the only runway offering instrument approaches and is, therefore, often used by jet aircraft operating under instrument flight rules (IFR) or conducting instrument flight training. Runway 12L/30R is used by large aircraft since it possesses the greatest runway load bearing strength of the three runways.

Implementation Actions. Since this is an existing policy, no specific implementation actions are necessary. The Airport Authority should continue to reflect this policy in the "Fly Friendly" program and in future published pilots guides.

Cost and Funding. As an existing policy, no additional costs would be borne by the airport users. The Airport Authority will incur normal administrative costs for informational efforts.

Timing. This is an existing policy which is recommended to continue.

Standard Noise Abatement Departure Procedures, or equivalent quiet flying procedures developed by aircraft manufacturers. The NBAA standard procedure involves the management of thrust, flap settings, speed, and climb rate to reduce noise quickly after takeoff. (A complete description of the procedure is in **Appendix C**.)

The NBAA has also published noise abatement approach procedures for jet aircraft. These include the using minimum approach flap settings, maintaining minimum speed, and minimizing the use of reverse thrust after landing, consistent with safety. These procedures are also included in **Appendix C**.

Implementation Actions. Since this is an existing policy, no specific implementation actions are necessary. The Airport Authority should continue to reflect this policy in the "Fly Friendly" program, on future published pilots guides, signs, pilot mailings, and on the Williams Gateway Airport Internet Web Site.

Cost and Funding. As an existing policy, no additional costs would be borne by the airport users. The Airport Authority will incur normal administrative costs for informational efforts.
Timing. This is an existing policy which is recommended to continue.

4. Continue to Promote use of AOPA Noise Awareness Steps by light single and twin-engine aircraft.

Description. The Aircraft Owners and Pilots Association (AOPA) encourages quiet and neighborly flying by distributing generalized noise abatement procedures for use by propeller aircraft. These "Noise Awareness Steps" have recommend-ations on how to fly the aircraft, as well as where to fly. Most of the steps provide guidance on pilot technique when maneuvering near noise-sensitive areas. The steps also encourage cooperation with the airport staff on noise abatement issues. These procedures are listed in **Appendix C** of this document.

It is not possible to predict how often these procedures would be used, so it is not possible to quantify their effects on noise. Nevertheless, any use of these procedures will help the overall noise conditions around the airport. Consequently, the airport staff should continue to encourage their use.

Implementation Actions. Since this is an existing policy, no specific implementation actions are necessary. The Airport Authority should continue to reflect this policy in the "Fly Friendly" program, on future published pilots guides, signs, pilot mailings, and on the Williams Gateway Airport Internet Web Site.

Cost and Funding. As an existing policy, no additional costs would be borne by the airport users. The Airport Authority will incur normal administrative costs for informational efforts.

Timing. This is an existing policy which is recommended to continue.

5. Continue to Promote the Departure Procedure for the AANG 161st Air Refueling Wing KC-135 Aircraft.

Description. Currently, aircraft greater than 12,500 pounds departing Runways 30C/R are requested to turn right prior to the power lines ½ mile north of Elliot Road. This procedure helps prevent overflights of residential and noise-sensitive areas north of the airport by departing aircraft. KC-135 aircraft from the Arizona Air National Guard 161st Air Refueling Wing have successfully used this departure turn procedure to remain south of residential areas. It should be noted than even though these aircraft may physically be able to comply with the right turn procedure, several other factors may preclude this from occurring including other traffic, weather conditions, air traffic control directives, and pilot proficiency.

It should also be stressed that while smaller jet and most military aircraft are able to complete this departure turn procedure, large transport category aircraft are unable to make the turn. The excessive angle between the runways and the present noise compatible corridors would require turns in excess of 150-degrees and the use of steep bank angles. Typical airline departure policies prohibit turns in excess of 120-degrees and bank angles in excess of 15-degrees until the aircraft is in a "clean" configuration (landing gear and flaps retracted). Large transport category aircraft departure turns needed to avoid noise-sensitive areas north and north east of the airport would often exceed FAA standards or airline policy and, therefore, are not recommended.

Implementation Actions. The Airport Authority should continue to reflect this policy for military and aircraft less than 12,500 pounds in the "Fly Friendly" program and in future

Description. Williams Gateway Airport currently has one instrument landing system (ILS) which is located on Runway 30C. Relocating the ILS from Runway 30C to Runway 30R shifts the noise contours eastward, further away from residential areas south, southwest and northwest of the airport and over undeveloped areas

Implementation Actions. Relocating the ILS on Runway 30C to Runway 30R involves the relocation of all ground based equipment (localizer and glide slope antennas) as well as defining the new approach. The new approach would also need to be reviewed for environmental impacts, flight-checked, and published by the FAA.

Costs and Funding. The cost of this recommendation would entail expenses incurred in the relocation of ground based navigational equipment and the design and publishing of the published pilots guides. Using the distance measuring equipment (DME) from the Willie VORTAC to create a DME fix would help pilots unfamiliar with the airport to initiate this turn procedure. The Authority should also request that the Airport Traffic Control Tower to note this procedure in a letter of agreement with the 161st Air Refueling Wing of the Arizona National Guard.

Costs and Funding. As an existing policy, no additional costs would be borne by the airport users. The Airport Authority will incur normal administrative costs for informational efforts.

Timing. This is an existing policy which is recommended to continue.

6. Relocate Instrument Landing System to Runway 30R.

new approach. The cost to move such a system is estimated at about $200,000. Slight costs to aircraft operators may include additional fuel usage due to increased taxi distance to the ramp.

Since no individuals are currently impacted within the 65 DNL contour, the cost of relocation for noise abatement purposes would not be eligible for funding under the noise set-a-side of the Federal Airport Improvement Program (AIP), however, the recently completed Airport Master Plan for Williams Gateway Airport also recommended the relocation of the ILS system on Runway 30R. Funding for the ILS relocation, therefore, is eligible from State and Federal sources. This project would be eligible for up to 91.06 percent funding through the set-a-side for reliever airports within AIP. The balance would be evenly split between the Arizona Department of Transportation and the airport capital budget.

Timing. In the Airport Master Plan this is projected for the intermediate term, 2005 to 2010. If possible, the Airport Authority should begin pursuing AIP funding for this recommendation as soon as the Noise Compatibility Program is approved.

7. Install PAPI-4 Lighting on Runway 12R-30L

Description. Approach lighting systems, if properly used by approaching pilots, can aid in the reduction of aircraft noise generated on approach. While pilots are trained to visually follow an appropriate descent path on approach, Aircraft that approach "below" the glide slope do not have the benefit of excess altitude to maintain aircraft approach speeds. Low approaches often result in numerous engine power fluctuations in order to maintain a proper approach and landing speed. In addition, these approaches result in low altitude overflights which increase noise levels.

Precision Approach Path Indicator (PAPI) lighting systems are considered the "next generation" of visual approach lighting systems. The PAPI consists of a series of four lights (PAPI-4) relaying detailed information to the approaching pilot. The PAPI system is able to inform a pilot of the aircraft's relation to the glide slope in increments of being "slightly above" or "slightly below" the designed glide slope. An additional benefit of the PAPI is that it can be utilized by the pilot until aircraft touchdown.

PAPI-4 lighting systems are installed and available to pilots on Runways 12L/30R and 12C/30C at Williams Gateway. Runway 12R/30L is currently without a visual approach lighting system. Since this runway is often used by inexperienced student pilots, visual approach lighting may prove beneficial in maintaining a usually approximating three-degrees, variations such as runway length, width, and pilot experience can alter the aircraft's true approach course. Aircraft on final approach that are "too high" will need to expedite their descent in order to land. This requires slowing the aircraft to the appropriate approach and landing speed often requiring the use of full flaps and premature lowering of the landing gear. The use of these items causes excessive airframe noise due to the friction created from the slowing aircraft. In addition, aircraft landing at higher speeds will often use engine thrust reversers to reduce brake wear.

proper aircraft approach glide slope from a noise abatement and safety perspective.

Implementation Actions. This project would be sponsored by the Airport Authority, as airport proprietor. After approval of the Noise Compatibility Program by the FAA, the Authority must seek grant funding through the Federal Airport Improvement Program, prepare required environmental documentation, and design the project. It would then prepare bidding documents, select a contractor, and supervise the construction.

Costs and Funding. The cost of this recommendation would entail expenses incurred in the installation of the PAPI lighting system. The system is estimated to cost about $130,000.

Since no individuals are currently impacted within the 65 DNL contour, the cost of new construction for noise abatement purposes would not be eligible for funding under the noise set-a-side of the Federal AIP program. The recently completed Airport Master Plan for Williams Gateway Airport, however, also recommended the installation of a PAPI lighting system on Runway 12R-30L. Therefore, funding for the PAPI lighting system is eligible from State and

Federal sources. This project would be eligible for up to 91.06 percent funding through the set-a-side for reliever airports within AIP. The balance would be evenly split between the Arizona Department of Transportation and the airport capital budget.

Timing. This is projected for the intermediate term, 2005 to 2010 in the Airport Master Plan.
Description. Currently, rotor wing aircraft are requested to approach/ depart in a southwest corridor to avoid overflight of the Williams Campus and residential development. A number of additional potential noise abatement corridors exist for helicopters including the Roosevelt Canal, Southern Pacific Railroad, and the General Motors Proving Grounds. In addition, visual check points should be established to assist both pilots and the air traffic control tower in following these noise abatement corridors.

It should be noted that large military helicopters create large amounts of down-wash turbulence disturbing large amounts of dust. Therefore, these aircraft fly a straight-in visual approach to Runway 30L. Consideration should be given to maintaining this procedure to limit the potential damage to ground facilities in and around the Airport.

Implementation Actions. The Airport Authority should incorporate these routes and procedures in the "Fly Friendly" program and in future published pilots guides. The Authority should also request that the Airport Traffic Control Tower note these routes and procedures in letters of agreement with helicopter operators. A sample letter of agreement can be found in **Appendix C**.

Costs and Funding. The Airport Authority will incur administrative costs in distributing information about these routes and procedures. These costs will be covered by the airport operating budget.

If possible, the Airport Authority should begin pursuing AIP funding for this recommendation as soon as the Noise Compatibility Program is approved.

8. Develop Helicopter Reporting Points and Arrival and Departure Routes.

Timing. Implementation of these routes and procedures should be undertaken as soon as possible after approval of the Noise Compatibility Program by the FAA. Implementation is anticipated in 2001.

9. Request Aircraft Using Runway 12R-30L Traffic Pattern to Remain East of the Southern Pacific Railroad.

Description. Current noise abatement procedures have established Runway 12R-30L for use by light propeller powered aircraft performing pattern operations. So as not to conflict with operations on Runways 12C-30C and Runway 12L-30R, the light aircraft traffic pattern is flown to the west of the airfield. This pattern does not create aircraft overflights of current noise-sensitive areas, other than the Williams Campus. The majority of noise-sensitive development is situated west of the Southern Pacific Railroad, essentially paralleling the traffic pattern. Aircraft using the western traffic pattern could be requested to remain east of the Southern Pacific Railroad during the "downwind leg", thereby avoiding residential overflights.

Implementation Actions. The Airport Authority should reflect this policy in the "Fly Friendly" program and in future published pilots guides. The Authority should also request the Airport Traffic Control Tower to note this policy in a Tower Order or in its internal operating policy.

Costs and Funding. The Airport Authority will incur administrative costs in distributing information about these routes and procedures. These costs will be covered by the airport operating budget.

Timing. Implementation of this policy should be undertaken as soon as possible after approval of the Noise Compatibility Program by the FAA. Implementation is anticipated in 2001.

10. Encourage Use of AC 91.53A Noise Abatement Departure Procedures by Air Carrier Jets.

Description. The Airport Authority should promote the use of noise abatement departure procedures described in Advisory Circular (AC) 91-53A by future airlines operating jet aircraft over 75,000 pounds, certificated gross takeoff weight.

Throughout the 1980s and early 1990s, the FAA and the airlines did considerable work in studying noise abatement departure procedures. In 1993, the FAA published an advisory circular (91-53A) describing general parameters for two alternative noise abatement departures. (A copy of FAA AC 91-53A is in **Appendix C**.) Both involve thrust reductions soon after takeoff, but at an altitude no less than 800 feet above the ground. The procedures differ as to when the flaps should be retracted – either before or after the thrust reduction. Both reduce aircraft noise, but the "close-in" procedure, involving thrust reduction before flap retraction tends to produce greater noise reduction near the runway end, while the "distant" procedure, involving thrust reduction after flap retraction, tends to produce greater noise reduction further from the airport.

The airlines have implemented the AC 91-53A guidelines, although the specific details vary among the airlines based on their own operating philosophies and system needs. The airlines now routinely use noise abatement departures in accordance with the AC 91-53A criteria.

Implementation Actions. No specific implementation actions are needed. Noise abatement departures are routinely used by air carrier jet aircraft in accordance with airline policy and wind, weather, and runway surface conditions. The Airport Authority should notify airlines of the importance it places on noise abatement departure procedures to ensure the airlines use them at Williams Gateway Airport.

Costs and Funding. The Airport Authority will incur normal administrative costs for informational efforts.

Timing. Implementation of this policy should be undertaken as soon as possible after approval of the Noise Compatibility Program by the FAA. Implementation is anticipated in 2001.

11. Support 161st Air Refueling Wing of the Arizona Air National Guard's efforts to re-engine KC-135 Aircraft.

Description. The 161st Air Refueling Wing KC-135 aircraft are currently equipped with older TF-33 engines. The Air Refueling Wing is attempting to obtain new CFM-56 engines for the KC-135 fleet. Funding for new engines, however, is currently not available. The Williams Gateway Airport Authority should support the efforts of the 161st Air Refueling Wing via contacting local, state and federal representatives to lobby for military funds for engine replacement.

Implementation Actions. The Williams Gateway Airport Authority should monitor the progress of the 161st Air Refueling Wing efforts and provide support via contacting local, state and federal representatives to lobby for military funds for engine replacement.

Costs and Funding. Administrative costs will be borne by the Williams Gateway Airport Authority.

Timing. This is recommended for implementation after FAA review and approval of the NCP. Implementation is anticipated in 2001.

LAND USE MANAGEMENT ELEMENT

The recommended land use manage-ment measures for the Williams Gateway Airport vicinity are presented below. They are summarized in **Table 6D** at the end of this chapter.

1. Update General Plans to Reflect the "Land Use Planning Scenario" noise contours and Airport Planning Area as a basis for noise compatibility planning (Mesa, Gilbert, Queen Creek, and Maricopa and Pinal County).

Description. Mesa, Gilbert, Queen Creek, Maricopa County, and Pinal County should amend their general plans to show the "Land Use Planning Scenario" noise contours for Williams Gateway Airport. It is recommended that they use both the 2015 noise exposure contour from the 1993 Williams Gateway Airport Master Plan and noise contours developed using the 1999 Williams Gateway Airport Master Plan high range 2020 forecasts as a basis for the "Planning Scenario noise contour" for noise compatibility planning. This can be accomplished by graphically overlaying the two contour sets and drawing a combined noise contour, as shown in **Exhibit 6A**. This is justified because the noise contours are subject to change over time as the use of the airport changes. By defining a reasonable "worst case" noise contour for land use planning purposes, the boundaries of the compatible land use planning area can be kept constant over a longer period of time instead of being subject to small variations due to periodic changes in the noise contours.

Two Technical Information Papers prepared for this study and included in this document provide the rationale for using 60 DNL as a noise compatibility threshold – (*Effects of Noise Exposure*, and *Noise and Land Use Compatibility Guidelines)*.

Exhibit 6A shows the boundaries of a recommended Airport Planning Area (APA) for Williams Gateway Airport. It includes land within the 60 DNL noise contour; areas of aircraft overflight (as documented in Chapter Two of the Williams Gateway Airport Noise Exposure Map Document-Exhibits 2F, 2G, 2H and 2J); and areas beneath the F.A.R. Part 77 horizontal surface.

Implementation Actions. This policy can be established by each jurisdiction (Mesa, Gilbert, Queen Creek, Maricopa County, and Pinal County) amending their general plans.

Cost and Funding. Adoption of this measure would involve administrative expenses for Mesa, Gilbert, Queen Creek, Maricopa County, and Pinal County. These would have to be borne by the operating budgets of each jurisdiction.

Timing. Amendments to general plans take time to prepare and process. The Growing Smarter legislation requires communities to update and re-adopt their General Plans by the end of 2001. This would be an ideal opportunity to incorporate the recommended airport related amendments into the General Plans.

2. Retain Compatible Land Use designations for undeveloped land within the APA (Mesa, Gilbert, Queen Creek, Maricopa County).

Description. A large portion of the undeveloped area within the APA continues to be designated for compatible use, including commercial, industrial, public/semi-public facilities, and parks and open space. It is recommended that within the APA that existing compatible use designation remain unchanged. **Exhibit 6B** depicts the General Plan designations within the APA to be retained.

Implementation Actions. This measure would be implemented through general plan amendments reflecting this policy by the City of Mesa, the Town of Gilbert, the Town of Queen Creek, and Maricopa County.

Cost and Funding. This measure would involve administrative expenses. Funding would come from the operating budgets of each jurisdiction.

Timing. For planning purposes, implementation is projected for 2000 to 2001 to allow time for preparation and processing of the amendments.

3. Develop a New Mixed Use Category that does not allow Residential within the Planned Mixed Use Areas inside the Planning Scenario's 60 DNL Boundary and Immediately North of the Airport (Mesa and Gilbert).

Description. As depicted on **Exhibit 6B**, large areas of planned mixed-use development north and west of the airport, within Mesa and Gilbert, could allow high densities of residential development within the 60 DNL Planning Scenario noise contour and under the primary departure path of aircraft departing from Runways 30C/L. Developing a new mixed use category that does not allow residential within these planned mixed use areas is recommended.

Implementation Actions. This measure would be implemented through general plan amendments by the City of Mesa and the Town of Gilbert.

Cost and Funding. This measure would involve administrative expenses. Funding would come from the operating budgets of each jurisdiction.

Timing. For planning purposes, implementation is projected for 2000 to 2001 to allow time for preparation and processing of the amendments.

4. Establish Noise Compatibility Guidelines for the Review of Development Projects within the "Planning Scenario" 60 DNL Noise Contour (Mesa, Gilbert, Queen Creek, Maricopa County, Pinal County).

Description. This policy is proposed to apply throughout the Planning Scenario's 60 DNL contour as shown in **Exhibit 6A**, where airport-compatible land use designations should be preserved. Situations may arise from time to time where proposals are filed for development within those areas. The adoption of special project review criteria, specifically addressing airport land use compatibility needs, would provide guidance to land use decision-makers as they review project proposals.

The following project review criteria should be included in the local general plans or as checklists for consideration by local planners, planning commissions, and governing bodies. These criteria are specifically suggested for use in reviewing planned development, rezoning, special use, conditional use, and variance applications within the Planning Scenario's 60 DNL contour. The following criteria are suggested:

A. Determine the sensitivity of the subject land use to aircraft noise levels. The F.A.R. Part 150 land use compatibility table can be used for this purpose. **Exhibit 6C** depicts the F.A.R. Part 150 land use compatibility guidelines.

B. Advise the airport management of development proposals involving noise-sensitive land uses within the Planning Scenario's 60 DNL noise contour.

C. Locate noise-sensitive public facilities outside the Planning Scenario 60 DNL contour and away from the primary aircraft traffic pattern, if possible. Otherwise, require building construction to provide an outdoor to indoor noise level reduction of 25 decibels within the 60-65 DNL range. Also, require the dedication of noise and avigation easements to the Williams Gateway Airport Authority as airport proprietor and the recording of a fair disclosure agreement and covenant noting the proximity of the airport and the existing and projected airport noise contours.

D. Discourage the approval of rezonings, exceptions, variances, and conditional uses which introduce noise-sensitive development into areas exposed to noise exceeding 60 DNL.

E. Where noise-sensitive development within the Planning Scenario's 60 DNL contour must be permitted, encourage developers to incorporate the following measures into their site designs.

(1) Where noise-sensitive uses will be inside a larger, mixed use building, locate noise-sensitive activities on the side of the building opposite the airport or, if the building is beneath a flight track, opposite the prevailing direction of aircraft flight.

(2) Where noise-sensitive uses are part of a larger mixed use

development, use the height and orientation of compatible uses, and the height and orientation of landscape features such as natural hills, ravines and manmade berms, to shield noise-sensitive uses from ground-noise generated at the airport.

Implementation Actions. The City of Mesa, the Town of Gilbert, the Town of Queen Creek, Maricopa County and Pinal County should adopt these project review criteria either through general plan amendments or as administrative guidelines.

Cost and Funding. This measure would involve administrative expenses. Funding would come from the operating budgets of each jurisdiction.

Timing. For planning purposes, this is projected for 2000.

5. Encourage rezoning areas within "Planning Scenario" Noise Contours and APA to Match the Compatible Land Use Designations in the General Plans. (Mesa, Gilbert, Queen Creek, and Maricopa County).

Description. Large tracts of undeveloped land in the APA are designated in local general plans for compatible uses but zoned for non-compatible uses. It is recommended that Mesa, Gilbert, Queen Creek, and Maricopa County should encourage rezoning areas not zoned for compatible use to conform with their respective General Plans. Recommended areas to be rezoned are depicted on **Exhibit 6D**.

In addition, it is recommended that Mesa, Gilbert, Queen Creek, and Maricopa County should require that future development conform with the future compatible land use designations of the general plans and that no rezonings contrary to the general plans would be approved in the APA without appropriate revisions to the general plans.

Implementation Actions. It is recommended that the City of Mesa, the Town of Gilbert, the Town of Queen Creek, and Maricopa County should encourage rezoning these areas when appropriate. In addition, future development should conform with the future compatible land use designations of the general plans.

Cost and Funding. This will involve administrative expenses that will have to be covered through the operating budget of each jurisdiction.

Timing. For planning purposes, implementation is projected for 2000-2001.

6. Amend Airport Overflight Zoning Ordinance: Reflect Planning Scenario Noise Contours and APA; Require Fair Disclosure Covenants and Amend Sound Insulation Standards (Mesa, Gilbert, Queen Creek, Maricopa County, Pinal County).

Description. In order to fully promote airport compatibility throughout the area, it is recommended that the City of Mesa, the Town of Gilbert, the Town of Queen Creek, Maricopa County and Pinal County amend the Williams Regional Planning Study (WRPS) overflight zoning ordinance for the Williams Gateway Airport area. These communities should consider revising, broadening and adopting the standards of the WRPS Overflight Zoning Districts as depicted on **Table 6A** and **Exhibit 6E**. Seven amendments are suggested.

1. Expand the current 60 and 65 DNL boundaries to include areas from the high range forecast noise contours that fall outside the WRPS contours (this would be the same as the Planning Scenario noise contour).

2. Revise the boundary of Over-flight Area III to reflect the APA boundary that reflects actual flight patterns based on radar data.

3. Add Runway Protection overlay zones to protect the approaches to each runway end.

4. Increase exterior to interior noise level reduction from 20 to 25 for residential development within the 60 DNL boundary or AOZ-2 zone. (For more information see Guidelines for the Sound Insulation of Residences Expose to Aircraft Operations, U.S. Department of Transportation, 1992)

5. Prohibit all noise-sensitive land uses within the Planning Scenario 65 DNL contour.

6. Expand noise level reduction efforts to other land use categories.

7. Adopt overflight districts as part of zoning ordinance for Mesa, Gilbert, Queen Creek, Maricopa County, and Pinal County.

Implementation Actions. The City of Mesa, the Town of Gilbert, the Town of Queen Creek, Maricopa County, and Pinal County must approve these amendments by ordinance.

Cost and Funding. This will involve administrative expenses that will have to be covered through the operating budget of each jurisdiction.

Timing. For planning purposes, implementation is projected for 2000-2001.

TABLE 6A
Potential Revised Noise Compatibility Matrix for the Overflight Zoning District
Mesa, Gilbert, Queen Creek, Maricopa County, and Pinal County

	RPZ[8]	***AOZ-1 65 + DNL***	***AOZ-2 60-65 DNL***	**AOZ-3 60-APA**
RESIDENTIAL				
Single-family, duplex, multi-family, manuf. housing	N	N	Y[*1*,2,4,9]	Y[*1*,2]
Recreational vehicle parks	N	N	Y[*1*,2,4,9]	Y[*1*,*2*]
Other residential	N	N	Y[*1*,2,4,9]	Y[*1*,*2*]
PUBLIC FACILITIES				
Education facilities	N	N	N	Y[*1*]
Religious facilities, libraries, museums, galleries, clubs and lodges	N	N	Y[*1*,4]	Y[*1*]
Outdoor sport events, entertainment and public assembly, except amphitheaters	N	N	N	Y[1]
Indoor recreation, amusements, athletic clubs, gyms and spectator events	N	Y[1,5]	Y[*1*,4]	Y[*1*]
Neighborhood parks	N	Y[*1*]	Y[*1*]	Y[*1*]
Community and regional parks	N	Y[*1*]	Y[*1*]	Y[*1*]
Outdoor rec.: tennis, golf courses, riding trails, etc.	N	Y[*1*]	Y[*1*]	Y[*1*]
Cemeteries	N	Y[*1*]	Y[*1*]	Y[*1*]
COMMERCIAL				
Hotels/motels	N	Y[*1*,*5*]	Y[*1*,4]	Y[*1*]
Hospitals and other health care services	N	N	N	Y[*1*]
Services: finance, real estate, insurance, professional and government offices	N	Y[*1*,4]	Y[*1*,*3*]	Y[*1*]
Retail sales: building materials, farm equipment, automotive, marine, mobile homes, recreational vehicles and accessories	N	Y[*1*,4]	Y[*1*,*3*]	Y[*1*]
Restaurants, eating and drinking establishments	N	Y[*1*,4]	Y[*1*,*3*]	Y[*1*]
Retail sales: general merch., food, drugs, apparel, etc.	N	Y[*1*,4]	Y[*1*,*3*]	Y[*1*]
Personal services: barber and beauty shops, laundry and dry cleaning, etc.	N	Y[*1*,4]	Y[*1*,*3*]	Y[*1*]
Automobile service stations	N	Y[*1*]	Y[*1*]	Y[*1*]
Repair services	N	Y[*1*]	Y[*1*]	Y[*1*]

TABLE 6A (Continued)
Potential Revised Noise Compatibility Matrix for the Overflight Zoning District
Mesa, Gilbert, Queen Creek, Maricopa County, and Pinal County

	RPZ[8]	*AOZ-1 65+ DNL*	*AOZ-2 60-65 DNL*	AOZ-3 60-APA
INDUSTRIAL				
Processing of food, wood and paper products; printing and publishing, warehouses, wholesale and storage activities	N	Y[1,6]	Y[1,6]	Y[1]
Refining, manufacturing and storage of chemicals, petroleum and related products, manufacturing and assembly of electronic components, etc.	N	Y[1,6]	Y[1,6]	Y[1]
Manufacturing of stone, clay, glass, leather, gravel and metal products; construction and salvage yards; natural resource extraction and processing, agricultural, mills and gins	N	Y[1,6]	Y[1,6]	Y[1]
AGRICULTURE				
Animal husbandry; livestock farming, breeding and feeding; plant nurseries (excluding retail sales)	N	Y[1]	Y[1]	Y[1]
Farming (except livestock)	7	Y	Y	Y
MISCELLANEOUS				
Transportation terminals, utility and communication facilities	N	Y[1]	Y[1]	Y[1]
Vehicle parking	N	Y[1]	Y[1]	Y[1]
Signs	N	Y	Y	Y

KEY TO TABLE 6A

Y	Land use is compatible and is permitted.
N	Land use is incompatible and is not permitted.
1	A fair disclosure agreement and covenant shall be recorded as a condition of development approval for all permitted uses in the APA Zoning Overlay District.
2	All plats recorded shall be inscribed with the following: "*These properties, due to their proximity to Williams Gateway Airport, are likely to experience aircraft overflights, which could generate noise levels that may be of concern to some individuals.*"
3	The land use or activity is permitted. The developer shall be encouraged to incorporate features into the design and construction of buildings where people live, work, or are otherwise received to achieve an outdoor-to-indoor noise level reduction (NLR) of 25 decibels.
4	The land use or activity is permitted; however, an outdoor-to-indoor noise level reduction (NLR) of 25 decibels must be incorporated into the design and construction of those buildings where people live, work, or are otherwise received.
5	The land use or activity is permitted; however, an outdoor-to-indoor noise level reduction (NLR) of 30 decibels must be incorporated into the design and construction of those buildings where people live, work, or are otherwise received.
6	Uses which produce air pollutants that may obscure vision in any way, or which involve raw materials, products or by-products that pose a potential explosive hazard, are not permitted.
7	Structures are not permitted in the runway protection zone.
8	In order to minimize public exposure to accident hazard and crash potential as generated by aircraft operations, no building shall be located within any portion of a runway protection zone as defined and designated by this Code. However, such on-site improvements as vehicle parking, storm water retention, landscaping, and yard set-backs, as otherwise required by this Code or other city regulation, may be permitted within the designated runway protection zones. No element of any landscaping shall be allowed to penetrate any runway protection zone slope or other approach surface.
9	Avigation easements are required which acknowledges that an airport is located nearby and aircraft to/from the airport have a right to fly over the property.

7. Amend subdivision regulations to require recording of fair disclosure covenants and granting of avigational easements in Airport Planning Area. (Mesa, Gilbert, Queen Creek, Maricopa County, Pinal County).

Description. The City of Mesa, the Town of Gilbert, the Town of Queen Creek, Maricopa County, and Pinal County should amend their respective subdivision regulations to support the relevant requirements of its Airport Overflight Zoning Ordinance as it is proposed to be amended. Specifically, the ordinance should be amended to require the recording of fair disclosure agreements and covenants and the dedication of avigational easements within Airport Overflight Zones 2 and 3. This would apply to all new subdivisions. This will ensure that these things are taken care of even if no rezoning actions are required prior to subdivision approval. A copy of a suggested amendment to the subdivision regulations is in **Appendix C**.

Implementation Actions. This requires adoption of an ordinance by each jurisdiction amending its subdivision regulations.

Cost and Funding. This will involve administrative expenses that will have to be covered through the operating budget of each jurisdiction.

Timing. For planning purposes, implementation is projected for 2000-2001.

8. Amend building codes to add sound insulation standards supporting APA overflight zoning requirements (Mesa, Gilbert, Queen Creek, Maricopa County, Pinal County).

Description. The Airport Overflight zoning ordinance establishes a standard for the outdoor-to-indoor noise level reduction for selected land uses within various noise overlay zones. In order to assist with the implementation of these requirements, the City of Mesa, the Town of Gilbert, the Town of Queen Creek, Maricopa County, and Pinal County should amend their local building codes to establish specific construction standards for sound insulation. This would provide builders and inspectors with specific guidance on the materials and construction techniques to ensure adequate sound insulation.

The Maricopa Association of Governments published a model set of sound insulation standards in support of a land use study in the Luke Air Force Base environs. This would be an appropriate model for the local jurisdiction to use. A copy of these standards is in **Appendix C**, Implementation Materials.

Implementation Actions. This requires adoption of an ordinance by each jurisdiction amending its building code.

Cost and Funding. This will involve administrative expenses that will have to be covered through the operating budget of each jurisdiction.

Timing. For planning purposes, implementation is projected for 2000-2001.

PROGRAM MANAGEMENT ELEMENT

The success of the Noise Compatibility Program requires a continuing effort to monitor compliance and identify new or unanticipated problems and changing conditions. Four program management measures are recommended at Williams Gateway Airport. The Airport Authority, as airport operator, is responsible for implementing these

measures. They are discussed below and summarized in **Table 6D**.

1. Maintain and update the system for receiving, analyzing, responding to noise complaints, and community outreach.

Description. The airport currently has a system of recording, responding to noise complaints, as well as pro-active community outreach efforts. In addition to recording and filing complaints, it is important for the airport management to respond to complaints, even if it is not possible to take remedial action. As part of this effort, it is recommended that the Airport Authority update the current noise complaint mapping system. The Airport Authority should develop a computerized geographic information system to map the noise complaints to better identify geographic patterns and trends that emerge which may deserve special attention.

Complaints are an imperfect indicator of noise problems. The tendency of an individual to file a complaint depends on many personal variables including socioeconomic status, housing tenure, sensitivity to noise, feelings about the aviation industry, and expectations about overall neighborhood livability. Recognizing that ***Timing.*** Implementation is dependent upon Airport Improvement Program funding and therefore, the timing for this recommendation is not predictable. For planning purposes, however, implementation is projected for 2000-2001.

2. Acquire noise monitors.

Description. The Airport Authority should acquire up to four noise monitors. The noise monitoring system would serve the following primary purposes:

- Track changes in noise levels over time.

complaints are limited in their ability to clearly reveal the existence and scope of noise problems, the staff should nevertheless periodically analyze the complaint records. If the geographic pattern of complaints, or the causes of complaints, indicate that consistent problems exist, the airport management should investigate and, if possible, seek corrective action.

Implementation Actions. When the Airport Authority has the funding to buy the geographical information system, it should request cost proposals from qualified software suppliers and consultants for installation and training.

Cost and Funding. This will involve administrative costs, purchasing of a geographic information system, setup of the system and training. This is estimated at $50,000.

Acquisition of the geographical information system would be eligible for Federal funding through the noise set-aside of the Airport Improvement Program. This would cover up to 91 percent of the costs. The balance would be split between the ADOT and the airport capital budget.

- Monitor noise levels for comparison with predictions of the Integrated Noise Model made in the F.A.R. Part 150 Study.

- Provide data to assist in investigating and responding to noise complaints.

The noise monitors could also be used as testing devices to provide information to local pilots. The airport staff could work with local aircraft operators to provide demonstrations of the effectiveness of various noise abatement measures, including NBAA noise abatement departure procedures and the AOPA noise awareness steps.

Implementation Actions: When the Airport Authority has the funding to buy the noise monitors, it should request cost proposals from qualified suppliers.

Cost and Funding. For budgeting purposes, $50,000 should be set aside for acquisition of noise monitoring equipment. This will allow for the purchase of up to four monitors.

Acquisition of the noise monitors would be eligible for Federal funding through the noise set-aside of the Airport Improvement Program. This would cover up to 91 percent of the costs. The balance would be split between the ADOT and the airport capital budget.

Timing. Implementation is dependent upon Airport Improvement Program funding and therefore, the timing for this recommendation is not predictable. For planning purposes, however, implementation is projected for 2000-2001.

3. Review Noise Compatibility Program implementation.

Description. The airport management must monitor compliance with the Noise Abatement Element. This will involve checking periodically with airport users and the local Tower Manager regarding compliance with the procedures.

It may be necessary from time to time to arrange for noise monitoring, noise modeling, or flight track analysis to study issues that may arise in the future.

The Airport Authority also should maintain communications with Mesa, Gilbert, Queen Creek, Maricopa County, and Pinal County planning officials to follow their progress in implementing the relevant measures of the Land Use Management Element.

Implementation Actions. The administrative actions discussed above in the "Description" will be necessary.

Costs and Funding. This measure will require administrative time and staff support. Expenditures for special noise monitoring or modeling studies could be necessary from time to time. For budgeting purposes, this cost is estimated at $30,000 every three years. This would be covered through the airport operating budget.

Timing. This is an ongoing activity that should begin as soon as the Noise Compatibility Program is approved.

4. Update Noise Exposure Maps and Noise Compatibility Program.

Description. The airport management should review the Noise Compatibility Program (NCP) and consider revisions and refinements as necessary. A complete plan update will be needed periodically to respond to changing conditions in the local area and in the aviation industry. This can be anticipated every five to ten years. An update may be needed sooner, however, if major changes occur. An update may not be needed until later if conditions at the airport and in the surrounding area remain stable or do not change as anticipated in the Plan.

Proposed changes to the NCP should be reviewed by the FAA and all affected aircraft operators and local agencies. Proposed changes should be submitted to the FAA for approval after local consultation and a public hearing to comply with F.A.R. Part 150.

Even if the NCP does not need to be updated, it may become necessary to update the Noise Exposure Maps (NEMs). F.A.R. Part 150 requires the NEMs to be updated if any change in the operation of the airport would create a substantial, new non-compatible use. The FAA interprets this to mean an increase in noise levels of 1.5 DNL or more, above 65 DNL, over non-compatible areas that had formerly been compatible.

As a rule of thumb, the trigger for determining the need for contour updating is a 17 percent change in equivalent operations by the loudest aircraft regularly using the airport. To calculate "equivalent operations," any nighttime operations, (between 10:00 p.m. and 7:00 a.m.) must be multiplied by ten and added to daytime operations.

Implementation Actions. No specific implementation actions, other than those discussed above, are required.

Cost and Funding. Costs of a complete update of the Noise Compatibility Program are estimated at $225,000. This would be eligible for up to 91.06 percent funding from the FAA. The Arizona Department of Transportation and the Williams Gateway Airport Authority would evenly split the remainder. The Authority's share would come from the airport operating budget.

Timing. This should be done as necessary. Updates are typically needed every five to ten years, depending on how much change occurs at the airport and in the local area. For planning purposes, two updates can be expected over the next 20 years.

RESIDUAL NOISE IMPACTS

Noise contours for current conditions are shown in **Exhibit 6F**. These can be compared with the projected noise contours for 2004 and 2020 in **Exhibits 6G** and **6H**.

Table 6B shows the number of dwelling units exposed to noise for baseline conditions and after the implementation of the Noise Compatibility Program. With the implementation of the program, 106 existing and future potential dwellings would be removed from the noise contours, including 41 within the 60-65 DNL contour, 64 within the 65-70 DNL contour, and one within the 70-75 DNL contour in 2004.

There is no change between the 2020 baseline noise contours and 2020 noise contours with the program. This is because the relocation of the instrument landing system (ILS) is schedule in the long range planning horizon of the Airport Master Plan and therefore incorporated into the 2020 baseline contours.

Table 6C shows the population exposed to noise with implementation of the Noise Compatibility Program in comparison with baseline conditions. With the implementation of the program, 371 existing and future potential residents would be removed from the noise contours, including 200 within the 60-65 DNL contour, 168 within the 65-70 DNL contour, and 3 within the 70-75 DNL contour in 2004.

As previously mentioned, there is no change between the 2020 baseline noise contours and 2020 noise contours with the program.

TABLE 6B
Noise-Sensitive Land Uses Exposed to Noise
With Noise Compatibility Program Versus Baseline Conditions

	Baseline Noise (Without Program)			With Noise Compatibility Program	
	1999	2004	2020	2004	2020
Existing Noise-Sensitive Institutions					
60+ DNL	1	1	0	1	0
Potential Future Noise-Sensitive Institutions					
60+ DNL	0	0	0	0	0
Existing Dwellings					
60-65 DNL	35	41	23	34	23
65+	0	0	0	0	0
Additional Potential Dwellings					
60-65 DNL	0	2,909	2,192	2,875	2,192
65-70 DNL	0	718	689	654	689
70-75 DNL	0	318	336	317	336
75+ DNL	0	1	40	1	40
Total Future Dwellings					
Total Above 60	35	3,987	3,280	3,881	3,280
Total Above 65	0	1,037	1,065	1,008	1,065

Source: Coffman Associates analysis.

TABLE 6C
Population Exposed to Noise
With Noise Compatibility Program Versus Baseline Conditions

	Baseline Noise (Without Program)			With Noise Compatibility Program	
	1999	2004[1]	2020[1]	2004[1]	2020[1]
60-65 DNL	94	7,850	5,893	7,741	5,893
65-70 DNL	0	1,909	1,832	1,741	1,832
70-75 DNL	0	847	894	844	894
75+ DNL	0	2	107	2	107
Total Above 60	94	10,608	8,726	10,328	8,726
Total Above 65	0	2,758	2,833	2,587	2,833
LWP[2] Above 60	20	2,874	2,580	2,788	2,580
LWP[2] Above 65	0	1,266	1,372	1,201	1,372

[1] Includes potential future residents of additional housing that may be developed inside noise contours.

[2] LWP - level-weighted population is an estimated of the number of people actually annoyed by noise. The actual

population within each 5 DNL range is multiplied by the appropriate response factor to compute LWP. The factors are: 60-65 DNL - 0.205; 65-70 DNL - .376; 70-75 DNL - .644; 75+ DNL - 1.00. See the Technical Information Paper, "Measuring the Impact of Noise on People."

Source: Coffman Associates analysis.

SUMMARY

The Noise Compatibility Program for Williams Gateway Airport is summarized in **Table 6D** on the next page. The total cost of the program is estimated at $1,090,000. Most of the costs are related to the relocation of the ILS to Runway 30R and addition of a PAPI lighting system to Runway 12R-30L ($330,000). Other significant costs in include future updates of the Program ($450,000) and miscellaneous special studies that may be needed to assist with monitoring Program implementation ($210,000).

Seventy-three percent of the cost ($801,328) would be eligible for FAA funding through the reliever and noise set-asides of the Federal Airport Improvement Program. Approximately three and one-half percent ($39,336) would be eligible for funding assistance from the Arizona Department of Transportation. Nineteen percent of the cost ($210,000) would be paid through the airport operating budget. Approximately three and one-half percent ($33,336) would be covered through the airport capital budget.

The recommended noise abatement measures can reduce disturbing aircraft noise in the area. The land use planning measures also can help to limit the potential for future noise-sensitive development in the airport area. Continuing program management will provide for a timely response to conditions that may change over time and require a re-evaluation of future noise conditions. While the airport management must provide leadership and coordination of the entire program, success hinges on the cooperation of all involved parties.

TABLE 6D
Summary of Noise Compatibility Program, 2000-2020
Williams Gateway Airport

Measure	Cost to Airport or Government	Direct Cost to Users[1]	Timing	Lead Responsibility[2]	Potential Funding Sources
NOISE ABATEMENT ELEMENT					
1. Continue Runway 30L/C/R Calm Wind Runway Use Program.	Administrative	None	2000 and ongoing	Williams Gateway Airport Authority	Airport operating budget
2. Continue using Runway 12R-30L for Light Piston Aircraft and 12C/L-30C/R for Large Piston/Turbojet Aircraft Operations	Administrative	None	2000 and ongoing	Williams Gateway Airport Authority	Airport operating budget
3. Continue to Encourage use of NBAA Noise Abatement Procedures.	Administrative	None	2000 and ongoing	Williams Gateway Airport Authority	Airport operating budget
4. Continue to Promote use of AOPA's "Noise Awareness Steps."	Administrative	None	2000 and ongoing	Williams Gateway Airport Authority	Airport operating budget
5. Continue to Promote Departure Procedure for AANG 161st Air Refueling Wing KC-135 Aircraft.	Administrative	None	2000 - 2001	Williams Gateway Airport Authority	Airport operating budget
6. Relocate Instrument Landing System to Runway 30R.	$200,000	None	2000-2001	Williams Gateway Airport Authority	FAA (91.06%) ADOT (4.47%) Airport capital budget (4.47%)
7. Install PAPI-4 Lighting on Runway 12R/30L.	$130,000	None	2000-2001	Williams Gateway Airport Authority	FAA (91.06%) ADOT (4.47%) Airport capital budget (4.47%)
8. Develop Helicopter Reporting Points and Arrival and Departure Routes.	Administrative	None	2000-2001	Williams Gateway Airport Authority	Airport operating budget

TABLE 6D (Continued)
Summary of Noise Compatibility Program, 2000-2020
Williams Gateway Airport

Measure	Cost to Airport or Government	Direct Cost to Users[1]	Timing	Lead Responsibility[2]	Potential Funding Sources
NOISE ABATEMENT ELEMENT (Continued)					
9. Request Aircraft Using Runway 12R/30L Traffic Pattern to Remain East of the Southern Pacific Railroad.	Administrative	None	2000 and ongoing	Williams Gateway Airport Authority	Airport operating budget
10. Encourage Use of AC 91.53A Noise Abatement Departure Procedures By Air Carrier Jets.	Administrative	None	2000 and ongoing	Williams Gateway Airport Authority	Airport operating budget
11. Support AANG 161st Air Refueling Wing's efforts to re-engine KC-135 Aircraft.	Administrative	None	2000 - 2001	Williams Gateway Airport Authority	Airport operating budget
LAND USE MANAGEMENT ELEMENT					
1. Update General Plans to reflect the "Land Use Planning scenario" noise contours and Airport Planning Area as basis for Noise Compatibility Planning.	Administrative	None	2000 - 2001	Mesa, Gilbert, Queen Creek, Maricopa County, and Pinal County	Operating budgets
2. Retain compatible land use designations for undeveloped land within the APA.	Administrative	None	2000 - 2001	Mesa, Gilbert, Queen Creek, Maricopa County, and Pinal County	Operating budgets
3. Develop a new Mixed Use Category that does not allow Residential inside the 60 DNL Planning Scenario Contour and Immediately North of the Airport.	Administrative	None	2000 - 2001	Mesa and Gilbert	Operating budgets

TABLE 6D (Continued)
Summary of Noise Compatibility Program, 2000-2020
Williams Gateway Airport

Measure	Cost to Airport or Government	Direct Cost to Users[1]	Timing	Lead Responsibility[2]	Potential Funding Sources
LAND USE MANAGEMENT ELEMENT (Continued)					
4. Establish guidelines specifying noise compatibility criteria for the review of development projects within the Planning Scenario 60 DNL boundary.	Administrative	None	2000 - 2001	Mesa, Gilbert, Queen Creek, Maricopa County, and Pinal County	Operating budgets
5. Encourage rezoning areas within the Planning Scenario Contours and APA to Match the Compatible Land Use Designations in the General Plans.	Administrative	None	2000 - 2001	Mesa, Gilbert, Queen Creek, Maricopa County	Operating budgets
6. Amend Overflight Zoning Ordinance: Reflect Planning Scenario Noise Contours and APA; Require Fair Disclosure Covenants; and Amend Sound Insulation Standards.	Administrative	None	2000 - 2001	Mesa, Gilbert, Queen Creek, Maricopa County, and Pinal County	Operating budgets
7. Amend subdivision regulations to require recording of fair disclosure covenants, avigation noise and overflight easements in APA District.	Administrative	None	2000 - 2001	Mesa, Gilbert, Queen Creek, Maricopa County, and Pinal County	Operating budgets
8. Amend building code to add sound insulation standards supporting APA zoning requirements.	Administrative	None	2000 - 2001	Mesa, Gilbert, Queen Creek, Maricopa County, and Pinal County	Operating budgets

TABLE 6D (Continued)
Summary of Noise Compatibility Program, 2000-2020
Williams Gateway Airport

Measure	Cost to Airport or Government	Direct Cost to Users[1]	Timing	Lead Responsibility[2]	Potential Funding Sources
PROGRAM MANAGEMENT ELEMENT					
1. Maintain and update the system for receiving, analyzing, responding to noise complaints, and community outreach.	$50,000	None	2000-2001	Williams Gateway Airport Authority	FAA (91.06%) ADOT (4.47%) Airport Capital budget (4.47%)
2. Acquire noise monitors.	$50,000	None	2000-2001	Williams Gateway Airport Authority	FAA (91.06%) ADOT (4.47%) Airport Capital budget (4.47%)
3. Review Noise Compatibility Program implementation.	$210,000 (assumes average of $30,000 every three years)	None	Ongoing	Williams Gateway Airport Authority	Airport operating budget
4. Update Noise Exposure Maps and Noise Compatibility Program.	$450,000 (assumes $225,000 every 5 to 10 years)	None	Update every 5 to 10 years as needed	Williams Gateway Airport Authority	FAA (91.06%) ADOT (4.47%) Airport Capital budget (4.47%)

Summary of Noise Compatibility Program, 2000-2020
Williams Gateway Airport

Total Costs and Funding	FAA	$801,328	73.5%
	ADOT	$39,336	3.6%
	Airport capital budget	$39,336	3.6%
	Airport Operating budget	$210,000	19.3%
	Total	$1,090,000	100%

NOTES:
N.A. -- Not applicable.
[1] Airport users will be indirectly responsible for at least part of Airport's share of funding for the noise abatement and program management measures through lease payments and user fees.
[2] Where the Airport Authority does not have direct responsibility for implementing a given measure, the Authority will encourage the listed jurisdictions to implement measures as described.

99SP09-6A-07/31/00

Broadway Rd.
Main St./Apache Trail
Southern Ave.
Superstition Freeway
Baseline Rd.
Apache Junction
Guadalupe Rd.
Mesa
Elliot Rd.
Warner Rd.
Ray Rd.
69
65
Williams Field Rd.
General Motors Proving Grounds
Pecos Rd.
Pecos Road Realignment
Germann Rd.
Chandler
Gilbert
Queen Creek
Ocotillo Rd.
Chandler Heights Rd.
Riggs Rd.
Power Rd.
Ellsworth Rd.
Meridian Rd.
Signal Butte Rd.
Idaho Rd.
Tomahawk Rd.
Hawes Rd.
Recker Rd.
Higley Rd.
Lindsay Rd.
Gilbert Rd.
Val Vista Drive
Greenfield Rd.
Roosevelt Water Conservation District Canal
Ritenhouse Road
Southern Pacific Railroad
Sossaman Rd.
Crismon Rd.
Queen Creek Rd.
Vineyard Rd.
La Palma Rd.
Schnepf Rd.
Maricopa County Line
Pinal County Line

LEGEND

- Detailed Land Use Study Area
- County Boundary
- Municipal Boundary
- Airport Property
- Planned Santan Freeway
- Recommended Airport Planning Area
- 60 DNL–Planning Scenario Boundary
- 60 DNL–Planning Scenario Contour
- 65 DNL–Planning Scenario Contour
- Rural Residential (0–2 du/ac)
- Low Density Residential (2.1–5 du/ac)
- Medium Density Residential (5.1–15 du/ac)
- High Density Residential (15+ du/ac)
- Mobile and Trailer Homes
- Mixed Use
- Noise Sensitive Institutions
- Place of Worship
- School

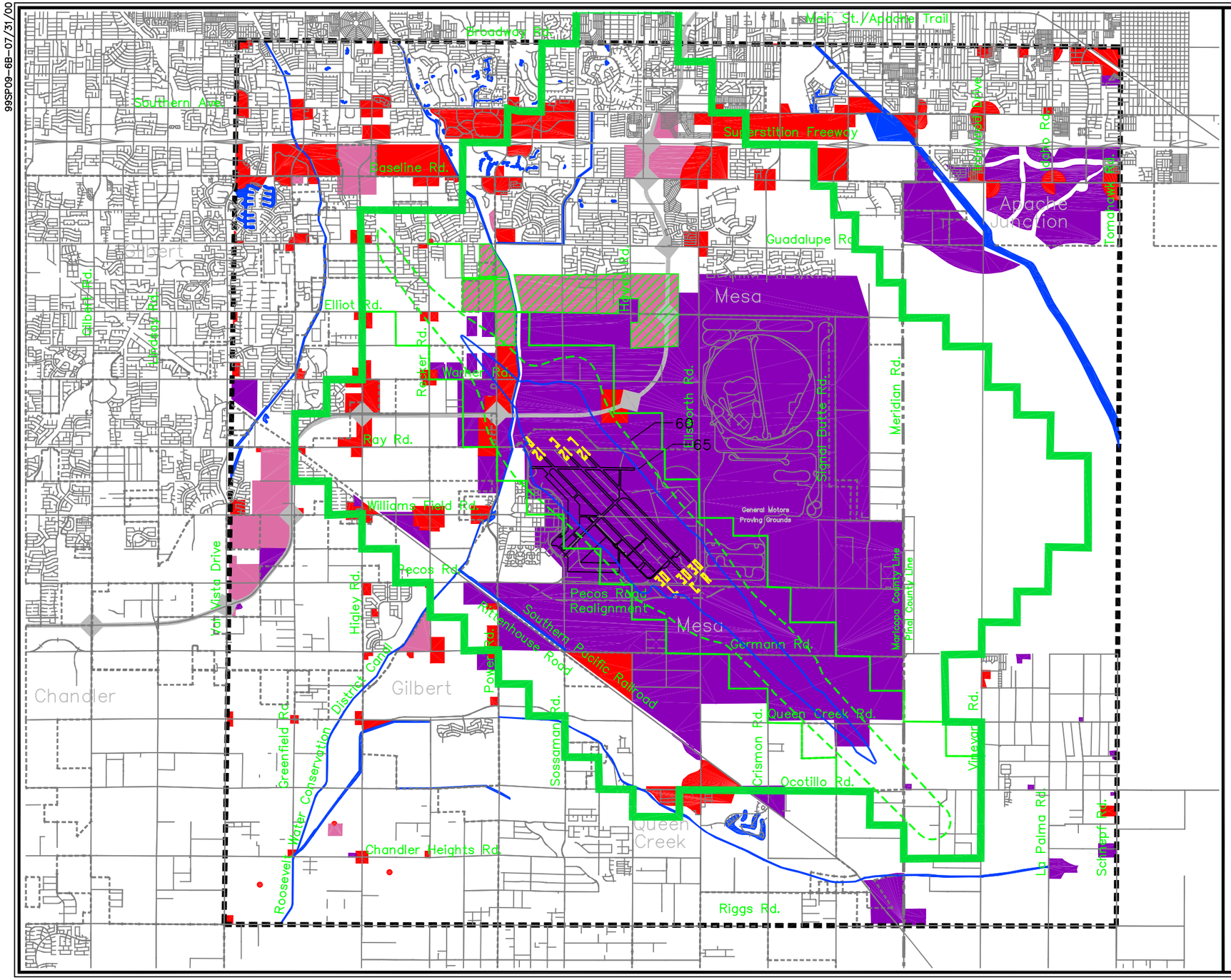
Source: Coffman Associates Analysis
Williams Regional Planning Study, 1996.

NORTH
0
8000
SCALE IN FEET

WILLIAMS GATEWAY AIRPORT

Exhibit 6A
RECOMMENDED AIRPORT PLANNING AREA

99SP09-6B-07/31/00



LEGEND

- Detailed Land Use Study Area
- County Boundary
- Municipal Boundary
- Airport Property
- Planned San Tan Freeway
- Recommended Airport Planning Area
- 60 DNL–Planning Scenario Boundary
- 60 DNL–Planning Scenario Contour
- 65 DNL–Planning Scenario Contour
- Mixed Use
- Commercial/Office
- Industrial, Transportation & Utilites
- Water
- Mixed Use General Plan Amendments

Source: Maricopa County Land Use Plan, 1992; Pinal County Comprehensive Plan, 1988, p. 147; City of Mesa, General Plan, 1996; City of Apache Junction, General Plan, 1987, p. 91; Town of Queen Creek, General Plan, 1996, Exhibit 4; Town of Gilbert, General Plan Land Use Map, 11/15/1999.
Coffman Associates Analysis

NORTH

0 8000

SCALE IN FEET

WILLIAMS GATEWAY AIRPORT

Exhibit 6B

GENERAL PLAN AMENDMENT RECOMMENDATIONS

69SP60-6D-08/01/00

Broadway Rd.
Main St./Apache Trail
Southern Ave.
Superstition Freeway
Baseline Rd.
Guadalupe Rd.
Apache Junction
Gilbert
Elliot Rd.
Mesa
Ray Rd.
60
65
Williams Field Rd.
Chandler
Gilbert
Queen Creek
Chandler Heights Rd.
Riggs Rd.
Ocotillo Rd.
Meridian Rd.
Tomahawk Rd.
Idaho Rd.
Vineyard Rd.
Lp Palma Rd.
Schnepf Rd.
Crismon Rd.
Sossaman Rd.
Greenfield Rd.
Higley Rd.
Recos Rd.
Power Rd.
Val Vista Drive
Roosevelt Water Conservation District Canal
Pinal County Line

LEGEND

- Detailed Land Use Study Area
- County Boundary
- Municipal Boundary
- Airport Property
- Planned San Tan Freeway
- Recommended Airport Planning Area
- 60 DNL–Planning Scenario Boundary
- 60 DNL–Planning Scenario Contour
- 65 DNL–Planning Scenario Contour
- Agriculture
- Rural Residential (0–2 du/ac)
- Low Density Residential (2.1–5 du/ac)
- Medium Density Residential (5.1–15 du/ac)
- High Density Residential (15+ du/ac)
- Mobile and Trailer Homes
- Planned Area Development
- Hotels, Motels, and Resorts
- Commercial/Office
- Industrial
- Parks and Open Space
- Noise Sensitive Institutions
- Public
- Rezone to Match General Plan

Source: City of Mesa Zoning Map, June 1998; Town of Gilbert Zoning Map, 7/12/1999; City of Apache Junction Zoning Map, March 1985; Town of Queen Creek Zoning Map; Pinal County Comprehensive Plan, January 1988.
Coffman Associates Analysis

NORTH
0 8000
SCALE IN FEET

WILLIAMS GATEWAY AIRPORT

Exhibit 6D
ZONING AMENDMENT RECOMMENDATIONS

69SP009-6E-08/01/00

Broadway Rd.
Main St./Apache Trail
Southern Ave.
Baseline Rd.
Superstition Freeway
Idaho Rd.
Tomahawk Rd.
Apache Junction
Guadalupe Rd.
Hawes Rd.
Mesa
Gilbert
Gilbert Rd.
Lindsay Rd.
Elliot Rd.
AOZ–2
Recker Rd.
Warner Rd.
AOZ–3
AOZ–1
Ray Rd.
Ellsworth Rd.
Signal Butte Rd.
Meridian Rd.
General Motors Proving Grounds
Williams Field Rd.
Val Vista Drive
Higley Rd.
Pecos Rd.
Pecos Road Realignment
AOZ–1
Rittenhouse Road
Southern Pacific Railroad
AOZ–3
Mesa
Germann Rd.
Maricopa County Line
Pinal County Line
Power Rd.
Chandler
Gilbert
Greenfield Rd.
Water Conservation District Canal
Sossaman Rd.
Queen Creek Rd.
Crismon Rd.
Ocotillo Rd.
AOZ–2
Val Vista Rd.
La Palma Rd.
Schnepf Rd.
Queen Creek
Chandler Heights Rd.
Roosevelt
Riggs Rd.

LEGEND

- Detailed Land Use Study Area
- County Boundary
- Municipal Boundary
- Airport Property
- Planned San Tan Freeway
- Runway Protection Zones
- Airport Overflight Zone 1 (AOZ–1)
- Airport Overflight Zone 2 (AOZ–2)
- Airport Overflight Zone 3 (AOZ–3)
- Maricopa County
- Pinal County
- City of Mesa
- Town of Gilbert
- Town of Queen Creek

Source: Coffman Associates Analysis

NORTH

0 8000

SCALE IN FEET

WILLIAMS GATEWAY AIRPORT

Exhibit 6E

RECOMMENDED AIRPORT NOISE OVERFLIGHT ZONING DISTRICT BOUNDARIES

69SP609-8F-08/01/00

Broadway Rd.
Main St./Apache Trail
Southern Ave.
Superstition Freeway
Baseline Rd.
Apache Junction
Guadalupe Rd.
Gilbert
Mesa
Elliot Rd.
Hawes Rd.
Recker Rd.
Warner Rd.
Ray Rd.
Ellsworth Rd.
Signal Butte Rd.
Meridian Rd.
60
65
70
75
General Motors Proving Grounds
Williams Field Rd.
Pecos Rd.
Pecos Road Realignment
Germann Rd.
Chandler
Gilbert
Queen Creek
Queen Creek Rd.
Ocotillo Rd.
Chandler Heights Rd.
Riggs Rd.
Van Buren St.
Higley Rd.
Power Rd.
Sossaman Rd.
Crismon Rd.
Vineyard Rd.
La Palma Rd.
Schnepf Rd.
Idaho Rd.
Tomahawk Rd.
Maricopa County Line
Pinal County Line
Roosevelt Water Conservation District Canal
Southern Pacific Railroad
Ritenhouse Road

LEGEND

- Detailed Land Use Study Area
- County Boundary
- Municipal Boundary
- Airport Property
- Planned Santan Freeway
- DNL Contours, Marginal Effect
- DNL Contours, Significant Effect
- Rural Residential (0–2 du/ac)
- Low Density Residential (2.1–5 du/ac)
- Medium Density Residential (5.1–15 du/ac)
- High Density Residential (15+ du/ac)
- Mobile and Trailer Homes
- Mixed Use
- Noise Sensitive Institutions
- Place of Worship
- School

Source: Coffman Associates Analysis

NORTH

0 8000

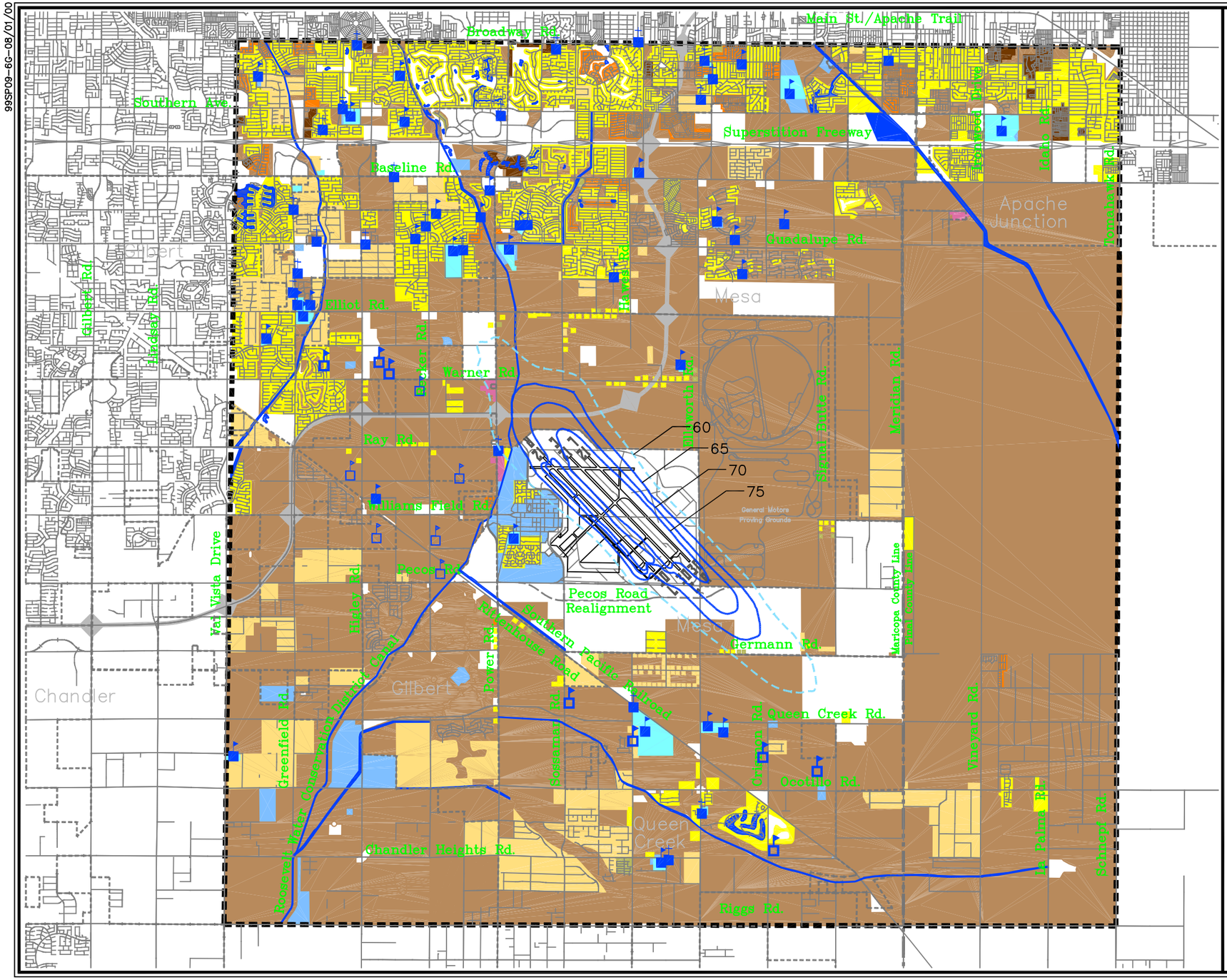
SCALE IN FEET

WILLIAMS GATEWAY AIRPORT

Exhibit 6F

1999 AIRCRAFT NOISE EXPOSURE AND LAND USE

99SP09-6G-08/01/00



LEGEND

- Detailed Land Use Study Area
- County Boundary
- Municipal Boundary
- Airport Property
- Planned Santan Freeway
- 2004 DNL Contours, Marginal Effect
- 2004 DNL Contours, Significant Effect
- Rural Residential (0–2 du/ac)
- Low Density Residential (2.1–5 du/ac)
- Medium Density Residential (5.1–15 du/ac)
- High Density Residential (15+ du/ac)
- Mobile and Trailer Homes
- Mixed Use
- Noise Sensitive Institutions
- Place of Worship
- School
- Potentially Available for Residential Development
- Potentially Available for Noise Sensitive Institutions
- Proposed School

Source: Coffman Associates Analysis

NORTH

0 8000

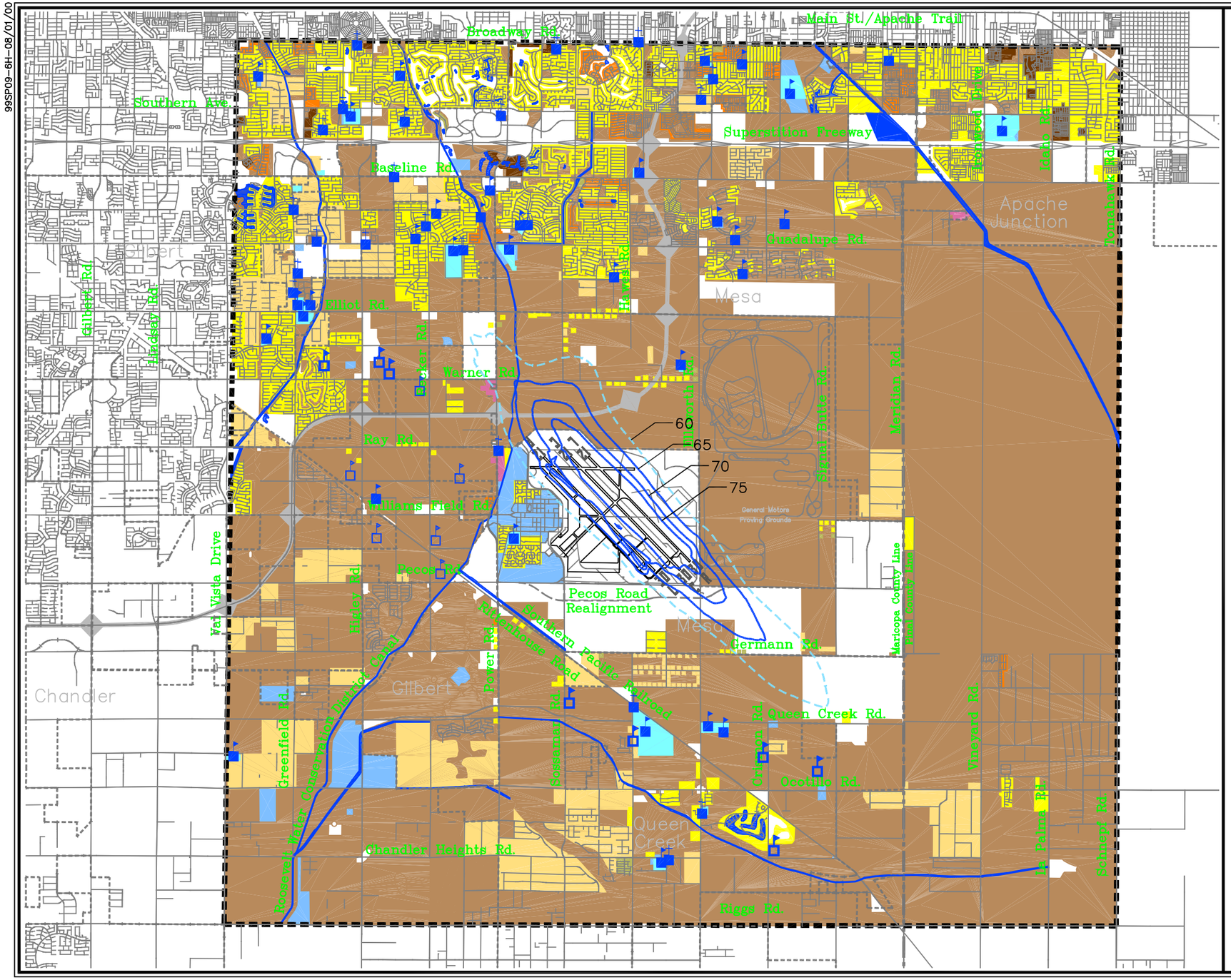
SCALE IN FEET

WILLIAMS GATEWAY AIRPORT

Exhibit 6G

2004 AIRCRAFT NOISE EXPOSURE WITH NOISE COMPATIBILITY PLAN

69SP09-6H-08/01/00



LEGEND

- Detailed Land Use Study Area
- County Boundary
- Municipal Boundary
- Airport Property
- Planned Santan Freeway
- DNL Contours, Marginal Effect
- DNL Contours, Significant Effect
- Rural Residential (0–2 du/ac)
- Low Density Residential (2.1–5 du/ac)
- Medium Density Residential (5.1–15 du/ac)
- High Density Residential (15+ du/ac)
- Mobile and Trailer Homes
- Mixed Use
- Noise Sensitive Institutions
- Place of Worship
- School
- Potentially Available for Residential Development
- Potentially Available for Noise Sensitive Institutions
- Proposed School

Source: Coffman Associates Analysis

WILLIAMS GATEWAY AIRPORT

Exhibit 6H
2020 AIRCRAFT NOISE EXPOSURE
WITH NOISE COMPATIBILITY PLAN

WELCOME TO THE PLANNING ADVISORY COMMITTEE

The Williams Gateway Authority and its consultant, Coffman Associates, are pleased to welcome you to the Planning Advisory Committee (PAC) for the F.A.R. Part 150 Noise Compatibility Study. We very much appreciate the interest you have in this project. Over the next several months you will be able to make an important contribution to the study. We believe that you, in turn, will find your participation with the committee to be an interesting and educational experience.

WHAT IS THE ROLE OF THE COMMITTEE?

The PAC will play an important role in the Noise Compatibility Study. We want to benefit from your unique viewpoints, to have access to the people and resources you represent, to work with you in a creative atmosphere, and to gain your support in achieving results. Specifically, your role in the PAC is as follows:

- **Linkage to the Community** - Each of you represent one or more constituent interests -- neighborhood residents, local businesses, public agencies, and aviation users. We will provide our presentation materials to all PAC members who might wish to volunteer to make presentations to their own constituents. Call the consultants at any time for advice and assistance.

- **Sounding Board** - The consultants need a forum in which to present information, findings, ideas, and recommendations during the study. Everyone involved with the study will benefit from this forum because it allows diverse interests an opportunity to experience the viewpoints, ideas, and concerns of other members directly.

- **Resource** - An airport noise compatibility study is very complex; it has an almost

unlimited demand for information. Many of you have access to specialized information and can ensure that it is used in the study to its fullest potential.

- **Think Tank** - "Too many cooks spoil the broth" reflects the difficulty committees have in writing a report. On the other hand, "two heads are better than one" tells us that creative thinking is best accomplished by a group of concerned people who represent a diversity of backgrounds and views on a subject. We need all of the creative input we can get. PAC member ideas have literally "made the difference" on other studies of this type across the country.

- **Critical Review** - The study team needs their work scrutinized closely for accuracy, completeness of detail, clarity of thought, and intellectual honesty. We want you to point out any shortcomings in our work and to help us improve on it.

- **Implementation** - A Part 150 Noise Compatibility Plan depends on the actions of many different agencies and organizations for implementation. Each of you has a unique role to play in implementing the plan and demonstrating leadership among your constituent interests. Inform and educate them about the importance of your effort on their behalf and work with them to see that the final plan is carried out.

To keep you informed of the proceedings at the PAC meetings, we will prepare summary minutes and will distribute them prior to the next meeting. These will be particularly helpful if you are unable to attend a meeting.

In the evening after each PAC meeting, we will hold a public information workshop so that we may report to the community at large and elicit their views and input. We invite you to attend these evening workshops. They will be organized to maximize the opportunity for two-way communi-cation. At these important meetings, you will have the chance to hear from local citizens and share your views and expertise with them.

WHO IS ON THE COMMITTEE?

Many organizations have been contacted and invited to designate representatives to serve on the Planning Advisory Committee. The attached list shows the broad range of interests to be represented -- local businesses and residents, air traffic controllers, pilots, fixed-base operators, national aviation organizations, and local governments and planning officials.

HOW WILL THE PAC OPERATE?

The PAC will operate as informally as possible -- no rules, no compulsory attendance, no voting, and no offices. The meetings will be conducted by the consultant and will be called at various points in the study (approximately four) when committee input is especially needed. Meetings will be scheduled with sufficient advance notice to permit you to arrange your schedule. We will initially schedule meetings in the afternoon and will continue to do so if the time is generally acceptable.

Before each PAC meeting, the consultant will distribute working papers to you. These are draft chapters of the Noise Compatibility Study, and they will be a focus for discussion at the meetings. In addition, we will provide an outline of the

subjects to be covered in the next phase of the project so that you may interject your ideas and concerns and have them addressed in the next working paper.

To help you keep your materials organized, we will give you a study workbook (a three-ring binder with a special cover and tab dividers) to hold working papers, technical information papers, PAC membership lists, meeting notes, and other resource material. Copies of the final reports will also be provided to each committee member at the end of the study.

WHERE CAN YOU GET MORE INFORMATION?

For specific information about the study, please contact:

Trish Shaffstall
Planning Manager
Williams Gateway Airport
6001 South Power Road
Building 41
Mesa, AZ 85206
(602) 988-1013

Jim Harris, P.E.
Project Manager
Coffman Associates, Inc.
11022 N. 28th Drive, Suite 240,
Phoenix, AZ 85029
(602) 993-6999

David Fitz
Technical Manager
Coffman Associates, Inc.
237 N.W. Blue Parkway, Suite 100,
Lee's Summit, MO 64063
(816) 524-3500

SEE YOU AT THE MEETINGS!

Once again, welcome to the PAC and thanks for accepting the invitation to participate. We will do everything we can to make sure your participation is a worthwhile and satisfying experience. All users and neighbors of Williams Gateway Airport will be better served as a result of these efforts.

WILLIAMS GATEWAY AIRPORT
PART 150 STUDY
PLANNING ADVISORY COMMITTEE (PAC)

Name and Title	Representing	Address	Phone/Fax
Mr. Gary Adams Director Aeronautics Division	**Arizona Department of Transportation**	255 East Osborn, Ste 101 Phoenix, AZ 85012 Mailing: P.O. Box 13588 Mail Drop 426M Phoenix, AZ 85002-3335	602-294-9144 602-294-9141 f
Mr. Clyde Anderson Planning & Development	**State Land Department**	1616 W. Adams Phoenix, AZ 85007	602-542-2677 602-542-4668 f
Mr. Hamid Arshadi Advanced Planning Director	**Town of Gilbert Community Development**	1025 South Gilbert Road Gilbert, AZ 85296	480-503-6811 602-497-4923 f
Mr. Brian Armstrong Airport Planner	**Airports Division, AWP 611.1 FAA - Western Pacific Region**	PO Box 92007 Worldway Postal Center Los Angeles, CA 90009-2007	310-725-3614 310-536-8601 f
Mr. Dennis Cady Director Planning & Dev. Services Dept.	**Pinal County**	PO Box 2973 Florence, AZ 85232	520-868-6447 520-868-6511 f
Mr. Dave Edens Chief Pilot	**Southwest Airlines**	3800 Sky Harbor Boulevard Phoenix, AZ 85034	602-389-3781 602/286-3776 f
Mr. Urban Giff Community Manager	**Gila River Indian Community**	PO Box 97 Sacaton, AZ 85247	520-562-6050 520-562-3422 f
Ms. Stacy Howard	**Aircraft Owners and Pilots Association**	41695 N. Coyote Road Queen Creek, AZ 85242	480-987-9165 480-987-0352 f
Mr. Terry Isaacson	**Arizona State University - East**	6045 S. Sagewood Mesa, AZ 85212	480-727-3278 480-727-1114 f
Lt. Col. Ken Klesner	**161st Air Refueling Wing**	3200 E. Old Tower Road Phoenix, AZ 85034-7263	602-302-9165 602-302-9199 f
Mr. John Kross Town Planner	**Town of Queen Creek**	22350 S. Ellsworth Road Queen Creek, AZ 85242-9311	480-987-9887 480-987-0109 f

WILLIAMS GATEWAY AIRPORT
PART 150 STUDY
PLANNING ADVISORY COMMITTEE (PAC)

Name and Title	Representing	Address	Phone/Fax
Mr. Lynn Kusy Executive Director	**Williams Gateway Airport Authority**	5835 S. Sossaman Road Mesa, AZ 85212-0919	480-988-1013 480-988-2315 f
Mr. Larry Likes Superintendent	**Higley School District**	15202 S. 170th Street Higley, AZ 85236	480-988-2571
Mr. Gibson McKay	**Home Builders Association**	2111 E. Highland #190 Phoenix, AZ 85016	602-274-6545 602-234-0442 f
Mr. Frank Mizner Planning Director	**City of Mesa**	PO Box 1466 Mesa, AZ 85211-1466	480-644-2181 480-644-2757 f
Mr. Howard Morrison	**Large Property Owner**	690 W. Elliot Road PO Box 464 Gilbert, AZ 85299	602-819-1037 602-818-8235 f
Dr. James Murlless Superintendent	**Queen Creek School District**	20435 S. Ellsworth Queen Creek, AZ 85242	480-987-5938 480-987-9714 f
Mr. Dan Pettyjohn	**Boeing**	6250 S. Taxiway Circle Mesa, AZ 85212-6008	480-891-9612 480-891-9611 f
Mr. Ron Pierce Tower Manager	**Circle Management Services, Inc.** **Barton/ATC - Tower**	6309 S. Taxiway Circle Mesa, AZ 85212	480-988-1710 480-988-9439
Mr. Jack Sellers	**Desert Proving Grounds** **General Motors Corporation**	Box 10100 Mesa, AZ 85216	480-827-5108 480-827-5320 f
Dr. Frank Ramirez	**Chandler-Gilbert Community College**	2626 East Pecos Rd Chandler, AZ 85225-2499	480-732-7125 480-732-7090f
Mr. John Solomon Aviation Director	**City of Phoenix**	3400 Sky Harbor Boulevard Phoenix, AZ 85034-4420	602-273-3321 602-267-0102 f
Mr. George Sullivan Manager	**Arizona Hub, FAA** **Phoenix, TRACON**	2800 Sky Harbor Boulevard Phoenix, AZ 85034	602-379-3684 602-220-4436 f
Mr. James Timm President	**Arizona Pilots Association**	220 E. Ellis Dr. Tempe, AZ 85282	480-839-9187 480-755-4128 f (call first to fax)

WILLIAMS GATEWAY AIRPORT
PART 150 STUDY
PLANNING ADVISORY COMMITTEE (PAC)

Name and Title	Representing	Address	Phone/Fax
Mr. Lou Torres	**Southeast Valley Community Alliance**	4059 E. Redfield Road Higley, AZ 85236	480-632-0034 480-632-0998 f
Mr. Robert Trzepkowski Telecom Real Estate Specialist	**Salt River Project**	Mail Station PAB349 PO Box 52025 Phoenix, AZ 85072-2025	602-236-8173 602-236-8193 f
Mr. Neil Urban Planning Manager	**Maricopa County**	301 W. Jefferson, Ste 300 Phoenix, AZ 85003	602-506-3430 602-506-3601 f
Mr. Glen Van Nimwegen Director, Development Services	**City of Apache Junction**	1001 N. Idaho Road Apache Junction, AZ 85219	480-671-5082 480-671-5102 f
Mr. G. Keith Vaughan Director, Planning & Development	**Gilbert Public Schools**	140 S. Gilbert Road Gilbert, AZ 85296	480-497-3300 480-497-3450 f
Mr. Harry Wolfe	**Maricopa Association of Governments**	302 North 1st Avenue, #300 Phoenix, AZ 85003	602-254-6300 602-254-6490
Ms. Jayne Brenna	**Gilbert Citizen Rep.**	4225 E. San Angelo Ave Higley, AZ 85236	480-981-5786 480-981-0712 f
Mr. Paul Hollar	**Town of Gilbert Citizen**	3940 E. Park Court Gilbert, AZ 85234	480-813-7621 520-473-7012 f
Ms. Georgette Baggett	**Mesa Citizen Rep.**	7704 East Portobello Ave Mesa, AZ 85212	480-838-7772 ext. 121
Mr. Bryan Hubbard	**City Of Mesa Citizen**	7416 E. Lobo Mesa, AZ 85208	480-926-0122 480-926-9178 f
Ms. Bev Selvage	**City of Mesa Citizen**	2627 S. Hibiscus Mesa, AZ 85208	480-380-7493
Ms. Silvia Centoz.	**Town of Queen Creek Citizen Representative**	26226 S. Hawes Queen Creek, AZ 85242	480-987-3933 480-987-3933 f
Mr. David Johnston	**Queen Creek Citizen Representative**	19115 East Via del Verde Queen Creek, AZ 85242	480-987-3536 480-987-0109 f

Appendix B
COORDINATION, CONSULTATION, AND PUBLIC INVOLVEMENT

As part of the planning process, the public, airport users, and local, state, and Federal agencies were given the opportunity to review and comment on the Noise Compatibility Program and supporting documentation. Materials prepared by the consultant were submitted for local review, discussion, and revision at several points during the process.

Much of the local coordination was handled through a special study committee formed specifically to provide advice and feedback on the Part 150 Noise Compatibility Study. Known as the Planning Advisory Committee (PAC), it included representatives of all affected groups, including local residents, airport users, officials from the cities of Apache Junction, Mesa, and Tempe, the towns of Gilbert and Queen Creek, the counties of Maricopa and Pinal, the Gila River Indian Community, the Maricopa Association of Governments, the State of Arizona Department of Transportation, air traffic control, local businesses, school districts, airlines, aviation organizations, and the Federal Aviation Administration (FAA).

The PAC reviewed and commented on the working papers prepared by the consultant and provided guidance for the next phases of the study. Most comments were made orally during the meetings, but some were followed by written confirmation. All comments were appropriately incorporated into this document or otherwise addressed.

The PAC met four times during the preparation of the Noise Compatibility Program. The first meeting was held on May 13, 1999 to introduce the participants, describe the study process, discuss goals and objectives, and distribute the study workbooks, and hear comments and views pertaining to conditions at the airport.

The second PAC Meeting was held on August 25, 1999. Chapters One, Inventory, Two, Aviation Noise, and Three, Noise Impacts were discussed. Many questions and comments were raised at the meeting. A number of questions related to the size of the noise contours and the control of residential development around the airport. Additional discussion related to the noise analysis and aircraft activity at the airport.

Technical Conferences relating to aviation and land use issues were held on November 17, 1999. The Aviation Technical Conference was attended by representatives from the FAA, airlines, air traffic control, airport users, and Arizona State University. A worksheet listing potential noise abatement techniques was distributed. Discussions included the status of current noise abatement procedures and the potential implementation of additional procedures.

The Land Use Technical Conference was attended by representatives of the cities of Following the PAC meetings held on August 25, 1999, January 31, 2000, and June 6, 2000 and the general public was invited to a Public Information Workshop. These workshops were structured as an informal open-house, with display boards and information posted throughout the meeting room. These meetings allowed citizens to acquire information about the F.A.R. Part 150 Study process, baseline noise analysis, alternative analysis, proposed recommendations, ask questions, and express concerns. These meetings also were intended to encourage two-way communication between the airport staff, consultants and local citizens.

Apache Junction and Mesa, the Town of Queen Creek, and the counties Maricopa and Pinal, local school districts and land owners. Discussions primarily focused on the adoption of public disclosure and proposed zoning amendments.

The third PAC meeting, held on January 31, 2000 opened with an explanation of the Noise Compatibility Program as the second portion to a complete Part 150 Study. The working papers for Noise Abatement Alternatives and Land Use Alternatives were presented. This facilitated a number of discussions about the use of the airport's calm wind runway use program. Additional discussions focused on land use compatibility and the use of aircraft procedural turns.

Chapter Six, , the Noise Compatibility Program, was the focus of discussion at the final PAC meeting held on June 6, 2000. Much of this meeting was devoted to methods of implementation for the noise abatement and land use alternatives presented. The meeting commenced with a discussion of methods to effectively acquire, categorize, and monitor and noise complaints.

The Noise Compatibility Study process also included a formal public hearing. This hearing, held on September 6, 2000, offered individuals an opportunity to provide testimony as part of the public record in a controlled setting. The hearing also offered the public another venue for asking questions pertaining to the study's proposed noise abatement, land use management, and implementation recommendations. Comments via

written or oral testimony were evaluated and responded to in the study's supporting documentation.

On November 16, 2000, the Noise Compatibility Program was brought before the Williams Gateway Airport Authority to request its approval for submission to the FAA. The Airport Authority unanimously approved the program for submission (Resolution 00-55).

In addition to these formal meetings, many written and verbal contacts were made between project management staff and officials of local and Federal agencies, representatives of various aviation user groups, and local residents. These were related to the day-to-day management of the project, as well as the resolution of specific questions and concerns arising from the working papers.

Appendix C
IMPLEMENTATION MATERIALS

The materials in this appendix are for use in implementing the Noise Compatibility Program for Williams Gateway Airport and include the following:

- National Business Aviation Association (NBAA) Noise Abatement Procedures;
- "Noise Awareness Steps" published by the Aircraft Owners and Pilots Association (AOPA);
- Federal Aviation Administration Advisory Circular 91-53A Noise Abatement Departure Profiles;
- Sample Letter of Agreement for Helicopter Routes;
- Model Subdivision Regulations Amendment;
- Maricopa Association of Governments Sound Insulation Standards; and
- Aircraft Noise Disclosure Statement.

AIRCRAFT OWNERS AND PILOTS ASSOCIATION
(AOPA)
NOISE AWARENESS STEPS

Following are some general guidelines and techniques to minimize the noise impact produced by aircraft operating near the ground:

1. If practical, avoid noise-sensitive areas such as residential areas; open-air assemblies (e.g., sporting events and concerts), and national park areas. Make every effort to fly at or above 2,000 feet over the surface of such areas when overflight cannot be avoided.

2. Consider using a reduced power setting if flight must be low because of cloud cover or overlying controlled airspace or when approaching the airport of destination. Propellers generate more noise than engines; flying with the lowest practical rpm setting will reduce the aircraft's noise level substantially.

3. Perform stalls, spins, and other practice maneuvers over uninhabited terrain.

4. Many airports have established specific noise abatement procedures. Familiarize yourself and comply with these procedures.

5. Work with airport managers and fixed-base operators to develop procedures to reduce the impact on noise-sensitive areas.

6. To contain aircraft noise within airport boundaries, avoid performing engine runups at the ends of runways near housing developments. Instead, select a location for engine runup closer to the center of the field.

7. On takeoff, gain altitude as quickly as possible without compromising safety. Being takeoffs at the start of a runway, not at an intersection.

8. Retract the landing gear either as soon as a landing straight ahead on the runway can no longer be accomplished or as soon as the aircraft achieves a positive rate of climb. If practical, maintain best-angle-of-climb airspeed until reaching 50 feet or an altitude that provides clearance from terrain or obstacles. Then accelerate to best-rate-of-climb airspeed. If consistent with safety, make the first power reduction at 500 feet.

9. Fly a tight landing pattern to keep noise as close to the airport as possible. Practice descent to the runway at low power settings and with as few power changes as possible.

10. If a VASI or other visual approach guidance system is available, use it. These devices will indicate a safe glidepath and allow a smooth, quiet descent to the runway.

11. If possible, do not adjust the propeller control for flat pitch on the downwind leg; instead, wait until short final. This practice not only provides a quieter approach, but also reduces stress on the engine and propeller governor.

12. Avoid low-level, high-power approaches, which not only create high noise impacts, but also limit options in the event of engine failure.

Note: These recommendations are general in nature; some may not be advisable for every aircraft in every situation. No noise reduction procedure should be allowed to compromise flight safety.

Source: *AOPA's Aviation USA - 1994*

SAMPLE LETTER OF AGREEMENT

HELICOPTER DEPARTURE AND ARRIVAL PROCEDURES

1. PURPOSE. This letter of agreement specifies responsibilities, defines terms, and establishes procedures to be used between _____ Tower and signatory operators for control and operation of helicopters operating within the _____ Class ____ Airspace under VFR and Special VFR weather conditions.

2. CANCELLATION. This Letter of Agreement cancels the Letter of Agreement, _____.

3. SCOPE. Unless otherwise coordinated and approved, the procedures contained herein shall be used by helicopter pilots under the jurisdiction of the signatories of this agreement while conducting flights to or from locations on _____ Airport and within the _____ Class ____ Airspace. The provisions of this agreement are applicable only when _____ Tower is in operation.

4. RESPONSIBILITIES.

a. Helicopter company signatories to this letter of agreement shall be responsible to ensure each pilot, operating a helicopter under their jurisdiction, is thoroughly briefed, is familiar with, and can demonstrate a working knowledge of the procedures contained herein.

b. Helicopter company signatories to this letter of agreement shall be responsible to secure, from the appropriate party, approval to depart, maneuver, and arrive within non-movement areas.

c. _____ Tower shall provide air traffic and advisory services in response to operational requests and as required by immediate circumstances.

5. DEFINITION OF APPLICABLE TERMS.

a. Movement Area. The runways and taxiways utilized for taxiing/hover taxiing, air taxiing, takeoff and landing of aircraft, exclusive of loading ramps and parking areas. Specific approval from the tower is required for entry onto the movement area.

b. Non-movement Area. Ramp, Heliport, Auto-Rotation Pad, and loading area, not controlled by the tower.

c. Auto-rotation pad. *Enter Location Description*.

d. Heliport. Designated helicopter arrival and departure pad located immediately *Enter Location Description*.

e. Reference Points:

(1) North Point – *Enter Location Description*, used in all procedures described in this agreement.

(2) South Point – *Enter Location Description*, used only by the east and south procedures described in this agreement.

f. Transition – airport ingress/egress routes are referred to as north transition (Alpha) and south transition (Bravo).

g. Standard departure/arrival procedures – procedures for operations to/from the north and south reference points.

h. "departure/arrival will be at your own risk" – a phrase used by the tower approving a takeoff or landing from the heliport and any other non-movement area not clearly visible from the tower.

6. PROCEDURES. All departure and arrival profiles are a combination of two phases of flight, a transition phase to egress or ingress the airport and the departure and arrival phase.

a. Helicopters shall:

(1) Use frequency _____, unless otherwise specified by Tower.

(2) State the following on initial contact:

(a) Departures – position, transition and standard departure procedure.

(b) Arrivals – position.

(c) Operations not covered by this agreement – position and specific service request.

(3) Operations, which will cross the runway, shall not be made until specifically authorized by the control tower, see paragraph 6b(4).

(4) Apply internally developed noise abatement procedures, particularly while conducting operations to the north, south, and west.

b. _____ Tower shall:

(1) Issue ATC clearances to aircraft operating to/from movement area.

(2) Approve a pilot's request to operate within the _____ Class ____ Airspace. Approve takeoff and/or landing from a non-movement area by stating, " . . . at your own risk", followed by applicable traffic and/or instructions, as necessary, or

(3) Issue traffic advisories to resolve conflicts within the Class ____ airspace, when appropriate, and as time permits.

(4) Issue a specific ATC clearance, to cross the runways when a departure or arrival profile crosses the airport.

7. DEPARTURE TRANSITIONS.

(a) Alpha – *Enter Location Description*.

(b) Bravo – *Enter Location Description*.

8. ARRIVAL TRANSITIONS. Arriving helicopters will announce transition route prior to reaching North Point.

(a) Alpha – *Enter Location Description*.

(b) Bravo – *Enter Location Description*.

9. STANDARD DEPARTURE PROCEDURES AND ALTITUDE. All standard departure routes originate at *Enter Location Description*.

(a) North – *Enter Location Description*.

(b) East – *Enter Location Description*.

(c) South – *Enter Location Description*.

(d) West – *Enter Location Description*.

10. STANDARD ARRIVAL PROCEDURES AND ALTITUDES. All standard arrival procedures terminate at *Enter Location Description*.

(a) North Arrival – *Enter Location Description*.

(b) East Arrival – *Enter Location Description*.

(c) South Arrival – *Enter Location Description*.

(d) West Arrival – *Enter Location Description*.

MODEL SUBDIVISION REGULATIONS AMENDMENT

SECTION 1.0 PURPOSE. This chapter is intended to protect the public health, safety and welfare by regulating development and land use within noise sensitive areas and airport hazard areas; to ensure compatibility between Williams Gateway Airport and surrounding land uses; and to protect the Airport from incompatible encroachment.

SECTION 2.0 DEFINITIONS.

2.1 Airport Planning Area: The area currently exposed to aircraft noise and low aircraft overflights and at risk of being exposed to aircraft noise and low overflights over the long-term future. It is presented in the Noise Compatibility Plan. See the F.A.R. Part 150 Noise Compatibility Study for Williams Gateway Airport for more information.

2.2. Day-Night Sound Level (DNL): The 24-hour average sound level, in decibels, for the period from midnight to midnight, obtained after the addition of ten decibels to sound levels for the periods between midnight and 7 a.m. and between 10 p.m. and midnight, local time, as averaged over one year. It is the Federal Aviation Administration's standard metric for determining the cumulative exposure of individuals to noise.

2.3 DNL Contour: A line linking together a series of points of equal cumulative noise exposure based on the DNL metric. Such contours are developed based on aircraft flight patterns, number of daily aircraft operations by type of aircraft and time of day, noise characteristics of each aircraft, and typical runway usage patterns.

2.4. Decibel (dB): A unit of measure of a sound expressed from a calibrated sound level meter using an A-level weighting scale.

2.5 Structure: Any object, whether permanent or temporary, including, but not limited to, a building, tower, crane, smokestack, earth formation, transmission line, flagpole, or ship mast, and includes a mobile object.

SECTION 3.0 AREA OF APPLICABILITY. For purposes of this chapter, the standards and requirements provided herein shall apply within the Airport Planning Area.

SECTION 4.0 PLAT NOTICE. A notice of potentially high aircraft noise levels shall be affixed to and recorded with the final plat (or for a minor subdivision, the deed) for properties in the Airport Planning Area. The notice shall be worded as follows:

> "**NOISE WARNING -** All or part of this property is in an area potentially subject to aircraft noise levels high enough to annoy users of the property and interfere with its unrestricted use. Contact Williams Gateway Airport Director for information regarding the most recently calculated levels of current and forecast aircraft noise levels on the property."

SECTION 5.0 AVIGATIONAL EASEMENT. An avigational easement shall be granted to the Williams Gateway Airport Authority before approval of the final plat or deed for all subdivisions where required by the _____ Zoning Ordinance.

SECTION 6.0 FAIR DISCLOSURE AGREEMENT. For all subdivisions, a fair disclosure agreement shall be filed whereby the owner and his or her agents agree fully to disclose to prospective buyers of the property the potential airport noise impacts to which the property may be subject. This agreement shall be written and recorded as a covenant running with the land, binding all succeeding owners of the property within the subdivision.

MARICOPA ASSOCIATE OF GOVERNMENT
SOUND INSULATION STANDARDS

SECTION 1215. DEFINITIONS

In this ordinance, unless the context otherwise requires:

"ASTM (American Society for Testing and Materials)" means an organization which develops and publishes recommended practices and standards for a broad range of testing and material properties issues.

"A-WEIGHTED SOUND LEVEL" means a quantity, in decibels, read from a standard sound level meter which discriminates against the lower frequencies to which the ear is less sensitive. The A-weighted scale attempts to approximate the auditory sensitivity of the human ear.

"DAY-NIGHT AVERAGE SOUND LEVEL (DNL)" means the A-weighted equivalent continuous sound exposure for a 24-hour period with a 10 dB adjustment added to sound levels occurring during nighttime hours (10 p.m. to 7 a.m.)

"INTERIOR NOISE LEVEL" means the sound level of noise in any habitable room with windows and doors closed.

"NOISE CONTOURS" mean lines which connect points subject to equal noise levels expressed in terms of average daily noise over a 24-hour period.

"R-VALUE" means insulation properties of an assembly. Insulation properties are further defined as the ability to reduce the factor of heat transmission or loss.

"SOUND TRANSMISSION CLASS (STC)" means a single-number rating for describing sound transmission loss of a wall, roof, floor, window, door, partition, or other individual building components or assemblies.

SECTION 1217. APPLICATION TO NEW BUILDINGS

The criteria of this ordinance establish the minimum requirements for acoustic design of the exterior envelope of buildings and for through-the-wall ventilation (HVAC) units and their parts. These requirements shall apply to all new buildings and alterations for first occupancy after October 1, 1996 that are located on property on which the average sound level is sixty-five decibels or greater. This noise level is defined by the noise contours for Luke Air Force Base prepared as a part of the 1988 Maricopa Association of Governments Westside Joint Land Use Study. The criteria of this ordinance do not apply to ancillary buildings used in agricultural land use.

SECTION 1219. APPLICATION TO EXISTING BUILDINGS

- Additions may be made to existing buildings without making the entire building comply with all the requirements of this ordinance for new construction.

- If the gross floor area of a building is expanded by less than fifty percent, the requirements of this section apply only to the area of expansion. If the gross floor area of a non-residential building is expanded by fifty percent or more, the requirements of this section apply to the entire building.

- Any change in occupancy or use of a building shall not be permitted unless the building or portion of the building complies with this ordinance.

SECTION 1221. PLANS AND SPECIFICATIONS

The plans and specifications shall show in sufficient detail all pertinent data and features of the building and the equipment and systems, as herein governed, including, but not limited to: exterior envelope component materials; STC ratings of applicable component assemblies; R-values of applicable insulation materials; size and type of apparatus and equipment; equipment and system controls and other pertinent data to indicate conformance with the requirements herein.

SECTION 1223. ALTERNATE MATERIALS AND METHODS OF CONSTRUCTION

- The provisions of this ordinance are not intended to prevent the use of any material or method of construction not specifically prescribed by this ordinance, provided any alternative has been approved and its use authorized by the building official.

- The building official may approve any such alternate, provided the building official finds that the proposed design is satisfactory and complies with the provisions of this ordinance and that the material or method of construction is, for the purpose intended, at least the equivalent of that prescribed in this ordinance in noise level reduction.

- The building official shall require that sufficient evidence or proof be submitted by a licensed architect or engineer to substantiate any claims that may be made regarding the use of alternative materials and methods. The details of any action granting approval of an alternate shall be recorded and entered in the files of the county, city, or town.

SECTION 1225. BUILDING REQUIREMENTS FOR A NOISE LEVEL REDUCTION OF 25 dB

Compliance with Section 1231 through Section 1239 in Appendix A shall be deemed to meet requirements for a minimum noise level reduction (NLR) of 25 decibels.

SECTION 1227. BUILDING REQUIREMENTS FOR A NOISE LEVEL REDUCTION OF 30 dB

Compliance with Section 1241 through Section 1249 in Appendix A shall be deemed to meet requirements for a minimum noise level reduction (NLR) of 30 decibels.

SECTION 1229. BUILDING REQUIREMENTS FOR A NOISE LEVEL REDUCTION OF 35 dB

Compliance with Section 1251 through Section 1259 in Appendix A shall be deemed to meet requirements for a minimum noise level reduction (NLR) of 35 decibels.

SOUND ATTENUATION STANDARDS
April 9, 1996

	25 dB Reduction (Required Within 65-70 DNL Noise Contours)	30 dB Reduction (Required within 70-75 DNL Noise Contours)	35 dB Reduction (Required within 75-80 DNL Noise Contours)
General	Section 1231 a. Brick veneer, masonry blocks, or stucco exterior walls shall be constructed airtight. All joints shall be grouted or caulked airtight.	Section 1241 a. Brick veneer, masonry blocks, or stucco exterior walls shall be constructed airtight. All joints shall be grouted or caulked airtight.	Section 1251 a. Brick veneer, masonry blocks, or stucco exterior walls shall be constructed airtight. All joints shall be grouted or caulked airtight.
	b. At the penetration of exterior walls by pipes, ducts, or conduits, the space between the wall and pipes, ducts, or conduits shall be caulked or filled with mortar.	b. At the penetration of exterior walls by pipes, ducts, or conduits, the space between the wall and pipes, ducts, or conduits shall be caulked or filled with mortar.	b. At the penetration of exterior walls by pipes, ducts, or conduits, the space between the wall and pipes, ducts, or conduits shall be caulked or filled with mortar.
	c. Window and/or through-the-wall ventilation units (HVAC) shall not be used.	c. Window and/or through-the-wall ventilation (HVAC) units shall not be used.	c. Window and/or through-the-wall ventilation units shall not be used.
	d. Through-the-wall/door mail boxes shall not be used.	d. Through-the-wall/door mail boxes shall not be used.	d. Through-the-wall/door mail boxes shall not be used.
	e. All sleeping spaces shall be provided with a sound-absorbing ceiling system and carpeted floors.	e. All sleeping spaces shall be provided with a sound-absorbing ceiling system and a carpeted floor.	e. All sleeping spaces shall be provided with a sound-absorbing ceiling system and a carpeted floor.
		f. Operational vented fireplaces shall not be used.	f. Operational vented fireplaces shall not be used.

	25 dB Reduction (Required Within 65-70 DNL Noise Contours)	30 dB Reduction (Required within 70-75 DNL Noise Contours)	35 dB Reduction (Required within 75-80 DNL Noise Contours)
Exterior Walls	Section 1233 1. Exterior walls, other than as described in this section, shall have a laboratory sound transmission class rating of at least STC 39;	Section 1243 1. Exterior walls, other than as described in this section, shall have laboratory sound transmission class rating of at least STC 44;	Section 1253 1. Exterior walls, other than as described in this section shall have a laboratory sound transmission class rating of at least STC 49;
	2. Masonry walls having a weight of at least 25 pounds per square foot do not require a furred (stud) interior wall. At least one surface of concrete block walls shall be plastered or painted with heavy "bridging" paint.	2. Masonry walls having a weight of at least 40 pounds per square foot do not require a furred (stud) interior wall. At least one surface of concrete block walls shall be plastered or painted with heavy "bridging" paint.	2. Masonry walls having a weight of at least 75 pounds per square foot do not require a furred (stud) interior wall. At least one surface of concrete block walls shall be plastered or painted with heavy "bridging" paint.
	3. Stud walls shall be at least 4 inches in nominal depth and shall be finished on the outside with solid sheathing under an approved exterior wall finish; siding-on-sheathing, stucco or brick veneer.	3. Stud walls shall be at least 4 inches in nominal depth and shall be finished on the outside with solid sheathing under an approved exterior wall finish: siding on sheathing, stucco or brick veneer.	3. Stud walls shall be at least 4 inches in nominal depth and shall be finished on the outside with solid sheathing under an approved exterior wall finish: siding-on-sheathing, stucco, or brick veneer.
	1. Interior surface or the exterior walls shall be of gypsum board or plaster at least ½ inch thick, installed on the studs.	1. Interior surface of the exterior walls shall be of gypsum board or plaster at least ½ inch thick, installed on the studs. The gypsum board or plaster may be fastened rigidly to the studs if the exterior	1. Interior surface of the exterior walls shall be of gypsum board or plaster at least 5/8 inch thick installed on the studs. The gypsum board or plaster may be fastened rigidly to the

		is brick veneer or stucco. If the exterior is siding-on-sheathing, the interior gypsum board or plaster must be fastened resiliently to the studs.	studs if the exterior is brick veneer or stucco. If the exterior is siding-on-sheathing, the interior gypsum board or plaster must be fastened resiliently to the studs or double thickness must be used.

	25 dB Reduction (Required Within 65-70 DNL Noise Contours)	30 dB Reduction (Required within 70-75 DNL Noise Contours)	35 dB Reduction (Required within 75-80 DNL Noise Contours)
	2. Continuous composition board, plywood, or gypsum board sheathing at least ½inch thick shall cover the exterior side of the wall studs behind wood or metal siding. Asphaltic or wood shake shingles are acceptable in lieu of siding.	2. Continuous composition board, plywood, or gypsum board sheathing at least 3/4 inch thick shall cover the exterior side of the wall studs behind wood or metal siding. The sheathing and facing shall weigh at least 4 pounds per square foot.	2. Continuous composition board, plywood, or gypsum board sheathing at least 1 inch thick shall cover the exterior side of the wall studs. The sheathing and facing shall weigh at least 4 pounds per square foot.
	3. Sheathing panels shall be butted tightly and covered on the exterior with overlapping building paper. The top and bottom edges of the sheathing shall be sealed.	3. Sheathing panels shall be butted tightly and covered on the exterior with overlapping building paper. The top and bottom edges of the sheathing shall be sealed.	3. Sheathing panels shall be butted tightly and covered on the exterior with overlapping building paper. The top and bottom edges of the sheathing shall be sealed.
	4. Insulation material at least R-11 shall be installed continuously throughout the cavity space behind the exterior sheathing and between wall studs. Insulation shall be glass fiber or mineral wool.	4. Insulation material at least R-15 shall be installed continuously throughout the cavity space behind the exterior sheathing and between wall studs. Insulation shall be glass fiber or mineral wool.	4. Insulation material at least R-19 shall be installed continuously throughout the cavity space behind the exterior sheathing and between wall studs. Insulation shall be glass fiber or mineral wool.
Exterior Windows	Section 1234 1. Windows other than as described in this section shall have a laboratory sound transmission class rating of at least STC-28;	Section 1244 1. Windows other than as described in this section shall have a laboratory sound transmission class rating of at least STC-	Section 1254 1. Windows other than as described in this section shall have a laboratory sound transmission class rating of at least STC-

	28;	33;	38;
	2. Glass shall be at least 3/16 inch thick, double glazed.	2. Windows shall be double glazed with panes at least 3/16 inch thick. Panes of glass shall be separated by a minimum ½ inch airspace.	2. Glass of double glazed windows shall be at least 3/16 inch thick. Panes of glass shall be separated by a minimum ½ inch airspace and shall not be equal in thickness.

	25 dB Reduction (Required Within 65-70 DNL Noise Contours)	30 dB Reduction (Required within 70-75 DNL Noise Contours)	35 dB Reduction (Required within 75-80 DNL Noise Contours)
	3. All operable windows shall be weatherstripped and airtight when closed so as to conform to an air infiltration test not to exceed 0.5 cubic foot per minute per foot of crack length in accordance with ASTM E-283-65-T.	3. Double-glazed windows shall employ fixed sash or efficiently weather-stripped, operable sash. The sash shall be rigid and weatherstripped with material that is compressed airtight when the window is closed so as to conform to an infiltration test not to exceed 0.5 cubic foot per minute per foot of crack length in accordance with ASTM E-283-65-T.	3. Double-glazed windows shall employ fixed sash or efficiently weatherstripped, operable sash. The sash shall be rigid and weather-stripped with material that is compressed airtight when the window is closed so as to conform to an infiltration test not to exceed 0.5 cubic foot per minute per foot of crack length in accordance with ASTM E-283-65-T.
	4. Glass of fixed sash windows shall be sealed in an airtight manner with a nonhardening sealant or a soft elastomer gasket or glazing tape.	4. Glass of fixed sash windows shall be sealed in an airtight manner with a nonhardening sealant or a soft elastomer gasket or gasket tape.	4. Glass of windows shall be sealed in an airtight manner with nonhardening sealant or a soft elastomer or glazing tape.
	5. The perimeter of window frames shall be sealed airtight to the exterior wall construction with a sealant conforming to one of the following Federal specifications: TT-S-00227, TT-S-00230, or TT-S-00153.	5. The perimeter of window frames shall be sealed airtight to the exterior wall construction with a sealant conforming to one of the following Federal specifications: TT-S-0027, TT-S-00230, or TT-S-00153.	5. The perimeter of window frames shall be sealed airtight to the exterior wall construction with a sealant conforming to one of the following Federal specifications: TT-S-00227, TT-S-00230, or TT-S-00153.
	6. The total area of glass in both windows and	6. The total area of glass of both windows and	6. The total area of glass of both windows and

	doors in sleeping spaces shall not exceed 20% of the floor area.	exterior doors in sleeping spaces shall not exceed 20% of the floor area.	exterior doors in sleeping spaces shall not exceed 20% of the floor area.
Exterior Doors	Section 1235 1. Doors other than as described in this section shall have a laboratory sound transmission class rating of at least STC-28.	Section 1245 1. Doors other than as described in this section shall have a laboratory sound transmission class rating of at least STC-33.	Section 1255 1. Doors other than as described in this section shall have a laboratory sound transmission class rating of at least STC 38.

	25 dB Reduction (Required Within 65-70 DNL Noise Contours)	30 dB Reduction (Required within 70-75 DNL Noise Contours)	35 dB Reduction (Required within 75-80 DNL Noise Contours)
	2. All exterior side-hinged doors shall be solid core wood or insulated hollow metal at least 1-3/4 inches thick and shall be fully weatherstripped.	2. Double door construction is required for all door openings to the exterior. Openings fitted with side-hinged doors shall have one solid core wood or insulated hollow metal door at least 1-3/4 inches thick separated by an airspace of at least 4 inches from another door, which can be a storm door. Both doors shall be tightly fitted and weatherstripped.	2. Double door construction is required for all door openings to the exterior. The doors shall be side-hinged and shall be solid core wood or insulated hollow metal door at least 1-3/4 inches thick, separated by a vestibule or enclosed porch at least 3 feet in length. Both doors shall be tightly fitted and weather-stripped.
	3. Exterior sliding doors shall be weather-stripped with an efficient airtight gasket system with performance as specified in Section 1234 (c). The glass in the sliding doors shall be at least 3/16 inch thick.	3. The glass of double glazed sliding doors shall be separated by a minimum ½ inch airspace. Each sliding frame shall be provided with an efficiently airtight weatherstripping material as specified in Section 1244 (c).	3. The glass of double glazed sliding doors shall be separated by a minimum ½ inch airspace. Each sliding frame shall be provided with an efficiently airtight weather-stripping material as specified in Section 1254 (c).
	4. Glass in doors shall be sealed in an airtight nonhardening sealant or in a soft elastomer gasket or glazing tape.	4. Glass in all doors shall be at least 3/16 inch thick. Glass in double sliding doors shall not be equal in thickness.	4. Glass of all doors shall be at least 3/16 inch thick. Glass in double sliding doors shall not be equal in thickness.
	5. The perimeter of door frames shall be sealed airtight to the exterior wall construction	5. The perimeter of door frames shall be sealed airtight to the exterior wall construction	5. The perimeter of door frames shall be sealed airtight to the exterior wall construction

	(framing) as described in Section 1234 (e).	(framing) as indicated in Section 1244 (e).	(framing) as indicated in Section 1254 (e).
		6. Glass in doors shall be sealed in an airtight nonhardening sealant or in a soft elastomer gasket or glazing tape.	6. Glass in doors shall be sealed in an airtight nonhardening sealant or in a soft elastomer gasket or glazing tape.

	25 dB Reduction (Required Within 65-70 DNL Noise Contours)	30 dB Reduction (Required within 70-75 DNL Noise Contours)	35 dB Reduction (Required within 75-80 DNL Noise Contours)
Roofs	Section 1236 1. Combined roof and ceiling construction other than described in this section and Section 1237 shall have a laboratory sound transmission class rating of at least STC-39.	Section 1246 1. Combined roof and ceiling construction other than described in this section and Section 1247 shall have a laboratory sound transmission class rating of at least STC-44.	Section 1256 1. Combined roof and ceiling construction other than described in this section and Section 1257 shall have a laboratory sound transmission class rating of at least STC-49.
	2. With an attic or rafter space at least 6 inches deep, and with a ceiling below, the roof shall consist of ½ inch composition board, plywood, or gypsum board sheathing topped by roofing as required.	2. With an attic or rafter space at least 6 inches deep, and with a ceiling below, the roof shall consist of 3/4 inch closely butted composition board, plywood, or gypsum board sheathing topped by roofing as required.	2. With an attic or rafter space at least 6 inches deep, and with a ceiling below, the roof shall consist of 1 inch composition board, plywood, or gypsum board sheathing topped by roofing as required.
	3. Open beam roof construction shall follow the energy insulation standard method for batt insulation.	3. Open beam roof construction shall follow the energy insulation standard method for batt insulation, except use 1 inch plywood decking with shakes or other suitable roofing material.	3. Open beam roof construction shall follow the energy insulation standard method for batt insulation, except use 1 inch plywood decking with concrete or clay tiles as roofing material.
	4. If the underside of the roof is exposed, or if the attic or rafter space is less than 6 inches, the roof construction shall have a surface weight of at least 6 pounds per	4. If the underside of the roof is exposed, or if the attic or rafter spacing is less than 6 inches, the roof construction shall have a surface weight of at	4. If the underside of the roof is exposed, or if the attic or rafter spacing is less than 6 inches, the roof construction shall have a surface weight of 9

	square foot. Rafters, joists, or other framing may not be included in the surface weight calculation.	least 9 pounds per square foot. Rafters, joists, or other framing may not be included in the surface weight calculations.	pounds per square foot. Rafters, joists, or other framing may not be included in the surface weight calculation.
	5. Window or dome skylights shall have a laboratory sound transmission class rating of at least STC-28.	5. Window or dome skylights shall have a laboratory sound transmission class rating of at least STC-33.	

	25 dB Reduction (Required Within 65-70 DNL Noise Contours)	30 dB Reduction (Required within 70-75 DNL Noise Contours)	35 dB Reduction (Required within 75-80 DNL Noise Contours)
Ceiling	Section 1237 1. Gypsum board or plaster ceilings at least ½ inch thick shall be provided where required by Section 1236 (b). Ceilings shall be substantially airtight with a minimum of penetrations.	Section 1247 1. Gypsum board or plaster ceilings at least 5/8 inch thick shall be provided where required by Section 1246 (b), above. Ceilings shall be substantially airtight with a minimum of penetrations.	Section 1257 1. Gypsum board or plaster ceilings at least 5/8 inch thick shall be provided where required by Section 1256, above. Ceilings shall be substantially airtight with a minimum of penetrations. The ceiling panels shall be mounted on resilient clips or channels.
	2. Glass fiber or mineral wool insulation at least R-19 shall be provided above the ceiling between joists.	2. Glass fiber or mineral wool insulation at least R-25 shall be provided above the ceiling between joists.	2. Glass fiber or mineral wool insulation at least R-30 shall be provided above the ceiling between joists.
Floors	Section 1238 Openings to any crawl spaces below the floor of the lowest occupied rooms shall not exceed 2% of the floor area of the occupied rooms.	Section 1248 The floor of the lowest occupied rooms shall be slab on fill, below grade, or over a fully enclosed basement or crawl space. All door and window openings in the fully enclosed basement shall be tightly fitted. Crawl space ventilation shall comply with Section 1238.	Section 1258 1. The floor of the lowest occupied rooms shall be slab on fill or below grade.

	25 dB Reduction (Required Within 65-70 DNL Noise Contours)	30 dB Reduction (Required within 70-75 DNL Noise Contours)	35 dB Reduction (Required within 75-80 DNL Noise Contours)
Ventilation	Section 1239 1. A ventilation system shall be installed that will provide the minimum air circulation and fresh air supply requirements for various uses in occupied rooms without the need to open any windows, doors, or other openings to the exterior. The inlet and discharge openings shall be fitted with sheet metal transfer ducts of at least 20 gauge steel, which shall be lined with 1 inch thick coated glass fiber, and shall be at least 5 feet long with one 90 degree bend.	Section 1249 1. A mechanical ventilation system shall be installed that will provide the minimum air circulation and fresh air supply requirements for various uses in occupied rooms without the need to open any windows, doors, or other openings to the exterior. The inlet and discharge openings shall be fitted with sheet metal transfer ducts of at least 20 gauge steel, which shall be lined with 1 inch thick coated glass fiber, and shall be at least 5 feet long with one 90 degree bend.	Section 1259 1. A mechanical ventilation system shall be installed that will provide the minimum air circulation and fresh air supply requirements for various uses in occupied rooms without the need to open any windows, doors, or other openings to the exterior. The inlet and discharge openings shall be fitted with sheet metal transfer ducts of at least 20 gauge steel, which shall be lined with 1 inch thick coated glass fiber, and shall be at least 10 feet long with one 90 degree bend.
	2. Gravity vent openings in attics shall not exceed code minimum in number and size, as practical.	2. Gravity vent openings in attics shall not exceed code minimum in number and size, as practical. The openings shall be fitted with transfer ducts at least 3 feet in length containing internal 1 inch thick coated fiberglass sound-absorbing duct lining. Each duct shall have a lined 90 degree bend	2. Gravity vent openings in attics shall be as close to code minimum in number and size, as practical. The openings shall be fitted with transfer ducts at least 6 feet in length containing internal 1 inch thick coated fiberglass sound-absorbing duct lining. Each duct shall have a lined 90 degree

		in the duct such that there is no direct line-of-sight from the exterior through the duct into the attic.	bend in the duct such that there is no direct line-of-sight from the exterior through the duct into the attic.

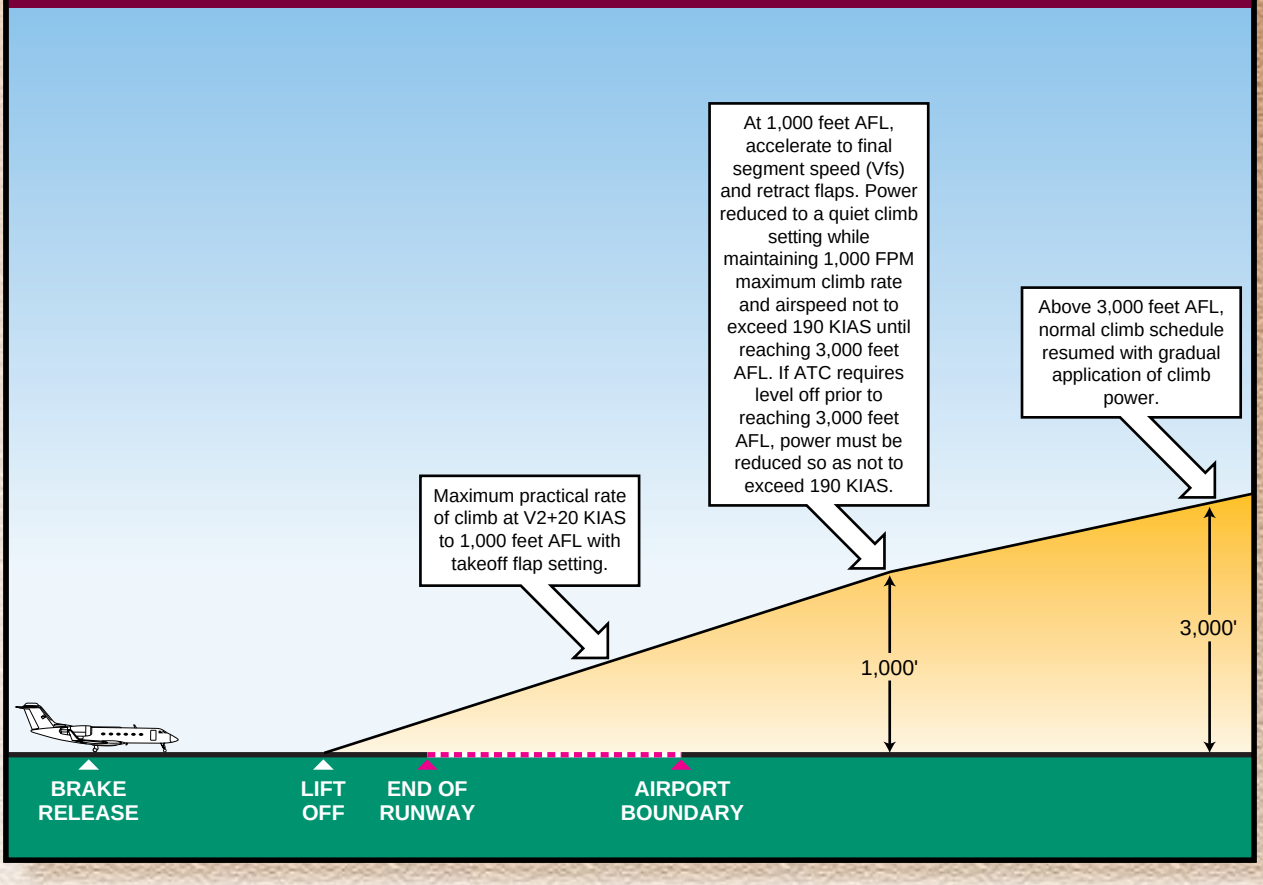
	25 dB Reduction (Required Within 65-70 DNL Noise Contours)	30 dB Reduction (Required within 70-75 DNL Noise Contours)	35 dB Reduction (Required within 75-80 DNL Noise Contours)
	3. If a fan is used for forced ventilation, the attic inlet and discharge openings shall be fitted with sheet metal transfer ducts of at least 20 gauge steel, which shall be lined with coated glass fiber 1 inch thick, and shall be at least 5 ft. long with one 90 degree bend.	3. If a fan is used for forced ventilation, the attic inlet and discharge openings shall be fitted with sheet metal transfer ducts of at least 20 gauge steel, which shall be lined with coated glass fiber 1 inch thick, and shall be at least 5 ft. long with one 90 degree bend.	3. If a fan is used for forced ventilation, the attic inlet and discharge openings shall be fitted with sheet metal transfer ducts of at least 20 gauge steel, which shall be lined with 1 inch thick coated glass fiber, and shall be at least 10 ft. long with one 90 degree bend.
	4. All other vent ducts connecting the interior space to the outdoors, shall contain at least a 5-foot length of internal sound-absorbing duct lining. Each duct shall be provided with a bend in the duct such that there is no direct line-of-sight through the duct from the venting cross-section to the room-opening cross-section. Duct lining shall be coated glass fiber duct liner at least 1 inch thick approved and suitable for the intended use.	4. All other vent ducts connecting the interior space to the outdoors, shall contain at least a 10-foot length of internal sound-absorbing duct lining. Each duct shall be provided with a lined 90 degree bend in the duct such that there is no direct line-of-sight through the duct from the venting cross-section to the room opening cross-section. Duct lining shall be coated glass fiber duct liner at least 1 inch thick approved and suitable for intended use.	4. All other vent ducts connecting the interior space to the outdoors, shall contain at least a 10-foot length of internal sound-absorbing duct lining. Each duct shall be provided with a lined 90 degree bend in the duct such that there is no direct line-of-sight through the duct from the venting cross-section to the room-opening cross-section. Duct lining shall be coated glass fiber duct liner at least 1 inch thick approved and suitable for intended use.

	25 dB Reduction (Required Within 65-70 DNL Noise Contours)	30 dB Reduction (Required within 70-75 DNL Noise Contours)	35 dB Reduction (Required within 75-80 DNL Noise Contours)
	5. Domestic range exhaust ducts connecting the interior space to the outdoors shall contain a baffle plate across the exterior termination which allows proper ventilation. The dimensions of the baffle plate should extend at least one diameter beyond the line-of-sight into the vent duct. The baffle plate shall be of the same material and thickness as the vent duct material.	5. Domestic range exhaust ducts connecting the interior space to the outdoors shall contain a self-closing baffle plate across the exterior termination which allows proper ventilation. Each duct shall be provided with a bend in the duct such that there is no direct line-of-sight through the duct from the venting cross-section to the room-opening cross-section. The dimensions of the baffle plate should extend at least one diameter beyond the line-of-sight into the vent duct. The baffle plate shall be made of the same material and thickness as the vent duct material.	5. Domestic range exhaust ducts connecting the interior space to the outdoors shall contain a self-closing baffle plate across the exterior termination which allows proper ventilation. The dimensions of the baffle plate should extend at least one diameter beyond the line-of-sight into the vent duct. The baffle plate shall be of the same material and thickness as the vent duct material. The duct shall be offset such that there is no direct line-of-sight through the duct.
	6. Fireplaces shall be provided with well fitted dampers as required for the type of fuel being used and tightly fitted glass doors.	6. Building heating units with flues or combustion air vents shall be located in a closet or room closed off from the occupied space by doors.	6. Building heating units with flues or combination air vents shall be located in a closet or room closed off from the occupied space by doors.
		7. Doors between occupied space and mechanical equipment	7. Doors between occupied space and mechanical equipment

		areas shall be solid core wood or 20 gauge insulated steel hollow metal at least 1-3/4 inch thick and shall be fully weather-stripped.	areas shall be solid core wood or 20 gauge insulated hollow metal at least 1-3/4 inch thick and shall be fully weatherstripped.

99SP09-C1-5/17/00

NATIONAL BUSINESS AVIATION ASSOCIATION (NBAA) STANDARD NOISE ABATEMENT DEPARTURE PROCEDURE



KEY

AFL - Above field elevation
ATC - Air traffic control
FPM - Feet per minute
KIAS - Knots, indicated airspeed

Note: It is recognized that aircraft performance will differ with aircraft type and takeoff conditions; therefore, the business aircraft operator must have the latitude to determine whether takeoff thrust should be reduced prior to, during, or after flap retraction.

Source: National Business Aviation Association (NBAA), "NBAA Noise Abatement Program," January 1, 1993.

For copies of the NBAA's noise abatement program, suitable for insertion into pilot flight manuals, contact:

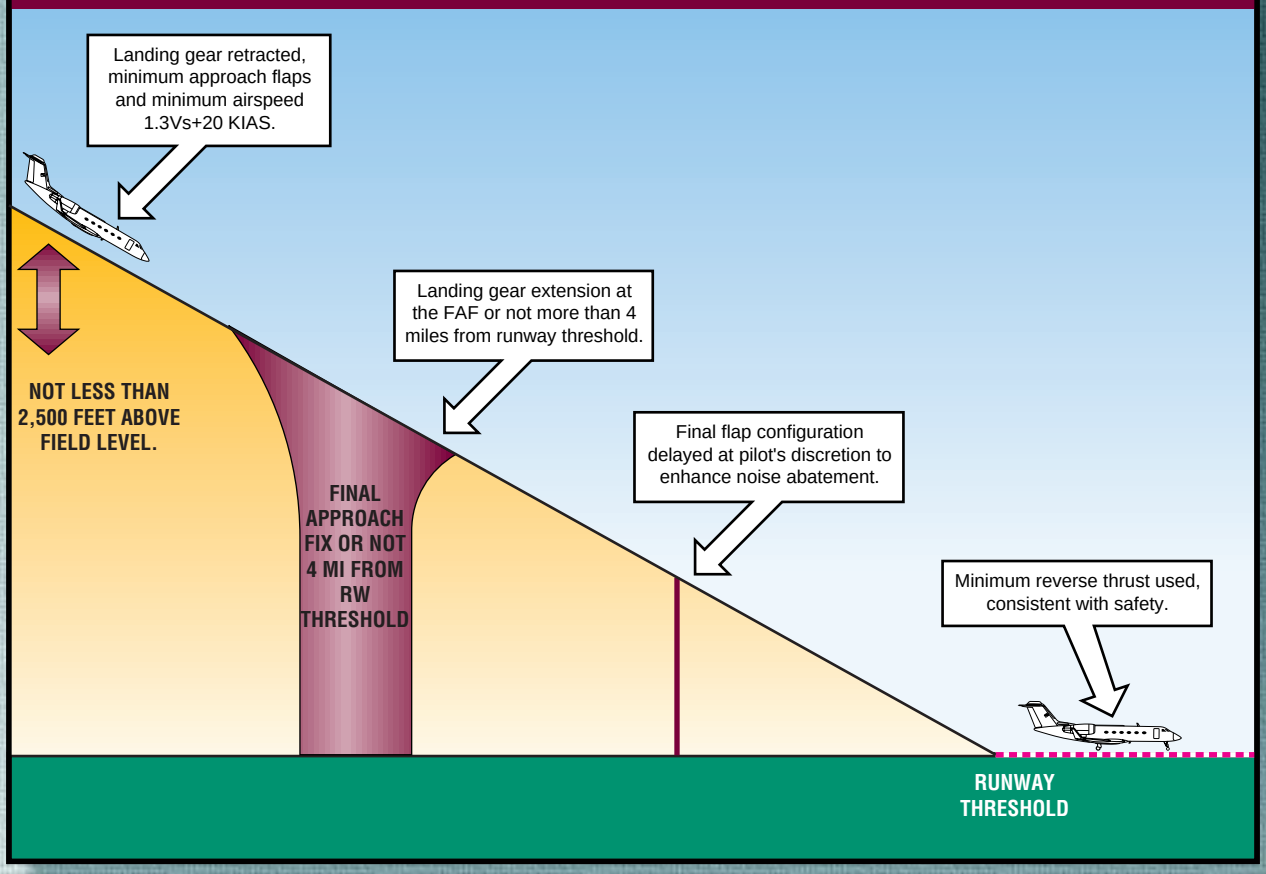
NBAA, Inc.
1200 Eighteenth St., NW
Washington, D.C. 20036
Phone: 202-783-9000
FAX: 202-331-8364

WILLIAMS GATEWAY AIRPORT

Exhibit C1
NATIONAL BUSINESS AVIATION ASSOCIATION (NBAA) STANDARD NOISE ABATEMENT DEPARTURE PROCEDURE

99SP09-C2-5/18/00

NATIONAL BUSINESS AVIATION ASSOCIATION (NBAA) APPROACH AND LANDING PROCEDURE VFR & IFR



1) Inbound flight path should not require more than a 20 degree bank angle to follow noise abatement track.

2) Observe all airspeed limitations and ATC instructions.

3) Initial inbound altitude for noise abatement areas will be a descending path from 2,500 feet AGL or higher. Maintain minimum airspeed (1.3Vs+20 KIAS) with gear retracted and minimum approach flap setting.

4) At the final approach fix (FAF) or not more than 4 miles from runway threshold, extend landing gear. Final landing flap configuration should be delayed at pilot's discretion to enhance noise abatement.

5) During landing, use minimum reverse thrust consistent with safety for runway conditions and available length.

Source: National Business Aviation Association (NBAA), "NBAA Noise Abatement Program," January 1, 1993.

For copies of the NBAA's noise abatement program, suitable for insertion into pilot flight manuals, contact:

NBAA, Inc.
1200 Eighteenth St., NW
Washington, D.C. 20036
Phone: 202-783-9000
FAX: 202-331-8364

WILLIAMS GATEWAY AIRPORT

Exhibit C2
NATIONAL BUSINESS AVIATION ASSOCIATION (NBAA) APPROACH AND LANDING PROCEDURE VFR & IFR

Appendix D
Noise Measurements

AIRCRAFT NOISE MEASUREMENT PROGRAM

A supplemental noise measurement program was conducted over a two-day period from August 25, 1999 through August 26, 1999. The supplemental field measurement program was undertaken to re-measure two monitor sites in which technical problems occurred with the noise monitor equipment.

It must be recognized that field measurements made over a 24-hour period are applicable only to that period of time and may not -- in fact in Information collected during the noise monitoring program included 24-hour measurements for comparison with computer-generated DNL values. DNL -- day-night sound level -- is a measure of cumulative sound energy during a 24-hour period. In addition, all noise occurring from 10:00 p.m. to 7:00 a.m. is assigned a 10 dB penalty because of the greater annoyance many cases, do not -- reflect the average conditions present at the site over a much longer period of time. The relationship between field measurements and computer-generated noise exposure forecasts is analogous to the relationship between weather and climate. While an area may be characterized as having a cool climate, many individual days of high temperatures may occur. In other words, the modeling process derives overall average annual conditions (climate), while field measurements reflect daily fluctuations (weather).

typically caused by nighttime noise. Use of the DNL noise metric in airport noise compatibility studies is required by F.A.R. Part 150. Additional information collected on single event measurements is used as an indicator of typical dBA and Sound Exposure Levels (SEL) within the study area as well as comparative ambient

noise measurements in areas affected by aircraft noise.

ACOUSTICAL MEASUREMENTS

This section provides a technical description of the acoustical measurements which were performed for the Williams Gateway Airport F.A.R. Part 150 Noise Compatibility Study. Described here are the instrumentation, calibration procedures, general maturement procedures, and related data collection items and procedures.

Instrumentation

Two sets of acoustical instrumentation, the components of which are listed in **Table D1**, were used to measure noise. Each set consisted of a high quality microphone connected to a 24-hour environmental noise monitor unit. Each unit was calibrated to assure consistency between measurements at different locations. A calibrator, with an accuracy of 0.5 decibels, was used for all measurements. At the completion of each field measurement, the calibration was rechecked, the accumulated output data was downloaded to a portable computer.

TABLE D1
Acoustical Measurement Instrumentation

2	Larson Davis 820 Portable Noise Monitors and Preamplifiers
2	Larson Davis Model 2559 - ½" Microphones
1	Model CA250 Sound Level Calibrator
1	Portable Computer

The equipment indicated in the table was supplemented by accessory cabling, windscreens, tripods, security devices, etc., as appropriate to each measurement site.

Two methods were used to attempt to minimize the potential for non-aircraft noise sources to unduly influence the results of the measurements. First, for single-event analysis, minimum noise thresholds of five to ten decibels (dB) greater than ambient levels were programmed. This procedure resulted in the requirement that a single noise event exceed a threshold of 60 dB at each site. Second, a minimum event duration longer than the time associated with ambient single events above the threshold (for example, road traffic) was set (generally at five seconds). The combination of these two factors limited the single events analyzed in detail to those which exceeded

Measurement Procedures

the preset threshold for longer than the preset duration. In spite of these efforts, contamination of the single event data is always possible.

Although only selected single events were specially retained and analyzed, the monitors do, however, cumulatively consider all noise present at the site, regardless of its level, and provide hourly summations of Equivalent Noise Levels (Leq). Additionally, the equipment optionally provides information on the hourly maximum decibel level, SEL values for each event which exceeds the preset threshold and duration, and

distributions of decibel levels throughout the measurement period.

Weather Information

The noise measurements taken during this study were obtained during a period of average summer weather for the Williams Gateway area. Conditions were generally clear throughout the program with only one intermittent rain shower during the monitor period. Winds were generally light and from the north in the mornings, switching to the south in the afternoons. Daily temperatures ranged from high of 105 degrees to lows in the low 80s.

Aircraft Noise Measurement Sites

Noise measurement sites are shown on **Exhibit D1**. Both sites were measured for 24-hours periods.

Site E is located at 21787 E. Nightingale in Queen Creek. This home is approximately 13,000 feet southeast of the airport. The area is a single-family residential area of contemporary homes on large lots. The site is in an area that would likely receive regular arrival and departure overflight noise from all three runways.

The equipment was set up at the side yard of the house. A small dog was present in the backyard. There were no overflights during the equipment setup.

The 24-hour equivalent sound level (Leq) for the 24-hour period at Site E was 45.4. The DNL level for this site was computed for the period was 51.5. The mode noise level, that is, the most commonly recorded level, was 39.9 for the 24-hour measurement period.

Site F is located at 17208 E Sagosa in Gilbert approximately 12,000 feet west of the airport. The area is a large single-family residential area of contemporary homes on large lots.

The equipment was set up at the rear of the house near a horse stable. Horses and a large dog were present during the monitor setup. The Southern Pacific Railroad tracks are approximately 2,000 feet from the monitor location. There were no aircraft overflights during the monitor setup.

The 24-hour Leq for Site F was 47.2. The DNL level for this site was computed to be 62.2 for the measurement period. The most commonly recorded level was 43.7 for the 24-hour measurement period.

MEASUREMENT RESULTS SUMMARY

The noise data collected during the measurement period are presented in **Table D2**. The information includes the average 24-hour Leq for each site. The Leq metric is derived by accumulating all noise during a given period and logarithmically averaging it. It is similar to the DNL metric except that no extra weight is attached to nighttime noise.

Three DNL values are presented for each site. DNL(24) represents the DNL from all noise sources. DNL(t) is developed only from noise exceeding the loudness and duration thresholds defined at each measurement site. The DNL(t) is a reasonable approximation of the DNL attributable to aircraft noise alone. Aircraft noise events are usually the only ones exceeding these thresholds if the site and the thresholds are carefully selected. It is this DNL(t)

TABLE D2
Measurement Results Summary
Williams Gateway Airport

	Site E	**Site F**
Measurement Dates	8/25 -85/26	8/25 -85/26
Cumulative Data		
LEQ(24)	45.4	47.2
DNL(24)	51.6	62.2
DNL(t)	46.0	50.6
DNL(b)	50.2	61.7
MODE dB	39.9	43.7
L(50)	42.4	50.8
Single Event Data		
L(max)	86.2	78.4
SEL(max)	88.3	98.5
Max Duration (sec)	38	2396
Number of Single Events above 60 dB (Lmax)	67	175
Number of Single Events Above		
SEL 70 dB SEL	45	92
SEL 80 dB	5	32
SEL 90 dB	0	4
SEL100 dB	0	0

Source: Coffman Associates Analysis

value against which modeled noise may be compared to assess the adequacy of the computer predictive model in describing actual conditions. DNL(b) provides a measure of the residual background noise resulting from subtracting the DNL(t) value from the DNL(24) value.

In addition, the L(50) values for each site are presented. These values represent the sound levels above which 50 percent of the samples were recorded. All of the cumulative data presented represents the average values for the duration of the measurements at each site.

The table also presents data on other measures of noise that may be useful for comparisons. These include:

- Maximum recorded noise level in dB (Lmax);
- Maximum recorded sound exposure level (SELmax);
- Longest single-event duration in seconds (Dur max);
- Most frequently recorded decibel level (Mode dB);
- Number of single events above sound exposure levels (SEL) 70, 80, 90, and 100.

For comparative purposes, normal conversation is generally at a sound level of 60 decibels while a busy street is approximately 70 decibels along the adjacent sidewalk.

The program resulted in a total of two 24-hour periods from two sites south and west of the Airport. A total of 242 single events were recorded during the program.

COMPARATIVE MEASUREMENT ANALYSIS

A comparison of the measured versus the computer-predicted cumulative DNL noise values for each measurement site has been developed. In this case, it is important to remember what each of the two noise levels indicates. The computer-modeled DNL contours are analogous to the climate of an area and represent the noise levels on an average day of the period under consideration. In contrast, the field measurements reflect only the noise levels on the specific day of measurement. Additionally, the field measurements consider all of the noise events that exceed a prescribed threshold and duration (DNL(t)), while the computer model only calculates the noise due to the aircraft events. As previously discussed, the field measurements can easily be contaminated by ambient noise sources other than aircraft around the measurement sites. With this understanding in mind, it is useful to evaluate the comparative aircraft DNL levels of the measurement sites.

DNL Comparison

This analysis provides a direct comparison of the measured and predicted average daily DNL values for both 24-hour noise measurement site. In order to facilitate such a comparison, it is necessary to ensure that the computer model input is representing the observed reality as accurately as possible within the capabilities of the model.

During the measurements, the airport operated in both a south flow and a north flow. The flow tended to vary throughout the day during the program. Consequently, in order to evaluate the INM based on this field data, it is reasonable to look at the average annual noise contours developed as a requirement of F.A.R. Part 150.

A difference of three to four DNL is generally not considered a significant deviation between measured and calculated noise, particularly at levels above 65 DNL. Additional deviation is expected at levels below 65 DNL. For comparison, the average human ear cannot distinguish changes in sound levels of less than two or three decibels. The measured and predicted noise levels are presented for each aircraft noise measurement site in **Table D3**.

For the most part, the measurements reflect the predicted sound levels in the area surrounding the airport. As seen in **Table D3**, in both cases the predicted sound levels fall within the three to four decibel deviation. Measured values at Site E, southeast of the Airport, were 4.0 DNL below the INM predicted values. Measured values at Site F, located west of the Airport, are slightly higher (4.4 DNL) than predicted. The nearby Southern Pacific Railroad tracks and horse stable are possible contributors to the higher DNL values measured at this location. There were several events recorded at Site F that lasts longer than a typical aircraft overflight (20 to 60 seconds). The longest event recorded lasted almost 40 minutes.

TABLE D3
Noise Measurement vs. Predicted DNL Values

	Site #E Day 1	Site #F Day 1
INM-Predicted Values	50.4	46.2
Measured Values	46.0	50.2
Difference	+4.4	-4.0

Source: Coffman Associates Analysis

SUMMARY

The noise measurement values recorded at Sites E and F are within acceptable deviation between measured and calculated noise levels. It must be recognized, however, that field measurements made over a one-day period are applicable only to that period of time and may not -- in fact, in many cases, do not -- reflect the average conditions at the site over a much longer period of time. The computer-modeled contours represent noise levels on an average day of the year. In contrast, the measurements reflect only the noise levels present at the time of measurement. In other words, the modeling process derives overall average annual conditions, while field measurements reflect daily fluctuations.

99SP09-D1-05/25/00

Broadway Rd.
Main St./Apache Trail
Southern Ave.
Superstition Freeway
Baseline Rd.
Apache Junction
Guadalupe Rd.
Gilbert
Elliot Rd.
Mesa
Warner Rd.
Ray Rd.
Williams Field Rd.
General Motors Proving Grounds
Pecos Rd.
Pecos Road Realignment
Germann Rd.
Chandler
Gilbert
Queen Creek Rd.
Ocotillo Rd.
Queen Creek
Chandler Heights Rd.
Riggs Rd.
Power Rd.
Ritenhouse Road
Southern Pacific Railroad
Roosevelt Water Conservation District Canal
Val Vista Drive
Higley Rd.
Recker Rd.
Ellsworth Rd.
Meridian Rd.
Signal Butte Rd.
Sossaman Rd.
Crismon Rd.
Vineyard Rd.
La Palma Rd.
Schnepf Rd.
Greenfield Rd.
Gilbert Rd.
Lindsay Rd.
Hawes Rd.
Tomahawk Rd.
Idaho Rd.
Ironwood Drive
Maricopa County Line
Pinal County Line

A
B
C
D
E
F

LEGEND

- Detailed Land Use Study Area
- County Boundary
- Municipal Boundary
- Airport Property
- Planned Santan Freeway
- A Measurement Site
- Rural Residential (0–2 du/ac)
- Low Density Residential (2.1–5 du/ac)
- Medium Density Residential (5.1–15 du/ac)
- High Density Residential (15+ du/ac)
- Mobile and Trailer Homes
- Mixed Use
- Noise Sensitive Institutions
- Place of Worship
- School

Source: Coffman Associates Analysis
August 1999.

NORTH
0
8000
SCALE IN FEET

WILLIAMS GATEWAY AIRPORT

Exhibit D1
NOISE MEASUREMENT SITES

Appendix E
State of Arizona
Revised Statutes

This appendix depicts the State of Arizona Revised Statutes pertaining to Public Airport Disclosure and Airport Influence Areas.

Arizona Revised Statute 28-8485 Airport Influence Areas

1 After notice and hearing, this state or the governing body of a political subdivision that has established or operates an airport may designate as an airport influence area all property that is in the vicinity of the airport, that is currently exposed to aircraft noise and overflight and that either has a day-night average sound level of sixty-five decibels or higher or is within such geographical distance from an existing runway that exposes the area to aircraft noise and overflights as determined by the airport owner or operators.

2 If this state of the governing body of a political subdivision establishes an airport influence area, this state or the governing body shall prepare and file a record of the airport influence area in the office of the county recorder in each county that contains property in the airport influence area. The record shall be sufficient to notify owners or potential purchasers of property in the airport influence area that property in the area is currently subject to aircraft noise and aircraft overflights.

Arizona Revised Statute 28-8486 Public Airport Disclosure

3 The state real estate department shall have and make available to the public on request a map showing the exterior boundaries of each territory in the vicinity of a public airport. The map shall

clearly set forth the boundaries on a street map. The real estate department shall work closely with each public airport and affected local government as necessary to create a map that is visually useful in determining whether property is located in or outside of a territory in the vicinity of a public airport.

4 Each public airport shall record the map prepared pursuant to Subsection A in the office of the county recorder in each county that contains property in a territory in the vicinity of the public airport. The recorded map shall be sufficient to notify owners and potential purchasers of property that the property is located in or outside of a territory in the vicinity of a public airport.

5 For the purposes of this section:

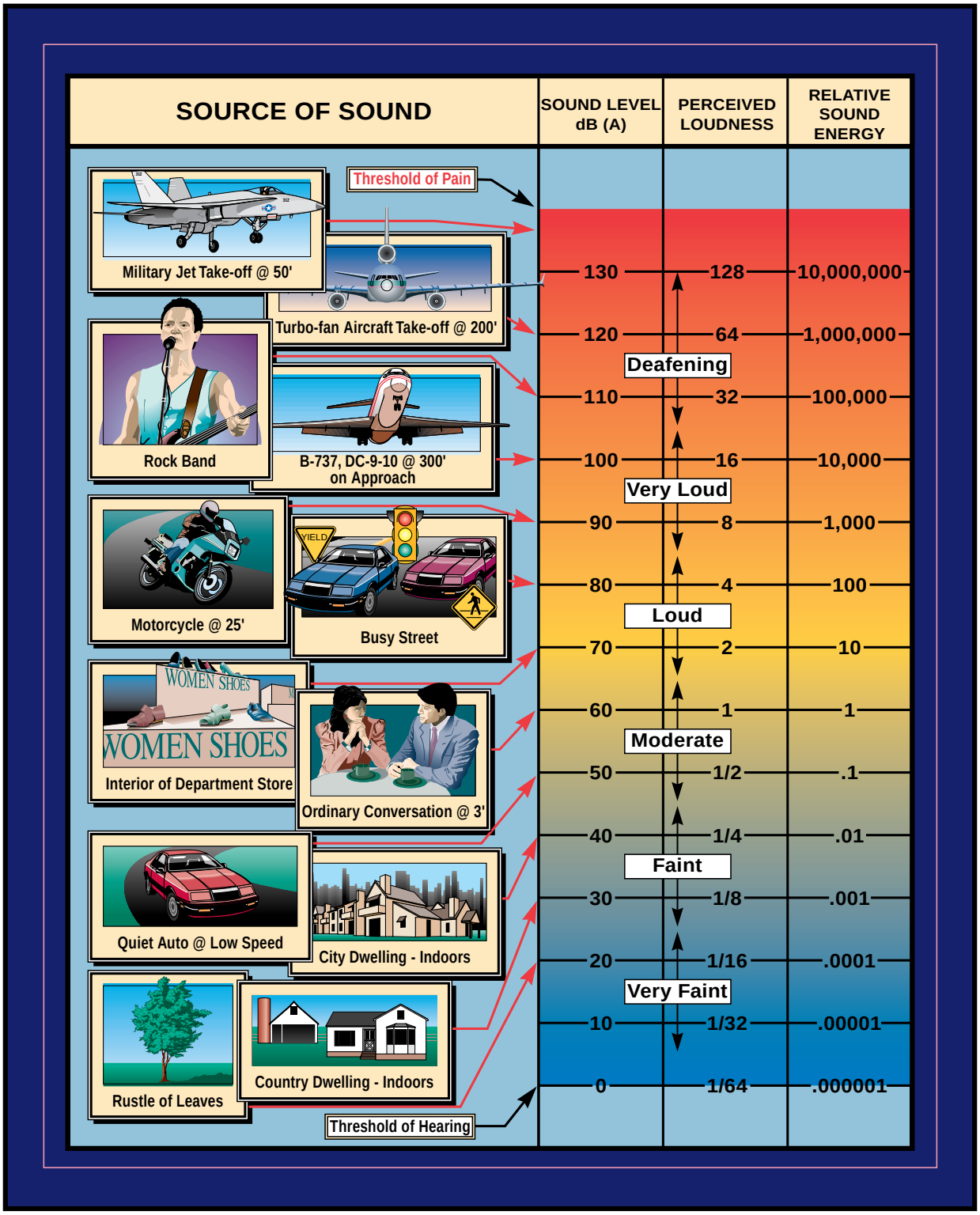
1. "Public airport" means an airport that is owned by a political subdivision of this state or that is otherwise open to the public.

2. "Territory in the vicinity of a public airport" means property that is within the traffic pattern airspace as defined by the federal aviation administration and includes property that experiences a day-night average sound level as follows:

(1) In counties with a population of more than five hundred thousand persons, of sixty decibels or higher at airports where such an average sound level has been identified in either the Airport Master Plan for the twenty year planning period or in a noise study prepared in accordance with Airport Noise Compatibility Planning. 14 code of Federal Regulations Part 150.

(2) In counties with a population of more than five hundred thousand persons or less, sixty-five decibels or higher at airports where such an average sound level has been identified in the Airport Master Plan for the twenty year planning period.

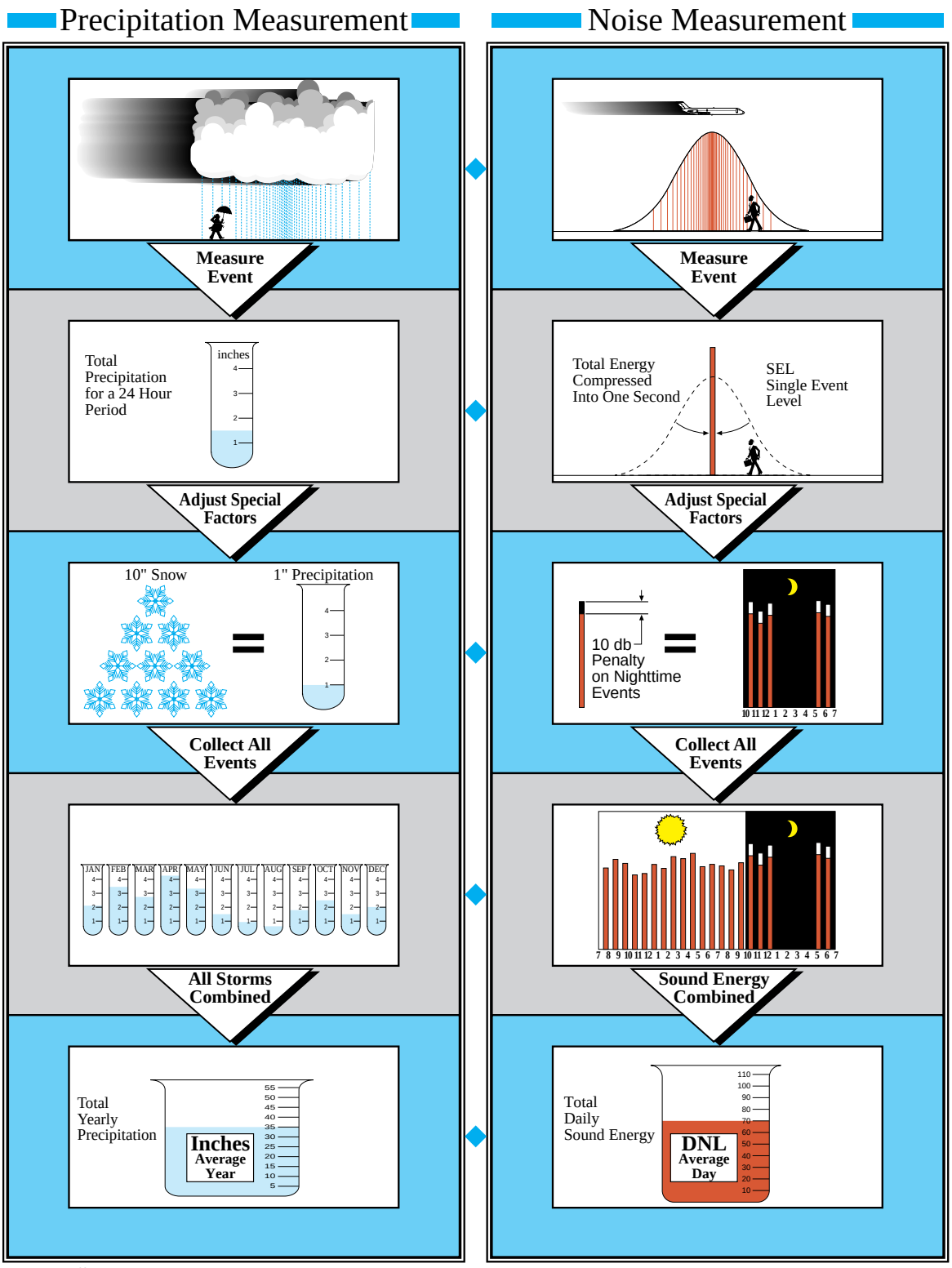
(3)



Source: Coffman Associates 1990

Coffman Associates Airport Consultants

Sound Exhibit A
TYPICAL SOUND LEVELS

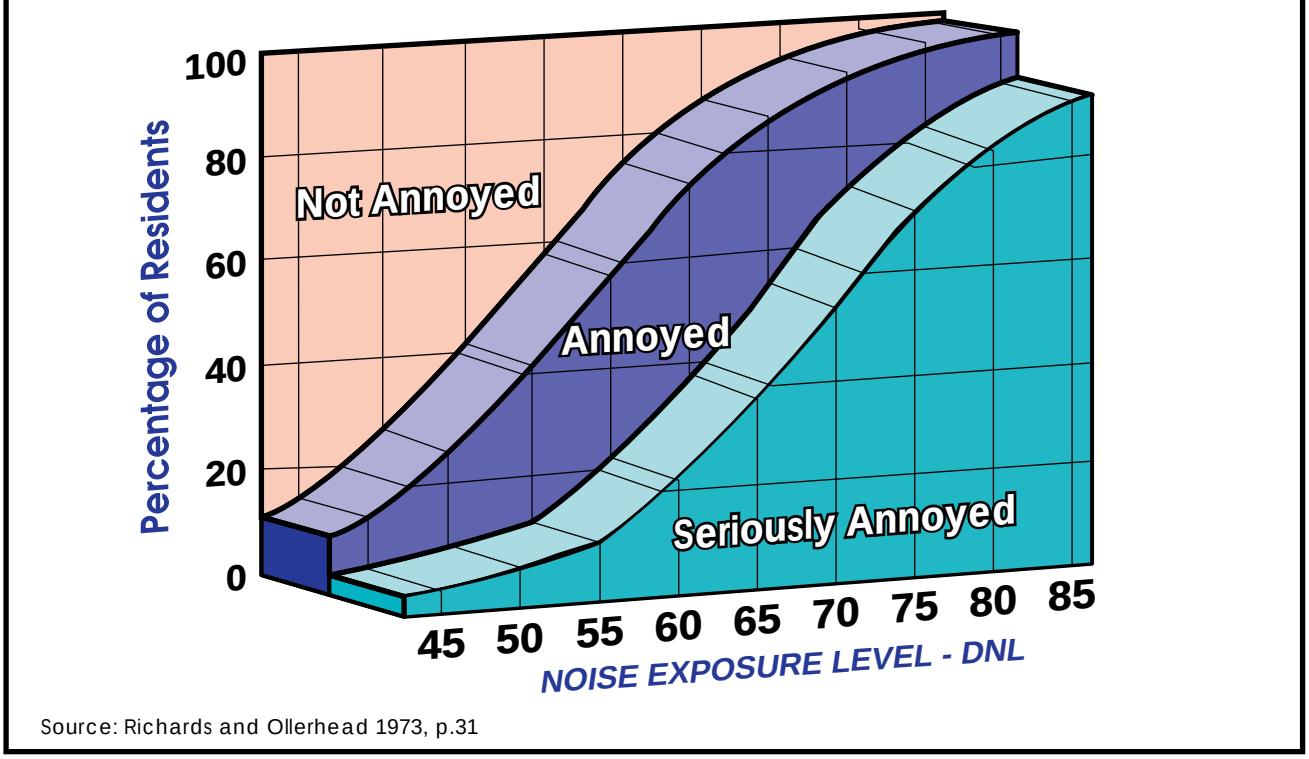


Source: Coffman Associates 1990

Coffman Associates Airport Consultants

Sound Exhibit D
PRECIPITATION AND NOISE MEASUREMENT COMPARISON

94SP02-1-7/11/94



Source: Richards and Ollerhead 1973, p.31

Coffman Associates
Airport Consultants

LWP Exhibit A
ANNOYANCE CAUSED BY AIRCRAFT NOISE IN RESIDENTIAL AREAS