

DAVIS-MONTHAN AIR FORCE BASE

FEBRUARY 1992

AIR

INSTALLATION

COMPATIBLE

USE

ZONE

***REPORT***

VOLUME I

---

*TO THE GOVERNMENTS AND CITIZENS OF THE TUCSON REGION*

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## DEPARTMENT OF THE AIR FORCE

HEADQUARTERS 856TH AIR DIVISION (TAC)  
DAVIS-MONTHAN AIR FORCE BASE AZ 85707-5000

REPLY TO CC  
ATTN OF

10 Jan 92

SUBJECT Air Installation Compatible Use Zone (AICUZ) Report

TO The Governments and Citizens of the Davis-Monthan AFB Environs

1. This Air Installation Compatible Use Zone (AICUZ) Report for Davis-Monthan Air Force Base is an update of the original AICUZ study dated August 1975. The update was initiated because of the changes in the number and type of aircraft at Davis-Monthan AFB since the last study. It is a reevaluation of aircraft noise and accident potential related to Air Force flying operations. It is designed to aid in the development of local planning mechanisms which will protect the public safety and health as well as preserve the operational capabilities of Davis-Monthan Air Force Base.

2. The report outlines the location of runway clear zones, aircraft accident potential zones and noise contours, and recommends compatible land uses for areas in the vicinity of the base. It is our hope that this information will be incorporated into your community plans, zoning ordinances, subdivision regulations, building codes, and other related documents.

3. The basic objective of the AICUZ program is to achieve compatible uses of public and private lands in the vicinity of military airfields by controlling incompatible development through local actions. This update provides noise contours based upon the day-night average noise level (Ldn) methodology. This report provides the information necessary to maximize beneficial use of the land surrounding Davis-Monthan Air Force Base while minimizing the potential for degradation of the health and safety of the affected public.

4. We greatly value the positive relationship Davis-Monthan Air Force Base has experienced with its neighbors over the years. As a partner in the process, we have attempted to mitigate noise disturbances through such actions as quiet hours, minimizing night flying and reduced flights over heavily populated areas. We solicit your cooperation in implementing the recommendations and guidelines presented in this AICUZ Report.

*Eugene D. Santarelli*  
EUGENE D. SANTARELLI  
Brigadier General, USAF  
Commander

DAVIS-MONTHAN AFB AICUZ REPORT

VOLUME 1

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## INTRODUCTION

This study is an update to the 1975 Davis-Monthan AFB Air Installation Compatible Use Zone (AICUZ) Study. It reaffirms the Air Force policy of promoting public health, safety and general welfare in areas surrounding Davis-Monthan AFB, Arizona. It reflects the changes in flight operations since the last study and provides current noise contours and compatible land use guidelines. (See complete listing of policy in AICUZ Volume 2). This information is made available to assist the local communities with future planning and zoning.

## PURPOSE AND NEED

The purpose of the AICUZ program is to promote compatible land development in areas that are subject to aircraft noise and potential accidents. Local governments have been responsive to considerations of aircraft noise and accident potential in their planning processes. Continued support for existing land use controls is strongly encouraged to ensure compatible development and population density in areas of accident and noise exposure.

Air Force AICUZ Land Use Guidelines reflect land use recommendations for clear zones, accident potential zones I and II and four noise zones. These guidelines have been established from studies prepared and sponsored by several federal agencies, including the Department of Housing and Urban Development, the Environmental Protection Agency, Federal Aviation Administration, and the Air Force, plus state and local agencies. The guidelines recommend land uses which are compatible with airfield operations while allowing maximum beneficial use of neighboring properties. The Air Force has no desire to recommend land use regulations which render property economically useless. It does, however, have an obligation to local citizens and the citizens of the United States to point out ways to protect the people in adjacent areas and to protect the public investment in the installation itself.

## PROCESS AND PROCEDURES

The preparation and presentation of the Davis-Monthan AFB AICUZ study is part of the continuing Air Force participation in the local planning process. We recognize that, as local communities prepare land use plans and zoning ordinances, the Air Force must provide information on base activities as they relate to the community. This study is presented in the spirit of mutual cooperation and assistance to aid in the local land use planning process. It has been prepared to update information on base operations.

The data collection phase of this study was conducted during August and September of 1991. Aircraft operational and maintenance data were obtained to determine average daily operations, by runway and type of aircraft. This data is supplemented by flight track information (where they fly), flight profile information (how they fly), and engine maintenance procedures. After verification for accuracy the data was input into the NOISEMAP software program at the Air Force Civil Engineering Services Agency to produce average day-night ( $L_{dn}$ ) noise contours. These contours were plotted on an area map and overlaid with clear zones and accident potential zone areas. Volume 2 contains more detailed information on the development of the AICUZ program.

## INSTALLATION DESCRIPTION

### HISTORY OF DAVIS-MONTHAN AFB

Davis-Monthan has been a military installation for over 50 years, but its origins can be traced to the earliest days of civil aviation. In 1919, Tucson established the first municipal airport in the United States. Hoping to attract the military, the city moved the airport to a larger site in 1925. In September 1927, Charles Lindbergh, who had flown solo across the Atlantic Ocean four months prior, dedicated the airport.

From 1925 until 1940, the Army Air Corps maintained a small detachment of personnel at the field to service transient aircraft. Among the base's visitors were the fathers of the modern-day Air Force and several aviation pioneers--names like Spaatz, Doolittle, Eaker, Foulis, and Earhart.

In September 1940 the War Department announced plans to occupy the airport and establish an airbase. Construction began that December and continued through May 1941. At that time, the base was known as Air Base, Tucson, Arizona. Prompted by the local community, base officials renamed it Davis-Monthan Field.

Shortly after V-J day, Davis-Monthan became one of three separation centers in the Second Air Force. After serving as the last stop for nearly 10,000 personnel, the base was selected as a storage site for hundreds of aircraft. Tucson's dry climate and alkali soil made it an ideal location for aircraft storage and preservation. That mission continues today and is performed by the Aerospace Maintenance and Regeneration Center (AMARC).

Strategic Air Command's (SAC) 43d Bombardment Group ushered in the cold war era at Davis-Monthan in May 1946. SAC remained the host command for the next thirty years. Davis-Monthan entered the jet age in 1953 when the 43d and 303d Bombardment Wings made the transition to B-47 Stratojets.

The early sixties brought the second leg of the nuclear triad to Davis-Monthan in the form of Titan II missiles. Control of the eighteen sites surrounding Tucson rested with the 390th Strategic Missile Wing, which became operational in December 1963 and maintained alert status for more than two decades.

After spending five years in Southeast Asia compiling an impressive war record, the 355th Tactical Fighter Wing (TFW) was reactivated at Davis-Monthan in July 1971 and equipped with the Vought A-7D Corsair II.

In 1976, the Tactical Air Command (TAC) became the host command at Davis-Monthan, with the 355 TFW assuming host unit status. The 355 TFW also accepted the first A-10A Thunderbolt II aircraft in the Air Force inventory. In 1979, A-10 pilot training became the sole mission of the wing then renamed the 355th Tactical Training Wing (now known as the 355th Fighter Wing).

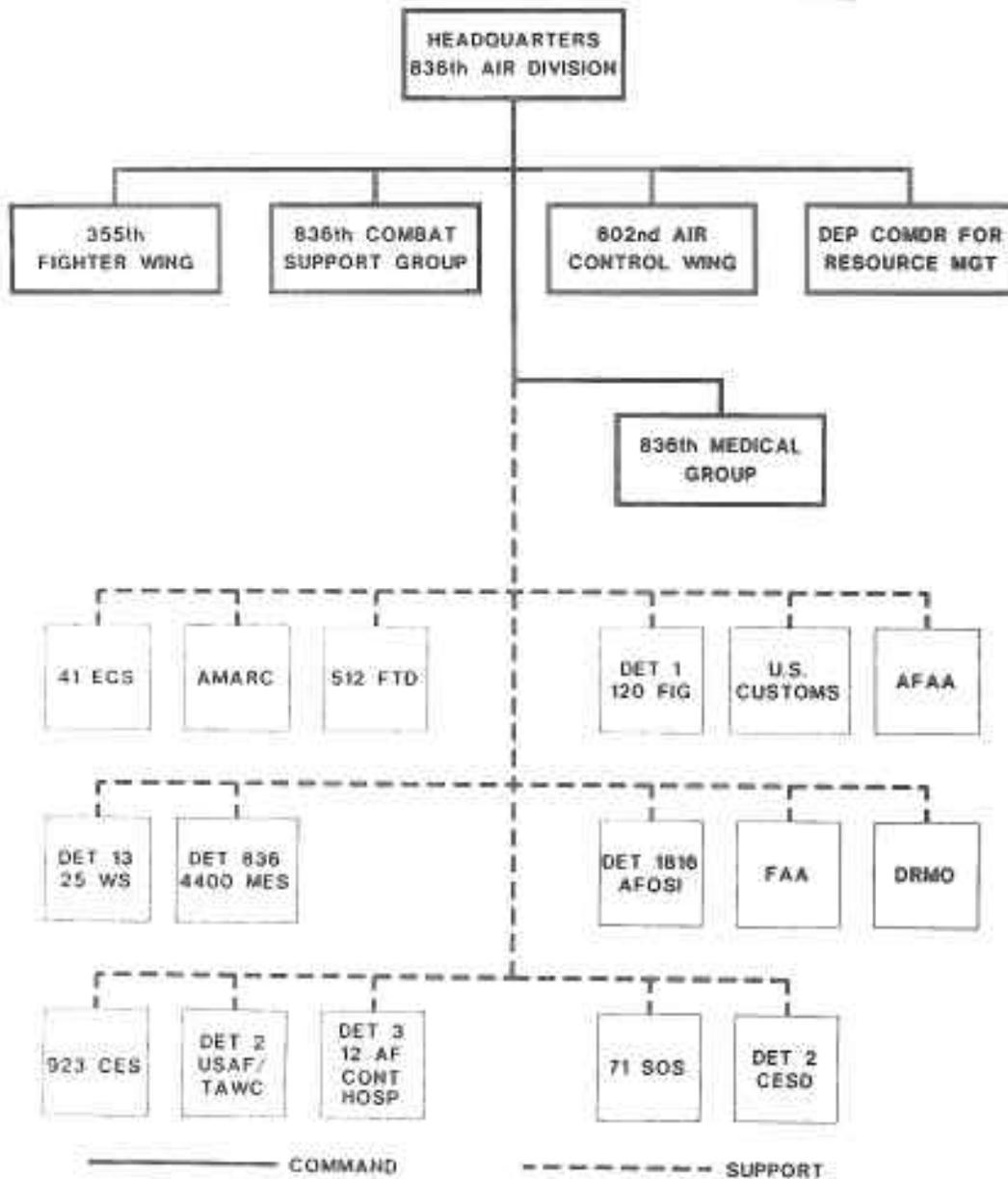
The 1980's brought several diverse missions to Davis-Monthan, and the 836th Air Division was activated in January 1981 to oversee them. Shortly thereafter, the base welcomed the 868th Tactical Missile Training Squadron (later Group) to train crews to operate and defend the Ground-Launched Cruise Missiles. The 868th was deactivated in 1990 after successfully completing its mission. The 41st Electronic Combat Squadron, equipped with EC-130H aircraft was the next to arrive, followed by the 602d Tactical Air Control Wing (now the 602d Air

Control Wing), a unit responsible for the air control system west of the Mississippi River.

The 1990's promise even more changes for Davis-Monthan as the Air Force restructures to meet the changing world scene. These changes include the move of 12th Air Force Headquarters and related missions to Davis-Monthan.

### MISSION OF DAVIS-MONTHAN AFB

Davis-Monthan AFB with over 10,600 acres of land and 7,000 employees is one of the most diversified military installations within the Tactical Air Command. The diagram below shows the assigned and tenant units under the command of the 836th Air Division.



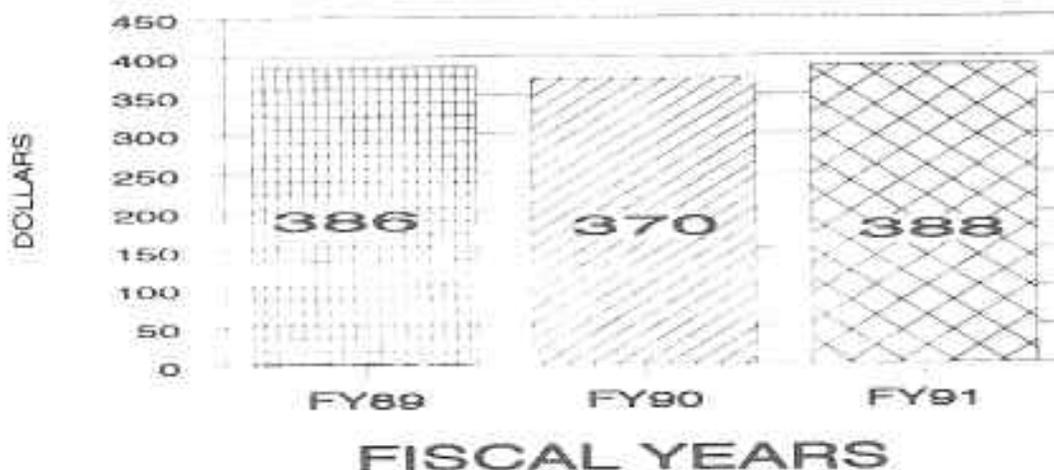
## ECONOMIC IMPACT

Davis-Monthan AFB is the second largest employer in the Tucson urban area and contributes significantly to the economy of Tucson and Pima County. In Fiscal Year (FY) 1991, Davis-Monthan employed over 7,300 people with a payroll in excess of \$181,000,000. In addition, there are over 12,600 military retirees in the Tucson urban area with a payroll of \$208,276,920 in FY91. Through procurement, service contracts, construction, equipment and supplies, Davis-Monthan provided over \$45,000,000 to the local economy in FY91.

The presence and operation of Davis-Monthan creates over 3,027 secondary jobs within the Tucson urban area. For FY91 the total employment supported by annual expenditures to operate Davis-Monthan was 10,351. The economic activity generated by base operations and expenditures within a 50-mile Economic Impact Region (EIR) was \$388,359,956 in FY91. The EIR figure is considered very conservative as it does not take into account the impact of military retirees on the Tucson Urban Area. The chart below shows Davis-Monthan's impact on Tucson's economy over the past three years (Source: FY91 Economic Resource Impact Statement for Davis-Monthan AFB).

# ECONOMIC IMPACT

(IN MILLIONS of \$)



The presence of Davis-Monthan has a positive financial effect on the City of Tucson and Pima County. With the annexation of the base in 1986, Tucson is able to include the 6,191 people living on base (1990 U.S. Census) in their population figures. The additional population allows Tucson to receive about \$1,000,000 annually from state revenue sharing funds and also increases Tucson's spending authority by over \$4,750,000. Pima County receives over \$900,000 annually from state revenue sharing funds due to Davis-Monthan's employment.

## FLYING ACTIVITIES

A complete description of the relationship of aircraft operations with land use requires a full evaluation of the exact nature of flying activities at Davis-Monthan AFB. An inventory and analysis of flying operations has been performed and includes aircraft types, where the aircraft fly, how high they fly, how many times they fly over a given area, and what time of day they operate.

The average number of flying days per year for each unit is used in determining the number of average daily operations. All units at Davis-Monthan typically fly a Monday thru Friday work week schedule except US Customs and transient aircraft. These two activities normally fly year round, 7 days a week. Average daily operations (landings, takeoffs and patterns) for aircraft at Davis-Monthan are summarized below:

### AVERAGE DAILY OPERATIONS

<u>AIRCRAFT</u>	<u>DAY (0600-2230)</u>	<u>NIGHT (2230-0600)</u>
A-10A	238	0
EC-130H	26	0
HH-3	22	0
F-16	8	0
UH-60	2	2
Cessna 550	6	2
162 ANG (Snowbirds)	34	0
Transients	<u>63</u>	<u>0</u>
TOTAL	399	4

As shown above, on an average flying day less than 1% of the operations are at night in an effort to minimize noise levels and reduce community disturbances. However, training requirements or high priority mission situations, require night flights on an infrequent basis by the above listed aircraft. Operations are coordinated with the FAA and flight paths are integrated to minimize conflict with civilian aircraft operations at Tucson International Airport and other private flying activities. Efforts are continually made to control and schedule missions to keep noise levels to a minimum, especially during the night. Flight paths have been selected with community disturbances and public reactions taken as one of the principal considerations. Pilot exposure to public needs is provided through flying safety training, unit pilot standardization meetings and feedback during the base's quarterly Air Traffic Control Board meetings.

## LAND USE COMPATIBILITY GUIDELINES

The three major operational factors that influence AICUZ land use recommendations are aircraft accident potential zones, noise contours and height restrictions.

The AICUZ program designates clear and accident potential zones (Figure 2) along with noise contours (Figure 3) and land use compatibility guidelines for these zones. The land use compatibility guidelines are found on pages 8-13 in this report.

As a part of the AICUZ program, the only real property interest for which the United States Air Force has received authorization and appropriations to acquire is the area designated as the Clear Zone. A Clear Zone is the area closest to the runway end (3000' x 3000') and is the most hazardous. Compatible land use controls for the remaining airfield environs are recommended to the local governments through their land use planning and control process. The Clear Zone areas at Davis-Monthan Air Force Base are owned by the Department of Defense (DoD).

Height obstruction criteria have been developed by the Federal Aviation Administration (FAA) and the DoD and are consistent with those contained in Federal Air Regulation Part 77, Subpart G. Additional information is contained in Volume II of this report.

LAND USE COMPATIBILITY

LAND USE ACCIDENT POTENTIAL NOISE ZONES

SLUCM NO.	LAND USE NAME	CLEAR ZONE	APZ I	APZ II	65-70	70-75	75-80	80+
10	Residential							
11	Household units	N	N	Y1	2511	3011	N	N
11.11	Single units; detached	N	N	N	2511	3011	N	N
11.12	Single units; semidetached	N	N	N	2511	3011	N	N
11.13	Single units; attached row	N	N	N	2511	3011	N	N
11.21	Two units; side-by-side	N	N	N	2511	3011	N	N
11.22	Two units; one above the other	N	N	N	2511	3011	N	N
11.31	Apartments; walk up	N	N	N	2511	3011	N	N
11.32	Apartments; elevator	N	N	N	2511	3011	N	N
12	Group quarters	N	N	N	2511	3011	N	N
13	Residential hotels	N	N	N	2511	3011	N	N
14	Mobile home parks or courts	N	N	N	N	N	N	N
15	Transient lodgings	N	N	N1	2511	3011	3511	N
16	Other residential	N	N	N1	2511	3011	N	N

20	Manufacturing							
21	Food & kindred products; manufacturing	N	N2	Y	Y	Y12	Y13	Y14
22	Textile mill products; manufacturing	N	N2	Y	Y	Y12	Y13	Y14
23	Apparel and other finished products made from fabrics, leather, and similar materials; manufacturing	N	N	N2	Y	Y12	Y13	Y14
24	Lumber and wood products (except furniture); manufacturing	N	Y2	Y	Y	Y12	Y13	Y14
25	Furniture and fixtures; manufacturing	N	Y2	Y	Y	Y12	Y13	Y14
26	Paper & allied products; manufacturing	N	Y2	Y	Y	Y12	Y13	Y14

LEGEND

SLUCM - Standard Land Use Coding Manual, US Dept of Transportation.  
 Y - (Yes) - Land use and related structures are compatible without restriction.  
 N - (No) - Land use and related structures are not compatible and should be prohibited.  
 MLR - (Noise Level Reduction) - MLR (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure. See Appendix E, Vol II.  
 Yx - (yes with restrictions) - Land use and related structures generally compatible; see notes 2, 3, 4, 25, 30 or 35.  
 25, 30 or 35 - Land use and related structures generally compatible; measures to achieve MLR of 25, 30 or 35 need to be incorporated into the design and construction of structures. See Appendix E, Vol II.  
 25a, 30a and 35a - Land use generally compatible with MLR. However, measures to achieve an overall noise level reduction do not necessarily solve noise difficulties and additional evaluation is warranted.

SLUCH NO.	LAND USE NAME	ACCIDENT POTENTIAL ZONES					NOISE ZONES			
		CLEAR ZONE	APZ I	APZ II	65-70	70-75	75-80	80+		
27	Printing, publishing, and allied industries	N	Y2	Y	Y	Y12	Y13	Y14		
28	Chemicals and allied products; manufacturing.	N	N	N2	Y	Y12	Y13	Y14		
29	Petroleum refining and related industries	N	N	Y	Y	Y12	Y13	Y14		
30	Manufacturing									
31	Rubber and misc. plastic products; manufacturing	N	N2	N2	Y	Y12	Y13	Y14		
32	Stone, clay and glass products; manufacturing	N	N2	Y	Y	Y12	Y13	Y14		
33	Primary metal industries	N	N2	Y	Y	Y12	Y13	Y14		
34	Fabricated metal products; manufacturing	N	N2	Y	Y	Y12	Y13	Y14		
35	Professional, scientific, and controlling instruments; photographic and optical goods; watches and clocks	N	N	N2	Y	25	30	N		
39	Miscellaneous manufacturing	N	Y2	Y2	Y	Y12	Y13	Y14		
40	Transportation, communications and utilities									
41	Railroad, rapid rail transit and street railroad transportation	N3	Y4	Y	Y	Y12	Y13	Y14		
42	Motor vehicle transportation	N3	Y4	Y	Y	Y12	Y13	Y14		
43	Aircraft transportation	N3	Y4	Y	Y	Y12	Y13	Y14		
44	Marine craft transportation	N3	Y4	Y	Y	Y12	Y13	Y14		
45	Highway & street right-of-way	N3	Y4	Y	Y	Y12	Y13	Y14		
46	Automobile parking	N3	Y4	Y	Y	2515	3015	N13		
47	Communication utilities	N3	Y4	Y	Y	Y	Y12	Y13		
48	Other transportation and utilities	N3	Y4	Y	Y	2515	3015	N		
49	Communication and utilities	N3	Y4	Y	Y	Y	Y	Y		

ACCIDENT POTENTIAL ZONES

LAND USE

NOISE ZONES

SLUCM NO.	NAME	CLEAR ZONE	APZ I	APZ II	65-70	70-75	75-80	80+
50	Trade					Y12	Y13	Y14
51	Wholesale trade	N	Y2	Y	Y	Y12	Y13	Y14
52	Retail trade-building materials, hardware and farm equipment	N	Y2	Y	Y	Y12	Y13	Y14
53	Retail trade-general merchandise	N	N2	Y2	Y	25	30	N
54	Retail trade-food	N	N2	Y2	Y	25	30	N
55	Retail trade-automotive, marine craft, aircraft and accessories	N	Y2	Y2	Y	25	30	N
56	Retail trade-apparel and accessories	N	N2	Y2	Y	25	30	N
57	Retail trade-furniture, home furnishings and equipment	N	N2	Y2	Y	25	30	N
57	Retail trade-eating and drinking establishments	N	N	N2	Y	25	30	N
59	Other retail trade	N	N2	Y2	Y	25	30	N
60	Services					25	30	N
61	Finance, insurance and real estate services	N	N	Y6	Y	25	30	N
62	Personal services	N	N7	Y6	Y	25	30	N
62.4	Cemeteries	N	Y8	Y8	Y	25	30	N
63	Business services	N	Y2	Y6	Y	25	30	N
64	Repair services	N	N	Y6	Y	25	30	N
65	Professional services	N	N	N	Y	25	30	N
65.1	Hospitals, nursing homes	N	N	N	25*	30*	30	N
65.1	Other medical facilities	N	N	N	Y	25	30	N
66	Contract construction services	N	Y6	Y6	Y	25	30	N
67	Governmental services	N	N	Y6	Y*	25*	30*	N
68	Educational services	N	N	N	25*	30*	N	N
69	Miscellaneous services	N	N2	Y2	Y	25	30	N

SLUCM NO.	LAND USE NAME	ACCIDENT POTENTIAL ZONES				NOISE ZONES			
		CLEAR ZONE	APZ I	APZ II	APZ III	65-70	70-75	75-80	80+
70	Cultural, entertainment and recreational	N	N	N <sup>2</sup>		25*	30*	N	N
71	Cultural activities (including churches)	N	Y <sup>2</sup>	Y		Y*	N	N	N
71.2	Nature exhibits	N	N	N		Y	N	N	N
72	Public assembly	N	N	N		25	30	N	N
72.1	Auditoriums, concert halls	N	N	N		N	N	N	N
72.11	Outdoor music shells, amphitheaters	N	N	N		Y <sup>17</sup>	Y <sup>17</sup>	N	N
72.2	Outdoor sports arenas, spectator sports	N	N	N		Y	Y	N	N
73	Amusements	N	N <sup>8,9,10</sup>	Y <sup>8</sup>		Y*	Y	30*	N
74	Recreational activities (incl golf courses, riding stables, water recreation)	N	N	Y		Y*	25*	N	N
75	Resorts and group camps	N	N	N		Y*	Y*	N	N
76	Parks	N	Y <sup>8</sup>	Y <sup>8</sup>		Y*	Y*	N	N
79	Other cultural, entertainment and recreation	N	Y <sup>9</sup>	Y <sup>9</sup>		Y*	Y*	N	N
80	Resource production and extraction	Y	Y	Y		Y <sup>18</sup>	Y <sup>19</sup>	Y <sup>20</sup>	Y <sup>20,21</sup>
81	Agriculture (except livestock)	N	Y	Y		Y <sup>18</sup>	Y <sup>19</sup>	Y <sup>20</sup>	Y <sup>20,21</sup>
81.5 to 81.7	Livestock farming and animal breeding	N <sup>5</sup>	Y <sup>5</sup>	Y		Y <sup>18</sup>	Y <sup>19</sup>	N <sup>20</sup>	N <sup>20,21</sup>
82	Agricultural related activities	N <sup>5</sup>	Y	Y		Y <sup>18</sup>	Y <sup>19</sup>	Y <sup>20</sup>	Y <sup>20,21</sup>
83	Forestry activities and related services	N <sup>5</sup>	Y <sup>5</sup>	Y		Y	Y	Y	Y
84	Fishing activities and related services	N	Y <sup>5</sup>	Y		Y	Y	Y	Y
85	Mining activities and related services	N	Y <sup>5</sup>	Y		Y	Y	Y	Y
89	Other resource production and extraction	N	Y <sup>5</sup>	Y		Y	Y	Y	Y

\*The designation of these uses as "compatible" in this zone reflects individual Federal Agencies, and program consideration of general cost and feasibility factors as well as past community experiences and program objectives. Localities, when evaluating the application of these guidelines to specific situations, may have different concerns of goals to consider.

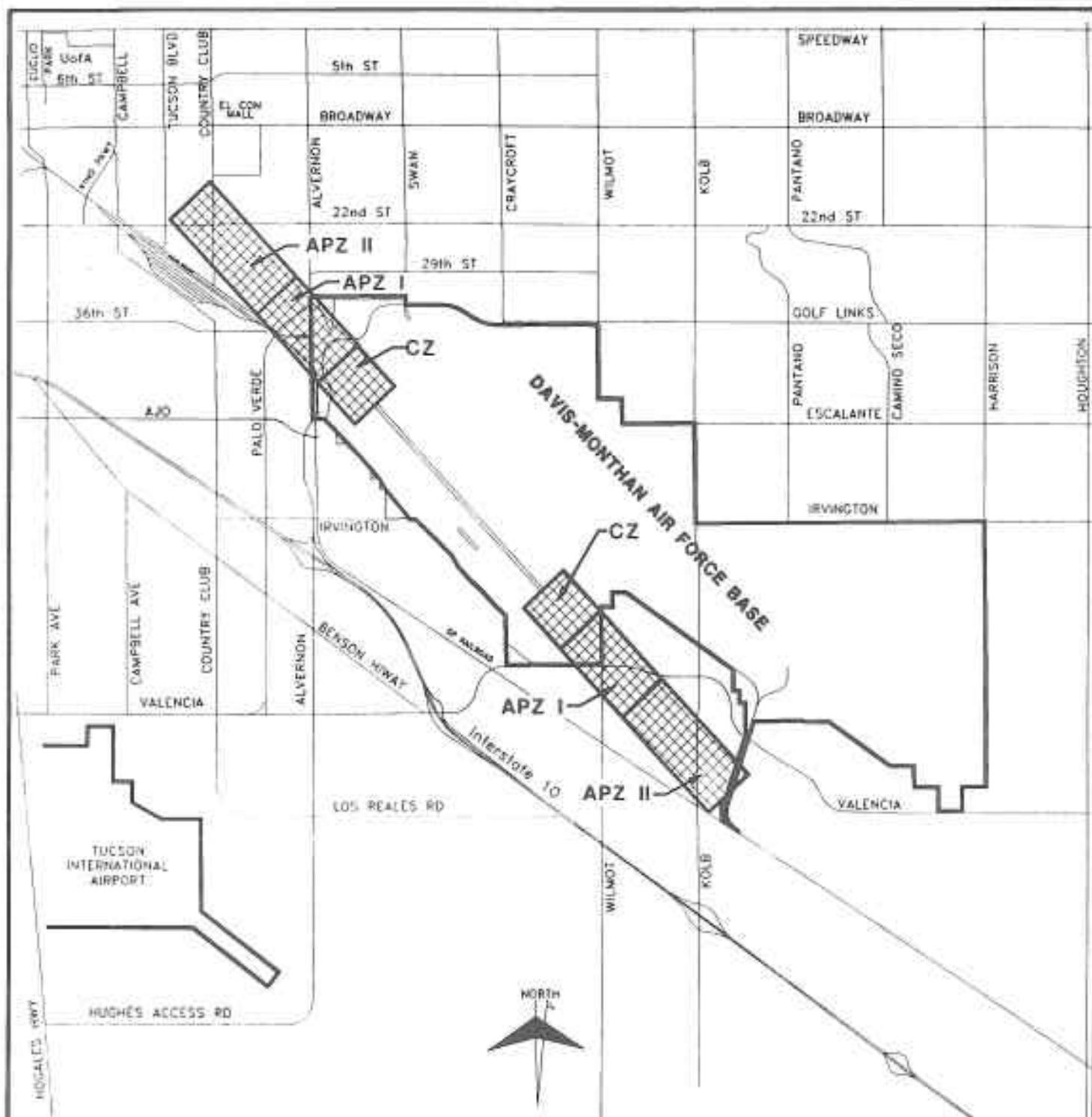
### NOTES

1. Suggested maximum density 1-2 dwelling units per acre, possibly increased under a Planned Unit Development (PUD) where maximum lot coverage is less than 20 percent.
2. Within each land use category, uses exist where further definition may be needed due to the variation of densities in people and structures. (See Appendix B)
3. The placing of structures, buildings, or above-ground utility lines in the clear zone is subject to severe restrictions. In a majority of the clear zones, these items are prohibited. (See APR 19-9 for specific guidance)
4. No passenger terminals and no major above-ground transmission lines in APZ I.
5. Factors to be considered: labor intensity, structural coverage, explosive characteristics, air pollution.
6. Low-intensity office uses only. Meeting places, auditoriums, etc., not recommended.
7. Excludes chapels.
8. Facilities must be low intensity.
9. Clubhouse not recommended.
10. Small areas for people gathering places are not recommended.
11. a. Although local conditions may require residential use, it is discouraged in Ldn 65-70 and strongly discouraged in Ldn 70-75. The absence of viable alternative development options should be determined and an evaluation indicating that a demonstrated community need for the residential use would not be met if development were prohibited in these zones should be conducted prior to approvals.
  - b. Where the community determines the residential uses must be allowed, measures to achieve outdoor to indoor Noise Level Reduction (NLR) of at least 25 dB (Ldn 65-70) and 30 dB (Ldn 70-75) should be incorporated into building codes and be considered in individual approvals. Normal construction can be expected to provide a NLR of 20 dB, thus the reduction requirements are often stated as 5, 10, or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year round. Additional consideration should be given to modifying NLR levels based on peak noise levels.
    - c. NLR criteria will not eliminate outdoor noise problems. However, building location and site planning, design and land use berms and barriers can help mitigate outdoor exposure particularly from level sources. Measures that reduce noise at a site should be used whenever practical in preference to measures which only protect interior spaces.

NOTES - continued

12. Measures to achieve NLR of 25 must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low.
13. Measures to achieve NLR of 30 must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low.
14. Measures to achieve NLR of 35 must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low.
15. If noise sensitive, use indicated NLR; if not use is compatible.
16. No buildings.
17. Land use compatible, provided special sound reinforcement systems are installed.
18. Residential buildings require a NLR of 25.
19. Residential buildings require a NLR of 30.
20. Residential buildings not permitted.
21. Land use not recommended, built if community decides use is necessary, hearing protective devices should be worn by personnel.





SOURCE:  
The Strategic Planner

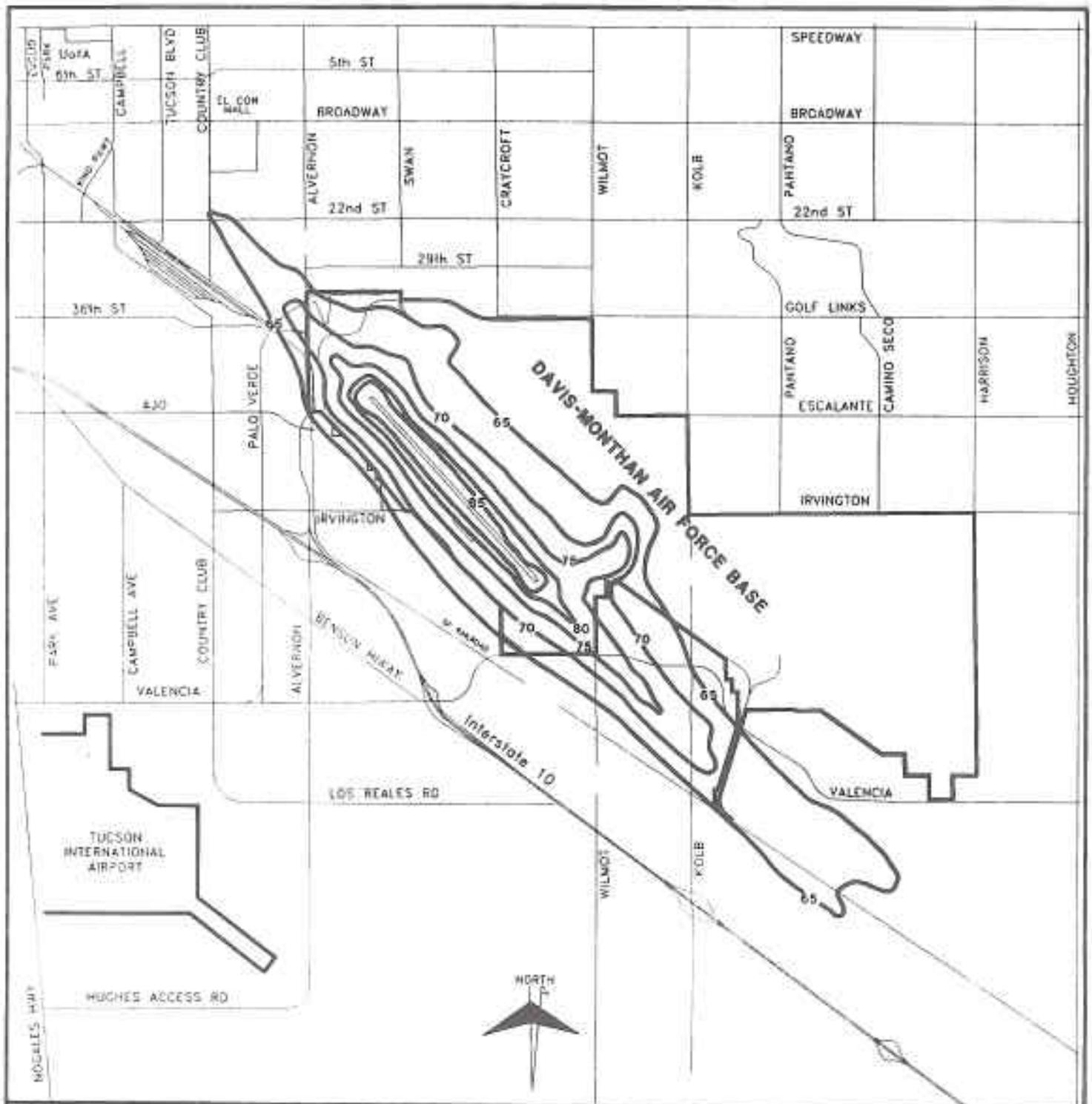
FIGURE 2

# AICUZ ACCIDENT POTENTIAL ZONES

**LEGEND**

**CZ - CLEAR ZONE**

**APZ - ACCIDENT POTENTIAL ZONE**



SOURCE:  
The Program Report

FIGURE 3

# AICUZ NOISE CONTOURS

## LEGEND

— 65 — NOISE CONTOUR

## LAND USE ANALYSIS

### DAVIS-MONTHAN AICUZ ENVIRONS

Davis-Monthan AFB is located in eastern Pima County within the corporate limits of Tucson, Arizona, along the city's southern edge. Davis-Monthan is situated in the Tucson Urban Area which has a population of over 675,000 people (Figure 4).

The Davis-Monthan AICUZ Environs (Figure 5), covering approximately 3,139 acres outside the base boundaries, affects the City of Tucson both to the northwest and southeast of the base and Pima County south of the base. The AICUZ Environs, which are made up of Noise Contours and Accident Potential Zones, describe the impact of a specific operational environment and as such will change if a significant operational change is made.

In planning for land use compatibility, the Air Force recommends AICUZ data be utilized with other planning data. Specific land use control decisions should not, therefore, be based solely on AICUZ boundaries. The Air Force can not guarantee that AICUZ boundaries will never change. It is reasonable to assume significant operational change would be subject to the provisions of the National Environmental Policy Act (NEPA) and thus be part of the continuing planning process.

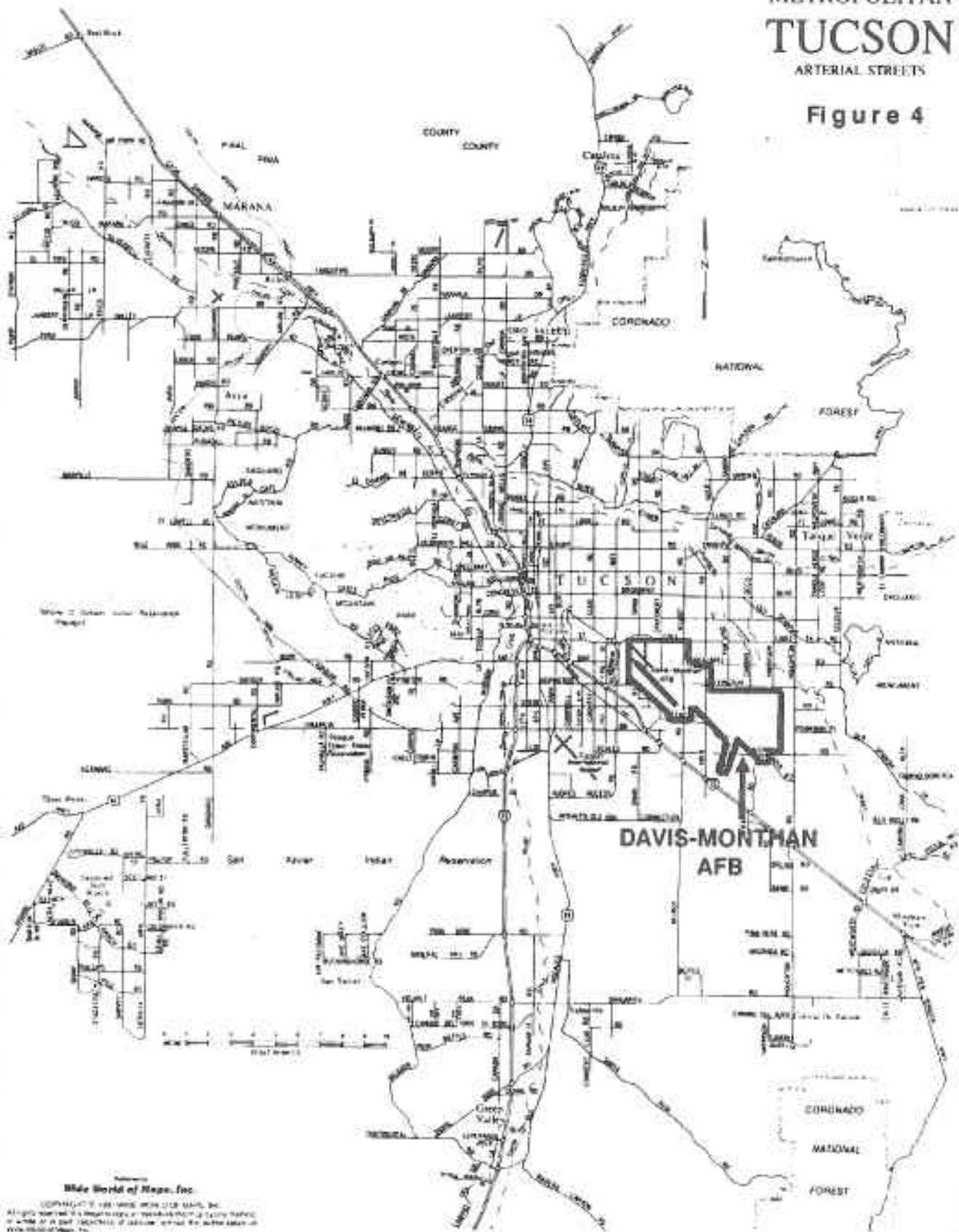
The Davis-Monthan AICUZ Environs has been divided into subareas using the accident potential zones and the noise contours. Within each subarea, an evaluation can be made of the land uses and their compatibility/incompatibility to airfield operations using the guidelines listed on pages 8-13. The chart below summarizes the number of estimated dwelling units and population affected within the AICUZ Environs (Source: 1990 Census).

AICUZ ENVIRONS SUMMARY CHART

AICUZ ENVIRONS SUBAREA	LAND AREA (ACRES) OFF-BASE	# OF DWELLING UNITS	1990 POPULATION
Clear Zones	0	0	0
APZ I	21	0	0
APZ I and LDN 75-80	54	0	0
APZ I and LDN 70-75	162	6	10
APZ I and LDN 65-70	159	187	457
APZ II and LDN 75-80	37	0	0
APZ II and LDN 70-75	268	0	0
APZ II and LDN 65-70	352	979	2096
APZ II	307	967	2436
LDN 65-70	1718	46	119
LDN 70-75	61	0	0
LDN 75-80	0	0	0
LDN 80+	0	0	0
TOTAL	3139	2185	5118

# METROPOLITAN TUCSON ARTERIAL STREETS

Figure 4

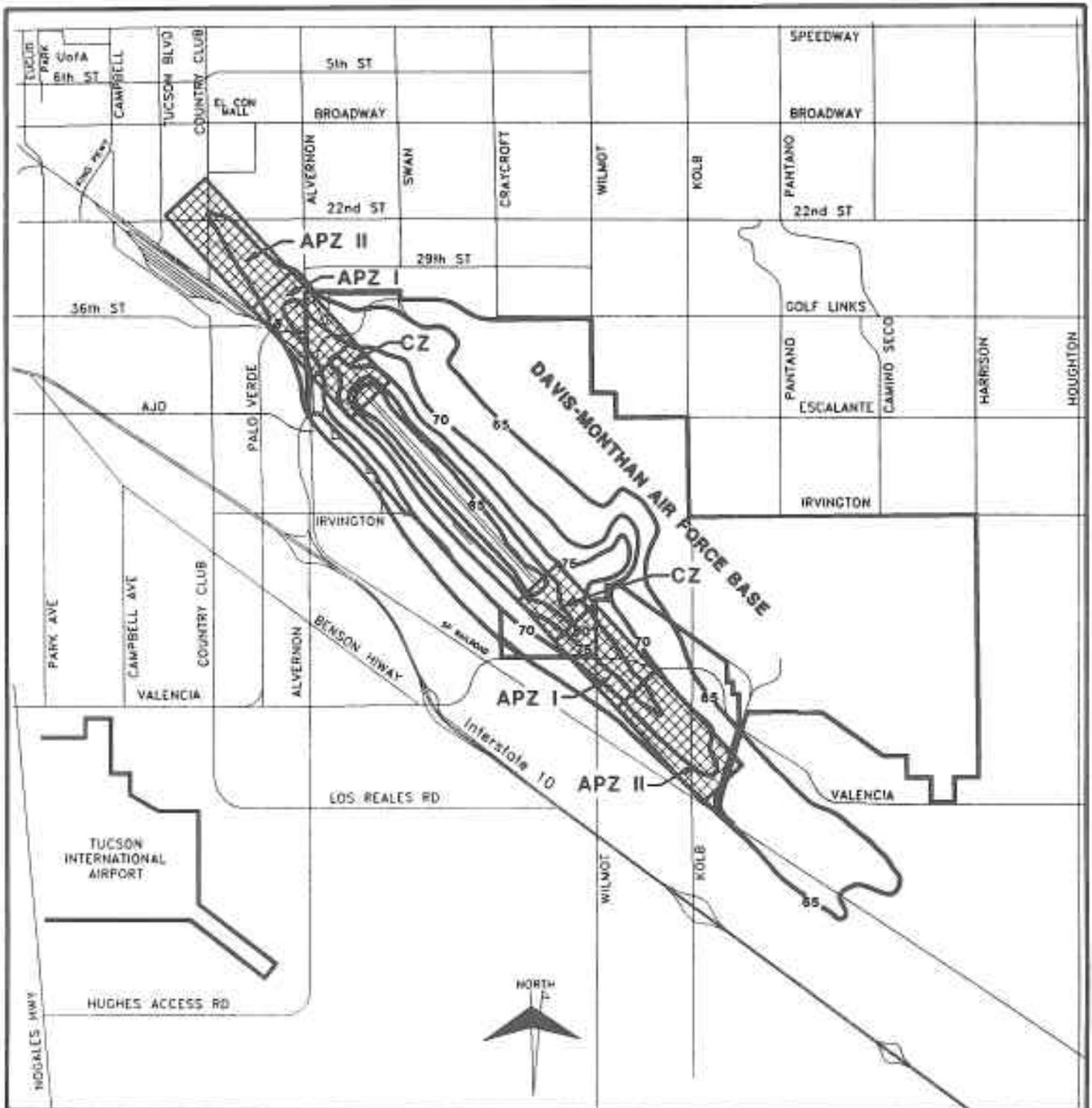


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Scale:  
1" = 1/4 mile

FIGURE 5

# DAVIS-MONTHAN AICUZ ENVIRONS

## COMPREHENSIVE PLANNING AREAS

(FIGURE 6)

Pima County and the City of Tucson are divided into comprehensive planning areas. The Davis-Monthan AICUZ encompasses portions of three comprehensive planning areas: the Arroyo Chico and Esmond Station Area Plans (City of Tucson) and the Rincon/Southeast Subregion of Pima County. Davis-Monthan's planning staff plays an active part in developing plans and policies for the areas surrounding the base.

The Arroyo Chico Area Plan adopted in 1986 provides policy direction for a 4.3 square mile urban area southeast of downtown Tucson and northwest of Davis-Monthan. The Arroyo Chico area is further divided into three industrial areas and the residential subareas of Miles/San Antonio, Plumer-Country Club, Colonia Solana and the Julia Keen neighborhoods. The Davis-Monthan AICUZ Environs cover approximately 680 acres within the Arroyo Chico area. Using 1990 Census data, the population of the Arroyo Chico area is 14,045 which is a population density of 3,226 people per square mile. The Arroyo Chico area contains a regional park and is in close proximity to the University of Arizona and the El Con Shopping Mall.

The Esmond Station Area Plan adopted in 1986 provides policy direction for 28 square miles of which 8.7 square miles are in the city of Tucson. The plan area is bounded by Davis-Monthan on the north, Kolb Road on the west, Interstate 10 on the south, and the Pantano Wash/Wentworth Road alignment on the east. Much of the land is undeveloped and the Davis-Monthan AICUZ Environs cover approximately 289 acres in the Esmond Station Area within Tucson's city limits.

The Rincon/Southeast Area Plan, currently under development as part of the Pima County Comprehensive Plan, contains the land area within these existing Area Plans: Southeast, Esmond Station, Rincon Valley, Rincon, and Empirita Ranch as well as the Vail Posta Quemada Zoning Plan. This subregion consists of 410 square miles and is the largest of the six subregions in Pima County. The Davis-Monthan AICUZ Environs cover approximately 2,213 acres in the Rincon/Southeast Subregion. Much of the land is undeveloped and the estimated 1990 population is 22,639 which is a population density of 55 people per square mile.

Both the Arroyo Chico and the Rincon/Southeast planning areas are shown on Figure 6. These two areas greatly contrast in their land use developmental stages. The Arroyo Chico Area is urban in form while the Rincon/Southeast/Esmond Station Area is primarily rural. Both areas are critical to Davis-Monthan's AICUZ program, but require varying approaches in AICUZ land use policies.



FIGURE 6

## EXISTING AREA PLAN BOUNDARIES

## EXISTING LAND USE

(FIGURE 7)

The Arroyo Chico Area Plan is one of two City of Tucson's comprehensive planning areas affected by the AICUZ. It is an established urban area with a mixture of land uses. The area's central location and high degree of access are key features which have attracted both residential and industrial uses.

Almost all the land in the Arroyo Chico Area Plan is developed. Residential uses comprise about 30% of the land uses within Arroyo Chico. Most of this residential development is single family dwelling units with some multifamily units found along major transportation corridors in the area.

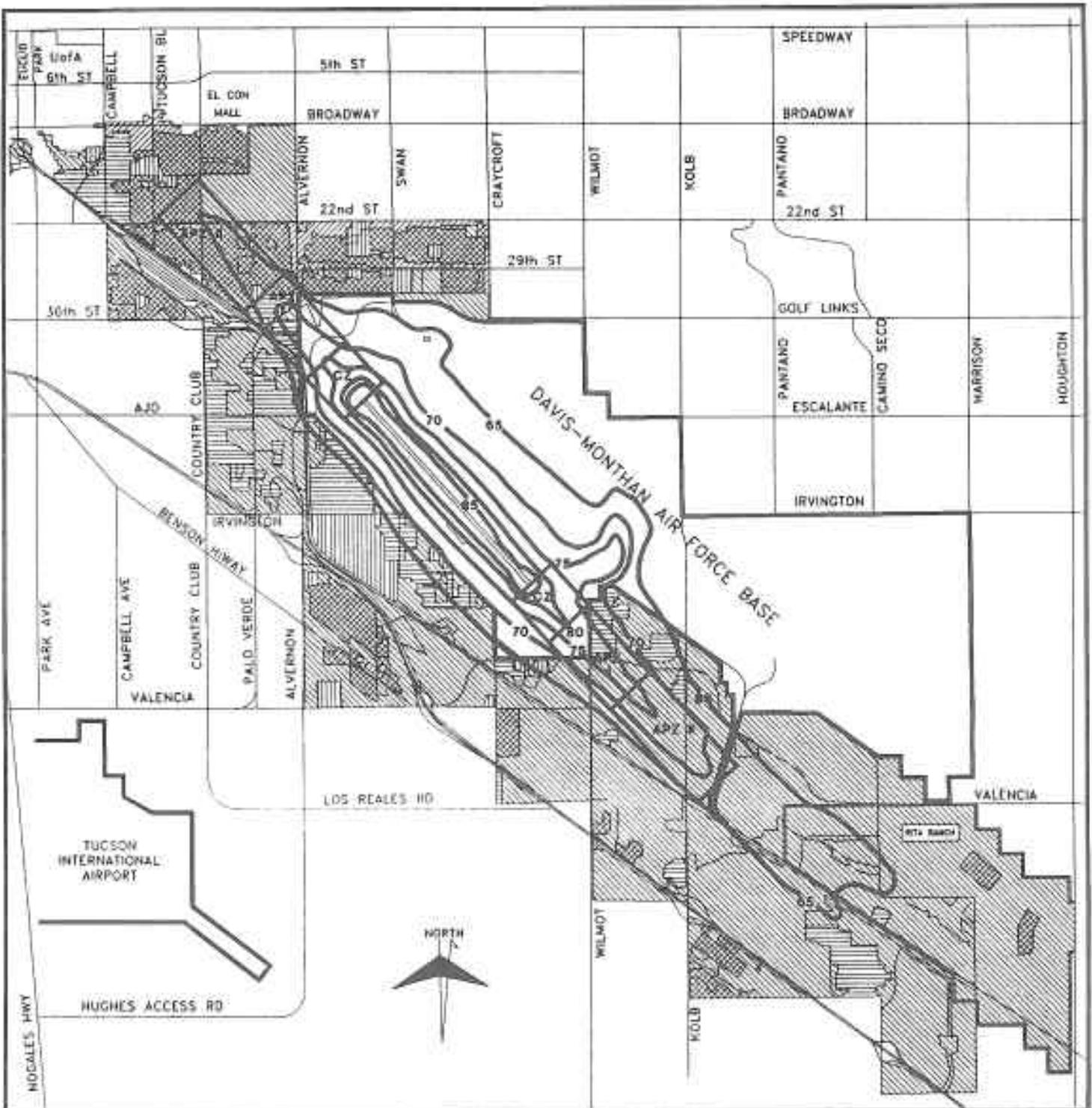
Both commercial and industrial uses are located within the Arroyo Chico Area Plan. Commercial uses are strip type developments found along the major streets. There is also considerable commercial development located in the area from Broadway to 15th Street and Campbell Avenue to Tucson Boulevard. The Southern Pacific Railroad is a major industrial user with additional industrial uses found in close proximity to the railroad and adjacent to the Palo Verde Overpass linking Alvernon Way with Palo Verde Road.

Recreation is a major land use within the Arroyo Chico Area Plan. Reid Park (the Zoo, Randolph Golf Course and the Recreation Center) comprises one of the largest and most complete regional parks in the Tucson urban area. In addition, there are three small neighborhood parks serving the residential areas in Arroyo Chico: Eastmoor, Parkview, and Country Club.

The Esmond Station Area Plan is the second City of Tucson planning area affected by the AICUZ. The majority of land within this area is undeveloped and owned by the State of Arizona. Rita Ranch is a 2800 acre mixed land use development (industrial, commercial, and residential) located within the area plan, west of Houghton Road and adjacent to Davis-Monthan's southern boundary.

A majority of the land contained in the Rincon/Southeast Subregion is undeveloped. Nearly 3000 acres in the eastern part of the subregion are protected as part of the Cienega Creek Natural Preserve. Except for some rural, low density housing in the Rincon Valley, the only significant existing development occurs within the 218 square miles of land adjacent to Davis-Monthan's southern boundaries that make up the existing Pima County Southeast Area Plan. 10 miles south of Davis-Monthan is Corona De Tucson which is a small satellite community of 1,000 people. Most of the 218 square miles is largely undeveloped, however, there is significant industrial and commercial development located between Interstate 10 and the western and southwestern boundaries of the base.

Other land uses within the sparsely developed Rincon/Southeast Area Plan include: a Medium-Security Prison, the Pima County Fairgrounds and Colossal Cave Park.



- SOURCES:
1. The Oregon Project
  2. Final County Planning and Development Services
  3. City of Tucson Planning Dept.

## EXISTING LAND USE (GENERALIZED) LEGEND

<p> RESIDENTIAL</p> <p> COMMERCIAL</p> <p> INSTITUTIONAL</p>	<p> INDUSTRIAL</p> <p> PARK/OPEN SPACE OR VACANT</p>
--	--

FIGURE 7

## EXISTING ZONING

(FIGURE 8)

Two types of zoning apply in the areas affected by the Davis-Monthan AICUZ. One is conventional or regular zoning established by a jurisdiction. The other zoning type is applied on top of existing zoning to form an overlay zone and is used by both Tucson and Pima County in their Airport Zoning Ordinances.

The existing zoning within the Arroyo Chico Area follows the same pattern as the existing land use. More land is zoned R-1 (single family residential and recreation) than any other zoning classification. Some R-2 and R-3 zoning (multifamily housing) is located in several concentrated developments. I-1 and I-2 (industrial) and B-1 and B-2A (commercial) zoning are located in the vicinity of the Southern Pacific Railroad corridor and along major streets.

Rezoning requests are producing few changes to the existing zoning structure. East of Tucson Boulevard the area has remained very stable with single family residences and recreation being the predominant land uses. West of Tucson Boulevard, there have only been a few industrial and commercial rezoning requests in the past ten years.

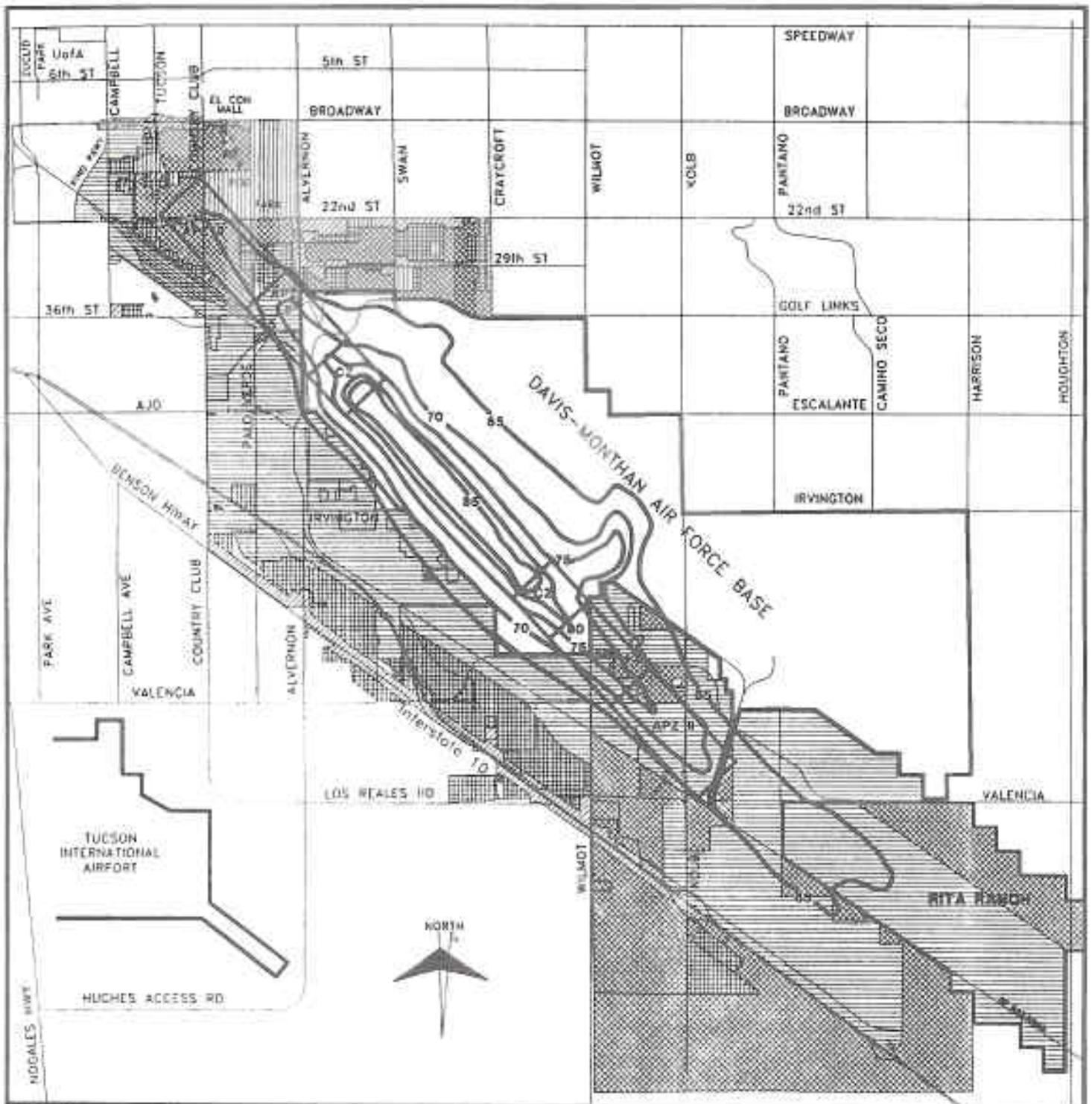
Most of the land covered by the Esmond Station Area Plan inside the City of Tucson is either zoned Urban Ranch (low density residential) or is part of Rita Ranch which is zoned for a mixture of land uses including residential, commercial and industrial. An agreement was reached between the developers of Rita Ranch and Davis-Monthan that divided the development into AICUZ compatible uses. All residential use was prohibited within the Davis-Monthan Approach-Departure zone. Only industrial uses are allowed within this area. This unique agreement allows for compatible growth, while maintaining the operational flexibility of the base.

In April of 1990, the City of Tucson adopted an overlay zone, the Airport Environs Zone. This ordinance incorporates many of the AICUZ recommendations and allows the City to prevent incompatible land uses from developing near Davis-Monthan while also protecting the public safety of Tucson residents. The Airport Environs Zone regulates areas of high noise exposure, limits intensity of land use, prohibits airport hazards and limits heights within landing and take-off approaches. Zones are established which prohibit public assembly, limit the intensity of land use, and prohibit such uses as child day care, adult education, and medical service. This zoning ordinance allows the City to control and regulate development around the base and assures that areas south of the base currently covered by the Pima County Airport Zoning Ordinance will still be so covered when incorporated into the city.

Existing zoning within the Rincon/Southeast Subregion, which includes the unincorporated land within the Esmond Station Area Plan, is predominantly RH (rural homestead) with a minimum lot size of four acres. On the east side of the subregion near the Saguaro National Monument is the 5,000 acre Rocking K Specific Plan. This proposed mixed-use development consists of residential, recreational, campus park industrial, and commercial zoning. The residential zoning varies from low density estate lots to limited areas of high density residential with over 11,500 homes proposed to be built.

Closer to Davis-Monthan's boundaries, most of the land north of the Southern Pacific Railroad is zoned either industrial or agricultural/rural residential. On the south side is the 348 acre South Kolb Road Specific Plan which was rezoned in 1988 from rural homestead and suburban ranch to SP (specific plan) for mainly industrial uses.

A comprehensive Airport Environs and Facilities Zoning Ordinance was adopted by Pima County in 1985 and amended in 1987. Pima County planners working with Davis-Monthan and Tucson Airport Authority Planning staffs used the 1975 Davis-Monthan AICUZ and the 1982 Tucson International Airport Environs Plan as a basis for the development of the county ordinance. It regulates areas of high noise exposure, prohibits airport hazards, limits heights within landing and take-off approaches and land uses within compatible use zones. Some of the restrictions include no public assembly within Davis-Monthan's Accident Potential Zones I and II (APZ), and a 50 employee limit per building within APZ I. This zoning ordinance, which is one of the strictest in the nation, affects the predominantly undeveloped land south of the base.

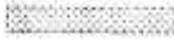
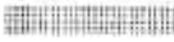


- SOURCES
1. The Images Project
  2. Pima County Planning and Development Services
  3. City of Tucson Planning Dept.

## EXISTING ZONING

FIGURE 8

### LEGEND

	SINGLE-FAMILY RESIDENTIAL		INDUSTRIAL
	MULTI-FAMILY RESIDENTIAL		INSTITUTIONAL
	COMMERCIAL		MULTI-USE

## FUTURE LAND USE

### (FIGURE 9)

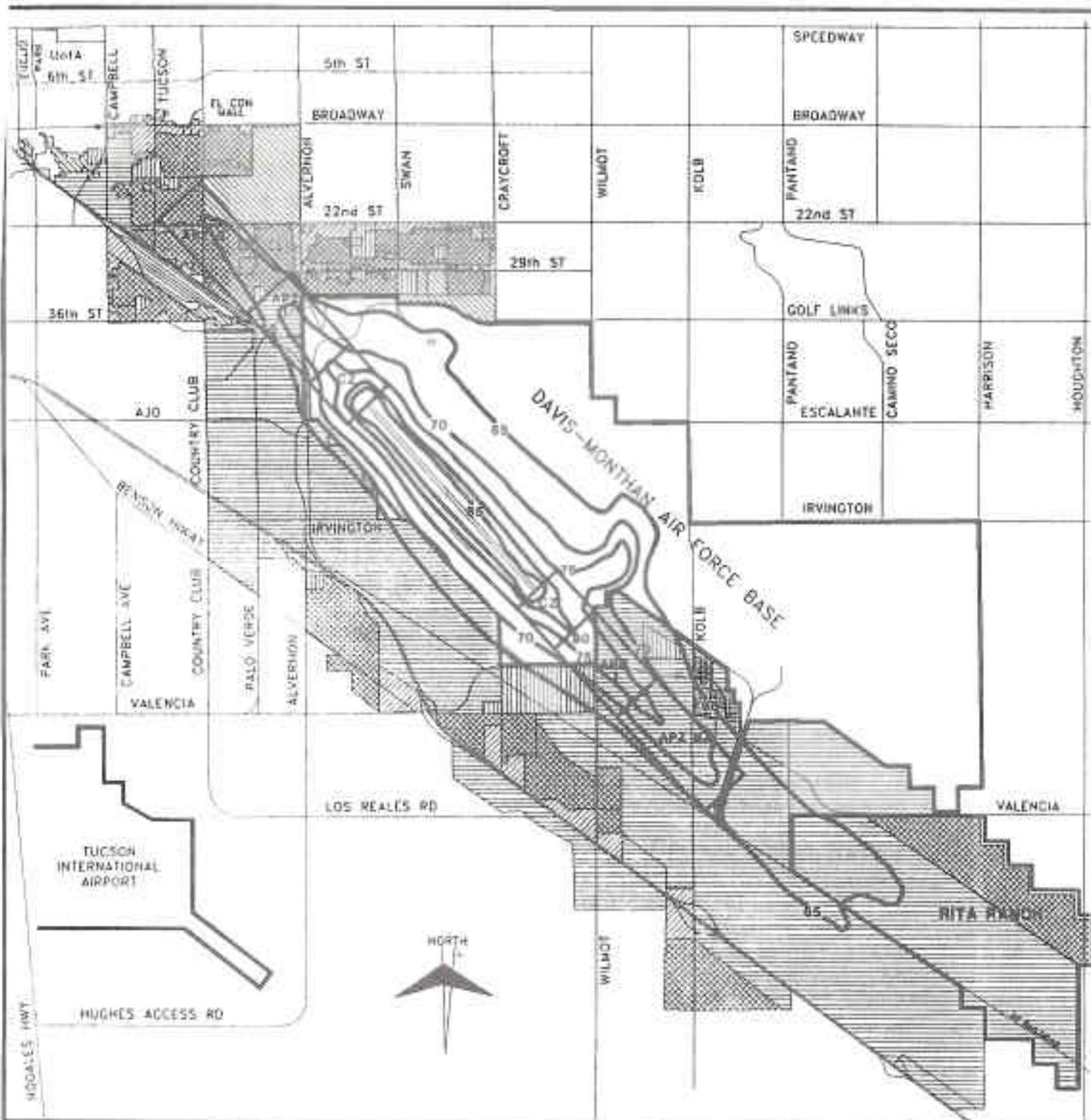
The Arroyo Chico Area is an almost fully developed older urban area that is basically stable in land uses. New development will either be through in-fill on existing vacant parcels, or by rezoning existing developments for other uses. Future land uses as outlined in the Arroyo Chico Area Plan are very similar to the existing land use pattern.

The Arroyo Chico Area Plan, which was developed with input from the Davis-Monthan Planning Staff, has a subgoal to encourage land use compatibility between Davis-Monthan and adjacent development. In order to reach the goal of land use compatibility there are three policies addressed in the area plan to: (1) ensure compatibility of new development with existing and future operations of Davis-Monthan, (2) ensure compatibility of base operations with existing and potential adjacent development, and (3) ensure new development consistent with AICUZ guidelines when compatible with Arroyo Chico Area Plan general policies.

The Rincon/Southeast Subregion Land Use Plan is being developed with an anticipated adoption date of June 1992. Six subregion land use plans will replace all adopted area, community, and neighborhood plans in unincorporated Pima County.

The land south and southeast of Davis-Monthan is currently covered by the Southeast (part of the Rincon/Southeast Subregion) and the Esmond Station Area Plans. Unlike the land within the Arroyo Chico area, most of the land is undeveloped. With such a large amount of land available for development, this area must be the focus for future compatible land use planning. During the development of the Southeast and Esmond Station Area Plans, information was provided to Pima County and City of Tucson Planning Staffs concerning Davis-Monthan's AICUZ program and recommended guidelines for compatible development. The adopted future land use plan within, and surrounding the AICUZ, is oriented towards industrial usage which is compatible with Davis-Monthan's flying mission.

Davis-Monthan's Planning Staff will be providing updated AICUZ flying information to Pima County Planners and Land Use Panel Members so that the Rincon/Southeast Subregion Land Use Plan reflects compatible land use for areas affected by Davis-Monthan's AICUZ. This is important to ensure Davis-Monthan's ability to continue its flying mission.



SOURCES:  
 1. The Greater Tucson  
 2. New Goals, Policies,  
 and Strategies Study  
 3. City of Tucson  
 Planning Dept.

## FUTURE LAND USE (GENERALIZED)

FIGURE 9

### LEGEND

<p> RESIDENTIAL</p> <p> COMMERCIAL</p> <p> INSTITUTIONAL</p>	<p> INDUSTRIAL</p> <p> PARK OR OPEN SPACE</p> <p> MULTI-USE</p>
--	---

## TUCSON INTERNATIONAL AIRPORT COORDINATION

Tucson International Airport's (TIA) main runway is 4.5 miles southwest and parallel to Davis-Monthan's runway. Due to the closeness of the two major airports and the heavy use of the airspace, the base and TIA closely coordinate daily traffic routing. There is a mutually beneficial arrangement allowing for commercial aircraft to land at Davis-Monthan and military aircraft to land at TIA. TIA and Davis-Monthan use a regional approach in working with local jurisdictions on land use compatibility for airport environs. Both Davis-Monthan and TIA share similar concerns about urban encroachment and land use compatibility. Each facility supports the other on relevant zoning issues and proposed developments that may be incompatible with airport operations. In 1988 TIA updated their Federal Aviation Regulations (FAR) Part 150 Program to include a noise study report, airport noise exposure maps and a noise compatibility program.

### DAVIS-MONTHAN AICUZ ENVIRONS

#### COMPATIBILITY/INCOMPATIBILITY EVALUATION

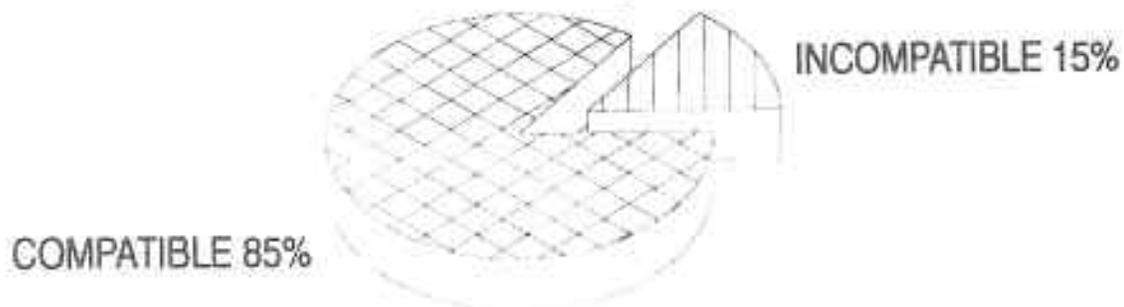
The land within the Davis-Monthan AICUZ Environs northwest of the base runway is the Arroyo Chico Area and contains most of the existing incompatible land uses. Land that is within the Accident Potential Zone II (APZ) with an Ldn level below 65 contains residential, commercial, and recreational land uses. The land uses are compatible except for residential development with a higher density than is recommended by the AICUZ land use guidelines. The predominant land use within APZ II/Ldn 65-70 is single family residential with some multifamily residential. Residential development within APZ II/Ldn 65-70 is compatible if the density is below two dwelling units per acre while multifamily residential is considered an incompatible land use. The evaluation shows that the density is higher than the one to two dwelling units per acre. The Julia Keen Elementary school within APZ II/Ldn 65-70 is an incompatible use. APZ I/Ldn 65-70 contains mainly industrial uses with some incompatible residential development in the northeast part of the subarea. Although industrial uses are generally considered to be compatible land uses, AICUZ guidelines stress the importance of limiting "people-intensive" development within the Accident Potential Zones. Industrial uses also make up the predominant land use within APZ I/Ldn 70-75.

Just outside of Davis-Monthan's boundaries to the west, is land that is within the Ldn 65-70. Most of this land is industrial which is compatible with the AICUZ land use guidelines.

The AICUZ Environs extends southeast of the runway into an area of mainly vacant land with some pockets of industrial uses. The land within APZ II/Ldn 75-80, APZ II/Ldn 65-70 and Ldn 65-70 is mostly undeveloped with a few compatible industrial sites. The Southeast Area Plan had projected industrial land uses which are both compatible and desirable for this land. The new Pima County Rincon/Southeast Subregion Land Use Plan also needs to reflect the same land use development policies.

Below is a pie chart illustrating the percentage of incompatible and compatible development within the off base AICUZ Environs.

## D-M AICUZ ENVIRONS Land Use Compatibility\*



\* Based on Off Base AICUZ Environs Acreage

The Davis-Monthan AFB AICUZ Environs for compatible and incompatible land uses is a contrast between an old established urban area and as yet undeveloped county land. Existing and future land use southeast of Davis-Monthan in the AICUZ Environs is very consistent with minimal incompatible development. This is in contrast to the AICUZ Environs northwest of Davis-Monthan which contain some incompatible residential, educational, and some high density industrial land uses. Much of the urban development in this area was built over 20 years ago. The major opportunity for compatible land use in the Arroyo Chico area rests with close evaluation of future zoning change requests and compliance with Tucson's Airport Environs Zone. Southeast of Davis-Monthan, the major opportunity for compatible development rests with implementation of the Rincon/Southeast Subregion Land Use Plan and compliance with Pima County's Airport Zoning Ordinance.

## IMPLEMENTATION

The implementation of the AICUZ study must be a joint effort between the Air Force and adjacent communities. The Air Force role is to minimize the impact of Davis-Monthan operations on local communities. The communities must ensure that development of the environs is compatible with accepted planning and development principles and practices.

### AIR FORCE RESPONSIBILITIES

In general, the Air Force perceives its AICUZ responsibilities as falling within the areas of flying safety, noise abatement, and participation in the land use planning process.

Well maintained aircraft and well trained aircrews do much to avoid aircraft accidents. However, despite the best training and maintenance, history makes it clear that accidents unfortunately do occur. It is imperative that flights be routed over sparsely populated areas as much as possible to reduce exposure to a potential accident. Aircraft noise is generated both in the air and on the ground. At Davis-Monthan AFB the following noise abatement and safety practices are undertaken:

#### Air Operations

1. Airfield departures and arrivals, to the maximum extent possible and consistent with established safety procedures, will use the airspace southeast of the base.
2. Traffic patterns will be designed to minimize overflights of populated areas.
3. Efforts are continually made to control and schedule missions to keep noise levels at an absolute minimum during evening hours.
4. Operational areas for aircraft are over very sparsely populated areas.
5. Quiet hours for aircraft operations are normally from 10:30 P.M. to 6:00 A.M. (2230 to 0600) unless a high priority mission or an emergency situation occurs.

#### Ground Operations

Base maintenance run-up activities are not normally performed between 10:30 P.M. and 6:00 A.M. (2230 to 0600) except for high priority mission requirements or when an emergency situation occurs.

### REVIEW

By Air Force regulation, commanders are required to periodically "review existing traffic patterns, instrument approaches, weather minimums, and operating practices and evaluate these factors in relationship to populated areas and other local situations." This requirement is a direct result and expression of the Air Force policy that all AICUZ plans must include an analysis of flying and flying related activities designed to reduce and control the effects of such operations on surrounding land areas.

## PARTICIPATION IN THE PLANNING PROCESS

Preparation and presentation of this Davis-Monthan AFB AICUZ report is the continuation of Air Force participation in the local planning process. The AICUZ program is an ongoing activity, even after compatible land use development plans are adopted and implemented. In recognition of this requirement, Base Civil Engineering Planning Staff are prepared to participate in the continuing discussion of zoning, noise, and other land use matters as they may affect Davis-Monthan AFB.

## LOCAL COMMUNITY RESPONSIBILITIES

Davis-Monthan AFB has a long history of working with the citizens of the Tucson Region to develop policies that are beneficial to all. We believe the following recommendations will strengthen this relationship, increase the health and safety of the public and help protect the integrity of the base's flying mission:

1. Incorporate AICUZ policies and guidelines into local comprehensive plans. Use overlay maps of the Davis-Monthan AICUZ noise contours and Air Force Land Use Compatibility Guidelines to evaluate existing and future land use proposals.
2. Continue to support existing zoning ordinances so as not to permit incompatible construction within the AICUZ zones.
3. Ensure height and obstruction ordinances reflect current Air Force and Federal Aviation Administration (FAA) Part 77 requirements.
4. Modify building codes to ensure that new construction within the AICUZ area has the recommended noise level reductions incorporated in design and construction.
5. Require that sellers of property within the AICUZ zones disclose in writing to the purchaser, the fact that the properties are affected by aircraft noise.
6. Inform Davis-Monthan AFB of planning and zoning actions that have the potential of affecting base operations.

DAVIS-MONTHAN AIR FORCE BASE

FEBRUARY 1992

AIR

INSTALLATION

COMPATIBLE

USE

ZONE

***REPORT***

VOLUME II

---

*TO THE GOVERNMENTS AND CITIZENS OF THE TUCSON REGION*

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AIR INSTALLATION COMPATIBLE  
USE ZONE REPORT  
(AICUZ)  
DAVIS-MONTHAN AIR FORCE BASE, ARIZONA  
VOLUME II

This is the companion document to Volume I of the updated Air Installation Compatible Use Zone (AICUZ) study prepared for Davis-Monthan Air Force Base, Arizona. It contains the following AICUZ information:

APPENDIX A	The AICUZ Concept, Program, Methodology and Policies
APPENDIX B	Accident Potential Study
APPENDIX C	Description of the Noise Environment
APPENDIX D	Height and Obstruction Criteria
APPENDIX E	Noise Level Reduction Guidelines
APPENDIX F	Operational Change Analysis

## APPENDIX A

### THE AICUZ CONCEPT, PROGRAM AND METHODOLOGY

#### CONCEPT

Federal legislation, national sentiment, and other external forces which directly affect the Air Force mission, have served to greatly increase the Air Force role in environmental and planning issues. Problems of airfield noise, air and water pollution, and socio-economic impacts, require continued and intensified Air Force involvement. These problems dictate direct Air Force participation in the process of comprehensive community and land use planning. Effective coordinated planning requires the establishment of good working relationships with local citizens, local planning officials and state and Federal officials which, in turn, depend upon creating an atmosphere of mutual trust and helpfulness. The Air Installation Compatible Use Zone (AICUZ) concept has been developed in an effort to reduce the noise and accident hazards associated with flying activities in the interest of health, safety, and general welfare and also to prevent degradation of mission capability due to encroachment.

Land Use zones and guidelines have been developed; the guidelines are a composite of a number of other land use compatibility studies which have been refined to fit the Davis-Monthan AFB aviation environment.

#### PROGRAM

Installation commanders establish and maintain active programs to achieve the maximum feasible land use compatibility between air installations and neighboring communities. The program requires that all appropriate governmental bodies and citizens be kept informed of Air Force views whenever AICUZ or other planning matters affecting the installation are under consideration. This includes positive and continuous programs designed to:

1. Provide criteria and guidelines to state, regional and local planning bodies, civic associations, and similar groups.
2. Inform groups of the noise exposure and aircraft accident potential resulting from flying activity.
3. Describe the noise reduction measures which are being used.
4. Insure that all practical measures are taken to reduce or control Air Force noise producing activities. These measures include properly locating engine test facilities, providing sound suppressors where necessary, and adjusting flight patterns and/or techniques to minimize the noise impact on populated areas. This must be done without jeopardizing safety or operational effectiveness.

## METHODOLOGY

The AICUZ consists of areas where facilities may obstruct the airspace or otherwise be hazardous to aircraft operations, and areas where occupants are exposed to the health, safety, or welfare hazards of aircraft operations. In other words, the AICUZ includes:

1. Accident Potential Zones based on an analysis of past Air Force aircraft accidents. (Appendix B)
2. Noise Zones produced by the computerized Day-Night Average Sound Level (Ldn) methodology. (Appendix C)
3. Federal Aviation Administration and the Air Force designated height limitations in the approach and departure zones of the base. (Appendix D)

The AICUZ program designates Accident Potential Zones and Noise Zones, and provides land use compatibility guidelines for these zones. The two zones are overlaid on area maps which are the basic planning units of the AICUZ program. The AICUZ becomes a composite input into the local planning process.

As part of the AICUZ program, the only real property interest for which the United States Air Force has received authorization and appropriations to acquire is the area designated as the Clear Zones. Compatible land use controls for the remaining airfield environs are recommended to the local governments through their land use planning and control process. The Clear Zone areas at Davis-Monthan Air Force Base are owned by the Department of Defense.

## AICUZ LAND USE DEVELOPMENT POLICIES

The basis of any effective land use system is a set of land development policies which serve as the standard by which all airfield environs land use planning and control actions are evaluated. The Air Force recommends the following policies be considered for incorporation into the comprehensive plans for the Davis-Monthan AFB environs:

POLICY #1: In order to promote the public health, safety, peace, comfort, convenience, and general welfare of those living within the airfield environs, it is necessary to:

1. Guide, control, and regulate future growth and development.
2. Promote orderly and appropriate use of land.
3. Protect the character and stability of existing land uses.

4. Prevent the impairment of the airfield and the public investment.
5. Enhance the quality of living in the areas affected.
6. Protect the general economic welfare by making developers aware of incompatible land use.

POLICY #2: In order to implement POLICY #1, it is necessary to:

1. Incorporate the Air Installation Compatible Use Zone concept into existing land use plans, and modifying them when necessary to:
  - a. Establish guidelines for land use compatibility.
  - b. Restrict or prohibit incompatible land use.
  - c. Prevent establishment of any land use which would unreasonably endanger aircraft operations and the continued use of the airfield.
2. Adopt appropriate ordinances to implement land use recommendations in the area surrounding Davis-Monthan AFB.

POLICY #3: Within the boundaries of the AICUZ, certain land uses are inherently incompatible. The following land uses are not in the public interest and must be restricted or prohibited:

1. Uses which release into the air steam, dust, and smoke or any substance, which impair visibility or otherwise interfere with the operation of aircraft.
2. Uses which produce light emissions, either direct or indirect (reflective), which interfere with pilot vision.
3. Uses which produce electrical emissions which would interfere with aircraft communication systems or navigational equipment.
4. Uses which attract birds or waterfowl, such as operation of sanitary landfills, maintenance of feeding stations, or growth of certain vegetation.
5. Uses which provide for structures within ten feet of aircraft and transitional surfaces.

POLICY #4: Certain noise levels of varying duration and frequency create hazards to both physical and mental health. Where this condition exists, it is not consistent with public welfare to allow the following land uses:

1. Residential
2. Retail Business

3. Office Buildings
4. Public Buildings (Schools, Churches, Hospitals, Etc.)
5. Recreation Buildings and Structures

**POLICY #5:** Areas below take off and flight approach paths are exposed to danger from aircraft accidents. It is prudent to limit the density of development and intensity of use in such areas.

**POLICY #6:** Different land uses have different sensitivities to noise. Standards of land use should be adopted based on these noise sensitivities. In addition, a system of Noise Level Reduction guidelines for new construction should be implemented to permit certain uses where they would otherwise be prohibited.

**POLICY #7:** Land use planning and zoning in the airfield environs cannot be based solely on aircraft generated effects. Allocation of land used within the AICUZ should be further refined by analysis of:

1. Physiographic Factors
2. Climate and Hydrology
3. Vegetation
4. Surface Geology
5. Soil Characteristics
6. Intrinsic Land Use Suitabilities and Constraints
7. Existing Land Use
8. Land Ownership Patterns and Values
9. Economic and Social Demands
10. Cost and Availability of Public Utilities, Transportation, and Community Facilities
11. Other Noise Sources

## APPENDIX B

### ACCIDENT POTENTIAL ZONES

#### GUIDELINES FOR ACCIDENT POTENTIAL

Urban areas around airports are exposed to the possibility of aircraft accidents even with well-maintained aircraft and highly trained aircraft crews. Despite stringent maintenance requirements and intensive training, past history makes it clear that accidents are going to occur.

When AICUZ first began, there were no current comprehensive studies on accident potential. In support of the program, the Air Force completed a study of Air Force accidents that occurred between 1968 and 1972 within 10 nautical miles of airfields. The study of 369 accidents revealed that 75 percent of aircraft accidents occurred on or adjacent to the runway (1000 feet to each side of the runway centerline) and in a corridor 3000 feet wide (1500 either side of runway centerline), extending from the runway threshold along the extended runway centerline for a distance of 15,000 feet.

Three zones were established based on crash patterns: The clear zone, Accident Potential Zone (APZ) I and Accident Potential Zone (APZ) II. The clear zone starts at the end of the runway and extends outward 3000 feet. It has the highest accident potential of three zones. The Air Force has adopted a policy of acquiring property rights to areas designated as clear zones because of the high accident potential. APZ I extends from the clear zone an additional 5000 feet. It includes an area of reduced accident potential. APZ II extends from APZ I an additional 7000 feet in an area of further reduced accident potential.

The Air Force work in accident potential was the first significant effort since 1952 when the President's Airport Commission published "The Airport and Its Neighbors", better known as the "Doolittle Report". The recommendations of this earlier report were influential in the formulation of the accident potential zone concept.

The risk of people on the ground being killed or injured by aircraft accidents is small. However, an aircraft accident is a high consequence event and when a crash does occur, the result is often catastrophic. Because of this, the Air Force does not attempt to base its safety standards on accident probabilities. Instead the Air Force approaches this safety issue from a land use planning perspective, given that aircraft accidents do occur.

#### ACCIDENT POTENTIAL ANALYSIS

Military aircraft accidents differ from commercial air carrier and general aviation accidents because of the variety of aircraft used, the type of missions, and the number of training flights. In 1973, the Air Force performed a service-wide aircraft accident hazard study in order to identify land near airfields with significant accident potential. The accidents that were studied occurred within ten nautical miles of airfields.

The study reviewed 369 major Air Force accidents during 1968-1972, and found that 61 percent of the accidents were related to landing operations and 30 percent were related to take-offs. It also found that 70 percent occurred in daylight and that fighter and training aircraft accounted for 80 percent of the accidents.

Because of the purpose of the study was to identify accident hazards, the study plotted each of the 369 accidents in relation to the airfield. This plotting found that the accidents clustered along the runway and its extended centerline. To further refine this clustering, a tabulation was prepared which described the cumulative frequency of accidents as a function of distance from the runway centerline along the extended centerline. This analysis was done for widths of 2,000, 3,000 and 4,000 total feet.

**THE LOCATION ANALYSIS FOUND THE FOLLOWING:**

<u>LENGTH FROM BOTH ENDS OF RUNWAY (FEET)</u>	<u>WIDTH OF RUNWAY EXTENSION (FEET)</u>		
	<u>2,000</u>	<u>3,000</u>	<u>4,000</u>
<u>PERCENT OF ACCIDENTS</u>			
On or adjacent to runway (1,000 feet to each side of runway centerline)	23	23	23
0 to 3,000	35	39	39
3,000 to 8,000	8	8	8
8,000 to 15,000	5	5	7

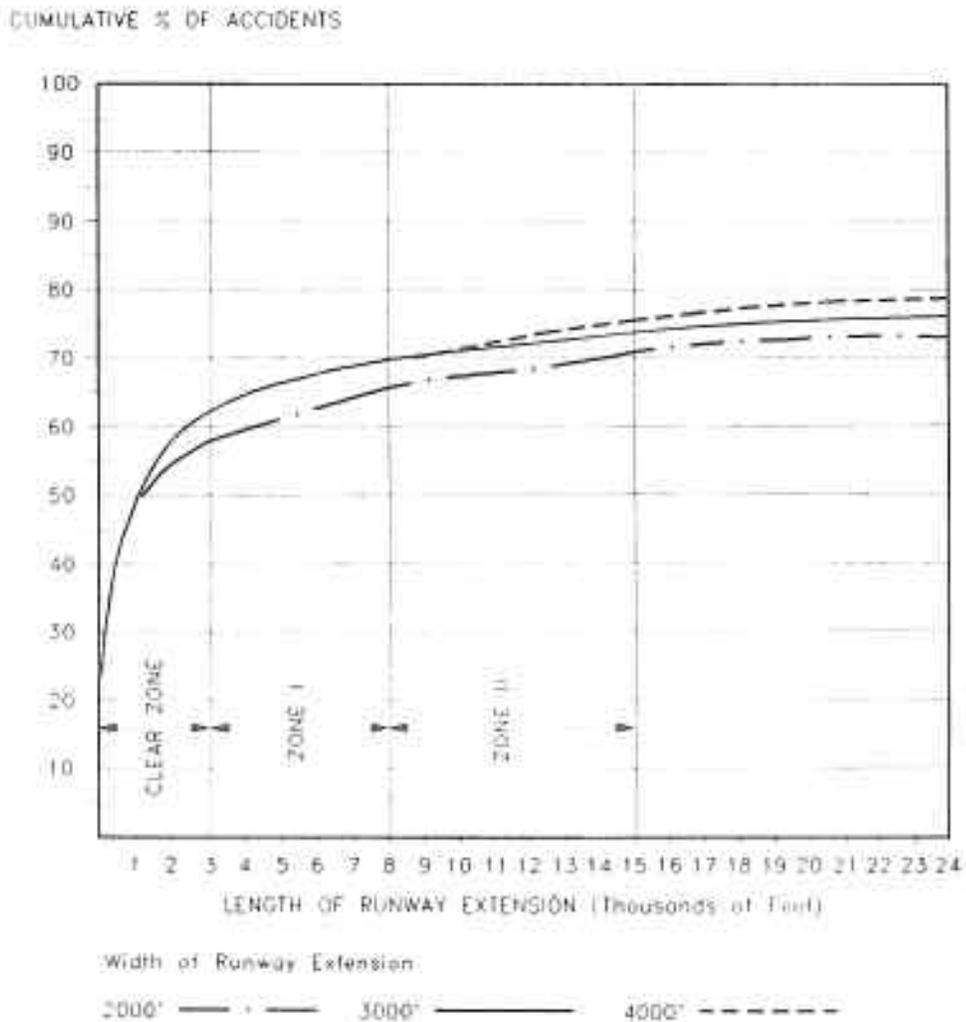
**CUMULATIVE PERCENT OF ACCIDENTS**

On or adjacent to runway (1,000 feet to each side of runway centerline)	23	23	23
0 to 3,000	58	62	62
3,000 to 8,000	66	70	70
8,000 to 15,000	71	75	77

Figure B-1, Distribution of Air Force Aircraft Accidents (1968-72), indicates that the cumulative number of accidents rises rapidly from the end of the runway to 3,000 feet, rises more gradually to 8,000 feet, then continues at about the same increase to 15,000 feet, where it levels off rapidly. The location analysis also indicates that the optimum width of the runway extension, which would include the maximum percentage of accidents in the smallest area, is 3,000 feet.

**FIGURE B-1**  
**DISTRIBUTION OF AIR FORCE AIRCRAFT ACCIDENTS**  
**(1968-1972)**

(369 ACCIDENTS WITHIN 10 NAUTICAL MILES)



Using the optimum runway extension width, 3,000 feet, and the cumulative distribution of accidents from the end of the runway, zones were established which minimized the land area included and maximized the percentage of accidents included. The zone dimensions and accident statistics for the 1968-1972 study are shown in Figure B-2.

FIGURE B-2

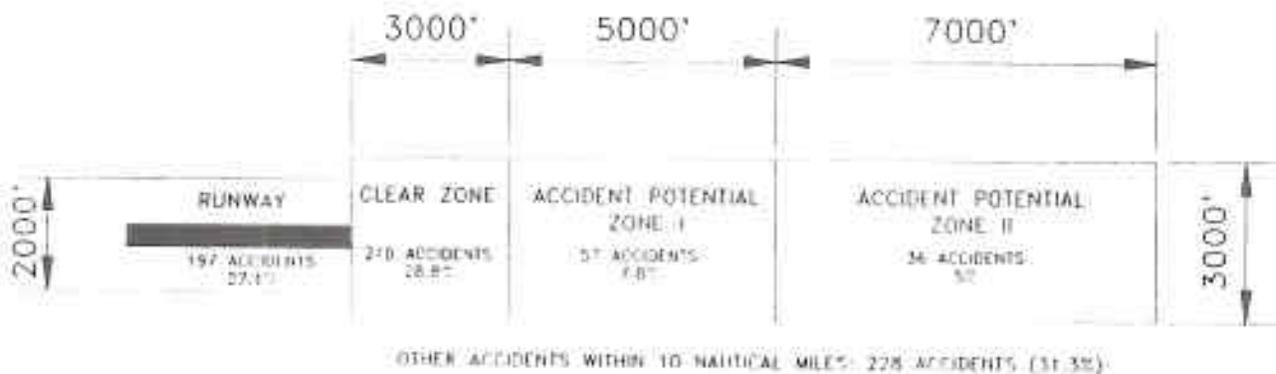
AIR FORCE ACCIDENT DATA  
(369 ACCIDENTS - 1968-1972)



The original study has been updated to include accidents through 1985. The updated study now includes 728 accidents during the 1968-1985 period. Using the optimum runway extension width, 3,000 feet, the accident statistics of the updated study are shown below.

FIGURE B-3

AIR FORCE ACCIDENT DATA  
(728 ACCIDENTS - 1968-1985)



Using the designated zones and the accident data, it is possible to calculate a ratio of percentage of accidents to percentage of area size. These ratios indicate that the clear zone, with the smallest area size and the highest number of accidents, has the highest ratio, followed by the runway and adjacent area, Zone I and then Zone II.

**RATIO OF PERCENTAGE OF ACCIDENTS TO PERCENTAGE OF AREA**

	<u>AREA<sup>1</sup></u> <u>(ACRES)</u>	<u>NO.<sup>2</sup></u> <u>ACCID</u>	<u>ACCIDENTS</u> <u>PER ACRE</u>	<u>%</u> <u>TOTAL</u> <u>AREA</u>	<u>%</u> <u>TOTAL</u> <u>ACCIDENTS</u>	<u>RATIO:<sup>3</sup></u> <u>ACCIDENTS</u> <u>TO AREA</u>
Runway Area	487	197	1 per 2.5 acres	0.165	27.1	164
Clear Zone	413	210	1 per 1.9	0.140	28.8	206
Zone I	689	57	1 per 12.1	0.233	7.8	33
Zone II	964	36	1 per 26.7	0.327	5.0	15
Other	292,483	228	1 per 1282.8 acres	99.135	31.3	.3

1. Area includes land within ten nautical miles of runway.
2. Total number of accidents is 728.
3. Percent total accidents divided by percent total area.

The Air Force also determined which accidents had definable debris impact areas and in what phase of flight the accident occurred. Overall, 75 percent of the accidents had definable debris impact areas, although they vary in size by type of accident.

The Air Force used weighted averages of impact areas, for accidents occurring only in the approach and departure phase, to determine the following average impact areas:

**AVERAGE IMPACT AREAS FOR APPROACH AND DEPARTURE ACCIDENTS**

Overall average impact area	5.06 acres
Trainer and misc aircraft	2.73 acres
Heavy bomber and tanker	8.73 acres

**1. FINDINGS**

- a. Designation of safety zones around the airfield and restriction of incompatible land uses can reduce the public's exposure to safety hazards.

b. Air Force accident studies have found that aircraft accidents near Air Force installations occurred in the following patterns:

- (1) 61% were related to landing operations;
- (2) 39% were related to takeoff operations;
- (3) 70% occurred in daylight;
- (4) 80% were related to fighter and training aircraft operations;
- (5) 27% occurred on the runway or within an area extending 1,000 feet out from each side of the runway;
- (6) 29% occurred in an area extending from the end of the runway to 3,000 feet along the extended centerline and 3,000 feet wide, centered on the extended centerline; and,
- (7) 13% occurred in an area between 3,000 and 15,000 feet along the extended runway centerline and 3,000 feet wide, centered on the extended centerline.

c. US Air Force aircraft accident statistics found that 75% of aircraft accidents resulted in definable impact areas. The size of the impact areas were:

- (1) 5.1 acres overall average;
- (2) 2.7 acres for fighters and trainers;
- (3) 8.7 acres for heavy bombers and tankers.

d. The flight characteristics, aircraft mix, and type of operations at military installations differ significantly from commercial air carrier and general aviation airports. Potential damage to people and structures on the ground from crashes of heavy bombers, high speed fighters, and fuel laden tankers is greater than general aviation or commercial air carrier operations.

e. The hazard to people and buildings in the overflight zone is less than in areas near the ends of runways. There is, however, a potential for accidents in this area for airfield traffic patterns.

f. Certain types of land uses have been recognized as hazards to air navigation. They are:

- \* Land uses that attract large concentrations of birds within approach-climbout areas
- \* Land uses that produce smoke
- \* Land uses with flashing lights
- \* Land uses that reflect light
- \* Land uses that generate electronic interference
- \* Land uses related to flammable materials

g. Air Force installations fulfill a vital national defense function and are significant economic influences in the surrounding areas. Their continued operation, unhindered by additional restrictions on flying activities, is important to the country.

## APPENDIX C

### DESCRIPTION OF THE NOISE ENVIRONMENT

#### NOISE CONTOURS

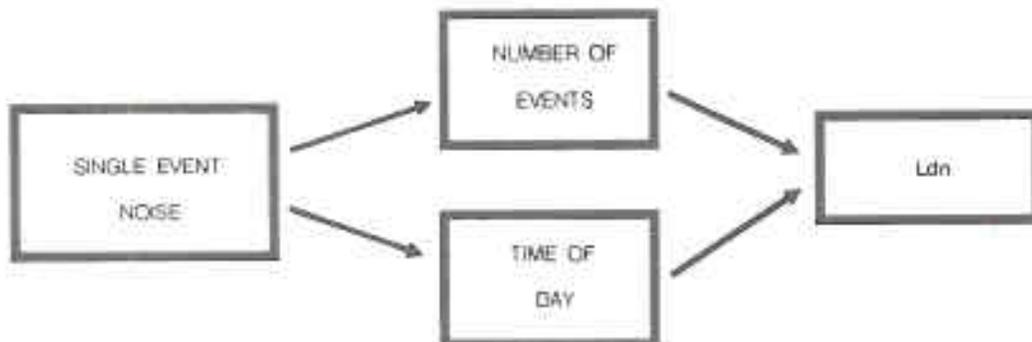
In a study of airport and aircraft noise, two different types of noise descriptors are needed; one to measure the noise of individual noise events, such as the noise of an aircraft flyover, and another to describe the noise environment resulting from a complex of noise events, such as the total noise effect of aircraft operations at an air base.

#### NOISE ENVIRONMENT DESCRIPTOR

The methodology used to produce the noise contours contained in this Study consists of the Day-Night Average Sound Level (Ldn) system of describing the noise environment. Efforts to provide a national uniform standard for noise assessment have resulted in adoption by the Environmental Protection Agency of Ldn as the standard noise prediction model for this procedure. The Ldn descriptor is a method of assessing the amount of exposure to aircraft noise and predicting the community response to the various levels of exposure. The Ldn values used for planning purposes and for which contours are shown in Figure III-3 of this report are 65, 70, 75, and 80. Land-use guidelines are based on the compatibility of various land uses with these noise exposure levels.

It is generally recognized that a noise environment descriptor should consider, in addition to the annoyance of a single event, the effect of repetition of such events and the time of day in which these events occur. Ldn begins with a single event descriptor and adds corrections for the number of events and the time of day. Since the primary development concern is residential, nighttime events are considered more annoying than daytime events and are weighted accordingly (10 decibels).

Ldn values are computed from the single event noise descriptor, plus corrections for number of flights and time of day.

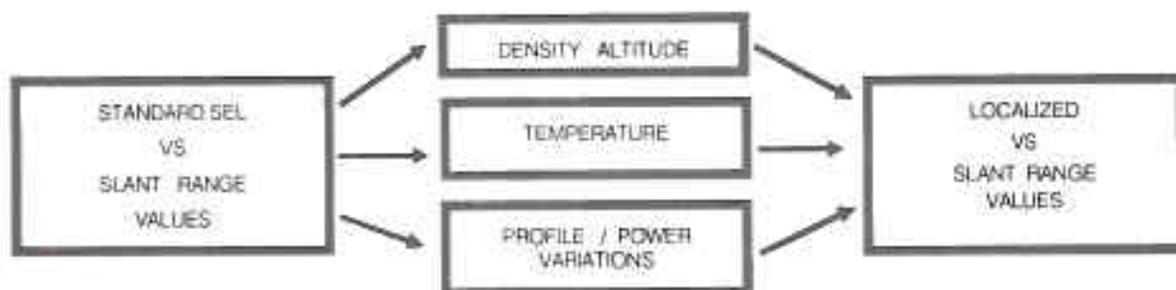


As part of an extensive data collection process, detailed information is gathered on the flight tracks flown by each type of aircraft assigned on the base and the number and time of day of flight on each of these tracks during a "typical" day. This information is used in conjunction with the single event noise descriptor to produce Ldn values. These values are combined on an energy summation basis to provide single Ldn values for the mix of aircraft operations at the base. Equal value points are connected to form the contour lines.

#### NOISE EVENT DESCRIPTOR

The single event noise descriptor used in the Ldn system is the Sound Exposure Level (SEL). The SEL measure is an integration of the "A" weighted noise level over the period of a single event such as an aircraft flyover, in decibels(dB). Frequency, magnitude, and duration vary according to aircraft type, engine type, and power setting. Therefore, individual aircraft noise data are collected for various types of aircraft/engines at different power settings and phases of flight. The following diagram shows the relationship of the single event noise descriptor (SEL) to the source sound energy.

SEL vs. slant range (distance from aircraft to the ground) values are derived from noise measurements made according to a source noise data acquisition plan developed by Bolt, Beranek, and Newman, Inc. in conjunction with the Air Force Aerospace Medical Research Laboratory (AMRL) and carried out by AMRL. These standard day, sea level values form the basis for the individual event noise descriptors at any location and are adjusted to the location by applying appropriate corrections for temperature, density altitude, and variations from standard profiles and power settings.



Ground-to-ground sound propagation characteristics are used for altitudes up to 500 feet absolute with a linear transition between 500 and 700 feet and air-to-ground propagation characteristics above 700 feet.

In addition to the assessment of aircraft flight operations, the Ldn system also incorporates aircraft and engine ground run-up or tests resulting from engine/aircraft maintenance checks on the ground. Data concerning the orientation of the noise source, type of aircraft or engine, number of test runs on a "typical" day, the power settings used and their duration, and use of suppression devices are collected for each ground run-up or test position. This information is processed and the noise contribution added (on an energy summation basis) to the noise generated by flying operations to produce Ldn contours reflecting the overall noise environment with respect to aircraft air and ground operations.

## NOISE CONTOUR PRODUCTION

Data describing flight tracks, flight profiles, power settings, flight path and profile/utilization, and ground run-up information by type aircraft/engine is assembled by the individual Air Force Base. These data are screened by Headquarters United States Air Force, and trained personnel process the data for input into a central computer. Flight track and utilization data are entered into the computer and flight track check plots are generated for verification by the Base AICUZ Project Officer. After verification and incorporation of any required changes, Ldn contours are generated by the computer using the base-supplied operational data and the standard source noise data corrected to local conditions. The computer system plots these contours which are then reviewed and prepared for photographic reproduction by specialists. A set of such contours is provided in the body of this report.

Additional technical information on the Ldn procedure is available in the following publications:

1. Community Noise Exposure Resulting from Aircraft Operations: Applications Guide for Predictive Procedure, AMRL-TR-73-105, November 1974 from National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22151.
2. Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with Adequate Margin of Safety, EPA Report 550/9-74-004, March 1974, from Superintendent of Documents, US Government Printing Office, Washington, DC 20402.

## APPENDIX D

### HEIGHT AND OBSTRUCTIONS CRITERIA

#### GENERAL

This appendix section establishes criteria for determining whether an object or structure is an obstruction to air navigation. Obstructions to air navigation are considered to be:

1. Natural objects or human-made structures that protrude above the planes or surfaces as defined in the following paragraphs, and/or
2. Human-made objects that extend more than 500 feet above the ground at the site of the structure.

#### EXPLANATION OF TERMS

The following will apply:

1. **Controlling Elevation:** Where surfaces or planes within these criteria overlap, the governing elevation is that of the lowest surfaces or plane.
2. **Runway Length:** Davis-Monthan AFB has a 13,645' runway designed and built for sustained aircraft landings and take offs.
3. **Established Airfield Elevation:** The elevation, in feet above mean sea level, for Davis-Monthan AFB it is approximately 2705 feet.
4. **Dimensions:** All dimensions are measured horizontally unless otherwise noted. Reference Figure D-1 for representation of planes and surfaces.

#### PLANES AND SURFACES

1. **Primary Surface:** This surface defines the limits of the obstruction clearance requirements in the immediate vicinity of the landing areas. The primary surface comprises surfaces of the runways, runway shoulders, and lateral safety zones. The length of the primary surface is the same as the runway length. The width of the primary surface is 2,000 feet or 1,000 feet on each side of the runway centerline.
2. **Clear Zone Surface:** This surface defines the limits of the obstruction clearance requirements in the vicinity contiguous to the ends of the primary surfaces. The length and width of the clear zone surface is 3,000 feet by 3,000 feet respectively.
3. **Approach/Departure Clearance Surface:** These surfaces are symmetrical about the runway centerline extended and begin as inclined planes (glide angles) 200 feet beyond each end of the primary surfaces at the centerline elevation of the runway ends, and extend for 50,000 feet. The slope of the approach/departure clearance surfaces is 50:1 along the

runway centerline extended (glide angles) until it reaches an elevation of 500 feet above the established airfield elevation. It then continues horizontally at this elevation to a point 50,000 feet from the start of the glide angles. The width of this surface at the runway end is 2,000 feet; it flares uniformly, and the width at 50,000 is 16,000 feet.

4. **Inner Horizontal Surface:** This surface is a plane, oval in shape at a height of 150 feet above the established airfield elevation. It is constructed by scribing an arc with a radius of 7,500 feet about the centerline at the end of the runway and interconnecting these arcs with tangents.

5. **Conical Surface:** This is an inclined surface extending outward and upward from the outer periphery of the inner horizontal surface for a horizontal distance of 7,000 feet to a height of 500 feet above the established airfield elevation. The slope of the conical surface is 20:1.

6. **Outer Horizontal Surface:** This surface is a plane located 500 feet above the established airfield elevation. It extends for a horizontal distance of 30,000 feet from the outer periphery of the conical surface.

7. **Transitional Surfaces:** These surfaces connect the primary surfaces, clear zone surfaces, and approach/departure clearance surfaces to the inner horizontal surface, conical surface, outer horizontal surface or other transitional surfaces. The slope of the transitional surface is 7:1 outward and upward at right angles to the runway centerline. To determine the elevation for the beginning of the transitional surface slope at any point along the lateral boundary of the primary surface, including the clear zone, draw a line from this point to the runway centerline. This line will be at a right angle to the runway axis. The elevation at the runway centerline is the elevation for the beginning of the 7:1 slope.

#### HEIGHT OBSTRUCTIONS AND OTHER CONSIDERATIONS

Although height and obstruction criteria in the vicinity of airports have been established for most airfields, including Davis-Monthan AFB, it is appropriate to mention these criteria in this report. Where such criteria are not included in local community land use planning, there is a possibility that uses could be permitted which would endanger safe aircraft operations.

The land area outlined by this Appendix for purposes of height obstruction criteria should be regulated to prevent uses which might otherwise be hazardous to aircraft operations. The following uses should be restricted and/or prohibited:

1. Uses which release into the air any substance which would impair visibility or otherwise interfere with the operations of aircraft, e.g., dust and smoke.
2. Uses which produce light emissions, either direct or indirect (reflective), which would interfere with pilot vision.
3. Uses which produce electrical emissions which would interfere with aircraft communication systems or air navigational equipment.
4. Uses which would attract birds or waterfowl, such as, but not limited to, operation of sanitary landfills or maintenance of feeding stations.

2. HEIGHT RESTRICTIONS:

City/County agencies involved with approvals of permits for construction should require developers to submit calculations which show that projects meet the height restriction criteria of FAA Part 77 as described, in part, by the information contained in this Appendix.

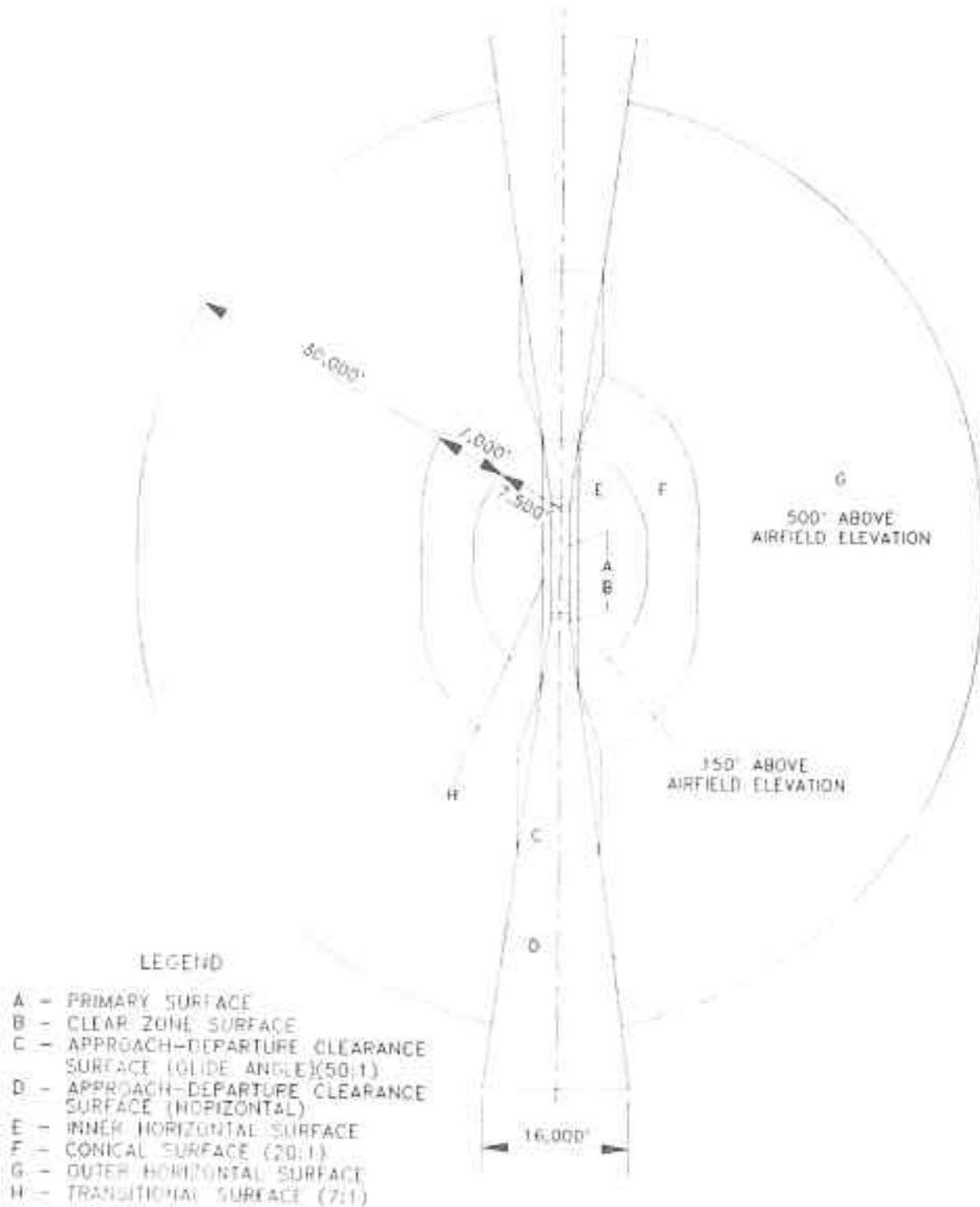
DAVIS-MONTHAN AFB

COORDINATES AND ELEVATIONS

Average Field Elevation	-	2705' MSL
Coordinates 12	-	Lat 32° 10' 48.30" N
	-	Long 110° 53' 50.764" W
	30	- Lat 32° 09' 08.93" N
		- Long 110° 52' 3.33" W

AIRSPACE CONTROL SURFACES  
PLAN VIEW

Figure D-1



## APPENDIX E

### NOISE LEVEL REDUCTION GUIDELINES

A study which provides in-depth, state-of-the-art noise level reduction guidelines was completed for the Naval Facilities Engineering Command and the Federal Aviation Administration, by Wyle Laboratories in November 1989. The study title is "Guidelines for the Sound Insulation of Residences Exposed to Aircraft Operations" (Wyle Research Report WR 89-7). Copies of this study are available, upon, request from 836 CSG/DEEV, Davis-Monthan AFB, Az 85707.

## APPENDIX F

### OPERATIONAL CHANGE ANALYSIS

#### PATTERN CHANGES

Davis-Monthan AFB has examined operational changes and, where feasible has taken action to reduce noise impacts. The active runways at Davis-Monthan AFB are 12 (takeoffs are over the desert in a southeasterly direction) and 30 (takeoffs are in a northwesterly direction). The present overhead patterns at Davis-Monthan AFB, without jeopardizing safety or operational effectiveness, attempt to minimize flight paths over densely populated areas.

Noise abatement is a continuing subject of discussion at all quarterly meetings of the Air Traffic Control Board, which are attended by Federal Aviation Administration representatives including local approach control personnel and all Davis-Monthan units which conduct flying operations.

#### RUNWAY USAGE

Aircraft arriving at Davis-Monthan AFB are preferentially routed to the southeast for a flow towards the north end of the runway. Arriving and departing traffic is regulated within a southeastern area of the airfield due to Tucson residences to the northwest. All possible takeoffs, up to a 10 knot tail wind, are attempted in the southeasterly direction over the desert. The southeasterly takeoff accounts for 75-80% of all takeoffs.

#### PROFILE MODIFICATIONS

1. Steeper Approach: The optimum approach angle is currently established for the precision approach to the runway. The glide slope is operationally feasible while minimizing noise problems over the City of Tucson. Steeper approaches, other than currently utilized, are not feasible due to the high percentage of jet fighter aircraft utilizing the Davis-Monthan AFB runway. Steeper approaches would require lower power settings, resulting in longer acceleration times and an excessive pitch change, which could lead to danger in transitioning from the glide slope to round out for touchdown.

2. Steeper Climb-Out: Most traffic departs Davis-Monthan utilizing military power, a reduced power setting, instead of afterburners. This procedure minimizes noise at ground level even though the climb-out gradient is less. The aircraft attempt to climb as rapidly as possible, but this is not always possible due to restrictions by Terminal Radar Approach Control (TRACON) traffic.

#### PATTERN ALTITUDE CHANGES

The predominant altitude for patterns at Davis-Monthan AFB is 1,500 feet Above Ground Level (AGL). Visual routes and orbit points in the Tucson basin are at 3,000 feet AGL. The fairgrounds visual departure to the northwest is flown at 1,000 feet AGL.

## USE OF NON-STANDARD TECHNIQUES

**Lower Power Approaches:** Low power approaches are not an effective technique for jet powered aircraft. This is because jet engine acceleration time and power response is very slow in comparison to reciprocating engines. Airflow in jet aircraft necessitates different approach techniques. The aircraft is flown in a high drag configuration. This allows the pilot to keep the engines at a relatively high power setting while keeping landing speeds down, so that thrust is available immediately should it be needed.

## NON-STANDARD DEPARTURES AND ARRIVALS

Non-standard departures and arrivals are already in use. Departing aircraft climb gradients are well in excess of minimum standards prescribed by the USAF and the Federal Aviation Administration. Arrivals are routed over ground tracks which reduce overflights of noise sensitive areas to the maximum extent possible consistent with safe training accomplishments.

## MINIMUM POWER TAKEOFFS

The aircraft at Davis-Monthan AFB operate at less than maximum power for all takeoffs unless safety dictates otherwise. Afterburners are generally not used during training sorties. When afterburners are used, they are shut off at the airfield boundary.

## POWER REDUCTIONS

Most aircraft depart from Davis-Monthan AFB utilizing military power, a reduced power setting, rather than afterburners. It is not feasible to safely reduce power further.

## LIMIT NUMBER OF OPERATIONS, RESTRICTED HOURS OF OPERATION

The number of flights conducted at Davis-Monthan AFB is dictated by unit training needs established by higher headquarters. Flight schedules, mission routes, and altitudes are predicated on optimum training per flying hour, maintenance capabilities, and availability of the Davis-Monthan range airspace. Because of these factors, it occasionally becomes necessary to fly early morning and late night missions.

Published quiet hours are observed daily between the hours of 2230 and 0600. Departures and arrivals are restricted during these hours. Additionally, training sorties are not generally accomplished on Saturdays or Sundays.

## LIMIT OPERATIONAL AREAS

Fully 90% of Davis-Monthan AFB training flights are conducted in the Tombstone Military Operating Areas (MOA), Sells MOA, and the Goldwater Range complex. Required instrument approaches are flown at Libby Army Airfield to the maximum extent possible.

## ENGINE RUN-UP

Ground run-ups of aircraft engines for maintenance purposes are conducted periodically. These run-ups are performed both suppressed and unsuppressed. All run-ups are restricted during quiet hours, which are from 2230 to 0600.