

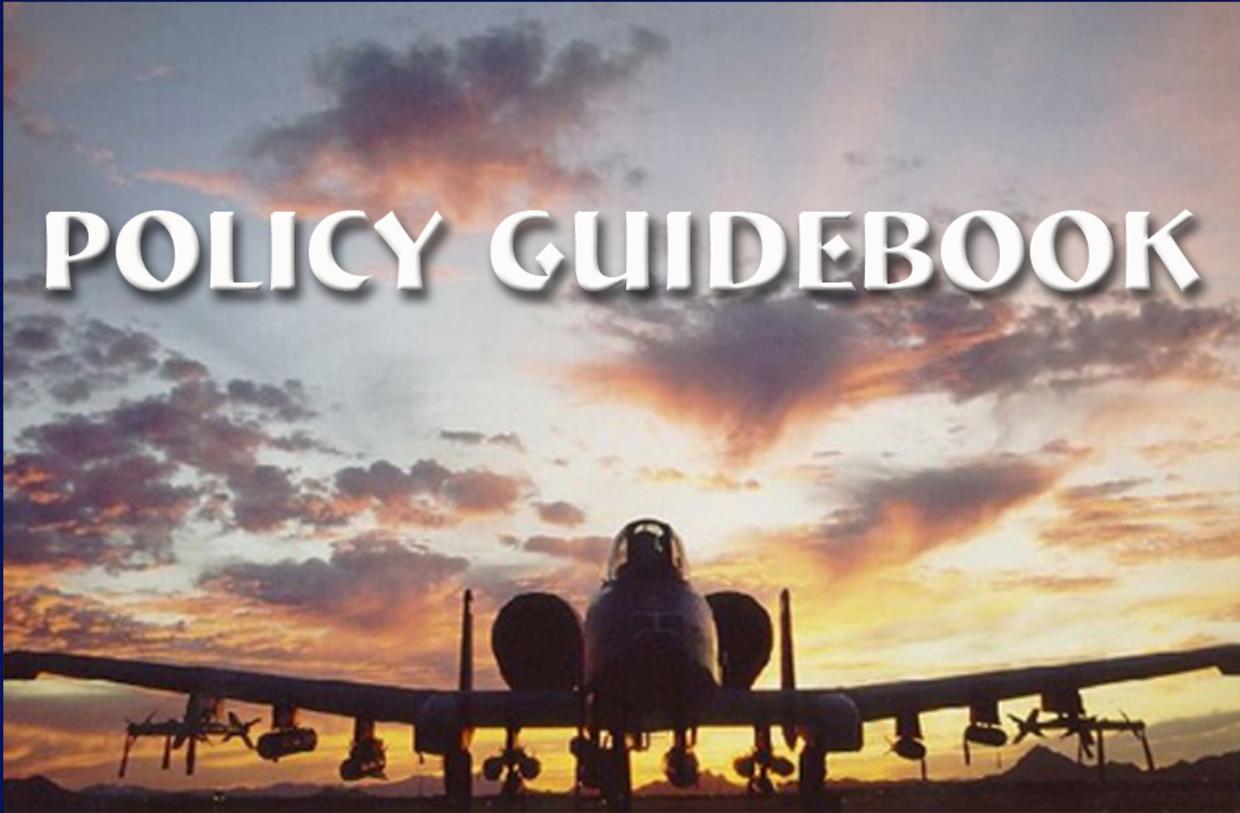


ARIZONA MILITARY

REGIONAL COMPATIBILITY PROJECT



POLICY GUIDEBOOK



ARIZONA DEPARTMENT OF COMMERCE
Our Job is JOBS!

This study was prepared under contract with the Arizona Department of Commerce with financial support from the Office of Economic Adjustment, Department of Defense. The content does not necessarily reflect the views of the Office of Economic Adjustment.

POLICY GUIDEBOOK



ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT

JULY 2006

PREPARED FOR:



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TABLE OF CONTENTS

1.	INTRODUCTION	1-1
2.	OVERVIEW OF ARIZONA'S MILITARY INSTALLATIONS	2-1
3.	LAND USE COMPATIBILITY.....	3-1
4.	REVIEW OF EXISTING LEGISLATION AND GUIDANCE	4-1
5.	TRENDS AND ISSUES	5-1
6.	POLICIES AND PRACTICES FOR COMPATIBLE LAND USE.....	6-1

On behalf of the Arizona Department of Commerce, sincere appreciation is extended to the dedicated staff from communities, counties and military installations across the state of Arizona who participated in the development and research of this document.

LIST OF TABLES

Table 5-1:
Population Change for Arizona Counties 5-1

Table 5-2:
Projected Population for Arizona Counties 2010 to 2050 5-3

Table 5-3:
Estimated Housing Units for Arizona Counties 2000 to 2004.. 5-4

Table 5-4:
Arizona State Trust Land Sales FY 2004 5-12

Table 6-1:
Recommended Planning Policies and Practices..... 6-3

Table 6-2:
Recommended Coordination / Public Participation Policies and
Practices..... 6-11

Table 6-3:
Recommended Notification Policies and Practices..... 6-18

Table 6-4:
Recommended Regulation Policies and Practices..... 6-21

Table 6-5:
Recommended Acquisition Policies and Practices 6-28

Table 6-6:
Recommended Miscellaneous Policies and Practices 6-38

LIST OF FIGURES

Figure 1-1: Military Lands in Arizona..... 1-2

APPENDIX A:

**SUMMARY OF ARIZONA LAND USE COMPATIBILITY
LEGISLATION A-1**

APPENDIX B:

**DEPARTMENT OF DEFENSE LAND USE COMPATIBILITY
GUIDANCE B-1**

APPENDIX C:

GLOSSARY OF ACRONYMS.....C-1

APPENDIX D:

REFERENCES..... D-1

APPENDIX E:

**SUMMARY OF RECOMMENDED POLICIES
AND PRACTICES.....E-1**

CHAPTER 1. INTRODUCTION

This Policy Guidebook has been prepared under the Arizona Military Regional Compatibility Project, which was conceived as a proactive statewide endeavor to convene the stakeholders around each military installation — the relevant jurisdictions, military personnel, landowners, and other interested parties — to address land use compatibility issues. Arizona is home to a network of United States military airports, installations, and ancillary facilities that include Davis-Monthan Air Force Base, Luke Air Force Base, Yuma Proving Ground and Yuma Marine Air Corps Station, Fort Huachuca, and the Barry M. Goldwater Range (BMGR) Complex (see Figure 1-1).

As issues of growth and development have moved to the forefront in many parts of Arizona, the installations and jurisdictions where the installations are located play key roles in addressing compatibility. Through the statewide Compatibility Project, the State endeavors to provide the tools to address land use conflicts that might impact the ability of each facility to conduct its mission, and to ensure land use compatibility around active military facilities.

Development of incompatible land uses in the vicinity of Arizona's military facilities constrains their ability to perform current and future missions. These incompatible uses expose people to safety and noise effects ranging from nuisance to physical harm. In response to these issues in the vicinity of air bases, State legislation amending Title 28, Article 7, Airport Zoning & Regulation (ARS §28-8480, §28-8481, and §28-8482) mandated that areas within high-noise or accident potential zones be addressed in municipal general plans and county comprehensive plans and required that land development within the high-noise or accident potential zones be compatible with military airport operations.

The State of Arizona, through amendments to existing law, including ARS §9-461.05, §9-461.06, §9-462.04, §11-806, §11-821, §11-824 and §11-826 enacted Growing Smarter and Growing Smarter Plus measures that address growth and land development issues through changes in community planning and rezoning processes.

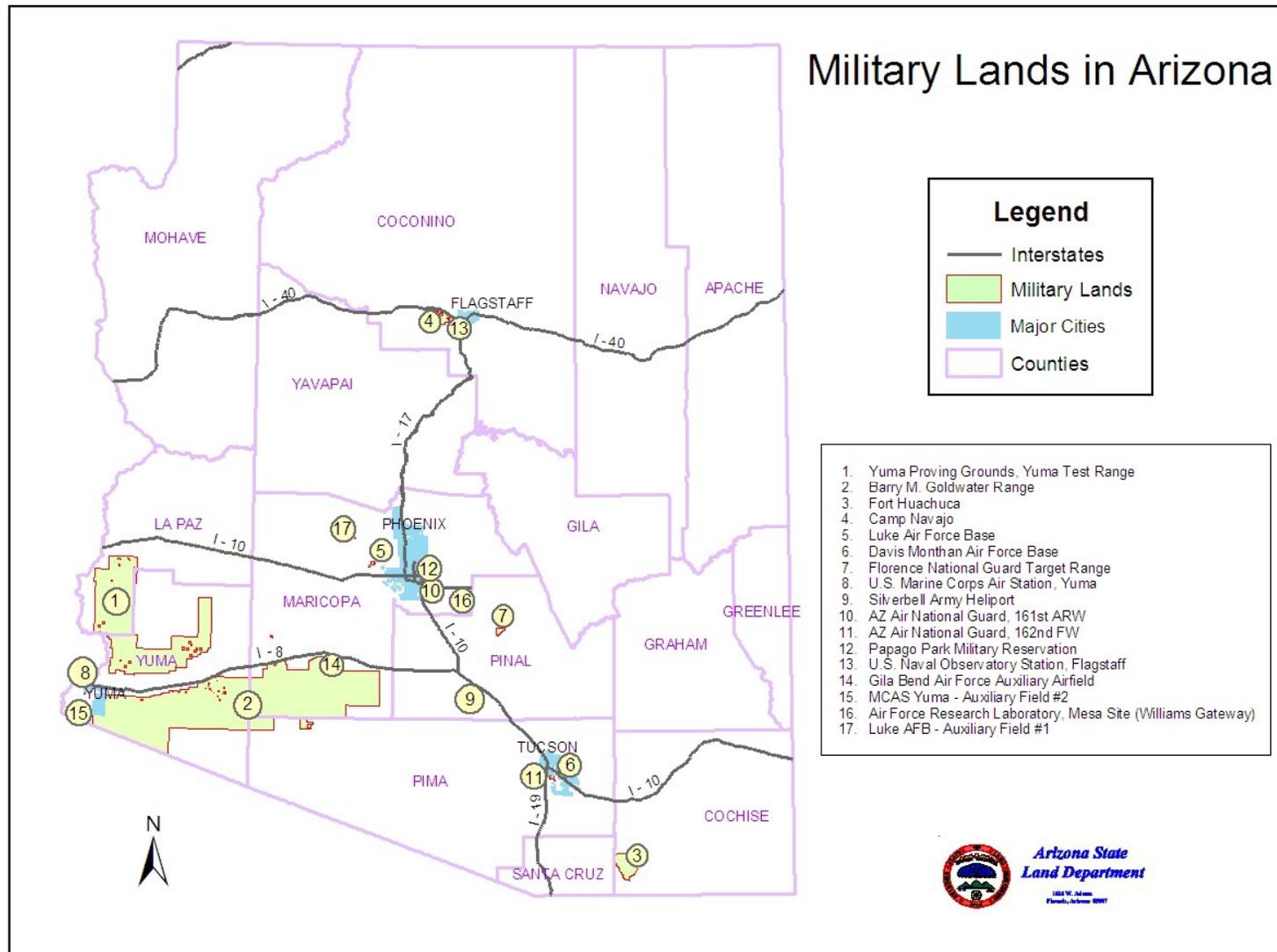


Figure 1-1: Military Lands in Arizona

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

CHAPTER 1: INTRODUCTION

These measures require political jurisdictions with property within territory in the vicinity of a military airport, as defined in ARS §28-8461, to include consideration of military airport operations in their General Plans and Comprehensive Plans, and to allow an opportunity for official comment by the military airport officials on the General Plans. The Growing Smarter statute requires that plans provide for a rational pattern of land development and an extensive public participation program. Compliance with these Growing Smarter and Growing Smarter Plus objectives serves as a key guiding principle for the overall Arizona Military Regional Compatibility Project.

In 1973, the U.S. Department of Defense created the Air Installation Compatible Use Zone (AICUZ) Program. The Installation Compatible Use Zone (ICUZ) Program was created post-1980. These programs were created to assist communities around military installations in planning for compatible land use. Elements from these national programs were also considered in developing the recommendations in this Guidebook.

The Joint Land Use Study (JLUS) program was created by the Department of Defense (DoD) in 1985 to further address problems of urban encroachment through a process of joint planning activities involving civilian and military installation representatives. Nationwide, the JLUS program, administered by the DoD's Office of Economic Adjustment (OEA), has involved over 70 bases with their surrounding communities in cooperative land use planning. The Arizona Department of Commerce (ADOC) was awarded a grant from OEA in 2002 to prepare Joint Land Use Studies for Davis-Monthan Air Force Base, Luke Auxiliary Field #1 and Barry M. Goldwater Range under the Arizona Military Regional Compatibility Project (AMRCP). This partnering between ADOC and OEA built upon the AMRCP's previous experience in preparing the Western Maricopa County / Luke Air Force Base Regional Compatibility Plan, which was completed in 2003. The adoption of the three Joint Land Use Studies and the Western Maricopa County / Luke Air Force Base Regional Compatibility Plan by the local jurisdictions (municipalities and counties) surrounding each of the installations was an important step in achieving land use compatibility to support and protect the missions of the State's military installations.

1.1 PURPOSE OF THE POLICY GUIDEBOOK

The purpose of the Policy Guidebook is to facilitate the implementation of compatible land uses around military installations through a cooperative program that includes the local jurisdictions, who have the authority and responsibility to implement compatible land use planning and regulation, the military installations, and other interested and affected parties, including institutions, corporations, and individuals. The challenge for each community is to protect the installation's mission and its economic benefits while ensuring the economic diversity and viability of the community through facilitating development in ways that are compatible with the installation's mission. To accomplish this, the Policy Guidebook provides information related to issues of land use compatibility and recommends policies and practices based upon sound compatibility criteria and experience in achieving compatibility in various contexts.

1.2 GUIDING PRINCIPLES FOR COMPATIBILITY PLANNING

The Arizona Military Regional Compatibility Project defined the following guiding principles for the compatibility planning process. These principles have become a foundation of the Policy Guidebook and apply to each element and phase of the compatibility process.

- Create feasible and sustainable solutions that are consistent with Arizona's compatibility legislation, including Title 28, Article 7, Airport Zoning and Regulation and the Growing Smarter and Growing Smarter Plus legislation
- Address areas within the vicinity of military installations in municipal general plans and county comprehensive plans to ensure development is compatible with areas of high-noise or accident potential or other impacts from installation operations, including those defined under ARS §28-8481
- Ensure openness to varying viewpoints throughout the process
- Focus on fair and equitable solutions for all affected parties
- Establish, maintain, and enhance consistency and continuity in the decision-making process

- Achieve consent among the stakeholders on the means to control encroachment
- Devise compatible land use solutions that accommodate reasonable development while preserving the installations' military missions.

1.3 PUBLIC PARTICIPATION

Because of the importance of implementation of recommended policies and practices by the communities around military installations, public participation at the local level should provide meaningful opportunities for interested parties to contribute to shaping the policies and practices to meet local needs.

The vision for public participation is that no one interest dominates the public process, but that all stakeholders in the affected area and all other interested parties have timely access to information, meaningful and convenient methods of participation, and timely notification in advance of public meetings. Recommended policies and practices related to public participation are contained in Section 6.2 of this Guidebook.

1.4 IMPLEMENTATION OF RECOMMENDED POLICIES AND PRACTICES

The recommended policies and practices contained in Chapter 6 of this Guidebook are the foundation for future action by a variety of public and private entities as it relates to compatible land use around a military installation. The policies and practices are designed to be implemented at several levels, including the State of Arizona and local political jurisdictions, and by cooperative efforts among local jurisdictions, military installations, and public / private partnerships.

CHAPTER 2. ARIZONA'S MILITARY INSTALLATIONS

This chapter of the Policy Guidebook presents information about Arizona's military installations as a foundation for understanding the need to address encroachment and land use compatibility issues.¹ The first section discusses the importance of the installations to the nation's defense and to the state and local economies. The second section provides a summary overview of the individual installations and their missions.

2.1 THE IMPORTANCE OF ARIZONA'S MILITARY INSTALLATIONS

Arizona's network of military facilities positions the State at the forefront of the current transformation of the U.S. military and represents an essential component of the State economy. The network comprises an integrated array of bases, testing and training facilities, ranges, and airspace that operate within a physical environment that is uniquely suited to their individual and combined mission objectives and to the nation's defense.

The importance of Arizona's military facilities and operations to the U.S. military cannot be understated: their emphasis on joint and combined operations and cutting-edge intelligence gathering and exploitation lie at the heart of the new role for the nation's military organizations, and position Arizona to satisfy the needs of the Department of Defense for many years to come.

Furthermore, Arizona's military industry generates thousands of jobs, billions of dollars in economic activity, and hundreds of millions of dollars in State and local tax revenue. According to a study of the economic impact of Arizona's military facilities prepared in 2002 by The Maguire Company and ESI Corporation, direct military employment in Arizona in 2000 was 41,647, which was more than the combined employment in

¹ The material in this section was adapted from The Report of the Governor's Military Facilities Task Force (December 2003).

Arizona for Honeywell, Motorola and Wal-Mart.² The stability of employment and tax revenues produced by the Arizona military industry are indispensable to the fiscal health of the State.

The 2002 Maguire study also states that total employment impact, total output, and total annual tax revenues for Arizona's military industry equaled 83,506 jobs, \$5.66 billion, and \$233.6 million respectively for Tax Year 2000. The stable nature and high-pay-scale value of military jobs make them a fundamental part of the State economy.

The long-term retention of Arizona's network of military facilities and the sustainability of their missions are thus vital to the security of the nation and the strength of the State economy.

2.2 OVERVIEW OF ARIZONA'S MILITARY INSTALLATIONS

Arizona's military facilities are located on over a dozen separate sites that range in size from less than 100 acres to over two million acres. These sites, as shown on Figure 1-1, include:

- Marine Corps Air Station (MCAS) Yuma
- U. S. Army Yuma Proving Ground
- Fort Huachuca (including Libby Army Airfield)
- Davis-Monthan Air Force Base
- Luke Air Force Base (including Luke Auxiliary Field #1)
- Barry M. Goldwater Range (including Gila Bend Air Force Auxiliary Field)
- Arizona Air National Guard, Phoenix Sky Harbor International Airport
- Arizona Air National Guard, Tucson International Airport
- Silverbell Army Heliport
- Florence Military Reservation (Arizona Army National Guard)

² Economic Impact of Arizona's Principal Military Installations, May 2002, prepared by The Maguire Company in collaboration with ESI Corporation.

- Camp Navajo (Arizona Army National Guard)
- Papago Park Military Reservation (Arizona Army National Guard)
- United States Naval Observatory, Flagstaff Station

In addition to these sites, there are extensive areas of airspace in the State that are used in conjunction with the State's military facilities. This airspace includes Military Operating Areas (MOAs) that are dedicated to military use, and over 5,000 miles of designated Military Training Routes (MTRs) that crisscross the State and are used for high-speed, low-level training.

These sites and areas of airspace constitute a network of interrelated facilities that are essential to the nation's defense. The following sections present an overview of the State's military facilities.

2.2.1 Marine Corps Air Station Yuma

Located adjacent to the City of Yuma, MCAS Yuma covers over 4,800 acres and has over 5,000 personnel (including civilian and active-duty military personnel). The mission of MCAS Yuma is to support aerial weapons training for the Atlantic and Pacific Fleet Marine Forces and Navy. The base is only three miles from the western border of the Barry M. Goldwater Range (BMGR), and units training at the base also have access to the Yuma Training Range Complex, including the Chocolate Mountain Aerial Gunnery Range in California, and five Military Operating Areas.

MCAS Yuma is the busiest air station in the Marine Corps. In addition to Marine Corps aviation training, the base conducts joint training with other services, as well as training for allied units (including Dutch, Belgian, German, and British units). MCAS Yuma also serves as the scheduling authority for the Yuma Training Range Complex, which includes over 10,000 square miles of restricted special-use airspace designated for military training.

MCAS Yuma is a joint military / civilian-use airfield. The Yuma County Airport Authority (YCAA) is responsible for a commercial operation at MCAS Yuma that serves general aviation and scheduled commercial airlines. Under the operating agreement between MCAS Yuma and YCAA, civilian aircraft use the base's runways and taxiways but have their own terminal and maintenance facilities.

2.2.2 U. S. Army Yuma Proving Ground

Occupying over 800,000 acres north of the City of Yuma, U.S. Army Yuma Proving Ground conducts tests on medium and long range artillery; aircraft target acquisition equipment and armament; armored and wheeled vehicles; a variety of munitions; and personnel and supply parachute systems. Testing programs are conducted for all United States military services, as well as allied countries and private industry.

Yuma Proving Ground is the Army's center for desert natural environment testing and the Yuma Test Center, which is more than 1,300 square miles in size, is a multi-purpose test facility able to test nearly every weapon system in the nation's ground combat arsenal. In addition, Yuma Proving Ground provides unique capabilities for joint training exercises in a realistic desert combat environment.

Laguna Army Airfield, used for both testing and training operations, has two runways, and can accommodate all currently operating military cargo aircraft, including the C-5, C-17, and C-130.

2.2.3 Fort Huachuca (including Libby Army Airfield)

Occupying 73,272 acres in Cochise County and within the City of Sierra Vista, Fort Huachuca is the largest and primary Army Installation in Arizona, supporting Army Reserve and Arizona Army National Guard, as well as a number of other military activities throughout the State. Fort Huachuca is home to over 11,000 personnel (including civilian and active-duty military) and an average of 1,000 students at any given time.

Fort Huachuca is the home of the U.S. Army Intelligence Center which is the originator of the Army's military intelligence structure, the source of all its trained manpower, and the developer and tester of its systems and equipment. The Center is the focal point of the Army's effort to meet its present and future intelligence collection and processing requirements.

In addition to the U.S. Army Intelligence Center, there is a synergy between unique high-tech Department of Defense organizations that reside on Fort Huachuca, including:

- The United States Army Network Enterprise Technology Command / 9th Army Signal Command (NETCOM/9th ASC);

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

CHAPTER 2: ARIZONA'S MILITARY INSTALLATIONS

- The U.S. Army Information Systems Engineering Command (ISEC);
- The Joint Interoperability Test Command (JITC);
- The Electronic Proving Ground (EPG) The Intelligence and Electronic Warfare Testing Directorate (IEWTD) of the Operational Test Command (OTC);
- The Department of Defense Unmanned Aerial Vehicle (UAV) Test Center;
- The U.S. Army Communications-Electronics Command Communications Security Logistics Activity (USACCSLA); and
- The Defense Coordination Office-Huachuca.

These units are located at Fort Huachuca to take advantage of its remote location, vast area, and electromagnetic interference-free environment for testing ground and airborne electronics. The units also use Libby Army Airfield at the Fort as part of training and testing missions related to airborne electronics.

Libby Army Airfield is unique to the Army because it is used jointly by military and civilian activities. In addition to UAV operations, Libby Army Airfield is used by the Arizona Air National Guard for F-16 training and for training of A-10 pilots from Davis-Monthan Air Force Base. It is also a joint-use airfield, with the runways, taxiways, navigational aids, and air-traffic control shared by military and civilian operations. Civilian operations are concentrated on the northern side of the airfield, accessible from the City of Sierra Vista, while military operations are concentrated on the southern side. The 12,000-foot runway will accommodate any military or civilian aircraft, and Fort Huachuca also has control of over 700 square miles of restricted airspace from the surface to 30,000 feet.

2.2.4 Davis-Monthan Air Force Base

Davis-Monthan Air Force Base is a key Air Combat Command (ACC) installation occupying 10,600 acres in the City of Tucson, approximately 10 miles southeast of downtown. Davis-Monthan Air Force Base is home to over 7,000 personnel (including civilian and active-duty military), and an average of 100 students at any given time. All A-10 and OA-10 pilots as well as all EC-130H pilots are trained at Davis-Monthan Air Force Base. The Air Force 355th Wing is the Davis-Monthan Air Force Base host unit and provides medical, logistical, and

operational support to all Davis-Monthan Air Force Base units. With six flying squadrons, and one geographically separated unit, the 355th Wing is one of the largest wings in the Air Force.

The 55th ECG, based at Davis-Monthan, operates EC-130H aircraft, a specially configured version of the C-130 transport to support tactical air, ground, and naval operations by confusing the enemy's defenses and disrupting its command and control capabilities. To execute its unique operations, the aircraft were modified with electronic countermeasures systems, specialized jamming equipment, and aerial refueling capability, as well as upgraded engines and avionics.

The 12th Air Force, headquartered at Davis-Monthan Air Force Base, directs seven combat wings, five direct-reporting units in the Midwestern and Western U.S., and numerous Air Force Reserve and Air National Guard units. The fighter and bomber wings possess 430 aircraft and more than 33,000 active-duty military and civilian people. The 12th Air Force is the air component of the U.S. Southern Command, which is a joint-service command with Army, Navy, Air Force, and Marine Corps components.

A unique facility for storing excess Department of Defense and Coast Guard aircraft, the Aerospace Maintenance and Regeneration Center (AMARC) has more than 5,000 aircraft stored on 2,600 acres at Davis-Monthan Air Force Base. AMARC annually in-processes about 400 aircraft for storage and out-processes about the same number for return to active service, either as remotely controlled drones or for sale to friendly foreign governments. Almost 70 different types of aircraft are currently stored at AMARC (including 4,500 viable aircraft), ranging from U.S. Army and Navy helicopters to the Air Force's Vietnam War-era F-4s with a total acquisition value of almost \$27 billion.

2.2.5 Luke Air Force Base (including Luke Auxiliary Field #1)

Located in the western portion of the metropolitan Phoenix area within the City of Glendale, Luke Air Force Base occupies approximately 4,200 acres and has over 8,000 personnel (including civilian, military reserve, and active-duty military). The most diversified training center in the Air Education and Training Command (AETC), Luke Air Force Base provides technical, field, medical, and flight training. Luke Air Force Base is the largest fighter pilot training base in the world and is the main provider of fighter pilots to the ACC, conducting

more than 10,000 flight operations monthly and training more than 1,000 pilots annually. All F-16 training for the USAF is consolidated at Luke Air Force Base and all active F-16 pilots were trained at the base. In addition, training units from Singapore and Taiwan are stationed at Luke.

The 56th Fighter Wing is the Luke Air Force Base host unit and provides medical, logistical, and operational support to all Luke Air Force Base units. With 190 assigned aircraft, the 56th Fighter Wing is the largest fighter wing in the world, and is responsible for scheduling, managing, and ensuring environmental compliance for the eastern portion the 2.7-million-acre Barry M. Goldwater Range located 50 miles south of Luke Air Force Base. (The U.S. Marine Corps manages, schedules and ensures environmental compliance on the western portion of the Range.) The 56th Fighter Wing has scheduling and operational control of Special Use Airspace and for eight low-level Military Training Routes, which start to the east, south, and north of Luke Air Force Base and all terminate at the Barry M. Goldwater Range.

Auxiliary Field #1 is located about 15 miles northwest of Luke Air Force Base and occupies 400 acres of Department of Defense-owned land and approximately 705 acres of land leased from the State of Arizona. About 12,000 operations per year are conducted at Auxiliary Field #1 for training in which pilots use the instrument landing systems at Auxiliary Field #1 to simulate approaches under poor weather conditions. Auxiliary Field #1 is one of only a few locations in the U.S. for training with Precision Approach Radar, which is commonly used in overseas locations.

2.2.6 Barry M. Goldwater Range (including Gila Bend Air Force Auxiliary Field)

Barry M. Goldwater Range (BMGR) occupies approximately 2.7-million-acres in Yuma, Pima, and Maricopa Counties and is located approximately three miles east of MCAS Yuma, 50 miles southwest of Luke Air Force Base, and 30 miles west of Davis-Monthan Air Force Base. BMGR is operated jointly by the Air Force and Marine Corps, with MCAS Yuma responsible for the western part of BMGR and Luke Air Force Base responsible for the eastern part. BMGR supports the military in Arizona with air-to-air, air-to-ground, and live drop areas, and it is the only low-altitude night-vision training area in Arizona. At roughly the size of Connecticut, the range's vast

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

CHAPTER 2: ARIZONA'S MILITARY INSTALLATIONS

acreage allows for simultaneous training activities on nine air-to-ground and two air-to-air ranges.

The key value of the Goldwater Range is that it is authorized for live-fire training, which is essential to the abilities of aircrews to survive and win in combat. Above BMGR are 57,000 cubic miles of airspace where pilots practice air-to-air maneuvers and engage simulated battlefield targets on the ground. More than 50 aircraft can simultaneously operate on the range while performing independent training missions. The range is within the unrefueled flight radius of twelve military installations and the U.S. Pacific Fleet aircraft carriers.

Pilots fly over 68,000 sorties in the range annually. However, only about six percent of the range is used for roads, targets, and support areas; the remaining 94 percent is relatively undisturbed, and most of the land is a safety buffer for low-flying fighter aircraft. Approximately 822,000 acres of BMGR were set aside as part of the Cabeza Prieta National Wildlife Refuge. Military activities in the Cabeza Prieta portion of BMGR are limited to four remotely located radio transmitters and flight-training operations in the overlying airspace.

Gila Bend Air Force Auxiliary Field (AFAF) is an integral part of operations at BMGR and is jointly managed with BMGR. Adjacent to the northern boundary of BMGR, Gila Bend AFAF occupies 1,886 acres adjacent to the northern boundary of BMGR and is three miles south of the Town of Gila Bend.

Its primary mission is to support BMGR, used by all branches of the military for air-to-air and air-to-ground training. Military aircraft, including F-16s, A-10s, and rotary-wing aircraft routinely use Gila Bend AFAF for practicing traffic pattern and emergency simulated engine flameout procedures. Other training conducted at Gila Bend Auxiliary Airfield includes night-vision device-assisted landings and Marine weapons tactics instructor exercises, including non-combatant evacuation operations. The airfield is also used for emergency recoveries of military aircraft that experience malfunctions on BMGR and diversion of aircraft due to factors such as bad weather at their home base, unsafe ordnance, or low fuel. Those aircraft are repaired at the airfield by maintenance crews that travel from their home base.

2.2.7 Arizona Air National Guard, Phoenix Sky Harbor International Airport

The 161st Air Refueling Wing (AFW) of the Arizona Air National Guard, whose mission is worldwide refueling, is based at Phoenix Sky Harbor International Airport, which is the newest Air National Guard base in the U.S. The Arizona Air National Guard occupies 62 acres leased from the Airport, with facilities constructed in 2002 as a part of Sky Harbor's expansion program for construction of a third runway and paid for by airport user fees.

The Wing has 900 personnel (including part-time and full-time) and flies 10 KC-135E aircraft, the oldest model in the current U. S. Air Force inventory. The 161st Air Refueling Wing has more aircraft refueling areas within a short distance from its base than any other refueling unit, including eight air refueling areas within a 15-minute flight time of Sky Harbor, from which the Wing can serve over 400 receiver aircraft.

2.2.8 Arizona Air National Guard, Tucson International Airport

The 162nd Fighter Wing of the Arizona Air National Guard is based at Tucson International Airport on a 92-acre site and has over 1,600 personnel (full-time and part-time). Its primary mission is International Military Training (IMT) for F-16 pilots from countries that purchase F-16s from the U.S., including air-to-air and air-to-ground tactical operations, as well as air-to-ground bombing. Mobile Training Teams from the 162nd Fighter Wing have also conducted training at individual client nations, including Turkey, the Netherlands, and Thailand. The Wing also trains International maintenance technicians on F-16 systems.

2.2.9 Silverbell Army Heliport

Silverbell Army Heliport (AHP), located on a 161-acre site in rural Pima County approximately 25 miles northwest of Tucson, is the home of the Western Army Air Training Site (WAATS), which is operated by the Arizona Army National Guard.

The WAATS mission is to conduct flight training, enlisted training, specialty training, and to provide regional simulation support. Flight training is conducted for the OH 58A/C "Kiowa" and AH-64A "Apache" aircraft, and the WAATS has responsibility for all AH-64A training for the Army. Specialty training courses meet unique requirements by offering training

specifically designed to enhance or improve an area of unit operations not taught at other Army training facilities. Specialty courses conducted at the WAATS include the Combat Lifesaver Course and several Readiness Enhancement Training courses. Flight-simulation capabilities at the WAATS include a Combat Mission Simulator and a Flight Weapons Simulator, both of which provide Instructor Operator courses and Aircrew Trainer courses.

The WAATS has access to a local tactical training area of 3,600 square miles, allowing for low-level tactical flight. This training area is primarily public land with low population densities, extensive landing rights, and excellent variation of terrain relief.

Silverbell Army Heliport operations also utilize outlying training areas. Picacho Stagefield, located to the west of Picacho Peak, has four helicopter landing lanes (each 1,500 feet long), an air traffic control tower, and on-site crash / rescue facilities. Picacho Stagefield is the primary location for trauma and emergency procedure training. In the Phoenix area, operations are conducted at the Rittenhouse Stagefield east of Queen Creek; the Deer Valley, Sycamore Creek, Granite Mountain, and Saguaro Lake training sites, which are located in the north and northeastern portion of the Phoenix area; and the heliport at Papago Park Military Reservation, located between Phoenix and Scottsdale.

2.2.10 Florence Military Reservation (Arizona Army National Guard)

Florence Military Reservation (FMR) is located along Arizona Route 79, approximately six miles north of the Town of Florence and 60 miles southeast of metropolitan Phoenix. FMR occupies over 26,000 acres of low Sonoran Desert land, including 19,000 acres leased from the State Lands Trust and 6,000 acres owned by the federal government. FMR has several ranges, simulator buildings for artillery firing, live-fire areas, and impact areas for artillery rounds are also present at FMR, along with a large maintenance facility and a vehicle storage area. With its location in close proximity to the Phoenix metropolitan area, over 75 percent of the Arizona Army National Guard are stationed, trained, or deployed at FMR.

2.2.11 Camp Navajo (Arizona Army National Guard)

Camp Navajo is located on over 28,000 acres near Flagstaff. It was constructed in 1942 as Navajo Ordnance Depot. Camp Navajo was transferred to the Arizona Army National Guard following the closing of the Active Army ordnance storage mission. It has been operated by the Arizona Army National Guard since 1993, under an indefinite license through the Army Corps of Engineers.

The main mission of Camp Navajo is to serve as a training site for the Arizona Army National Guard, but the base also maintains an industrial storage mission with a customer base that includes the U.S. Army, Air Force, Navy, and Coast Guard, as well as private corporations and public agencies such as the U.S. General Services Administration and Northern Arizona University. Approximately 11,000 acres are in the storage area, and 17,000 acres are in training and buffer areas. The Camp also has a railroad with 38 miles of track and two locomotives that serve the storage area. Revenue from the industrial storage supports the National Guard training operations.

2.2.12 Papago Park Military Reservation (Arizona Army National Guard)

Papago Park Military Reservation (PPMR) consists of 419 acres of land located at 52nd Street and McDowell Road between Phoenix and Scottsdale. The site was reserved for use by the Arizona National Guard by the U.S. Congress in 1930. PPMR is the headquarters and operational focal point of the Arizona Army National Guard and the Arizona Air National Guard. The Reservation is home to the Arizona Military Institute, which features classrooms supplied with state-of-the-art video and computer-projected instruction equipment, a distance-learning center with video conferencing capabilities, and dormitories to house personnel attending classes. Also located at PPMR are an Army Aviation heliport, a 3,000-foot-long runway, an Air Force Battle Management training center, a rifle range, a land navigation course, a rappel site, four large armories, and several maintenance facilities.

2.2.13 United States Naval Observatory, Flagstaff Station

Established in 1955 a few miles west of downtown Flagstaff, Arizona, the Flagstaff Station is the U.S. Naval Observatory's dark-sky site for optical and near-infrared astronomy. The Station has four telescopes, including the Kaj Strand

Astrometric Reflector which is the largest optical telescope operated by the U.S. Navy. It was designed to produce extremely accurate astrometric measurements in small fields, and has been used to measure parallaxes and therefore distance for faint stars. Over 1,000 of the world's most accurate stellar distances were measured with this telescope since 1964, and in recent years this telescope has also served as a test-bed for the development of state-of-the-art near-infrared detectors.

The Station also operates the Navy Prototype Optical Interferometer (NPOI), which is a cooperative project with the Naval Research Laboratory and Lowell Observatory, in addition to the U.S. Naval Observatory. Located on Anderson Mesa southeast of Flagstaff, the interferometer makes use of separate telescopes that are widely spaced rather than a single large mirror as is used in conventional telescopes. A unique program at the Station is the Precision Measuring Machine, or PMM, which is a large, fast, highly precise photographic plate measuring engine. The goal of the PMM program is to produce very high-quality catalogues of stars, based on digitization of the major photographic surveys.

2.2.14 Military Operating Areas (MOAs) and Restricted Airspace

In addition to facilities on the ground, airspace is a vital resource for the missions of Arizona's military facilities. The airspace available to these facilities has the capacity to support all missions and aviation needs of all of the services. This airspace environment is not duplicated elsewhere in the U.S. and optimizes the training operations at the Barry M. Goldwater Range (BMGR), the ranges that are part of the Yuma Training Range Complex, Yuma Proving Ground and Fort Huachuca.

Under the Special Use Airspace (SUA) Program, which designates airspace for military use, various types of airspace were designated, with the objective of segregating military traffic from civilian traffic. The vertical limits of SUA are measured by designated altitude floors and ceilings within which limitations are imposed upon aircraft operations that are not a part of the military operations.

The principal types of SUA are:

- Restricted Airspace, within which the flight of civil aircraft is subject to restrictions due to military operations considered hazardous to other aircraft,

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

CHAPTER 2: ARIZONA'S MILITARY INSTALLATIONS

including weapons firings and airdrop operations. Restricted airspace in Arizona is associated with BMGR, the Yuma Training Range Complex (YTRC), Yuma Proving Ground, and Ft. Huachuca. In this restricted airspace non-military aircraft operation is not forbidden but is subject to various restrictions, and during periods of active military operations, civilian aircraft are not permitted to enter the airspace.

- A Military Operating Area (MOA) is airspace below a certain altitude that is established to segregate civilian flight activities from military activities, which may involve multi-aircraft formations, high-speeds just short of supersonic, and steep climb and descent rates. The ceiling of a MOA is 17,999 feet above Mean Sea Level (MSL).
- Air Traffic Controlled Assigned Airspace (ATCAA), is airspace attached to the MOA airspace, within which operations above the MOA altitude are controlled by the Federal Aviation Administration (FAA) to support the military mission. Civilian air traffic using Instrument Flight Rules (IFR) is routed around active MOAs or is vertically separated from military air traffic. Civilian air traffic using Visual Flight Rules (VFR) may enter the MOA at any time without a specific clearance but at a risk.
- Military Training Routes, are airspace corridors used by military aircraft for low-level navigation and tactical training.

The principal MOA / ATCAAs in Arizona are:

- Gladden / Bagdad MOA / ATCAA, located approximately 50 miles northwest of Phoenix. This area supports air-to-air, basic flight maneuvers, air combat tactics, and formation training for the 56th and 944th Fighter Wings at Luke Air Force Base. One of the three Air Refueling Routes used by the 161st Air Refueling Wing overlies this MOA / ATCAA..
- Outlaw / Jackal MOA / ATCAA, located approximately 60 miles northwest of Tucson and 30 miles east of Phoenix. This area supports air-to air and night training missions for Luke Air Force Base and the 162nd Fighter Wing based at Tucson International Airport.
- Sunny MOA / ATCAA, located approximately 70 miles northeast of Phoenix. This area is used as a holding

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

CHAPTER 2: ARIZONA'S MILITARY INSTALLATIONS

area for exercises with large forces and supports Luke Air Force Base and Nellis Air Force Base (in Nevada). The primary Air Refueling Route used by the 161st Air Refueling Wing also overlies the Sunny MOA / ATCAA.

- Sells MOA / ATCAA, located approximately 40 miles south of Phoenix and 20 miles west of Tucson, adjacent to the eastern boundary of BMGR. This area supports intensive training for Luke Air Force Base, Davis-Monthan Air Force Base, the 162nd Fighter Wing, and MCAS Yuma. One of the Air Refueling Routes used by the 161st Air Refueling Wing overlies this MOA / ATCAA.

Other MOAs are the Dome MOA, located just south of MCAS Yuma; the Ruby and Fuzzy MOAs, located adjacent to the Sells MOA east of BMGR; the Tombstone MOA, located just east of Fort Huachuca; and the Turtle and Quail MOAs, located on the California-Arizona border west of the Gladden / Bagdad MOA / ATCAA.

There are over 20 Military Training Routes crisscrossing Arizona, totaling approximately 5,000 miles in length. These routes are used by the military to practice high-speed, low-altitude maneuvers (generally below the 10,000-foot altitude and at airspeeds greater than 400 miles per hour). Eight of the routes provide essential access to BMGR. Civilian air traffic is not prohibited from flying along or across the routes, but the route designation alerts aircraft to the presence of military operations.

CHAPTER 3. LAND USE COMPATIBILITY

The ability of any military installation to maintain its operational capabilities is related in large part to the compatibility of the land uses around the installation. Recognizing local communities have interests both in preserving the capabilities of the installation as well as furthering their own development, it is essential to define land uses that are compatible with the operations of installation, while also contributing to the balanced growth of the local communities. The following sections discuss the considerations involved in determining compatibility of land uses, and define principles for achieving compatible land use around military installations based on those considerations.

3.1 NOISE CONSIDERATIONS

Noise is “unwanted sound” and can be perceived as a nuisance that disturbs our routine activities or our peace, and that at louder levels may cause feelings of mounting annoyance, irritation, or anger. The loudness of sounds is dependent upon many factors, including sound pressure level and frequency content, and within the usual range of environmental noise levels, perception of loudness is relatively predictable. Sounds that are perceived as noise may vary among listeners and sounds that are not objectionable to some can be bothersome to others.

Aircraft or artillery noise may be experienced as particularly annoying because it may startle people, cause windows to rattle and houses to shake, or cause people to fear a crash or explosion. In addition to varying levels of annoyance, adverse impacts associated with exposure to noise may include interruption of sleep and conversation.

Some common terms used in assessing the effects of noise are:

- The Decibel (dB) is the unit used to measure the magnitude or intensity of sound. Decibel means 1/10 of a Bel (named after Alexander Graham Bell). The decibel uses a logarithmic scale to cover the very large range of sound pressures that can be heard by the human ear. Under the decibel unit of measure, a 10 dB increase will be perceived by most people to be a

doubling in loudness (80 dB seems twice as loud as 70 dB).

- The A-weighted Decibel (dBA) is the most common unit used for measuring environmental sound levels. It adjusts, or weights, the frequency components of sound to conform to the normal response of the human ear at conversational levels. dBA is an international metric that is used for assessing environmental noise exposure of most noise sources.
- The C-weighted Decibel (dBC) is used for measuring sound levels of heavy weapons operation and sonic booms, because it adjusts or weights the frequency components to emphasize higher and lower frequencies and therefore provides a way of capturing the most annoying characteristic of tank guns and artillery, which are house vibrations induced by low frequency sound.

Sound levels are plotted in decibels (abbreviated dB), a logarithmic measure of the magnitude of a sound, and may be plotted as either “A-weighted” (dBA) or as “C-weighted” (dBC). The “A-weighting” accounts for the fact that humans do not hear low frequencies and high frequencies as well as they hear middle frequencies. The A-weighting corrects for the relative efficiency of the human ear at the different frequencies. Conversely, the “C-weighting” accounts for the fact that low frequencies cause vibration, which is the principal noise impact of heavy weapons firing.

An additional important factor in measuring a sound environment is the occurrence of sound events at night. People are normally more sensitive to intrusive sound events at night and background sound levels are normally lower at night because of decreased human activity. Therefore, a “penalty” may be added to sound levels that occur during night hours. By accepted scientific convention, a 10-decibel penalty is added to sound levels occurring between 10:00 p.m. and 7:00 a.m. the following morning. This 10 dB penalty means that one nighttime sound event is equivalent to 10 daytime events of the same level. The 24-hour average sound level, including the 10 dB penalty, is known as the day-night average sound level (Ldn). Extensive research has found that the day-night average sound level correlates very well with community annoyance from most environmental noise sources, and Ldn is used by all Federal agencies and internationally in the assessment of potential noise impacts.

Relying on a considerable body of scientific research on noise impacts, federal agencies have adopted guidelines for compatible land uses and environmental sound levels. Compatible land uses are normally determined by planning and zoning regulations that segregate types of activities, such as residential, industrial, or commercial. Noise levels that are unacceptable for homes may be quite acceptable for other uses, such as agriculture or certain industries.

General guidelines for noise compatibility identify sound levels from aircraft operations between 55 and 60 dB as “moderate exposure” and as generally acceptable for residential uses. Both the Department of Defense’s Air Installation Compatible Use Zone (AICUZ) guidance and the Federal Aviation Administration’s (FAA) Airport Noise Compatibility Planning Toolkit discourage residential use in the 65 Ldn contour and higher. The Army Operational Noise Management Program uses a classification system of Zones I, II and III (Zone III being the worst) to define noise-impacted areas. Noise levels in Zone II are roughly equivalent to those within the AICUZ and FAA 65 Ldn contour.

3.2 SAFETY CONSIDERATIONS

The primary safety considerations for areas surrounding military installations relate to the operation of military aircraft and their associated weaponry and ordnance. There are two types of airspace environment – the environment surrounding airfields and the environment surrounding ranges, which is a non-airfield environment. Aircraft overflights, take-offs and landings, expose areas around military airports to the possibility of accidents even with well-maintained aircraft and highly specialized flight crews. Despite stringent maintenance requirements and intense pilot and crew training programs, history demonstrates that aircraft related accidents will occur around airports. Risk may be defined as:

The potential for realization of unwanted, adverse consequences to human life, health, property, or the environment; estimation of risk is usually based on the expected value of the conditional probability of the event occurring times the consequence of the event given that it has occurred.³

³*The Society for Risk Analysis, Risk Glossary*, accessed at <http://www.sra.org>.

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

CHAPTER 3: LAND USE COMPATIBILITY

Although the risk to people on the ground of being killed or injured by a military aircraft accident is very small, such an event is by its nature of high consequence and may be catastrophic in the breadth and extent of its impact.

In order to address the issue of public exposure to safety hazards related to flight, the Department of Defense undertook an accident study based on crash patterns for reported incidents between 1968 and 1972. The combined DoD study indicated that:

- a. The majority of accidents occur along the extended runway centerline. Percentages ranged from 65% within five miles for the Navy to 75% within 10 miles for the Air Force, and 97% within one mile for the Army. The analysis supported corridor widths of 3,000 feet for the Navy and Air Force and 1,000 feet for the Army.
- b. Fighter and training type aircraft accounted for over 55% of the total aircraft accidents
- c. Approximately 20% of all accidents occurred on or near the runway. For accidents occurring between the runway thresholds, but off the runway surface, over 94% were within 1,000 ft of the centerline and 1.9% were between 1,000 and 4,500 ft. The Army accident plot showed no accidents occurring outside the existing Army runway lateral clearance zone of 500 ft from the runway centerline, threshold to threshold.
- d. More accidents occurred during the landing phase of flight than the departure phase. Both the Air Force and the Navy experienced nearly twice as many of its accidents during this phase of flight as during the departure phase.
- e. Beyond a distance of 15,000 feet along the extended runway centerline, the number of accidents became insignificant.
- f. The impact areas (areas over which debris is scattered) varied according to aircraft type. The smallest crash areas covered slightly more than two acres, while the impact for heavy bombers in some instances exceeded eight acres. The average impact area was 5.06 acres.
- g. Accident plots for various classes of aircraft varied; therefore accident potential zones of different sizes are appropriate for each class of aircraft.

As a result of the study, it was concluded that the designation of safety zones around the airfield and restriction of incompatible land uses could reduce the public's exposure to safety hazards. Recommended dimensions for these zones are based on distribution of accidents and the debris scatter. The land use recommendations for each zone are based on the level of risk; the area of highest risk has the most restrictions, while areas of lesser risk have lesser restrictions. Although safety zones are areas where there is the highest potential for an aircraft mishap based upon historical locations of accidents, these zones do not reflect the totality of the locations where accidents may happen. The safety zones are also discussed in Sections 3.5.1 and 4.1.1 of this document.

In a subsequent Air Force accident study, data was plotted in relation to the airfield for 838 major accidents at U.S. Air Force bases from 1968 through 1995. These were all Class A accidents (defined as involving a loss of life or more than \$1 million worth of damage) that occurred within 10 nautical miles of the airfield. This study showed that the accidents clustered along the runway and its extended centerline. Approximately 43% of the accidents occurred within the clear zones and APZs, approximately 25% occurred on the runway, and approximately 32% occurred in other areas within 10 nautical miles of the airfield. The study also showed that the majority of accidents were associated with landing (61%) vs. takeoff (30%) and that 80% of the accidents were associated with fighter / training aircraft.

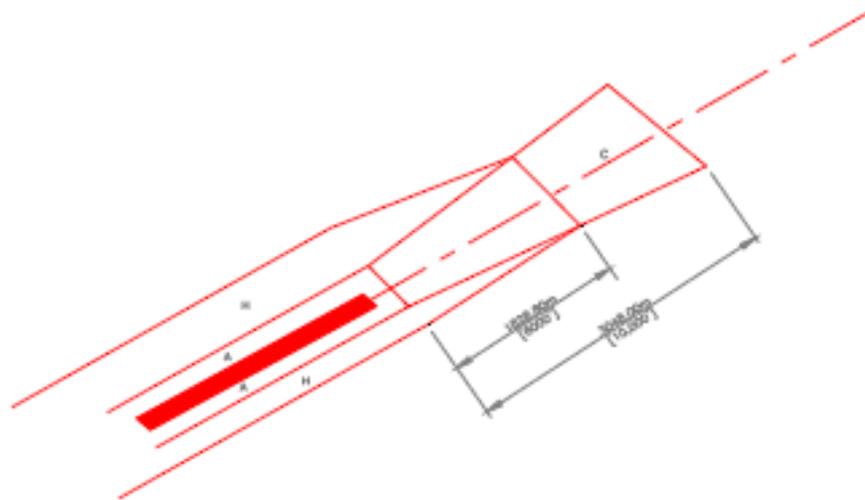
3.3 AIRSPACE OBSTRUCTION CONSIDERATIONS

Navigable airspace in the U.S. is under the control of the Federal Aviation Administration (FAA), which classifies airspace based upon factors such as the complexity or density of aircraft movements; the nature of the operations conducted within the airspace; and the level of safety required. The airspace within which the FAA exercises air traffic control is divided into six categories (Classes A through E). Class A is airspace generally above 18,000 feet above mean sea level (MSL). Classes B, C and D define the airspace around airports and airfields, with Class B airspace being located around the busiest airports and classes C and D being located around airports with lesser activity. Class E airspace is all of the remaining airspace subject to FAA air control. There is also a category of airspace (Class G), which although subject to FAA regulation is not under FAA air traffic control.

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

CHAPTER 3: LAND USE COMPATIBILITY

Structures that penetrate the airspace can create hazards for aircraft operations. The most critical locations with regard to the height of objects are those within the airport approach zones. Part 77 of Title 14 of the Code of Federal Regulations (Title 14, Part 77 CFR) provides the height limits for structures within FAA-controlled airspace. Under this guidance, the height of structures considered to be obstructions within airspace other than Classes B, C and D is 200 feet or more above ground level. Within Classes B, C and D the height of structures considered to be obstructions is related to a series of “imaginary surfaces”, which establish a three-dimensional space in the air above an airport. As an example of how imaginary surfaces appear in isometric view, the imaginary surfaces for a Class A Visual Flight Rules Runway at DoD installations are shown below.



LEGEND

- A PRIMARY SURFACE
- B CLEAR ZONE SURFACE (NOT SHOWN)
- C APPROACH-DEPARTURE CLEARANCE SURFACE (40H:1V SLOPE RATIO)
- D APPROACH-DEPARTURE CLEARANCE SURFACE (HORIZONTAL)(NOT REQUIRED)
- E INNER HORIZONTAL SURFACE (NOT REQUIRED)
- F CONICAL SURFACE (NOT REQUIRED)
- G OUTER HORIZONTAL SURFACE (NOT REQUIRED)
- H TRANSITIONAL SURFACE (7H:1V SLOPE RATIO)
- I NOT USED
- J ACCIDENT POTENTIAL ZONE (APZ) (NOT SHOWN)

Source: Air Force Civil Engineer Support Agency; U.S. Army Corps of Engineers; and Naval Facilities Engineering Command. Unified Facilities Criteria: Airfield and Heliport Planning and Design (UFC 3-260-01), Figure 3.8. 01 November 01, with changes through 19 May 2006.

Whether a particular object constitutes an airspace obstruction depends upon the height of the object and its proximity to the airport. Generally, the closer the proximity to the airport and to the runway approaches, the less the height that would be considered an obstruction. Any object that penetrates these imaginary surfaces is considered an obstruction and may affect the aeronautical use of the airspace.

The land area and height standards defined in the Tri-Service Unified Facilities Criteria: Airfield and Heliport Planning and Design (UFC 3-260-01) are used for purposes of defining height obstruction criteria around military airfields. UFC 3-260-01 is available on the web at:

http://www.wbdg.org/cdb/DOD/UFC/ufc_3_260_01.pdf

These standards are similar to those used by the FAA under Title 14, Part 77 CFR. U.S. standard instrument approach and departure procedures (*Terminal Instrument Procedures Manual* - TM 95-226, OPNAVINST 3722.16C, AFM 11-226), prescribe flight path area and vertical clearances from terrain and manmade obstructions. The restrictions limit the height of buildings and other structures in the vicinity of the airfield in order to ensure the safety of pilots, aircraft and individuals and structures on the ground.

Federal law requires that prior notification must be given to the FAA, as the manager of the nation's airspace, regarding any construction or alteration of structures that meet specific criteria. Those structures may include, but are not limited to: buildings, highways, bridges, signs and billboards, antennas and utility poles, as well as temporary-use construction materials or equipment.

In addition to the controlled and uncontrolled airspace, the FAA defines several classes of Special Use airspace. (See Section 2.12 of this Policy Guidebook for a discussion of Special Use airspace in Arizona.)

3.4 OTHER CONSIDERATIONS

In addition to airspace obstructions, compatibility of surrounding land uses with military operations can be affected by other considerations. These include electromagnetic interference, light emissions, particulate emissions and radar reflectivity.

3.4.1 Electromagnetic Interference

Because military installations in Arizona are highly dependent on the proper operation of sophisticated communication systems, electromagnetic interference is an important consideration. This is particularly true for installations such as Fort Huachuca, where an environment free of electromagnetic interference is essential to carry out its training and testing mission using a wide range of electronic equipment and systems.

Electromagnetic interference (EMI) (or radio frequency interference) occurs when an electromagnetic field interferes with the normal operation of an electronic device. Any device that transmits, distributes or processes any form of electrical energy can be a source of EMI. Such interference typically is generated on a small scale due to the operation of everyday items such as cell phones or fluorescent lights, but because the reach of the field from such devices is small, it does not result in problems. However, larger sources of interference, such as telecommunication signal facilities, or other transmitters can create significant problems for other devices using the radio frequencies. With the growth of the telecommunications industry, the increase in dependence on electronic control and guidance systems for aircraft, and the generally increased use of the radio frequency spectrum by an expanded number of users, the potential for adverse effects will likely increase in the future.

Transmitters are designed to emit electromagnetic energy to convey radio frequency signals to receiving devices; interference occurs when the emitted energy is picked up by a receiver that is not the intended recipient of the emissions. Typically, the operating frequency of the transmitter and receiver of the unwanted emissions are in the same frequency bandwidth; the potential for interference decreases as the frequency separation between a transmitter and receiver increases. Interference can also occur when unintended leakage occurs from a device that is not intended to emit energy. For example, properly maintained television cable carrier systems do not radiate much electromagnetic energy. However, malfunctioning of the system may result in significant leakage and consequent interference.

Electromagnetic interference from surrounding land uses can adversely affect military operations in numerous ways. Among these are interference with aircraft guidance systems (including those on the ground as well as in the aircraft itself);

interference with the proper functioning of computer hardware; disruption of communications between units during training exercises; and interference with testing of electronic systems and devices. Military operations that transmit electromagnetic energy can also potentially interfere with civilian activities around the installation, such as television and radio reception and operation of computers.

An important consideration for avoiding electromagnetic interference is that electronic fields operate according to the inverse square law of physics, which states that a quantity of something such as electromagnetic energy is inversely proportional to the square of the distance from a source point. For example, at twice the distance, $\frac{1}{4}$ of the emissions would be received, while at 10 times the distance, only $\frac{1}{100}$ would be received. For this reason, distance is one of the best methods to avoid electromagnetic interference as the effects decrease more rapidly than the distance increases.

3.4.2 Light Emissions

As development around military installations increases, the potential for incompatibility due to uncontrolled light emissions also increases. A variety of military training and testing operations depend upon “night-sky” conditions that can be disrupted by sky-glow and glare from unshielded light sources.

As a form of energy, light emissions are also subject to the inverse square law of physics (as discussed in Section 3.4.1 above), which means that the more distant the light source, the greater the relative level of reduction in the effects of emitted light. However, the proliferation of light sources in both urban and rural areas increases the likelihood that increased uncontrolled light emissions will create light pollution, especially sky-glow, even when the sources are some distance away.

A common method of reducing the potential for light pollution is to require shielding of exterior light fixtures, so that the light is directed downward rather than out or up. Shielded lights result in less sky-glow and glare and can prevent “light trespass”, which occurs when light falls on property outside that where the light source is located. Cochise County is currently considering adoption of an ordinance to address light pollution, among the provisions of which are requirements for shielding of lighting. The ordinance also provides for limits on total light output or luminance (the amount of light falling on a

surface); limits on internal lighting of signs; prohibition of searchlights and laser lights for commercial purposes; and prohibition on installation of new mercury vapor light fixtures. The draft Cochise County Light Pollution Ordinance may be accessed at: <http://www.co.cochise.az.us/P&Z/>.

3.4.3 Particulate Emissions

Particulate emissions (such as dust and smoke) generated by certain types of activities can affect the compatibility of land uses with military installation operations. Some industrial and resource extraction uses have the potential for producing smoke or dust, particularly from outdoor operations. If located adjacent to an installation such emissions, in sufficient quantity and depending on the prevailing winds, could adversely affect visibility or interfere with the operation or testing of equipment. Conversely, training or other operations on an installation may create dust or other particulate matter that due to prevailing winds is carried off the installation. Uses sensitive to dust or smoke, such as residential uses, public facilities and certain kinds of “clean” industries (such as manufacture of computer components or precision instruments) could be adversely affected. Temporary construction activities are also a potential source of particulate emissions, primarily in the form of fugitive dust.

Locations that are downwind under prevailing wind conditions are more likely to be affected by particulate emissions. In Arizona, as in much of the continental United States, the prevailing winds tend to be from the west. These can be northwesterly or southwesterly depending upon the locality and season. However, particulate matter can be carried aloft and deposited at considerable distance from its source. There are standard methods to control dust emissions that may be employed for construction and resource extraction activities. Application of these methods can substantially reduce, although not necessarily eliminate the potential for adverse impacts.

3.5 PRINCIPLES FOR LAND USE COMPATIBILITY

Two critical issues define compatibility of uses: first, exposure of areas outside the installation to safety and noise hazards resulting from installation operations; and second, the potential for interference with installation operations due to certain characteristics of land uses around the installation

(such as airspace obstructions or electro-magnetic interference.)

3.5.1 Noise and Safety Hazards

A fundamental goal of compatibility criteria is to avoid concentrations of people exposed to noise and safety hazards, and is achieved in principle by:

- limiting exposure of people and noise-sensitive activities to high noise levels, and
- limiting concentrations of people and safety-sensitive activities in areas of highest probable accident impact.

Each of these critical principles can be translated into specific types of land uses that are affected by military operations.

- Noise-sensitive land uses that are incompatible with high noise levels, particularly within the high-noise zones defined as the 65 Ldn contour and higher (or within Army Noise Zone II, Noise Zone III and Land Use Planning Zone). Noise-sensitive uses include:
 - Residences and places where people normally sleep such as hotels, hospitals, and nursing homes.
 - Uses such as schools, libraries, churches, museums, cultural centers, theaters, hotels, outdoor auditoriums, and concert halls, where it is important to avoid interference with such activities as speech, music, meditation, and concentration on reading or visual material.

Noise attenuation may mitigate the effects of the average noise exposure (as expressed in Ldn), on these uses; however, it is important to note that single-event noise levels at significantly higher decibels may not be fully mitigated by attenuation.

- Land uses that result in concentrations of people or that have special safety considerations are generally incompatible with high hazard areas around military airports. These areas typically include the Clear Zones, APZ-I, and APZ-II as defined under AICUZ guidance, or hazard zones defined under similar criteria. Note that the Navy/Marine Corps Clear Zones have different dimensions than the Air Force Clear Zones. Uses that result in concentrations of people include the following:

- Residences and similar uses where people reside, such as hotels and nursing homes.
- Employment uses with a high density of employees such as offices and labor-intensive industrial use.
- Uses where people may gather in large numbers such as churches, schools, shopping centers, retail establishments, bars and restaurants, auditoriums, sports arenas, and spectator sports.
- Land uses that have special safety considerations include the following:
 - Uses involving significant quantities of hazardous materials or explosives.
 - Critical public health and safety uses, such as hospitals, fire stations, and police communications facilities.
 - Landfills and agricultural row crops that are attractive to large flocks of birds.

3.5.2 Obstructions and Interference

Land use compatibility is also affected by the potential that exists for land uses around an installation to create obstructions or have characteristics that would interfere with the installation's operation. Compatibility problems due to obstruction or interference can be avoided by following principles concerning obstructions and sources of interference, and by submitting proposals for these kinds of uses to the installation for review.

- The height of structures and other objects (such as trees) in critical airspace should be restricted in accordance with relevant FAA and DoD guidance to avoid obstructions. (See Section 3.3 above for a discussion of guidance concerning airspace obstructions.) The critical areas are:
 - Airfield approach/departure areas at the ends of the runway, along with the transitional areas on the sides of the runway, as defined by the imaginary surfaces under FAA and DoD guidance (See Section 3.3 above)
 - Military Operating Areas (MOAs) and Military Training Routes, where aircraft operations may

occur at low elevations (e.g. below 200 ft above ground level)

- Uses that transmit electromagnetic energy should be located at sufficient distance from any receivers on the installation to avoid interference with the operation of the receivers. Such uses may include:
 - Telecommunications signal facilities
 - Television and radio transmitting towers
 - High-voltage electric transmission lines
- Uses that are sensitive to electromagnetic interference should not be located within areas subject to interference generated by transmitters on an installation. These uses include:
 - Residential uses
 - Educational facilities
 - Public safety facilities
 - Data processing facilities
 - Uses involving explosives or storage of flammable gases
- All sources of light around the installation should be shielded to avoid adverse effects of light pollution (such as light trespass, glare or sky-glow) on installation operations.
- Uses that emit particulate matter should be located at sufficient distance downwind from any activities on the installation that are sensitive to particulate matter to avoid interference with installation operations of the receivers. Such uses may include:
 - Resource extraction (e.g. surface or open-pit mining or quarrying)
 - Construction activities
- Uses that are sensitive to particulate matter should be located at sufficient distance downwind from any activities on the installation that generate particulate matter. Such uses may include:
 - Residential Uses
 - Schools and Recreation Facilities
 - Public Facilities

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

CHAPTER 3: LAND USE COMPATIBILITY

- Offices
- Manufacture of electronic components or precision instruments

CHAPTER 4.

REVIEW OF EXISTING LEGISLATION AND GUIDANCE

State, county and municipal laws may regulate land use compatibility around a military installation. In addition, Department of Defense (DoD) guidance under the Air Installation Compatible Use Zone (AICUZ) program, Installation Compatible Use Zone (ICUZ) program or Range Air Installation Compatible Use Zone (RAICUZ) program may apply, and the DoD Joint Land Use Study (JLUS) Program provides a framework for installations and local communities to deal with urban encroachment. The nature and status of the existing land use compatibility guidance (including federal, State and local guidelines and regulations) are addressed in Sections 4.1 through 4.3.

4.1 U.S. DEPARTMENT OF DEFENSE

The Department of Defense (DoD) recognized the problem of urban encroachment around installations, and in 1973 initiated the Air Installation Compatible Use Zone (AICUZ). The Navy and Air Force use the AICUZ program. The ICUZ program, initiated post-1980 and used by the Army, is now an integral part of a more comprehensive Operational Noise Management Program (ONMP). In addition, the Navy has added a Range Air Installation Compatible Use Zone study (RAICUZ) to delineate noise impacts from aerial firing ranges at Navy and Marine Corps installations. The RAICUZ is intended to address encroachment around ranges used for air-to-ground combat training and is similar to the AICUZ program

4.1.1 Air Installation Compatible Use Zone Program

The Air Installation Compatible Use Zone (AICUZ) Program⁴ was implemented in 1973 by the U.S. Department of Defense to promote compatible land use development around military airfields. The AICUZ Program creates standard land-use

⁴Guidance for the United States Air Force AICUZ program is contained in Air Force Instruction 32-7063, *Air Installation Compatible Use Zone Program*; guidance for the United States Navy and United States Marine Corps AICUZ program is contained in OPNAV Instruction 11010.36B, *Air Installation Compatible Use Zone (AICUZ) Programs*. This guidance implements Department of Defense Instruction 4165.57, *Air Installations Compatible Use Zones*.

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

CHAPTER 4: REVIEW OF EXISTING LEGISLATION AND GUIDANCE

guidelines for areas affected by possible noise exposure and accident potential combinations and provides local government jurisdictions with information that can be used to regulate land use and development. Included in the AICUZ program is a table of accident potential zones, noise zones, and guidance concerning the compatibility of various uses.

The Department of Defense adopted the NOISEMAP computer model to describe noise impacts created by aircraft operations. NOISEMAP is one of two Environmental Protection Agency (EPA) approved models. The other is the Integrated Noise Model (INM), which is used by the Federal Aviation Administration (FAA) for civilian airports.

In 1974, EPA designated the noise descriptor “Ldn,” or Day-Night Average Sound Level as the standard measurement for noise impacts. Ldn refers to the average sound level exposure, measured in decibels, over a 24-hour period, with a 10-decibel penalty added to sound levels for operations occurring during the hours of 10 p.m. to 7 a.m. This penalty is applied due to the increased annoyance created by noise events that occur during this time.

Accident Potential Zones (APZs) are one aspect of the AICUZ program where military application differs from civilian airfields. An analysis of aircraft accidents worldwide within 10 nautical miles of a military airfield for the period of 1968–1972 led to defining areas of high accident potential known as the Clear Zone (CZ), Accident Potential Zone I (APZ-I), and Accident Potential Zone II (APZ-II). The majority of these accidents (about 52 percent) occurred within the Clear Zones or APZs, while about 23 percent were associated with the runway and 25 percent occurred in other areas within 10 nautical miles.

It was concluded from the Department of Defense accident study that the Clear Zone warranted special attention due to the high potential for accidents that severely limited acceptable land uses. (Note that the Navy/Marine Corps Clear Zones have different dimensions than the Air Force Clear Zones.) The percentages of accidents within the two APZs are such that some land use control is essential. The Department of Defense recommendation for the APZs is to limit the number of people exposed to noise and safety hazards through appropriate land use planning.

Structures, whether permanent or temporary, that intrude into airspace are also a form of encroachment that the AICUZ program also addresses. An AICUZ report will include a

depiction of “airspace control surfaces” and height obstructions around military airfields, based upon DoD criteria. (See Section 3.3 of this Guidebook for a discussion of airspace control surfaces and criteria for airspace obstructions.)

4.1.2 Installation Compatible Use Zone Program and Operational Noise Management Program

Under the Army’s Operational Noise Management Program, as defined by Army Regulation AR 200-1, the Installation Operational Noise Management Plan (IONMP) is a primary tool for achieving compatible land use around Army installations. Elements of an IONMP include education, complaint management, noise and vibration mitigation, noise abatement procedures, and noise assessment. The Installation Compatible Use Zone (ICUZ) Program provides a methodology for assessing the effects of noise generated by installation operations. AR 200-1 is being revised to improve methods to evaluate and document the impact of noise produced by ongoing and proposed Army actions and activities and to minimize annoyance to humans to the extent practicable. Noise descriptors (metrics) appropriate for determination of compatible land use and assessment procedures are based on the best available scientific information.

The Army uses day-night level (DNL) as the primary descriptor for military impulsive noise, except for small arms noise. DNL is the time weighted energy average sound level with a 10-decibel (dB) penalty added to the nighttime levels (2200 to 0700 hours). The DNL noise metric may be further defined, as appropriate, by an Army installation with a specific, designated time period (for example, annual average DNL or average busy month DNL). The typical assessment period over which the noise energy is averaged is 240 days for Active Army installations and 104 days for Army Reserve and National Guard installations. The use of average busy month DNL is appropriate when the tempo of operations is significantly different during certain peak periods of the year. For future land use planning and encroachment assessment purposes, a reasonable annual growth factor in activity (e.g. 10 or 15 %) may be assumed. Supplemental metrics, such as single event noise data (for example, Peak, Pk15(met) or CSEL) discussed below, may be employed where appropriate. A-weighted maximum noise levels are used to assess aviation low-level military training routes (MTRs) and/or flight tracks.

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

CHAPTER 4: REVIEW OF EXISTING LEGISLATION AND GUIDANCE

Experience has demonstrated that the use of average noise levels over a protracted time period generally does not adequately assess the probability of community noise complaints at Army installations. Therefore Army guidance recommends that the risk of noise complaints from large caliber impulsive noise resulting from testing and training activities, ex. armor, artillery, mortars and demolition activities, be assessed in terms of a single event metric, either peak sound pressure level expressed as Pk15(met) or C-weighted sound exposure level (CSEL). The metric Pk15(met) accounts for statistical variation in received single event peak noise level that is due to weather. It is the calculated peak noise level, without frequency weighting, expected to be exceeded by 15 percent of all events that might occur. If there are multiple weapon types fired from one location, or multiple firing locations, the single event level used should be the loudest level that occurs at each receiver location. Noise from small arms ranges would be assessed using a single event metric, either Pk15(met) or A-weighted sound exposure level (ASEL). For additional discussion of A-weighted and C-weighted noise levels, see Section 3.1 of this Policy Guidebook.

Army guidance also recommends the use of available noise assessment software as the primary means of noise impact assessment rather than field measurements because spot measurements do not adequately capture variation in received noise level over time due to weather. Impacts due to blast noise emitted by large guns and explosions are assessed by means of the BNOISE2™ software, while impacts due to small arms noise are assessed by means of the SARNAM™ software.

Four noise zones are defined in terms of noise metric levels under Army guidance, (see Table 4.1.) The day-night sound levels used by the Army to define the noise zones represent an annual average based upon the total number of operations divided by the number of days in a year that the noise-generating events occur. However, operations at an installation are typically subject to daily and seasonal variations, and therefore, in order to provide a planning tool that could be used to account for days of higher than average operations, the Land Use Planning Zone (LUPZ) is included as part of the ICUZ methodology. It encompasses areas where, during periods of increased operations, community annoyance levels can reach those levels associated with Zone II. The contours for the LUPZ are established by considering the increased noise exposure that higher levels of operations would generate in relation to the noise exposure for Zone II. For

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

CHAPTER 4: REVIEW OF EXISTING LEGISLATION AND GUIDANCE

example, if operations are 3 times more numerous than the normal daily firing, and average noise levels increase by 5 dB, the LUPZ would be defined as the area between 70 and 65 dBA and 62 and 57 dBC. The Land Use Planning Zone (LUPZ) contour is also used to better predict noise impacts when levels of operations at airfields or large caliber weapons ranges are above average.

Single event noise limits in Table 4-2 correspond to areas of low to high risk of noise complaints from large caliber weapons and weapons systems. These should be used to supplement the noise zones defined in Table 4-1 for land use compatibility decisions. Noise sensitive land uses are strongly discouraged in areas equal to or greater than $Pk15(met) = 130$ dB. For infrequent noise events, installations should determine if land use compatibility within these areas is necessary for mission protection. In the case of infrequent noise events, such as the detonation of explosives, the installation should communicate with the public.

Under Army guidance, noise-sensitive land uses, such as housing, schools, and medical facilities, are considered acceptable within the LUPZ and noise zone I, normally not recommended in noise zone II, and not recommended in noise zone III. While recognizing that local conditions regarding the need for housing may require noise-sensitive land uses in Noise Zone II, on or off post, this type of land use is strongly discouraged under Army guidance. It is recommended that the absence of viable alternative development options should be determined and an evaluation should be conducted locally prior to local approvals indicating that a demonstrated community need for the noise-sensitive land use would not be met if development were prohibited in Noise Zone II. Where the community determines that these uses must be allowed, Army guidance recommends that measures to achieve an outdoor to indoor Noise Level Reduction (NLR) of at least 25 dB to 30 dB in Noise Zone II, from small arms and aviation noise, be incorporated into building codes and be in individual approvals. Because scientific studies to accomplish this NLR in communities subject to large caliber weapons and weapons system noise, noise-sensitive land uses are strongly discouraged in Noise Zone II where the noise source is large caliber weapons.

Normal permanent construction can be expected to provide a NLR of 20 dB for small arms and aircraft; thus the reduction requirements are often stated as 5, 10 or 15 dB over standard construction and normally assume mechanical ventilation,

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

CHAPTER 4: REVIEW OF EXISTING LEGISLATION AND GUIDANCE

upgraded Sound Transmission Class (STC) ratings in windows and doors and closed windows year round. Additional Army guidance with respect to noise reduction includes the following:

- Additional consideration should be given to modifying NLR levels based on peak noise levels or vibrations.
- Although NLR criteria will not eliminate outdoor noise problems, building location and site planning, and design and use of berms and barriers, can help mitigate outdoor noise exposure, particularly from ground level aircraft sources. However, barriers are generally not effective in noise reduction for large arms such as artillery and armor or large explosions.

It should be noted that Arizona Statutes (ARS §28-8481 and §28-8482) regulate land uses in the high noise zones defined for Military Airports and Ancillary Military Facilities under those Statutes and the regulations for these zones in some cases are more restrictive than the Army guidance. In addition, the Arizona Statutes (ARS §28-8481 and §28-8482) also contain requirements for noise attenuation that may be more stringent than the Army guidance. (See Section 4.2 of this Policy Guidebook for a discussion of the Arizona regulations.)

Army guidance defines single event noise limits corresponding to areas of low to high risk of noise complaints from large caliber weapons and weapons systems, and recommends that these be used to supplement the noise zones for land use compatibility decisions. For infrequent noise events, such as the detonation of explosives, it is recommended that installations determine if land use compatibility within these areas is necessary for mission protection and communicate with the public.

The ICUZ program also incorporates the definition of Accident Potential Zones (APZs) for Army airfields and also addresses airspace obstructions as well as other safety hazards that can affect aircraft operation, such as activities that produce air, light or electromagnetic emissions. The criteria used for the APZs, obstructions and safety hazards under the ICUZ program are essentially similar to those for the AICUZ program.

4.1.3 Range Installation Compatible Use Zone Program

The Navy and Marine Corps instituted the Range Installation Compatible Use Zone (RAICUZ) program in 1998 to address

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

CHAPTER 4: REVIEW OF EXISTING LEGISLATION AND GUIDANCE

encroachment issues around ranges used for air-to-ground combat training and is similar to the AICUZ program. The RAICUZ program includes range safety and noise analyses, and identifies land use recommendations that will be compatible with range safety zones and noise levels associated with the military operations.

The RAICUZ program also considers the special use airspace that is associated with air-to-ground ranges, including restricted areas, military operating areas (MOAs), and military training routes (MTRs). The Department of the Navy's Naval Aviation Simulation Model (NASMOD) is used to enable planners to evaluate complex airfield, range, and airspace scenarios to ensure that sufficient range and airspace capacity will be available to support existing and future mission requirements. The Marine Corps utilizes the Training Range Encroachment Information System (TREIS) and Range Environmental Vulnerability Assessment (REVA) programs to track and report range encroachment and its impacts on an installation's abilities to fulfill existing and future mission requirements.

Under the RAICUZ program three Range Safety Zones (RSZ) are defined for varying levels of safety hazard concerns due to potential weapons impact. RSZ A defines the maximum safety hazard. It is the area described by the weapons safety footprints and represents the weapons impact area (including potential ricochet.) RSZ B is the area of armed overflight. RSZ C is the minimum restricted airspace for aircraft to maneuver on the range. These RSZs, in combination with noise zones define the RAICUZ footprint, for which compatible land use guidance is provided.

Aircraft noise zones for the RAICUZ are defined similarly to those for an AICUZ, except that for ranges with run-ins (approaches) that are not on a fixed heading, as well as for restricted airspace, MOAs and MTRs, the MOA and Range Noise Map program (MRNMAP) is used to define noise contours instead of the NOISEMAP program. In addition, where noise-sensitive uses are present, a RAICUZ study considers noise impacts from ordnance delivery (blast noise), based on data developed using the Department of Defense Noise-B Program, which is designed for noise that is impulsive and of short duration.

4.1.4 Encroachment Control Program

The Marine Corps uses an Encroachment Control Program (ECP) where installation-specific ECPs are prepared that include an analysis of a Marine Corps installation's current and future encroachment situation, and an action plan presenting control strategies and actions for reducing the encroachment threat to installations. The Range Complex Management Plans (RCMPs), TREIS, and REVA programs are tools in the ECP program used to identify, analyze, and report on encroachment and its impacts on an installation's abilities to support mission essential tasks. Moreover, they assist in the development of strategies to engage federal, state, and local agencies in finding encroachment solutions. Encroachment partnering is an important tool in implementation of the ECP program, whereby the Marine Corps partner with public and private conservators to acquire undeveloped land adjacent/proximate to Marine Corps installations to prevent incompatible development.

4.1.5 Joint Land Use Study Program

The Department initiated the Joint Land Use Study (JLUS) program in 1985 in an effort to achieve greater application of the AICUZ / ONMP / RAICUZ program recommendations. The JLUS program utilizes the AICUZ /ONMP / RAICUZ data in a participatory planning context. Program objectives are twofold:

- To encourage cooperative land use planning between military installations and the surrounding communities so that future community growth and development are compatible with the training or operational missions of the installation; and
- To seek ways to reduce the operational impacts on adjacent land.

The JLUS program encourages communities and the military installation to study the issues in an open forum, taking into consideration both community and military viewpoints. As an incentive for communities to participate in a joint planning process, the Office of Economic Adjustment (OEA) offers matching grants for a Joint Land Use Study. Recommendations in a study are used to guide local jurisdictions in the development and implementation of land development controls and other measures to ensure that future public and private development around the military

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

CHAPTER 4: REVIEW OF EXISTING LEGISLATION AND GUIDANCE

installation will be compatible with both the military mission and the development needs of the community.⁵

4.2 STATE OF ARIZONA

From the 1990s through 2005, the State of Arizona passed legislation to address the issue of residential development and other compatibility issues around Arizona's military facilities. The major statutes, including ARS §28-8481 and ARS §28-8461, were most recently amended in 2004 through the enactment of House Bill 2140 and House Bill 2141.

With the passage of these bills, the State requires political subdivisions in the vicinity of a military airport, and in the vicinity of "ancillary military facilities" to adopt land use plans and enforce zoning regulations that assure development compatible with the high-noise and accident potential generated by military airport operations. (ARS §28-8461 defines military airports as Luke AFB, Davis-Monthan AFB, MCAS Yuma, Libby AAF at Ft. Huachuca, and Laguna AAF at Yuma Proving Ground; ancillary military facilities are defined as Luke Air Force Base Auxiliary Field #1, Gila Bend Air Force Auxiliary Field and Marine Corps Air Station Yuma Auxiliary Field #2). Compatibility with high-noise and accident potential is defined through a land use compatibility table included in ARS §28-8481. Under the ARS §28-8481 definitions, residential uses are generally considered incompatible in the high-noise and accident zones, while many non-residential uses are considered compatible in high-noise zones, and certain non-residential uses may be considered compatible in accident zones.

State legislation, specifically ARS §28-8481, also regulates land uses in hazard zones and high-noise areas, but allows a landowner to undertake development of property for which a development plan was approved before December 31, 2000, (or for lands subsequently added to "territory within the vicinity of a military airport or ancillary military facility", December 31 of the year the land was added) even though the uses may not be compatible with the regulations under ARS §28-8481. It is the responsibility of the local jurisdiction and landowner to work cooperatively on these "grandfathered" plans to mitigate potential future development conflicts where possible.

⁵ The Joint Land Use Study Program Guidance Manual, issued by the Department of Defense, Office of Economic Adjustment in August 2002, provides guidance in the preparation of Joint Land Use Studies. This discussion was adapted from the Manual.

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

CHAPTER 4: REVIEW OF EXISTING LEGISLATION AND GUIDANCE

Arizona Statutes (ARS §28-8481 and §28-8482) require that any city, town or county that has territory with the vicinity of a military airport or ancillary military facility as defined under ARS §28-8461 incorporate sound attenuation standards in their building codes for residential and other noise-sensitive uses in high-noise zones, in order to achieve an indoor noise level of 45 dB. For residential buildings within the defined territory in the vicinity of a military airport or ancillary military facility but outside the high-noise zones, ARS §28-8482 requires construction with a minimum of R18 exterior wall assembly, a minimum of R30 roof and ceiling assembly, dual-glazed windows and solid wood, foam-filled fiberglass or metal doors to the exterior (or alternative means to achieve a 45 dB interior noise level).

In December 2003, the Governor's Military Facilities Task Force put forth twenty-seven recommendations to ensure long-term retention of the State's military facilities so that they may continue to perform their vital national defense functions and maintain their critical role in the State economy. Included in these recommendations were establishment of a permanent Military Affairs Commission, and establishment of a Military Installation Fund with a dedicated stream of funding.

On May 17, 2004, the Governor signed House Bill (HB) 2140, a comprehensive military bill that included a number of the Task Force's recommendations, including the establishment of the Military Affairs Commission as a permanent body and the establishment of the Military Installation Fund (MIF).

Under ARS §28-8482 the Military Affairs Commission is comprised of fifteen voting members, three appointed by the President of the Senate, three appointed by the Speaker of the House of Representatives and nine appointed by the Governor:

The Commission's duties are to:

- Regularly meet with the Governor, President of the Senate and Speaker of the House of Representatives to provide recommendations on military issues and report on the progress of the Commission.
- Develop criteria, including accountability, for awarding monies from the Military Installation Fund.
- Annually recommend a priority listing of monies with available resources.
- Recommend how the monies in the Military Installation Fund should be awarded.

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

CHAPTER 4: REVIEW OF EXISTING LEGISLATION AND GUIDANCE

Beginning in fiscal year 2004-2005 and continuing in each successive fiscal year, \$4.825 million dollars will be appropriated from the state general fund for the MIF. ARS §41-1512.01 identifies specific disbursement components that must be adhered to including:

- Eighty percent of the monies in the fund shall be used for private property acquisition for the purpose of preserving a military installation; acquisition of real estate and rights to real estate and otherwise preserving real estate from development or mitigating impacts on development in high noise or accident potential zones and in areas as required to support a military installation; and, acquisition of real estate, property rights and related infrastructure that is vital to the preservation or enhancement of a military installation. Twenty percent of this amount may be awarded to cities, towns and counties for land acquisition purposes.
- Twenty percent of the monies in the fund shall go to cities, towns and counties for military installation preservation and enhancement projects.
- Monies in the MIF may be awarded for debt service on bonds issued by a political subdivision for the purpose of acquisition of private property for preserving a military airport or ancillary military facility.

In 2004, legislation was also enacted that required that the public report issued by the State Commissioner of Real Estate prior to sale of land include disclosure of location of the property under a Military Training Route, and directed the State Real Estate Department and State Land Department maintain maps of the Military Training Routes. The legislation also provided that in each county that includes land under a Military Training Route, the Real Estate Commissioner record a document disclosing the that the land is under a Military Training Route.

Enactment of House Bill (HB) 2308 in 2005 amended ARS §33-422 to amend the disclosure requirements for sellers of five lots or fewer (other than subdivided land) in unincorporated areas to include location of such property in clear zones, high noise zones or APZs as defined in ARS §28-8461 or under restricted airspace. HB 2308 also directs the State Land Department to prepare a map of restricted airspace and transmit a copy to all counties.

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

CHAPTER 4: REVIEW OF EXISTING LEGISLATION AND GUIDANCE

Appendix A summarizes the provisions of the various statutes related to the operation of military installations. A comparison of the land use compatibility guidance contained in ARS §28-8481 with that of the Air Installation Compatible Land Use (AICUZ) Program is contained in Appendix B.

4.3 LOCAL JURISDICTIONS

Regulations that typically are implemented by local political jurisdictions include zoning (including military airport zoning, airport impact and noise overlay districts), notification and disclosure requirements, and building code requirements for noise attenuation). In addition, local political jurisdictions adopt General Plans (for cities and towns) and Comprehensive Plans (for counties) that are required to address land use compatibility around military installations. Local jurisdictions may also adopt Area Plans or Specific Plans; these also may address issues of encroachment and land use compatibility. The following discussion presents examples of the types of regulations and land use compatibility guidance adopted by Arizona's local jurisdictions.

4.3.1 Zoning

The City of Tucson and Pima County addressed their similar issues of land use compatibility by passing zoning regulations that focused on regulating development around commercial and military airports. The City of Tucson adopted the Airport Environs Zone (AEZ) in 1990 and amended it in 2005 to conform to the recommendations of the Davis-Monthan Air Force Base / Pima County / City of Tucson Joint Land Use Study (JLUS), which was completed in 2004. The AEZ is part of the City's Land Use Code and defines allowed and prohibited uses in the various zones and districts defined within the ordinance, which correspond to the noise and safety zones defined in the JLUS. In addition to regulating types of land use, the AEZ also regulates the intensity of development (lot coverage and floor area ratio) and density of population in the various zones.

Similarly, Pima County specifically addresses permitted and prohibited land uses within the environs of civilian and military airports through overlay zones in its Zoning Code. Originally adopted in 1985, these regulations were amended in 2005 to conform to the recommendations of the Davis-Monthan Air Force Base / Pima County / City of Tucson JLUS. Thus,

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

CHAPTER 4: REVIEW OF EXISTING LEGISLATION AND GUIDANCE

there is a consistency between the City of Tucson and Pima County regulations for development around the Base

The City of Tucson Airport Environs Zone regulations may be found at:

<http://www.tucsonaz.gov/planning/codes/luc/art2div8.pdf>

The Pima County zoning regulations for Airport Environs and Facilities may be found at:

<http://www.co.pima.az.us/cob/code/c18a34.html#3941>

4.3.2 Notification and Disclosure

Several jurisdictions have adopted notification and disclosure requirements for real estate transactions around military installations.

- The City of Surprise has adopted a requirement that a copy of the City's "Surprise / Luke Notification Map" be posted in all real estate and model home sales offices in the City. The Map contains a notice that all homes within the City of Surprise are subject to aircraft overflights from Luke Air Force Base and shows the noise contours for Luke Air Force Base.
- Both the City of Yuma and Yuma County require disclosure statements for property located within restricted airspace. This disclosure is recorded to acknowledge on behalf of the grantor and its successors that a property is within the restricted airspace.
- Maricopa County also has requirements for notification to future homeowners regarding military aircraft operations, including posting various forms of notification in model home sales offices, notification on plats and public reports, and disclosure in Covenants, Conditions & Restrictions (CC&Rs) for new housing developments.

4.3.3 Noise Attenuation

The Uniform Building Code (UBC) adopted by most local jurisdictions in Arizona addresses interior noise level reductions related to noise generated by the operation of military aircraft. Typical methods to achieve interior noise reduction include use of noise-insulating windows; placement of noise-absorbing material in exterior walls; and baffling or

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

CHAPTER 4: REVIEW OF EXISTING LEGISLATION AND GUIDANCE

other measures to prevent the entry of noise through exterior vents. As an example, the City of Goodyear noise attenuation standards require that:

- Exterior walls shall be at least four inches in nominal depth and shall be finished on the outside with block, siding, sheathing or stucco on one-inch Styrofoam. Fiberglass or cellulose insulation at least three and one-half inches thick shall be installed continuously throughout the cavity space behind the wall. Exterior wall penetrations by pipe ducts or conduits shall be caulked.
- Mailboxes shall not be placed through the door or wall.
- Windows shall have two panes of glass and minimum sound transmission rating of STC-22. All operable windows shall be weather stripped and airtight in accordance with ASRM R-283-84-T Standard. Perimeter window frames shall be sealed to air tight specifications.
- Perimeter doorframes shall be sealed to airtight specifications.
- Fireplaces shall be provided with well fitting dampers, unless otherwise prohibited elsewhere in the Code.
- All non-glazed portions of exterior side-hinged doors shall be solid core wood or insulated hollow metal or at least one and three-quarter inch thick and fully weather-stripped.
- Roof rafter space of at least eight inches in depth shall be fiberglass or cellulose insulated at least eight inches in depth in the cavity space between the rafters.

Goodyear has gone beyond the State's standards to require these increased noise attenuation standards for homes outside of the high noise contours as well. The added benefit of energy efficiency makes the requirements attractive to prospective homebuyers, as well. (See the City of Goodyear's Website at <http://www.ci.goodyear.az.us/index.asp?NID=359>.)

4.3.4 General and Comprehensive Plans

Local jurisdictions have adopted General and Comprehensive Plans that address compatibility with the high-noise and accident potential generated by military airport operations, as required under State Statutes. As an example, the City of Goodyear's General Plan Land Use Element includes policies to

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

CHAPTER 4: REVIEW OF EXISTING LEGISLATION AND GUIDANCE

continue to partner with Luke AFB and the City of Phoenix to protect Luke's Accident Potential Zones and critical noise contours (including denial of new residential development within the 65 dB noise contour). The plan also includes a policy to require notification and disclosure statements for residential development within the defined "territory within the vicinity" of Luke AFB. The Goodyear Land Use Plan includes a Luke Compatible Use Area (LUCA) land use designation, which denotes areas within the 65 dB and higher Luke AFB noise contours, and allows for Community Commercial, Light Industrial, (excluding commercial office developments and / or complexes), Prisons, and Open Space uses that comply with adopted State legislation.

Local jurisdictions may also choose to address land use compatibility with military operations outside the areas of high-noise and accident potential defined under State Statutes. By amending its General Plan in 2004, provided for compatible use in expanded noise and accident potential zones (beyond those defined in ARS §28-8461). The 2004 General Plan Amendment provides for predominantly non-residential uses in these zones, and in addition, provides for an Airport Preservation land use designation, which extends beyond the expanded noise and accident potential zones, and provides for low-density residential development (up to 2 dwelling units per acre).

4.3.5 Area and Specific Plans

Cities, towns and counties also may adopt area and specific plans that include policies and land use designations that address land use compatibility with military installations. As an example, the Babocomari Area Plan adopted by Cochise County in 2005 included specific policies for compatibility of development with operations on Fort Huachuca's East Range, particularly at the Hubbard Assault Airstrip which lies just south of the Babocomari area. In the Plan, land adjacent to Fort Huachuca was designated for Rural Residential use and policies included for additional controls on residential density; notification to potential buyers of impacts from the airstrip operations; and limitations on special uses that could have an effect on the military missions of the Fort's East Range. (See the Cochise County website at:

<http://www.cochisecounty.com/P&Z/Comprehensive.htm>.)

4.4 REVIEW OF LEGISLATION / REGULATIONS RELATED TO THE OPERATION OF MILITARY FACILITIES IN OTHER STATES⁶

4.4.1 Overview

Military installations in the United States provide significant contributions to political jurisdictions at all levels, from federal to municipal. These installations create thousands of jobs and generate billions of dollars in direct and indirect economic activities as well as tax revenues. Because of the widening awareness of the importance of military installations to state and local economies and to our national defense, many states and local political jurisdictions are taking steps to deal with encroachment and land use compatibility issues that frequently arise in the vicinity of these facilities.

In recent years, a number of steps have been taken to ensure the missions of these military installations are protected from encroachment. These steps include the following:

- Several states, including California, Colorado, Florida, Illinois and Oklahoma, in addition to Arizona, have passed legislation or issued Executive Orders that require local communities to address land use compatibility around military installations.
- Local political jurisdictions in Arizona, California, Colorado, and Florida, as well as other states, have established zoning, planning, density of use, and interior noise reduction requirements in territories adjacent to military bases.
- Several states are considering use of existing statutory language to designate military installations as protected “Areas of Critical State Concern.” The advantages of this approach are an existing legal framework that many states have previously adopted and that it formally recognizes land surrounding military installations as requiring regulation owing to special circumstances of national security, public health (noise impacts) and public safety (in terms of hazards generated by normal military operations). Among the

⁶ Sources for this section include the National Governors Association Center for Best Practices, *State Strategies to Address Encroachment at Military Installations*; March 2003; and numerous State Government web sites.(see the list of references at the end of this Guidebook for addresses of specific sites)

disadvantages are that not all states have appropriate statutory language in place and amending an existing statute requires legislative action and executive approval. Among the states considering use of the “Areas of Critical State Concern” legislation are California, Florida, Maine, Maryland, Massachusetts, Minnesota, Nevada, New Jersey, North Carolina, South Carolina, Vermont, Virginia, and Wyoming.

- Political jurisdictions at various levels and in many states have initiated programs to acquire property surrounding a military installation through fee-simple purchase, transfer of development rights, purchase of development rights, and density transfers. Political jurisdictions that have initiated these programs include Arizona, Florida, Oklahoma, Nevada, and North Carolina. As an example, Florida has instituted a grant program to support military installations. The Defense Infrastructure Grant Program was established in 1999 to improve military base infrastructure and to provide dual-use benefits to local communities throughout the State. In recognition of the importance of military facilities to Florida’s economy, the program has received steady support from the Legislature, which has joined with the Governor to address the needs of the State’s military facilities.
- California, Georgia, North Carolina, Texas, and Virginia, in addition to Arizona, have created state military advisory commissions or have added offices of military affairs to the duties of existing agencies.

4.4.2 Review of Specific Legislation and Executive Orders

Specific legislation created by the States of California, Oklahoma, North Carolina, Florida and Colorado with respect to planning / real estate and the impacts generated by military facilities, as well as the Executive Order issued by the Governor of Illinois are briefly reviewed below.

California

In California, Aviation Noise Disclosure legislation (AB 2776) which passed in the 2002–2003 regular legislative session and was signed by the Governor, amends the real estate transfer disclosure statute (California Civil Code, Division 2 – Property, Part 4 – Acquisition of Property, Title 4, Chapter 2 – Transfer

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

CHAPTER 4: REVIEW OF EXISTING LEGISLATION AND GUIDANCE

of Real Property) to require sellers / lessors to disclose the fact that a house for sale or lease is “near” an airport if the house falls within an airport influence area (that could be several miles from an existing or proposed airport). An airport influence area is defined as the area in which current or future airport-related noise, overflight, safety, or airspace protection factors may significantly affect land uses or necessitate restrictions on those uses. The intent of the legislation is to notify buyers that they could experience airport noise, vibration, odor, annoyances, or other inconveniences at some time in the future as a result of the normal operation of an existing or proposed airport. This legislation is similar in intent to Arizona’s requirements under ARS §28-8484 and ARS §28-8485 for notification of owners or potential buyers of property that the area is currently subject to aircraft noise and overflights.

California passed legislation in 2002 (amending Section 1; Section 65302 of the Government Code) that required the land use element of General Plans prepared by cities and counties to consider the importance of military facilities to national defense when proposing zoning ordinances or designating land uses covered by the General Plan for land or other territory near or around military facilities. In addition, the legislation required the land use element to contain a noise element that appraises noise problems in the community from a variety of sources, including military airport operations. The noise is required to be measured and contours prepared and used as a guide for establishing land use patterns that minimize the exposure of community residents to excessive noise.

Oklahoma

Oklahoma has passed legislation (Title 11: Cities and Towns; Section 43-101.1 – Municipalities with Active Duty United States Air Force Military Installation) in 2002 based in large part on the compatible land use guidelines contained in the U.S. Air Force Air Installation Compatible Zone Program. The act restricts use of property within five miles from the corporate boundary of a military installation that may constitute hazards in terms of aircraft operations. Under provisions of the statute, prohibited or restricted land uses include airborne releases of substances that impair visibility, light emissions that interfere with pilot vision, activities that attract birds or waterfowl, and structures located within 10 feet of aircraft approach or departure surfaces. Minimal residential development is allowed and is limited to single-

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

CHAPTER 4: REVIEW OF EXISTING LEGISLATION AND GUIDANCE

family use on lots of one acre or more. The statute does not require that local political jurisdictions enact an ordinance enforcing these provisions.

Florida

Florida has several statutes related to land use compatibility around military installations.

- Under §163.3175, local governments in which a military installation is located must transmit to the installation commander for review and comment, information related to any change in comprehensive plans, plan amendments and proposed changes to land development regulations that would affect the intensity, density or use of land adjacent to or in close proximity to the installation.
- All city or county future land use plan elements must consider compatibility of uses on lands adjacent to or in close proximity to military installations and must include criteria to be used to achieve the compatibility of these lands. The state land planning agency also must consider land use compatibility issues adjacent or in close proximity to military installations in coordination with the Department of Defense.
- The state has created a Defense Infrastructure Grant Program to be implemented by the Office of Tourism, Trade, and Economic Development. The program is intended to provide grants that support local infrastructure projects deemed to have a positive impact on the military value of installations within the state. Projects that can be funded include those related to encroachment as well as transportation and access, utilities, communications, housing, environment and security. There is no limit on the amount of a grant, although local matching funds may be required.
- The State of Florida currently operates the largest and most aggressive land acquisition program in the nation, with \$300 million allocated annually to purchase environmentally sensitive lands through the Florida Forever program. The Florida Forever program, enacted by the Florida Forever Act, provides for land acquisition to protect environmentally significant lands, protect ground and surface water, provide high quality recreational opportunities in urban areas, and help local governments implement their comprehensive plans. As

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

CHAPTER 4: REVIEW OF EXISTING LEGISLATION AND GUIDANCE

part of the Florida Forever program, the Florida Department of Community Affairs assists in identifying and coordinating land acquisition opportunities that meet the goals of the Florida Forever Act and work to protect existing military bases.

Colorado

The Colorado Land Use Act (Colorado Revised Statutes Title 24, Article 65) encourages local governments to designate “areas and activities of State interest” which include “areas around key facilities in which development may have a material effect upon the key facility or the surrounding community.” The act defines the term “key facility” to include airports or major public utility facilities, such as central office buildings of telephone facilities, power plants, natural gas storage areas, etc.

The following provisions of the Act [Part 2; §65-202, (4)] apply to areas around key facilities:

- If the operation of a key facility may cause a danger to public health and safety or to property, as determined by local government, the area around the key facility shall be designated and administered so as to minimize such danger; and
- Areas around key facilities shall be developed in a manner that will discourage traffic congestion, incompatible uses, and expansion of the demand for government services beyond the reasonable capacity of the community or region to provide such services as determined by local government. Compatibility with non-motorized traffic shall be encouraged. A development that imposes burdens or deprivation on the communities of a region cannot be justified on the basis of local benefit alone.

In addition, the following provisions are applicable to areas around particular airports:

- Areas around airports shall be administered so as to:
 - Encourage land use patterns for housing and other local government needs that will separate uncontrollable noise sources from residential and other noise-sensitive areas; and
 - Avoid danger to public safety and health or to property due to aircraft crashes.

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

CHAPTER 4: REVIEW OF EXISTING LEGISLATION AND GUIDANCE

North Carolina

Under §153A-323 and §160A-364 of the General Statutes, counties and cities in North Carolina must notify a military base commander of any adoption or modification of an ordinance that would result in changes to the zoning map or would change or affect the permitted uses of land within five miles or less from the perimeter boundary of the base. If the military provides comments or analysis concerning the compatibility of the proposed ordinance or amendment with military operations at the base, the respective county board of commissioners or city council must take the comments or analysis into consideration before making a final determination on the ordinance.

In its 2004 session, the North Carolina General Assembly authorized the issuance of bonds to acquire up to 17,000 acres (conservation easement or fee simple) near the state's military bases to prevent encroachment by incompatible development. In the same session, the General Assembly created a Study Commission on Residential and Urban Development Encroachment on Military Bases and Training Areas. This commission was charged with submitting a report to the General Assembly in 2005, after studying the restriction of zoning in areas around installations; the effect of encroachment on deed registration; purchase of development rights and buffers around military installations; and other issues the Commission would deem relevant.

Illinois

In April 2005, Governor Rod Blagojevich issued an Executive Order on Land-Use Planning and Military Installation Compatibility (Executive Order 2005-4). This requires that all state agencies involved with land use planning to ensure that development is compatible with or enhances the military value of the state's installations, and in addition encourages local governments to consider the impact of new growth on installations when preparing zoning ordinances or designating land uses.

Texas

In 2003, the Texas Military Preparedness Commission (TMPC) was created to take the place of the Office of Defense Affairs and the Texas Strategic Military Planning Commission both of which were created in 1997. The new Commission, under the Governor's Office, contains nine members appointed by the

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

CHAPTER 4: REVIEW OF EXISTING LEGISLATION AND GUIDANCE

Governor, with appropriate staff, and its mission is to develop a pro-active statewide strategy to assist defense dependent communities. The Office of the TMPC develops and publishes an Annual Master Plan Report, which identifies objective and recommendations for maintaining and enhancing the military preparedness of the state and its military installations, and in addition sets strategies for attracting and retaining military missions in the state.

The Office of the TMPC also administers the Texas Military Value Revolving Loan Fund. Established in 2003, funding for the Fund is provided through issuance by the state of up to \$250 million in general obligation bonds. Loans may be made available to local governments for economic development projects that enhance the military value of their installations. The application process includes preparation by the local government of a Military Value Enhancement Statement (MVES) that identifies how the proposed project will enhance the military value of the installation. Loans may also be provided to local governments to develop a Comprehensive Defense Installation and Community Strategic Impact Plan that states the community's long-range goals and development proposals related to controlling negative effects of future growth and minimizing encroachment; enhancing military value while reducing operating costs, and; identifying property and services that can be shared by the installation and the community.⁷

State statutes (§397.005 of the Local Government Code) also require that if a county, municipality or special district that is adjacent to, is near, or encompasses any part of a military installation, determines that an ordinance, rule or plan proposed by the jurisdiction may impact the installation or its operations, the jurisdiction is required to seek comments from installation authorities before making a final determination on the proposal.

⁷ Additional information about the content of the Comprehensive Defense Installation and Community Strategic Impact Plan may be found in §397.003 of the State of Texas Local Government Code (see <http://www.state.tx.us/>)

CHAPTER 5. DEVELOPMENT TRENDS AND ISSUES

Growth trends and increased tempo of development around military installations can generate demand for new housing and related facilities, thereby creating issues of compatibility that directly and indirectly affect the ability of the installations to carry out their present and future missions.

5.1 POPULATION GROWTH

The State of Arizona has seen rapid population growth over the past 40 years, and between 2000 and 2004, according to the State Department of Economic Security, it was the second-fastest growing state with a population increase of 13.7%. All parts of the State have shared to some degree in this rapid growth. For example, Yuma and Maricopa Counties have been among the fastest growing in the nation. Metropolitan Yuma (Yuma County) is the third fastest growing area in the United States, with the County's population increasing by 3.1% between 2002 and 2003. Over the last forty years, the population of Maricopa County more than quadrupled from 664,000 to more than three million. Other counties with military facilities, including Pima, Pinal, Cochise and Coconino Counties are also growing rapidly (see Table 5-1.)

**Table 5-1
POPULATION CHANGE FOR ARIZONA COUNTIES
2000 Census to 2004 Arizona Department of
Economic Security (DES) Estimate**

	DES Estimate (7/1/2004)	Census (4/1/2000)	Number Change	Percent Change
Arizona	5,833,685	5,130,632	703,053	13.7%
County				
Apache	71,320	69,423	1,897	2.7%
Cochise	130,220	117,755	12,465	10.6%
Coconino	129,570	116,320	13,250	11.4%
Gila	54,060	51,335	2,725	5.3%

**Table 5-1
POPULATION CHANGE FOR ARIZONA COUNTIES
2000 Census to 2004 Arizona Department of
Economic Security (DES) Estimate**

	DES Estimate (7/1/2004)	Census (4/1/2000)	Number Change	Percent Change
Graham	36,020	33,489	2,531	7.6%
Greenlee	8,350	8,547	-197	-2.3%
La Paz	21,135	19,715	1,420	7.2%
Maricopa	3,524,175	3,072,149	452,026	14.7%
Mohave	180,210	155,032	25,178	16.2%
Navajo	107,420	97,470	9,950	10.2%
Pima	931,210	843,746	87,464	10.4%
Pinal	219,780	179,727	40,053	22.3%
Santa Cruz	41,985	38,381	3,604	9.4%
Yavapai	196,760	167,517	29,243	17.5%
Yuma	181,470	160,026	21,444	13.4%

Source: Population Statistics Unit, Arizona Department of Economic Security, accessed at <http://www.workforce.az.gov>

While the U.S. Census Bureau population estimates for July 1, 2004 showed somewhat lower numbers across the state than did the DES estimates, the Census Bureau estimates indicated that four Arizona counties – Maricopa, Pima, Pinal and Mohave – were among the 100 fastest growing counties in the U.S. between 2003 and 2004. Maricopa County also had the largest numerical increase in population for any county in the U.S. during that period.

Significant population growth is also projected for the future. According to projections prepared by the Arizona Department of Economic Security in 1997, the State as a whole is expected to have a population of over 11 million by 2050, nearly double the estimated population of 5.8 million in 2004 (see Table 5-2.) The projected population of 7.2 million for Maricopa County is more than double the 2004 estimated population, while the 2050 projected population of Coconino and Pima Counties is approximately 80% over the 2004 estimated population.

However, at least in the near-term future, the population growth rates appear to be greater than expected. While the 1997 projections indicated a State population of 5.4 million; the

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

CHAPTER 5: DEVELOPMENT TRENDS AND ISSUES

actual 2004 estimated State population was 5.8 million, indicating that the State is growing more rapidly than was anticipated when the projections were prepared in 1997. For most counties in the state, the estimated 2004 population also exceeded the numbers for 2004 contained in the 1997 projections, in some cases, significantly so. For Maricopa County, the estimated 2004 population is nearly 300,000 greater than the 2004 population level that was projected in 1997, while the 2004 estimated populations for Yuma and Pinal Counties reached levels that according to the 1997 projections were not expected until 2012 and 2016 respectively. Though it is not certain that these rates of growth will continue to be sustained, or if the growth slackens, at what point that may occur, it is reasonable to conclude that continued population growth is likely into the foreseeable future.

**Table 5-2
PROJECTED POPULATION FOR ARIZONA COUNTIES
2010 TO 2050**

	2010 Projected	2020 Projected	2030 Projected	2040 Projected	2050 Projected
Arizona	6,145,108	7,363,604	8,621,114	9,863,578	11,170,997
County					
Apache	76,645	85,766	94,707	103,690	113,227
Cochise	137,035	149,990	160,049	167,401	174,556
Coconino	147,352	169,343	189,868	211,616	235,707
Gila	54,603	60,757	66,378	70,163	73,708
Graham	43,499	50,673	57,355	63,492	69,239
Greenlee	9,605	10,271	10,984	11,634	12,322
La Paz	25,096	29,078	31,983	33,899	35,589
Maricopa	3,709,566	4,516,090	5,390,785	6,296,219	7,264,731
Mohave	194,403	236,396	270,785	295,045	316,959
Navajo	99,979	111,946	123,460	134,323	147,269
Pima	1,031,623	1,206,244	1,372,319	1,522,615	1,671,182
Pinal	199,715	231,229	255,695	273,057	288,529

**Table 5-2
PROJECTED POPULATION FOR ARIZONA COUNTIES
2010 TO 2050**

	2010 Projected	2020 Projected	2030 Projected	2040 Projected	2050 Projected
Santa Cruz	46,246	55,111	64,459	73,892	84,481
Yavapai	198,052	240,849	278,426	305,681	331,456
Yuma	171,689	209,861	253,861	300,851	352,042

As the majority of the State's population growth will continue to be in the counties where the State's principal military facilities are located, future population increase will continue to create the potential for development that is incompatible with the military installations.

5.2 HOUSING DEMAND

Population growth creates demand for new housing units. The number of housing units in the State increased by 12.3% between 2000 and 2004 (see Table 5-3.) Although the rate of growth in housing units in the State has been slightly less than the rate of population growth during this time, the actual number of new housing units in the State as a whole has averaged over 65,000 per year.

**Table 5-3
ESTIMATED HOUSING UNITS FOR ARIZONA
COUNTIES
2000 to 2004**

	U. S. Census Bureau Estimate (7/1/2004)	U.S. Census (4/1/2000)	Number Change	Percent Change
Arizona	2,458,231	2,189,189	269,042	12.3%
County				
Apache	31,994	31,621	373	1.2%
Cochise	54,029	51,126	2,903	5.7%
Coconino	57,224	53,443	3,781	7.1%

**Table 5-3
ESTIMATED HOUSING UNITS FOR ARIZONA
COUNTIES
2000 to 2004**

	U. S. Census Bureau Estimate (7/1/2004)	U.S. Census (4/1/2000)	Number Change	Percent Change
Gila	29,407	28,189	1,218	4.3%
Graham	11,694	11,430	264	2.3%
Greenlee	3,745	3,744	1	0.0%
La Paz	15,364	15,133	231	1.5%
Maricopa	1,429,101	1,250,231	178,870	14.3%
Mohave	90,777	80,062	10,715	13.4%
Navajo	50,237	47,413	2,824	6.0%
Pima	397,150	366,737	30,413	8.3%
Pinal	98,793	81,154	17,639	21.7%
Santa Cruz	14,858	13,036	1,822	14.0%
Yavapai	93,254	81,730	11,524	14.1%
Yuma	80,604	74,140	6,464	8.7%

Source: Table 4: Annual Estimates of Housing Units for Counties in Arizona: April 1, 2000 to July 1, 2004 (HU-EST2004-04-04), Population Division, U.S. Census Bureau, July 21, 2005

Maricopa, Pima, Pinal and Yuma Counties, which are home to many of the State's military facilities, were among the counties with the highest growth in housing units between 2000 and 2004. Maricopa County alone grew by an average of over 40,000 housing units per year. At the 2004 ratio of housing units to population, the projected State population of 11.1 million in 2050 would equate to 4.7 million housing units, an increase of 2.25 million housing units from the estimated number in 2004. Based on the projected 2050 population numbers (see Table 5-2), there would be potential demand between 2004 and 2050 for 1.5 million additional housing units in Maricopa County, as well as 300,000 in Pima County, 75,000 in Yuma County, 45,000 in Coconino County and 30,000 in Pinal County. The potential for growth of this magnitude is of concern because residential uses are among the uses most

affected by close proximity to operations at military installations.

5.3 EXPANSION OF URBAN AREAS

Historically, Arizona's military installations were located in relatively sparsely populated areas, and with relatively low population growth in the State for the first half of the 20th century, the potential for encroachment around the installations was minimal. For example, when Ft. Huachuca was established as a temporary camp in 1877, the surrounding area was essentially wilderness. Even when the Fort was reactivated in the 1950s, the community of Sierra Vista, which grew up near the Fort's cantonment, remained a small settlement. Similarly, when Luke AFB, Davis-Monthan AFB and MCAS Yuma were established in the 1940s, all were far beyond the fringe of urban development in Phoenix, Tucson and Yuma, and their surroundings were predominantly agricultural or vacant land.

Beginning in the 1940s and 1950s, however, the State's population began to grow rapidly particularly around urban centers such as Phoenix, Tucson, Yuma and Flagstaff. Phoenix's population grew by over 400% between 1950 and 1960; Tucson's population grew by over 500%; Yuma's by 160%; and Flagstaff's by nearly 140%. Continued growth for the next 50 years resulted in growth spreading beyond the central cities, so that small communities that had once been on the outskirts became urbanized. In The Phoenix area, urbanization of the East Valley has been followed by urbanization of the West Valley, with communities such as Surprise and Goodyear among the fastest growing in the State. Similarly in the Tucson area, urban growth spread to Oro Valley and Marana, and in Yuma to the Fortuna-Foothills area. Smaller urban areas expanded rapidly as well. The City of Sierra Vista grew from just over 3,000 people in 1960 to over 37,000 in 2000, while Flagstaff grew from a population of 18,000 in 1960 to nearly 53,000 in 2000.

The expansion of the State's urban areas is likely to continue. Population projections for 2050 prepared by the State Department of Economic Security⁸ indicate that 87% of the growth is expected to occur in the State's three largest metropolitan areas – Phoenix, Tucson and Yuma. The result of

⁸ July 1, 1997 to July 1, 2050 Arizona County Population Projections, prepared by the Arizona Department of Economic Security, Research Administration, Population Statistics Unit.

this growth will be continued urbanization on the fringe of the urban areas. For example, in the West Valley portion of metropolitan Phoenix, the population of Buckeye is expected to grow to over 400,000 by 2050, while Goodyear is expected to grow to nearly 300,000 and Surprise to 235,000 residents. In metropolitan Tucson, the population of Oro Valley is expected to increase to nearly 80,000 by 2050, while Marana is expected to grow to nearly 125,000. In metropolitan Yuma, the population of the Fortuna-Foothills area is expected to increase by over 200% by 2050, to 64,000. Continued growth is also expected in the State's smaller urban areas. The City of Sierra Vista's population is expected to increase to over 61,000 by 2050 and Flagstaff's 2050 population is expected to be over 113,000.

Because many of the State's military installations are located at the edge of metropolitan areas, continued development on the urban fringe increases the potential for encroachment and conflicts between military operations and urban land uses. Another factor that affects the potential for encroachment is the development constraints that limit the direction of growth as urban areas expand. For most urban areas in the State, constraints such as mountainous terrain and the presence of Native American lands restrict the amount of land available for development. This increases the development pressures on remaining lands, including those in the vicinity of military installations.

5.4 CHANGING RURAL ENVIRONMENT

In addition to the expansion of the State's urban areas, the character of non-urban areas is changing as well. Demand for second homes, retirement communities and an "exurban" or "small-town" lifestyle has resulted in increased population growth and housing in areas that were formerly rural in character. This development may occur in new planned communities as well as through construction of new residences on individual parcels.

Examples of the trend of new planned communities developing in formerly rural areas outside the major urban growth areas can be found along the northern boundary of Barry M. Goldwater Range, where the Coyote Springs development is being constructed in the Wellton area, less than three miles from the Range, and in Gila Bend, where the southern boundary of the new planned community on the Merrill-Paloma Ranch is located within a mile of the Range boundary.

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

CHAPTER 5: DEVELOPMENT TRENDS AND ISSUES

Although the introduction of developments of this type may present potential compatibility problems due to the increased density of development, planned communities also may present opportunities to maintain compatibility through effective site planning. In the case of the Merrill-Paloma Ranch, the Town of Gila Bend is working with the developer to maintain open space and non-residential uses in areas affected by operations at the Gila Bend Auxiliary Airfield. Similarly, in an urban setting, the City of Goodyear is working with the developers of planned communities to maintain compatibility in the Luke Air Force Base Southern Departure Corridor.

Development of residential uses on individual lots in unincorporated areas may occur through platting of a subdivision (defined as six or more parcels), which are subject to county subdivision regulations or, through division of land into five or fewer parcels. If the division of land does not include a parcel that is 10 acres or smaller, it is not subject to any county review; if it includes a parcel of 10 acres or smaller the land division is subject to staff review (but not legislative approval), provided that the county has adopted an ordinance requiring such review. The staff review is limited to conformance of the parcel size with applicable zoning regulations; availability of legal access; adequate physical access to each parcel; and reservation of appropriate utility easements.

This limited authority for counties to review and approve subdivisions in unincorporated areas makes it more difficult for counties to ensure that development around military installations will be compatible. All western states, except for Wyoming and Montana, provide for at least some level of county approval of divisions of land regardless of the number or size of parcels involved. (Wyoming exempts divisions where all parcels are at least 35 acres in size; Montana exempts a division where all parcels are at least 160 acres in size.)

An example of the effects that the changing nature of a rural area can have when located adjacent to a military installation is provided by the Babocomari area in Cochise County. Zoning of the San Ignacio del Babocomari Land Grant allows agricultural and large lot rural-residential development on a minimum of four-acre lots. Recently, the eastern portion of the land grant was sold and subsequently the new buyers changed the predominant land use from ranching to residential lot splits of four acres in size and larger. Additionally, new roads were graded into the area and a number of requests to rezone to more intensive residential or commercial uses are

anticipated. Because a portion of this area is adjacent to Fort Huachuca, the change in the trend of development raised concerns about future land use compatibility with operations at the Fort's Hubbard Assault Strip. The Babocomari Area Plan adopted by Cochise County in September 2005 designates a Hubbard Assault Strip Encroachment Area with polices for additional controls on residential density; notification to potential buyers of impacts from the airstrip operations; and limitations on special uses that could have an effect on the military missions of the Fort's East Range.

An increase in the number of second homes is another dimension of the changes in many of the state's rural areas, and in addition to the effects of increasing numbers, changes in the nature of their use can affect the degree of compatibility with adjacent military installations. Today, second homes are often similar to first homes in size and level of amenities, and tend to be used more frequently than the traditional vacation cabins. Also, second homes tend to become retirement homes, with full-time occupancy. With occupancy that is more frequent the level of incompatibility with impacts such as noise and safety hazards increases. An example of this effect is occurring along the westerly boundary of Yuma Proving Ground (YPG), where seasonal fishing camps along the Colorado River are being turned into more elaborate second homes. With more frequent use by their owners, the usage of the airstrip that serves the area has also increased, creating potential conflicts with YPG operations and airspace.

Another aspect of the changing rural environment that creates potential compatibility problems around military installations is the continuing increase in commercial recreational facilities. Uses such as campgrounds, RV parks, resorts and other lodging facilities can create compatibility problems with adjacent military installations for two reasons. First, these types of uses create concentrations of people that even on a seasonal or occasional basis are potentially incompatible with noise and safety standards. Second, if located in proximity to unfenced portions of an installation, these uses may create problems of unauthorized recreational access to the installation.

5.5 CHANGING MILITARY MISSIONS

Arizona's military facilities operate in support of the overall framework of a national defense strategy that is carried out by the U.S. Armed Forces. The defense strategy serves broad

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

CHAPTER 5: DEVELOPMENT TRENDS AND ISSUES

national security objectives and evolves in response to changing global trends and concerns in the security environment. The *Quadrennial Defense Review Report*, produced by the Department of Defense, is a strategic planning document that outlines the national defense strategy that guides the development of U.S. Forces and capabilities and their deployment at installations in the U.S. and overseas.

The mission of each of Arizona's military installations and of each of the units stationed at the installations supports the overall national defense strategy. However, these missions also evolve and may change over time to respond to changing security conditions, both internal and external. Changes in the overall national defense strategy resulting from the quadrennial review can lead to eventual changes in an installation or unit mission. Factors such as new technology or combat tactics as well as changing global geopolitical conditions can also lead to changes within the overall defense strategy.

Among the types of mission change that may occur are the introduction of a new unit and mission at an installation or a change in aircraft or weaponry. An example of a new unit with a new mission at an installation is the addition of the Combat Search and Rescue Group at Davis-Monthan Air Force Base. This unit, in addition to its primary mission also undertakes disaster relief, counter-drug operations, and noncombatant or medical evacuation. Operations of this unit, including a HH-60G helicopter unit, as well as an HC-130 aerial refueling unit, changed the mix of aircraft and number of operations at the base. An example of the potential effects of change in aircraft or weaponry is provided by the anticipated replacement of the F-16 and A-10 aircraft now stationed at Luke and Davis-Monthan Air Force Bases, with the F-35 Joint Strike Fighter. It is likely that this aircraft will have a larger noise 'footprint' than either the F-16 or A-10 and therefore noise zones larger than those of the current aircraft.

Changes within an existing mission can also change the impacts of an installation's operations. For example, an increase in the number of missions flown or number of artillery rounds fired can increase the effects of aircraft noise, and also increase the level of safety hazards.

As a means to address the potential changes in impacts due to future changes in missions, local communities can plan for future land use compatibility by defining the areas affected based on data that will accommodate future changes at an

installation. For land use compatibility planning around Luke AFB (Arizona), the State of Arizona chose to base the definition of areas that could be impacted on the 1988 AICUZ contours for the base rather than a more recent AICUZ study because the type of aircraft stationed at the base for 1988 study generated higher noise levels than currently assigned aircraft, and therefore, the compatibility planning therefore accommodate higher future noise levels as well.

Recognizing the need to consider the need to provide “planning contours” with a future look, the Department of Defense is considering changing the AICUZ procedures to require installations to provide such information.

5.6 DEVELOPMENT OF STATE LANDS

Recent trends in the development of State Trust Land tied to population growth and the expansion of urban areas throughout the state are additionally creating additional issues of compatibility that affect the ability of the installations to carry out their present and future missions.

At statehood, the federal government granted Arizona 10 million acres of land, known as State Trust Land. Income from the sale or lease of this land benefits a variety of public institutions, with the largest portion benefiting the public school system. The use of all State Trust Land must benefit the Trust, a fact that distinguishes it from the way other public lands may be used and disposed of. The Arizona State Land Department manages Arizona’s State Trust Lands, which currently total approximately 9.3 million acres and comprise approximately 12.8 percent of land area within the state. In many areas, State Trust Land borders or is found within the vicinity of military installations.

The State Land Department program has changed with the changing economy and growth patterns throughout the state. During the first 65 years of statehood, the state economy was based on natural resources, and the State Trust Land was primarily leased as rural land for livestock grazing, agriculture, and mineral production. During this time, the State Land Department focused on management of the land for its “highest and best use,” and land was generally not outright sold, as other states had done at the time.

However, the focus of the State Land Department’s program has shifted in recent years to reflect the expansion of urban growth throughout the state, from management of rural land to

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

CHAPTER 5: DEVELOPMENT TRENDS AND ISSUES

urban and commercial land development. Enabled by several major reform initiatives over the last 20 years, the State Land Department has developed aggressive sales and leasing programs, focused on urban development. One such reform is the Urban Lands Management Act of 1981, which gave the State Lands Department new authority and direction to plan, zone and merchandise State Trust Lands surrounding major population centers. This has allowed the State Lands Department to increase the value of State Trust Land in urban areas by planning and zoning it in cooperation with local governments.

Currently, the urban lands sales and lease program is the largest revenue producer for the Trust. Of 1,874.52 acres of State Trust Land sold in fiscal year (FY) 2003-2004, 97% were urban lands which generated \$309,940,931 in sales for the Trust. This represents an 89% increase in land sales over FY 2002-2003. The average sale price per acre of urban land is approximately \$150,000 more than the average acre of rural land within the state (see Table 5-4). The State of Nevada has managed State Trust Lands similarly, with the management program focus on land sales. The State of New Mexico has recently developed a state trust commercial land sales program, which is one of the lowest revenue producing management tools for the New Mexico State Land Office. New Mexico, like the States of Oregon and Wyoming, produce the greatest revenue from State Trust Land management through natural resource-based leases, namely oil and gas, logging and mineral royalties.

**Table 5-4
ARIZONA STATE TRUST LAND SALES
FY 2004**

Land Type	Acres Sold	Total Sales Price	Average Price Per Acre	Percent of Land Type Sold
Urban	1,824.41	\$309,940,931	\$169,886	97%
Rural	50.11	\$706,800	\$14,105	3%
Total	1,874.52	\$310,647,731	---	100%

Source: State of Arizona, State Land Department Annual Report 2003-2004. September 1, 2004.

Currently, most of Arizona's State Trust Lands are usable for livestock grazing purposes only. With the exception of several

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

CHAPTER 5: DEVELOPMENT TRENDS AND ISSUES

hundred thousand acres of these lands that have become urban lands in the Phoenix and Tucson areas, a trend projected to continue in these areas as well as around other cities throughout the state. Given this trend, management of State Trust Land for urban use primarily through sales would likely continue to generate the most immediate revenue for the Trust, and without successful reform is likely to remain the focus of the State Land Department management program.

As a result of this trend in State Trust Land management, issues of compatibility that affect the ability of the installations to carry out their present and future missions have risen and may continue to rise. For example, major concentrations of State Trust Lands adjacent to BMGR being converted to urban uses could create compatibility issues for the installation. Similarly, development of State lands for residential development uses near YPG's boundaries and within airspace of YPG, potentially causes compatibility conflicts including aircraft interference and safety issues. In some cases, state land sales and subsequent development occurring in a checkerboard pattern may encourage private land owners to develop adjacent undeveloped land parcels, further accelerating development near installation boundaries. In other cases, secure or obvious boundaries are not present to separate an installation from adjacent State Trust Land. Increased hunting or other recreational activities available to the public on these lands create compatibility issues.

In the BMGR case and potentially in many other cases, the ability for the State Land Department to engage in land exchanges and density transfers between various State Trust Lands is a potentially important reform element for achieving compatibility. Such reform requires legislative action and/or a vote of the electorate to modify the State Constitution. Although a recent attempt to provide this important reform through a constitutional amendment was defeated in the November 2004 election, indications are that various groups may support a future measure to provide for such transfers. Additionally, *Conserving Arizona's Future* is a new ballot initiative slated for the November 2006 election, which would outright preserve 300,000 identified acres of State Trust Land, and sell an additional 400,000 acres for conservation while not decreasing revenue to the public school Trust beneficiary. This initiative would also provide state and local authorities power to limit and control development on State Trust Lands. Typically, the open space conservation goals are compatible with low intensity land use goals in areas surrounding

installations. These proposed reforms as well as other future State Trust Land reform opportunities may be critical to achieving land use compatibility with military installations.

5.7 USE OF FEDERAL LANDS

Land administered by federal agencies comprises approximately 44 percent of land in Arizona. This land is primarily managed by the following federal agencies: the Bureau of Land Management (BLM), National Forest Service (Forest Service), National Park Service (Parks Service), Bureau of Reclamation (BOR), and the United States Fish and Wildlife Service (USFWS). Unlike the Department of State Lands, these federal agencies do not have aggressive land sales programs, and instead issue leases, rights-of-way, and use permits for a wide variety of uses through land management programs. The sale of federal land is not creating compatibility issues with military installations, and the open space conservation goals of these federal agencies are generally compatible with low intensity land use goals in areas surrounding installations. However, in some cases uses of these federal lands is creating, or has the potential to create, issues of compatibility with military installations. Land uses on federal lands may include: agricultural, grazing, timber, minerals, public utilities, roads, recreation, watershed management, fish and wildlife protection, wilderness preservation, scenic resource preservation, military use, scientific uses and cultural resource preservation. In many areas throughout Arizona, federal land borders military installations, or overlaps with military special use airspace, and uses of these federal lands can affect the ability of the installations to carry out their present and future missions.

For example, if a large 24-hour mining operation equipped with lighting were to be located on BLM land adjacent to the Barry M. Goldwater Range, it could create potential incompatibility with nighttime operations at BMGR Manned Range #4 due to light impacts because it is located near the northerly installation boundary.

The lack of secure or obvious boundaries between federal lands and an installation can lead to trespassing problems, especially in areas where roads and/or recreation trails provide access to these public lands that abut installations. The trespassing problem can be compounded by new improvements in roads and trails (for recreation, fire control, or other purposes) that provide improved access to areas near installation boundaries.

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

CHAPTER 5: DEVELOPMENT TRENDS AND ISSUES

In addition, intensified recreational use, like RV parks or campgrounds, in areas within military special use airspace can cause electromagnetic interference and noise compatibility issues.

Furthermore, in some cases federal properties leased to private parties that have historically been utilized on a seasonal or recreational basis as a hunting cabin or similar use, are being retrofitted to upscale properties that are inhabited on a more than seasonal basis, creating potential noise, light, hazard, and electromagnetic interference compatibility issues.

Development pressures in Arizona continue to place new demands on natural resources, increasing challenges in the management of federal lands for agencies like the Bureau of Land Management, US Forest Service and Bureau of Reclamation. At the same time, increasing populations are increasing the recreational use of Parks Service, Bureau of Land Management, US Fish & Wildlife Service, and Forest Service lands – creating new challenges for these agencies to manage their land in such a way to accommodate increased use while preserving natural and cultural resources. Maintaining compatibility with adjacent military installations may become increasingly challenging for federal agencies, as development pressures increase throughout Arizona.

6. RECOMMENDED POLICIES AND PRACTICES

This Policy Guidebook is intended to guide the decisions made by a variety of public and private entities in relation to compatible land use around military installations in the State. While local jurisdictions are in the forefront of implementing policies and practices to achieve compatible land use, the State of Arizona and its agencies, the military installations, and private interests within the area can also contribute to the implementation of the recommendations of the Policy Guidebook.

Successful implementation of the guiding principles contained in Chapter 1 of this Guidebook requires that a variety of tools be available to achieve compatible land use around military installations. These tools are contained in the recommended policies and practices presented in the following sections.

The recommended policies and practices for land use compatibility are grouped into the following categories:

1. **Planning Policies and Practices**, which are practices to ensure that land use compatibility is adequately defined and considered in preparing local plans;
2. **Coordination / Public Participation Policies and Practices**, which are practices to ensure that coordination is maintained among jurisdictions, installations and agencies responsible for land use compatibility and that appropriate public involvement is maintained;
3. **Notification Policies and Practices**, which are practices to ensure that those affected by military operations are adequately notified of potential effects;
4. **Regulation Policies and Practices**, which are practices to achieve land use compatibility through adoption of regulatory mechanisms;
5. **Acquisition Policies and Practices**, which are practices to achieve land use compatibility through acquisition of property; and
6. **Miscellaneous Policies and Practices**, which are other practices that assist in achieving land use compatibility.

The discussion of each policy or practice includes the following elements: its description and scope, including the principal characteristics and function; its applicability, including a discussion of prior experience and unique aspects; and its implementation, including potential responsible parties, timing and means to evaluate progress.

While not all of the policies and practices may be applicable to every installation, and the changing nature of economics and politics may affect the scope and timing of implementing any particular policy or practice, these recommendations provide the framework and guidance for achieving long-term compatibility of development with the State's military installations.

6.1 PLANNING POLICIES AND PRACTICES

Planning Policies and Practices ensure that land use compatibility is adequately defined and considered in preparing local plan. These policies and practices provide the foundation for determining land use compatibility. Recommended Planning Policies and Practices are described below and summarized in Table 6-1.

1-1. Identify, Map, and Analyze Off-Base Areas Potentially Impacted by or Impacting Installation Operations

The documentation and analysis should identify potential land use compatibility impacts affecting the military installation's mission as well as surrounding political jurisdictions. The analysis would use available information, maps and studies where possible to determine impacted areas based on current operations and future mission capability. The available information could include ARS Title 28, AICUZ or ICUZ Studies, the Installation Operational Noise Management Program (IONMP), defined safety arcs, environmental reports (Environmental Assessment or Environmental Impact Statement) and established guidance (such as AICUZ guidance for safety zones and height restrictions). To the extent possible, it is desirable for jurisdictions surrounding an installation to have land use classification and mapping systems that are compatible among the jurisdictions.

**Table 6-1
RECOMMENDED PLANNING POLICIES AND PRACTICES**

Policy / Practice	Description	Advantages	Challenges	When to Use
Comprehensive Planning	Development and regular updating of local jurisdiction General Plans, Community Plans, Specific and Area Plans, and other long-range development plans.	Low cost; preventative; supports coordination between local jurisdictions and installations.	Not effective for addressing existing land use incompatibilities. Not effective if local jurisdictions and installations do not work together in development and revision of land use plans.	Each time a comprehensive plan is developed or updated.
Adopt JLUS or other Compatibility Plans or Policies	Incorporation of results of JLUS and other compatibility studies into local jurisdiction General Plans and other comprehensive planning documents.	Low cost; preventative; supports comprehensive planning and coordination between local jurisdictions and installations.	Only effective if local jurisdictions are pro-active in adopting JLUS recommendations, and initiate implementation of JLUS recommendations.	Adoption of JLUS or specified JLUS recommendations should occur following completion of a JLUS. Incorporation of JLUS (or specified JLUS recommendations) should occur each time a comprehensive plan is developed or updated.
Identify Impact Areas	Use of existing maps and studies to determine impacted areas off-base, based on current and future base operations.	Low cost; preventative; promotes comprehensive planning.	Ineffective without effective communication between installations and local jurisdictions.	Each time a comprehensive plan is developed or updated.
Map Impact Areas	Creation of a visual representation and land categorization system to identify incompatibility impacts.	Establishes consistent land use categorizations among communities; provides a visual understanding of how and where existing and planned base operations and designated land use plans/zones overlap.	Multiple land use compatibility impacts and areas may be extensive to map.	Each time a comprehensive plan for an installation or local jurisdiction is developed or updated.

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

CHAPTER 6: RECOMMENDED POLICIES AND PRACTICES

**Table 6-1
RECOMMENDED PLANNING POLICIES AND PRACTICES**

Policy / Practice	Description	Advantages	Challenges	When to Use
Urban Growth Boundaries (UGBs)	Delineation of developable areas within a local jurisdiction to control growth.	Establishes growth boundaries for local jurisdictions.	Growth pressures can result from creating UGBs, potentially resulting in incompatible uses.	When comprehensive plans are updated, and when an installation maximum mission is determined.
Future Planning to Identify Impacted Areas	Anticipation of future installation operations, and definition of potentially affected areas.	Supports comprehensive, long-term planning with local jurisdictions; provides greater flexibility to accommodate potential future operations on-base.	Difficulties in anticipating changes in levels of operations, aircraft or other equipment.	Developed as part of base comprehensive planning, and to be considered each time a local jurisdiction comprehensive plan is developed, amended or updated.
Bird Strike Study	Local jurisdictions conduct bird studies to minimize bird populations around runways.	Mitigation measures can be proposed to prevent increases in bird movements around airport runways.	Requires effective collaboration between local jurisdictions and installations.	When comprehensive plans are developed or updated, and when installation maximum missions are determined.
Coordinated Traffic & Transportation Policy	A coordinated approach to traffic and transportation planning that crosses jurisdictional boundaries.	Reduces impacts from military personnel and civilian commuters, minimizes impact to operations caused by traffic bordering installations.	Collaboration may require involvement of local, state and federal transportation agencies in addition to installations.	When comprehensive plans are developed or updated, and when major new development is proposed.

Issues to be investigated should include the following.

- A. Noise / Vibration
- B. Safety
- C. Height Restrictions (Obstructions)
- D. Electro-Magnetic Interference
- E. Light Pollution
- F. Dust and Smoke
- G. Radar Reflectivity
- H. Traffic / Transportation

Potentially Responsible Parties – Cities, Towns, and Counties; and Public Educational Districts

References – Arizona Military Regional Compatibility Project – Western Maricopa County / Luke Air Force Base and Davis-Monthan Air Force Base / Tucson / Pima County JLUS;

1-2. Identify, Map, and Analyze Existing and Planned Development in Off-Base Impacted Areas

Local jurisdictions in the vicinity of military installations should identify and map existing and planned land development and growth trends, compile existing plans, reports, and studies, and identify potential areas of incompatibility or conflict as well as acceptable and feasible uses of land within the accident potential, noise, and hazard zones surrounding an active military installation. It is desirable that the mapping and land categorization systems used by the local jurisdictions are compatible among the jurisdictions (see Item 1-1 above). The documentation and analysis should include the following elements.

- Areas of Potential Impact (see Item 1-1 above)
- Land uses by major category (residential, commercial-retail, industrial, institutional, etc.)
- Land Densities
- Population Trends
- Land Demand / Absorption Rates

Potentially Responsible Parties – Cities, Towns, and Counties; Public Educational Districts

References – Florida Department of Community Affairs – Summary for Land Use Compatibility Training; Minnesota Rule 8800.2400 – State Airport Zoning Standards; City of Yakima, Washington – Airport Safety Overlay District; Eastern Carolina JLUS; and 14 CFR (Federal Aviation Regulations) Part 150 – Airport Noise Compatibility Planning Program

1-3. Use of Existing Studies

Existing studies prepared for the military installation, including Air Installation Compatible Use Zone (AICUZ) and Installation Compatible Use Zone (ICUZ) studies may provide data that can be used to identify areas affected by installation operations. However, it is important for local and regional jurisdictions to note that these studies, including AICUZ / ICUZ and related studies, provide minimum levels of response and land use regulation, not maximum. Consequently, local political jurisdictions should adjust and adapt those standards and regulations to meet their specific land use situations rather than adopt standards that do not fully address their needs.

Potentially Responsible Parties – Cities, Towns, and Counties; Public Educational Districts, Military Installations

References – Flint Hills, Kansas JLUS; Arizona Military Regional Compatibility Project – Western Maricopa County / Luke Air Force Base and Davis-Monthan Air Force Base / Tucson / Pima County JLUS

1-4. Future Planning to Identify Areas Impacted by Installation Operations

In order to maintain long-term land use compatibility around an installation while also maintaining future operational capabilities for the installation, planning by the local jurisdictions should recognize that future changes at an installation, including change of mission, change in level of operations, or change in aircraft or type of equipment at the installation can increase the areas affected by installation operations.

Thus, the objective for future planning around installations should be to define the areas affected using data that will accommodate future changes. There are significant benefits if the military and local

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

CHAPTER 6: RECOMMENDED POLICIES AND PRACTICES

jurisdictions look ahead, local jurisdictions should engage the military in determining how best to accomplish this a specific installation. As an example of the type of information that can be used to support future planning to accommodate changes, the Davis-Monthan AFB JLUS used new “notional” noise contours to define areas that would be affected by high noise levels; the contours were based upon operations with a noisier aircraft than the A-10 currently stationed at Davis-Monthan, thereby providing for capability to better accommodate future changes at the installation.

Potentially Responsible Parties – Cities, Towns, and Counties; and Military Installations

References – McConnell Air Force Base Joint Land Use Study; Wright Patterson Air Force Base Airport Zoning Regulations; Arizona Military Regional Compatibility Project – Western Maricopa County / Luke Air Force Base and Davis-Monthan Air Force Base / Tucson / Pima County JLUS

1-5. Incorporation of Joint Land Use Studies (JLUS) or other Compatibility Plans into General Plans or Comprehensive Plans prepared by Adjacent Local Political Jurisdictions.

The results of JLUS (or other compatibility plans, such as the Airport Land Use Compatibility Plan required in California) reflect coordinated efforts by the military installation and adjacent political jurisdictions to study land use, compatibility issues, and a wide variety of other factors that are directly related to the operations and functions of both the jurisdictions and the installation. Consequently, these and similar studies should be incorporated into general and comprehensive plans, and periodic updates, that are prepared by the local jurisdictions.

An example of how the recommendations of a compatibility plan can be incorporated into a community’s General Plan is provided by the Fairfield, California General Plan, which includes a Travis Air Force Base Protection Element. This Element of the General Plan specifies Goals, Objectives, Policies and Programs to “Protect the mission and operation of Travis Air Force Base”, including:

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

CHAPTER 6: RECOMMENDED POLICIES AND PRACTICES

- Requiring that proposed land uses are consistent with the land use compatibility guidelines of the Airport Land Use Plan for Travis AFB adopted by the Solano County Airport Land Use Commission;
- Maintaining existing agricultural zoning around the base;
- Prohibiting new residential zoning or development of new schools on land subject to aircraft noise levels of 60 CNEL or greater⁹;
- Prohibiting new development in the Clear Zone as well as Accident Potential Zones (APZ) 1 and 2;
- Establishing a reserve of land to be set aside for the expansion of Travis AFB or a change in its mission;
- Establishing an ongoing communication mechanism between the City and Air Force on issues of mutual concern;

The full text of the Travis Air Force Base Protection Element can be found at:

<http://www.ci.fairfield.ca.us/GeneralPlan.htm>

Potentially Responsible Parties – Cities, Towns, and Counties; Public Educational Districts

References – Fairfield California, General Plan; Arizona Military Regional Compatibility Project – Western Maricopa County / Luke Air Force Base and Davis-Monthan Air Force Base / Tucson / Pima County JLUS; and State of California, Aeronautics Act, Section 21676; and Contra Costa County, California – Airport Land Use Compatibility Plan

1-6. Coordinated Urban Growth Boundaries

Incorporated political jurisdictions in the vicinity of military installations may enter into a cooperative and mutually binding agreement to establish areas around the installation with coordinated boundaries in which full build-out would be limited.

⁹ CNEL (Community Noise Equivalent Level), which is used in California, is generally equivalent to Ldn noise levels used in Arizona. Thus 60 CNEL is roughly the same as 60 Ldn.

Potentially Responsible Parties – Cities, Towns, and Counties

Reference – Oregon Department of Aviation, Airport Land Use Compatibility Guidebook

1-7. Coordinated Bird Strike Study

Incorporated political jurisdictions in the vicinity of military installations should enter into a cooperative agreement to establish areas around the installation with coordinated boundaries in which bird populations and behavior would be identified and studied, including species composition, feeding patterns, densities, food sources, habitat, watering, roosting, seasonal movements, and nesting locations, etc. Mitigation measures would be proposed to prevent increases in bird movements in and around the airport vicinity for feeding, watering, and roosting. Federal Aviation Administration (FAA) Advisory Circular AC 150/5200-33: Hazardous Wildlife Attractants on or Near Airports provides more information about hazards related to bird strikes.

Potentially Responsible Parties – Military Installations; Cities, Towns, and Counties

Reference – Oregon Department of Aviation, Airport Land Use Compatibility Guidebook

1-8. Coordinated Traffic / Transportation Policy for Areas Adjacent to Military Installations

Increases or other significant changes in daily traffic on streets and highways bordering military installations as well as public access to the installations (in terms of closing existing gates and constructing new gates that are Anti-Terrorism Force Protection compliant) have the potential of affecting military operations, military personnel / civilian commuting patterns, and property values in surrounding communities. These issues may be more effectively addressed through establishing a coordinated approach to traffic and transportation planning that crosses local jurisdictional boundaries.

Potentially Responsible Parties – Cities, Towns, and Counties and Military Installations

Reference – Ft. Bragg / Pope AFB JLUS

6.2 COORDINATION / PUBLIC PARTICIPATION POLICIES AND PRACTICES

Coordination / Public Participation Policies and Practices ensure that coordination is maintained among jurisdictions, installations and agencies responsible for land use compatibility and that appropriate public involvement is maintained. Recommend Coordination / Public Participation Policies and Practices are described below and summarized in Table 6-2.

2-1. Ongoing Coordinating Body for Implementation of Land Use Compatibility

Efficient and effective communication between the local jurisdictions, area landowners, the development community, other local organizations, and the military installation is critical to the successful implementation of land use compatibility. As a means of ensuring that this communication occurs, local jurisdictions and the military installation could consider the joint designation of an ongoing coordinating body to provide a means to maintain communication and coordination in implementing land use compatibility. This body could be an existing organization providing for the inclusion of representatives from area landowners and other local organizations that have an interest in compatible land use around the installation. This body could also serve as the interface with the Governor's Military Affairs Commission on installation-related issues. Among the techniques considered should be creation and use of a permanent web site dedicated to local coordination.

Potentially Responsible Parties – Local Political Jurisdictions; Military Installation; and area landowners, the development community and other local organizations

References – Davis-Monthan Air Force Base / Tucson / Pima County JLUS, Flint Hills, Kansas, JLUS; Florida Department of Community Affairs – Summary for Land Use Compatibility Training; Oregon Department of Aviation, Airport Land Use Compatibility Guidebook; Eastern Carolina JLUS; Puget Sound Regional Council – Air Transportation Planning Program

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

CHAPTER 6: RECOMMENDED POLICIES AND PRACTICES

**Table 6-2
RECOMMENDED COORDINATION / PUBLIC PARTICIPATION POLICIES AND PRACTICES**

Policy / Practice	Description	Advantages	Challenges	When to Use
Coordinating Body	Establish on-going, coordinating body to maintain communication/ coordination of compatibility policies and practices among local jurisdictions and installations, which sets up formal consultation between local jurisdictions and installations for land use and zoning actions.	Improves implementation and evaluation of land use compatibility policies and practices; mode of interface with Governor's Military Affairs Commission.	Ineffective unless all jurisdictions build consensus on land use and planning goals/ objectives for areas surrounding installations.	As part of comprehensive planning, following adoption of JLUS recommendations, along with all land use and zoning actions.
Installation Community Affairs Liaison	Designated Community Affairs Liaison interacts and coordinates with local jurisdictions.	Up-to-date materials concerning base's mission are communicated to local jurisdictions; installations communicate operations and maximum mission needs to local jurisdictions.	Difficulties in information disclosure due to security concerns; difficulties in anticipating changing base operations.	As part of ongoing JLUS implementation and coordination with local communities.
Improved Communications	Use of web site, publications, press releases concerning military activities that may impact local jurisdictions.	Local jurisdictions can make informed decisions while updating comprehensive plans, general plans.	Difficulties in information disclosure due to security concerns; difficulties in anticipating changing base operations.	As part of comprehensive planning and or installation Community Affairs liaison operations.
Consultation for Comprehensive Planning	Consultation and comment opportunities set up for local jurisdictions and installations regarding local jurisdiction land use plans and zoning actions.	Supports comprehensive planning; supports ability to accommodate future changes at installation.	May lengthen comprehensive planning processes.	As part of comprehensive planning, with all major development projects and land use and zoning actions.

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

CHAPTER 6: RECOMMENDED POLICIES AND PRACTICES

**Table 6-2
RECOMMENDED COORDINATION / PUBLIC PARTICIPATION POLICIES AND PRACTICES**

Policy / Practice	Description	Advantages	Challenges	When to Use
Support for State Trust Land Reform	Support/enact legislative reform to enable State Lands Department to engage in land exchanges, transfer densities and uses; support collaborative planning between State Lands Department and military.	Provides State Lands Department additional flexibility in land management; supports long-term, cooperative planning.	Requires legislative action and/or a vote of the electorate to modify the State Constitution.	On-going; current ballot initiative.
Coordination with Federal Agencies	A coordinated approach to land use planning for federal lands involving coordination with the military and local jurisdictions.	Supports long-term, cooperative planning and maximum mission.	Current federal land use policy does not give local jurisdictions or the military formal opportunity to review development permits.	As part of comprehensive planning for federal lands, and with all major projects and federal land boundary changes.
Monitoring the Military Training Route (MTR) Notification Process	Local jurisdictions monitor effectiveness of MTR notification process, to ensure purchasers of property under the MTRs are informed of MTRs and potential exposure to effects of aircraft operations at low elevations.	MTR notification is already in place; improved disclosure educates property owners and minimizes complaints.	Potential opposition from real estate community.	On-going as part of notification and disclosure activities.
Support for Changes in County Authority to Control Lot Splits	Support/enact legislative reform to allow counties to exercise the same degree of control over lot splits in the vicinity of a military installation as they would over subdivisions as defined in State Statute.	Improved jurisdictional control over lot splits in locations adjacent to military installations; improved comprehensive, long-term planning.	Amendment of State Statutes would be required.	On-going; with reform of State Statutes.

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

CHAPTER 6: RECOMMENDED POLICIES AND PRACTICES

2-2. Improved Communications Between Military Installations and Local Jurisdictions

Efficient and effective communications from the military installation with local, regional, and State jurisdictions and agencies, including updated and expanded web site content, newsletters, announcements, press releases, a staffed community affairs office, etc., concerning current and foreseeable military activities that may affect the surrounding communities are critical to the successful implementation of land use compatibility programs.

Potentially Responsible Party – Military Installations

References – Flint Hills, Kansas, JLUS; and Eastern Carolina JLUS

2.3. Designated Community Affairs Liaison at the Military Installation

Land use encroachment and compatibility issues in communities adjacent to military installations have assumed roles of great importance in the present and future missions of the installations. Consequently, consideration of a designated Community Affairs liaison to coordinate and interact with counterparts in adjacent local political jurisdictions would be a means to ensure that the base's needs and mission are considered in the land use and development decisions and general plans prepared and implemented by the jurisdictions. The liaison would work closely with the base's Civil Engineer and Community Planner and with the Public Works and Planning Departments of adjacent political jurisdictions. In addition, the liaison could work with the installation's Public Affairs Officer to maintain and distribute the most up-to-date materials concerning the base's mission and its far-reaching economic effects on the surrounding areas.

Potentially Responsible Party – Military Installations

References – Arizona Military Regional Compatibility Project, Davis / Monthan AFB JLUS

2-4. Land Use Compatibility Consultation with Local Political Jurisdictions

Establish procedures that would require local and regional political jurisdictions to include military installations in the review and comment process for land use and zoning actions that may affect land use compatibility with respect to the installation. These actions would include but not be limited to jurisdiction-wide plans, district plans, small area plans and park-recreation-open space plans. Property development plans for residential, commercial-retail, industrial, and other types of development; street-roadway location or re-alignment; zoning and re-zoning; location of new schools, school expansions, and other noise- and safety-sensitive public and private institutions; and changes to the General Plan and future updates should all be reviewed and commented on by local military installations.

Potentially Responsible Parties – Cities, Towns, and Counties; Public Educational Districts; Private Educational Institutions; Other Institutions; and Military Installations

References – Flint Hills, Kansas, JLUS and Ft. Bragg / Pope AFB JLUS

2-5. Coordination with Local Jurisdictions on Installation Mission and Operational Changes

Through a coordination process prior to implementation of mission and operational changes that may affect existing, proposed and future surrounding land use and development, military installations are likely to significantly increase effective communications and avoid the creation of unnecessary land use and development conflicts. Examples of such change would be the relocation of a firing range or an additional flying mission at an installation.

Potentially Responsible Party – Military Installations

Reference – Ft. Bragg / Pope AFB JLUS

2-6. Support for State Trust Land Reform

The ability for the State Trust to engage in land exchanges and the ability to transfer densities and land

uses between various State Trust lands is potentially an important element for achieving compatibility in the development of State Trust lands in the vicinity of military installations. Although the most recent attempt to provide this important tool through a constitutional amendment was defeated in the November 2004 election, an initiative measure to reform the management of State Trust Lands has been proposed for the November 2006 ballot. If passed, this would amend the State's constitution to implement the proposed reforms. The United States Congress would also need to amend the state's Enabling Act, allowing Arizona to fully implement the reform improvements.

As any future mechanism would also likely require legislative action and / or a vote of the electorate to modify the State Constitution, the local jurisdictions around military installations and other interested organizations should actively support efforts to develop and adopt changes that would allow management of State Trust Lands to engage in land exchanges and transfer densities for their holdings in the vicinity of military installations.

Potentially Responsible Parties – Cities, Towns, and Counties

References – Arizona Military Regional Compatibility Project – Davis-Monthan Air Force Base / Tucson / Pima County JLUS; and Luke Air Force Base Auxiliary Field #1 and Barry M. Goldwater Range JLUS.

2-7. Coordination with Federal Agencies' Land Management Plans and Policies

Federal lands in the vicinity of military installations are managed by various federal agencies including the Bureau of Land Management (BLM), U.S. Fish and Wildlife Service (USFWS), and Bureau of Reclamation (BOR). The uses permitted under these agencies' land management plans and policies affect the compatibility of these lands with the installations' operations.

While many of the uses permitted would be generally compatible, there are some aspects of certain uses that would be potentially incompatible. For example, a large 24-hour mining operation with lights could create potential incompatibility with nighttime operations at an installation. In addition, certain kinds of recreation,

such as campgrounds and off highway vehicle (OHV) use, could be incompatible in close proximity to an installation. Local jurisdictions should maintain close coordination with federal agencies managing land in the vicinity of an installation to ensure that the agencies' plans and policies provide for compatible use. Military installations also may wish to consider such coordination.

Potentially Responsible Parties –Military installations and Federal agencies with land management responsibilities in the vicinity of military installations.

Reference – Arizona Military Regional Compatibility Project – Luke Air Force Base Auxiliary Field #1 and Barry M. Goldwater Range JLUS.

2-8. Monitoring the Military Training Route (MTR) Notification Process

Because the Military Training Routes (MTRs) are critical for many of the state's installations, it is in the interests of the installations as well as the jurisdictions in the vicinity of the installations and those where MTRs are located, that the notification process for property under the MTRs mandated by State legislation be effective. The affected jurisdictions should monitor the effectiveness of the notification process to ensure that it accomplishes the intent of making purchasers of property under the MTRs aware of the potential exposure to effects of aircraft operations at low elevations.

Potentially Responsible Parties –Cities, towns, and counties affected by use of the MTRs.

Reference – Arizona Military Regional Compatibility Project – Luke Air Force Base Auxiliary Field #1 and Barry M. Goldwater Range JLUS.

2-9. Support for Changes in County Authority to Control Lot Splits

Under existing State Statutes, counties in Arizona have relatively limited ability to control lot splits. With the continuing demand for a rural or "exurban" lifestyle in the state, the development of residential parcels through lot splits in locations adjacent to military installations creates potential problems of compatibility.

Jurisdictions in the vicinity of military installations should support legislation to allow counties to exercise the same degree of control over lot splits in the vicinity of a military installation as they would over subdivisions as defined in State Statute.

Potentially Responsible Parties –Cities, towns, and counties in the vicinity of military installations.

6.3 NOTIFICATION POLICIES AND PRACTICES

Notification Policies and Practices ensure that those in the vicinity of military operations are adequately notified of potential effects. While notification alone does not result in compatible land use, it can improve community understanding and acceptance of an installation and its mission. Recommended Notification Policies and Practices are described below and summarized in Table 6-3.

3-1. Enhanced Local Notification and Disclosure by Local Communities

The Governor’s Military Facilities Task Force recommended that the notification and disclosure provisions under the current Arizona Revised Statutes be strengthened, including a recommendation that the Arizona Department of Real Estate develop a “rule” to strengthen and standardize the notification process for its licensees. Also, some jurisdictions have adopted additional notification and disclosure requirements.

- The City of Surprise has adopted a requirement that a copy of the City’s “Surprise / Luke Notification Map” be posted in all real estate and model home sales offices in the City. The Map contains a notice that all homes within the City of Surprise are subject to aircraft overflights from Luke Air Force Base and shows the noise contours for the Base.
- Both the City of Yuma and Yuma County require disclosure statements for property located within restricted airspace. This disclosure is recorded with the deed to acknowledge on behalf of the grantor and its successors that a property is within the restricted airspace.

**Table 6-3
RECOMMENDED NOTIFICATION POLICIES AND PRACTICES**

Policy / Practice	Description	Advantages	Challenges	When to Use
Notification Mapping	Posting of maps in real estate and lease offices, model home complexes and other public locations that show safety hazard zones, noise contours for aircraft, and off-base areas that are subject to aircraft overflights.	Improved disclosure educates residents and minimizes complaints.	Potential opposition from real estate community.	Local jurisdictions must adopt as a requirement, as part of comprehensive planning.
Disclosure Statements	Recording of disclosure statements with property deeds to acknowledge properties are subject to aircraft overflights, and may be located within restricted or other special airspace.	Improved disclosure educates residents and minimizes complaints.	Potential opposition from real estate community.	Local jurisdictions must adopt as a requirement, as part of comprehensive planning.

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

CHAPTER 6: RECOMMENDED POLICIES AND PRACTICES

- Maricopa County also has adopted requirements for notification to future home owners regarding military aircraft operations, including posting various forms of notification in model home sales offices, notification on plats and public reports, and disclosure in Covenants, Conditions & Restrictions (CC&Rs) for housing developments.

Increasingly, communities have determined that there is value to their citizens in going beyond the minimum public notification and disclosure standards outlined in State law. Some of the additional mechanisms to enhance public notification and disclosure include:

- Requiring notices and maps to be posted in real estate sales and leasing offices, including identification of noise contours.
- Requiring notices placed in model home complexes and sales offices advising potential buyers that the area is subject to military aircraft over-flight during weekdays and at times during the night.
- Installing over-flight signage at roadway intersections within the main noise contours (65 dnl, 70 dnl, 75 dnl, etc.).
- Monitoring the effectiveness of aviation disclosure statements and easements.

Experience has shown that notification is highly effective in educating nearby residents about the presence of military activities and in minimizing complaints.

Potentially Responsible Parties – Cities, Towns, and Counties

References – Arizona Military Regional Compatibility Project – Western Maricopa County / Luke Air Force Base and Davis-Monthan Air Force Base / Tucson / Pima County JLUS; Oregon Department of Aviation, Airport Land Use Compatibility Guidebook; Denver Regional Council of Governments – Airport Compatible Land Use Design Handbook; Eastern Carolina JLUS; and California Airport Land Use Planning Handbook

6.4 REGULATION POLICIES AND PRACTICES

Regulation Policies and Practices are intended to achieve land use compatibility through adoption of regulatory mechanisms, and are critical in ensuring that future development is compatible with an installation and its operations. Recommended Regulation Policies and Practices are described below and summarized in Table 6-4.

4-1. Regulation of Cell Towers, Wind Farms, Radio Antennae, and Other Tall Structures

Define the characteristics of telecommunications / cell towers, wind farms, radio antennae, and other tall structures that may affect aircraft safety including their location, height, density, etc. and create appropriate regulations vis-à-vis land use compatibility with respect to the mission and functioning of the military installation.

Potentially Responsible Parties – Cities, Towns, and Counties

References – Flint Hills, Kansas, JLUS; Ft. Bragg / Pope AFB JLUS; Texas Department of Transportation, Division of Aviation – Airport Compatibility Guidelines, Height Hazard Zoning; Oregon Department of Aviation – Airport Land Use Compatibility Guidebook; and Minnesota Rule 8800.1200 Air Navigation Obstructions and Rule 8800.2400 – State Airport Zoning Standards

4-2. Limits on Expansion of Public Infrastructure in High Risk Areas

One method that supports compatible land use is to limit the availability of public infrastructure, particularly water, sewer, and roads, that would serve high-risk areas in the vicinity of military installations. This planning process could include regulations that prohibit “leap-frog” type development and require Capital Improvement Planning and Programming to determine the full range of benefits and costs associated with providing infrastructure to unserved areas.

Potentially Responsible Parties – Cities, Towns, and Counties

**Table 6-4
RECOMMENDED REGULATION POLICIES AND PRACTICES**

Policy / Practice	Description	Advantages	Challenges	When to Use
Height Restrictions	Creation of appropriate regulations regarding characteristics of cell towers, wind farms, radio antennae, other tall structures (on & off-base).	Reduces hazards; supports maximum mission.	Only effective in preventing new height obstructions; many not be effective in dealing with tree or terrain obstructions; regulations could interfere with local jurisdiction land use plans; requires effective communication between local jurisdictions and installations.	Installations and local jurisdictions must adopt regulations as part of comprehensive planning.
Limit Public Infrastructure	Regulation of development and designated high-risk areas where the availability of public infrastructure is limited or excluded.	Reduces hazards and incompatible land uses; supports maximum mission.	Regulations could interfere with local jurisdiction land use plans; requires effective communication between local jurisdictions and installations.	Local jurisdictions must adopt as a requirement, as part of comprehensive planning.
Low Density Residential Development in High Risk Areas	Control of residential development, to limit density to low, (housing one unit between five and ten acres) in high risk areas.	Reduces hazards; supports maximum mission.	Regulations could interfere with local jurisdiction land use plans; requires effective communication between local jurisdictions and installations.	Local jurisdictions must adopt as a requirement, as part of comprehensive planning.
Regulate Light Pollution	Definition of light sensitive areas around installations and limit new public and private lighting projects/project components.	Reduces hazards; supports maximum mission.	Ineffective in addressing existing lighting incompatibilities; regulations could interfere with local jurisdiction land use plans.	Local jurisdictions must adopt in coordination with installations as a requirement, as part of comprehensive planning.

**Table 6-4
RECOMMENDED REGULATION POLICIES AND PRACTICES**

Policy / Practice	Description	Advantages	Challenges	When to Use
Airport Safety/ Compatibility Overlay Zone	Limitation of development in defined critical noise and safety areas.	Reduces hazards and incompatible land uses; support maximum mission; underlying zone remains unchanged.	Regulations could interfere with local jurisdiction land use plans; ineffective without effective communication between installations and local jurisdictions.	Local jurisdictions must adopt in coordination with installations as part of comprehensive planning.
Airport/Hazard Zoning or Development Ordinance	Creation of separate zoning districts for airports and determination of outright and conditionally permitted uses and development densities for these areas.	Creates more distinct area of influence for an airport; more precisely controls land use than an overlay zone and better defines specific compatible land uses.	Changes the zoning; effectiveness requires collaborative planning.	Local jurisdictions must adopt in coordination with installations as part of comprehensive planning.
Clustered Residential Development	Design density and layout of residential development relative to hazards and safety zones.	Reduces hazards; support maximum mission.	Regulations could interfere with local jurisdiction land use plans.	As part of comprehensive planning, with all land use and zoning actions, off-base.
Graduated Density Concept	Phased development density from lower near high noise or accident potential zones to higher further from these zones.	Limits encroachment; reduces hazards; supports maximum mission.	Regulations could interfere with local jurisdiction land use plans; ineffective unless all jurisdictions build consensus on land use and planning goals/objectives for areas surrounding installations.	Local jurisdictions must adopt policy with development, or update of a comprehensive plan.

References – Florida Department of Community Affairs – Summary for Land Use Compatibility Training; Ft. Bragg / Pope AFB JLUS; Eastern Carolina JLUS; Oregon Department of Aviation, Airport Land Use Compatibility Guidebook; and Texas Department of Transportation, Division of Aviation – Airport Compatibility Guidelines, Height Hazard Zoning

4-3. Low-Density Residential Development (five- to ten-acre minimum lot size) in High Risk Areas

Local political jurisdictions would limit residential development to low-density housing of one unit to between five and ten acres within high-risk areas in the vicinity of military installations.

Potentially Responsible Parties – Cities, Towns, and Counties

Reference – Ft. Bragg / Pope AFB JLUS; Contra Costa County, California – Airport Land Use Compatibility Plan

4-4. Regulation of Light Pollution in the Night Skies

Local political jurisdictions would define critical areas in the vicinity of military installations and limit new public and private lighting to downlighting or shielded lighting to prevent the spread of light pollution, off-site glare, and light trespass that interfere with night training missions.

Potentially Responsible Parties – Cities, Towns, and Counties

References – Coconino County, Arizona, Zoning Ordinance – Lighting; Cochise County, Arizona, Light Pollution Code; Ft. Bragg / Pope AFB JLUS; and Eastern Carolina JLUS

4-5. Development of an Airport Safety / Compatibility Overlay Zone

Local political jurisdictions would define critical areas in the vicinity of installations with respect to noise and safety as a Safety Overlay District and limit new public and private development to reduce the highest involuntary risks incurred by the general public and to

increase safety and land use compatibility within the Overlay District.

Potentially Responsible Parties – Cities, Towns, and Counties

References – City of Yakima, Washington – Airport Safety Overlay District; City of Bismarck, South Dakota – Airport Noise Overlay Zoning District; Loudon County, Virginia – Airport Impact Overlay District; Puget Sound Council of Governments – Model Airport Overlay Zone Ordinance; Oregon Department of Aviation – Airport Land Use Compatibility Guidebook; Sumter City-County (SC) Zoning and Development Standards Ordinance; and Texas Department of Transportation, Division of Aviation – Airport Compatibility Guidelines, Height Hazard Zoning

4-6. **Airport / Hazard Zoning or Development Ordinance**¹⁰

Local political jurisdictions would define airport land development issues in the vicinity of military installations and identify the area needed or used for installation operations, areas needed for anticipated growth or mission change, and areas that would impact or would be impacted by military operations, etc., and determine outright and conditionally permitted uses and development densities for those areas in a new Airport / Hazard Zoning or Development District. Land development issues to be addressed in such an ordinance may include airborne releases of substances that impair visibility, light emissions that interfere with pilot vision, activities that attract birds or waterfowl, and structures located within aircraft approach or departure surfaces.

Potentially Responsible Parties – Cities, Towns, and Counties

References – Oregon Department of Aviation, Airport Land Use Compatibility Guidebook; Denver Regional Council of Governments – Airport Compatible Land Use Design Handbook; and Texas Department of

¹⁰ Note that some sources used the term *Airport Zoning* and others the term *Hazard Zoning* but the textural materials specified the same context and conditions, therefore they are listed under the same heading.

Transportation, Division of Aviation – Airport
Compatibility Guidelines, Height Hazard Zoning

4-7. Clustered Residential Development

Local political jurisdictions would identify areas in which, owing to high-risk associated with various safety zones in the vicinity of Air Force bases, residential development would be concentrated through application of urban and site design principles on a portion of the area and the remaining property would remain undeveloped.

Potentially Responsible Parties – Cities, Towns, and Counties

References – California Airport Land Use Planning Handbook; Flint Hills, Kansas, JLUS; and Oregon Department of Aviation, Airport Land Use Compatibility Guidebook

4-8. Graduated Density Concept

The Graduated Density Concept was developed by Luke Air Force Base to address development outside the "high noise or accident potential zone" as defined in A.R.S. § 28-8461. The rationale for the Graduated Density Concept is described by the base's Community Initiatives Team as follows:

Although the "high noise or accident potential zone" is the area with the greater risk of an aircraft incident, the area within 10 miles of the base also carries a significant level of risk. As a consequence, lesser densities of people surrounding the "high noise or accident potential zone" are more consistent with Luke Air Force Base's current and future operations than high densities. To this end, Luke Air Force Base encourages cities to reduce, to the greatest extent possible, residential concentrations within 10 miles of the base.

Recognizing that each political subdivision faces unique circumstances and obstacles that prevent the most aggressive implementation of low density residential within 10 miles of the base, Luke Air Force Base developed a concept of graduated development away from the 65 Ldn.

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

CHAPTER 6: RECOMMENDED POLICIES AND PRACTICES

This Graduated Density Concept proposes, in the absence of a more restrictive state, county or municipal general or comprehensive plan, graduating densities away from the 65 Ldn as follows: a maximum of 2 dwelling units (du) per acre (ac) from the 65 Ldn to ½ mile, a maximum of 4 du / ac from ½ mile to 1 mile, a maximum of 6 du / ac from 1 to 3 miles, and graduated densities beyond 3 miles that include open spaces, light industrial / commercial and rural uses throughout the area defined by State Statute A.R.S. § 28-8461 as "territory in the vicinity of a military airport".

The Graduated Density Concept also has potential to limit encroachment in other situations, with modifications to meet specific local needs. For example, the Barry M. Goldwater Range (BMGR) / Gila Bend AFAF Joint Land Use Study, recommended a Graduated Density Concept for a defined 3-mile wide "zone of influence". This would allow increased density of development as distance from the Range's land boundary increases, generally providing that:

- Within 0-1 mile from BMGR land boundary existing zoning be maintained and no new residential development permitted (other than allowed by existing zoning),
- Within 1-3 miles from BMGR land boundary, graduated densities to be determined by the local jurisdiction would be allowed so that at the furthest extent of the zone of influence, allowable densities are similar to those allowed in adjacent areas outside the zone of influence.

Potentially Responsible Parties – Cities, Towns, and Counties

References – Barry M. Goldwater Range / Gila Bend Air Force Auxiliary Field JLUS

6.5 ACQUISITION POLICIES AND PRACTICES

Acquisition Policies and Practices, which achieve land use compatibility through acquisition of property typically require expenditure of public funds are therefore are most frequently used when other means to achieve compatible land use are not

effective. Recommend Acquisition Policies and Practices are described below and summarized in Table 6-5.

5-1. Department of Defense Acquisition

In recent years, through the efforts of local jurisdictions and organizations in the vicinity of Luke AFB along with the Arizona Congressional delegation, money has been provided in the Department of Defense budget for acquisition of critical parcels to protect Luke's mission from encroachment. Local jurisdictions around other military installations along with other interested groups would work with the State's Congressional delegation to obtain appropriations in the Department of Defense budget dedicated to the purchase of critical parcels to protect the installation from encroachment.

Potentially Responsible Parties – Cities, Towns, and Counties; Arizona Congressional delegation; Department of Defense; and other interested organizations

Reference – Arizona Military Regional Compatibility Project – Davis-Monthan Air Force Base / Tucson / Pima County JLUS and Barry M. Goldwater Range / Gila Bend AFAF JLUS

5-2. Use of Local Financing Tools

Cities, towns and counties could consider using local financing tools for purchasing land in critical areas. Depending upon the intended use for the property to be acquired, and whether there is private participation in the proposed land use, other financing methods may include use of municipal property corporations, general obligation bonds, revenue bonds, and improvement district bonds. It should be noted that there are restrictions on all of these methods depending on participation and use of the property.

As an example of the potential for use of local financing tools, Pima County included authorization for up to \$10 million for purchase of land to prevent encroachment around Davis-Monthan AFB, in a multipurpose countywide general obligation bond issue that was approved by the County's voters in 2004.

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

CHAPTER 6: RECOMMENDED POLICIES AND PRACTICES

**Table 6-5
RECOMMENDED ACQUISITION POLICIES AND PRACTICES**

Policy / Practice	Description	Advantages	Challenges	When to Use
Department of Defense Acquisition	Local jurisdictions lobby for appropriations in Department of Defense budget with which to purchase of critical parcels.	Reduces hazards and incompatible land uses; supports maximum mission.	Requires support of Congressional Delegation; landowner may be unwilling to sell; takes land off tax roles; limited funding available for this initiative; effectiveness requires collaborative planning.	Following identification of critical areas and encroachment issues, either through completion of a JLUS or other compatibility study.
Local Financing Tools - Acquisition	Local jurisdictions purchase land in critical areas using local financing tools, including municipal property corporations, general obligation bonds, revenue and improvement district bonds.	Reduces hazards and incompatible land uses; supports maximum mission.	Landowner may be unwilling to sell; potential legal opposition; takes land off tax roles; effectiveness requires collaborative planning between local jurisdictions and installations.	Following identification of critical areas and encroachment issues, either through completion of a JLUS or other compatibility study.
Federal Airport Improvement Funds (AIP) - Acquisition	Local jurisdictions apply for grants through the AIP with which to purchase land in critical areas.	Reduces hazards and incompatible land uses; supports maximum mission and the sustainability of the civilian airport.	Useful only in cases where an airport has joint military and civilian use; Landowner participation may be involuntary; potential legal opposition; takes land off tax roles.	Following identification of critical areas and encroachment issues, either through completion of a JLUS or other compatibility study.
State Tax Credits - Acquisition	Local jurisdictions work with the State Legislature to establish State regulations that create tax credits or deductions to encourage property owners to sell their property or development rights in critical areas.	Landowner participation is voluntary; reduces hazards and incompatible land uses; supports maximum mission.	Tax incentives may not be great enough to support an effective program.	Following identification of critical areas and encroachment issues, either through completion of a JLUS or other compatibility study.

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

CHAPTER 6: RECOMMENDED POLICIES AND PRACTICES

**Table 6-5
RECOMMENDED ACQUISITION POLICIES AND PRACTICES**

Policy / Practice	Description	Advantages	Challenges	When to Use
Gifts and Donations	Local jurisdictions use tax incentives to encourage land owners in critical areas to donate property or development rights.	Landowner participation is voluntary; reduces hazards and incompatible land uses; supports maximum mission.	Tax incentives may not be great enough to support an effective program.	Following identification of critical areas and encroachment issues, either through completion of a JLUS or other compatibility study.
Department of Defense Cooperative Agreements with Other Entities	Secretary of a Military Department may enter into cooperative agreements with another entity (i.e. states, local jurisdictions, conservation organizations) to address environmental and encroachment issues; and accept property or interest acquired pursuant to such agreements on behalf of the federal government.	In most cases the “other entity” manages acquired land; DOD surplus real property may be conveyed to states or other entities for natural resource conservation.	Limited funding available for this initiative; two-year lead time for agreements; requires willing landowners; potential legal opposition; takes land off tax roles if acquired by fee.	Following identification of critical areas and encroachment issues, either through completion of a JLUS or other compatibility study.
Land and Water Conservation Fund (LWCF)	The State applies for LWCF matching grants to purchase critical land for state and local parks and recreation uses.	reduces hazards and incompatible land uses; may also promote open space/ conservation efforts; supports maximum mission.	Limited funding available for this initiative; funds must be used to match state or local monies; requires willing landowner; takes land off tax roles.	Following identification of critical areas and encroachment issues, either through completion of a JLUS or other compatibility study.
Military Installation Fund (MIF)	Local jurisdictions apply for MIF grant money administered by the State to purchase critical parcels or other activities to preserve or expand military operations.	May be used to support acquisition of land or development rights, as well as for other activities that would support compatible use.	Limited funding available for this initiative; landowner may be unwilling to sell; potential legal opposition; may take land off tax role if acquired by fee for public use.	Following identification of critical areas and encroachment issues, either through completion of a JLUS or other compatibility study.

**Table 6-5
RECOMMENDED ACQUISITION POLICIES AND PRACTICES**

Policy / Practice	Description	Advantages	Challenges	When to Use
Purchase of Development Rights	Public agency purchases development rights for fair market value through negotiation with property owners	Land owners continue to manage land; participation by landowner is voluntary; effective often where the issue of compatibility involves density of development rather than type of land use proposed.	Dependent on securing funds through one of the other acquisition programs identified above; applicable in very limited situations; not suitable for large areas; may result in substantial reduction in tax value.	Following securing of funds through an acquisition program.
Transfer of Development Rights (TDR)	Local jurisdictions compensate land owners for reducing intensity or density of land by having permitted uses of other land expanded or intensified.	Not costly for jurisdictions; land owners continue to manage land; participation by landowner is voluntary. effective often where the issue of compatibility involves density of development rather than type of land use proposed.	Program success is dependent on creation of effective incentives, which may be difficult to create and maintain; may not alter existing incompatible uses; difficulties in identifying willing landowners in both the sending and receiving zones.	Following identification of critical areas and encroachment issues, either through completion of a JLUS or other compatibility study.
Partnerships with Non-Governmental Organizations (NGOs)	NGOs acquire development rights for critical lands and dedicate them to compatible uses, or transfer lands to public ownership for conservation/open space uses.	Land owners may continue to manage land in some cases; especially effective for high hazard and noise zones; promotes open space conservation efforts.	Requires willing landowner; Program success is dependent on creation of effective incentives; which may be difficult to create and maintain.	Following identification of critical areas and encroachment issues, either through completion of a JLUS or other compatibility study.

In certain cases, communities that pursue land purchase may save money by using the Greater Arizona Development Authority (GADA). GADA is empowered by state statute to sell bonds at a lower interest rate by subsidizing the costs of issuance. Participation in the GADA program requires that there be an estimate of the total cost of the land to be purchased and a determination that GADA has enough capacity to loan.

Potentially Responsible Parties – Cities, Towns and Counties (and the Greater Arizona Development Authority for use of GADA bonds)

References – ARS § 41-1554, Title 20: Commerce, Banking, and Insurance – Chapter 8. Greater Arizona Development Authority; also Denver Regional Council of Governments – Airport Compatible Land Use Design Handbook; Eastern Carolina JLUS; Oregon Department of Aviation – Airport Land Use Compatibility Guidebook; and Texas Department of Transportation, Division of Aviation – Airport Compatibility Guidelines, Height Hazard Zoning

5-3. Property Acquisition with Federal Airport Improvement Program Funds

In cases where an airport has joint military and civilian use, local political jurisdictions should identify areas and projects eligible for federal funding under the Airport Improvement Program (AIP) in terms of land acquisition necessary for airport development or noise compatibility purposes.

Potentially Responsible Parties – Cities, Towns, and Counties

Reference – Denver Regional Council of Governments – Airport Compatible Land Use Design Handbook

5-4. State Tax Credits

Local political jurisdictions should work with elected State representatives to establish State regulations that would create tax credits or deductions to encourage property owners of land in high-noise and risk areas in the vicinity of military installations to voluntarily sell their property or development rights.

Potentially Responsible Parties – Cities, Towns, and Counties and the State Legislature

Reference – Ft. Bragg / Pope AFB JLUS

5-5. Acquisition by Gift or Donation

A city, town or county could accept title to land or development rights from landowners who desired to give or donate land or development rights within the areas affected by installation operations. The gift or donation could provide a tax benefit for the owner, and the local jurisdictions could facilitate such actions on the part of interested landowners.

Potentially Responsible Parties – Cities, Towns, and Counties; and interested landowners

References – Arizona Military Regional Compatibility Project – Western Maricopa County / Luke Air Force Base and Davis-Monthan Air Force Base / Tucson / Pima County JLUS

5-6. Department of Defense Cooperative Agreements with Other Entities

The Department of Defense (DOD) is implementing a program that allows the Secretary of a Military Department (i.e. Army, Navy or Air Force) to enter into cooperative agreements with other entities (States, political subdivisions, or conservation organizations) in order to address environmental and encroachment issues around military installations. These agreements may provide for fee-simple land purchases, acquisition of development rights, conservation easements and other means in accordance with applicable laws. Section 2811 of the National Defense Authorization Act for fiscal year 2003 (P.L. 107-314) provided new statutory authority that permits the Department of Defense to enter into agreements with eligible entities to address encroachment and other constraints on military training and operations, and to accept on behalf of the United States Government any property or interest acquired pursuant to such agreements.

In general terms, the new authority includes the following elements.

- Eligible entities are States, political subdivisions or private conservation organizations.
- The amendment provides for the acquisition by an eligible entity of all right, title, interest in

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

CHAPTER 6: RECOMMENDED POLICIES AND PRACTICES

and to any real property, and sharing by the Government and the entity in acquisition costs. The amendment also requires the entity, upon request of the DOD, to transfer to the Government the minimum property or interests necessary to avoid encroachment from the use or management of the property.

- Department of Defense funds may be used for such agreements for purchase from willing sellers. It is important to note that the amendment does not provide specific funding for these purchases. The Department of Defense will determine if, and how much funding will be available for this initiative.

The amendment also permits Department of Defense to convey surplus real property to states or other eligible entities for conservation of natural resources. Each of the Military Departments is responsible for developing specific program guidance.

The Department of the Army is implementing the authority provided by Section 2811 through the use of Army Compatible Use Buffers (ACUBs). An important element of the ACUB program is that it allows Army funds to be used for the acquisition of property or development rights by a partner without the Army taking a real property or management interest in the land. In most cases, the partner and not the Army would manage the buffer property.

The Navy has also implemented cooperative agreements for encroachment management under their Encroachment Management Program. Examples include acquisition of easements adjacent to the La Posta Mine Warfare Testing Range in California with the State and Nature Conservancy and a cooperative program with Florida Forever and Santa Rosa County at Whiting Field.

Under this measure, a city, town or county would work with the military installation and the appropriate Military Department to acquire interests in land in appropriate locations within the vicinity of the installation, and would likely work with conservation organizations as well, with respect to acquisition and management of the land.

Potentially Responsible Parties – Cities, Towns and Counties; Military Installations; Department of Defense; and conservation organizations

Reference – Headquarters Department of the Army, Army Land and Training Land Strategy.

5-7. Land Acquisition through the Land and Water Conservation Fund

The Land and Water Conservation Fund (LWCF) was established by Congress in 1964 to create parks and open spaces, protect wilderness, wetlands, and refuges, preserve wildlife habitat, and enhance recreational opportunities. The LWCF has a matching grants program that provides funds to states for planning, developing and acquiring land and water areas for state and local parks and recreation areas. These funds could be used to match state or local monies to purchase critical parcels of land.

Potentially Responsible Parties – Federal, State and local governments

References – Oregon Department of Aviation, Airport Land Use Compatibility Guidebook; and Arizona Military Regional Compatibility Project – Western Maricopa County / Luke Air Force Base and Davis-Monthan Air Force Base / Tucson / Pima County JLUS

5-8. Land Acquisition through the Military Installation Fund

The Military Installation Fund (MIF), as established under ARS §41.1512.01, is administered by the State and funded by dedicated revenue at the State level. The MIF will provide grants to local governments for land acquisition or other activities to preserve or expand military installations. Under this program, a city, town or county could apply for the use of MIF funding to support acquisition of land or development rights in critical areas (most likely in combination with other funding), or for other activities that would support compatible land use.

Potentially Responsible Parties – Cities, Towns and Counties, and State of Arizona

References – Arizona Revised Statutes §41.1512.01; Military Installation Fund; Arizona Military Regional Compatibility Project – Western Maricopa County /

Luke Air Force Base and Davis-Monthan Air Force
Base / Tucson / Pima County JLUS

5-9. Purchase of Development Rights

An alternative to the purchase of land is the purchase of development rights that would be negotiated with the owner of the development rights. Participation in the purchase of development rights would be voluntary on the part of the owner. This type of acquisition may be effective in appropriate situations and areas, particularly where the issue of compatibility involves density of development rather than the type of land use proposed. When development rights are purchased, a landowner is paid fair market value for the rights that are purchased. The value of the purchased rights is roughly equal to the value of the land without any special restriction less the value of the land with the land use restrictions. The use of this strategy would be dependent on securing funding for the purchase through one of the other practices identified in this memorandum.

Potentially Responsible Parties – Federal government, State government, and local political jurisdictions

References – Flint Hills, Kansas, JLUS; and Arizona Military Regional Compatibility Project – Western Maricopa County / Luke Air Force Base and Davis-Monthan Air Force Base / Tucson / Pima County JLUS

5-10. Transfer of Development Rights

The use of Transfer of Development Rights (TDRs) can reduce the intensity and density of use in areas identified as important for preserving an installation's mission while increasing density in other areas by encouraging local political jurisdictions to create incentives for developers to use the density transfer technique in appropriate situations and areas affected by installation operations. The transfer of development rights is similar to the purchase of development rights, except rather than a public agency buying development rights, which are then in effect "retired," the landowner is compensated by having the permitted uses of other land expanded or intensified. The land to which the rights are transferred may be owned either by the landowner, or by someone else. In addition, for counties under recently passed legislation, the sending and

receiving land must be within the County's jurisdiction. In the latter case, compensation is paid to the "sending" landowner by the "receiving" landowner. Participation in TDR programs would be voluntary on the part of the landowner(s). Under the TDR scenario, the use of land currently zoned for lower intensity use outside the affected areas could be modified to allow higher density development while at the same time the use of land in the affected areas currently zoned to permit higher density development would be restricted to lower density use.

Potentially Responsible Parties – Cities, Towns and Counties; and participating private landowners

References – Oregon Department of Aviation, Airport Land Use Compatibility Guidebook; and Arizona Military Regional Compatibility Project – Western Maricopa County / Luke Air Force Base and Davis-Monthan Air Force Base / Tucson / Pima County JLUS

5-11. Partnerships with Non-Governmental Organizations to Facilitate Transfers of Development Rights

Governmental or non-governmental entities, such as the Trust for Public Land (TPL), may acquire development rights for land adjacent to a military installation, especially for land in the high hazard and noise zones, and dedicating it to uses compatible with military missions or to transferring those lands to public ownership for conservation or open space uses. TPL also has a program to assist communities in pursuing a preservation ballot initiative, providing services that include political analysis and campaign strategy.

Potentially Responsible Parties – Local jurisdictions and TPL or other non-governmental organizations

References – Arizona Military Regional Compatibility Project – Western Maricopa County / Luke Air Force Base and Davis-Monthan Air Force Base / Tucson / Pima County JLUS

6.6 MISCELLANEOUS POLICIES AND PRACTICES

Miscellaneous Policies and Practices assist in achieving land use compatibility but are not included in one of the other five

categories. Recommend Miscellaneous Policies and Practices are described below and summarized in Table 6-6

6-1. Ongoing Evaluation of Best Practice Techniques

A process to assess the usefulness of various techniques used by other political jurisdictions with similar military air base encroachment issues is an effective means to ensure that the “best practices” are being identified and properly implemented to guide development around military installations.

This evaluation of “best practice” techniques will need to determine their potential to be adapted to the needs of various political jurisdictions in the State, and the State will continue its role as convener and clearinghouse in these efforts. The local jurisdictions and military installations can contribute to this process by participating in data collection with respect to the performance of “best practices” in their situations.

Potentially Responsible Parties – State government, local jurisdictions, military installations and other stakeholder groups

References – Arizona Military Regional Compatibility Project – Western Maricopa County / Luke Air Force Base and Davis-Monthan Air Force Base / Tucson / Pima County JLUS

6-2. Provision of Noise Barriers

Noise barriers may be useful in shielding noise-sensitive areas from intensive levels of noise generated during ground operations such as aircraft engine run-up testing at the ends of the runways or noise generated by military vehicles. These barriers may be of combinations of several types, including berms, masonry walls, and vegetation, depending on factors such as the specific type of noise, location of noise sensitive uses, and the topography of the area. Noise barriers may be constructed on the military installation, or may be constructed on adjacent land by landowners or developers. Local jurisdictions may consider requiring noise shielding as part of the local development process, particularly for large-scale planned developments.

**Table 6-6
RECOMMENDED MISCELLANEOUS POLICIES AND PRACTICES**

Policy / Practice	Description	Advantages	Challenges	When to Use
Best Practice Techniques	Continuous assessment of usefulness of all compatibility techniques, practices and policies.	Ensures the “best practices” are being identified and properly implemented.	Successful results require effective sharing of information between federal, state, and local jurisdiction agencies, NGOs, and installations.	As part of comprehensive planning.
Noise Barriers	Use of noise barriers (i.e. walls, berms, vegetation, window replacements) to shield noise sensitive areas from aircraft or other intense noise generating sources on the ground.	<p>May be constructed on an installation or adjacent lands - by landowners, developers or the military.</p> <p>May be effective in dealing with existing noise issues as well as preventative for new development.</p>	Potential high costs; often not a long-term solution; does not reduce noise from aircraft overflight or takeoffs.	<p>As part of new major development projects, comprehensive planning, and following completion of JLUS or noise-specific technical study.</p> <p>Where residential development is being proposed near sites where engine run-ups are conducted.</p>

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

CHAPTER 6: RECOMMENDED POLICIES AND PRACTICES

Potentially Responsible Parties – Military
Installations; Landowners and Developers; Local
Jurisdictions

References – Oregon Department of Aviation, Airport
Land Use Compatibility Guidebook

APPENDIX A. SUMMARY OF ARIZONA LAND USE COMPATIBILITY LEGISLATION

To view the full text of the Arizona Revised Statutes (ARS) discussed below visit the Arizona State Legislature's web site at:

<http://www.azleg.state.az.us/ArizonaRevisedStatutes.asp>

1.0 TITLE 9

Title 9 of the ARS contains legislation governing cities and towns; the cited sections are especially concerned with municipal planning issues.

ARS §9-461.05. This section stipulates that the general plan prepared by municipalities within the territory in the vicinity of a military airport or ancillary military facility have a land use element that includes consideration of military airport or ancillary military facility operations.

ARS §9-461.06. This section requires that the governing body shall consult with, advise, and provide an opportunity for official comment by the military airport if the municipality has territory in the vicinity of a military airport or ancillary military facility as defined in ARS section 28-8461.

ARS §9-462.04. This section requires that in proceedings involving rezoning of land that is located within the territory in the vicinity of a military airport or ancillary military facility the municipality shall send copies of the notice of public hearing by first class mail to the military airport.

If the matter to be considered applies to territory in a high noise or accident potential zone as defined in section 28-8461, the notice prescribed in this section shall include a general statement that the matter applies to property located in the high noise or accident potential zone

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

**APPENDIX A: SUMMARY OF ARIZONA LAND USE COMPATIBILITY
LEGISLATION**

In municipalities with territory in the vicinity of a military airport, the governing body shall hold a public hearing if, after notice is transmitted to the military airport and before the public hearing, the military airport provides comments or analysis concerning the compatibility of the proposed rezoning with the high-noise or accident potential generated by military airport or ancillary military facility operations that may have an adverse impact on public health and safety, and the governing body shall consider and analyze the comments or analysis before making a final determination.

2.0 TITLE 11

Title 11 of the ARS contains legislation governing counties; the cited sections are especially concerned with county planning and zoning.

ARS §11-806. The section requires that counties with territory in the vicinity of a military airport or ancillary military facility must prepare a comprehensive plan that considers the operation of the military airport and allows the military airport the opportunity to consult with, advise, review, and comment on the plan.

ARS §11-829. In proceedings involving rezoning of land that is located within territory in the vicinity of a military airport or ancillary military facility the commission shall send copies of the notice of public hearing to the military airport. In counties with territory in the vicinity of a military airport or ancillary military facility the board is required to hold a public hearing if the military airport provides comments or analysis concerning the compatibility of the proposed rezoning with the high-noise or accident potential generated by military airport operations the board shall consider and analyze the comments or analysis before making a final determination.

3.0 TITLE 15

Title 15 of the ARS contains legislation governing education; the cited sections are especially concerned with financing school development.

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

**APPENDIX A: SUMMARY OF ARIZONA LAND USE COMPATIBILITY
LEGISLATION**

ARS §15-2002. The executive director of the school facilities board is required to establish procedures in compliance with the official notice and hearing requirements that, with respect to monies to fund the construction of new school facilities proposed to be located in the territory in the vicinity of a military airport or ancillary military facility the military airport receive notification of the application for funding at least thirty days before any hearing.

ARS §15-2041. The section requires that, with respect to monies to fund the construction of new school facilities proposed to be located in the territory in the vicinity of a military airport or ancillary military facility the board shall consider and analyze the comments or analysis from military airport before making a decision.

4.0 TITLE 28

Title 28 of the ARS contains legislation governing transportation; the cited sections are especially concerned with airport zoning regulations and joint powers airport authorities.

ARS §28-8461. This section is concerned with a number of definitions that directly relate to military airport operations. It defines Accident Potential Zone 1 and Accident Potential Zone 2, Clear Zone, high-noise or accident potential zones, military airport, ancillary military facility, territory in the vicinity of a military airport or ancillary military facility, etc.

ARS §28-8480. This section allows political subdivisions to acquire or lease land or interests in land for the continued operation of a military airport or ancillary military facility.

ARS §28-8481. This section requires a political subdivision that has territory in the vicinity of a military airport or ancillary military facility to adopt comprehensive and general plans for property in the hazard zone to assure development compatible with the high-noise and accident potential generated by military airport operations, which includes noise reduction standards for specific land uses within noise zones of 65 Ldn or higher.

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

**APPENDIX A: SUMMARY OF ARIZONA LAND USE COMPATIBILITY
LEGISLATION**

Political subdivisions that have property in a high-noise or accident potential zone cannot grant zoning variances without a specific finding that the purpose of military airport compatibility is preserved.

A political subdivision that has territory in a high-noise or accident potential zone is required to notify the owner or owners of property in that zone of any additions or changes to the general plan, comprehensive plan, zoning regulations applicable to property in those zones. The political subdivision shall provide a notice of such additions or changes including a statement that the property is located in a high-noise or accident potential zone. Each political subdivision that has territory that includes property in a high-noise or accident potential zone is required to file with the attorney general a report that demonstrates compliance during the previous reporting period.

ARS §28-8482. This section requires political subdivisions in the vicinity of a military airport or ancillary military facility to incorporate sound attenuation standards in their building codes.

ARS §28-8483. The State Real Estate Department and political subdivisions that have territory in the vicinity of a military airport are required to request from the military airport a registry of certain information concerning flight operations and contact persons; this registry shall be available to the public on request.

ARS §28-8484. Any public report applicable to property located within territory in the vicinity of a military airport is required to include the statements that: the property is located within territory in the vicinity of a military airport; the maps of military flight operations provided by the military airport are available to the public on request. Each military airport may provide the State Real Estate Department and each political subdivision with territory in the vicinity of the military airport with a map that shows the boundaries of each territory in the vicinity of a military airport and the boundaries of each high-noise or accident potential zone.

ARS §28-8485. This section allows the state or a governing body of a political subdivision that operates

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

**APPENDIX A: SUMMARY OF ARIZONA LAND USE COMPATIBILITY
LEGISLATION**

an airport to designate an airport influence area of all property that is exposed to aircraft noise and overflights and has a 65 Ldn noise level or higher. If such an airport influence area is established it shall be recorded with the appropriate county recorder so as to be sufficient to notify owners or potential buyers of property that the area is currently subject to aircraft noise and overflights.

ARS §28-8486. This section defines the terms, public airport and territory in the vicinity of a public airport and directs the State Real Estate Department to make available to the public a map showing the boundaries of each territory in the vicinity of a public airport.

ARS §28-8521. This section allows two or more political jurisdictions to enter into an agreement establishing a joint powers airport authority in connection with the closing of a military facility.

ARS §28-8521. This section defines a joint powers airport authority.

ARS §28-8523. The procedures for an annual operating budget for a joint powers airport authority are established in this section.

ARS §28-8524. This section establishes procedures for a joint powers airport authority to allocate funds, hold public hearings, adopt a development plan and a capital improvement plan, etc.

ARS §28-8526. The procedures for a joint powers airport authority to admit additional members established in this section.

ARS §28-8527. The official procedures for a joint powers airport authority to operate established in this section.

ARS §28-8528. If a joint powers airport authority is established under the statute, the President of the Senate and the Speaker of the House of Representatives shall establish a joint legislative military airport reuse committee and stipulates its membership and duties.

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

**APPENDIX A: SUMMARY OF ARIZONA LAND USE COMPATIBILITY
LEGISLATION**

5.0 TITLE 32

Title 32 of the ARS contains legislation governing professions and occupations; the cited sections are especially concerned with real estate transactions and land development.

ARS §32-2113. This section establishes requirements for disclosure applicable to property that is located within territory in the vicinity of a military airport or ancillary military facility: “This property is located within territory in the vicinity of a military airport or ancillary military facility and may be subject to increased noise and accident potential.”

ARS §32-2181. This section establishes notification requirements of intentions to subdivide lands and requires a statement as to whether all or any portion of the property is located within territory in the vicinity of a military airport, ancillary military facility or public airport, or a high-noise or accident potential zone.

ARS §32-2181.01. Permits the commissioner to exempt certain land subdivisions or fractional interests from one or more of the stipulations of the statute.

ARS §32-2181.02. Defines the exempt land transactions.

ARS §32-2181.03. Defines the requirements of a lot reservation.

ARS §32-2183. If any of the lots, parcels, or fractional interests within a subdivision are located within territory in the vicinity of a military airport, ancillary military facility or under a military training route, the report shall include the statements required pursuant to applicable Arizona law and, if the department has been provided a map prepared pursuant to applicable Arizona law, the report shall include a copy of the map.

ARS §32-2195. This section requires the commissioner to be notified of the intent to offer unsubdivided lots or parcels for sale or lease; that notice shall include a statement as to whether the property is located within territory in the vicinity of a military airport or ancillary military facility or within territory in the vicinity of a public airport, or a high-noise and accident potential zone.

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

**APPENDIX A: SUMMARY OF ARIZONA LAND USE COMPATIBILITY
LEGISLATION**

ARS §32-2195.03. Establishes the requirements for the commissioner to issue a report on unsubdivided lands and determines that if the unsubdivided land is located within territory in the vicinity of a military airport or ancillary military facility such a statement shall be included as shall be a map showing its location within the vicinity of a military airport.

6.0 TITLE 33

Title 33 of the ARS contains legislation related to property; the cited section is concerned with disclosure for certain land divisions in unincorporated areas of a county.

ARS §33-422. This section requires that A seller of five or fewer parcels of land, other than subdivided land, in an unincorporated area of a county and any subsequent seller of such a parcel shall furnish a written affidavit of disclosure to the buyer including disclosure of whether or not the parcel is within the clear zone, high noise zone or accident potential zone of a military airport or ancillary military facility, or is located under restricted military airspace.

7.0 TITLE 41

Title 41 of the ARS contains legislation regulating state government; the cited sections are especially concerned with the establishment of the Military Affairs Commission and Military Installation Fund, along with the duties of the State Department of Commerce with respect to military facilities.

ARS §41-1512. This section establishes the Military Affairs Commission, prescribes the Commission's membership and defines the Commission's duties.

ARS §41-1512.01. This section establishes the Military Installation Fund and defines basic procedures for its operations and the purposes for which monies from the fund can be awarded.

ARS §41-1512.02. This section establishes the appropriations from the General Fund for the Military Installation Fund.

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

**APPENDIX A: SUMMARY OF ARIZONA LAND USE COMPATIBILITY
LEGISLATION**

ARS §41-1531. This section determines the procedures to establish military reuse zones at closed military facilities.

ARS §41-1532. This section establishes the conditions for tax incentives with respect to activities in a military reuse zone.

ARS §41-1533. This section defines the duties of the State Department of Commerce with respect to military reuse zones.

8.0 TITLE 48

Title 48 of the ARS contains legislation regulating special taxing districts; the cited sections are especially concerned with agriculture preservation districts and military airports.

ARS §48-5702. This section establishes and defines an agriculture preservation district; requires these districts to take actions that are consistent with the continued use and operation of military airports.

ARS §48-5703. The procedures for the operation of an agriculture preservation district determined in this section and the district location with respect to an existing military airport or decommissioned military airport are defined.

APPENDIX B.

COMPARISON OF LAND USE COMPATIBILITY GUIDANCE

Although the land use compatibility guidance under ARS §28-8481 of the Arizona Revised Statutes and under the Department of Defense Air Installation Compatible Use Zone (AICUZ) program share the common objective of achieving compatible land use and also take a similar approach to establishing compatible use zones and defining appropriate uses within the zones, there are also important differences in specific regulations or guidance among them.

The following sections compare the noise and safety land use criteria under ARS §28-8481 and AICUZ Guidance.

ARS §28-8481 and the AICUZ Program are based on differing sets of variables, in that they do not address the same hazard zones and they organize noise zones a different manner. For example, ARS §28-8481 does not recognize, identify, or define a Clear Zone as defined by the Department of Defense, nor does it regulate uses in that zone. ARS §28-8481 defines a much larger area as constituting APZ-II. An additional noise zone, 85+ decibels, is included in ARS §28-8481 that is not identified in the AICUZ Program.

There are 64 land use categories defined in ARS §28-8481 and 75 land use categories defined in the AICUZ Program. However not all of those categories are the same nor are they entirely consistent when compared to each other. Certain uses allowed in the AICUZ Guidance are not permitted under Arizona law; conversely, some uses not allowed in the AICUZ Guidance are allowed under Arizona law. Another point of difference is that specific land use categories addressed in the AICUZ Program are not addressed in ARS §28-8481. For example, Schools and Public Assembly uses are not defined in ARS §28-8481.

The AICUZ guidelines list wholesale trade, retail sale of building materials and automobiles, business services, repair services as compatible uses in APZ I and APZ II, and also lists a variety of service uses, amusements, recreation, and single-family residential up to two dwelling units per acre as compatible uses in APZ II. The AICUZ guidelines (Table 3-1) also list most types of retail trade and services as compatible within noise zones 65 Ldn through 79 Ldn. Single-family

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

APPENDIX B: COMPARISON OF LAND USE COMPATIBILITY GUIDANCE

residential, schools, churches, hospitals, and retail-food uses are listed as compatible in noise categories 65 to 74 decibels. Public assembly uses are listed as compatible in the 65-69 Ldn category.

Table 3-1: Compatibility of Uses – AICUZ Program

Selected Land Uses	Clear Zone	APZ I	APZ II	65-69 Ldn	70-74 Ldn	75-80 Ldn	80+ Ldn
Single-Family Residential	N	N	Y ¹¹	Y	Y	N	N
Schools	N	N	N	Y	Y	N	N
Churches	N	N	N	Y	Y	N	N
Hospitals	N	N	N	Y	Y	N	N
Public Assembly	N	N	N	Y	N	N	N
Outdoor Amphitheaters	N	N	N	N	N	N	N
Retail-Food	N	N	Y	Y	Y	Y	N

• Source: Prepared by Parsons from U.S. Air Force data.

In ARS §28-8481, indoor recreation, and several types of commercial-retail trade, wholesale trade, retail sale of building materials and government services are permitted within APZ II and noise zones 65 Ldn through 79 Ldn (Table 3-2). Outdoor amphitheaters and music shells, retail sale of general merchandise, retail apparel, water-based recreation, eating and drinking, and retail-food uses are permitted within noise zones 65 Ldn through 79 Ldn. Churches, medical and health services, auditoriums and concert halls, and other public and quasi-public services are permitted within noise zones 65 Ldn through 74 Ldn.

¹¹Suggested maximum density of 1-2 dwelling units per acre.

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

APPENDIX B: COMPARISON OF LAND USE COMPATIBILITY GUIDANCE

Table 3-2: Compatibility of Uses – ARS §28-8481

Selected Land Uses	APZ I	APZ II	65-69 Ldn	70-74 Ldn	75-79 Ldn	80-84 Ldn	85+ Ldn
Single-Family Residential	N	N ¹²	N ³	N ³	N	N	N
Schools ¹³	N	N	N	N	N	N	N
Churches	N	N	Y	Y	N	N	N
Hospitals	N	N	Y	Y	N	N	N
Public Assembly ¹⁴	N	N	N	N	N	N	N
Outdoor Amphitheaters	N	N	Y ¹⁵	Y ⁶	Y ⁶	N	N
Retail-Food	N	N ³	Y	Y	Y	N	N

• Source: Prepared by Parsons from ARS §28-8481 data.

Although ARS §28-8481 does not consider single-family residential uses compatible in any of the hazard or noise zones (Table 3-2), it is silent about uses in the Clear Zone, since the law does not define such a zone.

¹²The use is allowed in the AICUZ Guidance but is not permitted under Arizona law.

¹³Schools as a specific land use category are not addressed in ARS §28-8481; the data provided above are for the category: Other Public and Quasi-Public Services.

¹⁴Public Assembly as a specific land use category is not addressed and it is not defined in ARS §28-8481; the data provided above are for the category: Other Public and Quasi-Public Services.

¹⁵The use is allowed under Arizona law, but not under the AICUZ Program.

APPENDIX C. GLOSSARY OF ACRONYMS

A

AB – Assembly Bill

ACC – Air Combat Command

ADC – Approach-Departure Corridor

ADOC – Arizona Department of Commerce

ADOT – Arizona Department of Transportation

AEP – Airport Environs Plan

AEZ – Airport Environs Zone

AFSOC – Air Force Special Operation Command

AGL – Above Ground Level

AHD – Airport Hazard District

AICUZ – Air Installation Compatible Use Zone

AMARC – Aerospace Maintenance and Regeneration Center

APZ – Accident Potential Zone

ARS – Arizona Revised Statutes

B

BMGR – Barry M. Goldwater Range

BRAC – Base Realignment and Closure

C

CSAR – Combat Search and Rescue

CUZ – Compatible Use Zone

CZ – Clear Zone

D

dB – Decibel

dBA – A-weighted Decibel

E

EPA – Environmental Protection Agency

ECP – Encroachment Control Program

ESRI – Environmental Systems Research Institute

F

FAA – Federal Aviation Administration

G

GADA – Greater Arizona Development Authority

GIS – Geographic Information System

I

ICAO – International Civil Aviation Organization

INM – Integrated Noise Model

J

JLUS – Joint Land Use Study

L

Ldn – Day-Night Average Sound Level

LUC – Land Use Code

LWCF – Land and Water Conservation Fund

M

MCZ – Military Clear Zone

MIF – Military Installation Fund

MTR – Military Training Route

N

NCD – Noise Control District

NLR – Noise Level Reduction

P

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

APPENDIX C: GLOSSARY OF ACRONYMS

PUD – Planned Unit Development

R

RASP – Regional Aviation Systems Plan

RCMP – Range Complex Management Plan

REVA – Range Environmental Vulnerability Assessment

S

SAC – Strategic Air Command

SLT – Simulated Laser Target

T

TDR – Transfer of Development Rights

TPL – Trust for Public Land

TREIS – Training Range Encroachment Information System

U

USAFB – United States Air Force Base

V

VFR – Visual Flight Rules

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**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

APPENDIX D: REFERENCES

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**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

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**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

APPENDIX D: REFERENCES

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**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

APPENDIX D: REFERENCES

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**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

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APPENDIX E. SUMMARY OF RECOMMENDED POLICIES AND PRACTICES

Policy / Practice	Description	When to Use	Potentially Responsible Parties	References	
				Policy Guidebook	Other Resources/ Case Examples ¹
Planning Policies & Practices					
Comprehensive Planning	Development and regular updating of local jurisdiction General Plans, Community Plans, Specific and Area Plans, and other long-range development plans.	Each time a comprehensive plan is developed or updated.	Cities, Towns, and Counties	Page 6-2	Fairfield California, General Plan; Luke Air Force Base and Davis-Monthan Air Force Base / Tucson / Pima County JLUS; City of Goodyear General Plan
Adopt JLUS or other Compatibility Plans or Policies	Incorporation of results of JLUS and other compatibility studies into local jurisdiction General Plans and other comprehensive planning documents.	Adoption of JLUS or specified JLUS recommendations should occur following completion of a JLUS. Incorporation of JLUS (or specified JLUS recommendations) should occur each time a comprehensive plan is developed or updated.	Cities, Towns, and Counties; Public Educational Districts	Page 6-7	Fairfield California, General Plan; Arizona Military Regional Compatibility Project – Western Maricopa County / Luke Air Force Base and Davis-Monthan Air Force Base / Tucson / Pima County JLUS; State of California, Aeronautics Act, Section 21676; Contra Costa County, California – Airport Land Use Compatibility Plan

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

APPENDIX E: SUMMARY OF RECOMMENDED POLICIES AND PRACTICES

Policy / Practice	Description	When to Use	Potentially Responsible Parties	References	
				Policy Guidebook	Other Resources/ Case Examples ¹
Identify Impact Areas	Use of existing maps and studies to determine impacted areas off-base, based on current and future base operations.	Each time a comprehensive plan is developed or updated.	Cities, Towns, and Counties; and Public Educational Districts	Page 6-2, 6-3	Arizona Military Regional Compatibility Project – Western Maricopa County / Luke Air Force Base and Davis-Monthan Air Force Base / Tucson / Pima County JLUS
Map Impact Areas	Creation of a visual representation and land categorization system to identify incompatibility impacts.	Each time a comprehensive plan for a local jurisdiction is developed or updated.	Cities, Towns, and Counties; and Public Educational Districts	Page 6-2, 6-3	Arizona Military Regional Compatibility Project – Western Maricopa County / Luke Air Force Base and Davis-Monthan Air Force Base / Tucson / Pima County JLUS
Urban Growth Boundaries (UGBs)	Delineation of developable areas within a local jurisdiction to control growth.	When comprehensive plans are updated, and when an installation maximum mission is determined.	Cities, Towns, and Counties	Page 6-8	Oregon Department of Aviation Airport Land Use Compatibility Guidebook
Future Planning to Identify Impacted Areas	Anticipation of future installation operations, and definition of potentially affected areas.	To be considered each time a local jurisdiction comprehensive plan is developed, amended or updated.	Cities, Towns, and Counties	Page 6-6	McConnell Air Force Base Joint Land Use Study; Wright Patterson Air Force Base Airport Zoning Regulations; Arizona Military Regional Compatibility Project – Western Maricopa County / Luke Air Force Base and Davis-Monthan Air Force Base / Tucson / Pima County JLUS

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

APPENDIX E: SUMMARY OF RECOMMENDED POLICIES AND PRACTICES

Policy / Practice	Description	When to Use	Potentially Responsible Parties	References	
				Policy Guidebook	Other Resources/ Case Examples ¹
Bird Strike Study	Local jurisdictions conduct bird studies to minimize bird populations around runways.	When comprehensive plans are developed or updated, and when installation maximum missions are determined.	Military Installations; Cities, Towns, and Counties	Page 6-9	Oregon Department of Aviation Airport Land Use Compatibility Guidebook
Coordinated Traffic & Transportation Policy	A coordinated approach to traffic and transportation planning that crosses jurisdictional boundaries.	When comprehensive plans are developed or updated, and when major new development is proposed.	Cities, Towns, and Counties and Military Installations	Page 6-9	Ft. Bragg / Pope AFB JLUS
Coordination/Public Participation Policies and Practices					
Coordinating Body	Establish on-going, coordinating body to maintain communication/coordination of compatibility policies and practices among local jurisdictions and installations, which sets up formal consultation between local jurisdictions and installations for land use and zoning actions.	As part of comprehensive planning, following adoption of JLUS recommendations, along with all land use and zoning actions.	Local Political Jurisdictions; Military Installation; and area landowners, the development community and other local organizations	Page 6-10	Flint Hills, Kansas, JLUS; Florida Department of Community Affairs – Summary for Land Use Compatibility Training; Oregon Department of Aviation Airport Land Use Compatibility Guidebook; Eastern Carolina JLUS; Puget Sound Regional Council – Air Transportation Planning Program; Contra Costa County, California – Airport Land Use Compatibility Plan; and 14 CFR Part 150 – Airport Noise Compatibility Planning Program

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

APPENDIX E: SUMMARY OF RECOMMENDED POLICIES AND PRACTICES

Policy / Practice	Description	When to Use	Potentially Responsible Parties	References	
				Policy Guidebook	Other Resources/ Case Examples ¹
Installation Community Affairs liaison	Designated Community Affairs liaison interacts and coordinates with local jurisdictions.	As part of ongoing JLUS implementation and coordination with local communities.	Military Installations	Page 6-13	Arizona Military Regional Compatibility Project, Davis / Monthan AFB JLUS
Improved Communications	Use of web site, publications, press releases concerning military activities that may impact local jurisdictions.	As part of comprehensive planning and or installation Community Affairs liaison operations.	Military Installations	Page 6-13	Flint Hills, Kansas, JLUS; Eastern Carolina JLUS
Consultation for Comprehensive Planning	Formal consultation and comment opportunities set up for local jurisdictions and installations regarding local jurisdiction land use plans and zoning actions.	As part of comprehensive planning, with all major development projects and land use and zoning actions.	Cities, Towns, and Counties; Public Educational Districts; Private Educational Institutions; Other Institutions; and Military Installations.	Page 6-14	Flint Hills, Kansas, JLUS Ft. Bragg / Pope AFB JLUS

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

APPENDIX E: SUMMARY OF RECOMMENDED POLICIES AND PRACTICES

Policy / Practice	Description	When to Use	Potentially Responsible Parties	References	
				Policy Guidebook	Other Resources/ Case Examples ¹
Support for State Trust Land Reform	Enact legislative reform to enable State Lands Department to engage in land exchanges, transfer densities and uses; support collaborative planning between State Lands Department, military and local jurisdictions.	On-going; current ballot initiative.	Cities, Towns, and Counties; State Lands Department	Page 6-14	Arizona Military Regional Compatibility Project – Davis-Monthan Air Force Base / Tucson / Pima County JLUS; Luke Air Force Base Auxiliary Field #1 and Barry M. Goldwater Range JLUS.
Coordination with Federal Agencies' Land Management Plans and Policies	A coordinated approach to land use planning for federal lands involving coordination between the federal agencies and local jurisdictions.	As part of comprehensive planning for federal lands, and with all major projects and federal land boundary changes.	Local Jurisdictions and Federal agencies with land management responsibilities (namely the BLM; Forest Service; Parks Service; BOR; USFWS) in the vicinity of military installations.	Page 6-15	Arizona Military Regional Compatibility Project – Luke Air Force Base Auxiliary Field #1 and Barry M. Goldwater Range JLUS.

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

APPENDIX E: SUMMARY OF RECOMMENDED POLICIES AND PRACTICES

Policy / Practice	Description	When to Use	Potentially Responsible Parties	References	
				Policy Guidebook	Other Resources/ Case Examples ¹
Monitoring the Military Training Route (MTR) Notification Process	Local jurisdictions monitor effectiveness of MTR notification process, to ensure purchasers of property under the MTRs are informed of MTRs and potential exposure to effects of aircraft operations at low elevations.	On-going as part of notification and disclosure activities.	Cities, towns, counties affected by use of the MTRs.	Page 6-16	Arizona Military Regional Compatibility Project – Luke Air Force Base Auxiliary Field #1 and Barry M. Goldwater Range JLUS.
Support for Changes in County Authority to Control Lot Splits	Support/enact legislative reform to allow counties to exercise the same degree of control over lot splits in the vicinity of a military installation as they would over subdivisions as defined in State Statute.	On-going; with reform of State Statutes.	Cities, towns, and counties in the vicinity of military installations.	Page 6-16	Arizona Military Regional Compatibility Project – Western Maricopa County / Luke Air Force Base and Davis-Monthan Air Force Base / Tucson / Pima County JLUS; Luke Air Force Base Auxiliary Field #1 and Barry M. Goldwater Range JLUS.

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

APPENDIX E: SUMMARY OF RECOMMENDED POLICIES AND PRACTICES

Policy / Practice	Description	When to Use	Potentially Responsible Parties	References	
				Policy Guidebook	Other Resources/ Case Examples ¹
Notification Policies and Practices					
Notification Mapping	Posting of maps in real estate and lease offices, model home complexes and other public locations that show safety hazard zones, noise contours for aircraft, and off-base areas that are subject to aircraft overflights.	Local jurisdictions must adopt as a requirement, as part of comprehensive planning.	Cities, Towns, and Counties	Page 6-17	<p>Arizona Military Regional Compatibility Project – Western Maricopa County / Luke Air Force Base and Davis-Monthan Air Force Base / Tucson / Pima County JLUS; Oregon Department of Aviation Airport Land Use Compatibility Guidebook;</p> <p>Denver Regional Council of Governments – Airport Compatible Land Use Design Handbook;</p> <p>Eastern Carolina JLUS;</p> <p>California Airport Land Use Planning Handbook;</p> <p>14 CFR Part 150 – Airport Noise Compatibility Planning Program</p>

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

APPENDIX E: SUMMARY OF RECOMMENDED POLICIES AND PRACTICES

Policy / Practice	Description	When to Use	Potentially Responsible Parties	References	
				Policy Guidebook	Other Resources/ Case Examples ¹
Disclosure Statements	Recording of disclosure statements with property deeds to acknowledge properties are subject to aircraft overflights, and may be located within restricted or other special airspace.	Local jurisdictions must adopt as a requirement, as part of comprehensive planning.	Cities, Towns, and Counties	Page 6-17	Arizona Military Regional Compatibility Project – Western Maricopa County / Luke Air Force Base and Davis-Monthan Air Force Base / Tucson / Pima County JLUS; Oregon Department of Aviation Airport Land Use Compatibility Guidebook; Denver Regional Council of Governments – Airport Compatible Land Use Design Handbook; Eastern Carolina JLUS; California Airport Land Use Planning Handbook; 14 CFR Part 150 – Airport Noise Compatibility Planning Program

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

APPENDIX E: SUMMARY OF RECOMMENDED POLICIES AND PRACTICES

Policy / Practice	Description	When to Use	Potentially Responsible Parties	References	
				Policy Guidebook	Other Resources/ Case Examples ¹
Regulation Policies and Practices					
Height Restrictions	Creation of appropriate regulations regarding characteristics of cell towers, wind farms, radio antennae, other tall structures (on & off-base).	Installations and local jurisdictions must adopt regulations as part of comprehensive planning.	Cities, Towns, and Counties	Page 6-20	<p>Flint Hills, Kansas, JLUS; Ft. Bragg / Pope AFB JLUS;</p> <p>Texas Department of Transportation, Division of Aviation – Airport Compatibility Guidelines, Height Hazard Zoning;</p> <p>Oregon Department of Aviation Airport Land Use Compatibility Guidebook;</p> <p>Minnesota Rule 8800.1200 Air Navigation Obstructions and Rule 8800.2400 – State Airport Zoning Standards</p>

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

APPENDIX E: SUMMARY OF RECOMMENDED POLICIES AND PRACTICES

Policy / Practice	Description	When to Use	Potentially Responsible Parties	References	
				Policy Guidebook	Other Resources/ Case Examples ¹
Limit Public Infrastructure	Regulation of development and designated high-risk areas where the availability of public infrastructure is limited or excluded.	Local jurisdictions must adopt as a requirement, as part of comprehensive planning.	Cities, Towns, and Counties	Page 6-20	Florida Department of Community Affairs – Summary for Land Use Compatibility Training; Ft. Bragg / Pope AFB JLUS; Eastern Carolina JLUS; Oregon Department of Aviation Airport Land Use Compatibility Guidebook; Texas Department of Transportation, Division of Aviation – Airport Compatibility Guidelines, Height Hazard Zoning
Low-Density Residential Development in High Risk Areas	Control of residential development, to limit density to low, (housing one unit between five and ten acres) in high risk areas.	Local jurisdictions must adopt as a requirement, as part of comprehensive planning.	Cities, Towns, and Counties	Page 6-23	Ft. Bragg / Pope AFB JLUS; Contra Costa County, California – Airport Land Use Compatibility Plan
Regulate Light Pollution	Definition of light sensitive areas around installations and limit new public and private lighting projects/project components.	Local jurisdictions must adopt in coordination with installations as a requirement, as part of comprehensive planning.	Cities, Towns, and Counties	Page 6-23	Cochise County, Arizona, Light Pollution Code; Ft. Bragg / Pope AFB JLUS; Eastern Carolina JLUS

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

APPENDIX E: SUMMARY OF RECOMMENDED POLICIES AND PRACTICES

Policy / Practice	Description	When to Use	Potentially Responsible Parties	References	
				Policy Guidebook	Other Resources/ Case Examples ¹
Airport Safety/Compatibility Overlay Zone	Limitation of development in defined critical noise and safety areas.	Local jurisdictions must adopt in coordination with installations as part of comprehensive planning.	Cities, Towns, and Counties	Page 6-23	<p>City of Yakima, Washington – Airport Safety Overlay District; City of Bismarck, South Dakota – Airport Noise Overlay Zoning District; Loudon County, Virginia – Airport Impact Overlay District;</p> <p>Puget Sound Council of Governments – Model Airport Overlay Zone Ordinance;</p> <p>Oregon Department of Aviation Airport Land Use Compatibility Guidebook;</p> <p>Sumter City-County (SC) Zoning and Development Standards Ordinance; Texas Department of Transportation, Division of Aviation – Airport Compatibility Guidelines, Height Hazard Zoning</p>

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

APPENDIX E: SUMMARY OF RECOMMENDED POLICIES AND PRACTICES

Policy / Practice	Description	When to Use	Potentially Responsible Parties	References	
				Policy Guidebook	Other Resources/ Case Examples ¹
Airport/Hazard Zoning or Development Ordinance	Creation of separate zoning districts for airports and determination of outright and conditionally permitted uses and development densities for these areas.	Local jurisdictions must adopt in coordination with installations as part of comprehensive planning.	Cities, Towns, and Counties	Page 6-24	Oregon Department of Aviation Airport Land Use Compatibility Guidebook; Denver Regional Council of Governments – Airport Compatible Land Use Design Handbook; Texas Department of Transportation, Division of Aviation – Airport Compatibility Guidelines, Height Hazard Zoning
Clustered Residential Development	Design density and layout of residential development relative to hazards and safety zones.	As part of comprehensive planning, with all land use and zoning actions, off-base.	Cities, Towns, and Counties	Page 6-25	California Airport Land Use Planning Handbook; Flint Hills, Kansas, JLUS; Oregon Department of Aviation, Airport Land Use Compatibility Guidebook
Graduated Density Concept	Phased development density from lower near high noise or accident potential zones to higher further from these zones.	Local jurisdictions must adopt policy with development, or update of a comprehensive plan.	Cities, Towns, and Counties	Page 6-25	Barry M. Goldwater Range / Gila Bend Air Force Auxiliary Field JLUS

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

APPENDIX E: SUMMARY OF RECOMMENDED POLICIES AND PRACTICES

Policy / Practice	Description	When to Use	Potentially Responsible Parties	References	
				Policy Guidebook	Other Resources/ Case Examples ¹
Acquisition Policies and Practices					
Department of Defense Acquisition	Local jurisdictions lobby for appropriations in Department of Defense budget with which to purchase of critical parcels.	Following identification of critical areas and encroachment issues, either through completion of a JLUS or other compatibility study.	Cities, Towns, and Counties; Arizona Congressional delegation; Department of Defense; and other interested organizations	Page 6-27	Arizona Military Regional Compatibility Project – Davis-Monthan Air Force Base / Tucson / Pima County JLUS and Barry M. Goldwater Range / Gila Bend AFAF JLUS
Local Financing Tools - Acquisition	Local jurisdictions purchase land in critical areas using local financing tools, including municipal property corporations, general obligation bonds, revenue and improvement district bonds.	Following identification of critical areas and encroachment issues, either through completion of a JLUS or other compatibility study.	Cities, Towns and Counties (and the Greater Arizona Development Authority for use of GADA bonds)	Page 6-27	ARS § 41-1554, Title 20: Commerce, Banking, and Insurance – Chapter 8. Greater Arizona Development Authority; Denver Regional Council of Governments – Airport Compatible Land Use Design Handbook; Eastern Carolina JLUS; Oregon Department of Aviation – Airport Land Use Compatibility Guidebook;

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

APPENDIX E: SUMMARY OF RECOMMENDED POLICIES AND PRACTICES

Policy / Practice	Description	When to Use	Potentially Responsible Parties	References	
				Policy Guidebook	Other Resources/ Case Examples ¹
Federal Airport Improvement Funds (AIP) - Acquisition	Local jurisdictions apply for grants through the AIP with which to purchase land in critical areas.	Following identification of critical areas and encroachment issues, either through completion of a JLUS or other compatibility study.	Cities, Towns, and Counties	Page 6-31	Denver Regional Council of Governments – Airport Compatible Land Use Design Handbook
State Tax Credits - Acquisition	Local jurisdictions work with the State Legislature to establish State regulations that create tax credits or deductions to encourage property owners to sell their property or development rights in critical areas.	Following identification of critical areas and encroachment issues, either through completion of a JLUS or other compatibility study.	Cities, Towns, and Counties and the State Legislature	Page 6-31	Ft. Bragg / Pope AFB JLUS
Gifts and Donations	Local jurisdictions use tax incentives to encourage land owners in critical areas to donate property or development rights.	Following identification of critical areas and encroachment issues, either through completion of a JLUS or other compatibility study.	Cities, Towns, and Counties; and interested landowners	Page 6-32	Arizona Military Regional Compatibility Project – Western Maricopa County / Luke Air Force Base and Davis-Monthan Air Force Base / Tucson / Pima County JLUS

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

APPENDIX E: SUMMARY OF RECOMMENDED POLICIES AND PRACTICES

Policy / Practice	Description	When to Use	Potentially Responsible Parties	References	
				Policy Guidebook	Other Resources/ Case Examples ¹
Department of Defense Cooperative Agreements with Other Entities (National Defense Authorization Act, Section 2811, P.L. 107-314)	Secretary of a Military Department may enter into cooperative agreements with another entity (i.e. states, local jurisdictions, conservation organizations) to address environmental and encroachment issues; and accept property or interest acquired pursuant to such agreements on behalf of the federal government.	Following identification of critical areas and encroachment issues, either through completion of a JLUS or other compatibility study.	Cities, Towns and Counties; Military Installations; Department of Defense; and conservation organizations	Page 6-32	Headquarters Department of the Army, Army Land and Training Land Strategy.
Land and Water Conservation Fund (LWCF)	The State applies for LWCF matching grants to purchase critical land for state and local parks and recreation uses.	Following identification of critical areas and encroachment issues, either through completion of a JLUS or other compatibility study.	Federal, State and local governments	Page 6-34	Oregon Department of Aviation Airport Land Use Compatibility Guidebook; Arizona Military Regional Compatibility Project – Western Maricopa County / Luke Air Force Base and Davis-Monthan Air Force Base / Tucson / Pima County JLUS

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

APPENDIX E: SUMMARY OF RECOMMENDED POLICIES AND PRACTICES

Policy / Practice	Description	When to Use	Potentially Responsible Parties	References	
				Policy Guidebook	Other Resources/ Case Examples ¹
Military Installation Fund (MIF)	Local jurisdictions apply for MIF grant money administered by the State to purchase critical parcels or other activities to preserve or expand military operations.	Following identification of critical areas and encroachment issues, either through completion of a JLUS or other compatibility study.	Cities, Towns and Counties, and State of Arizona	Page 6-34	Arizona Revised Statutes §41.1512.01; Military Installation Fund; Arizona Military Regional Compatibility Project – Western Maricopa County / Luke Air Force Base and Davis-Monthan Air Force Base / Tucson / Pima County JLUS
Purchase of Development Rights	Public agency purchases development rights for fair market value through negotiation with property owners	Following securing of funds through an acquisition program.	Federal government, State government, and local political jurisdictions	Page 6-35	Flint Hills, Kansas, JLUS; Arizona Military Regional Compatibility Project – Western Maricopa County / Luke Air Force Base and Davis-Monthan Air Force Base / Tucson / Pima County JLUS
Transfer of Development Rights (TDR)	Local jurisdictions compensate land owners for reducing intensity or density of land by having permitted uses of other land expanded or intensified.	Following identification of critical areas and encroachment issues, either through completion of a JLUS or other compatibility study.	Cities, Towns and Counties; and participating private landowners	Page 6-35	Oregon Department of Aviation Airport Land Use Compatibility Guidebook; Arizona Military Regional Compatibility Project – Western Maricopa County / Luke Air Force Base and Davis-Monthan Air Force Base / Tucson / Pima County JLUS

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

APPENDIX E: SUMMARY OF RECOMMENDED POLICIES AND PRACTICES

Policy / Practice	Description	When to Use	Potentially Responsible Parties	References	
				Policy Guidebook	Other Resources/ Case Examples ¹
Partnerships with Non-Governmental Organizations (NGOs)	NGOs acquire development rights for critical lands and dedicate them to compatible uses, or transfer lands to public ownership for conservation/open space uses.	Following identification of critical areas and encroachment issues, either through completion of a JLUS or other compatibility study.	Local jurisdictions and TPL or other non-governmental organizations	Page 6-36	Arizona Military Regional Compatibility Project – Western Maricopa County / Luke Air Force Base and Davis-Monthan Air Force Base / Tucson / Pima County JLUS
Miscellaneous Policies and Practices					
Best Practice Techniques	Continuous assessment of usefulness of all compatibility techniques, practices and policies.	As part of comprehensive planning.	State government, local jurisdictions, military installations and other stakeholder groups	Page 6-37	Arizona Military Regional Compatibility Project – Western Maricopa County / Luke Air Force Base and Davis-Monthan Air Force Base / Tucson / Pima County JLUS

**ARIZONA MILITARY REGIONAL COMPATIBILITY PROJECT
POLICY GUIDEBOOK**

APPENDIX E: SUMMARY OF RECOMMENDED POLICIES AND PRACTICES

Policy / Practice	Description	When to Use	Potentially Responsible Parties	References	
				Policy Guidebook	Other Resources/ Case Examples ¹
Noise Barriers	Use of noise barriers (i.e. walls, berms, vegetation, window replacements) to shield noise sensitive areas from aircraft or other intense noise generating sources.	As part of new major development projects where residential development is proposed near engine run-up sites, comprehensive planning, and following completion of JLUS or noise-specific technical study.	Military Installations; Landowners and Developers; Local Jurisdictions	Page 6-37	Oregon Department of Aviation Airport Land Use Compatibility Guidebook