UNITED STATES AIR FORCE ACADEMY, COLORADO

Air Installations Compatible Use Zones (AICUZ) Study

2019

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United States Air Force Academy, Colorado

Air Installations Compatible Use Zones (AICUZ) Study

Final

July 2019

Air Force Civil Engineer Center
2261 Hughes Ave, Suite 155
Joint Base San Antonio
Lackland, TX 78236-9853

United States Air Force Academy, Colorado

July 2019

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 10TH AIR BASE WING
USAF ACADEMY COLORADO

MEMORANDUM FOR AREA GOVERNMENTS

JUL 03 2019

FROM: 10 ABW/CC
10th Air Base Wing
8034 Edgerton Drive, Suite 200
USAF Academy CO 80840-2201

SUBJECT: Air Installations Compatible Use Zones (AICUZ) Study

1. The 2019 AICUZ Study for the United States Air Force Academy (USAFA) is an update of the AICUZ Study dated 2005, as well as the noise contour update conducted in 2015. The Air Force initiated the update to include changes related to flight tracks, flight operations, and land use compatibility around the installation. Aircraft noise and accident potential zones associated with United States Air Force (USAF) flying operations were reevaluated through the AICUZ study process to guide the development of recommendations for local planning mechanisms that will protect public health and safety while also preserving the operational capabilities of the Air Force Academy.

2. The AICUZ Study contains a description of the affected area around the installation. It outlines the location of runway Clear Zones (CZs), Accident Potential Zones (APZs), and noise contours, and provides recommendations for development compatible with military flight operations. It is our recommendation that local governments incorporate the AICUZ Study recommendations into community plans, zoning ordinances, subdivision regulations, building codes, and other related documents. The update also provides noise contours based upon the Day-night Average Sound Level (DNL) metric and current operational data (Fiscal Year 19). The study is also able to utilize a planning noise contour applicable to future missions and operations for Bullseye Auxiliary Airfield. AICUZ studies using planning contours provide a description of the long-term (5- to 10-year) aircraft noise environment for projected aircraft operations that is more consistent with the planning horizon used by state, tribal, regional, and local planning bodies.

3. The strong partnership between USAFA and the Colorado Springs community is integral to the successful execution of the Academy's mission. In the spirit of partnership, USAFA will continue to work to minimize noise impacts associated with flight operations by restricting missions to operating only during daylight hours after 6 a.m. The Academy appreciates the cooperation of all community stakeholders in the collaborative implementation of the recommendations and guidelines presented in the AICUZ Study update.

Brian Hartless
BRIAN S. HARTLESS, Colonel, USAF
Commander

Team Ten...Forging the Future!

United States Air Force Academy, Colorado

July 2019

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Abbreviations and Acronyms

AFB	Air Force Base
AFH	Air Force Handbook
AFI	Air Force Instruction
AGL	Above Ground Level
AICUZ	Air Installations Compatible Use Zones
AICUZ PM	AICUZ Program Manager
APZ	Accident Potential Zones
ATC	Air Traffic Control
BAA	Bullseye Auxiliary Airfield
BASH	Bird/Wildlife Aircraft Strike Hazard
CZ	Clear Zone
dB	Decibel
dBA	A-weighted Decibel
DNL	Day-Night Average Sound Level
DoD	Department of Defense
DoDI	Department of Defense Instruction
EMI	Electromagnetic Interference
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
GIS	Geographic Information System
HAFZ	Hazards to Aircraft Flight Zone

HZ	Hertz
IFR	Instrument Flight Rule
JLUS	Joint Land Use Study
MAJCOM	Major Command
NLR	Noise Level Reduction
NZ	Noise Zone
PA	Public Affairs
PPACG	Pikes Peak Area Council of Governments
SLUCM	Standard Land Use Coding Manual
T&G	Touch and Go
USAF	United States Air Force
USAFA	United States Air Force Academy
VFR	Visual Flight Rules

Introduction

1.0 Introduction

The 2019 United States Air Force Academy (USAFA) Air Installations Compatible Use Zones (AICUZ) Study focuses on the flying missions at the main Academy airfield and Bullseye Auxiliary Airfield (BAA). This update assesses and documents the relevant changes that have occurred within the AICUZ study area since the public release of the of 2005 USAFA AICUZ Study and updated noise contours in 2015. It reaffirms United States Air Force (USAF) policy that promotes public health, safety, and general welfare in areas surrounding the installation while seeking to guide development compatible with the defense flying mission. This study presents changes in flight operations since the previous study and provides current noise contours for the main Academy airfield, planning noise contours for BAA, and recommendations for achieving development that is compatible with the defense flying mission.

1.1 AICUZ Program

Military airfields attract development—people who work on the installation want to live nearby, while others want to provide services to installation employees and residents. When incompatible development occurs near an installation or training area, affected parties within the community may seek relief through political channels that could restrict, degrade, or eliminate capabilities necessary to perform the defense mission. In the early 1970s, the Department of Defense (DoD) established the AICUZ Program. The goal of the program is to protect the health, safety, and welfare of those living and working near air installations while sustaining the Air Force's operational mission. The Air Force accomplishes this goal by promoting proactive collaborative planning for compatible development to sustain mission and community objectives.

The AICUZ Program recommends that noise zones, Clear Zones (CZs), Accident Potential Zones (APZs), and flight clearance requirements associated with military airfield operations be incorporated into local community planning programs in order to maintain airfield operational requirements while minimizing the impact to residents in the surrounding community. Cooperation between military airfield planners and community-based counterparts serves to increase public awareness of the importance of air installations and the need to address mission requirements and associated noise and risk factors in the public planning process. As the communities that surround airfields grow and develop, the Air Force has the responsibility to communicate and collaborate with local governments on land use planning, zoning, and similar matters that could affect the installation's operations or missions. Likewise, the Air Force has a responsibility to understand and communicate potential impacts that new and changing missions may have on the local community.

1.2 Scope and Authority

1.2.1 Scope

This AICUZ Study uses current and projected air operations. The Air Force provides the Academy's CZs, APZs, and noise zones associated with the airfields' runways to the local communities, along with recommendations for compatible land use near the installation for incorporation into comprehensive plans, zoning ordinances, subdivision regulations, building codes, and other related documents.

1.2.2 Authority

Authority for the Air Force AICUZ program lies in two documents:

- Air Force Instruction (AFI) 32-7063, Air Installations Compatible Use Zones Program implements Department of Defense Instruction (DoDI) 4165.57 Air Installations Compatible Use Zones and applies to all Air Force installations with active runways located in the U.S. and its territories. This instruction provides guidance to installation AICUZ Program Managers (PMs).
- Air Force Handbook (AFH) 32-7084, AICUZ Program Manager's Guide provides installation AICUZ PM specific guidance concerning the organizational tasks and procedures necessary to implement the AICUZ program. It is written in a "how to" format and aligns with AFPD 32-70, Environmental Quality.

1.3 Previous AICUZ Efforts and Related Studies

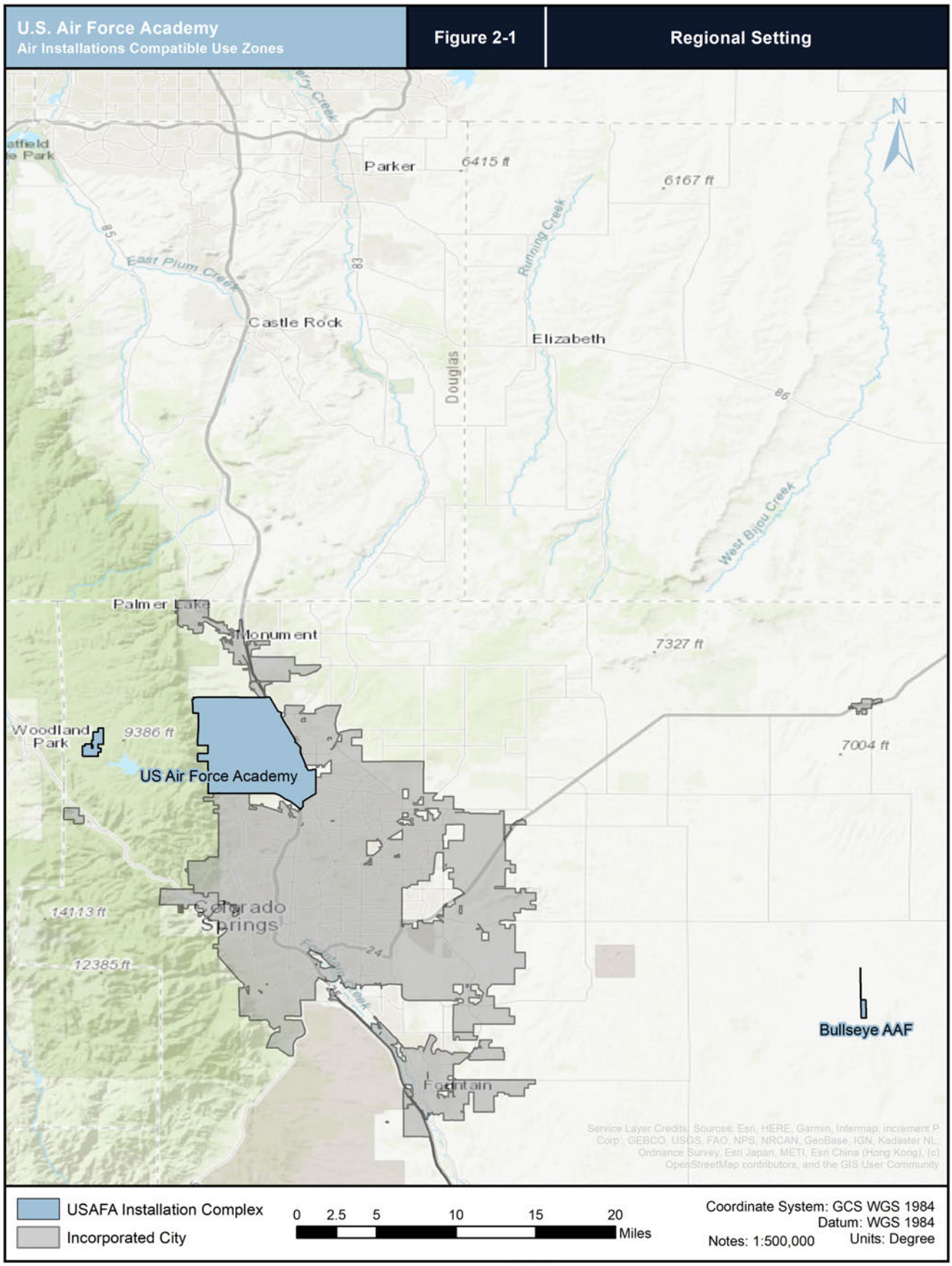
Previous studies relevant to this AICUZ study include:

- 2005 USAFA Air Installations Compatible Use Zones Study
- 2005 Finding of No Significant Impact Proposed Sailplane Landing Area Project at USAFA
- 2013 USAFA Airmanship Program Environmental Assessment Update
- 2014 Environmental Assessment Finding of No Significant Impact for Army Use of the Bullseye Auxiliary Airfield, Colorado
- 2017 Blue Ridge Research and Consulting Sound Analysis Technical Report
- 2018 Colorado Springs Regional Joint Land Use Study

1.4 Changes that Require an AICUZ Update

The USAFA AICUZ Study provides the installation's current flight tracks, CZs, APZs, and noise contour information. With this information, the AICUZ Program allows surrounding communities to consider current air operations activities when making land use decisions. As the DoD aircraft fleet and training requirements change over time, the resulting flight operations change as well. These changes can affect noise contours and necessitate an AICUZ study update. Additionally, non-operational changes, such as improvements in noise modeling methods and local community land use progress, may also trigger the need for an update. In accordance with AFI 32-7063, Air Installations Compatible Use Zones and AFH 32-7084, AICUZ Program Manager's Guide, the primary changes occurring since the previous USAFA AICUZ Study that compelled this update include:

- Joint Land Use Study recommendation to update AICUZ
- Changes in land use throughout surrounding communities
- Projected flight operations at Bullseye Auxiliary Airfield
- Updated noise modeling (See section 4.4.1)


U.S. Air Force Academy
Air Installations Compatible Use Zones
Figure 2-1
Regional Setting
N
Parker
6415 ft
6167 ft
East Plum Creek
Running Creek
Castle Rock
Elizabeth
Douglas
West Bijou Creek
Palmer Lake
Monument
7327 ft
Woodland Park
9386 ft
US Air Force Academy
7004 ft
14113 ft
Colorado Springs
12385 ft
Bullseye AAF
Fountain
Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
USAFA Installation Complex
Incorporated City
0 2.5 5 10 15 20
Miles
Coordinate System: GCS WGS 1984
Datum: WGS 1984
Notes: 1:500,000
Units: Degree
6/21/2019

2.0 United States Air Force Academy, Colorado

2.1 Location

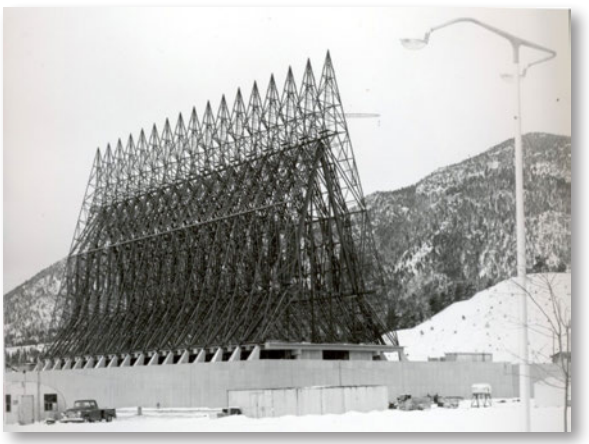
The Air Force Academy is located on the northwest side of Colorado Springs, CO, with five ridges of the Southern Front Range forming the main topographic feature of the site (Figure 2-1. Regional Setting). Primarily located in northern El Paso County, CO, the Academy is approximately 61 miles south of the state capital, Denver, CO. Including its outlying Farish recreational area and Bullseye airfield, the Academy encompasses 19,372 acres. The main base extends roughly seven miles from north to south, and five miles from east to west.

The Academy is near five other major installations: Peterson Air Force Base (AFB), Schriever AFB, Buckley AFB, Cheyenne Mountain Air Force Station (AFS), and Fort Carson. Additionally, the Academy neighbors Denver International Airport and several regional and municipal airports, including Colorado Springs Airport, Meadow Lake Airport, and Calhan Airport, as well as the West Pueblo Airport Flight School. The following is a list of key operational attributes of the Academy:

- Four active runways on the main airfield supporting cadet airmanship programs
- Jack's Valley, a 3,300-acre ground and air training complex located in the northwest corner of the Academy
- BAA, located approximately 32 miles east-southeast of the main Academy airfield
- Aardvark Auxiliary Field, officially closed in July 2008 as an active runway, and currently utilized for remotely piloted aircraft (RPA) training

2.2 History

The Air Force established the U.S. Air Force Academy on 1 April 1954. Prior to the establishment of the Air Force in 1947, U.S. military officials developed the idea of a training academy dedicated to preparing cadets for war in the air. Following an extensive selection process, the Air Force chose the site near Colorado Springs, Colorado. President Dwight D. Eisenhower recalled Lieutenant General Huber R. Harmon from retirement to become the first superintendent of the Academy. Cadets initially trained at nearby Lowry AFB in Denver before permanently establishing residence at the modern Academy campus in 1958. The Academy gained academic accreditation and graduated its first class of 207 airman on June 3, 1959. The Academy has provided the Air Force with a corps of officers dedicated to upholding the highest standards of their profession. More than 50,000 Air Force officers have graduated from this prestigious military institution since it opened its gates over sixty years ago.



2.3 Mission

The Air Force Academy mission is to educate, train, and inspire men and women to become leaders of character, motivated to lead the United States Air Force in service to our nation. The Academy is an accredited academic institution of higher education for officer candidates for the United States Air Force. The Academy produces leaders, mentors, and experts in the Air Force core competencies and their respective career fields. The Air Force Academy is the youngest of the five U.S. service academies, with a current incoming class size of about 1,050 students. Upon graduation from the four-year program, cadets earn a Bachelor of Science degree and are commissioned as Second Lieutenants in the U.S. Air Force. As part of the curriculum, the Academy trains students in powered flight, soaring, and parachuting courses through the 306th Flying Training Group.

2.4 Host and Tenant Organizations

2.4.1 Headquarters US Air Force Academy

Headquarters US Air Force Academy (HQ USAFA) is a Direct Reporting Unit (DRU), which operates similar to a major command (MAJCOM) for the Air Force. To administer the various operations at the installation, the command is divided into four major groups:

- The Superintendent oversees all aspects of The Academy, including military training, academics, athletics, admissions, and the administration of the installation
- The Commandant of Cadets office is in charge of the Cadet Wing and more than 300 Air Force civilian support personnel that oversee the entire cadet military training and airmanship education
- The Dean of Faculty Community commands the 700-member Dean of Faculty element and oversees the annual design and instruction of 500 undergraduate courses in 32 academic disciplines
- The Director of Athletics provides cadets with a realistic leadership experience in a mentally and physically challenging environment

2.4.2 10th Air Base Wing

The 10th Air Base Wing (ABW) provides quality support to enhance the education and development of more than 4,000 future Air Force leaders. The 10 ABW is also responsible for medical, engineering, logistics, communications, personnel, services, security, and other key support for more than 14,000 military and civilian personnel. The staff agencies handle anti-terrorism, command post, equal opportunity, financial management, chaplain, small business, and plans and programs. The following groups are assigned to the 10 ABW:

- 10th Mission Support Group (MSG) provides installation and mission support to include civil engineering, recreation, and improvement of the Academy's 3.5 billion dollar infrastructure.
- 10th Medical Group (MDG) provides wartime, contingency, and community health care in support of DoD and Air Force Academy missions. In addition, the 10 MDG operates a regional medical infrastructure serving four nearby Air Force installations

2.4.3 306th Flying Training Group

The 306th Flying Training Group (FTG) is an Air Education and Training Command (AETC) unit under the 12th Flying Training Wing. The mission of the 306 FTG is to develop cadets into leaders of character through airmanship. The 306 FTG trains 2300 cadets each year in powered flight, soaring, and parachuting. The excellent training provided by the 306 FTG reduces timelines in follow-on flight training and is crucial in helping the Air Force increase the number of rated officers to combat the current pilot shortage. The following FlyingTraining Squadrons (FTS) are a part of the 306 FTG.

- 1 FTS- Initial Flight Training
- 94 FTS – Cadet Soaring Program
- 98 FTS – Cadet Parachuting Program
- 557 FTS – Cadet Powered Flight Program

2.5 Airfield Environment

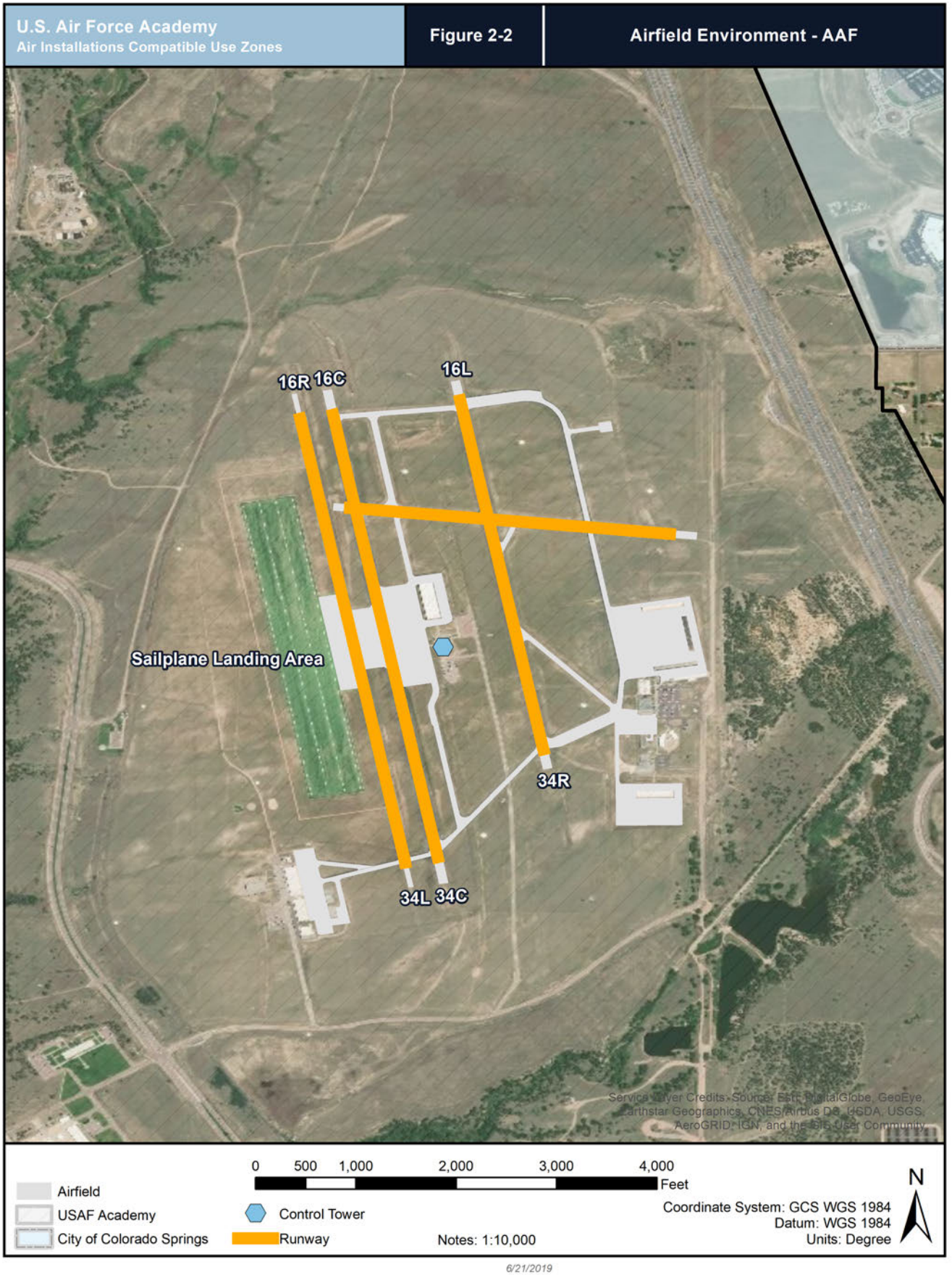
2.5.1 USAF Academy Airfield

The Academy Airfield is located on the southeast side of the main installation (See Figure 2-2. Academy Airfield Environment) and includes aircraft hangars for maintenance and storage, aircraft parking ramps and taxiways, four hard surface runways, assorted support buildings, and administrative offices. Additionally, the airfield has a control tower and assigned air traffic control personnel.

The airfield was built to train cadets in small basic trainers. As such, it is one of the few AF airfields designated as a Class A airfield. This designation calls for smaller clear zones and accident potential zones because of the shorter length of the runways, (< 8000 feet) designed for the smaller training aircraft.

The three primary runways (RWY) are parallel to each other and named for the direction of orientation for landing or takeoff. When pilots take off to the south (magnetic heading 160^0), the runways are known as RWY 16 Left, 16 Center and 16 Right. When the runways are used in the opposite direction (magnetic heading 340^0), they are known as RWY 34 Left, 34 Center, and 34 Right. RWY 16R/34L and 16C/34C are the Academy's longest runways at 4,500 ft., while RWY 16L/34R is 3,500 ft. In addition to the three primary runways, this airfield has a 2,500 ft. intersecting runway (RWY 8/26) to allow for takeoffs and landings when the crosswind is too strong to land or takeoff safely on RWY 16 or RWY 34.

The runways in use are determined by the direction of the prevailing winds and a variety of other factors discussed in Section 3.5. For example, if the prevailing winds are blowing from the north, then aircraft will take off and land toward the north on RWY 34 Left, Right or Center (depending on which runway is available). If the prevailing winds are blowing from the south, then aircraft will take off and land toward the south on RWY 16 Left, Right or Center. In other words, fixed-wing aircraft will almost always takeoff and land into the wind.


U.S. Air Force Academy
Air Installations Compatible Use Zones
Figure 2-2
Airfield Environment - AAF
16R
16C
16L
Sailplane Landing Area
34R
34L
34C
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
0
500
1,000
2,000
3,000
4,000
Feet
Airfield
USAF Academy
City of Colorado Springs
Control Tower
Runway
Notes: 1:10,000
Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree
N
6/21/2019

2.5.2 Bullseye Auxiliary Airfield (BAA)

BAA is located 32 miles east-southeast of the Academy (See Figure 2-3. Bullseye Auxiliary Airfield Environment). BAA is used for powered-flight training and when wind conditions at the main Academy runways do not allow for safe training operations.

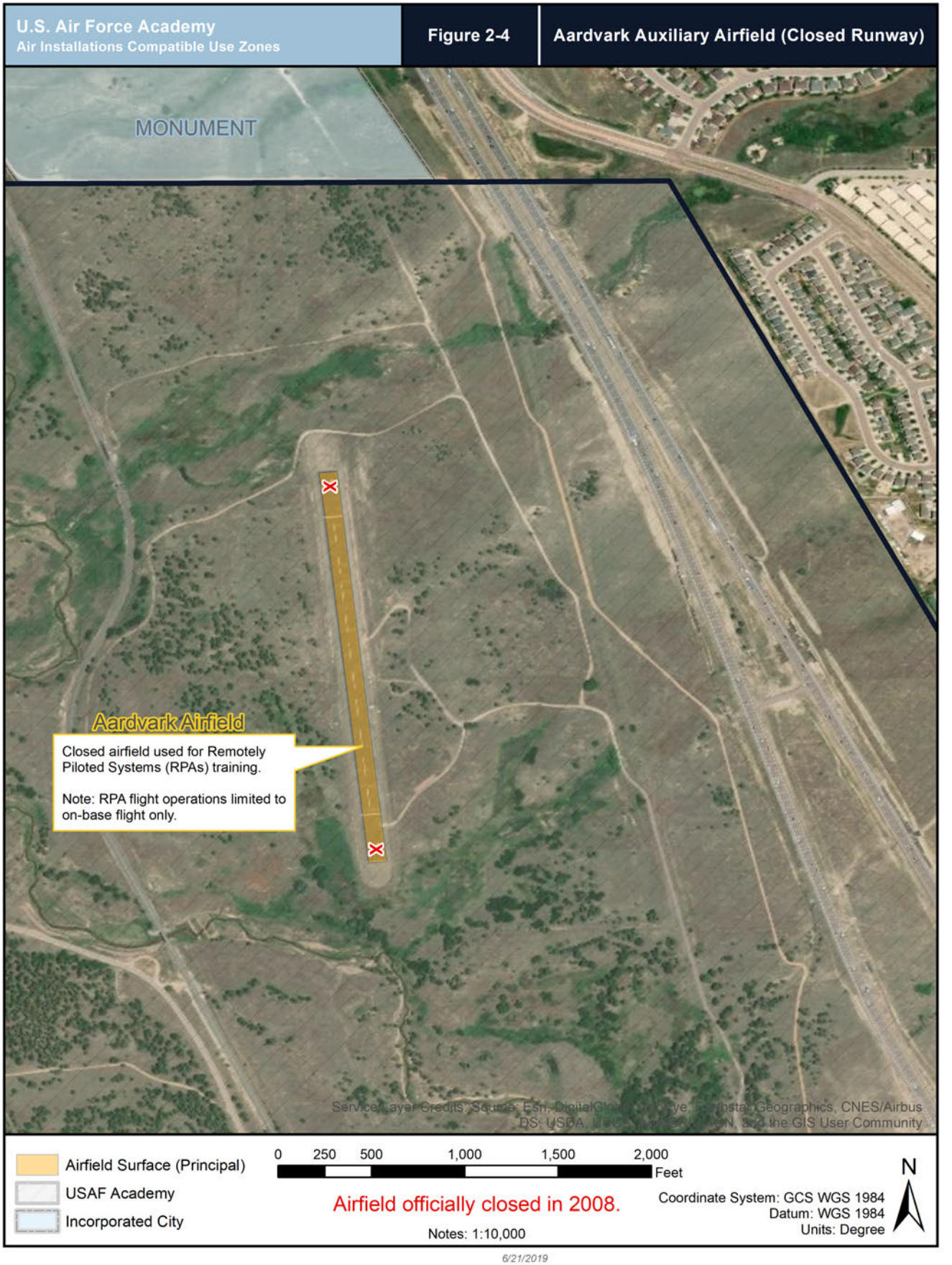
The Academy built BAA in the 1980s for powered flight training, which includes practice landings and takeoffs, and touch-and-goes. The airfield has no control tower or air traffic control personnel assigned. Pilots announce their own positions and intentions in the pattern using a Common Traffic Advisory Frequency to accomplish traffic separation. The field consists of one 3500 ft. runway pavement oriented in a 17/35 direction. Due to the small size of the field, generally no more than four aircraft operate in the pattern at one time.

The State of Colorado granted an easement to the Air Force Academy to use State land in perpetuity to construct, operate, and maintain an auxiliary airfield, and related access road, to accommodate increases in pilot training, and other types of aircraft operations that exceeded the capacity of the existing airfield. The area surrounding the airfield has a low-density population and is zoned for agricultural use.


U.S. Air Force Academy
Air Installations Compatible Use Zones
Figure 2-3
Airfield Environment - Bullseye
17
35
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Runway
Airfield Surface (Principal)
USAF Academy Property
0 375 750 1,500 2,250 3,000
Feet
N
Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree
Notes: 1:10,000
5/29/2019

2.5.3 Aardvark Auxiliary Airfield

Aardvark Auxiliary Airfield is located on the Academy's main property. In July 2008, HQ AETC officially closed Aardvark Airfield for flight operations. The remaining pavement is currently utilized for remotely piloted aircraft (RPA) training. An image of a RPA taking off from Aardvark can be seen below..


U.S. Air Force Academy
Air Installations Compatible Use Zones
Figure 2-4
Aardvark Auxiliary Airfield (Closed Runway)
MONUMENT
Aardvark Airfield
Closed airfield used for Remotely Piloted Systems (RPAs) training.
Note: RPA flight operations limited to on-base flight only.
Airfield Surface (Principal)
USAF Academy
Incorporated City
0 250 500 1,000 1,500 2,000
Feet
Airfield officially closed in 2008.
Notes: 1:10,000
Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree
N
6/21/2019

2.6 Local Economic Impacts

The military provides direct, indirect, and induced economic benefit to the local community through employment and wages. Benefits include employment opportunities and increases in local business revenue, property sales, and tax revenue. The military further contributes to the economic development of communities through increased demand for local goods and services.

The economic impact of a military installation is based on annual payroll, annual expenditures, and the estimated annual dollar value of the jobs created. Five military installations account for the labor force contributing to the 36.6 billion dollar economic impact to the state of Colorado: The Academy, Fort Carson, Peterson AFB, Schriever AFB, and Cheyenne Mountain.

The military is a significant driver of Colorado's economy, accounting for 7.5% of total State labor earnings, making it the third largest industry in the State.

The total economic impact of The Academy on the surrounding community in Fiscal Year 2017 was 987 million dollars. The predominant component of this economic impact is annual payroll and the estimated value of created jobs. Table 2-1. Annual Military Payroll by Category summarizes the Annual Military Payroll by Category for the Academy which directly employs 9,905 military and civilian personnel.

Table 2-1. Annual Military Payroll by Category

Type of Personnel	Base Jobs	Multiplier	Indirect Jobs
Military	1,913	0.41	785
Trainees	4,366	0.16	699
Civilians	3,626	0.55	1,994
Total	**9,905**		**3,478**
Estimated Number of Indirect		**3,478**	
Average Annual Pay for the Local		**$44,494**	
Estimated Annual Dollar Value of		**$155,000,000**	

Source: USAFA Economic Impact Analysis, FY 2017

Table 2-2. . Total Civilian Personnel by Appropriated and Non-Appropriated Funds (Total Persons)

Appropriated Fund Civilians	Total
General Schedule	786
Federal Wage Board	185
Other (Faculty/Hospital/SL)	351
Sub-Total	1,322
Non-Appropriated Fund AF Civilians	**Total**
Civilian NAF	453
Civilian Base Exchange	78
Contract Civilians	585
Private Business	13
Sub-Total	1,129
Total	**2,451**

Source: USAFA Economic Impact Analysis, FY 2017

Civilian and military personnel are divided into two categories: Appropriated Funds and Non-Appropriated Funds (NAF) (Tables 2-2. Total Civilian Personnel by Appropriated and Non-Appropriated Funds (Total Persons) and 2-3. Annual Civilian Payroll by Category). Appropriated Fund employees include general schedule, federal wage board and others. Civilian NAF, Base Exchange, contractors, and private business employees comprise the NAF population.

Table 2-3. Annual Civilian Payroll by Category

Appropriated Fund Civilians	Total
General Schedule	$61,461,463
Federal Wage Board	$9,909,055
Other (Faculty/Hospital/SL)	$51,025,398
Sub-Total	$122,395,916
Non-Appropriated Fund AF Civilians	
Civilian NAF	$11,538,673
Civilian Base Exchange	$1,122,827
Contract Civilians	$765,977
Private Business	$331,500
Sub-Total	$13,758,977
Total	**$136,154,893**

Source: USAFA Economic Impact Analysis, FY 2017

The Academy is a national icon that draws nearly one million visitors annually. Sporting events, which include 17 varsity sports for men, and 10 for women associated with NCAA Division I athletics draw over 350,000 attendees and 27 million dollars in economic impact. Other institutional events, such as graduation, in-processing and parents' weekend, brings in tens of thousands of visitors and 37-million dollars in economic impact. The total annual economic impact from all sources (e.g. payroll, jobs created, expenditures) is 987 million dollars.

Table 2-4. Estimated Local Economic Impact of 2017 Graduation Week & Parents' Weekend Visitors

Graduation Week Estimated Economic Impact	Total
Estimated Attendance	30,000 persons
Average Length of Stay	5 days
Expenditures per person per day	$165
Estimated economic impact: 30,000 x 5.0 x $165	$24,750,000
Estimated sales tax revenue:	
Colorado Springs Sales Tax (3.12%)	$772,200
El Paso County Sales Tax (1.23%)	$304,425
Pikes Peak Rural Transportation Authority Sales Tax (1.0%)	$247,500
CO State Sales Tax (2.9%)	$717,750
TOTAL Sales Tax (8.25%)	$2,041,875
Sub-Total	$26,791,875
Parents Weekend Estimated Economic Impact	
Estimated Number of Visitors	8,700 persons
Average Length of Stay	5 days
Expenditures per Person per Day	165
Estimated Economic Impact: 8,700x5.0x $165	$7,177,500
Estimated Sales Tax Revenue: 8.25% x $7,177,500	$592,143
Sub-Total	$7,769,643
Total	**$34,561,518**

Source: USAFA Economic Impact Analysis, FY 2017

Throughout the year, The Academy also hosts a number of important and historic events, many of which are open to parents and the public. Of these, graduation and parents' weekend, provide the most significant economic impact to the community. Table 2-4. Estimated Local Economic Impact of 2017 Graduation Week & Parents Weekend Visitors, details the 2017 Estimated Local Economic Impact of Gradation Week and Parents Weekend Visitors contributing 35 million dollars to the area.

Table 2-5. Summary of Expenditures for Construction, Services and Procurement of Materials, Equipment, and Supplies

Expense Category	Amount
Construction	$77,668,297
Services	$58,200,000
Materials, Equipment, and Supplies Procurement	$178,703,734
Commissary (DECA)	$3,195,602
Total Annual Expenditure	**$317,767,633**

Source: USAFA Economic Impact Analysis, FY 2017

The total economic impact of an installation is computed by summing annual base payroll, annual base expenditures, and the estimated dollar value of indirect jobs created. The Academy generated approximately 318 million dollars in local expenditures, including construction, services and procurement (Table 2-5. Summary of Expenditures for Construction, Services and Procurement of Materials, Equipment, and Supplies). The total economic impact also takes into account federal campaign monies, sporting events/camps and cadet in processing, contributing nearly 1 billion dollars to the local economy (Table 2-6. Total Annual Economic Impact Estimate).

Table 2-6. Total Annual Economic Impact Estimate

Economic Impact Classification	Total
Annual Payroll	$450,971,052
Annual Expenditures	$317,767,633
Estimated Annual Dollar Value of Jobs Created	$154,750,132
Estimate Local Economic Impact of Graduation Week/Parents Weekend	$34,561,518
Combined Federal Campaign	$335,521
Sporting Events/Camps	$27,329,118
Cadet In processing	$1,704,859
Total Economic Impact	**$987,419,833**

Source: USAFA Economic Impact Analysis, FY 2017


AF
AF
C

3.0 Aircraft Operations

Aircraft are the primary source of noise associated with a military air installation. The level of noise exposure relates to a number of variables, including the aircraft type, engine power setting, altitude flown, direction of the aircraft, flight track, temperature, relative humidity, frequency, and time of operation (day/night). This chapter discusses the aircraft based at or transient to the Academy, the number of operations conducted at the airfield, and the runways and flight tracks used to conduct the operations.

3.1 Aircraft Types

The Academy's flight training units support only permanently assigned aircraft. These include a variety of fixed-wing airplanes and gliders.

"Transient aircraft" refers to aircraft not permanently assigned to the Academy, but on an occasional basis conduct operations on the installation's training grounds. Transient aircraft utilizing Academy airspace for training and flyovers typically do not conduct landings or takeoffs from its airfield. While the airfield itself does have support facilities for transient aircraft, landing at the airfield requires special permission. The airfield does not meet landing requirements for Air Force jet aircraft and jet fuel is not available at the field.

On the following pages are brief descriptions of assigned and transient aircraft at the Academy. All of the assigned aircraft are civilian-type, adapted for military training.

Transient aircraft at the Academy include fixed-wing jets and rotary-wing aircraft, belonging to multiple military branches.

3.1.1 Permanently Assigned Aircraft

The T-53A (Cirrus SR-20) is a small, single engine aircraft. These aircraft represent the backbone of the Academy's Powered Flight training program in which over 500 cadets participate annually.

T-53 A

The Academy sailplane fleet consists of TG-15 and new TG-16A gliders. Cadets normally get their first flying experience in these aircraft during their freshman year. These gliders are towed (via PA-18 aircraft) to an elevation of approximately 9,500 feet over the western maneuver area, whereupon the glider pilots release their tow ropes and return to the Academy airfield.

TG-16 A

As explained above, the soaring mission also uses the PA-18 (Piper Super Cub) tow plane. These tow planes fly standardized departure and arrival routings, altered as required to maintain safe de-confliction with other aircraft, or when weather conditions warrant deviations in the interest of safety.

PA-18

The UV-18B (DHC-6) 'Twin Otter' supports the Wings of Blue cadet parachute team. The aircraft carries a pilot, copilot and up to 17 jumpers. These UV-18s are the only three owned by the Air Force. Upon completion of daily parachuting operations, the UV-18s return to their overnight home at Peterson AFB.

UV-18 B

T-51 (Cessna 150) and the T-41 (Cessna 172) are also small single engine aircraft used exclusively by the Academy's nationally recognized flying team. The team competes against other flight training schools throughout the U.S. Although the aircraft appear to be similar, the T-51 is configured for two occupants versus the T-41, which is configured for four occupants.

T-51

T-41

3.1.2 Transient Aircraft

The UH-60 Black Hawk is a utility helicopter primarily used by the U.S. Army since 1978. Designed to carry 11 combat-loaded soldiers, it is capable of sling loading a variety of equipment, including vehicles and firefighting buckets. Helicopter units from nearby Fort Carson utilize the Jack's Valley training area in the northern portion of the Academy.

UH-60

The V-22 Osprey is a tiltrotor vertical/short takeoff and landing (VSTOL), multi-mission aircraft. Variants of this aircraft are the CV-22 (Air Force) and the MV-22 (Marine Corps). The Air Force requires the CV-22 to provide a long-range VSTOL insertion and extraction capability. The tiltrotor design combines the vertical flight capabilities of a helicopter with the speed and range of a turboprop airplane. Similar to the UH-60, these aircraft occasionally utilize Jack's Valley for training.

V-22

Typical jets that may utilize Academy airspace include F-16s of the USAF Thunderbirds. Fly-bys typically occur during graduations or other special events. Other aircraft similar to the F-16s may conduct overflights several times a month, transiting through the Academy airspace. These aircraft never operate from the Academy airfield.

F-16

3.2 Maintenance Operations

Maintenance engine runs are an integral part of any flying operation and requires a dedicated team of professionals to ensure that units can meet their flying requirements.

Maintenance at the Academy airfield typically takes place inside dedicated hangars on the east side of the airfield. Contractor personnel conduct all maintenance during the normal duty day. In the event that maintainers conduct engine run-ups on the ramp, the associated noise level with the small aircraft is typically not noticeable beyond the airfield perimeter.

3.3 Flight Operations

Flight activities, including where aircraft fly, how high they fly, how many times they fly over a given area, and the time of day they operate, must be fully evaluated to understand the relationship of flight operations and land use. This chapter discusses typical flight operations for aircraft based at or visiting the Academy.

While the physical footprint of the Academy Airfield is relatively small, the number of annual flight operations make it the third busiest airfield in the US Air Force.

Each time an aircraft crosses over a runway threshold (the beginning or ending of a runway's useable surface) to either takeoff, practice an approach, or land, it counts as a single flight operation. For example, a departure counts as a single operation, as does an arrival. As another example, when an aircraft conducts a pattern (a departure followed by an immediate return) it counts as two operations because the aircraft crosses both the approach and departure ends of the runway during the pattern.

Another unique aspect of the airfield is the variety and volume of operations that take place during the day. A typical day at the Academy airfield will include powered-flight training, tow and sailplane operations, parachuting operations, and transiting aircraft, possibly, all at the same time. In addition to flight operations, during peak times the airfield will have a corresponding high volume of aircraft and personnel movement on the ground, requiring a high degree of coordination with tower controllers.

The Academy airfield conducts operations on a daily basis, and occasionally on Sundays, federal holidays, and winter and spring breaks. Operations increase over the summer, when cadets conduct more flight training. Due to the high volume and variety of operations some of the Air Force's best air traffic controllers work the Academy Airfield.

Table 3-1. USAF Top Ten Busiest Airfields for Fiscal Year (FY) 2018

Rank	Base	Command	Operations
1	Randolph AFB	AETC	202,166
2	Kalaeloa	ANG	150,564
3	**Air Force Academy**	**AETC**	**119,881**
4	Ellington Field	ANG	90,786
5	Nellis AFB	ACC	76,426
6	Sheppard AFB	AETC	75,253
7	Vance AFB	AETC	72,586
8	Meridian	ANG	68,065
9	Eglin AFB	AFMC	67,965
10	Creech AFB	ACC	67,478

Source: Air Force AF Flight Standards Agency. USAF Air Traffic Activity Report, Fiscal Year 2018

The 306th Operations Support Squadron controllers have divided Academy traffic into two main components to accommodate this high volume of traffic: powered flight, which operates on the east side of the field (see Figure 3-4. Pattern Flight Tracks – USAFA, East Runway 34R/16L) and glider operations, which operate primarily to the west. This pattern requires powered aircraft to operate for at least a portion of the pattern over the City of Colorado Springs.

Traffic pattern altitude around military fields may vary between 600 feet and 1500 feet aboveground. This altitude is relative to the airfield elevation; however, terrain elevation underneath the pattern may vary, causing the aircraft to be closer to the ground. In all cases, aircraft are required to maintain an absolute distance of 500 feet from any structure or the ground, except when necessary for takeoff or landing.

The Academy is unusual in that it is one of the few "Class A- Visual Flight Rules" designated airfield in the Air Force. This designation means the Academy Airfield is not equipped, nor authorized for Instrument Flight Rule (IFR) operations. Additionally, its runways are not suitable for heavy or jet aircraft.

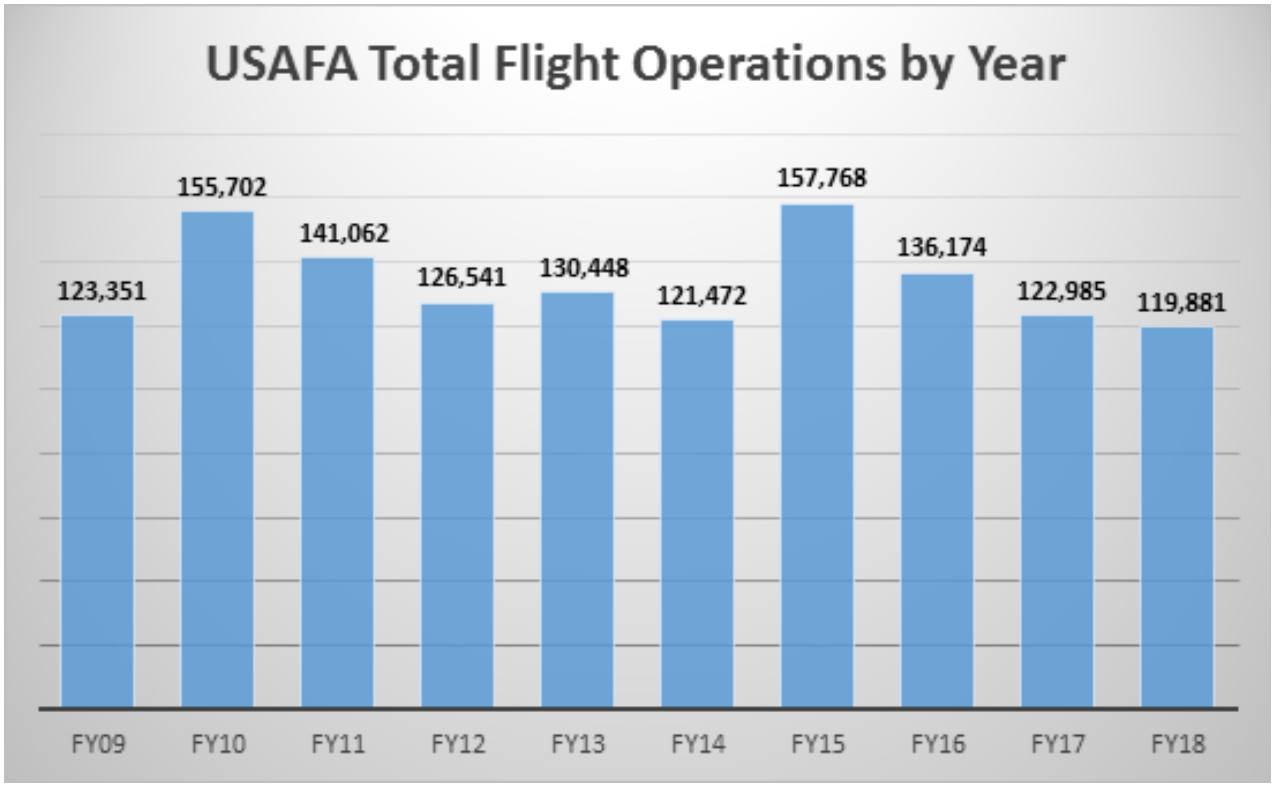
The following list highlights typical maneuvers utilized during normal or increased flight operations. Each flight track utilized is designed to maximize flight operations and, when possible, minimize the effects of noise.

- Takeoff: When an aircraft is positioned on the runway, the engine power is set to facilitate movement and eventual flight.
- Departure: For the purpose of air traffic sequencing, separation, noise abatement, compliance with avoidance areas, and overall safety of flight, aircraft follow specific ground tracks and altitude restrictions as they depart the airfield's immediate airspace.
- Straight-In Arrival: An aircraft performing a straight-in arrival aligns with the runway extended centerline and begins a gradual descent for landing. This type of approach enables an aircraft to maintain a smooth, stable, and steady approach and requires no additional maneuvering.
- Overhead Break Arrival: An expeditious arrival using visual flight rules (VFR). The aircraft arrives over the airfield on the runway centerline at a specified point and altitude and then performs a 180-degree "break turn" away from the runway to enter the landing pattern. Once established, the pilot lowers the landing gear and flaps and then performs a second 180-degree descending turn toward the runway centerline to land.
- Pattern Work: Pattern work refers to traffic pattern training where the pilot performs takeoffs and landings in quick succession by taking off, flying the pattern, and then landing. A closed pattern consists of two portions, a takeoff/departure and an approach/landing; a complete closed pattern is counted as two operations because the aircraft crosses over a runway threshold twice, once on departure and once on arrival. Traffic pattern training is demanding and utilizes all of the basic flying maneuvers a pilot learns—takeoffs, climbs, turns, climbing turns, descents, descending turns, and straight and level landings.
  - Low Approach: A low approach is an approach to a runway that does not result in a landing, but rather a descent towards the runway (usually below 500 feet above ground level [AGL]) followed by a climb-out away from the airfield. Pilots perform low approaches for a number of reasons, including practicing to avoid potential ground obstructions (e.g., vehicles, debris, stray animals).
  - Touch-and-Go (T&G): A T&G landing pattern is a training maneuver that involves landing on a runway and taking off again without coming to a full stop. Usually, the pilot then circles the airfield in a defined pattern, known as a closed-pattern, and repeats the maneuver.
- Simulated Forced Landing (Engine-Out Procedure): This is a visual flight maneuver used to simulate a landing recovery from a complete loss of engine power. To execute the maneuver, a pilot must establish the aircraft on a specified flight profile (altitude, airspeed, position over the airfield) that would allow the aircraft to glide safely across the runway threshold in a position to land. If properly executed, the maneuver should not require the use of additional engine power until after the maneuver is complete.

3.4 Annual Aircraft Operations

Figure 3-1 provides the number of aircraft operations that have occurred at the Academy over a 10-year period, including based and transient aircraft. Total annual operations account for each departure and arrival, including those conducted as part of a pattern operation.

Figure 3-1. Summary of Flight Operations for Fiscal Years 2009 – 2018



Source: Air Traffic Manager, 306 OSS/OSAT

3.5 Runway Utilization and Flight Tracks

3.5.1 Runway Utilization

The frequency with which aircraft utilize a runway involves a variety of factors including but not limited to:

- Airfield environment (layout, runway length, etc.)
- Direction of prevailing winds
- Location of natural terrain features; rivers, lakes, mountains, and other features
- Wildlife activity
- Number of aircraft in the pattern
- Preference of a runway for the purpose of safety

ATC personnel establish and coordinate the runway in use with the 306 FTG Supervisor of Flying and the 94 FTS Soaring Control Officer.

The Academy does not track the number of times a particular runway is used, but the Airspace Manager provides the following estimates:

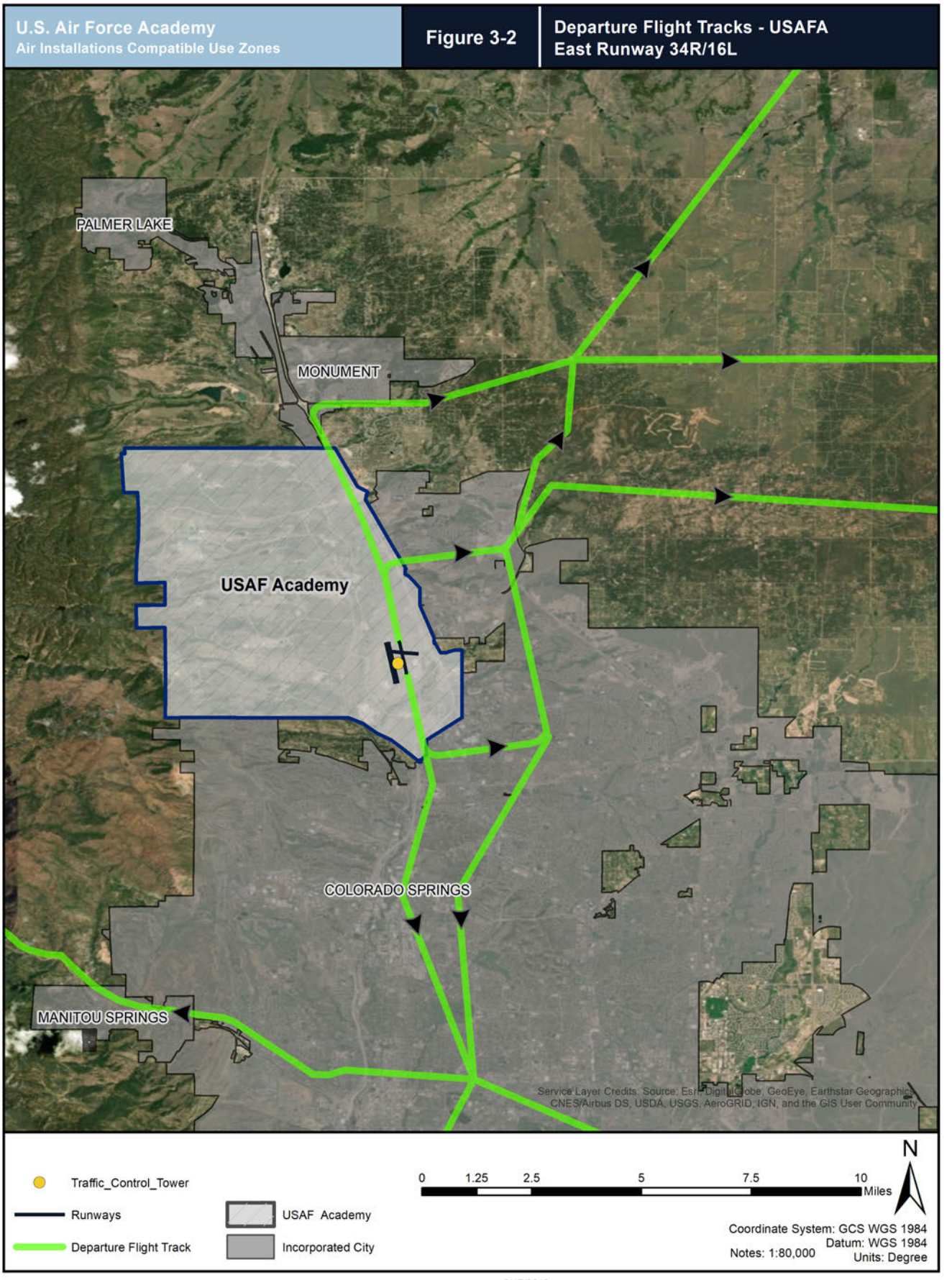
- RWY 16 approximately 57%
- RWY 34 approximately 40%
- RWY 26 approximately 3%
- RWY 08 rarely used

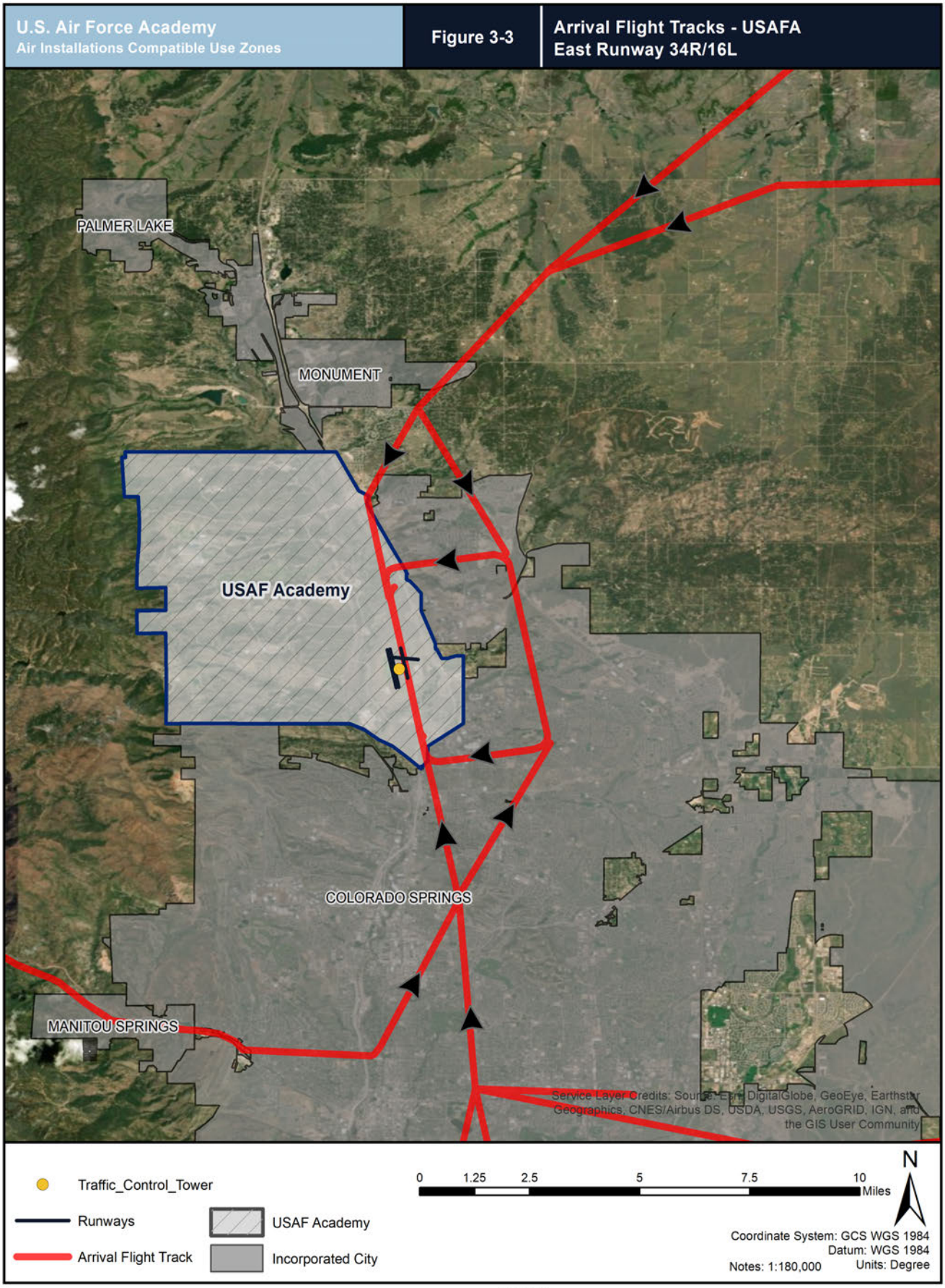
There is no Air Traffic Control at BAA. Runway utilization is pilot controlled.

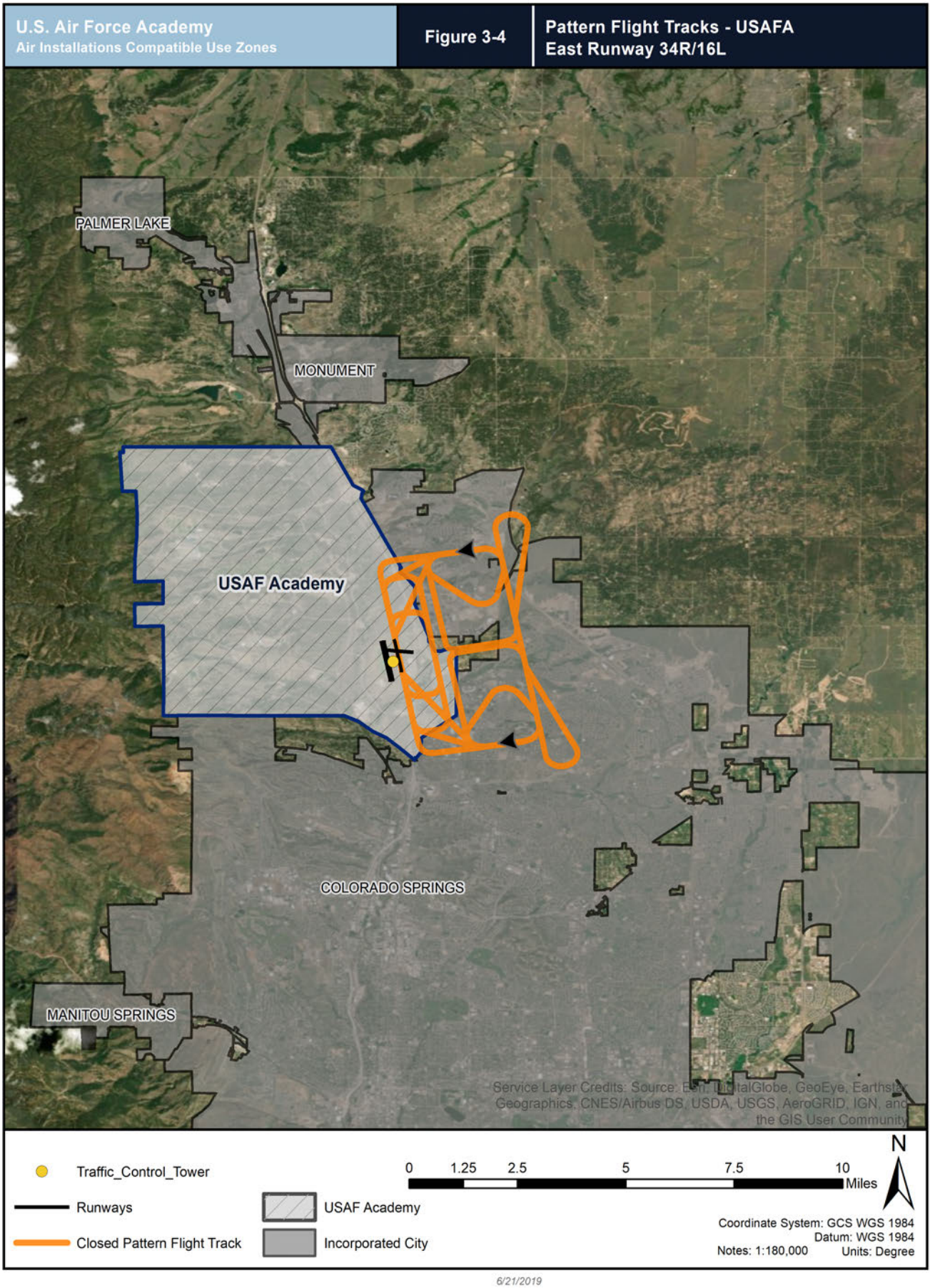
3.5.2 Flight Tracks

Each runway has designated flight tracks that provide for the safety, consistency, and control of an airfield. Flight tracks depict where aircraft fly in relation to an airfield. They are designed for departures, arrivals, and for pattern work procedures, and are designated for each runway to facilitate operational safety, noise abatement, aircrew consistency, and the efficient flow of air traffic within the towers' controlled airspace.

Aircraft flight tracks are not set "highways in the sky." While flight tracks are visually represented as lines on the map, they are actually bands that allow for deviation as necessary. Aircraft de-confliction, configuration, takeoff weight, and wind all affect the actual path taken on any given flight. Figures 3-2, 3-3, and 3-4 present the flight tracks for the Academy.


U.S. Air Force Academy
Air Installations Compatible Use Zones
Figure 3-2
Departure Flight Tracks - USAFA
East Runway 34R/16L
PALMER LAKE
MONUMENT
USAF Academy
COLORADO SPRINGS
MANITOU SPRINGS
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Traffic_Control_Tower
Runways
Departure Flight Track
USAF Academy
Incorporated City
0 1.25 2.5 5 7.5 10 Miles
N
Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree
Notes: 1:80,000
6/17/2019


U.S. Air Force Academy
Air Installations Compatible Use Zones
Figure 3-3
Arrival Flight Tracks - USAFA
East Runway 34R/16L
PALMER LAKE
MONUMENT
USAF Academy
COLORADO SPRINGS
MANITOU SPRINGS
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Traffic_Control_Tower
Runways
Arrival Flight Track
USAF Academy
Incorporated City
0 1.25 2.5 5 7.5 10
Miles
N
Coordinate System: GCS WGS 1984
Datum: WGS 1984
Notes: 1:180,000
Units: Degree
6/21/2019


U.S. Air Force Academy
Air Installations Compatible Use Zones
Figure 3-4
Pattern Flight Tracks - USAFA
East Runway 34R/16L
PALMER LAKE
MONUMENT
USAF Academy
COLORADO SPRINGS
MANITOU SPRINGS
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Traffic_Control_Tower
Runways
Closed Pattern Flight Track
USAF Academy
Incorporated City
0 1.25 2.5 5 7.5 10
Miles
N
Coordinate System: GCS WGS 1984
Datum: WGS 1984
Notes: 1:180,000
Units: Degree
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4.0 Aircraft Noise

How an installation manages aircraft noise can play a key role in shaping its relationship with neighboring communities. Ideally, aircraft noise and its management should be key factors in local land use planning. Because noise from aircraft may affect areas around the installation, the AF has defined noise zones using the guidance provided in the AFI 32-7063, Air Installations Compatible Use Zones.

While the level of noise produced by aircraft may have a direct effect on communities in proximity to military air installations, other factors also influence the noise impact. An airfield's layout (its buildings, parking ramps, and runways), type of aircraft, natural terrain, weather phenomena, and daily activities all influence the levels of noise that the community experiences.

4.1 What is Sound/Noise?

Sound consists of vibrations in the air. A multitude of sources can generate these vibrations, including roadway traffic, barking dogs, radios—or aircraft operations. We call these vibrations compression waves. Just like a pebble dropped into a pond creates ripples, the compression waves—formed of air molecules pressed together—radiate out, decreasing with distance. If these vibrations reach your eardrum at a certain rate and intensity, you perceive it as sound. When the sound is unwanted, we refer to it as noise. Generally, sound becomes noise to a listener when it interferes with normal activities. Sound has three components: intensity, frequency and duration. Sound becomes noise when it interferes with normal activities.

- Intensity or loudness relates to sound pressure change. As vibrations oscillate back and forth, they create a change in pressure on the eardrum. The greater the sound pressure change, the louder it seems.
- Frequency determines how we perceive the pitch of the sound. Low-frequency sounds are characterized as rumbles or roars, while high-frequency sounds are typified by sirens or screeches. Sound frequency is measured in terms of cycles per second or hertz (Hz). While the range of human hearing goes from 20 to 20,000 Hz, we hear best in the range of 1,000 to 4,000 Hz. For environmental noise, we use A-weighting, which focuses on this range, to best represent human hearing. While we may refer to A-weighted decibels as "dBA", if it is the only weighting being discussed, the "A" is generally dropped.
- Duration is the length of time one can detect the sound.

Terrain features, weather phenomena, man-made structures, and daily life activity contribute to noise exposure.

4.2 How Sound is Perceived

The loudest sounds that the human ear can comfortably hear are a trillion times higher in pressure than those of sounds we barely hear. Because such large numbers become awkward to use, we measure noise in decibels (dB), which uses a logarithmic scale.

Figure 4-1 is a chart of A-weighted sound levels from common sources. A sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB. Sound levels above 110 dB can cause discomfort inside the ear, while sound levels above 130 dB are felt as pain.

Figure 4-1. Typical A-weighted Sound Levels of Common Sounds

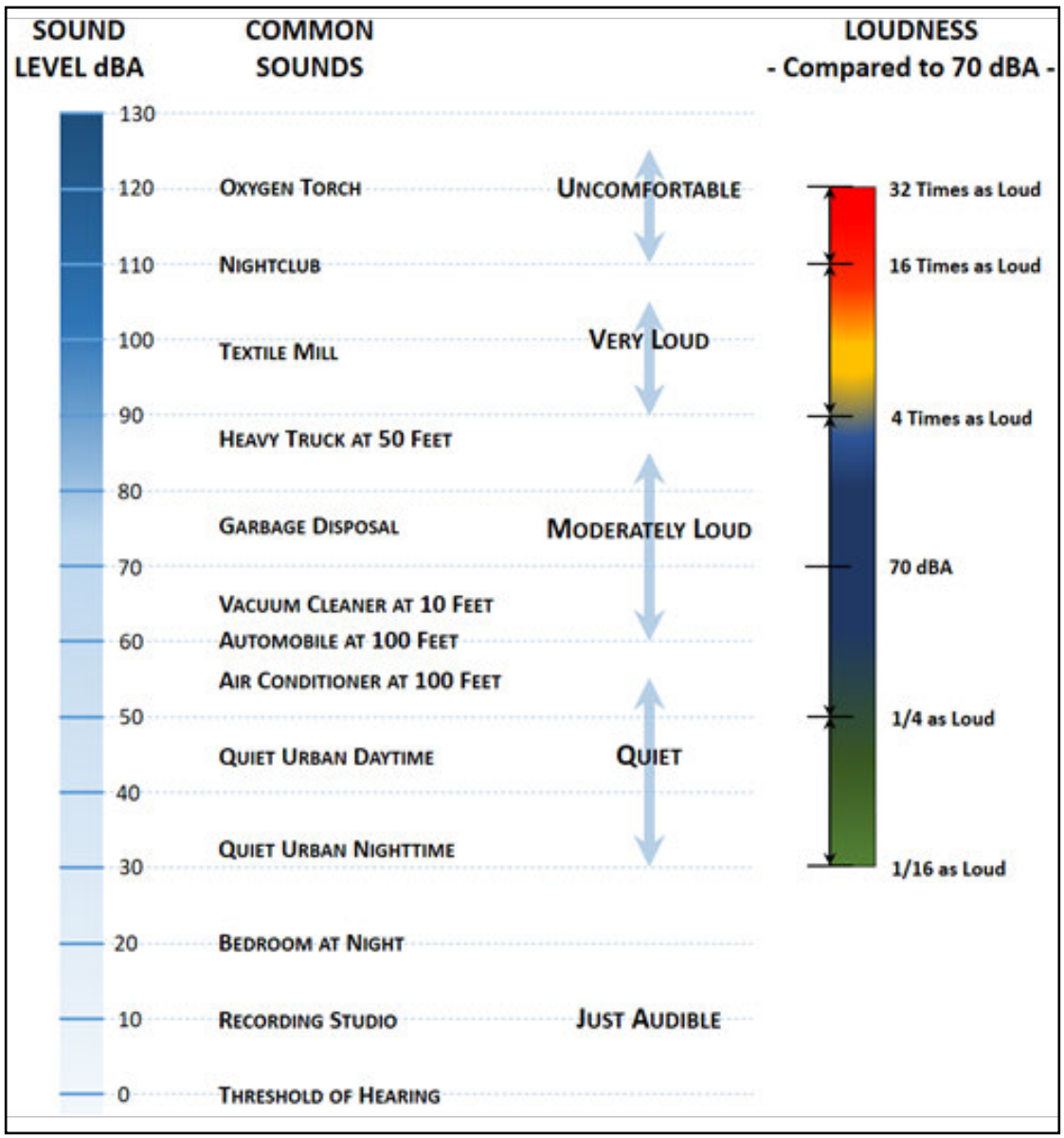


Table 4-1. Subjective Response to Changes in Sound Level

Change in Sound Level	Change in Loudness
20 dB	Striking Four-fold Change
10 dB	Dramatic Two-fold or Half as Loud
5 dB	Quite Noticeable
3 dB	Barely Perceptible
1 dB	Requires Close Attention to Notice

Table 4-1 shows the subjective responses with change in (single-event) sound level. While noise energy doubles or halves with every 3-dB change, we do not perceive all this noise energy. It takes a 10 dB increase or decrease for our ears to perceive a doubling or halving of loudness.

When people hear an aircraft fly overhead, the question may be asked, "How loud was that?" While we may often find ourselves concerned over the loudness of a sound, there are other dimensions to the sound event that draw our interest. For instance, does one overflight draw the same interest as two separate overflights—or 20? Also, does the 30-second run-up of engines prior to takeoff draw the same interest as a 30-minute maintenance run? Additionally, is an overflight more noticeable at 2:00 p.m. or at 2:00 a.m., when the ambient noise is low and most people are sleeping?

The length and number of events—the total noise energy—and the time of day that a noise event takes place play key roles in our perception of noise. To reflect these concerns, the Air Force uses a metric called the "Day-night Average Sound Level" (DNL). DNL was created by the United States Environmental Protection Agency (EPA) and is used throughout the United States.

DNL, when used as a metric for aircraft noise, represents the accumulation of noise energy from all aircraft noise events in a 24-hour period. Additionally, for all operations between 10:00 p.m. and 7:00 a.m., DNL adds a 10-dB penalty to each event to account for the intrusiveness of nighttime operations. As is implied in its name, the DNL represents the noise energy present in a daily period. However, because aircraft operations at military airfields fluctuate from day to day, the Air Force typically bases DNL on a year's worth of operations and represents the annual average daily aircraft events.

DNL is not a level heard at any given time, but represents long-term exposure. Scientific studies have found good correlation between the percentages of groups of people highly annoyed by sounds and the level of average noise exposure measured in DNL.

4.4 Noise Contours

The AF develops noise contours, as needed, to assess the compatibility of aircraft operations with surrounding land uses. Noise contours connect points of equal value, just as contours on topographic maps connect points of equal elevation. This AICUZ Study presents the 2019 noise contours, which have been developed using the DoD standard model for assessing noise exposure from military aircraft operations at air installations, NOISEMAP. Noise contours, when overlaid on local land use maps, can help to identify areas of incompatible land use and assist communities in planning for future development around an air installation. (Noise contours are mapped down to 60dB DNL due to the low ambient noise surrounding the Air Force Academy; typical AF installation noise contours are only presented down to 65 dB DNL.)

Table 4-2. Annual Aircraft Flight Operations for AICUZ Noise Contours presents the current annual aircraft flight operation numbers that were modeled to produce updated 2019 noise contours for the main Academy runways and BAA.

Table 4-2. Annual Aircraft Flight Operations for AICUZ Noise Contours

Aircraft	Departures			Arrivals			Closed Pattern Operations			Totals		
	Day 7AM-10PM	Night 10PM-7AM	Total	Day 7AM-10PM	Night 10PM-7AM	Total	Day 7AM-10PM	Night 10PM-7AM	Total	Day 7AM-10PM	Night 10PM-7AM	Total
Academy Airfield												
T-53	5,656	-	5,656	5,656	-	5,656	11,312	-	11,312	33,936	-	33,936
UV-18	2,730	-	2,730	2,730	-	2,730	-	-	-	5,460	-	5,460
PA-18	16,105	-	16,105	16,105	-	16,105	-	-	-	32,210	-	32,210
T-51	1,161	-	1,161	1,161	-	1,161	3,483	-	3,483	9,288	-	9,288
T-41	1,133	-	1,133	1,133	-	1,133	2,266	-	2,266	6,798	-	6,798
Aeroclub	2,850	150	3,000	3,000	-	3,000	6,000	-	6,000	17,850	150	18,000
Transient	21	-	21	21	-	21	-	-	-	42	-	42
Sub-Total	29,656	150	29,806	29,806	-	29,806	23,061	-	23,061	105,584	150	105,734
Bullseye Auxiliary Airfield												
T-53	1,387	-	1,387	1,387	-	1,387	5,275	-	5,275	13,324	-	13,324
DA-20	3,155	-	3,155	3,155	-	3,155	14,197	-	14,197	34,704	-	34,704
UV-18	1,200	-	1,200	1,200	-	1,200	-	-	-	2,400	-	2,400
CH-47	87	434	521	521	-	521	3,002	1,691	4,693	6,612	3,816	10,428
H-60	217	1,086	1,303	1,303	-	1,303	7,505	4,227	11,732	16,530	9,540	26,070
H-64	130	652	782	782	-	782	4,503	2,536	7,039	9,918	5,724	15,642
Sub-Total	6,176	2,172	8,348	8,348	-	8,348	34,482	8,454	42,936	83,488	19,080	102,568
Grand Total	**35,832**	**2,322**	**38,154**	**38,154**	**0**	**38,154**	**57,543**	**8,454**	**65,997**	**189,072**	**19,230**	**208,302**

Source: Data collected from 2019 Academy Site Visit

Note: 1. Closed patterns count as two operations. 2. The noise model and table accounts for L3-DOSS aviation use of Bullseye airfield.
3. A small percentage of UV-18 landings take place at the Academy prior to 7:00 AM. 4. The civilian Aero Club occasionally flies before 7:00 AM (but always after sunrise). 5. Aero Club flies C-172s and T-41s. 6. Transient aircraft include UH-60s supporting Jacks Valley training. 7. In addition to aircraft operations, the Academy's noise model accounts for annual pre-flight and post-flight maintenance operations.

4.4.1 USAFA Noise Contours

Since the 2005 USAFA AICUZ Study, several advances have been made in noise modeling.

Noise models now properly account for terrain and topographical features such as water which allows for higher fidelity modeling results. Second, to allow for standardization in comparison of contours, all noise models use average annual day as the timeline for results. In 2005, this could vary based on the number of days the airfield was open or in use. For example, an airfield open 250-260 days would use that timeline while a nearby airfield flying for 300 days would use that timeline. Mathematically, transitioning from 250-260 days to 365 days per Air Force policy shrinks the contours by around 1-2 dB DNL with everything else held constant.

The 2019 USAFA AICUZ noise contours are based on current and future operations found on Table 4-2. Figure 4-2. 2019 USAFA AICUZ Noise Contours with Gradient Shading depicts noise contours at the main Academy airfield based on current operations; and Figure 4-4. Comparison of 2015 and 2019 Bullseye Auxiliary Airfield AICUZ Noise Contours depicts noise contours at BAA based current Academy use and projected joint use by the Army. Figure 4-3. Comparison of 2015 and 2019 Noise Contours and Figure 4-4 depict comparison of the 2019 with the previous, publically released, noise models based on 2015 operational flight data. In general, the noise contours for the main Academy airfield are similar in form and levels, and do not extend beyond the base boundary. Therefore, no compatible land use recommendations associated with the noise contours are necessary.

Although noise contours associated with future flight operations at BAA extend beyond the airfield boundary, the current land use in affected areas is zoned agricultural (A35, Agriculture District) and compatible within the Recommended Land Use Compatibility for Noise Zones listed on Table A-2 in Appendix A, Recommended Land Use Compatibility for Noise Zones.

4.5 Noise Abatement

The Air Force recognizes that noise from military operations may cause concerns for people living near military installations.

While the computer-modeled noise contours do not extend past the installation boundary at the main Academy airfield, some noise does. Academy leadership understands the surrounding community concerns and established the following noise policy:

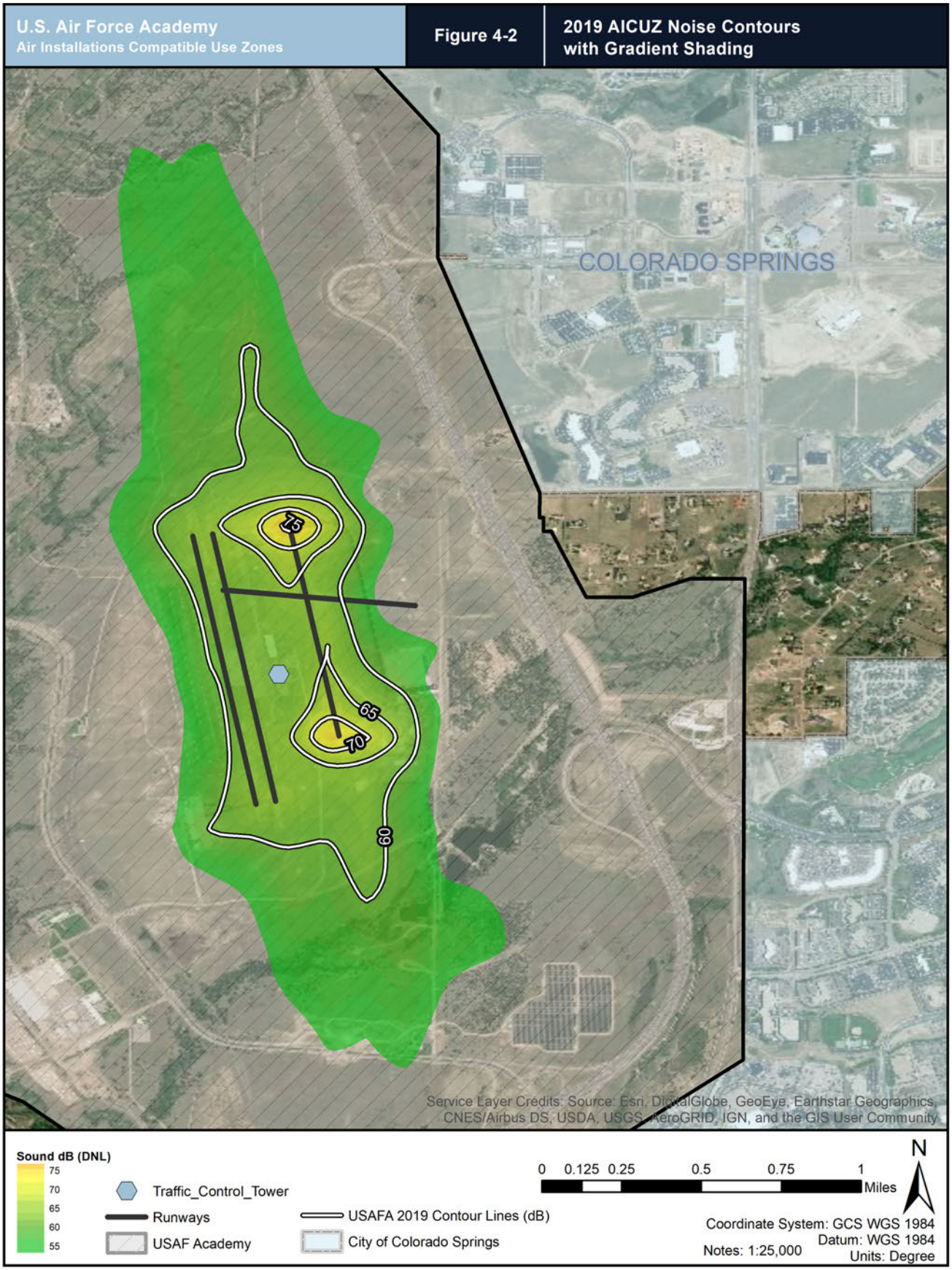
- Academy Airfield operations are not authorized between the hours of sunset and sunrise
- UV-18s are not authorized to make west turnouts off Runway 16

Installation leadership periodically reviews flight operations and their potential impact on surrounding communities. This requirement facilitates the planning, designation, and establishment of flight tracks over sparsely populated areas and/or waterways as often as practicable to balance operational safety and reduce noise exposure levels in surrounding communities.

4.6 Noise Complaints

Military operations may at times generate noise complaints from surrounding communities. The Air Force evaluates each noise complaint to ensure that future operations, to the extent practicable, do not generate unacceptable noise. Concerned citizens are encouraged to contact the USAFA Public Affairs Office, which manages the Noise Complaint Program. Upon receiving a noise complaint, the Public Affairs staff posts the report to a database and initiates a review of the circumstances associated with the reported noise event.

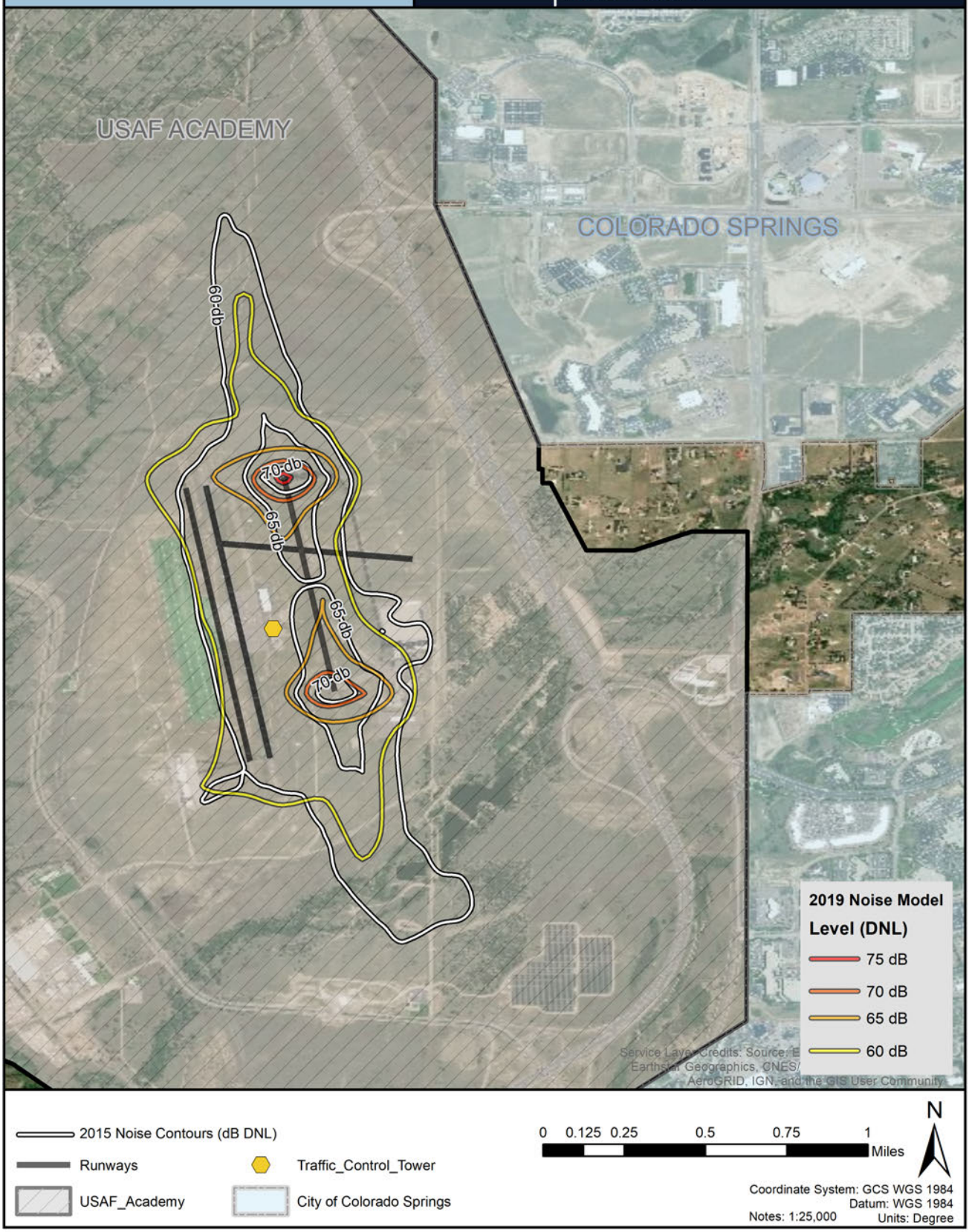
The majority of aircraft noise complaints are from areas directly under the powered flight program flight paths of departures, arrivals, and closed pattern routes. In cases where specific complaint details indicate unusual or peculiar procedures, a thorough investigation will follow. Should the investigation reveal a violation of established flight procedures and directives, Air Force leadership will resolve the violation accordingly and take measures to prevent its repetition.
Concerned citizens may contact Public Affairs by phoning (719) 333-7746 or can complete a noise complaint form (USAFA Form 0-488) online at https://www.usafa.af.mil/About-Us/Flight-Operations/. Completed forms are sent to PA.COMREL2@usafa.edu.


U.S. Air Force Academy
Air Installations Compatible Use Zones
Figure 4-2
2019 AICUZ Noise Contours
with Gradient Shading
COLORADO SPRINGS
75
65
70
60
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sound dB (DNL)
75
70
65
60
55
Traffic_Control_Tower
Runways
USAF Academy
USAFA 2019 Contour Lines (dB)
City of Colorado Springs
0 0.125 0.25 0.5 0.75 1
Miles
N
Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree
Notes: 1:25,000
6/7/2019

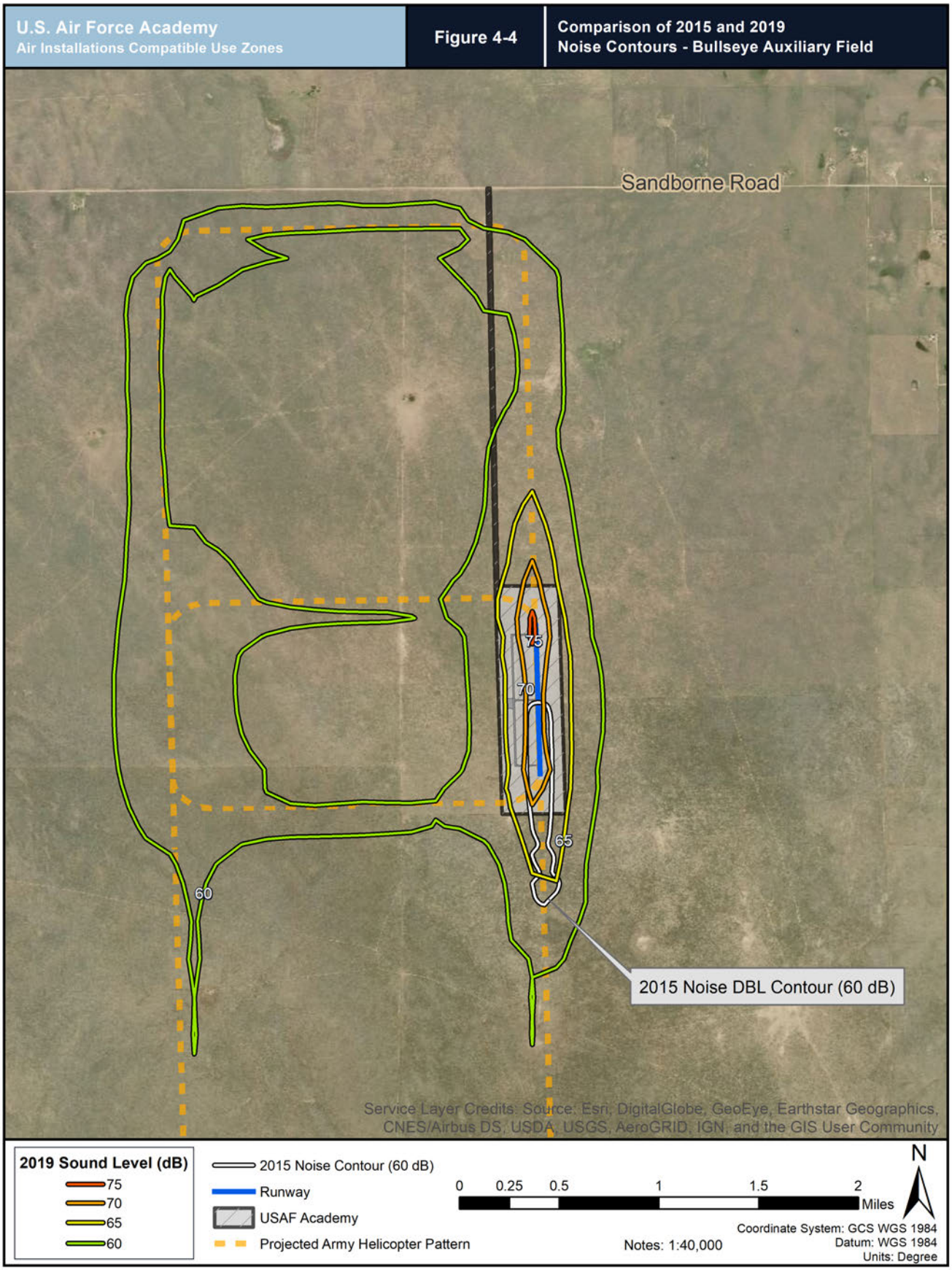
U.S. Air Force Academy
Air Installations Compatible Use Zones

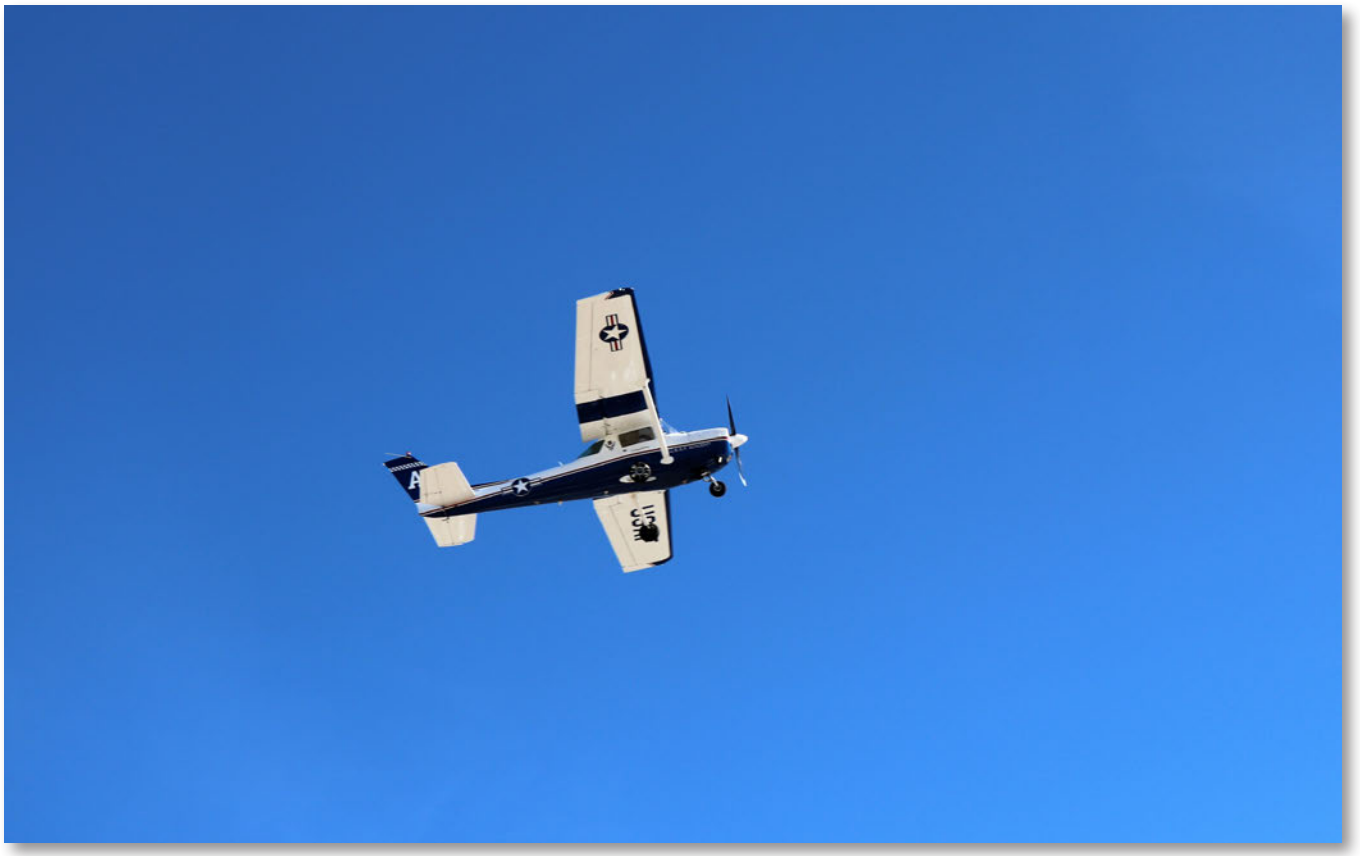
Figure 4-3

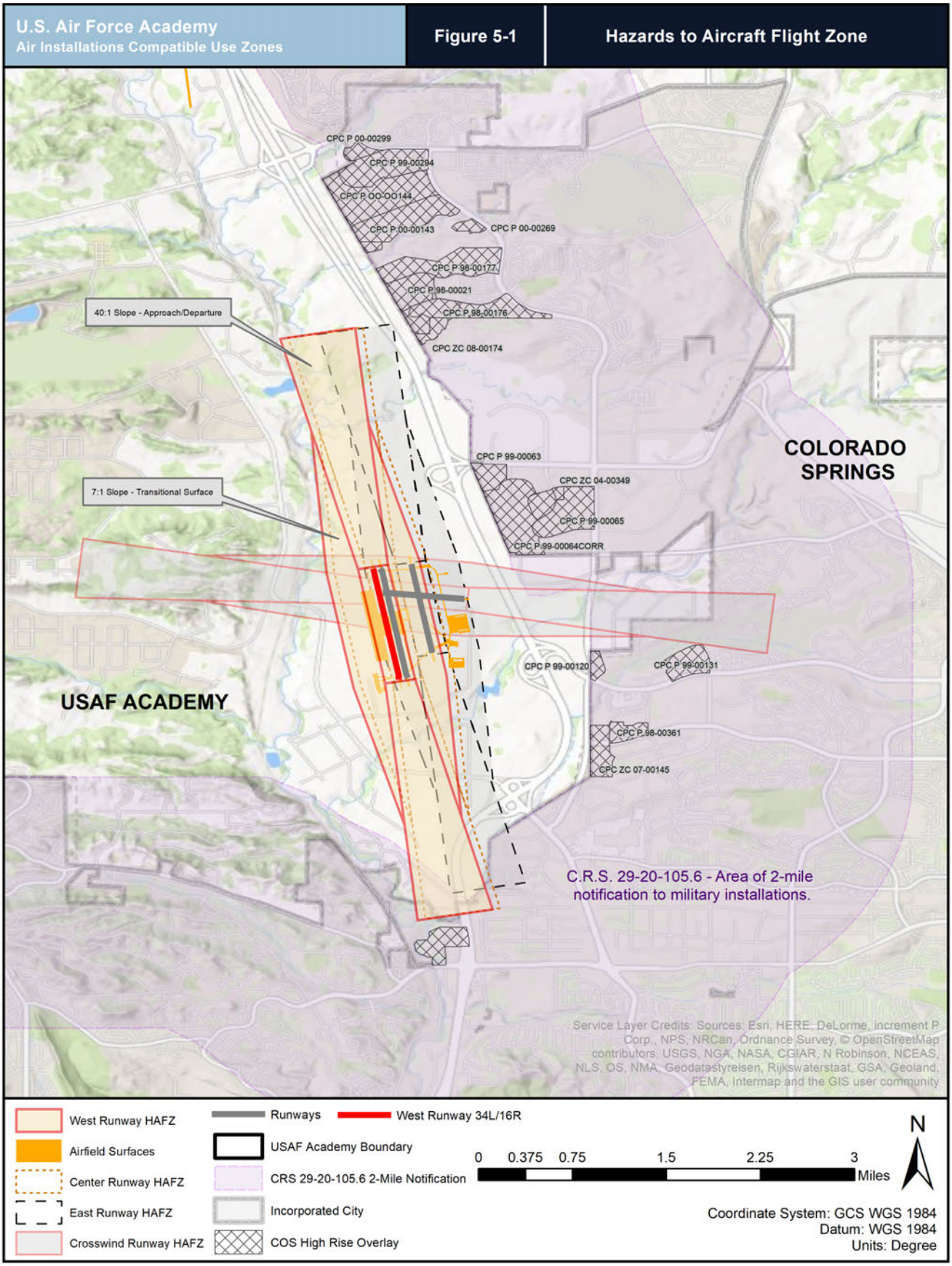
Comparison of 2015 and 2019 Noise Contours



6/21/2019


U.S. Air Force Academy
Air Installations Compatible Use Zones
Figure 4-4
Comparison of 2015 and 2019
Noise Contours - Bullseye Auxiliary Field
Sandborne Road
75
70
65
60
2015 Noise DBL Contour (60 dB)
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
2019 Sound Level (dB)
75
70
65
60
2015 Noise Contour (60 dB)
Runway
USAF Academy
Projected Army Helicopter Pattern
0 0.25 0.5 1 1.5 2
Miles
N
Notes: 1:40,000
Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree
6/20/2019




U.S. Air Force Academy
Air Installations Compatible Use Zones
Figure 5-1
Hazards to Aircraft Flight Zone
CPC P 00-00299
CPC P 99-00294
CPC P 00-00144
CPC P 00-00143
CPC P 00-00269
CPC P 98-00177
CPC P 98-00021
CPC P 98-00176
CPC ZC 08-00174
40:1 Slope - Approach/Departure
7:1 Slope - Transitional Surface
CPC P 99-00063
CPC ZC 04-00349
CPC P 99-00065
CPC P 99-00064CORR
COLORADO SPRINGS
USAF ACADEMY
CPC P 99-00120
CPC P 99-00131
CPC P 98-00361
CPC ZC 07-00145
C.R.S. 29-20-105.6 - Area of 2-mile notification to military installations.
Service Layer Credits: Sources: Esri, HERE, DeLorme, increment P Corp., NPS, NRCan, Ordnance Survey, © OpenStreetMap contributors, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community
West Runway HAFZ
Airfield Surfaces
Center Runway HAFZ
East Runway HAFZ
Crosswind Runway HAFZ
Runways
West Runway 34L/16R
USAF Academy Boundary
CRS 29-20-105.6 2-Mile Notification
Incorporated City
COS High Rise Overlay
0 0.375 0.75 1.5 2.25 3
Miles
N
Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree
6/21/2019

5.0 Community and Aircraft Safety

Collaboration between the Air Force and the community is necessary for strategic and effective land use planning and development.

Community and aircraft safety is paramount to the Air Force flying mission. This safety is a shared responsibility between the AF and the surrounding communities with each playing a vital role in its success. To facilitate this, the Air Force has established a flight safety program that includes designated areas of increased accident potential around its air installations to assist in preserving the health, safety, and welfare of community members living or working near its airfields. This AICUZ Study provides the information needed to reach this shared safety goal.

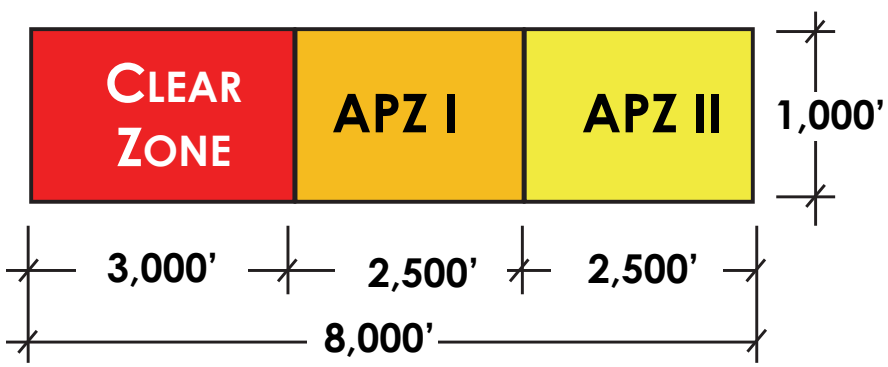
Identifying safety issues assists the community in developing land uses compatible with airfield operations. As part of the AICUZ Program, the Air Force defines areas of accident potential, imaginary surfaces, and hazards to aircraft flight.

5.1 Clear Zones and Accident Potential Zones

In the 1970s and 1980s, the military researched historical accident and airfield operations data throughout the military. The studies showed that most aircraft mishaps occur on or near the runway, diminishing in likelihood with distance from the runway. Based on these studies, the DoD identified CZs and accidental potential (APZs) as areas where an aircraft accident is most likely to occur if an accident were to take place; however, note that CZs and APZs are not predictors of accidents. The studies identified three areas that, because of accident potential, planners should consider for density and land use restrictions: the CZ, APZ I, and APZ II. The Academy CZs and APZs are described in the bullets below and are shown on Figure 5-3. 2019 Clear Zones and Accident Potential Zones for USAF Academy.

- Clear Zone: At the end of all active Air Force runways is an area known as the "Clear Zone." The CZ for the Academy's Class A runways are areas 1,000 feet in width and 3,000 feet in length, centered on the end of each runway. A CZ is required for all active runways and should remain undeveloped.
- APZ I: Beyond the CZ is APZ I. The Academy's APZ I is 1,000 feet in width and 2,500 feet in length along the extended runway centerline.
- APZ II: APZ II is the rectangular area beyond APZ I. The Academy APZ II is 1,000 feet in width by 2,500 feet in length along the extended runway centerline.

Figure 5-2. Runway Clear Zones and Accident Potential Zones for USAFA Class A Runways



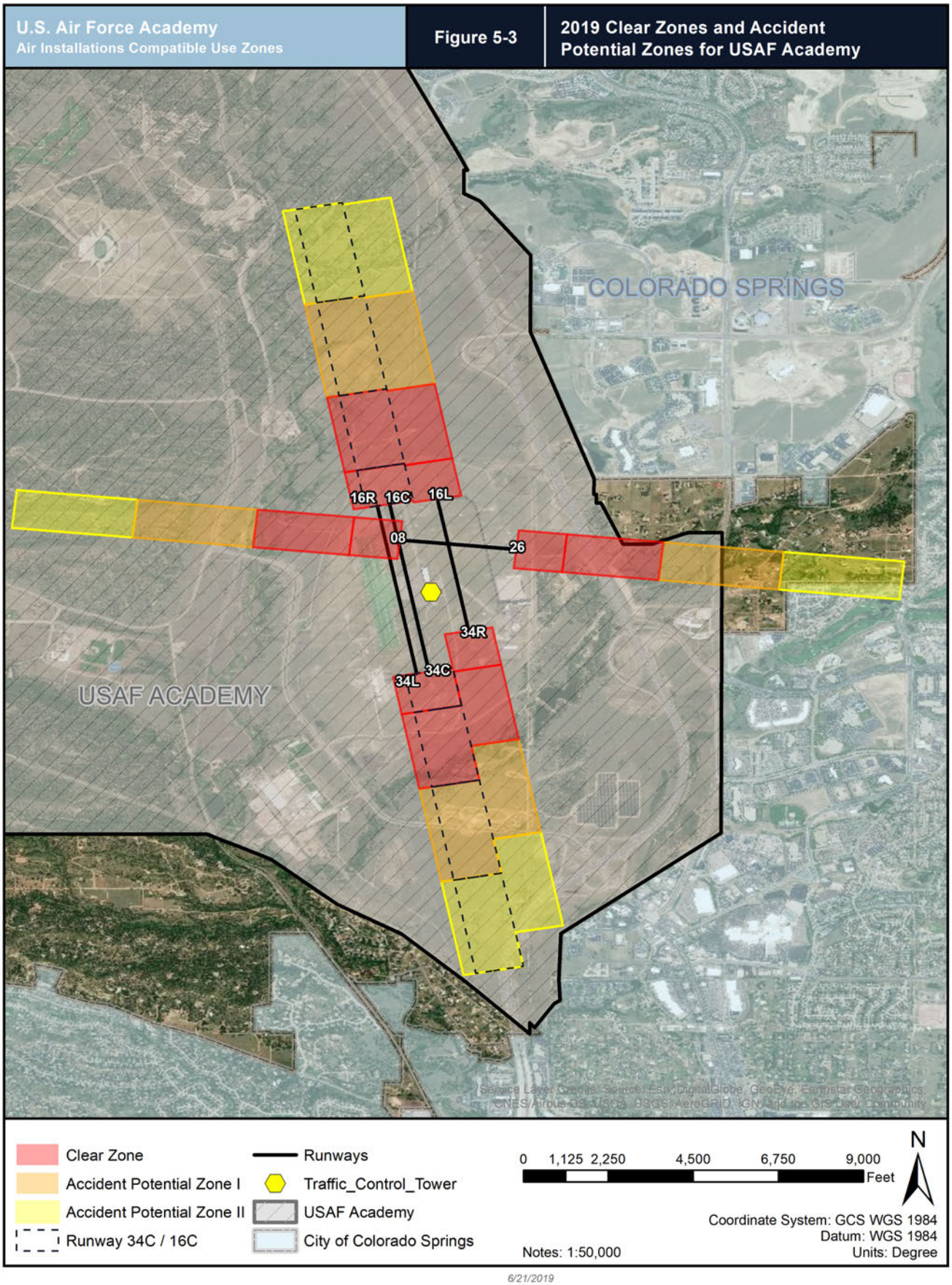
Within the CZ, most uses are incompatible with military aircraft operations. For this reason, it is AF policy, where possible, to acquire real property interests in land within the CZ to ensure incompatible development does not occur. A variety of land uses are compatible within APZ I and APZ II; however, higher density uses (e.g., schools, apartments, churches) should be restricted because of the greater safety risk in these areas. Chapter 6 discusses land use and recommendations for addressing incompatibility issues within APZs for each runway.

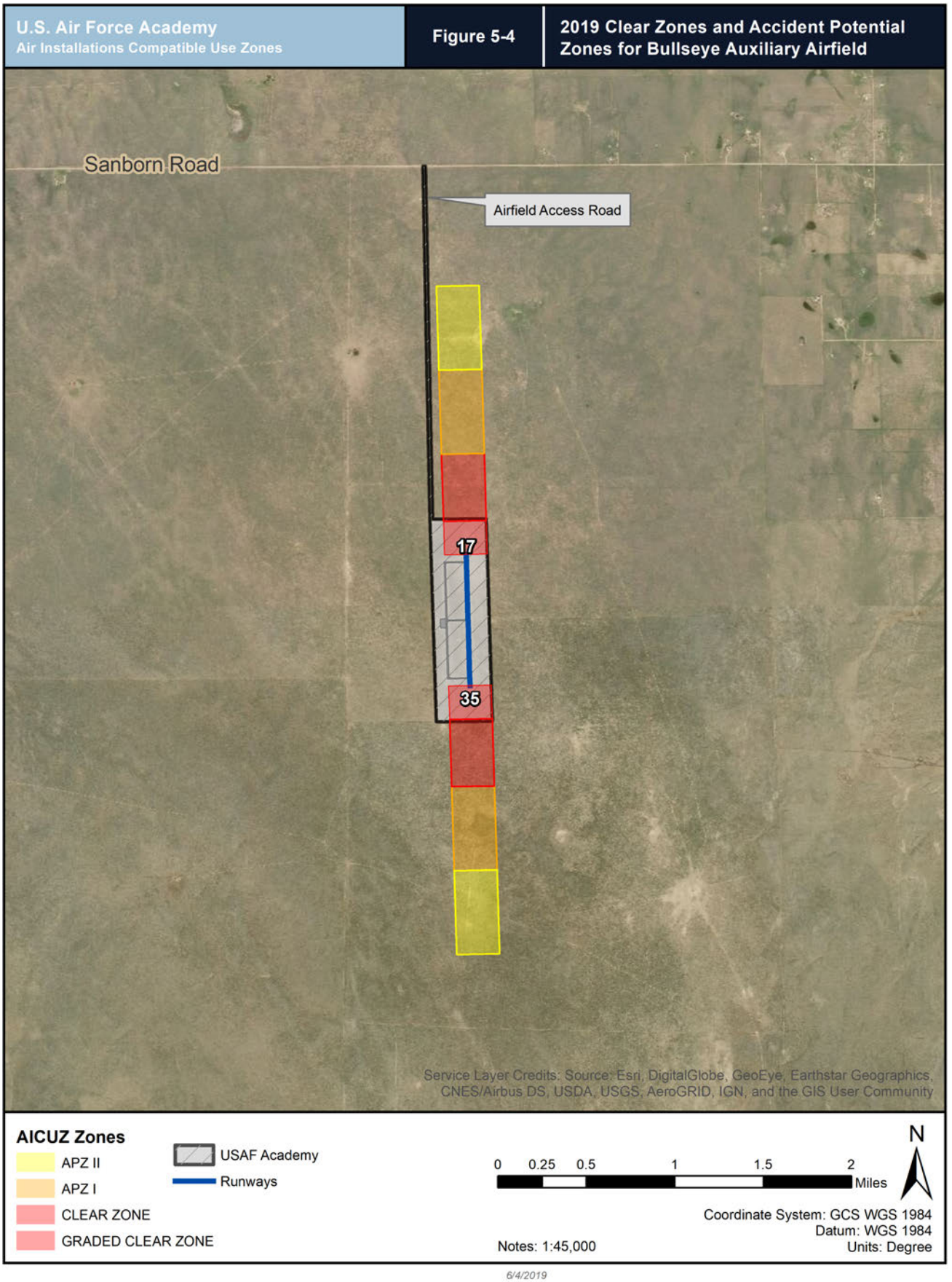
The main Academy Airfield contains four active Class A runways, and BAA contains a single Class A runway. Figure 5-3. 2019 Clear Zones and Accident Potential Zones for USUSAFA depicts the CZs and APZs for the Academy Runways 16R/34L, 16C/34C, 16L/34R, and Rwy 08/26. Figure 5-4. 2019 Clear Zones and Accident Potential Zones for USUSAFA depicts BAA CZs and APZs. Table 5-1 tabulates the off-installation land acreage and estimated population within the CZs and APZs.

Table 5-1. Off-installation Land Area and Estimated Population within the Clear Zones and Accident Potential Zones for Academy Airfield

Zone	Acres	Population
CZ	1.69	0
APZ I	27.68	~24
APZ II	53.33	~140
Total	**82.7**	**~164**

Source: Population estimate is dwelling count times average household size from 2017 census estimate for El Paso County, Colorado.


U.S. Air Force Academy
Air Installations Compatible Use Zones
Figure 5-3
2019 Clear Zones and Accident Potential Zones for USAF Academy
COLORADO SPRINGS
USAF ACADEMY
16R
16C
16L
08
26
34R
34C
34L
Clear Zone
Accident Potential Zone I
Accident Potential Zone II
Runway 34C / 16C
Runways
Traffic_Control_Tower
USAF Academy
City of Colorado Springs
0 1,125 2,250 4,500 6,750 9,000
Feet
N
Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree
Notes: 1:50,000
6/21/2019

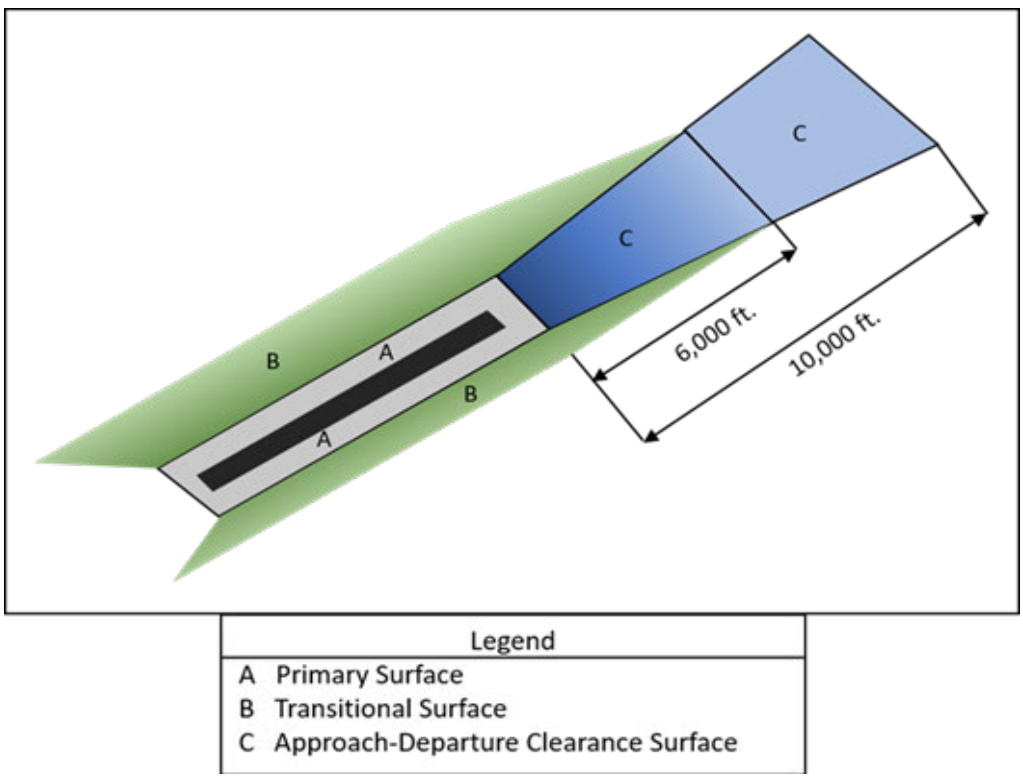

U.S. Air Force Academy
Air Installations Compatible Use Zones
Figure 5-4
2019 Clear Zones and Accident Potential Zones for Bullseye Auxiliary Airfield
Sanborn Road
Airfield Access Road
17
35
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
AICUZ Zones
APZ II
APZ I
CLEAR ZONE
GRADED CLEAR ZONE
USAF Academy
Runways
0 0.25 0.5 1 1.5 2
Miles
N
Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree
Notes: 1:45,000
6/4/2019

5.2 Imaginary Surfaces

The DoD and Federal Aviation Administration (FAA) identify a complex series of imaginary planes and transition surfaces that define the airspace required to remain free of obstructions around an airfield. Obstruction-free imaginary surfaces ensure safe flight approaches, departures, and pattern operations. Obstructions include natural terrain and man-made features such as buildings, towers, poles, wind turbines, cell towers, and other vertical obstructions to airspace navigation.

An illustration of the imaginary surfaces for fixed-wing runways is depicted on Figure 5-5. DoD Imaginary Surfaces and Transition Planes for USAFA Runways and Table 5-2. DoD Descriptions of Imaginary Surfaces for USAFA Airfields provides brief descriptions for each. Figure 5-5 depicts the runway airspace imaginary surfaces specific to the Academy's VFR-only airfield (DoD describes as Class 'A' Runway). In general, the AF does not permit above-ground structures in the primary surface, and CZ. Height restrictions apply to transitional surfaces and approach and departure surfaces. Height restrictions are more stringent for areas closer to the runway and flight paths.

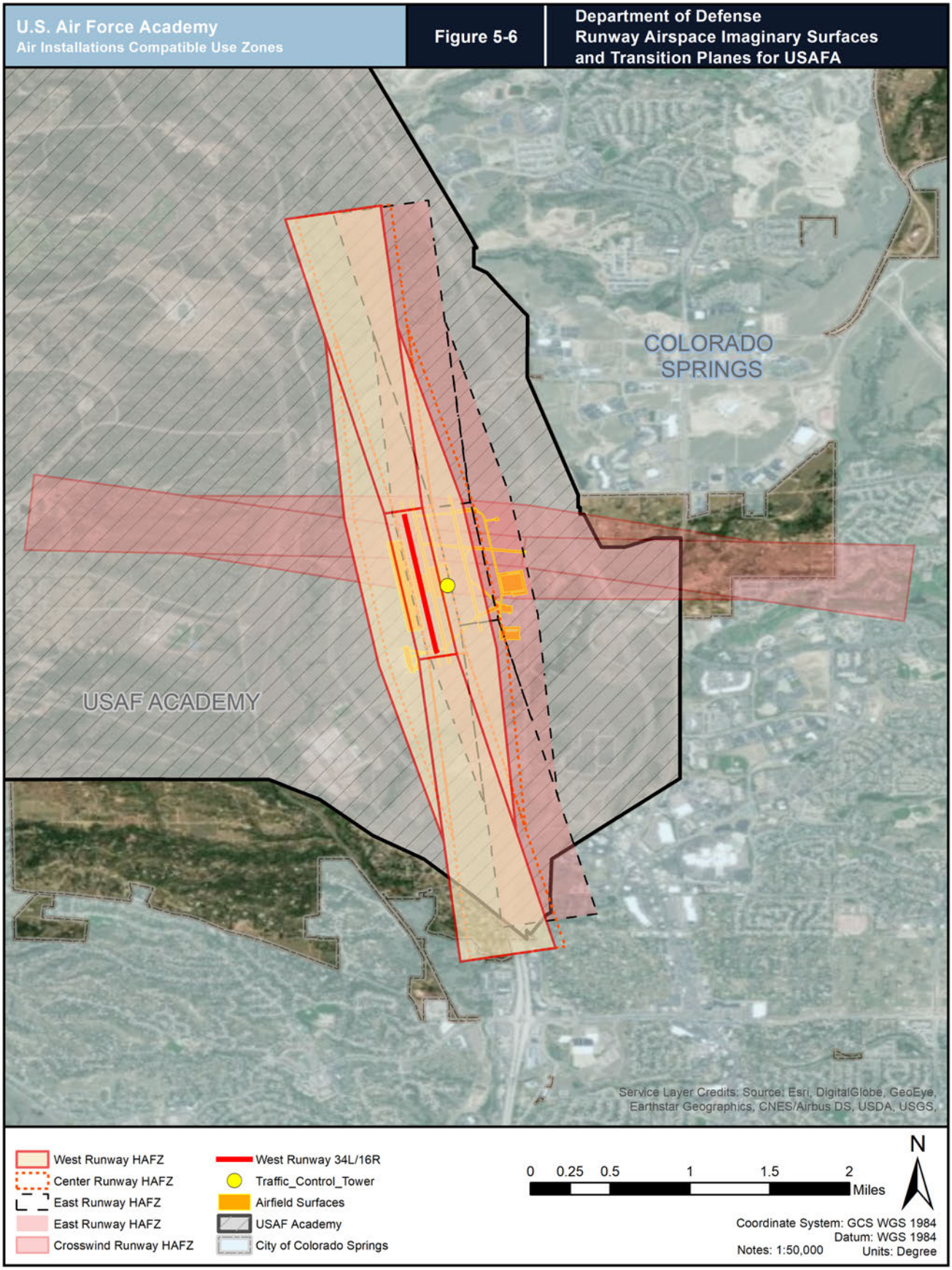
Figure 5-5. DoD Imaginary Surfaces and Transition Planes for USAFA Runways



Source: Unified Facilities Criteria 3-260-01, February 2019

Table 5-2. DoD Descriptions of Imaginary Surfaces for USAFA Airfields

Primary Surface	An imaginary surface symmetrically centered on the runway, extending 200 feet beyond each runway end that defines the limits of the obstruction clearance requirements in the vicinity of the landing area. The width of the primary surface is 1,000 feet (500 feet to either side of the runway centerline).
Approach-Departure Clearance Surface	This imaginary surface is symmetrically centered on the extended runway centerline, beginning as an inclined plane (glide angle) at the end of the primary surface (200 feet beyond each end of the runway), and extending for 10,000 feet. The slope of the approach-departure clearance surface is 40:1 until it reaches an elevation of 250 feet above the established airfield elevation. It then continues horizontally at this elevation to a point 10,000 feet from the starting point. The width of this surface at the runway end is 1,000 feet, flaring uniformly to a width of 2,500 feet at the end-point.
Transitional Surface	This surface extends outward and upward at right angles to the runway centerline and extended runway centerline at a slope of 7:1. The transitional surface connects the primary and the approach-departure clearance surfaces to the inner horizontal, the conical, and the outer horizontal surfaces.


U.S. Air Force Academy
Air Installations Compatible Use Zones
Figure 5-6
Department of Defense
Runway Airspace Imaginary Surfaces
and Transition Planes for USAFA
COLORADO
SPRINGS
USAF ACADEMY
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye,
Earthstar Geographics, CNES/Airbus DS, USDA, USGS,
West Runway HAFZ
Center Runway HAFZ
East Runway HAFZ
East Runway HAFZ
Crosswind Runway HAFZ
West Runway 34L/16R
Traffic_Control_Tower
Airfield Surfaces
USAF Academy
City of Colorado Springs
0 0.25 0.5 1 1.5 2
Miles
N
Coordinate System: GCS WGS 1984
Datum: WGS 1984
Notes: 1:50,000
Units: Degree
6/21/2019

5.3 Hazards to Aircraft Flight Zone

Certain land uses and activities pose potential hazards to flight. To ensure land uses and activities are examined for compatibility, the Air Force has identified a Hazards to Aircraft Flight Zone (HAFZ). The HAFZ is defined as the area within the imaginary surfaces that are shown on Figure 5-6. Runway Airspace Imaginary Surfaces and Transition Planes for USAFA. In addition to the imaginary surfaces, the HAFZ for the Air Force Academy includes the area defined by Colorado Revised Statute 29-20-105.6, as shown on Figure 5-1. Hazards to Aircraft Flight Zone. Unlike noise zones and safety zones, the HAFZ does not have recommended land use compatibility tables. Instead, it is a consultation zone recommending that project applicants and local planning bodies consult with the Air Force to ensure the project is compatible with Air Force operations. These land use and activity compatibility considerations include:

- Height: Tall objects can pose significant hazards to flight operations or interfere with navigational equipment (including radar). City and county agencies involved with approvals of permits for construction should require developers to file notice of construction or alteration to the Federal Aviation Administration (FAA) for determination of hazard (FAA Form 7460-1) per Title 14 Code of Federal Regulations (CFR), Part 77.9. For the Academy, the FAA requires filing notice within 20,000 feet of the runway surface. City and county agencies should consider requiring a "Determination of No Hazard" issued by the FAA for any tall objects within this zone prior to issuing a construction permit (see Figure 6-9. FAA Notification of Construction/Alteration Zone 20,000 Ft).
- Visual Interference: Industrial or agricultural sources of smoke, dust, and steam in the airfield vicinity can obstruct a pilot's vision during takeoff, landing, or other periods of low-altitude flight. Close coordination between the installation and landowners can often mitigate these concerns. For example, irrigating before plowing can greatly reduce dust concerns.
- Light Emissions: Bright lights, either direct or reflected, in the airfield vicinity can impair a pilot's vision. A sudden flash from a bright light causes a spot or "halo" to remain at the center of the visual field for a few seconds or more, rendering a person virtually blind to all other visual input. The eyes partially recover from this adaptation in a matter of minutes, but full adaptation typically requires 40 to 45 minutes.
- Bird/Wildlife Aircraft Strike Hazard (BASH): Wildlife represents a significant hazard to flight operations. Birds, in particular, are drawn to different habitat types found in the airfield environment, including hedges, grass, brush, forest, water, and even the warm pavement of the runways. Due to the speed of the aircraft, collisions with wildlife can happen with considerable force. Although most bird and animal strikes do not result in crashes, they cause structural and mechanical damage to aircraft as well as loss of flight time.

Most collisions occur when the aircraft is at an elevation of less than 1,000 feet. To reduce the potential of a BASH, the Air Force recommends that land uses that attract birds not be located near installations with an active air operations mission. These land uses include:

- Waste disposal operations;
- Wastewater treatment facilities;
- Transfer stations;
- Landfills;
- Golf courses;
- Wetlands;
- Storm water ponds; and
- Dredge disposal sites.

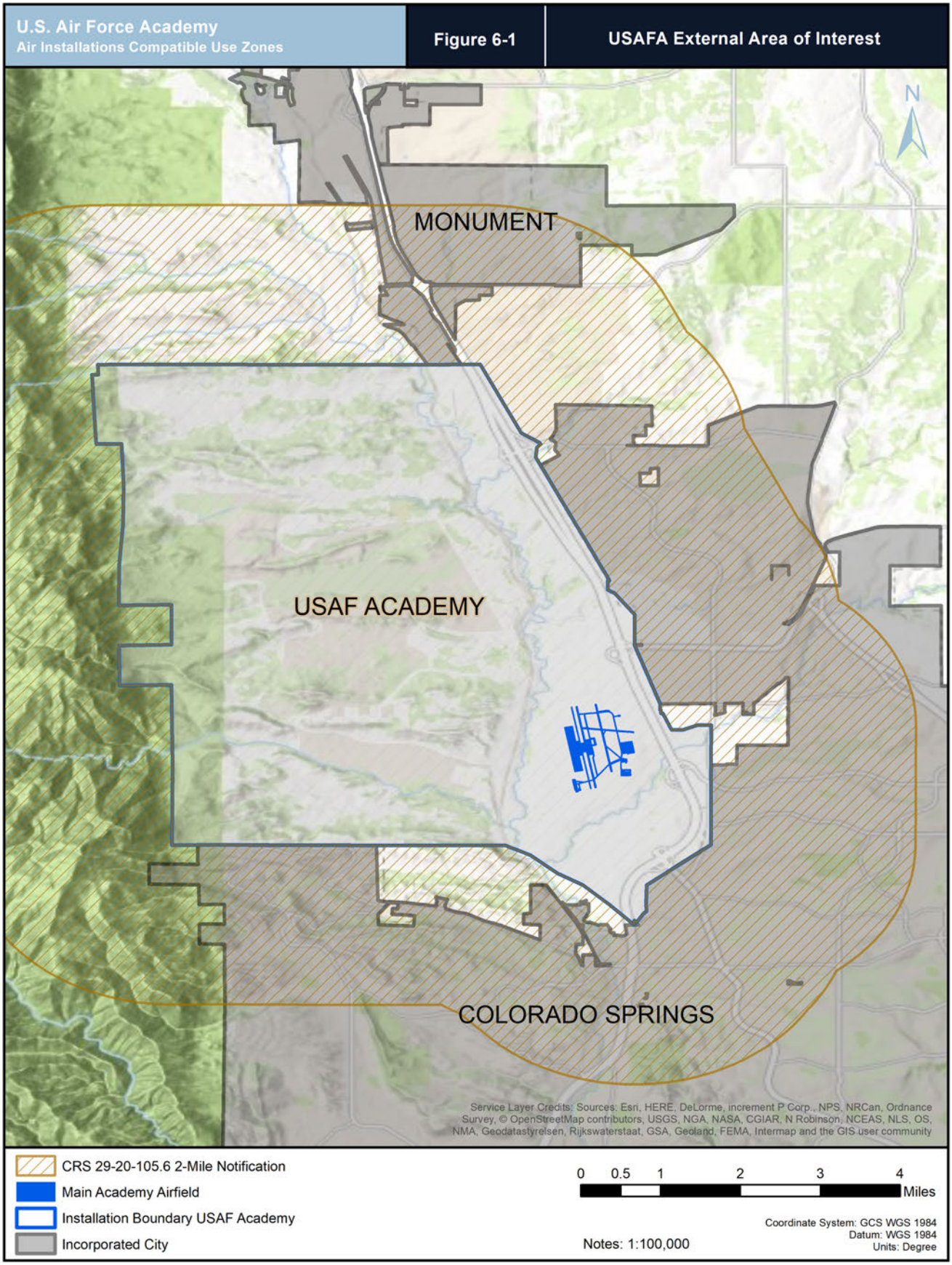
Birds and raptors in search of food or rodents will flock to landfills, increasing the probability of BASH occurrences near these facilities. One can also use design modifications to reduce the attractiveness of these types of land uses to birds and other wildlife.

- Radio Frequency/Electromagnetic Interference: The American National Standards Institute defines electromagnetic interference (EMI) as any electromagnetic disturbance that interrupts, obstructs, or otherwise degrades or limits the effective performance of electronics/electrical equipment.

EMI can be induced intentionally, as in forms of electronic warfare, or unintentionally, as a result of spurious emissions and responses, such as high-tension line leakage and industrial machinery. In addition, EMI may be caused by atmospheric phenomena, such as lightning or precipitation static.

New generations of military aircraft are highly dependent on complex electronic systems for navigation and critical flight and mission-related functions. Consequently, communities should use care when siting any activities that create EMI. Many of these sources are low-level emitters of EMI. However, when combined, they have an additive quality.

EMI also affects consumer devices, such as cell phones, FM radios, television reception, and garage door openers. In some cases, the source of interference occurs when consumer electronics use frequencies set aside for military use.


U.S. Air Force Academy
Air Installations Compatible Use Zones
Figure 6-1
USAFA External Area of Interest
N
MONUMENT
USAF ACADEMY
COLORADO SPRINGS
Service Layer Credits: Sources: Esri, HERE, DeLorme, increment P Corp., NPS, NRCan, Ordnance Survey, © OpenStreetMap contributors, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community
CRS 29-20-105.6 2-Mile Notification
Main Academy Airfield
Installation Boundary USAF Academy
Incorporated City
0 0.5 1 2 3 4
Miles
Notes: 1:100,000
Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree
6/21/2019

The AICUZ Study identifies the minimum recommended area within which land use controls can protect the health, safety, and welfare of those living or working near a military airfield while also ensuring the preservation of the military flying mission. AICUZ planning criteria are comprised of CZs noise zones, APZs, and hazards to aircraft flight zones. The AICUZ Study is a public document intended to inform local jurisdictional planning processes and resultant land use codes and regulations, which guide compatible use and development around military airfields.

This particular AICUZ Study uses noise zones, CZs, and APZs, and HAFZ (Figures 6-2 and 6-3, and 5-1 respectively) for the main USAFA airfield and BAA as the basis for this land use compatibility analysis.

6.1 Land Use Compatibility Guidelines and Classifications

In an effort to establish long-term compatibility for lands within the vicinity of military air installations, the DoD has created land use compatibility recommendations based on the Federal Highway Administration's Standard Land Use Coding Manual (SLUCM). These guidelines are used by DoD personnel for on-installation planning and for engaging with the local community to foster compatible land use development. Table A-1 of Appendix A, Land Use Compatibility Recommendations in APZs and CZs, shows the recommended land use compatibility guidelines within the CZs and APZs. Table A-2 of Appendix A, Recommended Land Use Compatibility for Noise Zones, provides land use compatibility recommendations within noise zones.

6.1.1 Analysis Process

The land use analysis identifies existing and future land use near the Air Force Academy and BAA to determine compatibility and identify concerns. Existing land use and zoning were assessed to determine current land use function, while future land use plans were used to project development and potential growth areas. Land use and GIS parcel data gathered from the local communities were evaluated and standardized in accordance with the SLUCM. Special attention is given to areas of interest identified by the Academy (See Figure 6-3. Existing Land Use and 2019 AICUZ Clear Zones and Accident Potential Zones). Additionally, local management plans, policies, ordinances, and zoning regulations were evaluated to determine the type and extent of land use allowed in specific areas.

6.2 Planning Authorities

This section presents information for each land use control agency whose jurisdiction could potentially impact the Air Force Academy and includes descriptions of existing and future land uses as well as pertinent Colorado statutes. The Air Force Academy is located in El Paso County, Colorado, adjacent to the municipalities of Colorado Springs and Monument. All three jurisdictions exercise land use authority, have established zoning ordinances and overlays, and control land sub-division and development through a formal application process. Furthermore, each jurisdiction notifies and requests comments from the Air Force Academy for applications within two miles of its military installation boundary in accordance with Colorado Revised Statute (C.R.S.) 29-20-105.6

6.2.1 Colorado Revised Statute 24-65.1-202 – Criteria for Administration of Areas of State Interest

Under C.R.S. 24-65.1-200 local governments are required to protect and administer areas around airports specifically as to (I) 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 (II) avoid danger to public safety and health or to property due to aircraft crashes.

6.2.2 Colorado Revised Statute 29-20-105.6 – Notification to Military Installations by Local Governments of Land Use Changes

Under C.R.S. 29-20-105.6, the General Assembly declares that it is desirable for local governments in the state to cooperate with military installations located within the state in order to encourage compatible land use, help prevent incompatible urban encroachment upon military installations, and facilitate the continued presence of major military installations within the state. This statute requires each local government with territorial boundaries within two miles of a military installation to notify the installation of information relating to proposed zoning changes, amendments to the local government's comprehensive plan, or land development regulations that, if approved, would affect the use of any area within two miles of the military installation (see Figure 6-1. USAFA External Area of Interest).

6.2.3 Colorado Revised Statute 41-4 – County Airports 42-4-101, 42-4-106, and 41.4.107

C.R.S. 41-4 is the authority for which the City of Colorado Spring cites for the creation of its airport overlay district. Specifically, parts 42-4-101 – Operation a Government Function, 42-4-106 – Operation of Airports, and 42-4-107 – Appropriation for Airports are cited in the City's zoning code.

6.2.4 Colorado Revised Statute 43.10.113 – Safe Operating Areas Around Airports

Under C.R.S. 43.10.113, land areas surrounding airports, as defined in Title 14 Code of Federal Regulations, Part 77, are declared to be a matter of state interest. The statute tasks governmental entities with zoning and building permit authority to adopt and enforce, at a minimum, rules and regulations to protect the land areas defined in Part 77.

6.2.5 Colorado Revised Statute 41.4.109 – Encroachment a Nuisance

Under C.R.S. 41.4.109, Removal of Airport Hazards, it is unlawful for anyone to build, rebuild, create, or cause to be built, rebuilt, or created any object or plant or cause to be planted or permit to grow higher any tree or other vegetation that shall encroach upon any airport protection privileges acquired pursuant to the provisions of C.R.S. Section 41-4-108.

6.2.6 Pikes Peak Area Council of Governments (PPACG)

The Pikes Peak Area Council of Governments (PPACG) is a voluntary organization of 16 counties and municipalities serving the region's cities, towns, and counties. The PPACG mission is "to provide a forum for local governments to discuss issues which cross political boundaries, identify shared opportunities and challenges, and develop collaborative strategies for action." Its governing Board of Directors is composed of elected officials appointed by member governments. There are five non-voting military representatives, including the U.S. Air Force Academy. Additionally, PPACG serves as the State-designated Metropolitan Planning Organization for the Colorado Springs Urbanized Area.

PPACG was the sponsoring agency for the 2018 Colorado Springs Regional Joint Land Use Study (JLUS) – a collaborative, intergovernmental planning effort to identify and address land use compatibility issues facing the region. This JLUS study recommends twelve implementation strategies to address regional civil-military compatibility issues.

The 2018 JLUS considered surrounding community and regional plans. Local governments legislate and administer independent land development regulations and zoning ordinances. The JLUS introduced recommendations for compatible land uses surrounding the Academy. The AICUZ Study discusses these recommendations further in Chapter 7.

6.2.7 El Paso County

El Paso County manages land use compatibility through a public process administered by its Planning and Community Development Department with oversight provided by the County Commission. The department provides a full range of planning and land use review services, as well as construction inspections and enforcement of the land development code and County ordinances.

The department utilizes GIS and an electronic development application review process (EDARP) to assess the requirement for local military base notification of development applications within unincorporated areas of the county within two miles of installations.

Planning staff routinely conduct 'early application' meetings with prospective developers to advise them on county regulations and state statutes, to include initial reviews by airport authorities and military installations within these respective zones. County staff require applicants to mitigate compatibility issues and notify military installations (or airport districts) of any amended development or sub-division applications. County staff provide notice to the Air Force Academy for amended applications. Unresolved issues follow the standard public process of review by the Planning Commission and decision by County Commission.

6.2.8 City of Colorado Springs

Colorado Springs manages land use compatibility through a public process administered by its Planning and Community Development Land Use Review Department with oversight provided by the Mayor and City Council. The department provides a full range of planning and land use review services, as well as construction inspections and enforcement of the land development code and City ordinances.

The department utilizes manual analysis of GIS data to determine if there is a requirement to notify military installations of a development application falling within two miles of the base. The department notifies local military installation staff within its jurisdiction via its standard notification protocol for initial review and comment. Adjudication of compatibility issues follows one of two tracks for development review; public hearing process or administrative review. In the former, City Planning Commission is the approval authority with appeal to City Council; in the latter, some development applications may be approved by city planning staff with appeal to the planning commission.

The 2019 draft City Comprehensive Plan (discussed further in Section 6.4.3) sets a goal to collaborate with regional military institutions and to incorporate appropriate recommendations from the Joint Land Use Study (JLUS).

6.2.9 Town of Monument

The Town of Monument manages land use compatibility through a public process administered by its Planning Department with oversight provided by the Mayor and Board of Trustees. The department reviews and processes all development applications, including those that require a recommendation from the Planning Commission and approval by the Board of Trustees, as well as smaller-scale development applications and permits that are approved administratively. The department utilizes manual analysis of GIS data to determine if there is a requirement to notify military installations of a development application falling within two miles of the base. Notices are provided via email to local military installation staff within its jurisdiction for review and comment.

6.3 Land Use and Proposed Development

6.3.1 Existing Land Use

The Air Force Academy is within the Colorado Springs Metropolitan Statistical Area and abuts the City of Colorado Springs to the south and east of the installation and the Town of Monument to the north. The Pike National Forest and the Southern Front Mountain Range mark its western border with lands managed by the National Forest Service and the Federal Bureau of Land Management.

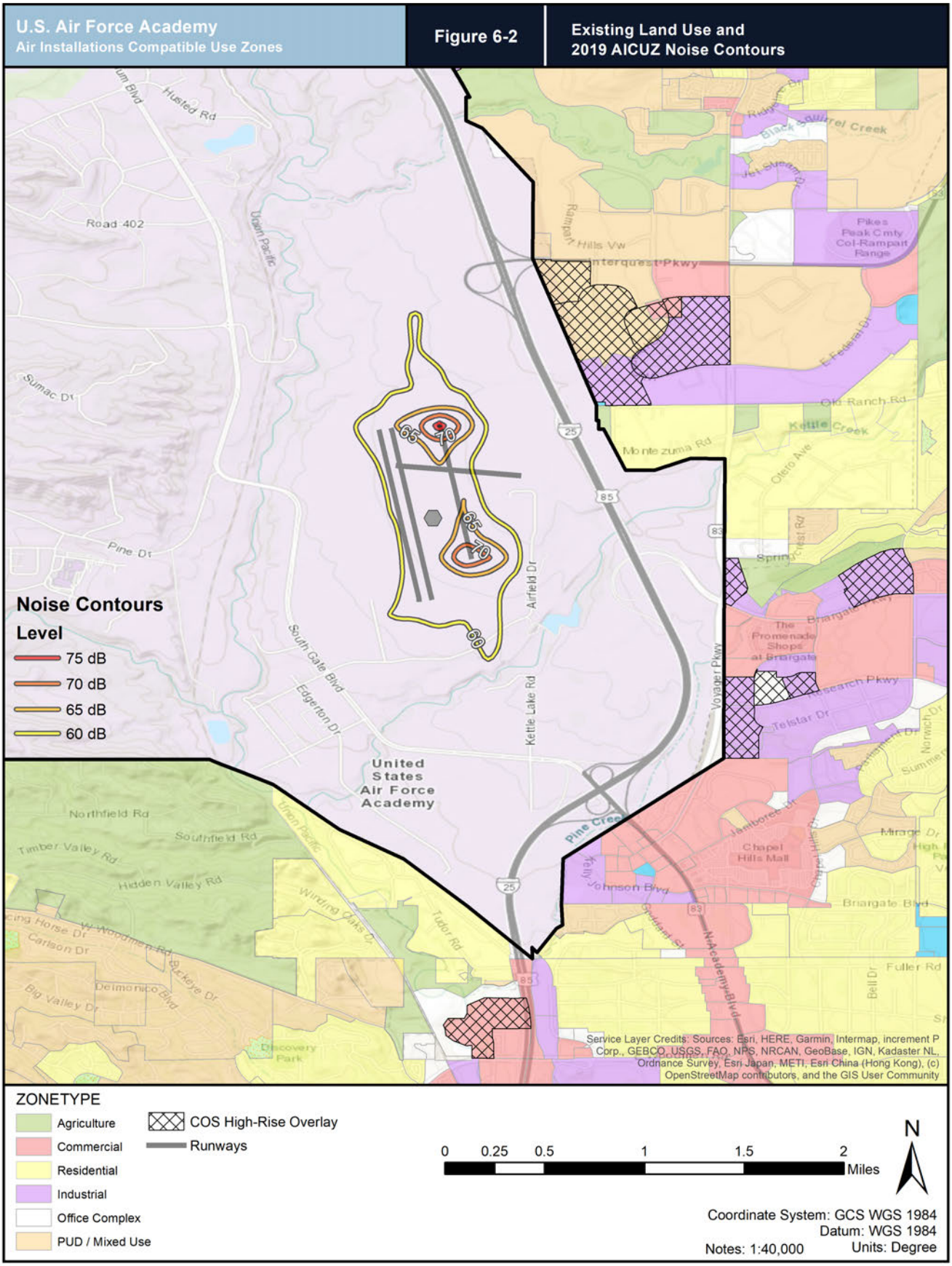
The airfield and mission support areas of the Academy fall within the greater urbanized area of Colorado Springs with commercial districts, light industrial areas, office parks, and residential neighborhoods characterizing the urban form along nearly all of its southern and eastern boundaries. Land along the Academy's northern boundary remains relatively undeveloped with agriculture, and rural estate characterizing the predominant land use.

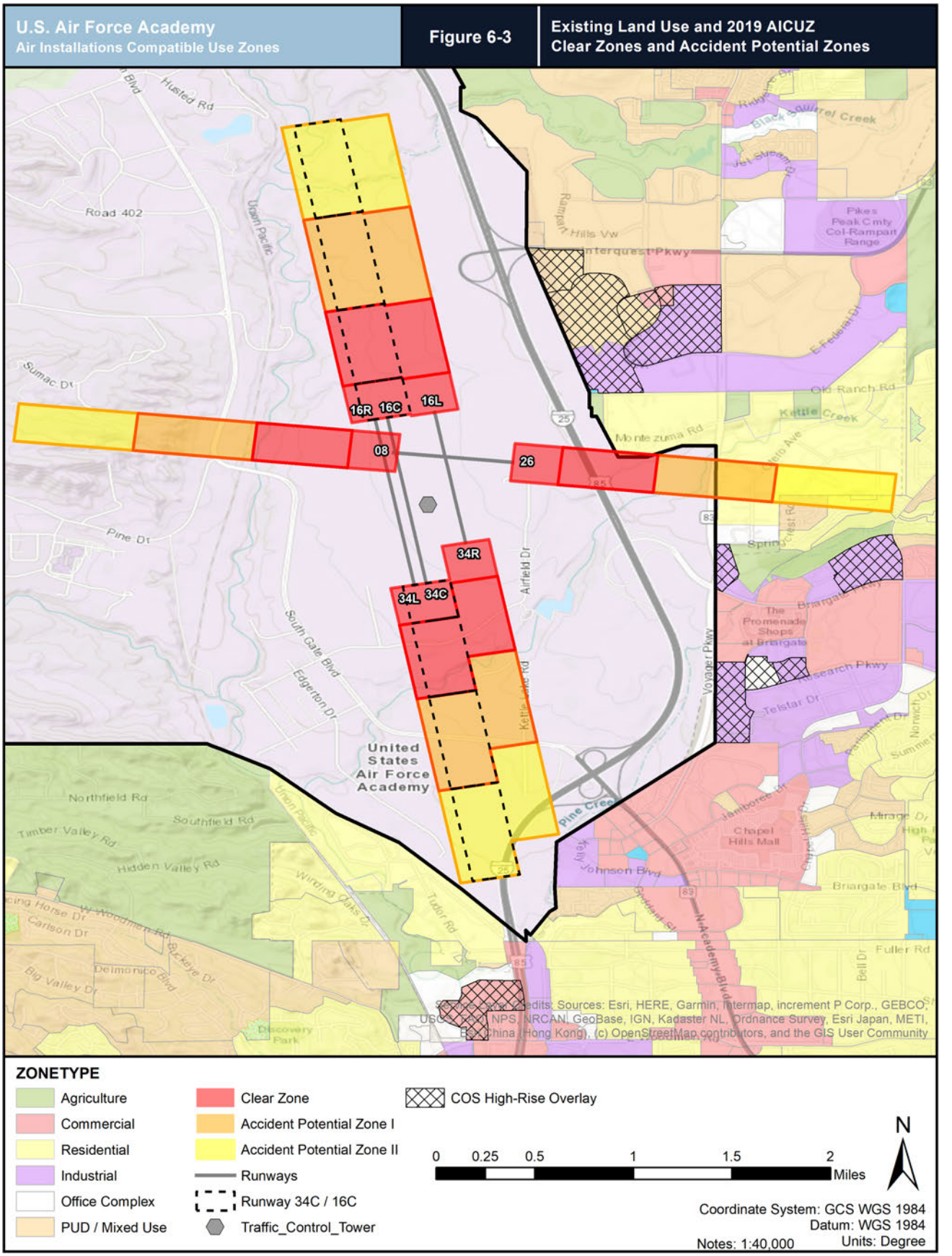
The Air Force Academy is not subject to any extraterritorial jurisdiction and is currently outside the jurisdiction of the City of Colorado Springs. However, the City of Colorado Springs recently annexed, in mutual agreement with the Academy, approximately 185 acres of Academy property along North Gate Boulevard at Interstate Highway 25 (I-25). Under an enhanced use lease agreement for approximately 50 acres of the site, a developer will construct a mixed-use development, including office, retail, hotel, and a new Academy visitors' center.

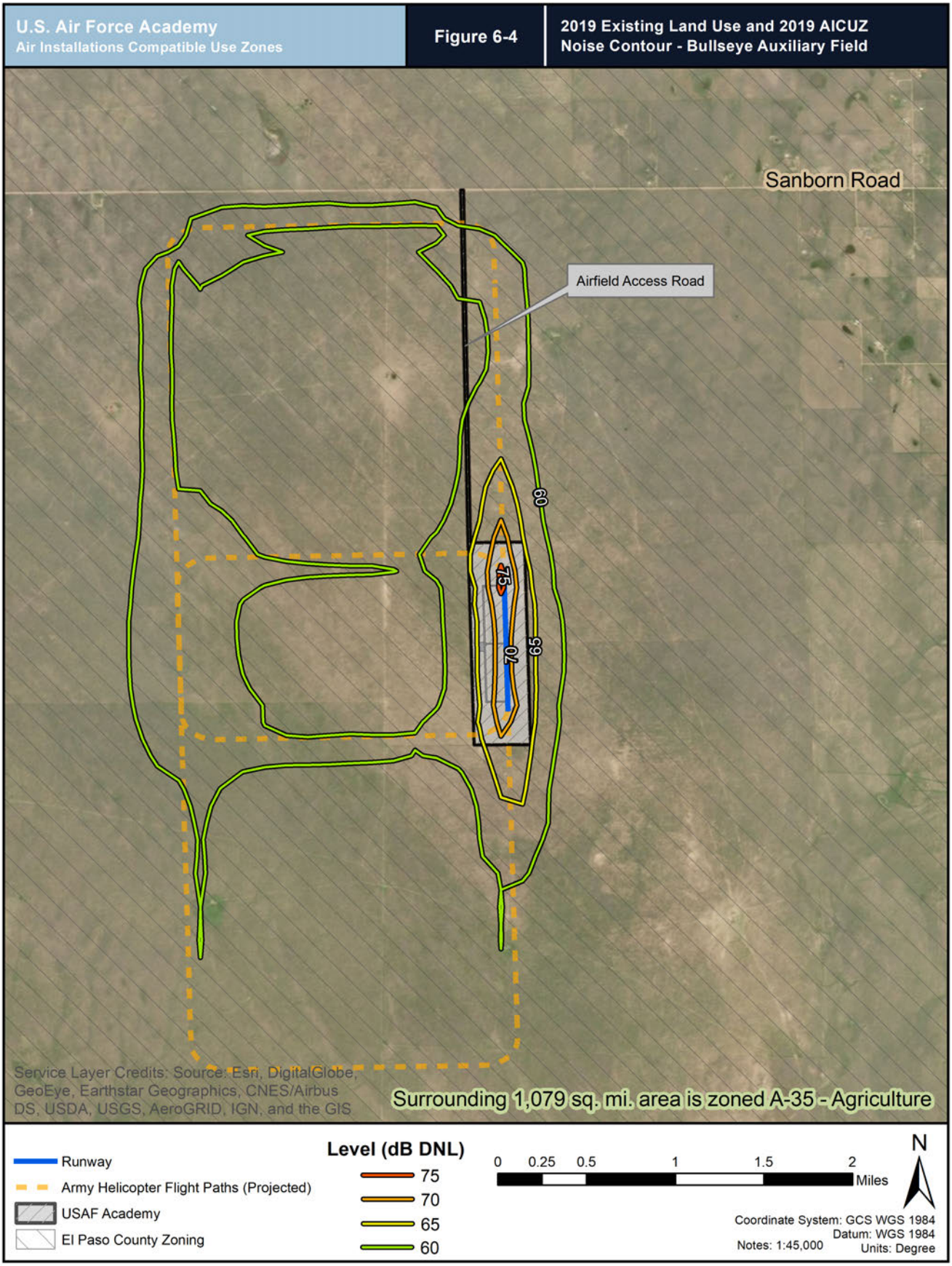
Land use within CZs and APZs for the Academy's main airfield east runway (Runway 34R/16L) are single-family residential and planned unit residential development (Figure 6-3. Existing Land Use and 2019 AICUZ Clear Zones and Accident Potential Zones and Table 6-3. Academy Airfield Off-installation Future Land Use Acreage within Clear Zones/Accident Potential Zones). Areas of specific land use compatibility concern for the Air Force Academy are further evaluated in Section 6.4.2, Existing Land Use Compatibility Concerns and Section 6.4.3, Future Land Use Compatibility Concerns.

Existing land uses within the AICUZ CZs, APZs, and noise contours are illustrated on Figures 6-1. USAFA External Area of Interest, 6-2. Existing Land Use and 2019 AICUZ Noise Contours, and 6-6. Incompatible Land Use and 2019 AICUZ Clear Zones and Accident Potential Zones, respectively. No civilian land use falls within the main Academy airfield noise zones. Table 6-2. Academy Airfield Off-installation Existing Land Use Acreage within Clear Zones/Accident Potential Zones summarizes the total acreage of land uses within the 2019 AICUZ APZs.

Agriculture is the predominant land use within BAA APZs and noise contours. The State of Colorado leases the land for the airfield to the Air Force and leases surrounding parcels for agriculture. Land use compatibility around BAA is not a significant concern, however some specific types of agriculture operations are not compatible within the CZs (see Figure 6-4. 2019 Existing Land Use and 2019 Bullseye AICUZ Noise Planning Contours).


U.S. Air Force Academy
Air Installations Compatible Use Zones
Figure 6-2
Existing Land Use and
2019 AICUZ Noise Contours
Noise Contours
Level
75 dB
70 dB
65 dB
60 dB
United States Air Force Academy
Road 402
Sumac Dr
Pine Dr
Husted Rd
Union Pacific
Airfield Dr
Kettle Lake Rd
South Gate Blvd
Edgerton Dr
Monte zuma Rd
Old Ranch Rd
Kettle Creek
Oteto Ave
Pikes Peak Cmty Col-Rampart Range
Rampart Hills Vw
Interquest Pkwy
E Federal Dr
Spring Crest Rd
Voyager Pkwy
Research Pkwy
Telstar Dr
The Promenade Shops at Briargate
Briargate Blvd
Chapel Hills Mall
Johnson Blvd
Jamboree Dr
Mirage Dr
Fuller Rd
Bell Dr
N Academy Blvd
Pine Creek
Northfield Rd
Southfield Rd
Timber Valley Rd
Hidden Valley Rd
Carlson Dr
Big Valley Dr
Delmonico Blvd
Buckeye Dr
Tudor Rd
Discovery Park
Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
ZONETYPE
Agriculture
Commercial
Residential
Industrial
Office Complex
PUD / Mixed Use
COS High-Rise Overlay
Runways
0 0.25 0.5 1 1.5 2
Miles
N
Coordinate System: GCS WGS 1984
Datum: WGS 1984
Notes: 1:40,000
Units: Degree
6/28/2019

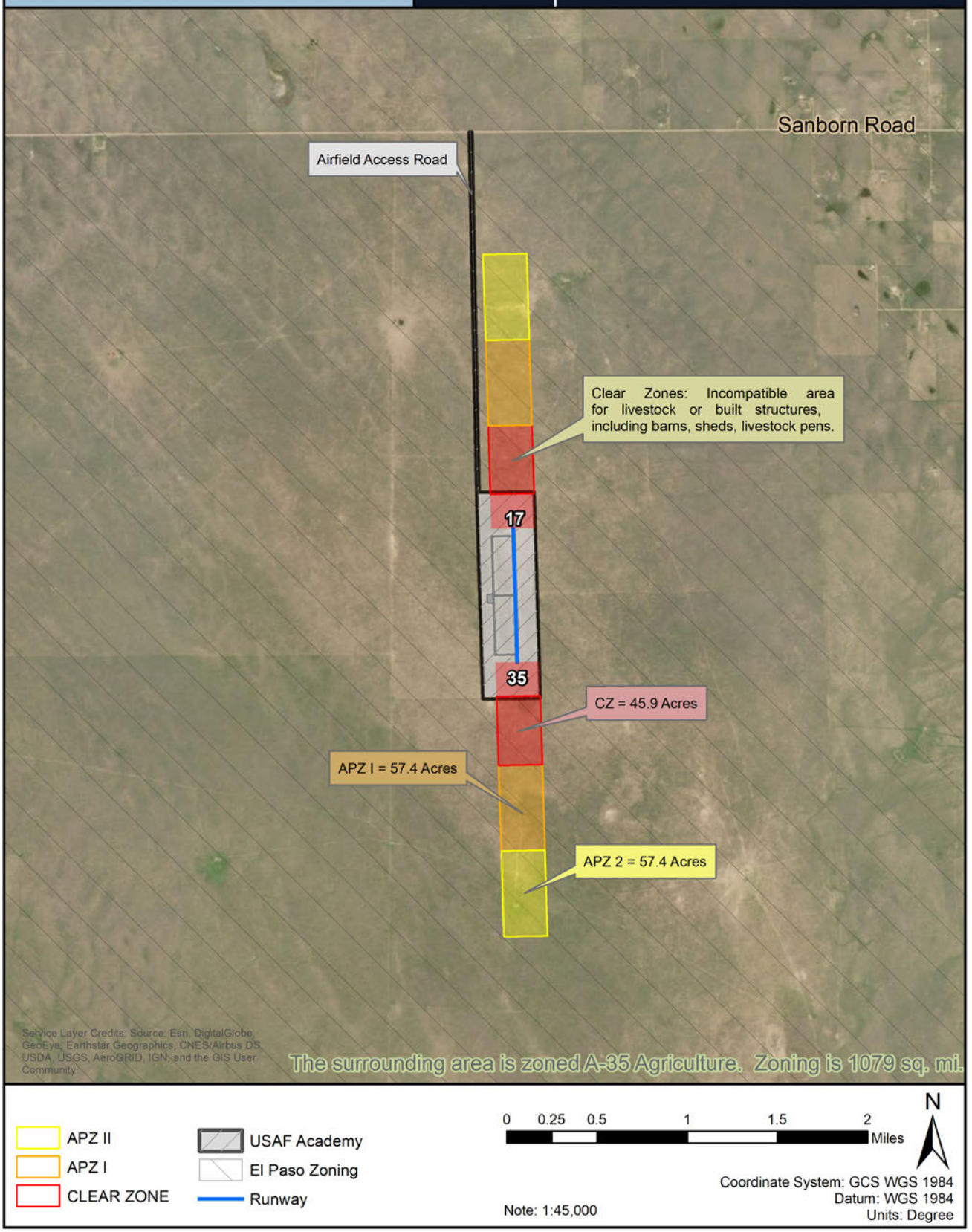

U.S. Air Force Academy
Air Installations Compatible Use Zones
Figure 6-3
Existing Land Use and 2019 AICUZ
Clear Zones and Accident Potential Zones
16R
16C
16L
08
26
34R
34L
34C
United States Air Force Academy
Road 402
Pine Dr
Sumac Dr
Husted Rd
Northfield Rd
Southfield Rd
Timber Valley Rd
Hidden Valley Rd
Carlson Dr
Delmonico Blvd
Big Valley Dr
Discovery Park
Airfield Dr
South Gate Blvd
Edgerton Dr
Kettle Creek Rd
Voyager Pkwy
Research Pkwy
Telstar Dr
Monte Zuma Rd
Old Ranch Rd
Kettle Creek
Pikes Peak Cmty Col-Rampart Range
Chapel Hills Mall
Johnson Blvd
Briargate Blvd
Fuller Rd
N Academy Blvd
Union Pacific
Pine Creek
ZONETYPE
Agriculture
Commercial
Residential
Industrial
Office Complex
PUD / Mixed Use
Clear Zone
Accident Potential Zone I
Accident Potential Zone II
Runways
Runway 34C / 16C
Traffic_Control_Tower
COS High-Rise Overlay
0 0.25 0.5 1 1.5 2
Miles
N
Coordinate System: GCS WGS 1984
Datum: WGS 1984
Notes: 1:40,000
Units: Degree
6/28/2019


U.S. Air Force Academy
Air Installations Compatible Use Zones
Figure 6-4
2019 Existing Land Use and 2019 AICUZ
Noise Contour - Bullseye Auxiliary Field
Sanborn Road
Airfield Access Road
60
65
70
75
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS
Surrounding 1,079 sq. mi. area is zoned A-35 - Agriculture
Runway
Army Helicopter Flight Paths (Projected)
USAF Academy
El Paso County Zoning
Level (dB DNL)
75
70
65
60
0 0.25 0.5 1 1.5 2
Miles
N
Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree
Notes: 1:45,000
7/1/2019

U.S. Air Force Academy
Air Installations Compatible Use Zones

Figure 6-5

Existing Land Use Around Bullseye and 2019 AICUZ Clear Zones and Accident Potential Zones



6.3.2 Current Zoning

Zoning is the legal regulation of property use to protect the health, safety, and welfare of citizens, to protect property rights, to conserve resources, to minimize nuisances, and to avoid incompatible uses. In Colorado, counties and cities enact zoning ordinances to implement their respective comprehensive plan objectives.

Land use and parcel GIS data obtained from the City of Colorado Springs, the Town of Monument, and El Paso County were evaluated and standardized in accordance with Section 6.4. Additionally, local management plans, policies, ordinances, and zoning regulations were evaluated to determine the type and extent of land use allowed in specific areas of interest relative to airfield and flight operations to determine the compatibility of existing land use (See Figure 6-5. Existing Land Use Around Bullseye and 2019 AICUZ Clear Zones and Accident Potential Zones).

6.3.3 Future Land Use

Municipal comprehensive land use plans were reviewed to project development, changing land use, and potential growth areas that may challenge future compatible land use with the Air Force Academy – specifically PlanCOS, the comprehensive plan for Colorado Springs, and the Town of Monument Comprehensive Plan 2017. El Paso County Planning and Community Development Department is drafting a comprehensive development plan for El Paso County as well as small area plans for specific areas of the county. This effort may include the unincorporated county parcels along the Academy's northern boundary, west of Monument as a focus area for small area planning (See Figure 6-7. Incompatible Land Use and 2019 USAFA Airfield AICUZ CZs and APZs).

Table 6-1. Generalized Land Use Categories and Noise/Safety Compatibility

Generalized Land Use Category	Noise Zone (dB DNL)						Clear Zone	APZ I	APZ II
	<65	65-69	70-74	75-79	80-85	85+			
Residential	Yes	No [1]	No [1]	No	No	No	No	No	No [1]
Commercial	Yes	Yes	Yes [2]	Yes [2]	No	No	No	Yes [2]	Yes [2]
Industrial	Yes	Yes	Yes	Yes	Yes [2]	No	No	Yes [2]	Yes [2]
Public/Quasi-Public	Yes	Yes [2]	Yes [2]	Yes [2]	No	No	No	No	Yes [2]
Recreation	Yes	Yes [2]	Yes [2]	No	No	No	No	Yes [2]	Yes [2]
Open/Agriculture/Low Density	Yes	Yes [2]	Yes [2]	Yes [2]	Yes [2]	Yes [2]	No	Yes [2]	Yes [2]
Undesignated	Yes	No	No	No	No	No	No	No	No

Notes: 1 Incompatible with exceptions. 2 Compatible with restrictions. 3 This generalized table demonstrates the land compatibility guidelines. Refer to Appendix A for use in determining land use compatibility.

6.4 Compatibility Concerns

6.4.1 Standards for Land Use Analysis – Current Zoning

To compare land use consistently across jurisdictions, this analysis uses the following land use classifications illustrating compatibility across common use types among multiple jurisdictions. These generalized land use categories are not exact representations of the local community's designations, but combine similar uses into one of several categories:

- Residential: All types of residential activity, such as single- and multi-family residences and mobile homes, at a density greater than one dwelling unit per acre
- Commercial: All types of commercial and retail business to include small offices, retail and service business, restaurants, stores, malls, strip commercial centers, restaurants, hotels, and highway commercial uses
- Office Complex: Professional offices that include business offices, usually grouped in office parks, campuses, medium or high-rise buildings
- Mixed Use: A horizontal or vertical blend of residential, commercial, office, cultural, institutional, or even industrial uses as governed by local ordinance
- Industrial: Heavy manufacturing, seaport, utilities, chemical storage and other high impact uses. Includes low-impact or high-tech manufacturing, distribution, or warehousing uses.
- Public/Quasi-Public: Publicly owned lands and land that the public has access to, including public buildings, schools, churches, cemeteries, hospitals, libraries museums, government offices, police and fire stations (also referred to as Institutional land use)
- Recreational: Natural, preserved, or undeveloped land areas designated for recreational activity, such as parks, wilderness areas and reservations, conservation areas, and areas designated for trails, hikes, camping. Also includes wetlands, floodplains, forests, and stream buffers
- Open/Agriculture/Low Density: Undeveloped land areas, agricultural areas, grazing lands and areas with residential activity at densities less than or equal to one dwelling unit per acre
- Military: Applies to military reservations, satellite utility infrastructure, auxiliary airfields and training grounds
- Undesignated: Applies to parcels that had no indicated value or were listed as "undesignated" in the original datasets, usually public right-of-ways and utility infrastructure parcels

6.4.2 Existing Land Use Compatibility Concerns

The 2005 USAFA AICUZ Study focused attention on three unincorporated parcels of El Paso County intersecting with the CZ of Runway 26. These parcels intersect the CZ at the rear of the property line. While the parcels appear to be free of structures within the CZ, residential structures exist on each parcel. This area is approximately 1.7 acres in size. The Academy has no right-of-way easements for this area (see Figure 6-7. Incompatible Land Use and 2019 USAFA Airfield AICUZ CZs and APZs).

This 2019 AICUZ study further identifies 87.2 acres of incompatible land use within Runway 26 APZs I and II. This area is fully developed and land use is predominantly single-family residential with roughly ten acres of planned unit residential. Table 6-2 summarizes the total acreage of land uses within the 2019 AICUZ APZs (see also Figure 6-6. Incompatible Land Use and 2019 AICUZ Clear Zones and Accident Potential Zones).

More concerning to compatible land use are twenty-three high-rise overlays districts in close proximity to the main Academy airfield. Twelve high-rise overlays are within 10,000 feet of its airfield runways. These overlays are codified in Chapter 7, Article 3, Part 5, Section 7.3.503: HR High Rise Overlay of the Colorado Springs City Code. This zoning allows for construction of high-rise buildings in accordance with height, floor area and bulk limitations, on fourteen base zones of the city with a maximum multiplying factor of ten times the buildable lot area for zones C-6 and MU-R/EC. These zones are primarily intended for the downtown district; however, the twenty-three high-rise overlay parcels near the Air Force Academy airfield cover four base zones (Planned Unit Development, Office Complex, Planned Business Center, and Planned Industrial Park) (See Figure 6-8. High Rise Overlay Zones relative to 2019 AICUZ Clear Zones and Accident Potential Zones).

High-rise overlays combined with the absence an airport overlay district (neither city nor county) for the main Academy airfield along with anticipated high intensity development create ongoing land use compatibility concerns for the Air Force.

Tall structures combined with rising terrain relative to the elevation of the airfield, encroach upon airspace needed for safe separation between buildings and aircraft. Safe separation is the distance required by FAA regulations for aircraft and must be a minimum of 500 feet. Continued high-rise development near the Academy threatens its Cadet Flight Training Program and safe airfield operations. Existing code for the City of Colorado Springs and El Paso County, or both, could be extended to cover the Academy airfield as an airport overlay district.

Table 6-2 Academy Airfield Off-installation Existing Land Use Acreage within Clear Zones/ Accident Potential Zones

Designation	Generalized Land Use Category2	CZ	Note	APZ I	Note	APZ II	Note	Total
Incompatible	Residential	1.69		27.68		53.33	(1)	82.70
	Commercial	-						-
	Industrial	-						-
	Public/Quasi-Public	-		-				-
	Recreation	-						-
	Open/Agriculture/Low Density	-						-
	Undesignated	-		-		-		-
Compatible	Residential							
	Commercial			-		-		-
	Industrial			-		-		-
	Public/Quasi-Public					-		-
	Recreation			-		-		-
	Open/Agriculture/Low Density			-		-		-
	Undesignated							
Subtotals	Incompatible	1.69		27.68		53.33		82.70
	Compatible	-		-		-		-
TOTAL								

Notes: All areas on-installation are excluded from the counts. Shaded compatible cells correspond to incompatible rows, and vice versa.

1 Compatible with restrictions. (Easement not to build structures)

2 Refer to Appendix A for details.

Table 6-3 Academy Airfield Off-installation Future Land Use Acreage within Clear Zones/ Accident Potential Zones

Designation	Generalized Land Use Category2	CZ	Note	APZ I	Note	APZ II	Note	Total
Incompatible	Residential	1.69		27.68		53.33	(1)	82.70
	Commercial	-						-
	Industrial	-						-
	Public/Quasi-Public	-		-				-
	Recreation	-						-
	Open/Agriculture/Low Density	-						-
	Undesignated	-		-		-		-
Compatible	Residential							
	Commercial			-		-		-
	Industrial			-		-		-
	Public/Quasi-Public					-		-
	Recreation			-		-		-
	Open/Agriculture/Low Density			-		-		-
	Undesignated							
Subtotals	Incompatible	1.69		27.68		53.33		82.70
	Compatible	-		-		-		-
TOTAL								

Notes: All areas on-installation are excluded from the counts. Shaded compatible cells correspond to incompatible rows, and vice versa.

1 Compatible with restrictions. (Easement not to build structures)

2 Refer to Appendix A for details.

Chapter 7, Article 3, Part 5, Section 7.3.506 of Colorado Springs City Code and Airport Overlay District was established in alignment with USC 49, Title 14 CFR Part 77 (FAA criteria) and Colorado Revised Statutes 41-4-101, 41-4-106 and 41-4-107. This code declares hazards to air navigation and airports are a public nuisance and that public safety and free unobstructed passage of all aircraft within airport airspace (set by overlay district) are paramount to application for development; and that any application of development, if reasonably requested, shall grant and record an avigation easement. The City has established and adopted such an overlay district for the Colorado Springs Airport and Peterson Air Force Base. Note: the Planning and Community Development department does not procedurally advise, require or enforce FAA Form 7460-1 "Notice of Proposed Construction or Alteration" filings.

For the Professional Planner:

General Aviation Overlay (GA-O) and Commercial Airport Overlay (CAD-O) districts are zoned under Chapter 4 of the El Paso County Land Development Code and apply to unincorporated areas of the county. The Land Development Code requires filing of FAA Form 7460-1 Notice of Proposed Construction or Alteration by "any person proposing construction or alteration of an improvement" within GA-O or CAD-O districts (sections 4.3.2.E (3) and 4.3.1.F (5)). However, the County code does not impose any building height restrictions within designated GA-O or CAD-O districts. The Planning and Community Development Department does advise, but does not procedurally require or enforce FAA Form 7460-1 "Notice of Proposed Construction or Alteration" filings. Section 77.9, CFR Part 77 requires filings for any "construction or alteration" within 20,000 feet of any airfield with a runway more than 3,200 fee (See Figure 6-9. FAA Notification Zone 20,000 Ft). Additionally, the County Land Development Code allows residential zoning within its CAD-O Accident Potential (sub) Zone II (APZ II) for single-family, multi-family and mixed-use residential.

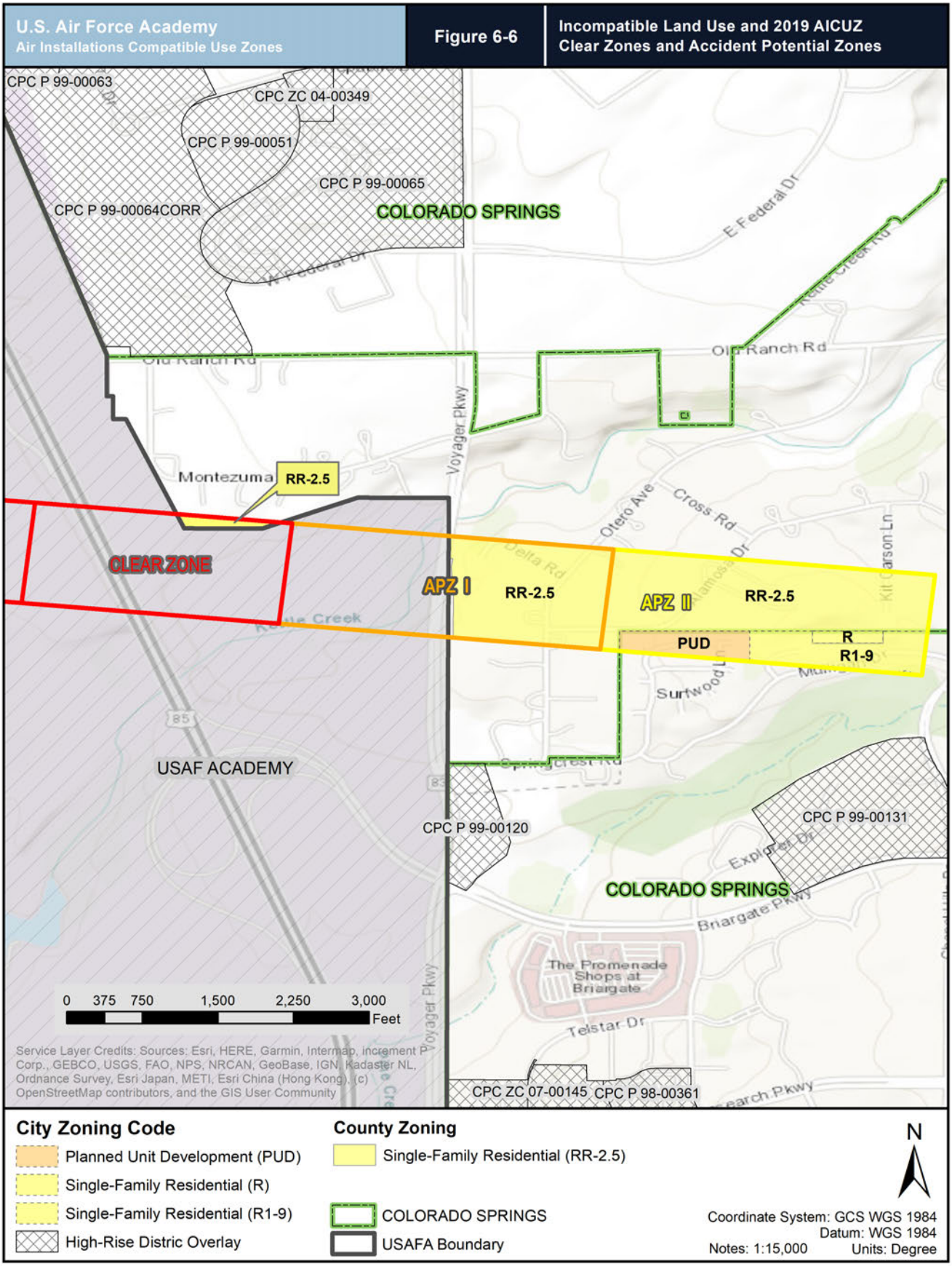
Table 6-4 Bullseye Off-installation Existing Land Use Acreage within Clear Zones/Accident Potential Zones

Designation	Generalized Land Use Category2	CZ	Note	APZ I	Note	APZ II	Note	Total
Incompatible	Residential	-		-		-		-
	Commercial	-						-
	Industrial	-						-
	Public/Quasi-Public	-		-				-
	Recreation	-						-
	Open/Agriculture/Low Density	91.80						91.80
	Undesignated	-		-		-		-
Compatible	Residential							
	Commercial			-		-		-
	Industrial			-		-		-
	Public/Quasi-Public					-		-
	Recreation			-		-		-
	Open/Agriculture/Low Density			114.80	(1)	114.80	(1)	139.60
	Undesignated							
Subtotals	Incompatible	91.80		-		-		-
	Compatible	-		114.80		114.80		139.60
TOTAL								

Notes: All areas on-installation are excluded from the counts. Shaded compatible cells correspond to incompatible rows, and vice versa.

1 Compatible with restrictions. (Easement not to build structures)

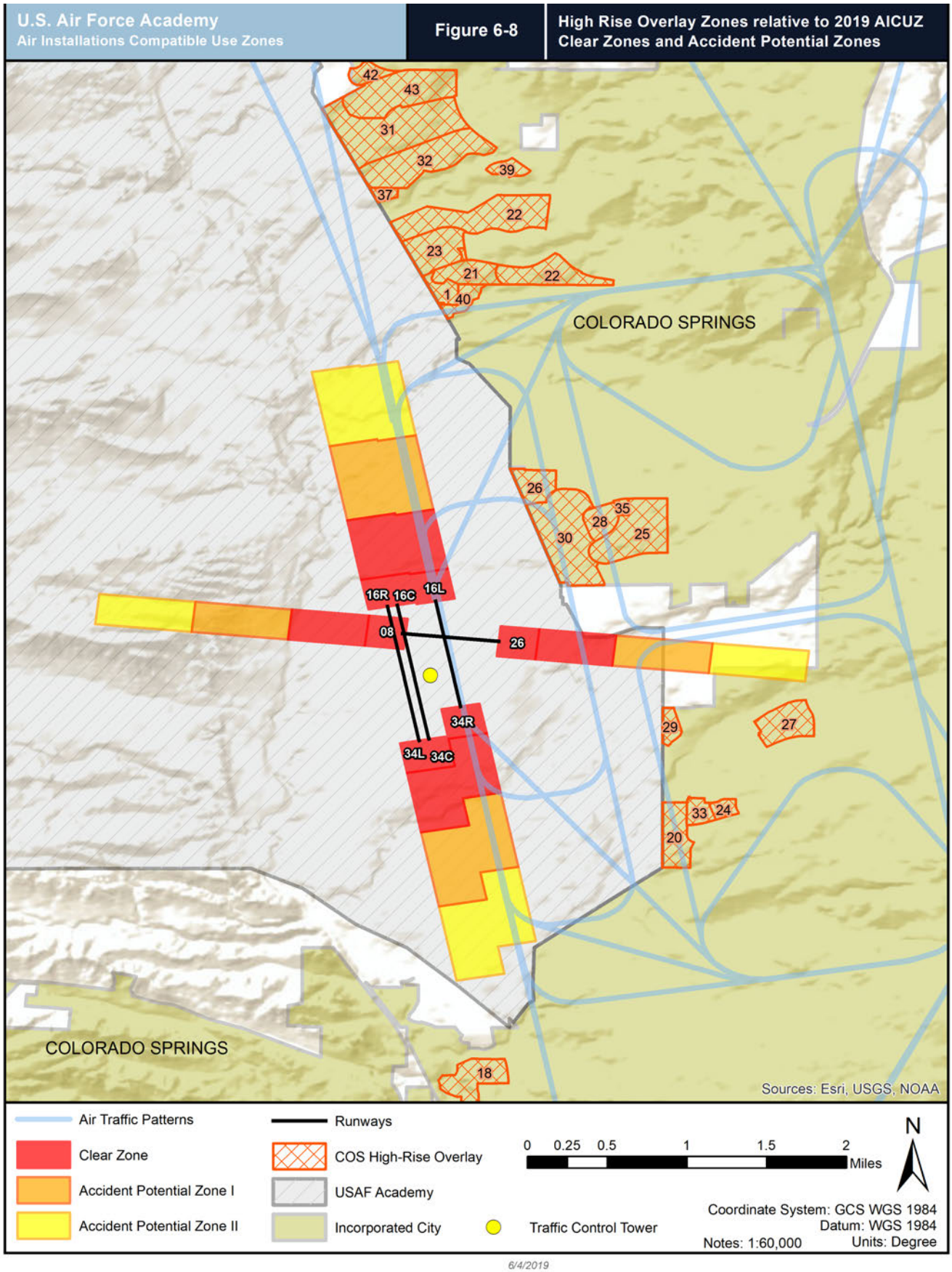
2 Refer to Appendix A for details.


U.S. Air Force Academy
Air Installations Compatible Use Zones
Figure 6-6
Incompatible Land Use and 2019 AICUZ
Clear Zones and Accident Potential Zones
CPC P 99-00063
CPC ZC 04-00349
CPC P 99-00051
CPC P 99-00065
CPC P 99-00064CORR
COLORADO SPRINGS
E Federal Dr
Old Ranch Rd
Voyager Pkwy
Montezuma
RR-2.5
CLEAR ZONE
APZ I
RR-2.5
APZ II
RR-2.5
PUD
R
R1-9
Otero Ave
Cross Rd
Kit Carson Ln
Surfwood Dr
USAF ACADEMY
CPC P 99-00120
CPC P 99-00131
Explorer Dr
COLORADO SPRINGS
Briargate Pkwy
The Promenade Shops at Briargate
Telstar Dr
CPC ZC 07-00145
CPC P 98-00361
0 375 750 1,500 2,250 3,000
Feet
Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
City Zoning Code
Planned Unit Development (PUD)
Single-Family Residential (R)
Single-Family Residential (R1-9)
High-Rise Distric Overlay
County Zoning
Single-Family Residential (RR-2.5)
COLORADO SPRINGS
USAFA Boundary
N
Coordinate System: GCS WGS 1984
Datum: WGS 1984
Notes: 1:15,000
Units: Degree
6/28/2019

U.S. Air Force Academy
Air Installations Compatible Use Zones

Figure 6-7 Incompatible Land Use Closeup and 2019 AICUZ CZs and APZs

6/28/2019


U.S. Air Force Academy
Air Installations Compatible Use Zones
Figure 6-8
High Rise Overlay Zones relative to 2019 AICUZ
Clear Zones and Accident Potential Zones
COLORADO SPRINGS
COLORADO SPRINGS
16R
16C
16L
08
26
34R
34L
34C
Sources: Esri, USGS, NOAA
Air Traffic Patterns
Clear Zone
Accident Potential Zone I
Accident Potential Zone II
Runways
COS High-Rise Overlay
USAF Academy
Incorporated City
Traffic Control Tower
0 0.25 0.5 1 1.5 2
Miles
N
Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree
Notes: 1:60,000
6/4/2019

6.4.3 Future Land Use Compatibility Concerns

PlanCOS is the comprehensive plan for Colorado Springs. It identifies the Air Force Academy as a Cornerstone Institution as well as a regional employment and activity center, with focused development in the immediate vicinity of both the Academy's north and south entry control points, Briargate Business Campus and Polaris Point respectively. The plan also identifies Interquest Parkway as a new development corridor and enterprise zone with focus on incubating technology spinoffs and startups, and creation of an experience economy comprised of tourism, entertainment, and cultural industries.

Development is intensifying along the Interquest and Voyager parkways near the airfield and north entry control point along North Gate Boulevard. (The intersection of these two parkways is less than 7,000 feet from the airfield.) The City of Colorado Springs is strategically targeting high-tech and start-up economic development in this area. Active strategic development in this district combined with current incompatible land use described in 6.4.2 poses a significant challenge to maintaining current airfield and flight operations, e.g. continued construction of tall buildings and further densification of the built environment. If not mitigated, the Academy's cadet flight training program is at risk (See Figure 6-10 – Colorado Springs Projected Growth Areas).

The Monument planning department developed and administers its 2017 Town of Monument Comprehensive Plan. This plan does not specifically address land use compatibility issues with the Air Force Academy along the shared, approximately 900 feet long, boundary. Although the immediate vicinity (approximately 1,600 feet north of Aardvark Airfield) to the Academy is zoned for planned industrial development, it is available for rezoning under planned unit development, which allows for mixed-use residential.

Aardvark Auxiliary Airfield was closed in 2008 and is no longer an active runway for flight operations. The runway is currently used for cadet training with remotely piloted aircraft. These aircraft are small (under 60 pounds) and are not permitted to fly beyond the Academy's boundaries. As such, the Air Force does not require AICUZ analysis of this airfield. Should the Academy need to activate this airfield then AICUZ analysis would be required. If the runway is activated for manned flight operations its APZs would extend north into Monument.

The Town's proposed annexation plan does not significantly directly impact the Air Force Academy. Unincorporated land west of Monument along the northern boundary of the Academy, however, does present future risk for a master-planned residential development close to the vital Jacks Valley Training Area. This training area is the only fully-functional weapons range along the Southern Front Range, which serves over 30,000 cadets, airmen, soldiers, marines, special forces, as well as federal, state, and local law enforcement agencies annually. Tactical and weapons training in Jacks Valley produces noise due to small arms firing, the use of pyrotechnics and helicopter operations. Increased residential development along the northern boundary of the Academy could generate sufficient noise complaints to restrict full use of Jacks Valley.

El Paso County Planning and Community Development Department is currently drafting a comprehensive development plan for the county, as well as small area plans for specific areas of the county such as the unincorporated area along the Academy's northern installation boundary.

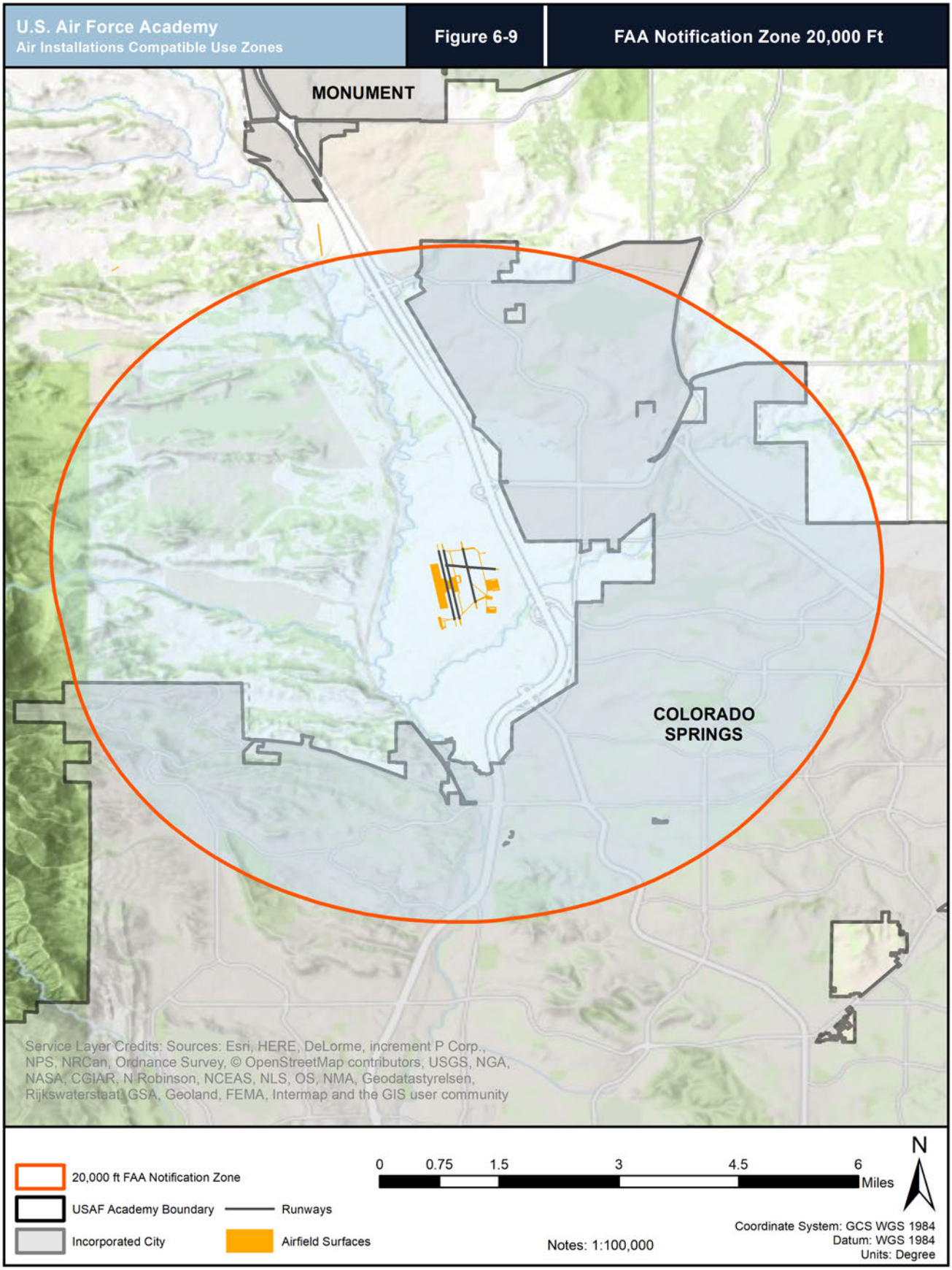
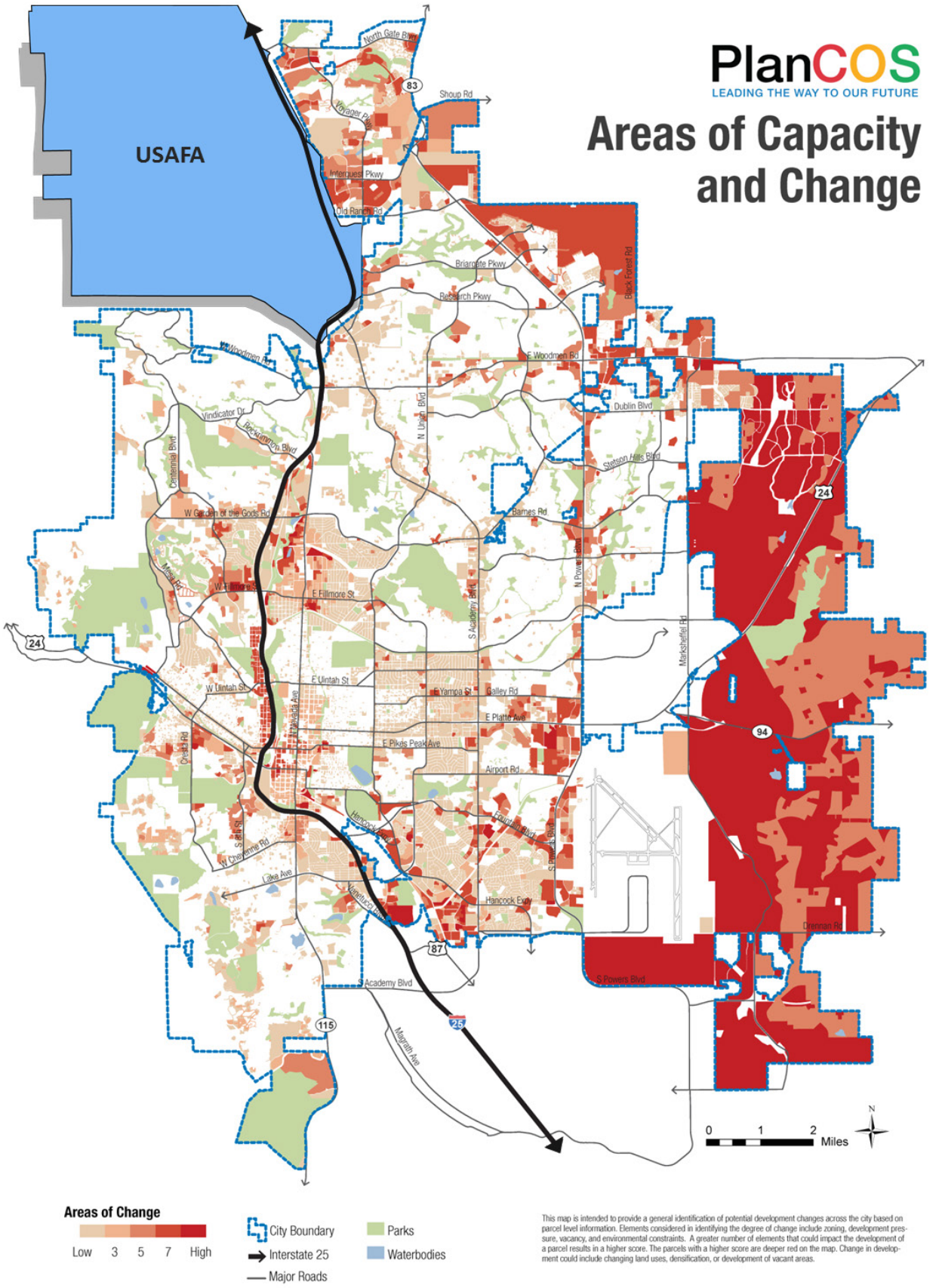

U.S. Air Force Academy
Air Installations Compatible Use Zones
Figure 6-9
FAA Notification Zone 20,000 Ft
MONUMENT
COLORADO
SPRINGS
Service Layer Credits: Sources: Esri, HERE, DeLorme, increment P Corp., NPS, NRCan, Ordnance Survey, © OpenStreetMap contributors, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community
20,000 ft FAA Notification Zone
USAF Academy Boundary
Runways
Incorporated City
Airfield Surfaces
0 0.75 1.5 3 4.5 6
Miles
N
Notes: 1:100,000
Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree
6/28/2019

Figure 6-10. Colorado Springs Projected Growth Areas



7.0 Implementation

The Air Force promotes compatible partnerships between its installations and surrounding communities by being a good neighbor.

The U.S. Air Force encourages collaborative effort between the Air Force Academy and surrounding communities to develop partnership solutions in land use planning decisions. Land use compatibility is vital to ensuring the Academy retains the cadet flight training mission and remains a cornerstone institution within the greater Colorado Springs urbanized area. This chapter offers recommendations for all stakeholders to implement for the protection of the community and preservation of the flying mission.

7.1 Air Force Role

The goal of the Air Force AICUZ Program is to assist local, regional, state and federal officials in protecting the public health, safety, and welfare by promoting long-term land use compatible with military operations; and to protect Air Force operational capability from the effects of incompatible land use. This program helps mitigate noise and safety concerns for the surrounding communities and advises these communities about potential impacts from flight operations on the safety, welfare, and quality of life of their citizens.

The Air Force Academy is responsible for flight safety, noise abatement, and participation in existing local jurisdictional land use planning processes as part of its AICUZ Program responsibilities. Air Force policy and guidance requires that installation leadership periodically review existing practices for flight operations and evaluate these factors in relationship to populated areas and other local situations. The Air Force Academy will:

- Route flights, whenever and wherever possible, over sparsely populated areas to reduce the exposure of lives and property to a potential accident
- Periodically review existing air traffic patterns, instrument approaches, weather conditions, and operating practices and evaluate these factors in relationship to populated areas and other local conditions
- Participate in local government land use planning forums, policy working groups

The Air Force Can Support By:

EDUCATING officials and community on flying mission and AICUZ

PARTICIPATING in local government forums to address incompatible uses

PROVIDING online and printed materials about military operations and impact, including FAA notification

PROVIDING this AICUZ study to all stakeholders and state/federal agencies

The Air Force Academy is responsible for flight safety, noise abatement, and participation in existing local jurisdictional land use planning processes as part of its AICUZ Program responsibilities.

and zoning meetings to address development or incompatible land use issues that may surface
- Continue to participate as non-voting member in Pikes Peak Area Council of Governments and to educate elected officials on the Academy flight training mission and AICUZ related issues
- Support the Chamber of Commerce through its Defense Mission Task Force, Military Affairs Committee and Chief Defense Industry Officer in its effort to protect military missions in the greater Colorado Springs area
- Host, or participate in, community forums, when necessary, with surrounding community stakeholders to discuss land use and other issues of concern
- Explore methods for adapting airfield management and encroachment mitigation strategies utilized by the 12th Flying Training Wing at Joint Base San Antonio (JLUS Recommendation 2.2.9)
- Engage key community leaders through its Honorary Flight Commander Program and other community engagement / mission familiarization programs, etc.
- Provide web-based and printed materials to the local council of governments, real estate professionals, developers and surrounding communities to educate elected officials, development professionals and the public about military operations and impacts
- Work with local, state, federal, and private-sector partners on educating the public on drone safety and creating awareness of potential airspace conflicts (JLUS Recommendation 1.3.1)
- Maintain a centralized online tool to address resident inquiries regarding flight activity, educate the public on AICUZ, the flight training mission requirement and web link to FAA construction development applications

Preparation and presentation of this AICUZ Study is one phase in continuous Air Force participation in the local planning process. The Air Force recognizes that as local communities implement and maintain land use plans the Academy is prepared to provide additional input, as needed, and will:

- Provide copies of this AICUZ Study to all interested stakeholders including municipal, county, and regional planning departments and zoning administrators to aid in the planning and development process.
- Provide copies of the AICUZ Study to appropriate state and federal agencies.

7.2 State and Regional Roles

7.2.1 State of Colorado

The Air Force recommends the General Assembly consider legislation amending C.R.S. 29-20-105.6 to require mandatory seller's disclosure language to ensure notifications to buyers of military overflight noise and safety risk for all areas within two miles of military installations; and within land areas identified by Title 14 C.F.R., Part 77.9. The Air Force recommends the General

Assembly consider legislation requiring compliance for filings required by Title 14 C.F.R., Part 77, i.e. Federal Aviation Administration "Notice of Proposed Construction or Alteration" filings (FAA form 7460-1).

7.2.2 Pikes Peak Area Council of Governments (PPACG)

The PPACG sponsored 2018 Joint Land Use Study (JLUS), a collaborative planning action between local governments and DoD installations in the greater Colorado Springs region, provides a strategic framework to maintain common understanding, continued collaboration and, most importantly, continued action towards achieving shared regional goals.

The Air Force recognizes the vital partnership with the Pikes Peak Area Council of Governments and the role PPACG plays in developing partnership solutions on compatible land use to ensure future viability of the Academy's Cadet Flight Training Mission.

This chapter offers recommendations specific to this AICUZ Study, and pertinent recommendations from the 2018 JLUS for stakeholders to implement that will afford long term protection to the community and preserve USAFA's flying mission.

The Air Force endorses PPACG key implementation strategies identified by the Joint Land Use Study (JLUS) adopted in December 2018. Most notably to:

- Improve collaboration among military and community stakeholders on JLUS topics (JLUS Recommendation 1.1):
  - Support ongoing efforts by state and local organizations to preserve, protect, expand, and attract new military missions, assets and installations
  - Coordinate with military installation committees or other groups, i.e. the Air Force Academy Installation Encroachment Management Team
  - Identify opportunities to address JLUS objectives within the Air Force Community Partnership Program
  - Formalize the Airspace Working Group to address ongoing issues
  - Produce 'Area of Concern' maps to assist local jurisdictions with zoning overlays and protection of compatible land use
  - Incorporate military accident potential zone (APZ) standards into city and county GIS zoning codes and maps
- Develop methods to inform and collaborate with residents and community leaders to manage impacts from flight operations (JLUS Recommendation 1.3):
  - Provide web- and print-based materials to civilian partners including military flight

operations and civilian drone use
    - Develop materials to educate real estate professionals and developers about military operations and impacts
    - Develop standard sellers' disclosure language for real estate agents to inform residents of flight/military operations in airspace near affected areas
    - Examine long-term approaches to reduce flight operation impacts on surrounding neighborhoods, including sound attenuation and flight schedules
- Minimize incompatible land uses and development affected by military flight operations (JLUS Recommendation 2.2):
    - Educate local land use officials on the effects of incompatible development on military operations
    - Incorporate flight safety information to establish specific criteria for evaluating development that would affect military flight or airspace operations
    - Comply with FAA regulations and refer all types of development within 20,000 feet of military airfields for review for public safety, flight safety, and vertical obstructions, including cell towers, temporary cranes, and multistory buildings
    - Recognize the AFA Airfield as an airport to ensure development complies with FAA regulations and protects public safety
    - Establish airport overlay zoning for all military airfields within the JLUS study area
    - Formalize development notification and review processes between local jurisdictions and military installations through memoranda of understanding
    - Coordinate on economic development to address planning efforts relating to military airfield and airspace operations, including FAA Part 150 and AICUZ
    - Implement consistent and compatible zoning regulations for land areas within air APZs.

- Pursue land use buffering and conservation opportunities to preserve mission (JLUS Recommendation 2.3):
    - Pursue conservation partnering opportunities for compatible land use buffering under flight training areas and other critical areas
    - Plan for long-term storm water and utility infrastructure challenges expected from future mission growth (due to anticipated impact to airfield operations) (JLUS Recommendation 2.6)

7.3 Local Government Role

The role of local government is critical to ensure land use compatibility balances economic development with preservation of the Academy's flight training mission. The Air Force Academy has a long history of working closely with the local municipal governments of Colorado Springs and the Town of Monument, as well as the County of El Paso. Collaboration and partnership will strengthen these relationships, increase public safety and help preserve the vitality of the flight-

training mission. Consideration of the following recommendations during revision of relevant land use planning or zoning regulation will help promote mutually compatible land use and development near this vital air installation.

7.3.1 Planning

- Continue collaboration and partnership between municipal and county planning and development departments and the Academy installation planning team
- Continue to include Air Force Academy leadership as ex-officio members on boards, commissions, and regional councils addressing long-range development and other planning policies
- Consider AICUZ policies and guidelines when developing or revising city comprehensive plans and use AICUZ overlay maps, and Air Force Land Use Compatibility Guidelines (see Appendix A) to evaluate existing and future land use proposals
- Review capital improvement plans, infrastructure investment, and development policy as not to encourage incompatible land use patterns near the Air Force Academy airfields, with particular emphasis on utility extension and transportation planning
- Update land use plans and ordinances to reflect AICUZ recommendations for development in CZs/APZs and noise zones
- Recognize the AFA Airfield as an airport to ensure development complies with FAA regulations and protects public safety
- Consider development of an area plan for unincorporated land around the Air Force Academy
- Consider development of a working group of city, county, and Academy representatives to discuss land use concerns and major development proposals that could affect aircraft operations
- Consider creation of an Intergovernmental Joint Airport Advisory Commission with development review authority and chartered to preserve private, commercial and military aviation capacity within El Paso County

Local Government Can Support By:

ADOPTING zoning ordinances to reflect AICUZ recommendations.

CONSULTING with USAFA on planning and zoning actions.

IMPLEMENTING height obstruction ordinances.

ADOPTING an airport overlay

MONITORING construction for compliance with FAA CFR Part 77

REQUIRING disclosure of the AICUZ footprint in real estate transactions.

Local governments can enact compatible planning, zoning and development policy, principles and practices.

7.3.2 Zoning

- Continue to consult Academy leadership and base planning staff on proposed planning and zoning actions with potential to impact air installation operations
- Develop and adopt an Airport overlay for the U.S. Air Force Academy airfield; extend/amend current county and municipal zoning codes in accordance with C.R.S. 24-65.1-202 and 43-10-113
- Implement height and obstruction zoning ordinances that reflect Title 14 CFR, Part 77 obstruction standards, and filing requirements
- Encourage local government to ensure compliance with FAA regulations and refer all types of development within 20,000 feet of military airfields for review for public safety, flight safety, and vertical obstructions, including cell towers, temporary cranes, and multistory buildings
- Enact or modify building/residential code to ensure that new construction near the Academy's airfields have recommended noise level reduction measures incorporated into the design and construction of structures
- Implement consistent and compatible zoning regulations for land areas within air APZs.

7.3.3 Real Estate and Development

- Continue to provide the Air Force Academy opportunity to review development applications and "change use of property" requests to assess potential impact to the Academy's mission, flight training program and airfield operations
- Formalize development notification and review processes between local jurisdictions
- Monitor construction applications for tall structures, such as buildings, communication towers, and wind turbines, for compliance with FAA Part 77 criteria to mitigate hazards to navigable airspace around the Academy
- Develop standard sellers' disclosure language as a means for real estate agents to inform residents of flight/military operations in airspace near affected homes (JLUS recommendation 1.3.4)
- Enact fair disclosure ordinances to require real estate disclosure for individuals purchasing property under operational airspace, within airfield APZs, and near established noise zones

Academy Standard Review and Notice Request

The Air Force Academy incorporates the following standard language in its official response to development reviews:

"As an adjacent property owner, USAFA requests the City require the owner to add this note to the final development plan, property plat maps, deed transfer, and lease agreements to provide full disclosure at any future time of sale or lease of nearby training operations:

NOTICE: This property may be impacted by noise and other similar sensory effects of flight by aircraft used in the United States Air Force Academy's training programs. This notice shall remain in effect until the Air Force Academy shall cease to be used for training purposes. This notice shall run with the land."

7.4 Community Roles

As a Cornerstone Institution of Colorado Springs, the Air Force Academy has a long-established history of working together with neighboring residents for the mutual benefit of the Academy mission, the local community and the City of Colorado Springs. The following are recommended to strengthen this relationship, protect the health and ensure the safety of the public, and help protect the integrity of the installation's flying mission:

7.4.1 Real Estate Professionals and Brokers:

- Know where noise zones, CZs, and APZs encumber land near the the main Academy airfield
- Invite installation representatives to professional realtor association meetings to discuss the AICUZ Program with real estate professionals
- Consider voluntary disclosures of military aircraft overflight zones, CZs, and APZs encumber land near the main Academy airfield
- Consider requiring the Multiple Listing Service (MLS) to disclose noise zones, CZs, APZs, and overflight corridors for all affected real estate listings
- Participate, through professional realtor associations, in any action committee addressing AICUZ related policy issues
- **View AICUZ for Real Estate video at: https://www.usafa.af.mil/About-Us/Flight-Operations/**

7.4.2 Developers:

- Know where the noise zones, CZs, and APZs encumber land near the air installation
- Consult with the Air Force Academy on proposed developments near its proposed HAFZ
- Participate in discussions regarding existing zoning ordinances and subdivision regulations to support compatible land uses outlined in this AICUZ study through implementation of a zoning overlay district based on FAA Part 77 criteria
- Consider extending an invitation to the Academy to participate in pertinent Home Builders Association meetings

Community Can Support By:

Developers can support AICUZ implementation by:

KNOWING where noise zones, Clear Zones, APZs affect land use

CONSULTING with USAFA on proposed developments within AICUZ footprint

INVITING Academy to participate in Housing & Builders Association meetings

Local citizens can support AICUZ implementation by:

PARTICIPATING in local discussions about land use planning

BECOMING informed about the AICUZ Program and Air Force Academy mission

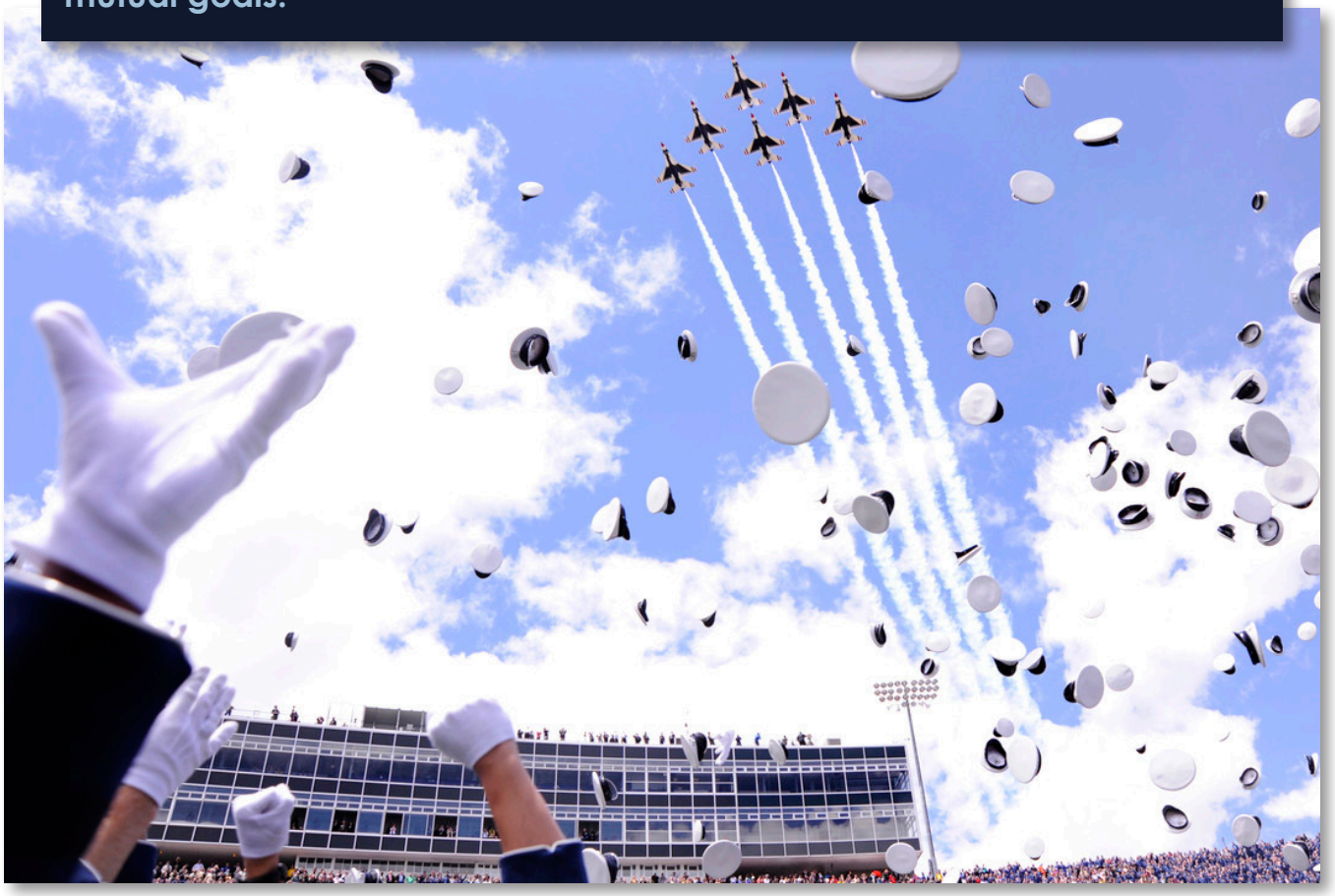
ASKING local real estate professionals, city planners, and installation representatives about noice and accident potential when purchasing property

Neighboring residents, local developers and instillation personnel work together for the mutual benefit of the US Air Force Academy mission and local community.

7.4.3 Local Citizens:

- Participate in local forums with the installation to learn more about the Air Force Academy's flight training mission
- Become informed about the AICUZ Program and learn about the program's goals, objectives, and value in protecting the public's health, safety, and welfare
- When considering property purchases, ask local real estate professionals, city planners, and installation representatives about noise and APZs

While the installation and community are separated by a fence, Air Force activities and operations affect the community and, conversely, community activities and decisions can affect the Air Force mission. Collaborative planning, forging partnerships, open communications, and close relationships help the Air Force and its neighbors achieve their mutual goals.




UNITED STATES AIR

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04

Table A-1. Land Use Compatibility Recommendations in APZs and CZs

SLUCM NUMBER	LAND USE NAME	CLEAR ZONE	APZ-I	APZ-II	DENSITY
		Recommendation[1]	Recommendation[1]	Recommendation[1]	Recommendation[1]
10	**Residential**				
11	Household Units				
11.11	Single units: detached	N	N	Y[2]	Maximum density of 2 Du/Ac
11.12	Single units: semi-detached	N	N	N	
11.13	Single units: attached row	N	N	N	
11.21	Two units: side-by-side	N	N	N	
11.22	Two units: one above the other	N	N	N	
11.31	Apartments: walk-up	N	N	N	
11.32	Apartment: elevator	N	N	N	
12	Group quarters	N	N	N	
13	Residential hotels	N	N	N	
14	Mobile home parks or courts	N	N	N	
15	Transient lodgings	N	N	N	
16	Other residential	N	N	N	
20	**Manufacturing [3]**				
21	Food and kindred products; manufacturing	N	N	Y	Maximum FAR 0.56 IN APZ II
22	Textile mill products; manufacturing	N	N	Y	Maximum FAR 0.56 IN APZ II
23	Apparel and other finished products; products made from fabrics, leather and similar materials; manufacturing	N	N	N	
24	Lumber and wood products (except furniture); manufacturing	N	Y	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
25	Furniture and fixtures; manufacturing	N	Y	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
26	Paper and allied products; manufacturing	N	Y	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
27	Printing, publishing, and allied industries	N	Y	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
28	Chemicals and allied products; manufacturing	N	N	N	
29	Petroleum refining and related industries	N	N	N	

30	Manufacturing[3] (continued)				
31	Rubber and miscellaneous plastic products; manufacturing	N	N	N	
32	Stone, clay, and glass products; manufacturing	N	N	Y	Maximum FAR 0.56 in APZ II
33	Primary metal products; manufacturing	N	N	Y	Maximum FAR 0.56 in APZ II
34	Fabricated metal products; manufacturing	N	N	Y	Maximum FAR 0.56 in APZ II
35	Professional, scientific, and controlling instruments; photographic and optical goods; watches and clocks	N	N	N	
39	Miscellaneous manufacturing	N	Y	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
40	**Transportation, communication, and utilities[3, 4]**				
41	Railroad, rapid rail transit, and street railway trans	N	Y[6]	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
42	Motor vehicle transportation	N	Y[6]	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
43	Aircraft transportation	N	Y[6]	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
44	Marine craft transportation	N	Y[6]	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
45	Highway and street right-of-way	Y[5]	Y[6]	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
46	Automobile parking	N	Y[6]	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
47	Communication	N	Y[6]	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
SLUCM NUMBER	**LAND USE NAME**	**CLEAR ZONE** Recommendation[1]	**APZ-I** Recommendation[1]	**APZ-II** Recommendation[1]	**DENSITY** Recommendation[1]
48	Utilities[7]	N	Y[6]	Y[6]	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
48.5	Solid waste disposal (landfills, incinerators, etc.)	N	N	N	
49	Other transportation, communication, and utilities	N	Y[6]	Y	See Note 6 below

50	**Trade**				
51	Wholesale trade	N	Y	Y	Maximum FAR of 0.28 in APZ I & .56 in APZ II
52	Retail trade – building materials, hardware and farm equipment	N	Y	Y	See Note 8 below
53	Retail trade – including, discount clubs, home improvement stores, electronics superstores, etc.	N	N	Y	Maximum FAR of 0.16 in APZ II
53	Shopping centers-Neighborhood, Community, Regional, Super-regional[9]	N	N	N	
54	Retail trade – food	N	N	Y	Maximum FAR of 0.24 in APZ II
55	Retail trade – automotive, marine craft, aircraft, and accessories	N	Y	Y	Maximum FAR of 0.14 in APZ I & 0.28 in APZ II
56	Retail trade – apparel and accessories	N	N	Y	Maximum FAR of 0.28 in APZ II
57	Retail trade – furniture, home, furnishings and equipment	N	N	Y	Maximum FAR of 0.28 in APZ II
58	Retail trade – eating and drinking establishments	N	N	N	
59	Other retail trade	N	N	Y	Maximum FAR of 0.16 in APZ II
60	**Services[10]**				
61	Finance, insurance and real estate services	N	N	Y	Maximum FAR of 0.22 in APZ II
62	Personal services	N	N	Y	Office uses only. Maximum FAR of 0.22 in APZ II.
62.4	Cemeteries	N	Y[11]	Y[11]	
63	Business services (credit reporting; mail, stenographic, reproduction; advertising)	N	N	Y	Maximum FAR of 0.22 in APZ II
63.7	Warehousing and storage services[12]	N	Y	Y	Maximum FAR of 1.0 in APZ I; 2.0 in APZ II
64	Repair Services	N	Y	Y	Maximum FAR of 0.11 APZ I; 0.22 in APZ II
65	Professional services	N	N	Y	Maximum FAR of 0.22 in APZ II
65.1	Hospitals, nursing homes	N	N	N	
65.1	Other medical facilities	N	N	N	
66	Contract construction services	N	Y	Y	Maximum FAR of 0.11 APZ I; 0.22 in APZ II
67	Government Services	N	N	Y	Maximum FAR of 0.24 in APZ II
68	Educational services	N	N	N	
68.1	Child care services, child development centers, and nurseries	N	N	N	
69	Miscellaneous Services	N	N	Y	Maximum FAR of 0.22 in APZ II
69.1	Religious activities (including places of worship)	N	N	N	

70	Cultural, entertainment and recreational				
71	Cultural activities	N	N	N	
71.2	Nature exhibits	N	Y[13]	Y[13]	
72	Public assembly	N	N	N	
72.1	Auditoriums, concert halls	N	N	N	
72.11	Outdoor music shells, amphitheaters	N	N	N	
72.2	Outdoor sports arenas, spectator sports	N	N	N	
73	Amusements – fairgrounds, miniature golf, driving ranges; amusement parks, etc.	N	N	Y[20]	
74	Recreational activities (including golf courses, riding stables, water recreation)	N	Y[13]	Y[13]	Maximum FAR of 0.11 in APZ I; 0.22 in APZ II
75	Resorts and group camps	N	N	N	
76	Parks	N	Y[13]	Y[13]	Maximum FAR of 0.11 in APZ I; 0.22 in APZ II
79	Other cultural, entertainment and recreation	N	Y[11]	Y[11]	Maximum FAR of 0.11 in APZ I; 0.22 in APZ II
80	**Resource production and extraction**				
81	Agriculture (except live- stock)	Y[4]	Y[14]	Y[14]	
81.5,81.7	Agriculture-Livestock farming, including grazing and feedlots	N	Y[14]	Y[14]	

SLUCM NUMBER	LAND USE NAME	CLEAR ZONE	APZ-I	APZ-II	DENSITY
		Recommendation[1]	Recommendation[1]	Recommendation[1]	Recommendation[1]
82	Agriculture related activities	N	Y[15]	Y[15]	Maximum FAR of 0.28 in APZ I; 0.56 in APZ II, no activity which produces smoke, glare, or involves explosives
83	Forestry activities[16]	N	Y	Y	Maximum FAR of 0.28 in APZ I; 0.56 in APZ II, no activity which produces smoke, glare, or involves explosives
84	Fishing activities[17]	N[17]	Y	Y	Maximum FAR of 0.28 in APZ I; 0.56 in APZ II, no activity which produces smoke, glare, or involves explosives
85	Mining activities[18]	N	Y[18]	Y[18]	Maximum FAR of 0.28 in APZ I; 0.56 in APZ II, no activity which produces smoke, glare, or involves explosives
89	Other resource production or extraction	N	Y	Y	Maximum FAR of 0.28 in APZ I; 0.56 in APZ II, no activity which produces smoke, glare, or involves explosives
90	**Other**				
91	Undeveloped land	Y	Y	Y	
93	Water areas[19]	N[19]	N[19]	N[19]	

Table A-1 Land Use Compatibility Recommendations in APZs and CZs Notes:

1. A "Yes" or a "No" designation for compatible land use is to be used only for general comparison. Within each, uses exist where further evaluation may be needed in each category as to whether it is clearly compatible, normally compatible, or not compatible due to the variation of densities of people and structures. In order to assist air installations and local governments, general suggestions as to FARs are provided as a guide to density in some categories. In general, land use restrictions that limit occupants, including employees, of commercial, service, or industrial buildings or structures to 25 an acre in APZ I and 50 an acre in APZ II are considered to be low density. Outside events should normally be limited to assemblies of not more than 25 people an acre in APZ I, and maximum assemblies of 50 people an acre in APZ II. Recommended FARs are calculated using standard parking generation rates for various land uses, vehicle occupancy rates, and desired density in APZ I and II. For APZ I, the formula is FAR = 25 people an acre/ (Average Vehicle Occupancy x Average Parking Rate x (43560/1000)). The formula for APZ II is FAR = 50/ (Average Vehicle Occupancy x Average Parking Rate x (43560/1000)).

2. The suggested maximum density for detached single-family housing is two Du/Ac. In a planned unit development (PUD) of single family detached units, where clustered housing development results in large open areas, this density could possibly be increased slightly provided the amount of surface area covered by structures does not exceed 20 percent of the PUD total area. PUD encourages clustered development that leaves large open areas.

3. Other factors to be considered: Labor intensity, structural coverage, explosive characteristics, air-pollution, electronic interference with aircraft, height of structures, and potential glare to pilots.

4. No structures (except airfield lighting and navigational aids necessary for the safe operation of the airfield when there are no other siting options), buildings, or above-ground utility and communications lines should normally be located in CZ areas on or off the air installation. The CZ is subject to the most severe restrictions.

5. Roads within the graded portion of the CZ are prohibited. All roads within the CZ are discouraged, but if required, they should not be wider than two lanes and the rights-of-way should be fenced (frangible) and not include sidewalks or bicycle trails. Nothing associated with these roads should violate obstacle clearance criteria.

6. No above ground passenger terminals and no above ground power transmission or distribution lines. Prohibited power lines include high-voltage transmission lines and distribution lines that provide power to cities, towns, or regional power for unincorporated areas.

7. Development of renewable energy resources, including solar and geothermal facilities and wind turbines, may impact military operations through hazards to flight or electromagnetic interference. Each new development should to be analyzed for compatibility issues on a case-by-case basis that considers both the proposal and potentially affected mission.
8. Within SLUCM Code 52, maximum FARs for lumberyards (SLUCM Code 521) are 0.20 in APZ-I and 0.40 in APZ-11; the maximum FARs for hardware, paint, and farm equipment stores, (SLUCM Code 525), are 0.12 in APZ I and 0.24 in APZ II.

9. A shopping center is an integrated group of commercial establishments that is planned, developed, owned, or managed as a unit. Shopping center types include strip, neighborhood, community, regional, and super-regional facilities anchored by small businesses, a supermarket or drug store, discount retailer, department store, or several department stores, respectively.

10. Ancillary uses such as meeting places, auditoriums, etc. are not recommended.

11. Chapels, houses of worship, and other land uses of public gatherings are incompatible within APZ I or APZ II.

12. Big box home improvement stores are not included as part of this category.

13. Facilities must be low intensity, and provide no playgrounds, etc. Facilities such as club houses, meeting places, auditoriums, large classes, etc., are not recommended.

14. Activities that attract concentrations of birds creating a hazard to aircraft operations should be excluded.

15. Factors to be considered: labor intensity, structural coverage, explosive characteristics, and air pollution.

16. Lumber and timber products removed due to establishment, expansion, or maintenance of CZ lands owned in fee will be disposed of in accordance with applicable DoD guidance.

17. Controlled hunting and fishing may be permitted for the purpose of wildlife management.

18. Surface mining operations that could create retention ponds that may attract waterfowl and present bird/wildlife aircraft strike hazards (BASH), or operations that produce dust or light emissions that could affect pilot vision are not compatible.

19. Naturally occurring water features (e.g., rivers, lakes, streams, wetlands) are pre-existing, nonconforming land uses. Naturally occurring water features that attract waterfowl present a potential BASH. Actions to expand naturally occurring water features or construction of new water features should not be encouraged. If construction of new features is necessary for storm water retention, such features should be designed so that they do not attract waterfowl.

20. Amusement centers, family entertainment centers or amusement parks designed or operated at a scale that could attract or result in concentrations of people, including employees and visitors, greater than 50 people per acre at any given time are incompatible in APZ II.

Table A-2. Recommended Land Use Compatibility for Noise Zones

LAND USE NAME	SUGGESTED LAND USE COMPATIBILITY				
	DNL or CNEL 65-69	DNL or CNEL 70-74	DNL or CNEL 75-79	DNL or CNEL 80-84	DNL or CNEL 85+
Residential					
Household units	N[1]	N[1]	N	N	N
Single units: detached	N[1]	N[1]	N	N	N
Single units: semidetached	N[1]	N[1]	N	N	N
Single units: attached row	N[1]	N[1]	N	N	N
Two units: side-by-side	N[1]	N[1]	N	N	N
Two units: one above the other	N[1]	N[1]	N	N	N
Apartments: walk-up	N[1]	N[1]	N	N	N
Apartment: elevator	N[1]	N[1]	N	N	N
Group quarters	N[1]	N[1]	N	N	N
Residential hotels	N[1]	N[1]	N	N	N
Mobile home parks or courts	N	N	N	N	N
Transient lodgings	N[1]	N[1]	N[1]	N	N
Other residential	N[1]	N[1]	N	N	N
Manufacturing					
Food and kindred products; manufacturing	Y	Y[2]	Y[3]	Y[4]	N
Textile mill products; manufacturing	Y	Y[2]	Y[3]	Y[4]	N
Apparel and other finished products; products made from fabrics, leather, and similar materials; manufacturing	Y	Y[2]	Y[3]	Y[4]	N
Lumber and wood products (except furniture); manufacturing	Y	Y[2]	Y[3]	Y[4]	N
Furniture and fixtures; manufacturing	Y	Y[2]	Y[3]	Y[4]	N
Paper and allied products; manufacturing	Y	Y[2]	Y[3]	Y[4]	N
Printing, publishing, and allied industries	Y	Y[2]	Y[3]	Y[4]	N
Chemicals and allied products; manufacturing	Y	Y[2]	Y[3]	Y[4]	N
Petroleum refining and related industries	Y	Y[2]	Y[3]	Y[4]	N
Manufacturing (continued)					
Rubber and misc. plastic products; manufacturing	Y	Y[2]	Y[3]	Y[4]	N
Stone, clay and glass products; manufacturing	Y	Y[2]	Y[3]	Y[4]	N
Primary metal products; manufacturing	Y	Y[2]	Y[3]	Y[4]	N
Fabricated metal products; manufacturing	Y	Y[2]	Y[3]	Y[4]	N
Professional scientific, and controlling instruments; photographic and optical goods; watches and clocks	Y	25	30	N	N
Miscellaneous manufacturing	Y	Y[2]	Y[3]	Y[4]	N

Transportation, communication and utilities					
Railroad, rapid rail transit, and street railway transportation	Y	Y[2]	Y[3]	Y[4]	N
Motor vehicle transportation	Y	Y[2]	Y[3]	Y[4]	N
Aircraft transportation	Y	Y[2]	Y[3]	Y[4]	N
Marine craft transportation	Y	Y[2]	Y[3]	Y[4]	N
Highway and street right-of-way	Y	Y	Y	Y	N
Automobile parking	Y	Y	Y	Y	N
Communication	Y	255	305	N	N
Utilities	Y	Y[2]	Y[3]	Y[4]	N
Other transportation, communication and utilities	Y	255	305	N	N
Trade					
Wholesale trade	Y	Y[2]	Y[3]	Y[4]	N
Retail trade – building materials, hardware and farm equipment	Y	25	30	Y[4]	N
Retail trade – including shopping centers, discount clubs, home improvement stores, electronics superstores, etc.	Y	25	30	N	N
Retail trade – food	Y	25	30	N	N
Retail trade – automotive, marine craft, aircraft and accessories	Y	25	30	N	N
Retail trade – apparel and accessories	Y	25	30	N	N
Retail trade – furniture, home, furnishings and equipment	Y	25	30	N	N
Retail trade – eating and drinking establishments	Y	25	30	N	N
Other retail trade	Y	25	30	N	N
LAND USE NAME	**SUGGESTED LAND USE COMPATIBILITY**				
	DNL or CNEL 65-69	**DNL or CNEL 70-74**	**DNL or CNEL 75-79**	**DNL or CNEL 80-84**	**DNL or CNEL 85+**
Services					
Finance, insurance and real estate services	Y	25	30	N	N
Personal services	Y	25	30	N	N
Cemeteries	Y	Y[2]	Y[3]	Y[4,11]	Y[6,11]
Business services	Y	25	30	N	N
Warehousing and storage	Y	Y[2]	Y[3]	Y[4]	N
Repair services	Y	Y[2]	Y[3]	Y[4]	N
Professional services	Y	25	30	N	N
Hospitals, other medical facilities	25	30	N	N	N

Nursing homes	N[1]	N[1]	N	N	N
Contract construction services	Y	25	30	N	N
Government services	Y[1]	25	30	N	N
Educational services	25	30	N	N	N
Child care services, child development centers, and nurseries	25	30	N	N	N
Miscellaneous Services	Y	25	30	N	N
Religious activities (including places of worship)	Y	25	30	N	N
Cultural, entertainment and recreational					
Cultural activities	25	30	N	N	N
Nature exhibits	Y[1]	N	N	N	N
Public assembly	Y	N	N	N	N
Auditoriums, concert halls	25	30	N	N	N
Outdoor music shells, amphitheaters	N	N	N	N	N
Outdoor sports arenas, spectator sports	Y[7]	Y[7]	N	N	N
Amusements	Y	Y	N	N	N
Recreational activities (including golf courses, riding stables, water recreation)	Y	25	30	N	N
Resorts and group camps	Y	25	N	N	N
Parks	Y	25	N	N	N
Other cultural, entertainment and recreation	Y	25	N	N	N
Resource production and extraction					
Agriculture (except live- stock)	Y[8]	Y[9]	Y[10]	Y[10,11]	Y[10,11]
Agriculture-Livestock farming including grazing and feedlots	Y[8]	Y[9]	N	N	N
Agriculture related activities	Y[8]	Y[9]	Y[10]	Y[10,11]	Y[10,11]
Forestry activities	Y[8]	Y[9]	Y[10]	Y[10,11]	Y[10,11]
Fishing activities	Y	Y	Y	Y	Y
Mining activities	Y	Y	Y	Y	Y
Other resource production or extraction	Y	Y	Y	Y	Y

Table A-2 Recommended Land Use Compatibility for Noise Zones Notes:

1. General

a. Although local conditions regarding the need for housing may require residential use in these zones, residential use is discouraged in DNL 65-69 and strongly discouraged in DNL 70-74. 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 residential use would not be met if development were prohibited in these zones. Existing residential development is considered as pre-existing, non-conforming land uses.

b. Where the community determines that these uses must be allowed, measures to achieve outdoor to indoor NLR of at least 25 decibels (dB) in DNL 65-69 and 30 dB in DNL 70-74 should be incorporated into building codes and be considered in individual approvals; for transient housing, an NLR of at least 35 dB should be incorporated in DNL 75-79.

c. Normal permanent construction can be expected to provide an NLR of 20 dB, thus the reduction requirements are often stated as 5, 10, or 15 dB over standard construction and normally assume mechanical ventilation, upgraded sound transmission class ratings in windows and doors, and closed windows year round. Additional consideration should be given to modifying NLR levels based on peak noise levels or vibrations.

d. NLR criteria will not eliminate outdoor noise problems. However, building location, site planning, design, and use of berms and barriers can help mitigate outdoor noise exposure particularly from ground level sources. Measures that reduce noise at a site should be used wherever practical in preference to measures that only protect interior spaces.

2. Measures to achieve NLR of 25 must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.

3. Measures to achieve NLR of 30 must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.

4. Measures to achieve NLR of 35 must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.

5. If project or proposed development is noise sensitive, use indicated NLR; if not, land use is compatible without NLR.

6. Buildings are not permitted.

7. Land use is compatible provided special sound reinforcement systems are installed.

8. Residential buildings require an NLR of 25.

9. Residential buildings require an NLR of 30.

10. Residential buildings are not permitted.

11. Land use that involves outdoor activities is not recommended, but if the community allows such activities, hearing protection devices should be worn when noise sources are present. Long-term exposure (multiple hours per day over many years) to high noise levels can cause hearing loss in some unprotected individuals.

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Appendix B. Key Terms

Day-Night Average Sound Level (DNL) – DNL is a composite noise metric accounting for the sound energy of all noise events in a 24-hour period. In order to account for increased human sensitivity to noise at night, DNL includes a 10 dB penalty to events occurring during the acoustical nighttime period (10 p.m. through 7 a.m.). See section 4.3 for additional information.

Decibel (dB) – Decibel is the unit used to measure the intensity of a sound.

Flight Profiles – Flight profiles consist of aircraft conditions (i.e. altitude, speed, power setting, etc.) defined at various locations along each assigned flight track.

Flight Track – The flight track locations represent the various types of arrivals, departures, and closed patterns accomplished at air installations. The location for each track is representative for the specific track and may vary due to air traffic control, weather, and other reasons.

Operation – An aircraft operation is defined as one takeoff or one landing. A complete closed pattern or circuit is counted as two operations because it has a takeoff component and a landing component. A sortie is a single military aircraft flight from the initial takeoff through the termination landing. The minimum number of aircraft operations for one sortie is two operations, one takeoff (departure) and one landing (approach).

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United States Air Force Academy
Colorado

Air Installations Compatible Use Zones (AICUZ) Study

2019

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