Air Installations Compatible Use Zones Study

Eglin Air Force Base and Duke Field, Okaloosa County, Florida








June 2018

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Eglin Air Force Base and Duke Field, Florida
Air Installations Compatible Use Zones (AICUZ) Study

June 2018

Prepared for:

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 96TH TEST WING (AFMC)
EGLIN AIR FORCE BASE FLORIDA

MAR 1 2 2018

MEMORANDUM FOR AREA GOVERNMENTS AND CITIZENS

FROM: 96 TW/CC

SUBJECT: Air Installations Compatible Use Zones (AICUZ) Study

1. This study is an update of the 2006 Eglin Air Force Base AICUZ Study including Eglin Main Base and Duke Field. A summary of Naval Outlying Landing Field (NOLF) Choctaw is included for information. The authoritative document for Choctaw Field is the AICUZ for Naval Air Station Whiting Field and 12 NOLFs. This update was initiated because of mission and operational changes, improved noise modeling technology, and updated AICUZ policies and re-evaluates noise and accident potential related to aircraft operations. The study was designed to aid in the development of local planning mechanisms to protect public safety and health as well as preserve the operational capabilities of the installation.

2. The study contains a summary description of affected areas around the installation. It outlines the location of runway clear zones, aircraft accident potential zones, and noise contours. Compatible land use for areas in the vicinity of the installation is addressed. I recommend this information be incorporated into community plans, zoning ordinances, subdivision regulations, building codes and other related documents.

3. The basic objective of the AICUZ Program is to achieve compatible use of public and private lands in the vicinity of military airfields by shaping incompatible development through local actions. This update provides noise contours based on the Day-Night Average Sound Level metric used by the Air Force. This study provides the information necessary to maximize beneficial use of the land surrounding the installations studied while minimizing the potential for degradation of the health and safety of the affected public.

4. We greatly value the positive relationship the installation has experienced with our neighbors over the years. As a partner in the process, we have attempted to minimize noise disturbances through such actions as minimizing night operations, avoiding flights over heavily populated areas, and installing jet engine noise suppressors for maintenance activities. We solicit your cooperation in implementing the recommendations and guidelines presented in this AICUZ study.

EVAN C. DERTIEN
Brigadier General, USAF
Commander

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Table of Contents

Sections

Figures

Tables

1.0 AICUZ Overview

This study is an update of the Eglin Air Force Base (AFB) Air Installations Compatible Use Zones (AICUZ) Study and also presents AICUZ information for Duke Field and Naval Outlying Landing Field (NOLF) Choctaw. It documents the changes to the AICUZ since the last Eglin AFB AICUZ Study was released in 2006. This 2018 study also provides AICUZ information for Duke Field, for which an AICUZ study has not previously been released, and contains a synopsis of the recently released Navy AICUZ Study for NOLF Choctaw. This study reaffirms Air Force policy of promoting public health, safety, and general welfare in areas surrounding the installations studied while seeking development compatible with the defense flying mission. For each of the installations studied, current flight and noise level information is provided together with recommendations for achieving development compatible with the defense flying mission.

1.1 AICUZ Program

Military airfields attract development—people who work on base want to live nearby while others want to provide services to base 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. The Department of Defense (DoD) established the AICUZ Program to promote proactive, collaborative planning for compatible development to sustain mission and community goals.

The AICUZ Program recommends that noise levels, 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 the airfield's operational requirements while minimizing the impact to residents in the surrounding community. Mutual 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. As the communities that surround airfields grow and develop, the United States Department of the Air Force has the responsibility to communicate and collaborate with local government on land use planning, zoning, and similar matters that could affect the installations' operations or missions.

1.2 Scope and Authority

1.2.1 Scope

This study summarizes Eglin AFB and Duke Field aircraft operations and describes AICUZ planning factors (e.g., noise levels, CZs, and APZs) at these airfields. Recommendations for compatible land use in the vicinity of the two airfields are provided for state and local governments to incorporate into comprehensive plans, zoning ordinances, subdivision regulations, building codes, and other related documents. The AICUZ

planning factors for NOLF Choctaw are described in the U.S. Navy's 2018 NOLF Choctaw AICUZ and are summarized only very briefly in this study.

1.2.2 Authority

Air Force Instruction (AFI) 32-7063 (U.S. Air Force 2015) implements DoD Instruction 4165.57 and applies to all Air Force installations with active runways located in the United States and its territories. This instruction provides guidance to installation AICUZ Program Managers.

Air Force Handbook 32-7084 (U.S. Air Force 2017) provides installation AICUZ Program Managers with 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 AFI 32-7063.

Navy planning criteria contained in the Chief of Naval Operations Instruction (OPNAVINST) 11010.36C (U.S. Navy 2008) are applied to NOLF Choctaw. These planning criteria are described in the 2018 AICUZ Study for NOLF Choctaw (U.S. Navy 2018).

1.3 Previous AICUZ Efforts and Related Studies

The following documents are relevant to this AICUZ study:

- 2006 Eglin AFB AICUZ Study
- 2009 Eglin AFB Joint Land Use Study (JLUS)
- 2014 Supplemental Environmental Impact Statement (SEIS) for F-35 Beddown at Eglin AFB
- 2018 AICUZ Study for Naval Air Station Whiting Field and 12 Naval Outlying Landing Fields (for NOLF Choctaw noise contours and APZs)

1.4 Changes that Require an AICUZ Update

This 2018 Eglin AICUZ Study updates the 2006 AICUZ Study and provides flight track, CZ, APZ, and noise zone information that reflects an updated picture of Eglin AFB and Duke Field aircraft operations. An AICUZ study has not been previously released for Duke Field. AICUZ planning factor information for NOLF Choctaw is reproduced from the recently released U.S. Navy 2018 AICUZ Study.

As the DoD aircraft fleet mix and training requirements change over time, the resulting flight operations, which drive the noise contours, change as well. Additionally, non-operational changes may also require the need for an AICUZ update. The primary changes since the previous AICUZ update are as follows:

- Changes in based aircraft, including the basing of F-35A and F-35C aircraft at Eglin AFB, the drawdown of 33d Fighter Wing (33 FW) F-15 aircraft from Eglin AFB, and the replacement of MC-130 aircraft at Duke Field with C-145A and C-146 aircraft

- Incremental changes over the past 12 years in operational procedures and tempo
- Changes in noise modeling software
- Changes in Air Force AICUZ policies
- Changes in off-base land use

Additional information on changes relative to the previous Eglin AFB AICUZ study and other Eglin AFB documents is provided in Section 4.6.

2.0 Eglin AFB, Florida

2.1 Location

Eglin AFB, located in northwest Florida approximately 40 miles east of Pensacola, spans Santa Rosa, Okaloosa, and Walton Counties. Eglin AFB is one component of the Eglin Test and Training Complex (ETTC), which includes a total of 726 square miles of land and 96,319 square miles of airspace and is 1 of 20 installations that make up the Department of Defense's Major Range and Test Facility Base. In addition to the main airfield, ETTC includes several auxiliary airfields, which include Duke Field, Hurlburt Field, Biancur Field, and NOLF Choctaw.

As shown in Figure 2-1, Choctawhatchee Bay lies to the southeast of Eglin Main Base and Eglin Range abuts the northwest boundary of the main base. The city of Valparaiso is immediately north of Eglin Main Base, and the town of Shalimar is located immediately south. Other municipalities near the base include the cities of Destin, located on the southern shore of Choctawhatchee Bay, Fort Walton Beach, located about five miles south of Eglin Main Base, and Niceville, which is located east of Eglin Main Base.

Duke Field, also known as Eglin AFB Auxiliary Field #3, is in the north-central portion of the Eglin Range and encompasses approximately 2,700 acres of land. The installation is approximately three miles south of the city of Crestview (Figure 2-1).

NOLF Choctaw is located in the western portion of the Eglin Range and is in Santa Rosa County. East Bay is approximately two miles west and south of the installation (Figure 2-1).

2.2 History

Eglin AFB was established when the Valparaiso Bombing and Gunnery Base was created in 1935. The base, then part of the Army Air Corps, was redesignated Eglin Field in 1937. With the start of World War II, the need for a proving ground for aircraft armaments was identified, and in 1942 Eglin became the site for gunnery training for the Army Air Forces fighter pilots, as well as a major testing center for aircraft, equipment, and tactics. In March 1942, the base served as one of the sites for Lieutenant Colonel Jimmy Doolittle to prepare his B-25 crews for their raid against Tokyo.

Eglin also became a pioneer in missile development when, in early 1946, the First Experimental Guided Missiles Group was activated to develop the techniques for missile launching and handling, establish training programs, and monitor the development of a drone or pilotless aircraft capability to support Atomic Energy Commission tests, such as Operation CROSSROADS, at Eniwetok in the Pacific.

In early 1950, the Air Research and Development Command (later Air Force Systems Command) was established. The following year, the Air Research and Development Command established the Air Force Armament Center at Eglin, which, for the first time, brought development and testing together.

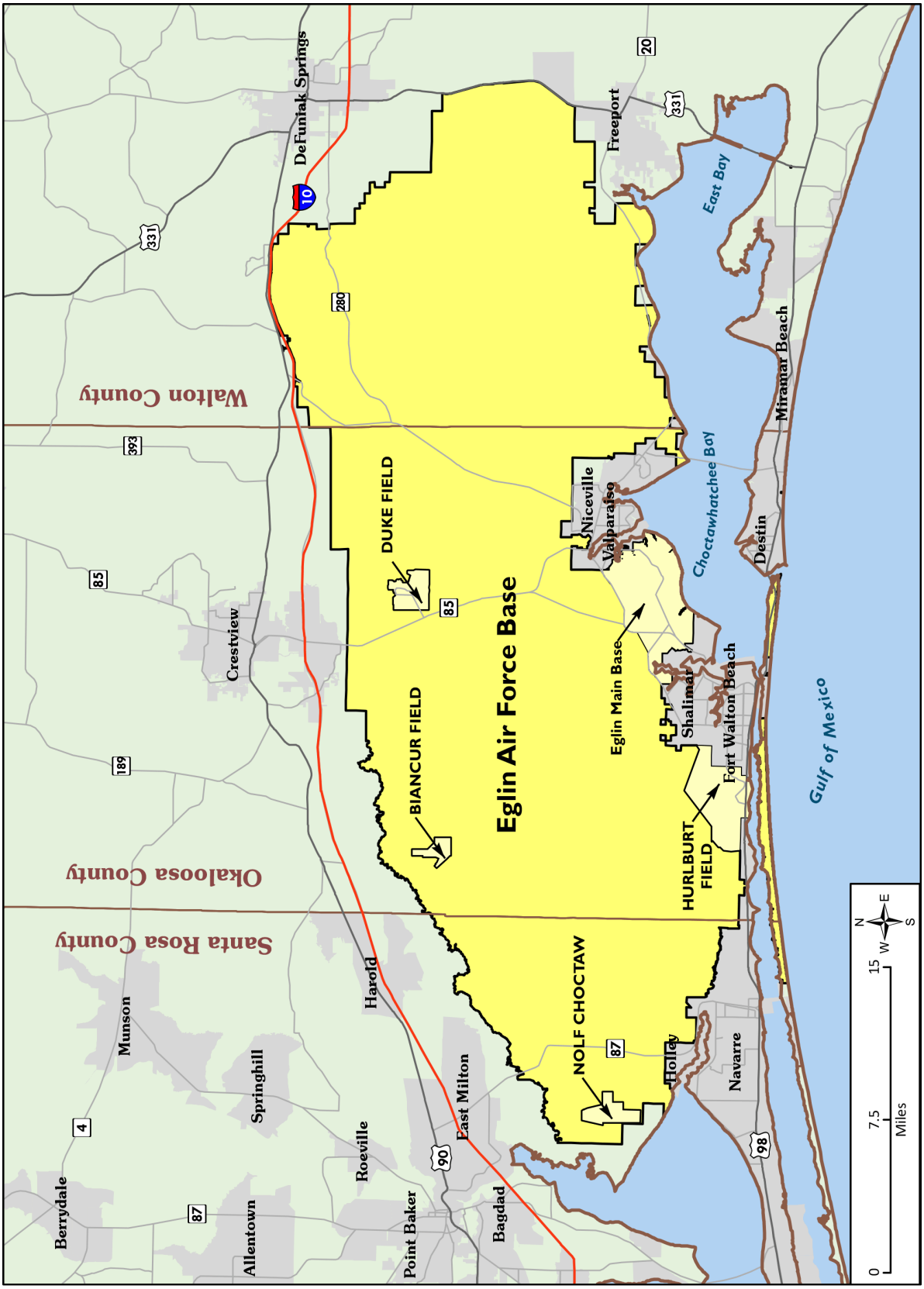


Figure 2-1. Regional Setting

On December 1, 1957, the Air Force combined the Air Proving Ground Command and the Air Force Armament Center to form the Air Proving Ground Center. The center built the highly instrumented Eglin Gulf Test Range and for the next few years served as a major missile test center for weapons such as the BOMARC, Matador, GAM-72 "Quail," and GAM-77 "Hound Dog."

Fighter aircraft were assigned to Eglin AFB in April 1965. F-4D Phantom aircraft assigned to Tactical Air Command operated from Eglin until 1979 when the units received the F-15C Eagles. In 1992, the units were assigned to Air Combat Command (ACC)'s Ninth Air Force and continued operations from Eglin AFB until their transition to Air Education and Training Command and the Nineteenth Air Force in October 2009.

On October 1, 1998, as part of the Air Force's strategic plan to guide the service into the 21st century, the Air Force Development Test Center became the Air Force Materiel Command (AFMC)'s Air Armament Center. As one of AFMC's product centers, the Air Armament Center was responsible for development, acquisition, testing, and fielding all air-delivered weapons.

On July 18, 2012, the Air Armament Center was deactivated as part of a consolidation effort to reduce AFMC's number of centers from 12 to 5. On the same day, the 46th Test Wing and 96th Air Base Wing were merged to create the 96th Test Wing (96 TW), now the Air Force's largest wing, which houses all of Eglin's test and support functions

2.3 Mission

Eglin AFB is the test and evaluation center for Air Force air-delivered weapons, navigation and guidance systems, Command and Control systems, and Air Force Special Operations Command (AFSOC) systems.

2.4 Host and Tenant Organizations

The host unit is the AFMC's 96 TW, which is composed of seven distinct groups whose responsibilities include providing essential base operating support to approximately 40 tenants. These tenants number more than 9,800 military, civilian, and contractor personnel who represent all branches of the DoD. Groups located at Eglin AFB are responsible for stewardship of the complete research, development, acquisition, test and evaluation life cycle of all Air Force air-delivered weapons, navigation and guidance systems, Command Control systems, and AFSOC systems, including evaluation and validation of systems performance. These seven distinct groups include:

- 96th Operations Group (96 OG) conducts the 96 TW's primary missions of developmental testing and evaluation of conventional munitions, command and control systems, avionics, and navigation and guidance systems.
- 96th Mission Support Group (96 MSG) provides Aerospace Expeditionary Force readiness, fuels, supply, and transportation, ground combat training, security, personnel, education, family services, lodging, food service, recreation and logistics planning, and deployment support to approximately 20,000 Team Eglin military and civilian personnel and 43,000 retirees.

- 96th Civil Engineer Group (96 CEG) operates, maintains, and protects the physical plant (11.6 million square feet), infrastructure, 3,256 facilities, housing, and the environment. In addition, the 96 CEG provides engineering forces to support global aerospace forces during peace and war missions.
- 96th Range Group (96 RN) operates, maintains, and protects Eglin's ranges, including its 724-square mile land range that contains 45 specific test and training areas.
- 96th Maintenance Group (96 MXG) maintains 36 modified test aircraft, which include F-15s, F-16s, and A-10s.
- 96th Medical Group (96 MDG) operates the fourth largest hospital in the Air Force providing health care services for all eligible beneficiaries located within the hospital's catchment area.
- Air Force Seek Eagle Office (96 SK) certifies stores carriage, release, and ballistics for Air Force weapons and aircraft.

Major missions on the base are described in the following sections.

2.4.1 33d Fighter Wing (33 FW)

The 33 FW, also known as the "Nomads" due to its numerous deployments since World War II, has a distinguished history of supporting U.S. operations in overseas theaters. The 2005 Base Realignment and Closure (BRAC) decisions established the 33 FW as the host unit for the joint graduate flying and maintenance training program for Air Force, Marine Corps, Navy, and international partner operators and maintainers of the F-35 Lighting II Joint Strike Fighter. The first F-35A aircraft at Eglin AFB began operations in July 2011.

2.4.2 53d Wing (53 WG)

The 53d Wing (53 WG) provides our Combat Air Forces with operational test and evaluation to include tactics, techniques, and procedure development for new and fielded aircraft armament, avionics, electronic warfare, space, life support, biological/chemical/ nuclear defense and decontamination systems, and aircrew training devices. The 53 WG is composed of four groups: 53d Electronic Warfare Group, 53d Test Management Group, 53d Test and Evaluation Group, and the 53d Weapons Evaluation Group. These four groups number more than 2,200 military and civilians at 22 various locations throughout the United States. The wing reports to the U.S. Air Force Warfare Center at Nellis AFB, Nevada, a direct reporting unit to Headquarters ACC at Joint Base Langley-Eustis, Virginia.

While the number of aircraft operated by the wing on the ETTC fluctuates based on mission requirements and attrition, the following airframes are currently assigned to the 53d Test and Evaluation Group: test-configured F-35A, F-22, F-15C, F-15E, F-16, A-10, B-52, B-1, HH-60, HC-130, Guardian Angel, MQ-1, and MQ-9 aircraft with flying hours assigned to the B-2, RQ-4, and U-2 aircraft.

2.4.3 919th/492nd Special Operations Wing (919 SOW/492 SOW)

The 492nd Special Operations Wing (492 SOW), headquartered at Hurlburt Field, is an active Air Force unit that has three squadrons at Duke Field that are Total Force Integrated with the 919th Special Operations Wing (919 SOW).

The 919 SOW is an Air Force Reserve Command unit that reports to AFSOC at Hurlburt Field, Florida. Currently, the 492 SOW has five C-145A aircraft and five C-146A aircraft assigned at Duke Field. The C-146A aircraft provides multiconfigurable cabin combinations for passengers and cargo for the Air Force. The mission of the C-146A aircraft is to provide flexible, responsive, and operational movement of small teams required to support AFSOC operations. In addition, AFSOC uses the aircraft to conduct airlift operations to prepared and semiprepared airfields around the world.

2.4.4 7th Special Forces Group (Airborne) (7 SFG [A])

The mission of the U.S. Army 7th Special Forces Group (Airborne), or the 7 SFG(A), is to plan and execute unconventional warfare, counterterrorism operations, direct action, special reconnaissance, and foreign internal defense in support of overseas contingency operations. The unit maintains a 24-hour state of readiness at the cantonment area west of Duke Field. The unit was relocated from Fort Bragg, North Carolina, to Eglin Main Base as part of the 2005 BRAC decisions.

2.4.5 6th Ranger Training Battalion (6 RTBn)

The U.S. Army 6th Ranger Training Battalion (6 RTBn) provides the third and final phase of U.S. Army Ranger training. The training is conducted on Camp Rudder and within Eglin AFB's training areas to expose students to tactical operations in a coastal swamp environment. Included in the field training exercise are basic waterborne techniques, airborne and helicopter assaults, urban operations, small boat operations, tactical river crossings, and swamp crossings. Each 18-day training cycle consists of 150 to 300 students.

2.4.6 Armament Directorate (AFLCMC/EB)

The mission of the Armament Directorate (AFLCMC/EB) is to equip warfighters by acquiring and supporting war-winning capabilities. The AFLCMC/EB designs, develops, produces, fields, and sustains a family of air-to-ground and air-to-air munitions for both the United States and allied nations.

2.4.7 20th Space Control Squadron (20 SPCS)

The mission of the 20th Space Control Squadron (20 SPCS) is to perform continuous all-weather, day-night surveillance of orbiting satellites. To perform its mission, the 20 SPCS utilizes the Army Navy/Fixed Position Sensor-85. The 20 SPCS operates out of Site C-6 within the Eglin Test and Training Complex.

2.4.8 Air Force Research Lab Munitions Directorate (AFRL/RW)

The Air Force Research Lab Munitions Directorate (AFRL/RW) develops conventional munitions technologies to provide the Air Force with a strong technology base for future air-delivered munitions to neutralize potential threats to the United States. The

AFRL/RW also leads in the discovery, development, and integration of war-fighting technologies for air, space, and cyberspace forces.

2.4.9 Defense Threat Reduction Agency (DTRA)

The Defense Threat Reduction Agency (DTRA) is the DoD's official combat support agency for countering weapons of mass destruction (WMDs). DTRA ensures the nation's readiness and ability to address all WMD threats (i.e., nuclear, radiological, chemical, biological, and high-yield explosives).

2.4.10 Air Force Operational Test and Evaluation Center – Detachment 2 (AFOTEC)

To meet the demand for realistic operational testing of new and modified weapons, the Air Force Operational Test and Evaluation Center (AFOTEC) partners with the warfighter and developmental test communities to provide operational test programs. The primary purpose of the AFOTEC is to determine how well systems perform when operated and maintained by military personnel in operating environments.

2.4.11 Naval School Explosive Ordnance Disposal (NAVSCOLEOD)

The Naval School Explosive Ordnance Disposal (NAVSCOLEOD) provides all common-type basic and advanced explosive ordnance disposal (EOD) training, which occurs both in the classroom and within the Eglin Test and Training Complex (e.g., D-51, C-52N, C-52W, C-52C, C-87, TTA L-14, TTA L-15, and SRI Range [A-3, A-10]). The school provides training to all DoD military services, partner nations, and other government agencies.

2.5 Airfield Environment

As shown in Figure 2-2, Eglin Main Base includes two runways: Runway 1/19 and Runway 12/30. Runways are typically named based on the magnetic heading on which they are used divided by 10. For example, aircraft departing towards the south from the strip of concrete designated as Runway 1/19 are travelling on a 194° magnetic heading and are said to be operating on Runway 19. Aircraft departing toward the north on the same strip of concrete are traveling on heading 014° and are said to be operating on Runway 1. Runway 12/30 is generally oriented east-west on magnetic headings 122° (Runway 12) and 302° (Runway 30). Runway 1/19 is 10,001 feet long and 300 feet wide while Runway 12/30 is 11,987 feet long and 300 feet wide. The airfield elevation is 84 feet above mean sea level (MSL) (Airnav 2017a).

Duke Field Runway 18/36 is oriented north-south and is 8,025 feet long by 150 feet wide (Airnav 2017b). An Assault Landing Zone (ALZ), designated 180/360, runs parallel and approximately 900 feet east of the main runway. The ALZ is 3,500 feet long by 60 feet wide and is specifically designed for practicing operations on short runways. The naming convention applied to standalone ALZs differs from the naming convention applied to standard runways in that the magnetic heading is not divided by 10. A simulated Landing Helicopter Assault (LHA) ship deck is located an additional 2,200 feet east from the ALZ. The simulated LHA deck is used primarily by helicopters and tiltrotor aircraft. The airfield elevation is 191 feet above MSL (Airnav 2017b).

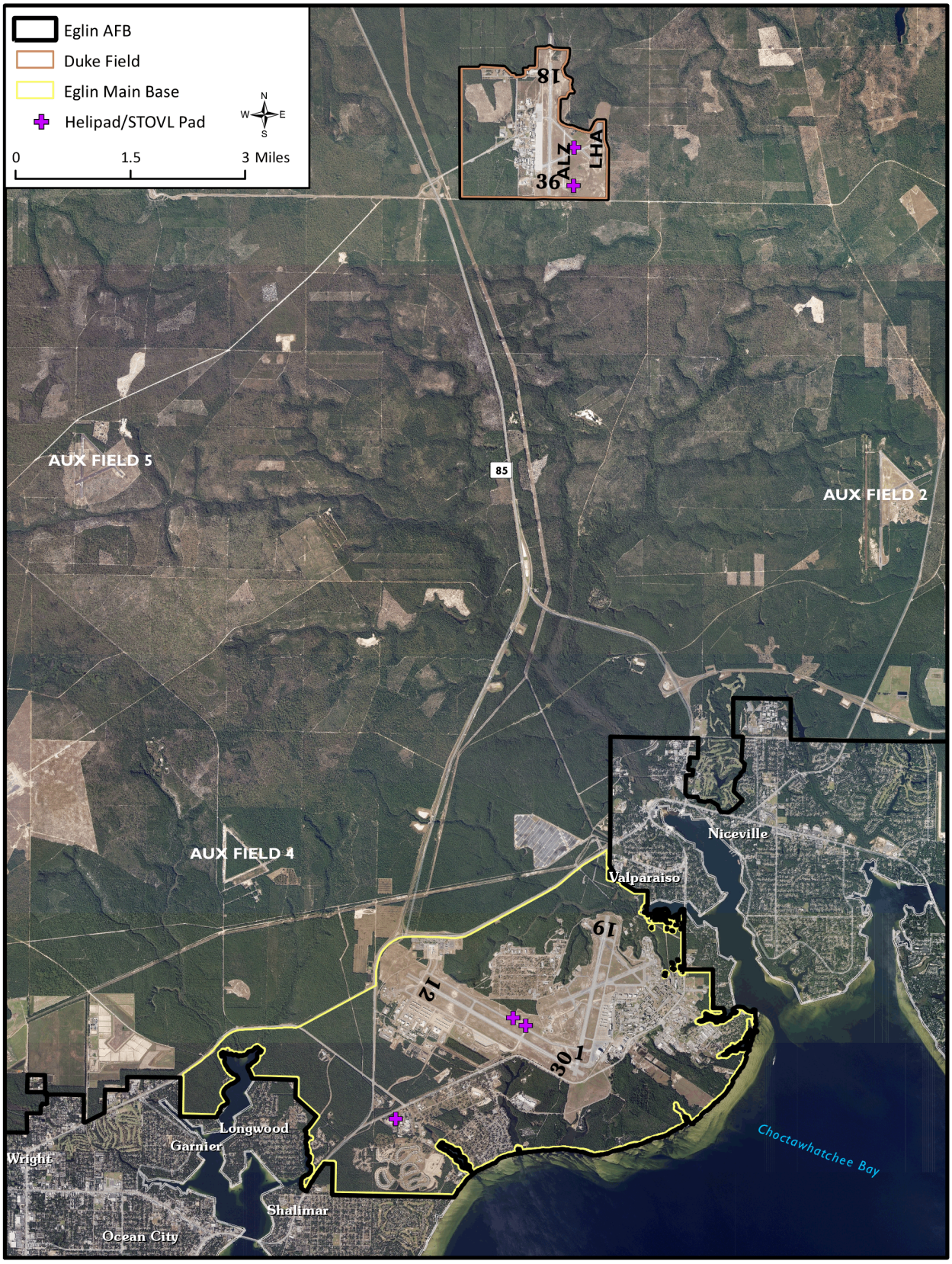


Figure 2-2. Eglin AFB and Duke Field

NOLF Choctaw includes a single runway (Runway 18/36) that is 8,000 feet long by 150 feet wide. The airfield elevation is 102 feet above MSL (Airnav 2017c).

2.6 Local Economic Impacts

The geographic area subject to significant Eglin AFB-generated economic impacts is defined as the area within a 50-mile radius of the base. This area includes all of Okaloosa County and a portion of Walton and Santa Rosa Counties and the cities of Crestview, Destin, Fort Walton Beach, Shalimar, Valparaiso, and Niceville. As shown in Table 2-1, Okaloosa County had a population of over 202,183 in 2016. This was an increase of nearly 23,000 people (11 percent) from 2000. Okaloosa County is expected to grow in population during the next decade to over 212,703 by 2022.

Table 2-1. Historical and Projected Population

Area	2000[1]	2010[1]	2017[2]	2022[2]
Okaloosa County	170,498	180,822	198,210	212,703
Crestview	14,766	20,978	24,111	26,392
Destin	11,119	12,305	13,401	14,249
Fort Walton Beach	19,973	19,507	21,199	22,651
Niceville	11,684	12,749	14,008	15,601
Shalimar	718	717	770	813
Valparaiso	6,408	5,036	5,143	5,399
Unincorporated Okaloosa County	100,849	104,759	119,578	128,138

1. Source: Florida Office of Economic & Demographic Research 2017
2. Source: Enterprise Florida 2018

Table 2-2 shows that Eglin AFB employs over 13,000 military personnel and nearly 9,850 civilians. These jobs support a total of approximately 33,000 military personnel and their dependents. The annual payroll in fiscal year 2016 was approximately $1.8 billion, as shown in Table 2-3. When contracts and procurement, material, equipment, supplies, construction (Table 2-4), and the estimated value of indirect jobs are considered, Eglin AFB has an estimated total economic impact of just over $2.7 billion.

In addition to Eglin AFB, Hurlburt Field, also located on ETTC, is home to AFSOC, the AFSOC Training Center, and the 1st Special Operations Wing (1 SOW). Hurlburt Field supports approximately 19,300 military and civilian personnel and dependents and contributes an additional $932.8 million in salaries and $122.7 million dollars in contracts and procurement to the regional economy (U.S. Air Force, 2016a).

Table 2-2. Personnel by Classification and Housing

Category	Sub-Category	Personnel			Jobs		New Job Salaries
		On-Base	Off-Base	Total	On-Base	Created	
Appropriated Fund Military	Active Duty	1,244	9,509	10,753	10,753	3,118	$174.2 million
	Reserve/ANG[1]	0	1,624	1,624	1,624	211	$11.8 million
	Dependents	1,574	35,598	37,172			
Civilians	Appropriated Fund				5,956	2,561	$143.1 million
	Other				3,893	1,674	$93.5 million
Total		**2,818**	**46,731**	**49,549**	**22,226**	**7,564**	**$422.6 million**

Source: Eglin AFB Economic Impact Statement, Fiscal Year 2016; average annual pay= $55,880

1. Includes Non-Extended Active Duty Reserve/Air National Guard (ANG)

Table 2-3. Summary of Annual Gross Payroll

Payroll Category	Sub-Category	Personnel		Total
		On-Base	Off-Base	
Appropriated Fund Military	Active Duty	$100.4 million	$630.9 million	$731.3 million
	Reserve/ANG*	0	$35.5 million	$35.5 million
Civilians	Appropriated	$573.1 million		$573.1 million
	Non-Appropriated	$468.9 million		$468.9 million
Total		**$1,142.4 million**	**$666.4 million**	**$1,826.8 million**

Source: Eglin AFB Economic Impact Statement, Fiscal Year 2016

* Includes Non-Extended Active Duty Reserve/Air National Guard (ANG)

Table 2-4. Summary of Construction, Contracts, and Expenditures for Materials, Equipment, and Supplies

Category	Sub-category	Amount
Construction Expenses		$82.1 million
Service Contracts		$221.4 million
Materials, Equipment and Supplies Procurement Expenses	Commissary (inventory)	$0.38 million
	Base Exchange	$7.0 million
	Health (Government cost only)	$108.6 million
	Education (Government cost only)	$2.6 million
	Temporary Duty	$18.5 million
	Other materials, Equipment, Supplies	$85.9 million
	Subtotal	$223.1 million
	Total	**$526.5 million**

Source: Eglin AFB Economic Impact Statement, Fiscal Year 2016

3.0 Aircraft Operations

3.1 Aircraft Types

3.1.1 Assigned Aircraft

Table 3-1 presents the flying units based at Eglin AFB and Duke Field as well as the aircraft types operated by the units. Aircraft are temporarily assigned to the 96 TW at Eglin AFB while testing and/or aircraft modifications are underway.

Table 3-1. Permanently and Temporarily Assigned Aircraft

Installation	Wing/Squadron	Aircraft Type	Description
Eglin AFB	33d Fighter Wing	F-35A	Fighter jet, single engine
		F-35C	Fighter jet, single engine
	96th Test Wing	F-16	Fighter jet, single engine
		C-130	Propeller-driven cargo aircraft, four engines
		F-15	Fighter jet, two engines
		H-1	Helicopter
	53d Wing	F-15	Fighter jet, two engines
		F-16	Fighter jet, single engine
	Aero Club	Various small propeller-driven aircraft types	Single- and two-engine, propeller-driven general aviation aircraft
	486th Flight Test Squadron	C-32	Transport jet, two engines
Duke Field	919th/492nd Special Operations Wing	C-145	Propeller-driven cargo aircraft, two engines
		C-146	Propeller-driven cargo aircraft, two engines

The F-35 Lightning II is a family of single-seat, single-engine, all-weather, stealth, multirole fifth-generation fighters. The F-35A is the conventional takeoff variant used by the U.S. Air Force, and the F-35C is the U.S. Navy variant designed for use aboard an aircraft carrier.

The F-15 Eagle is a fourth-generation, two-engine, all-weather fighter that has been in service since 1972. U.S. Air Force F-15A/C/D aircraft are air-to-air variants, and the F-15E aircraft are variants designed primarily for air-to-ground missions.

The F-16 Fighting Falcon is a fourth-generation, single-engine, multirole, all-weather fighter aircraft that has been in service since 1979. Single- and two-seat F-16A and B aircraft that have undergone a program of upgrades are re-designated as F-16C and D, respectively.

The A-10 Thunderbolt II is a single-seat, dual-engine, attack aircraft that has excellent maneuverability at low air speeds and altitude. The aircraft can loiter near battle areas for extended periods of time, making it ideal for close air support, forward air control, and combat search and rescue roles.

The Lockheed C-130 Hercules is a four-engine turboprop, military transport aircraft. Originally designed for troop transport, it has filled many roles such as gunship, airborne assault, search and rescue, scientific research support, weather reconnaissance, aerial refueling, maritime patrol, and aerial firefighting.

The H-1 Iroquois is a utility helicopter powered by turboshaft engines. The helicopter first flew in 1956 and has served numerous roles in the years since for the U.S. Army, Air Force, and Navy.

The Eglin AFB Aero Club operates several types of propeller-driven aircraft providing training and general aviation rentals. These aircraft include the two-engine Cessna 310R (shown at right) as well as the single-engine C-172P, PA-28R, and T-41A.

The C-32 is a twin-engine transport aircraft used for a wide variety of purposes. The aircraft is a specially configured version of the Boeing 757-200.

The C-145 is a twin-engine, propeller-driven cargo aircraft that supports the U.S. Special Operations Command providing light mobility capability. The aircraft is capable of short takeoffs from and landings on unprepared runways.

The C-146 Wolfhound is also a twin-engine propeller-driven cargo aircraft employed by U.S. Special Operations Command and is also capable of short takeoffs from and landings on unprepared runways.

3.1.2 Transient and Civilian Aircraft

Aircraft that are not assigned, either temporarily or permanently, at an airfield are considered to be transient. Aircraft typically land at other airfields to refuel or to conduct airfield training that cannot otherwise be accomplished at their home airfield. Table 3-2 lists transient aircraft types at Eglin AFB and Duke Field.

Table 3-2. Transient Aircraft at Eglin AFB and Duke Field

Service	Aircraft Type	Description
Multiple	C-130	Propeller-driven cargo aircraft, four engines
Air Force	A-10	Attack jet, two engines
Air Force	C-12	Propeller-driven, two engines
Air Force	C-5	Cargo jet, four engines
Air Force	C-17	Cargo jet, four engines
Air Force	C-21	Cargo jet, two engines
Air Force	C-32	Cargo jet, two engines
Multiple	C-40	Cargo jet, two engines
Air Force	F-15	Fighter jet, two engines
Air Force	F-16	Fighter jet, one engine
Multiple	F-35	Fighter jet, one engine
Navy	F-18	Fighter jet, two engines
Air Force	F-22	Fighter jet, two engines
Multiple	H-60	Helicopter

Table 3-2. Transient Aircraft at Eglin AFB and Duke Field (continued)

Service	Aircraft Type	Description
Air Force	KC-10	Tanker / Cargo jet, three engines
Air Force	KC-135	Tanker / Cargo jet, four engines
Air Force	T-1	Trainer jet, two engines
Multiple	T-6	Propeller-driven, one engine
Air Force	T-38	Trainer jet, two engines
Navy	T-45	Trainer jet, one engine
Navy	TH-57	Trainer helicopter
Air Force	U-28	Propeller-driven, one engine
Multiple	V-22	Tiltrotor aircraft

Eglin AFB is co-located with Destin-Fort Walton Beach Airport, which supports commercial service. Aircraft types used to represent the wide variety of civilian aircraft types that use the commercial airport are listed in Table 3-3.

Table 3-3. Representative Civilian Aircraft

Aircraft Type	Description
Airbus A-320	Two-engine jet
McDonnell Douglas DC-9	Two-engine jet
Saab 340	Two-engine propeller-driven
McDonnell Douglas MD-82	Two-engine jet
Bombardier Challenger 601	Two-engine jet

3.2 Aircraft Operations

3.2.1 Pre-Flight and Maintenance Run Operations

Pre-flight engine runs refer to aircraft engine tests conducted just prior to takeoff. Such engine runs are conducted either on the runway or at designated areas commonly called hammerheads. Aircraft engine runs are also conducted as part of maintenance. These runs are conducted along the flightline or in buildings specifically designed to muffle engine noise during testing (i.e., test cells or hush house).

To the maximum extent possible, engine run locations are established in areas that minimize noise for people on base as well as for those in the surrounding communities. Late-night engine runs are minimized, but heavy workloads or unforeseen contingencies sometimes require a limited number of nighttime engine runs.

The noise associated with pre-takeoff and engine maintenance engine runs were included in the noise analysis and modeling associated with the existing noise contours. Representative engine run locations at Eglin AFB that were used in noise modeling are depicted in Figure 3-1, and engine run locations at Duke Field are depicted in Figure 3-2.

Figure 3-1. Static Engine Run Locations at Eglin AFB

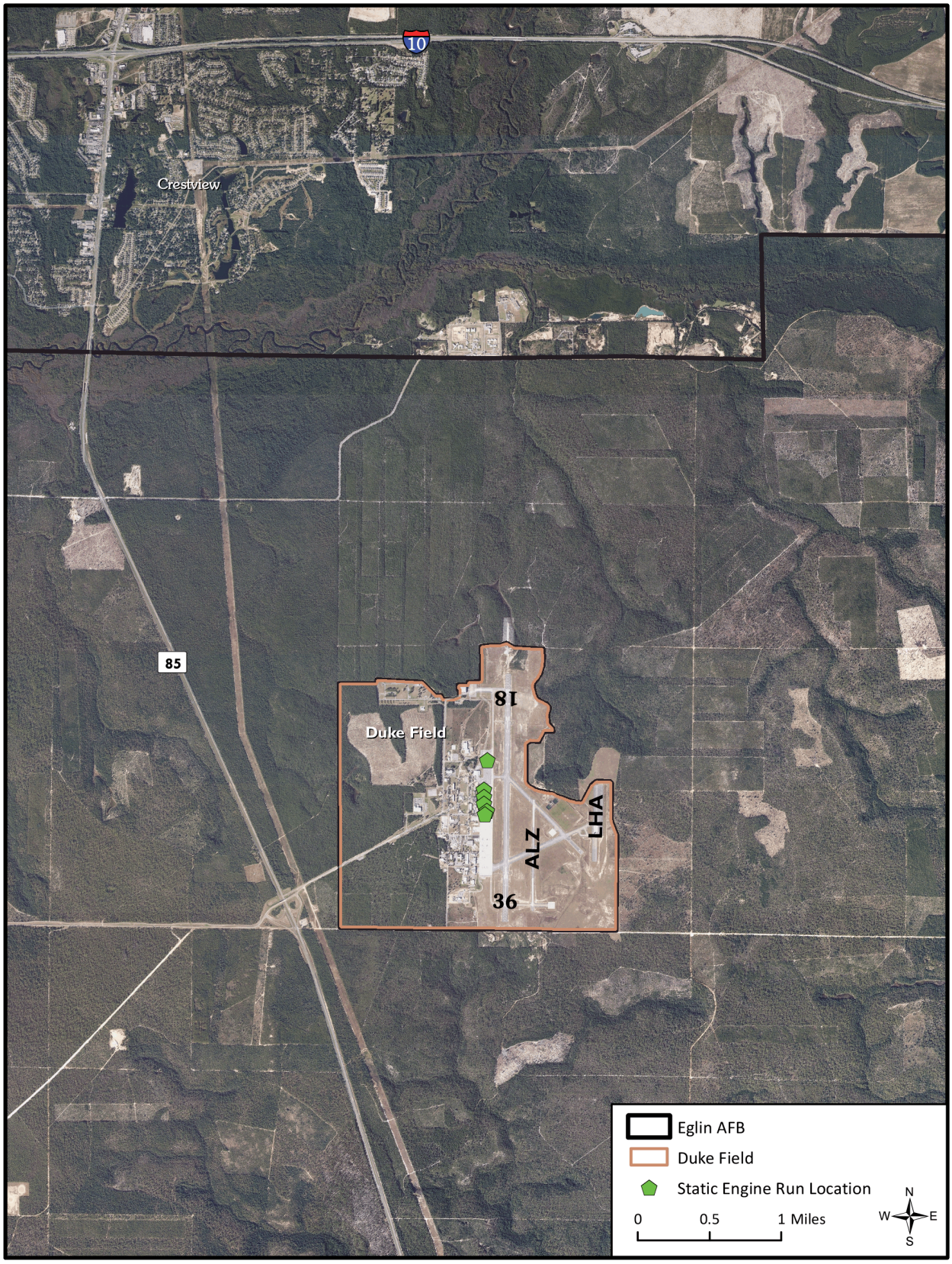


Figure 3-2. Static Engine Run Locations at Duke Field

3.2.2 *Flight Operations*

In terms of tracking the number of aircraft flying at an installation, an aircraft "operation" is defined as one takeoff or one landing. A complete closed pattern or circuit is counted as two operations because the aircraft crosses over a runway threshold twice, once on arrival and once on departure. Annual flight operations at Eglin AFB are presented in Figure 3-3 for 2006 through 2015 and 2016—the year in which 33 FW F-35 flying units reached full strength. Operations counts at Eglin AFB have been affected by the replacement of 33 FW F-15 aircraft with F-35 aircraft. F-15 aircraft assigned to the 33 FW left well before the F-35 aircraft arrived on-station, leaving a gap that resulted in a low-point 33 FW fleet size and operations counts in the 2010 timeframe. Operations counts have also been affected by temporary stand-downs of F-35 operations while safety issues were addressed, resulting in reduced operations counts during certain time periods relative to what would have occurred otherwise. As is shown in Figure 3-3, the total number of aircraft operations flown at Eglin AFB was approximately the same in 2016 as the number recorded in calendar year 2015.

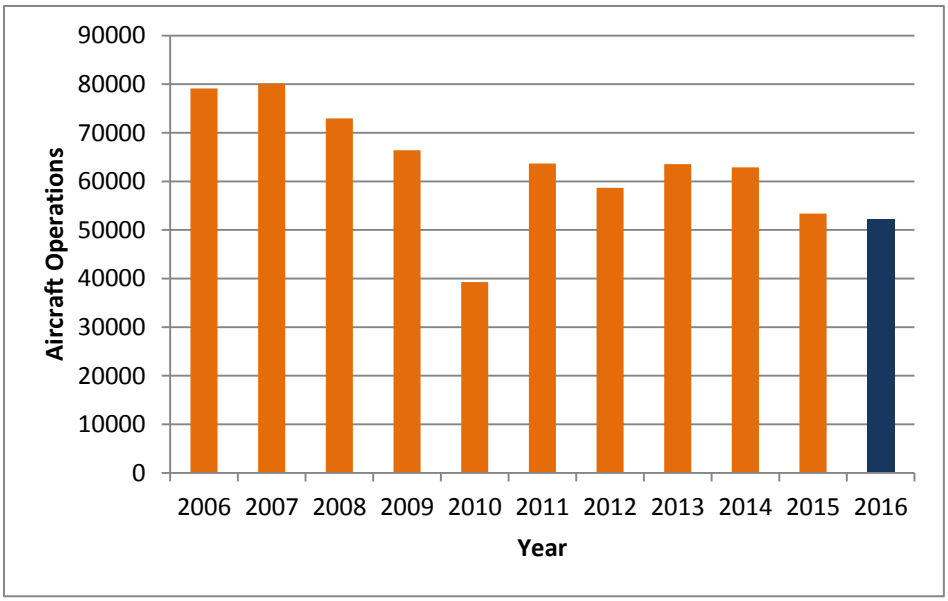


Figure 3-3. Summary of Eglin AFB Flight Operations for Calendar Year 2006 to 2015 and 2016

Figure 3-4 depicts Duke Field annual airfield operations counts for 2012 to 2015 and for a future year (nominally 2019) in which 33 FW and 919 SOW flying units operate at their full currently authorized fleet sizes. Operations counts at Duke Field between 2012 and 2015 reflect a transition from based C-130 aircraft to C-145 and C-146 aircraft (U.S. Air Force, 2016b). In 2012, based C-130 aircraft operations had begun to depart the base, resulting in a relatively low overall number of airfield operations. In 2014 and 2015, there was a net increase in overall operations tempo as additional C-145 and C-146 were added and the last remaining C-130s departed Duke Field. The 2019 operational scenario includes an estimated 13,000 airfield operations conducted annually by F-35 aircraft based at Eglin AFB, which increases the overall operations tempo to 46,560 annual airfield operations.

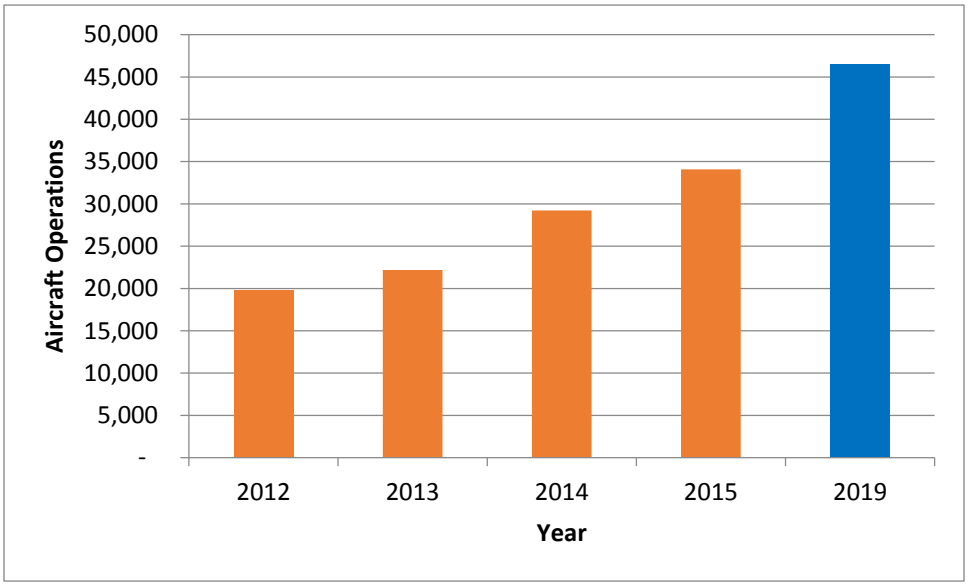


Figure 3-4. Summary of Duke Field Flight Operations for Calendar Year 2012 to 2015 and 2019

Table 3-4 lists the number of operations conducted by assigned, transient, military, and civilian aircraft at Eglin AFB and the co-located civilian airport. Additional details on expected airfield operations in the future year (nominally 2019) in which 33 FW and 919 SOW would operate at their full currently authorized fleet sizes are listed in Table 3-5.

Typical types of flight operations conducted by the units stationed at Eglin AFB and Duke Field are described below.

- **Departure and Interfacility.** An aircraft departs the airfield after a takeoff; an interfacility flight track departs one runway and then lands to another.
- **Approaches and Arrivals.** An aircraft makes an initial approach to the runway.
  a. **Straight-In/Full-Stop Arrival.** An aircraft lines up on the runway extended centerline, descends gradually, lands, comes to a full stop, and then taxis off the runway.
  b. **Overhead Arrival.** An expeditious arrival using visual flight rules. The aircraft arrives over the airfield at pattern altitude and then breaks (turns), performing a 180-degree turn to enter the landing pattern. Once established in the pattern, the aircraft lowers landing gear and flaps and performs a 180-degree descending turn to land on the runway.
  c. **Low Approach.** A low approach is a runway approach when the pilot does not actually land but rather descends near the runway and then increases altitude to set up for another arrival.
  d. **Instrument Approach.** An instrument approach is provided with active assistance from Air Traffic Control (ATC). ATC personnel direct the aircraft to align with the runway centerline and glideslope to the runway following specific published procedures, continuing until the pilot gains visual with the runway

environment. The approach, which can be flown when weather conditions are not conducive to a visual approach, can terminate in a landing, low approach, or missed approach.

e. **Simulated Flame-Out.** In a simulated flame-out (SFO), the pilot simulates the complete loss of engine power and glides the aircraft to a low approach.

- **Patterns.** Patterns refer to operations where the aircraft will practice approaches to the runway in a closed circuit. Following an initial approach to the runway during which the aircraft either makes a low approach or momentarily touches down on the runway, aircrews maneuver to set up for another approach following established flight paths, known as "closed patterns." This process may be repeated several times in sequence to satisfy training requirements. Patterns are designed with either left- or right-hand turns, depending on variables that include airport layout, nearby terrain, and urban development/noise restrictions.

  a. **Visual Closed Pattern.** A visual pattern (i.e., no radar-based guidance to aircrews) that is designed to allow as many practice approaches as possible in as short a time as possible. Aircraft in this type of closed pattern stay relatively close to the runway while maneuvering to set up for a subsequent approach.

  b. **SFO Pattern.** This pattern involves the aircraft climbing to a high altitude from which to begin the SFO approach to the runway. During the climbing portion of the pattern, the aircraft remain relatively close to the runway.

  c. **Reentry Pattern.** The aircraft leaves the local airspace (i.e., the area within approximately five miles of the runway) and then reenters the airspace after receiving clearance from ATC to do so. This pattern allows aircrews to practice the early stages of a visual, i.e., non-radar assisted, approach to the runway in addition to the actual landing. It can also be used as a way to remove aircraft from the local flying airspace when the Eglin AFB pattern has reached the maximum number of aircraft that can safely do pattern work simultaneously.

  d. **Instrument Approach Pattern.** Aircrews maneuver to a point relatively distant from the runway to begin a radar approach. ATC and Radar Approach Control provide guidance throughout the maneuver.

  e. **Tactical Pattern.** These patterns provide aircrews with practice for making approaches in a hostile environment and are designed to minimize risk from ground fire. The aircraft maneuver to approach the runway from a non-standard angle reduces flight path predictability for the enemy. The aircraft then descends to land while staying very close to the airfield, minimizing overflight of ground areas outside the installation perimeter.

Table 3-4. Annual Flight Operations at Eglin AFB

Category	Aircraft Type (Unit)	Departures			Arrivals			Closed Pattern Operations [1]			Total		
		Day	Night	Total	Day	Night	Total	Day	Night	Total	Day	Night	Total
Assigned (Permanent or Temporary)	F-35A (33 FW)	5,500	0	5,500	5,499	1	5,500	5,500	0	5,500	16,499	1	16,500
	F-35C (33 FW)	2,000	0	2,000	1,999	1	2,000	800	0	800	4,799	1	4,800
	A-10 (96 TW)	91	0	91	91	0	91	0	0	0	182	0	182
	C-130 (96 TW)	705	45	750	675	75	750	1,500	0	1,500	2,880	120	3,000
	F-15C (96 TW and 53 WG)	730	0	730	730	0	730	1,460	0	1,460	2,920	0	2,920
	F-15E (96 TW and 53 WG)	261	0	261	261	0	261	522	0	522	1,044	0	1,044
	F-16C (53 WG)	1,460	0	1,460	1,460	0	1,460	1,460	0	1,460	4,380	0	4,380
	UH-1 (96 TW)	62	1	63	62	1	63	190	0	190	315	1	316
	C-32 (486 FTS)	181	2	183	174	9	183	0	0	0	355	11	366
	Twin-engine, propeller-driven (Aero Club)	186	2	188	186	2	188	26	0	26	398	4	402
	Single-engine, propeller-driven (Aero Club)	716	38	754	746	8	754	106	0	106	1,569	45	1,614
	Assigned (Subtotal)	11,893	87	11,980	11,883	97	11,980	11,564	0	11,564	35,340	184	35,524
Transient	A-10	22	0	22	22	0	22	0	0	0	44	0	44
	B-737	9	0	9	9	0	9	0	0	0	18	0	18
	H-60	32	0	32	32	0	32	128	0	128	192	0	192
	C-12	34	0	34	34	0	34	0	0	0	68	0	68
	C-130	131	0	131	131	0	131	550	0	550	812	0	812
	C-17	69	0	69	69	0	69	28	0	28	166	0	166
	C-21	11	0	11	11	0	11	0	0	0	22	0	22
	C-32	22	0	22	22	0	22	24	0	24	68	0	68
	C-5	10	0	10	10	0	10	0	0	0	20	0	20

Table 3-4. Annual Flight Operations at Eglin AFB (continued)

Category	Aircraft Type (Unit)	Departures			Arrivals			Closed Pattern Operations [1]			Total		
		Day	Night	Total	Day	Night	Total	Day	Night	Total	Day	Night	Total
	F-15	7	0	7	7	0	7	0	0	0	14	0	14
	F-16	31	0	31	31	0	31	434	0	434	496	0	496
	F-18	23	0	23	23	0	23	322	0	322	368	0	368
	F-22	8	0	8	8	0	8	0	0	0	16	0	16
	F-35	9	0	9	9	0	9	162	0	162	180	0	180
	KC-10	11	0	11	11	0	11	0	0	0	22	0	22
	KC-135	76	0	76	76	0	76	304	0	304	456	0	456
	T-1	10	0	10	10	0	10	0	0	0	20	0	20
	T-38	93	0	93	93	0	93	130	0	130	316	0	316
	T-45	6	0	6	6	0	6	24	0	24	36	0	36
	T-6	25	0	25	25	0	25	50	0	50	100	0	100
	Transient (Subtotal)	*639*	*0*	*639*	*639*	*0*	*639*	*2,156*	*0*	*2,156*	*3,434*	*0*	*3,434*
Civilian	A320	137	15	152	144	8	152	0	0	0	281	23	304
	DC-9	1,056	117	1,173	1,114	59	1,173	0	0	0	2,170	176	2,346
	SAAB-340	56	6	62	59	3	62	0	0	0	115	9	124
	MD-82	598	66	664	631	33	664	0	0	0	1,228	100	1,328
	CL-601	4,072	452	4,524	4,298	226	4,524	0	0	0	8,369	679	9,048
	Civilian (Subtotal)	*5,918*	*658*	*6,575*	*6,246*	*329*	*6,575*	*0*	*0*	*0*	*12,164*	*986*	*13,150*
TOTAL	**Various**	**18,449**	**745**	**19,194**	**18,769**	**425**	**19,194**	**13,720**	**0**	**13,720**	**50,938**	**1,170**	**52,108**

This table lists airfield operations. Each closed pattern circuit includes two operations—one arrival and one departure.

Table 3-5. Annual Flight Operations at Duke Field

Category	Aircraft Type (Unit)	Departures			Arrivals			Closed Pattern Operations [1]			Total		
		Day	Night	Total	Day	Night	Total	Day	Night	Total	Day	Night	Total
Assigned	C-145 (919 SOW)	600	0	600	300	300	600	1,000	1,000	2,000	1,900	1,300	3,200
	C-146 (919 SOW)	2,400	0	2,400	1,560	840	2,400	9,360	5,040	14,400	13,320	5,880	19,200
Transient	F-35A	1,000	0	1,000	1,000	0	1,000	6,000	0	6,000	8,000	0	8,000
	F-35C	500	0	500	500	0	500	4,000	0	4,000	5,000	0	5,000
	H-60	100	0	100	100	0	100	300	0	300	500	0	500
	UH-1	200	50	250	200	50	250	800	200	1,000	1,200	300	1,500
	C-130	300	0	300	300	50	350	1,000	200	1,200	1,600	250	1,850
	C-17	49	0	49	48	1	49	0	0	0	97	1	98
	CV-22	300	0	300	290	10	300	1,000	200	1,200	1,590	210	1,800
	TH-57	100	20	120	100	20	120	0	0	0	200	40	240
	U-28	200	600	800	200	600	800	400	1,200	1,600	800	2,400	3,200
	F-15	24	0	24	24	0	24	96	2	98	144	2	146
	F-16	183	0	183	179	4	183	1,431	29	1,460	1,793	33	1,826
TOTAL	**Various**	**5,956**	**670**	**6,626**	**4,801**	**1,875**	**6,676**	**25,387**	**7,871**	**33,258**	**36,144**	**10,416**	**46,560**

The 2018 AICUZ noise contours for Duke Field, which will be shown in Chapter 4 of this study, reflect a highly conservative estimate of long-term growth in aircraft operations tempo that exceeds the operations counts listed in Figure 3-4 and Table 3-5. The operations tempo used in noise modeling—128,000 total airfield operations annually—represents a year in which based and transient aircraft activity is much higher than average. A large fraction of the aircraft operations conducted at Duke Field consists of transient aircraft conducting practice approaches. The transient operations tempo varies over time due to unit funding levels and other factors, resulting in a wide range of potential annual operations counts. Based aircraft operations tempo at Duke Field is also highly variable, due in large part to deployments for real-world contingencies. Use of higher than average operations tempo in noise level calculations ensures that the 2018 AICUZ noise contours presented in Chapter 4 do not underestimate noise levels that would be generated if there was substantial growth in operations tempo lasting one or more years. As will be shown in Chapter 4, even under this noise modeling scenario, noise levels at which not all land uses are considered compatible would not extend outside of DoD-owned lands.

3.2.3 Runway Utilization and Afterburner Use

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

- the airfield environment (layout, lights, 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, and/or
- the preference of a runway for the purpose of safety and noise abatement.

Base Operations, control tower personnel, and the Supervisor of Flying establish the runway in use. Pattern procedures are adjusted accordingly to maximize air traffic flow efficiency. Restrictions on the use of Runway 01/19 by F-35 aircraft are discussed in Section 3.2.5*, Noise Abatement*. Figure 3-5 displays the relative frequency at which each runway at Eglin AFB is used by F-35 aircraft, other based aircraft, civilian aircraft, and transient military aircraft. Figure 3-6 shows the relative frequency at which northbound and southbound runways are used at Duke Field.

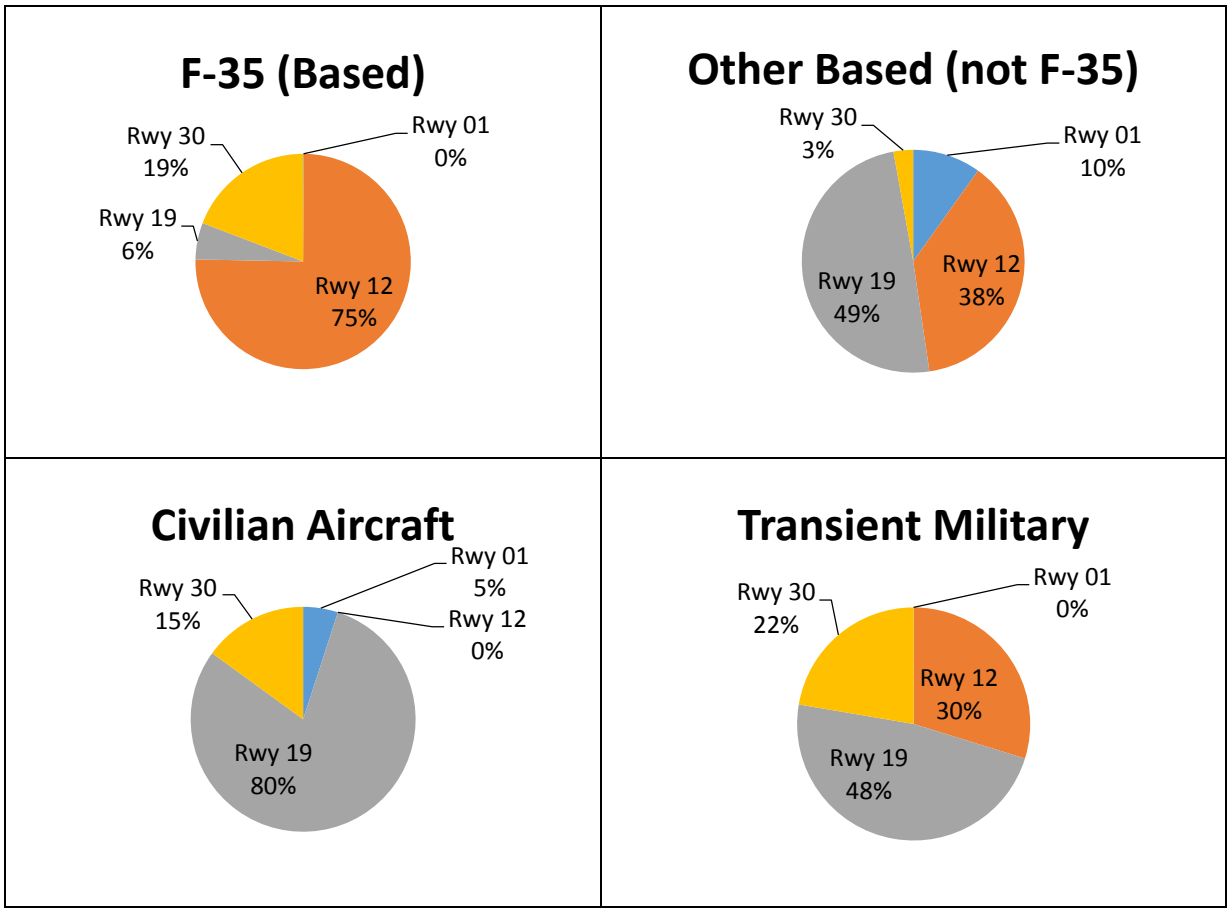


Figure 3-5. Runway Utilization at Eglin AFB

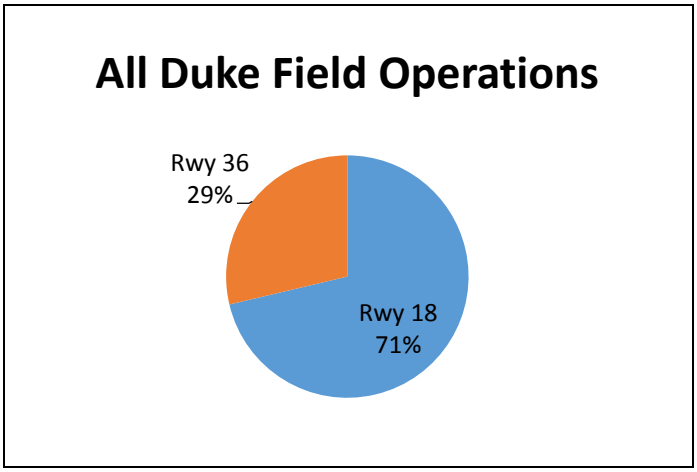


Figure 3-6. Runway Utilization at Duke Field

Figure 3-7 displays the percentage of F-35A and F-35C departures requiring use of the "afterburner." This increased thrust power setting ensures safe departures for aircraft that are heavily loaded or that are operating in atmospheric conditions that are not conducive to climb-out (e.g., extreme heat).

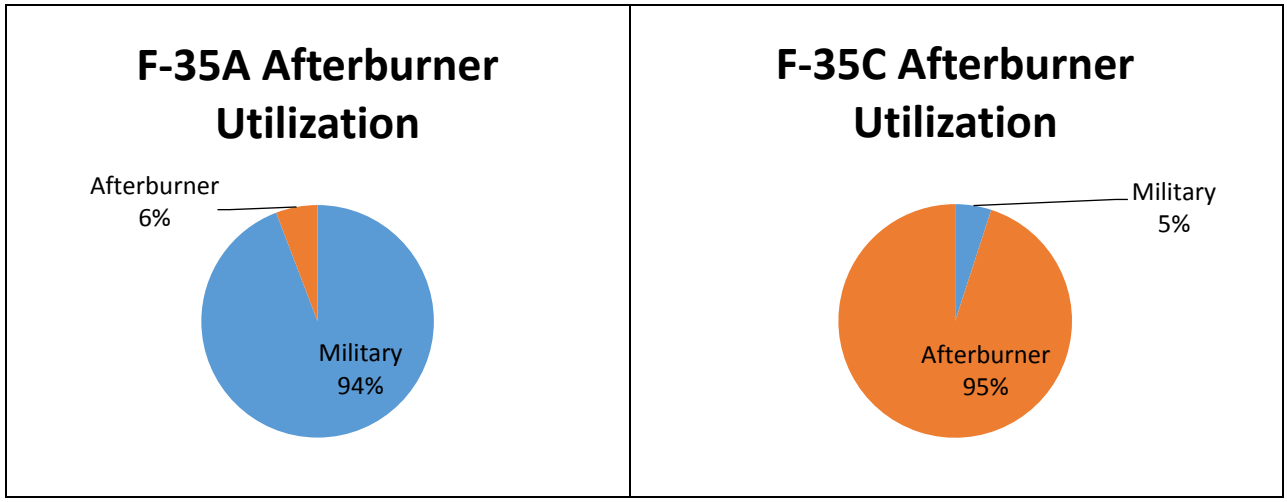


Figure 3-7. F-35 Departures Using Afterburner

3.2.4 Flight Tracks

Each runway has designated flight pattern tracks (flight tracks) that provide for the safety, consistency, and control of an airfield. A flight track is a route an aircraft follows while conducting an operation at the airfield, between airfields, or to/from training areas. Flight tracks typically include departures, arrivals, and local area patterns to depict where the aircraft fly in relation to the airfield.

Flight tracks are graphically represented as single lines, but actual flight pattern ground tracks may vary due to aircraft performance, pilot technique, and weather conditions, such that the actual flight track is a band, often one-half to several miles wide. Flights are idealized representations based on pilot and ATC input. Flight tracks at Eglin AFB are presented in Figure 3-8 through Figure 3-10. Duke Field flight tracks are presented in Figure 3-11 through Figure 3-13.

Flight paths to and from Eglin AFB and Duke Field are strongly influenced by the locations of training areas (e.g., offshore Warning Areas, Eglin Test and Training Range Restricted Area airspace) and other airfields (e.g., Destin Executive Airport, Hurlburt Field). In general, the flight tracks connect the installations to aircraft training areas such as the offshore Warning Areas and training airfields such as Duke Field as directly as is practicable. However, the routings to and from these locations reflects the need to remain clear of military training areas that are being used by other aircraft and to de-conflict with air traffic at other airfields. Flight paths for runway approaches reflect the need to "line up on the runway" at appropriate distances for the particular type of arrival procedure being carried out.

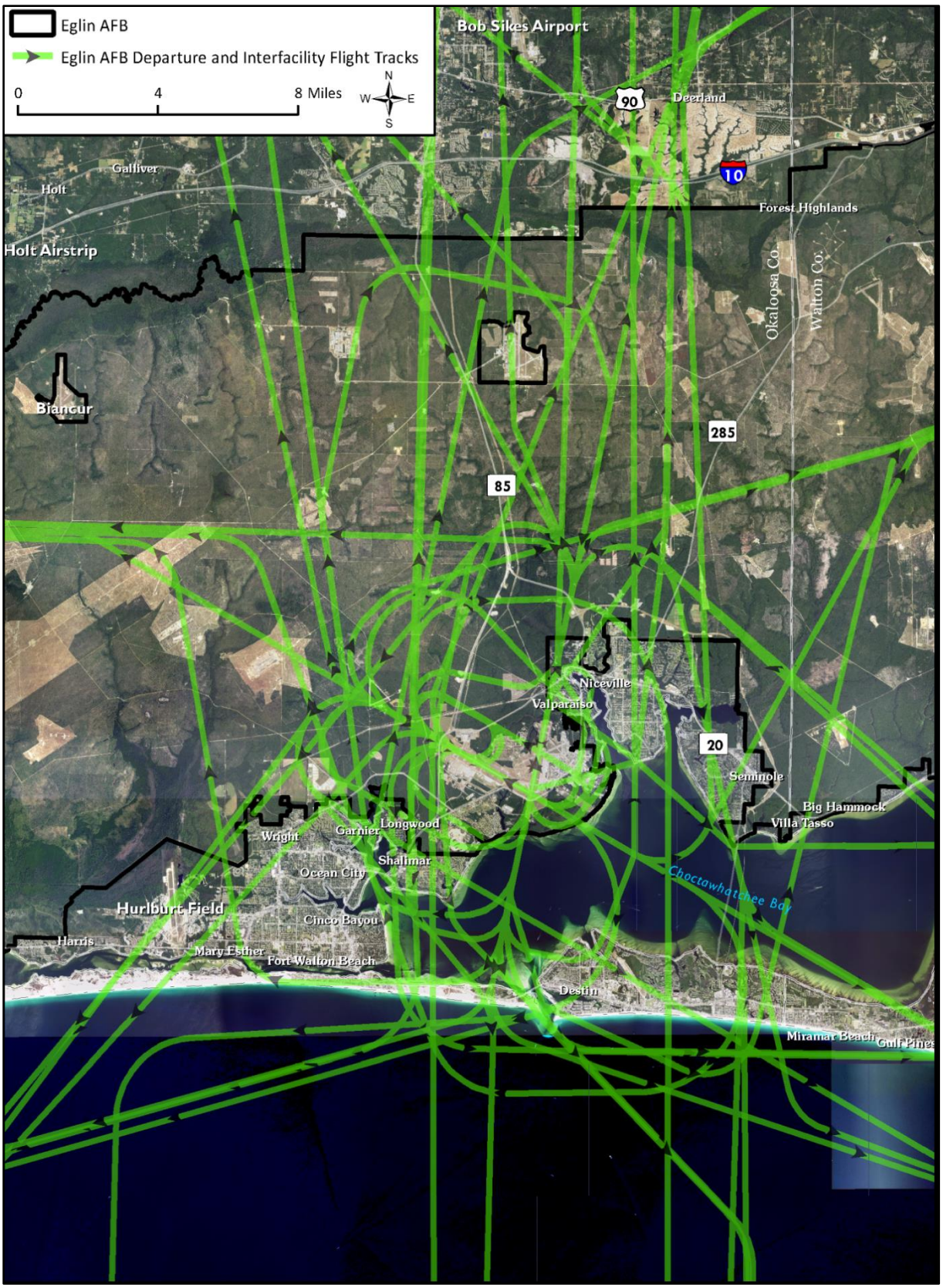


Figure 3-8. Modeled Eglin AFB Departure and Interfacility Flight Tracks

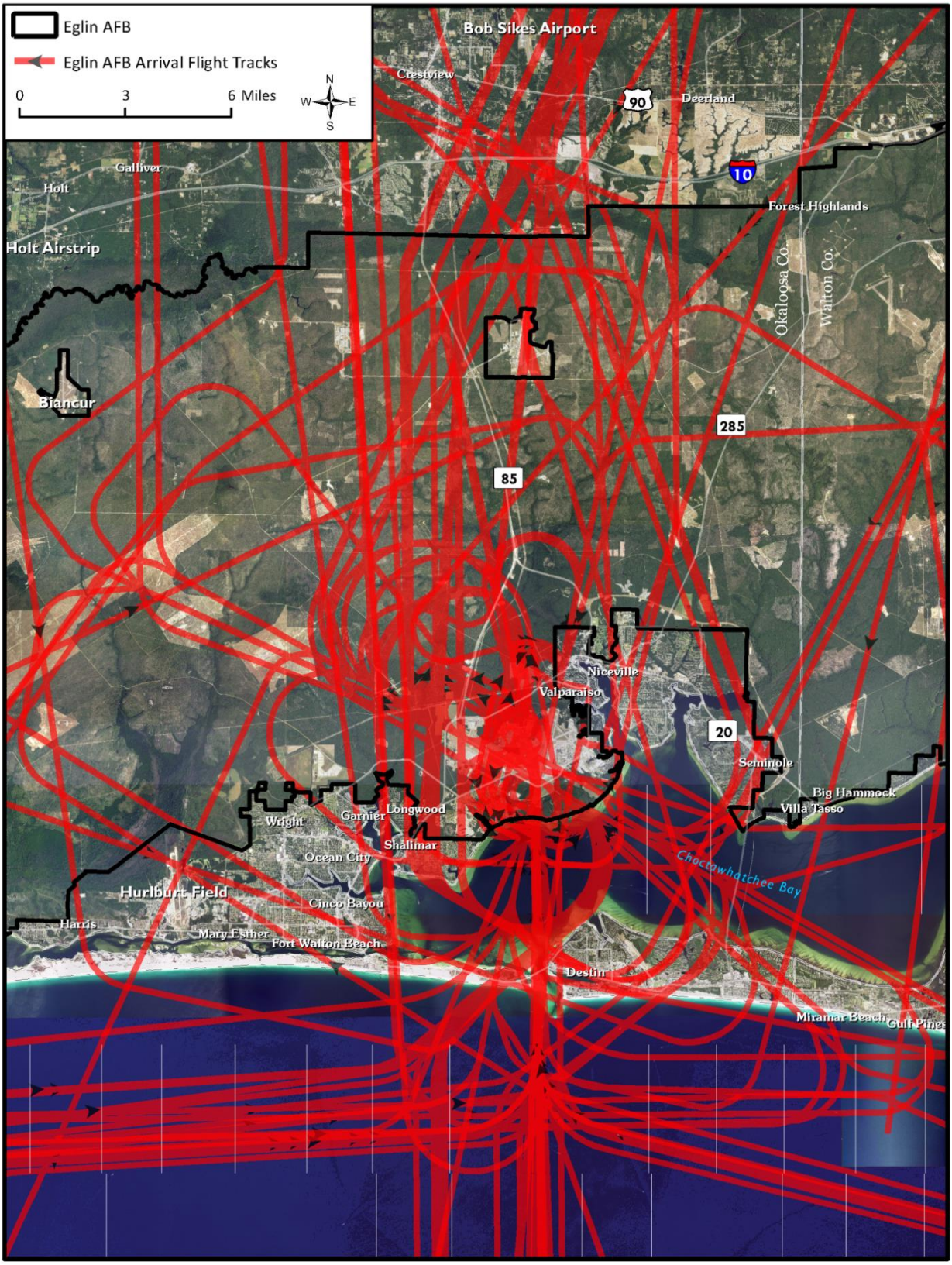


Figure 3-9. Modeled Eglin AFB Arrival Flight Tracks

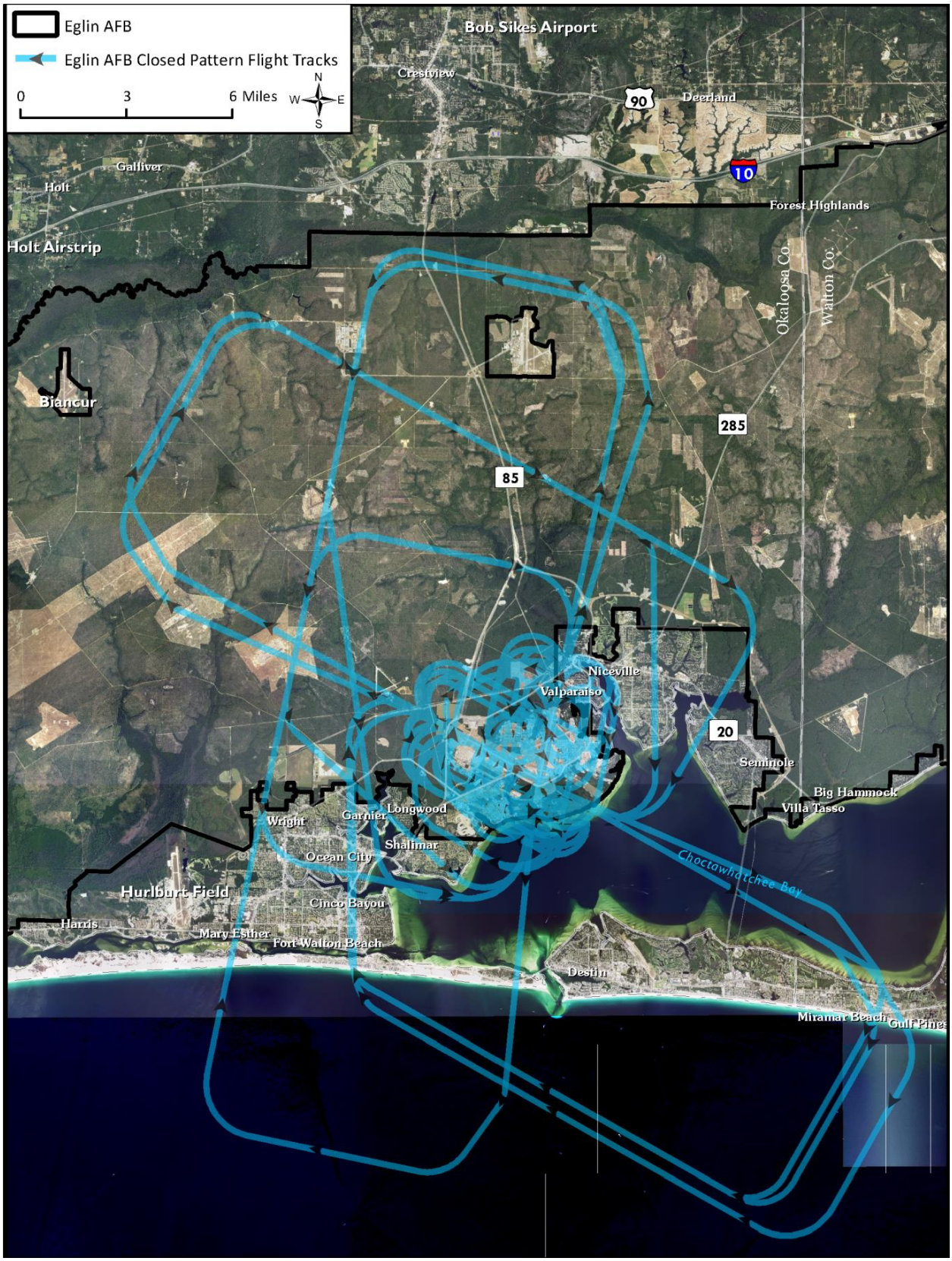


Figure 3-10. Modeled Eglin AFB Closed Pattern Flight Tracks

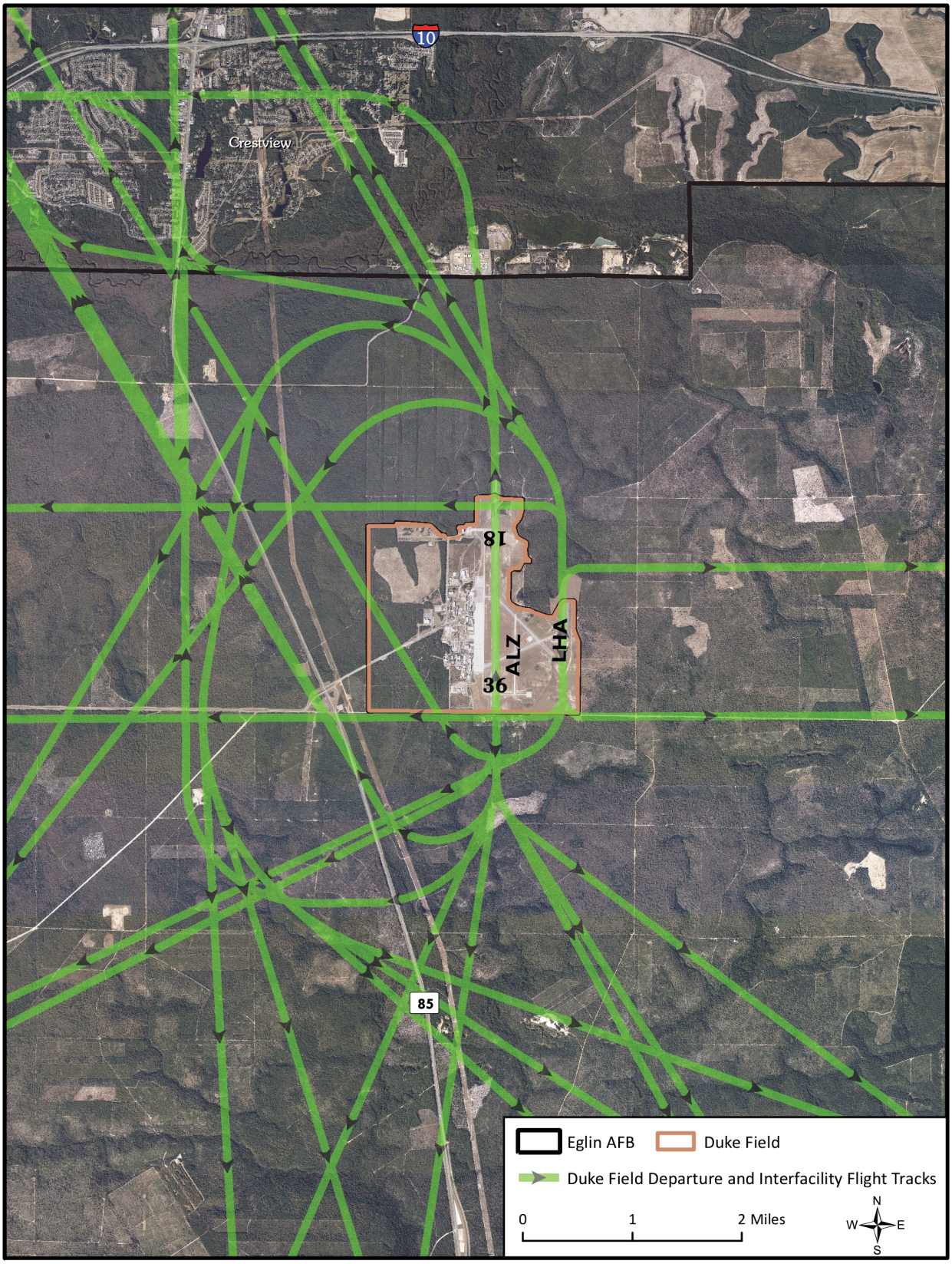


Figure 3-11. Modeled Duke Field Departure and Interfacility Flight Tracks

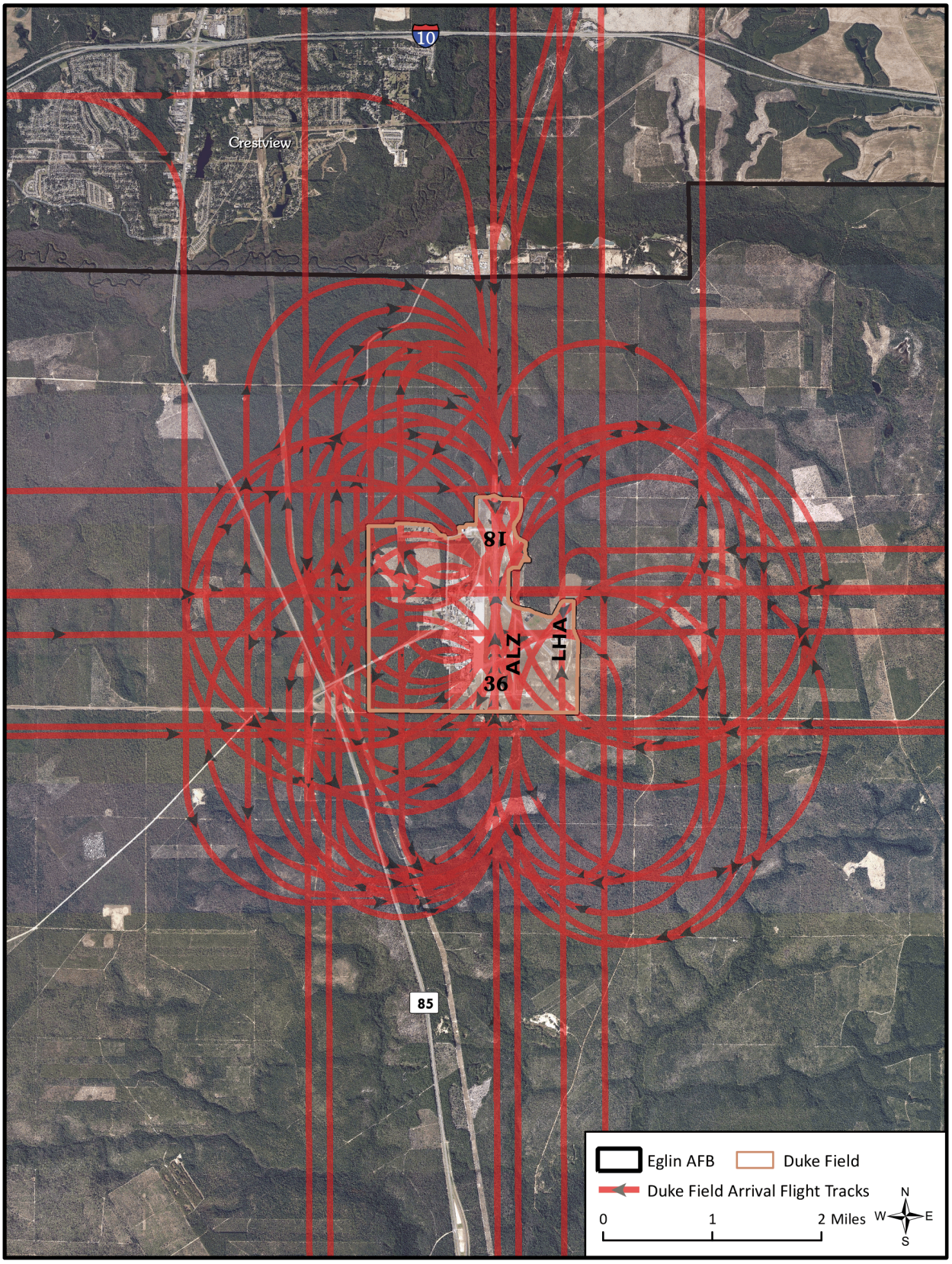


Figure 3-12. Modeled Duke Field Arrival Flight Tracks

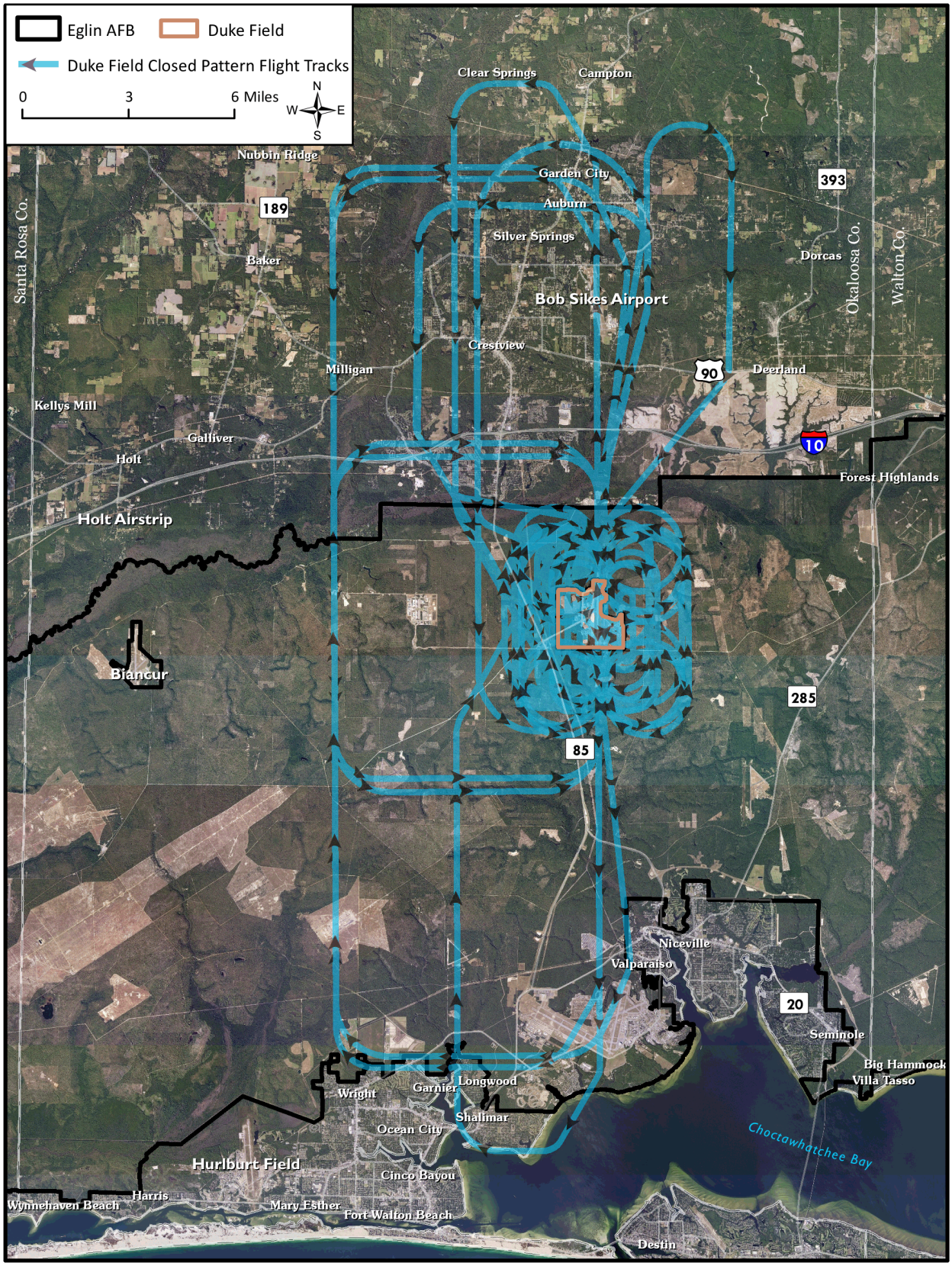


Figure 3-13. Modeled Duke Field Closed Pattern Flight Tracks

3.2.5 Noise Abatement

"Aircraft operations"—a common term used to describe the flying activities and ground engine runs of aircraft —is the primary source of noise at and near Eglin AFB and Duke Field. Noise generated during both flight and static engine runs performed on the ground were incorporated into the noise analysis and modeling inputs associated with the Eglin AFB and Duke Field 2018 AICUZ noise contours that are presented in Chapter 4 of this study.

The Air Force strives to be a good neighbor. The following measures reduce noise levels near the installation.

- Late-night operations are minimized to the extent possible while still accomplishing training and testing requirements, thereby reducing late-night noise disturbances. Only approximately 2 percent of total flying operations at Eglin AFB are conducted between 10:00 p.m. and 7:00 a.m.
- High-power static engine runs (i.e., runs exceeding 80 percent power) for fighter aircraft other than the F-35 are conducted in a "hush house" or at a designated location near the center of the base. The maintenance concept for F-35 aircraft involves sending the engines to Hill AFB, Utah, whenever intensive maintenance is required. High-power static engine runs are conducted at Hill AFB and are not conducted at Eglin AFB.
- Afterburners are typically de-selected prior to crossing the installation fenceline, a measure which saves gas and reduces noise levels
- To reduce noise in Valparaiso, F-35 aircraft operations on Eglin AFB Runway 1/19 are limited in accordance with the 2014 *Record of Decision, Final Supplemental Environmental Impact Statement, F-35 Beddown at Eglin Air Force Base, Florida*. Arrivals to Runway 19 and departures from Runway 01 are limited to those flight operations necessary for emergencies, unplanned contingencies, and weather affecting aircraft performance limitations and requirements.
- Flights over populated areas are avoided to the extent practicable. When flights over populated areas are necessary, flight crews are required to adhere to established minimum altitudes.
- Through Air Force regulations, commanders are required to periodically review existing traffic patterns, instrument approaches, weather constrictions, and operating practices in relation to populated areas and other local situations.

3.2.6 Noise Complaints

At times, air operations may draw noise complaints. All noise complaints are evaluated to ensure that future operations, where possible, do not generate unacceptable noise and provide results from noise investigations back to the complainant as soon as practical. Concerned citizens are encouraged to contact Team Eglin Public Affairs with any noise complaints. The Eglin AFB public affairs Community Engagement Division can be reached at (850) 882-3931. For complaints associated with operations at NOLF Choctaw the public should contact the Navy Operational Liaison Officer at (850) 665-6132.

4.0 Aircraft Noise

4.1 Introduction

How an installation manages the aircraft noise it generates can play a key role in shaping relationships with adjacent communities. It is also a key factor in local land use planning. Since there is the potential for noise from aircraft operations to significantly impact areas surrounding the installation, Eglin AFB and Duke Field AFB have defined noise zones using the guidance provided in the AICUZ Instruction. The contours are based on aircraft type, their operations, and when they are flown.

4.2 What is Sound/Noise?

Sound is vibrations in the air, which can be generated by a multitude of sources to include roadway traffic, a barking dog, a radio—and/or aircraft operations. The vibrations are known as 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 strike the eardrum at a certain rate and intensity, it is perceived as sound. When the sound is unwanted, it is referred to as noise. Generally, sound becomes noise to a listener when it interferes with normal activities. Sound has three components: intensity, frequency and duration.

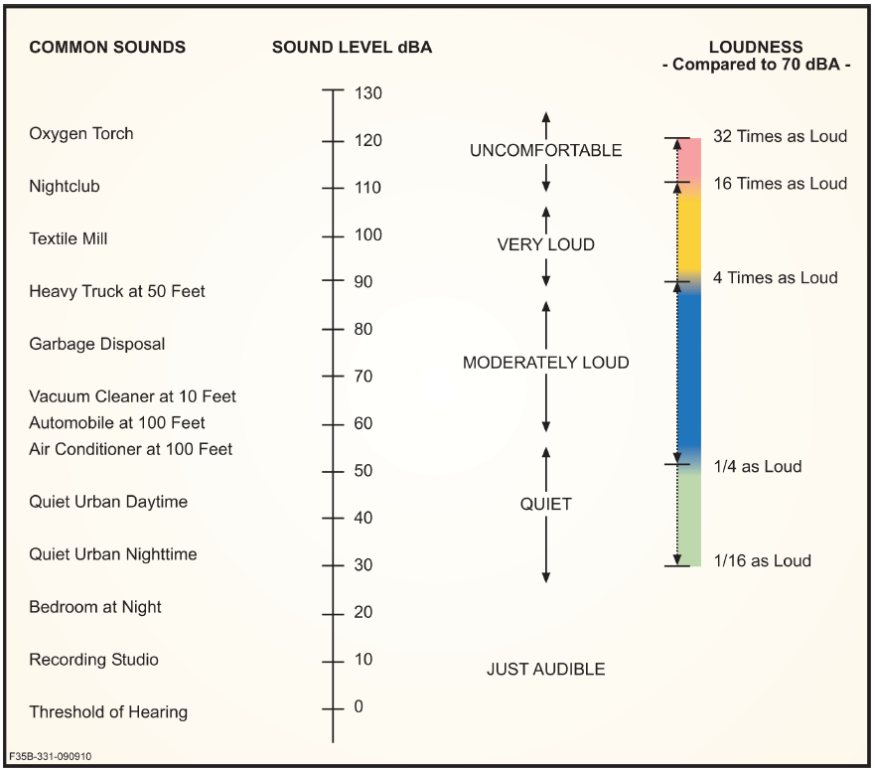
- Intensity, or loudness, is related to sound pressure change. As the vibrations oscillate back and forth, they create a change in pressure on the eardrum. The greater the sound pressure change, the louder it seems.
- Frequency determines how the pitch of the sound is perceived. Low-frequency sounds 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, people hear best in the range of 1,000 to 4,000 Hz. For environmental noise, A-weighting is used, which focuses on this range, to best represent human hearing. While A-weighted decibels may be written as “dBA,” if it is the only type of weighting being discussed, the “A” is generally dropped.
- Duration is the length of time a sound can be detected.

4.3 How Sound Is Perceived

The loudest sounds that can be comfortably heard by the human ear have intensities a trillion times higher than those of sounds barely heard. Because such large numbers become awkward to use, noise is measured in decibels (dB), which uses a logarithmic scale that doubles the noise energy every 3 dB.

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 120 dB begin to be felt inside the human ear as discomfort. Sound levels between 130 and 140 dB are felt as pain (Berglund and Lindvall 1995).



Source: Harris 1979

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

Table 4-1 tabulates the subjective responses with change in (single-event) sound levels. While noise energy doubles or halves with every 3-dB change, people do not perceive all that noise energy. It takes a 10-dB increase or decrease for humans to perceive a doubling or halving of loudness.

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

Change in Sound Level	Change in Loudness
20 dB	Striking fourfold 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

Source: Berendt et al. 1976

4.4 Day-Night Average Sound Level

When someone hears an aircraft fly over, they may ask, “How loud was that?” While people may often be concerned over the loudness of a sound, there are other dimensions to the sound event. For instance, does one overflight draw the same interest as two separate overflights—or as 20? Also, does the 30-second run-up of engines prior to takeoff roll draw the same interest as a 30-minute maintenance run?

Additionally, is an overflight more noticeable at 2 PM or 2 AM, when the ambient noise is low and people are trying to sleep?

The length and number of events—the total noise energy—and the time of day 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 U.S. Environmental Protection Agency (EPA).

DNL, when used as a metric for aircraft noise, represents the accumulation of noise energy from all aircraft noise events in 24 hours. Additionally, for all operations between 10:00 PM and 7:00 AM, 10 dB are added 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, DNL is typically based upon a year's worth of operations and thus represents 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 and the level of average noise exposure measured in DNL (Schultz 1978, USEPA 1978).

4.5 Preparing Noise Contours

The Air Force prepares noise contours, as needed, to assess the compatibility of aircraft operations. This AICUZ Study presents noise contours reflecting currently based units operating at full strength. The Air Force utilizes NOISEMAP, the DoD model for assessing noise exposure from military aircraft operations at air installations.

4.6 AICUZ Noise Contours

Figure 4-2 presents Eglin AFB noise contours reflecting the current aircraft operations tempo. Areas of elevated noise level generally exist near flight paths or static engine run locations. Flight paths that are frequently used, used by loud aircraft types, or that are used frequently during the late-night period between 10:00 PM and 7:00 AM are associated with higher DNL. Segments of flight paths at lower altitudes generate higher noise levels on the ground than segments on which the aircraft is at higher altitudes. Notable features of the Eglin AFB noise contours are described below.

- Noise contours generated by flying operations on Runway 12/30 cover more area than noise contours associated with flying operations on Runway 1/19. This reflects the fact that F-35 aircraft—the loudest aircraft type in the Eglin AFB fleet—use Runway 12/30 almost exclusively.
- Areas of localized high noise level often reflect a convergence of flight tracks or static engine run locations.

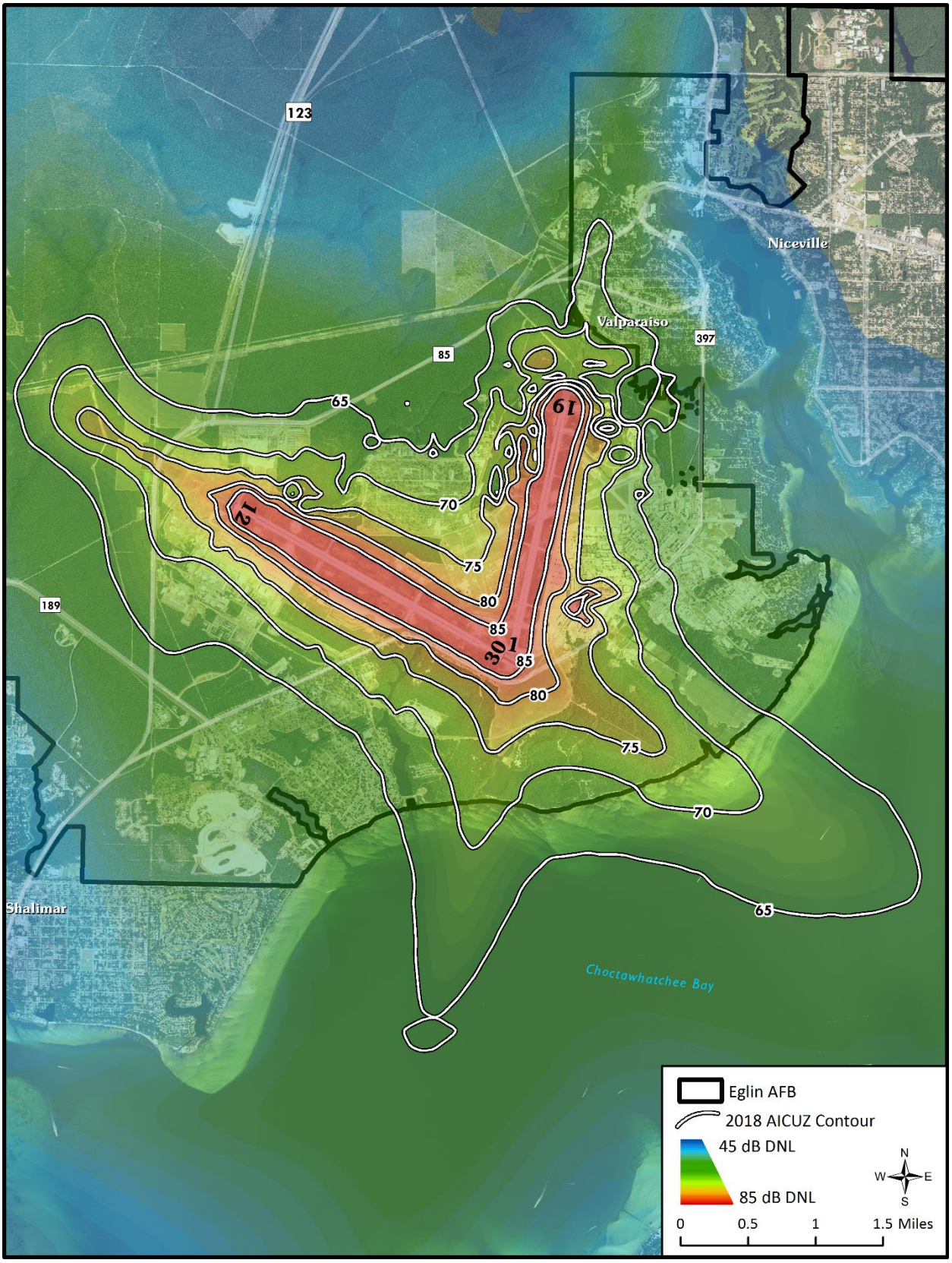


Figure 4-2. 2018 AICUZ Noise Contours with Gradient Shading

Figure 4-3 shows a comparison of the 2018 AICUZ contours along with noise contours published in the SEIS for the F-35 Beddown at Eglin AFB (referred to as "SEIS noise contours") and noise contours published in the 2006 AICUZ. In the 12 years since the 2006 AICUZ, there have been mission and procedural changes, improvements in computer noise modeling technology, and changes in Air Force AICUZ policies. Changes that have affected the size and shape of the noise contours are summarized below:

- **Changes in based aircraft.** The 2006 AICUZ Study reflected 33 FW operating F-15 aircraft. Those aircraft have now been replaced by F-35 aircraft.
- **Evolution of F-35 operational data.** The SEIS noise contours reflect the best F-35 operational data (e.g., percent of departures using afterburner) that was available at the time the SEIS was being prepared. As was fully expected (and noted in the SEIS), certain aspects of F-35 operations have evolved relative to what was expected during SEIS production. Also, while the SEIS contours reflect operations of F-35B aircraft, F-35B aircraft are no longer scheduled to beddown at Eglin AFB. Although no based F-35B aircraft are reflected in the 2018 AICUZ noise contours, F-35 aircraft that do not belong to 33 FW are expected to visit Eglin AFB and are included in the noise modeling as transient aircraft. The 2018 AICUZ noise contours in this study reflect completion of the 33 FW beddown and current F-35 operating parameters. The 2006 AICUZ did not include F-35 operations.
- **Changes in airfield operational details.** Flight procedures at Eglin AFB are somewhat constrained by the locations of training areas and other airfields, and have been optimized for this operating environment. However, certain operational details (e.g., how often individual flight paths are used) do change over time. The total number of annual aircraft operations at Eglin AFB decreased from 98,788, per the 2006 AICUZ, to 52,108 in 2018. Use of Runway 01 and 19 has decreased. Current airfield operations are reflected in the 2018 AICUZ noise contours.
- **Changes in noise modeling software.** The 2018 AICUZ noise contours and SEIS noise contours reflect the effects of topography (e.g., hills can block sound, sound energy flows more smoothly over water than over land) as calculated using the current version of DoD noise modeling software, NOISEMAP version 7.3. Updates to the NOISEMAP necessary to account for topography were not available in 2006. The terrain surrounding Eglin AFB and Duke Field is relatively flat, and terrain relief has minimal effects on patterns of noise propagation. However, the increased transmission of noise across bodies of water such as the Choctawhatchee Bay and Boggy Bayou does have an effect on noise contours.
- **Changes in AICUZ Air Force policies.** The DoD and Air Force have shifted to use of an "average annual day" rather than an "average flying day" in calculating DNL (U.S. Air Force 2015). The average annual day method averages noise across all 365 days of the year while the average flying day method averages across only those days on which flying typically occurs. The average annual day method of DNL calculation is used in the current study while the 2006 AICUZ and SEIS used the average flying day method. The 2006 AICUZ modeled 260 flying days per year for based aircraft and 365 days per year for transient aircraft. The SEIS used 232 days for based aircraft and 365 days for transient aircraft.

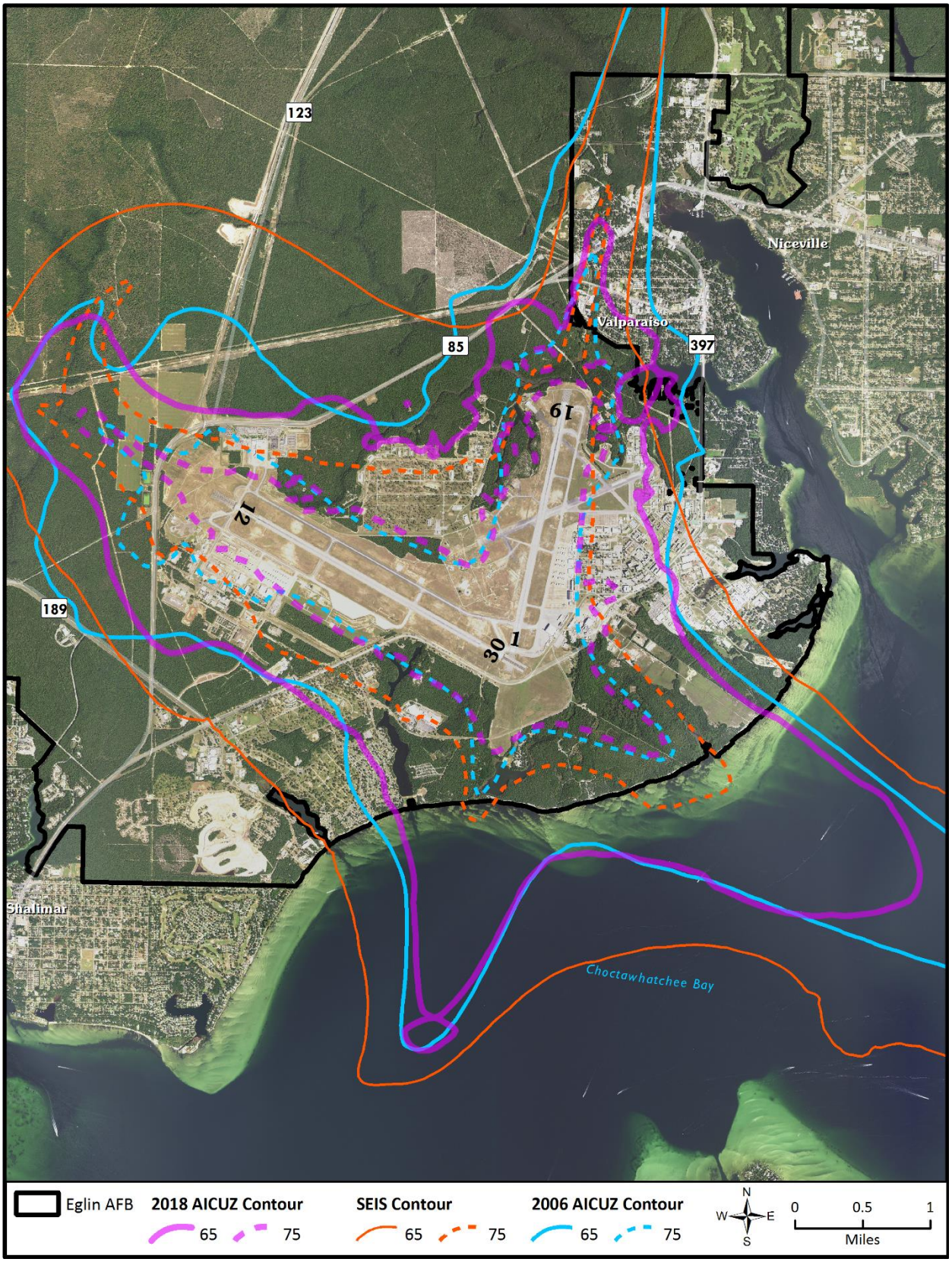


Figure 4-3. Comparison of 2018, SEIS, and 2006 AICUZ Noise Contours

The primary reason for the change to average annual day is to be consistent with the land use recommendations guideline. The shift from average busy day to average annual day slightly reduces DNL if all other factors are held constant.

Table 4-2 presents the off-base land acreage and estimated population within noise zones for the 2018 noise contour map. The population estimates are based on 2010 Census block-level data (U.S. Census Bureau 2010). A geometric proportion method was used to determine the estimated population within the contour bands. This method assigns population based on the portion of a census block that falls within the contour. The population across census blocks is assumed to be evenly distributed.

Noise levels between 65 and 69 dB DNL affect 2,181 acres of off-base land and an estimated 556 residents. The 239 acres of off-base land affected by noise levels between 70 and 74 dB DNL are primarily non-residential and include an estimated one resident.

Table 4-2. Off-Base Land Area and Estimated Population Within Noise Zones for the 2018 AICUZ Noise Contours

Noise Zone (dB DNL)	Acres	Population
65 to 69	2,181	556
70 to 74	239	1
75 to 79	0	0
80 to 84	0	0
85+	0	0
Total (65+)	**2,420**	**557**

Noise contours at Duke Field (Figure 4-4) also reflect 33 FW F-35 units at full-strength, and an increased tempo of transient operations relative to that which has been experienced in the recent past. Duke Field noise contours reflect current Air Force policies as well as current operating parameters for all aircraft types. At the time the SEIS was being conducted, Duke Field was intended to be used heavily by F-35B aircraft. F-35B aircraft are no longer scheduled to beddown at Eglin AFB, and noise levels near Duke Field are less intense than was expected during preparation of the SEIS. Although noise generated by Duke Field aircraft operations is sometimes audible in nearby communities, off-base time-averaged noise levels are below 65 dB DNL. Because the contours do not extend outside of DoD-owned land, zero acres of off-base land, and zero off-base residents are affected at greater than 65 dB DNL.

Noise contours from the 2018 NOLF Choctaw Draft AICUZ study are re-printed in Figure 4-5. This contour set was originally published in the 2005 Final Environmental Impact Statement for BRAC Decisions and Related Actions. The contours were adopted and continue to be used by Santa Rosa County for use in land use planning purposes. The shape of the noise contours reflects the predominant use of NOLF Choctaw as a location to practice runway approaches (i.e., pattern work). For questions concerning operations at NOLF Choctaw the public should contact the Navy Operational Liaison Officer at (850) 665-6132.

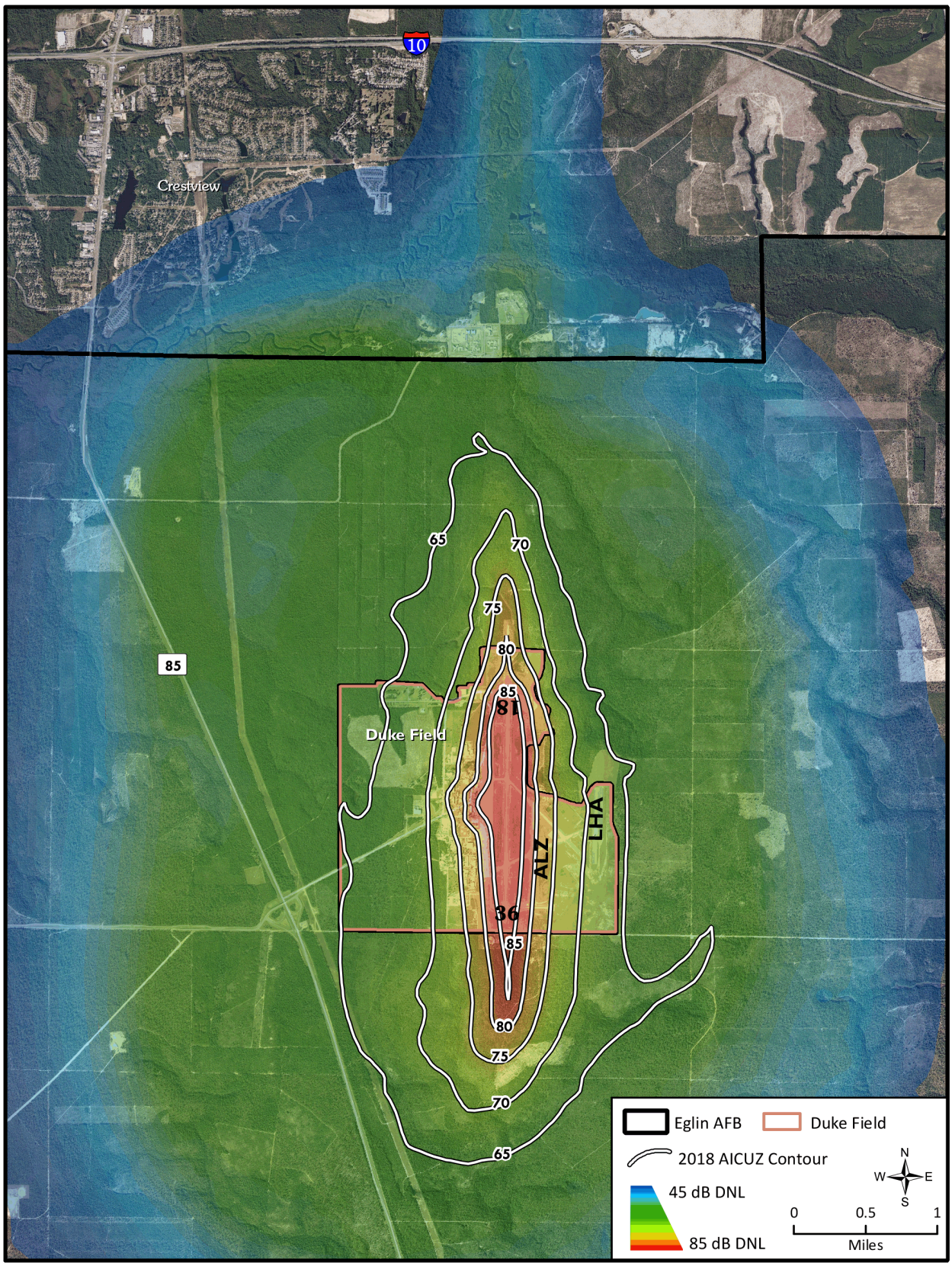


Figure 4-4. 2018 AICUZ Noise Contours for Duke Field with Gradient Shading

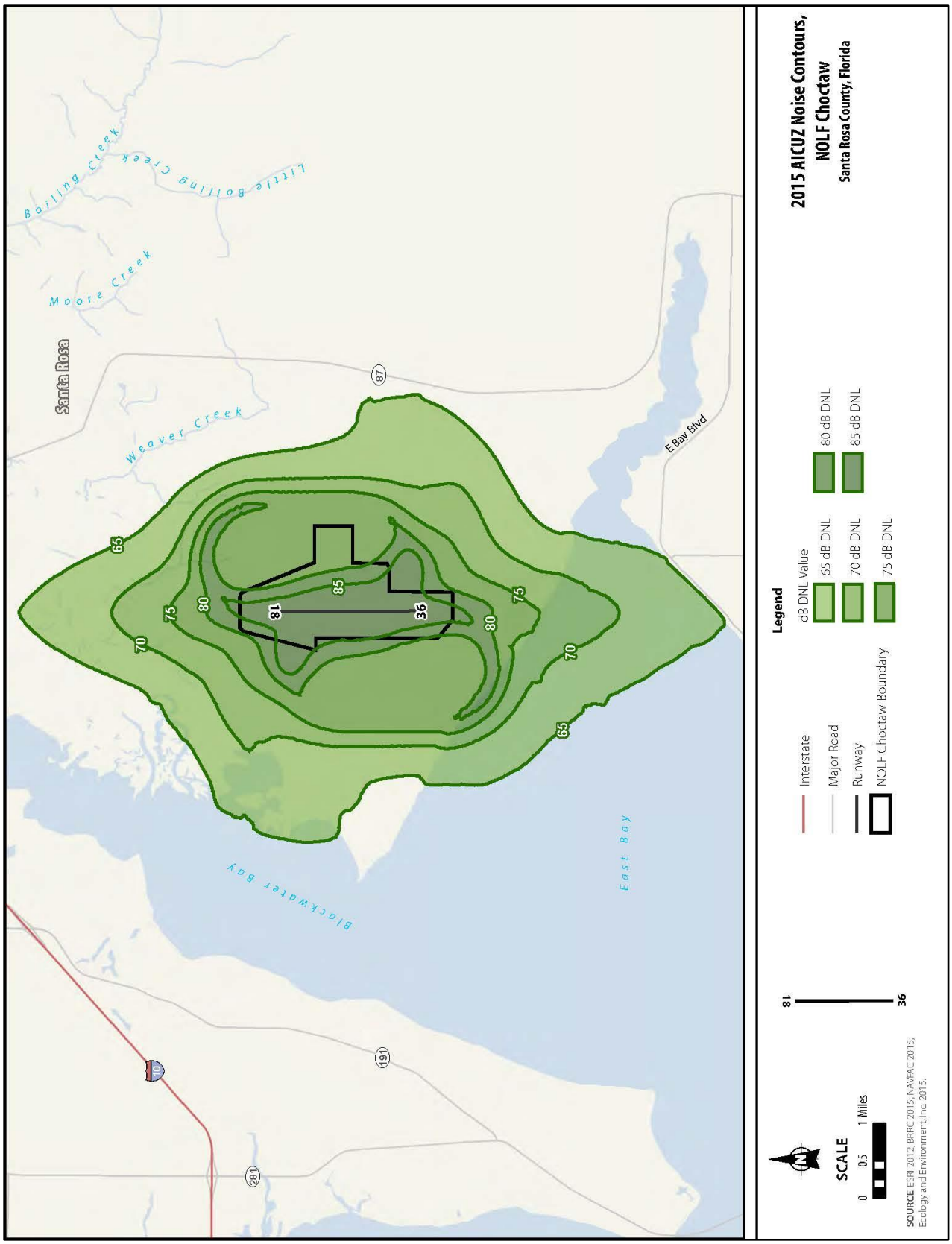


Figure 4-5. NOLF Choctaw 2015 Noise Contours as Published in 2018 Naval Air Station Whiting Field, Florida AICUZ Study

5.0 Community and Aircraft Safety

Community and aircraft safety is paramount to the Air Force, and airfield safety is a shared responsibility between the Air Force and the surrounding communities, each playing a vital role in its success. Cooperation between the Air Force and the community results in strategic and effective land use planning and development. As such, the Air Force has established a flight safety program and has designated areas of accident potential around its air installations to assist in preserving the health, safety, and welfare of the people living near the airfield. This AICUZ Study provides the information needed, in part, to reach the 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 flight.

5.1 Clear Zones and Accident Potential Zones

In the 1970s and 1980s, the military conducted studies of historical accident and 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 Clear Zones (i.e., CZ) and Accident Potential Zones (i.e., APZ) as areas where an aircraft accident is most likely to occur if an accident were to take place – they are not predictors of accidents. The AICUZ defines three areas that, because of accident potential, should be considered for density and land use restrictions: the CZ, APZ I, and APZ II. Standard CZs and APZs are described in the bullets below and sketched in Figure 5-1.

- **Clear Zone.** At the end of all active runways is an area known as the CZ. The CZ is a square area beyond the end of the runway and centered on the runway centerline extending outward for 3,000 feet. A CZ is required for all active runways and should be undeveloped.
- **APZ I.** Beyond the CZ is Accident Potential Zone I (i.e., APZ I). The standard APZ I is 3,000 feet in width and 5,000 feet in length along the extended runway centerline.
- **APZ II.** Accident Potential Zone II (i.e., APZ II) is the rectangular area beyond APZ I. The standard APZ II is 3,000 feet in width by 7,000 feet in length along the extended runway centerline.

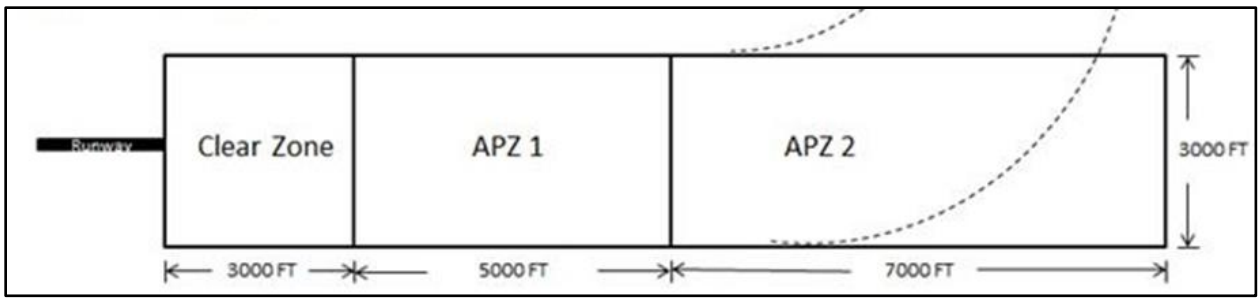


Figure 5-1. Sketch of Generic CZs and APZs for a Runway

While the APZs extend outward from the ends of the runway along the extended runway centerline, an APZ may be added where over 80 percent of the operations follow a curved departure.

CZs and APZs are also designated for ALZs, helipads, and rotary-wing landing lanes. ALZs are shorter and narrower than standard DoD runways to simulate airfields used during combat or contingency operations when larger runways are not available. Helipads are used for standard rotary-wing operations, while rotary-wing landing lanes are designed to accommodate sliding landings conducted as part of training for emergencies. The CZs and APZs for ALZs, helipads, and landing lanes are much smaller than those associated with standard fixed-wing runways, and do not extend off base.

Figure 5-2 depicts the CZs and APZs for Eglin AFB and Duke Field runways, helipads, and rotary-wing aircraft landing lanes. As shown in Figure 5-2, the relatively small CZs and APZs associated with helipads and rotary-wing aircraft landing lanes do not extend off-base. Table 5-1 and Table 5-2 list the off-base land acreage and estimated population within the CZs and APZs at Eglin AFB and at Duke Field, respectively.

Table 5-1. Off-Base Land Area and Estimated Population Within the Accident Potential/Clear Zones for Eglin AFB

Zone	Acres	Population
CZ	6.8	22
APZ I	713.1	948
APZ II	1,282.3	687
Total	**2,002.2**	**1,657**

Table 5-2. Off-Base Land Area and Estimated Population Within the Accident Potential/Clear Zones for Duke Field

Zone	Acres	Population
CZ	0	0
APZ I	0	0
APZ II (North)	196.5	404
Total	**196.5**	**404**

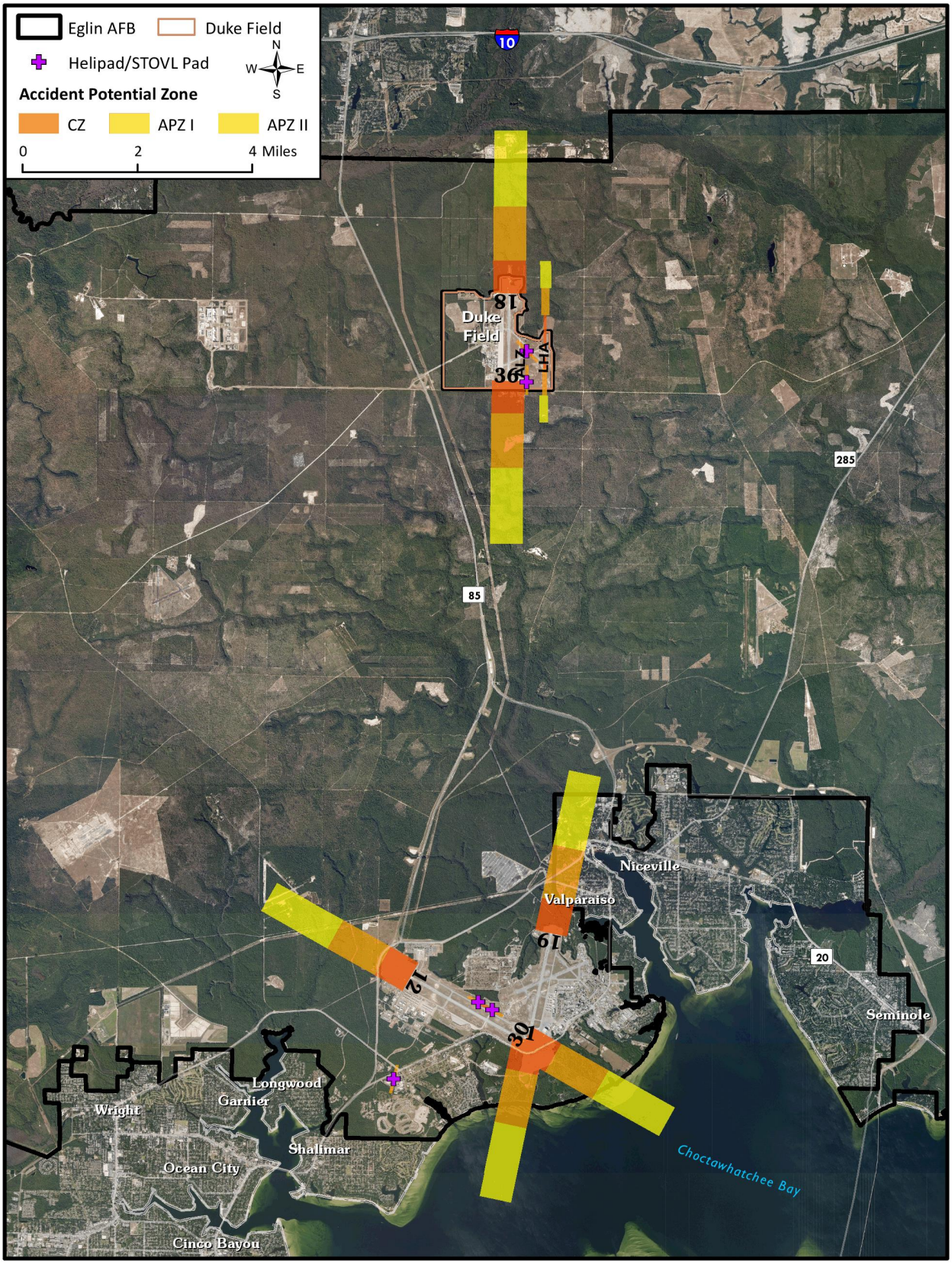


Figure 5-2. 2018 AICUZ Clear Zones and Accident Potential Zones for Eglin AFB and Duke Field

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

Associated with Runway 1/19, the south CZ is fully contained with the base, and Eglin AFB owns 178 acres of the north CZ, with the remainder in the city of Valparaiso. For the area located within the city of Valparaiso, any land uses other than vacant or agricultural are incompatible with safety criteria established for a CZ. Two small areas of residential land use occur in the CZ. One area is in the north central portion of the CZ and the other is a small wedge of residential land within the corner of the CZ. All remaining land with the CZ is open space and is compatible with Air Force planning criteria. APZs I and II for Runway 1 are contained within Eglin AFB or over Choctawhatchee Bay. For Runway 19 the majority of APZ I and II lies within the cities of Valparaiso and Niceville. The CZs and APZs associated with Runway 12/30 are entirely within DoD-owned land or Choctawhatchee Bay.

Figure 5-3 illustrates the CZs/APZs for Runway 18/36 at NOLF Choctaw. These APZ configurations are derived from the Navy AICUZ Instruction (OPNAVINST 11010.36C). The AICUZ Instruction requires CZs for all runway ends. In accordance with the Navy instruction, the curving APZs I and II are required because arrival and departure operations exceed 5,000 annually. The curving APZs follow departure, arrival, and pattern flight tracks. The quantity of Field Carrier Landing Practice operations requires the APZ II portion to extend the entire length of the track, resulting in a closed-loop APZ combination to the east and west of the runway. Approximately 3,127 acres of off-station lands and 2,305 acres over water areas are impacted by the 2018 AICUZ APZs. The majority of the land is agricultural and rural (U.S. Navy 2018).

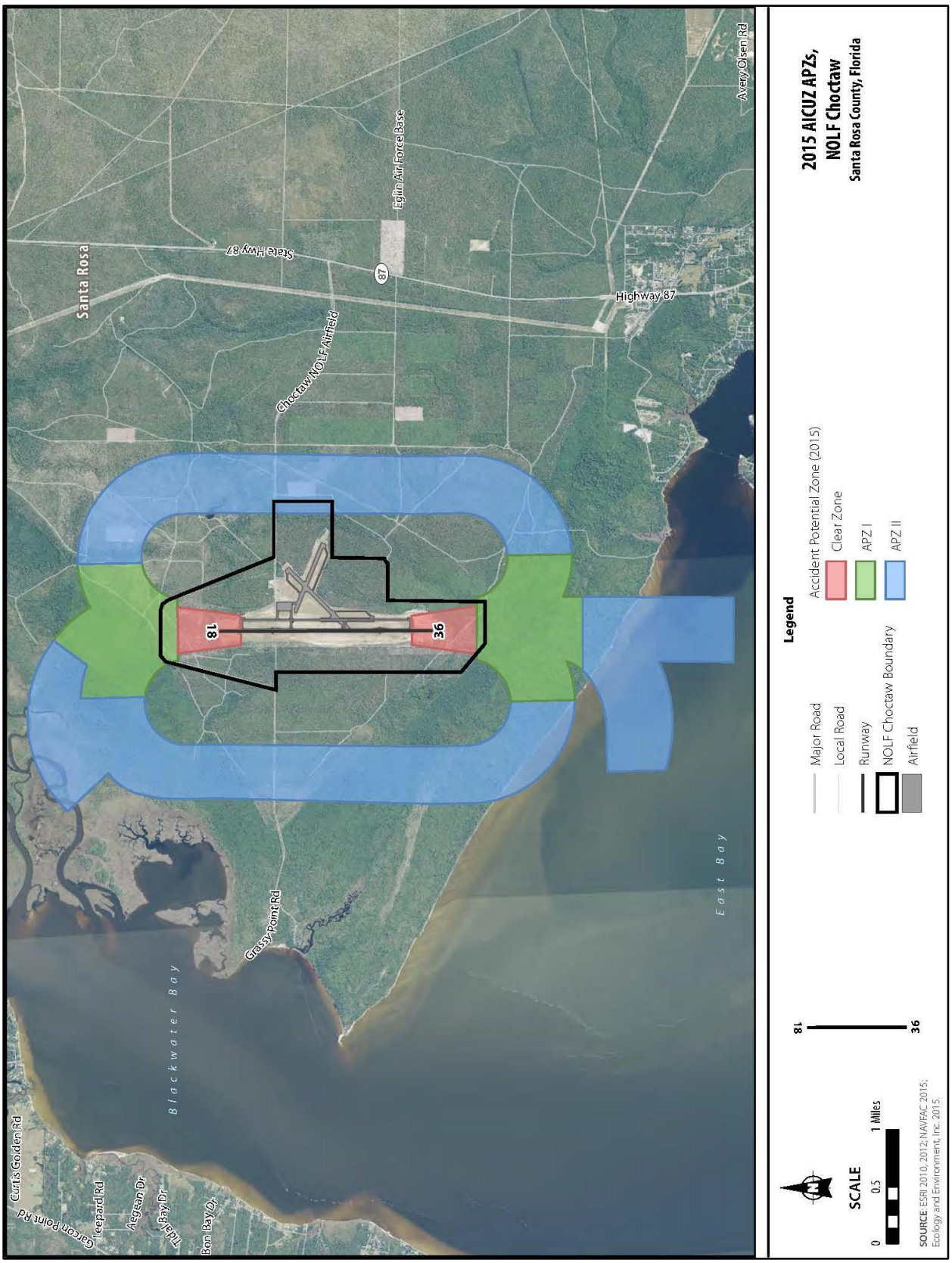


Figure 5-3. 2018 AICUZ Clear Zones and Accident Potential Zones for NOLF Choctaw

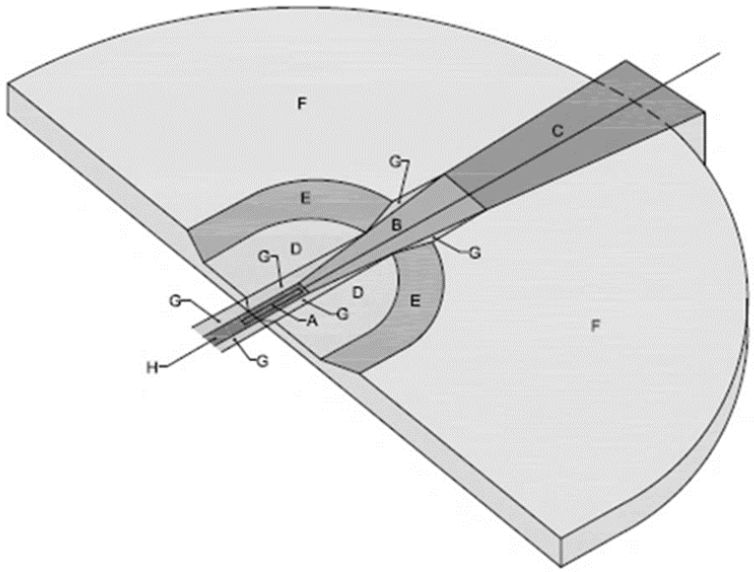
5.2 Imaginary Surfaces

The DoD and Federal Aviation Administration (FAA) identify a complex series of imaginary planes and transition surfaces which define the airspace needed to remain free of obstructions around an airfield. Obstruction-free imaginary surfaces help 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.

Brief descriptions of the imaginary surfaces for fixed-wing runways are provided on Figure 5-4 and in Table 5-3. Figure 5-5 depicts the runway airspace imaginary surfaces specific to Eglin AFB and Duke Field. In general, no above-ground structures are permitted in the primary surface or CZs, and height restrictions apply to transitional surfaces and approach and departure surfaces. Height restrictions are more stringent as one approaches the runway and flight path.

Table 5-3. Description of Imaginary Surfaces for Military Airfields

Planes and Surfaces	Geographical Dimensions
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 2,000 feet, or 1,000 feet on each 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) 200 feet beyond each end of the primary surface, and extending for 50,000 feet. The slope of the approach-departure clearance surface is 50:1 until it reaches an elevation of 500 feet above the established airfield elevation. It then continues horizontally at this elevation to a point 50,000 feet from the starting point. The width of this surface at the runway end is 2,000 feet, flaring uniformly to a width of 16,000 feet at the end point.
Inner Horizontal Surface	This imaginary surface is an oval plane at a height of 150 feet above the established airfield elevation. The inner boundary intersects with the approach-departure clearance surface and the transitional surface. The outer boundary is formed by scribing arcs with a radius 7,500 feet from the centerline of each runway end and interconnecting these arcs with tangents.
Conical Surface	This is an inclined imaginary surface extending outward and upward from the outer periphery of the inner horizontal surface for a horizontal distance of 7,000 feet to a height of 500 feet above the established airfield elevation. The slope of the conical surface is 20:1. The conical surface connects the inner and outer horizontal surfaces
Outer Horizontal Surface	This imaginary surface is located 500 feet above the established airfield elevation and extends outward from the outer periphery of the conical surface for a horizontal distance of 30,000 feet.
Transitional Surface	This imaginary 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.



LEGEND

A Primary Surface
B Approach-Departure Clearance Surface (50:1 Slope Ratio)
C Approach-Departure Clearance Surface (Horizontal)
D Inner Horizontal Surface (45.72m [150'] Elevation)
E Conical Surface (20:1 Slope Ratio)
F Outer Horizontal Surface (152.40m [500'] Elevation
G Transitional Surface (7:1 Slope Ratio)
H Runway

Figure 5-4. Imaginary Surfaces and Transition Planes for Military Runways

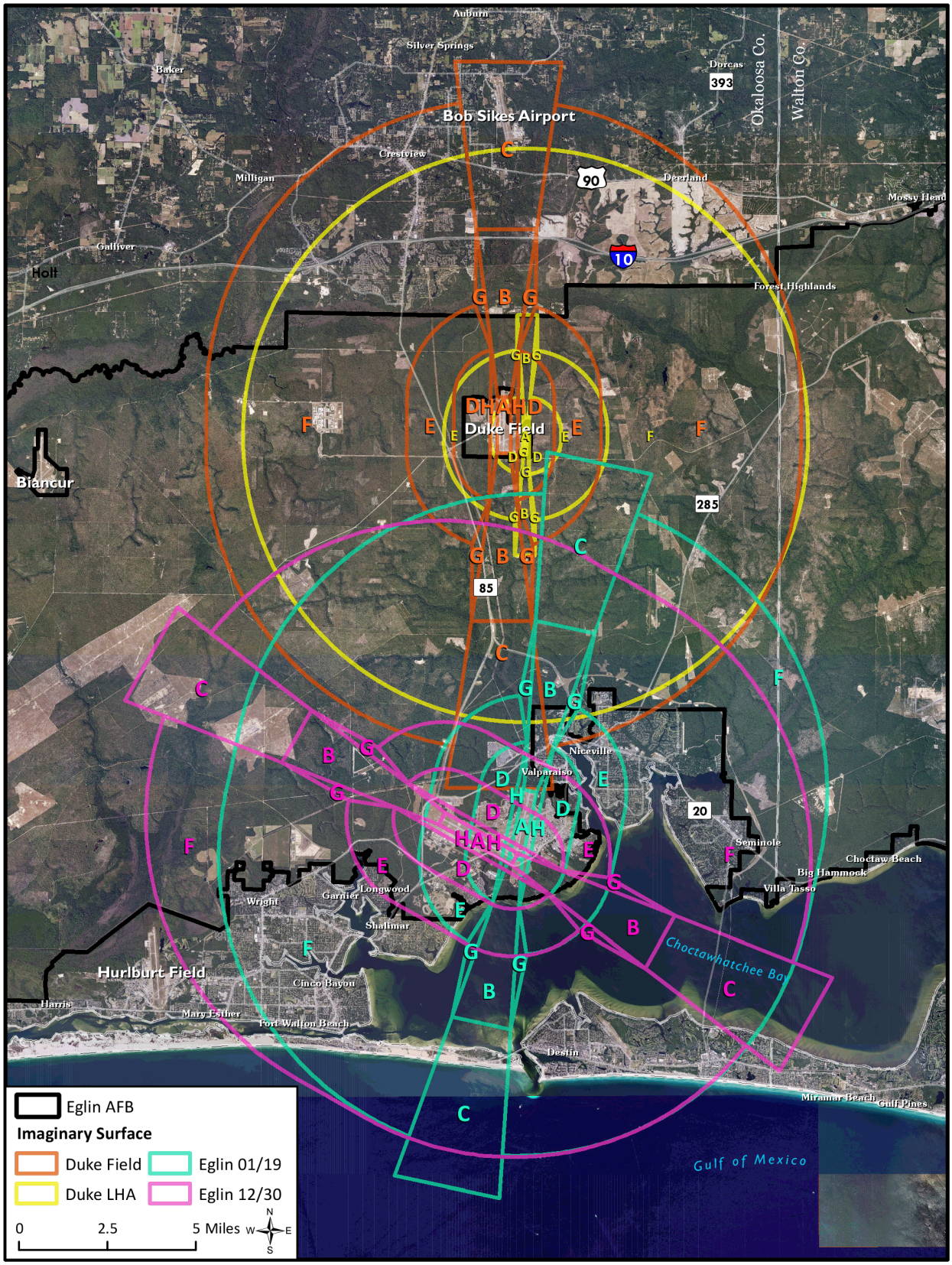


Figure 5-5. Imaginary Surfaces and Transition Planes for Eglin AFB and Duke Field

5.3 Hazards to Aircraft Flight Zone (HAFZ)

Certain land uses and activities can 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 described in the UFC 3-260-01, and in 14 CFR Part 77.17. Unlike Noise and Safety Zones, the HAFZ does not have recommended land use compatibility tables. Instead, it is a consultation zone for the purposes of project applicants and local planning bodies to consult with the Air Force to ensure the project is built compatibly. These land uses and activities include:

- **Height:** Tall objects can pose significant hazards to flight operations or interfere with navigational equipment (including radar). City/County agencies involved with approvals of permits for construction should require developers to submit calculations which show that projects meet the height restriction criteria of Title 14 Code of Federal Regulations (CFR), Part 77.17.
- **Visual Interference:** Industrial or agricultural sources of smoke, dust, and steam in the airfield vicinity can obstruct the pilot's vision during takeoff, landing, or other periods of low-altitude flight. These concerns can often be mitigated with close coordination between the base and the landowner. 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, especially at night. 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. This is particularly dangerous at night when the flash can diminish the eye's adaptation to darkness. Partial recovery of this adaptation is usually achieved in minutes, but full adaptation typically requires 40 to 45 minutes. Lasers that emit in the visible spectrum can be potentially harmful to a pilot's vision during both day and night.
- **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. 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. Due to the speed of the aircraft, collisions with wildlife can happen with considerable force.

  To reduce the potential of a bird/animal aircraft strike hazard (BASH), the Air Force recommends that land uses that attract birds not be located near installations with an aircraft operations mission. These land uses include:

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

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

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

  New generations of military aircraft are highly dependent on complex electronic systems for navigation and critical flight and mission-related functions. Consequently, care should be taken in siting any activities that create EMI. Additionally, EMI may be caused by atmospheric phenomena, such as lightning and precipitation static, and by non-telecommunications equipment, such as vehicles and industry machinery. Cellular towers are not a significant source of EMI.

  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.

6.0 Land Use Analysis

CZs, APZs, noise zones and the HAFZ make up the AICUZ footprint for an air installation. The AICUZ footprint defines the minimum recommended area within which land use controls are needed to enhance the health, safety, and welfare of those living or working near a military airfield and to preserve the flying mission. The AICUZ footprint, combined with the guidance and recommendations set forth in the AICUZ study, are the fundamental tools necessary for the planning process. The Air Force recommends that the existing noise zones, CZs, APZs, and HAFZ be adopted into individual county and city planning studies, regulations, and processes to best guide compatible development around the installation.

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 AICUZ land use compatibility recommendations based on the Federal Highway Administration's Standard Land Use Coding Manual. These guidelines are used by DoD personnel for on-base planning and for engaging with the local community to foster compatible land use development. Suggested land use compatibility guidelines within noise zones and the CZ and APZ are shown in Table A-1 of Appendix A. Table A-2 of Appendix A provides land use compatibility recommendations within noise contours.

6.2 Planning Authorities

This section presents information for each of the governing bodies who have land-use jurisdictions near Eglin AFB, including descriptions of existing and future land uses: the State of Florida, the City of Valparaiso, City of Niceville, and unincorporated Okaloosa County.

6.2.1 Florida Statutes

In order to protect important military and state assets such as Eglin AFB, the Florida Legislature enacted a law in 2004 (Florida Statute 163.3175) that acknowledged the potential for negative impacts to occur when incompatible land development occurs close to military installations. The legislation found it "desirable for the local governments in the state to cooperate with military installations to encourage compatible land use, help prevent incompatible encroachment, and facilitate the continued presence of major military installations in this state."

The State of Florida requires local governments (cities and counties) to regulate land use and development. Florida Statute Section 163.3167(1) states that the several incorporated municipalities and counties shall have power and responsibility to:

- To plan for their future development and growth.
- To adopt and amend comprehensive plans, or elements or portions thereof, to guide their future development and growth.

- To implement adopted or amended comprehensive plans by the adoption of appropriate land development regulations or elements thereof.
- To establish, support, and maintain administrative instruments and procedures to carry out the provisions and purposes of this act (Florida Land Development Regulations 2015).

Section 163.3175(2) identifies major military installations that, due to their mission and activities, have a greater potential for experiencing compatibility and coordination issues than others, and identifies the local governments proximate to these installations that are required to address compatibility of land development with military installations in their comprehensive plans. The statute specifically mentions Eglin AFB as a major military installation.

Section 163.3175 (4) requires local governments to transmit to the installations information relating to proposed changes to comprehensive plans, plan amendments, and proposed changes to land development regulations which, if approved, would affect the intensity, density, or use of the land adjacent to or in close proximity to the military installation. If requested by the commanding officer, the affected local governments must also transmit copies of applications for development orders requesting a variance or waiver from height or lighting restrictions or noise attenuation reduction requirements within areas defined in the local government's comprehensive plan as being in a zone of influence of the military installation. Each affected local government shall provide the military installation an opportunity to review and comment on the proposed changes.

Section 163.3175 (7) provides that a representative of a military installation acting on behalf of all military installations within that jurisdiction shall be included as an ex officio, nonvoting member of the county's or affected local government's land planning or zoning board to facilitate the exchange of information identified in these statutes.

Section 163.3177 requires affected local governments to amend their comprehensive plans to include criteria addressing compatibility by December 31, 2013. As of July 1, 2014, all affected local governments, including those surrounding Eglin AFB, adopted the required comprehensive plan amendments (FDEO 2015).

Section 163.3177(6)(a) requires that the future land use element in the local government's comprehensive plan include criteria to be used to achieve the compatibility of lands adjacent or closely proximate to a military installations.

6.2.2 Comprehensive Plans

Comprehensive plans typically contain chapters known as "elements" which address future land use, transportation, infrastructure, housing, coastal management, conservation, recreation and open space, intergovernmental coordination, and capital improvements. The following comprehensive plans provide guidance on constructing compatible development adjacent to Eglin AFB. Comprehensive plans for communities under the HAFZ (Figure 5-5) provide guidance on height, visual interference, light emissions, BASH issues, and radio interference/electromagnetic interference concerns.

6.2.2.1 West Florida Regional Planning Council

The West Florida Regional Planning Council (WFRPC) is a multi-purpose entity recognized by the state. The WFRPC supports northwest Florida by planning for and coordinating intergovernmental solutions to growth-related problems, providing technical assistance to local governments, including the preparation of comprehensive plans, and meeting the needs of the municipalities in a seven-county region: Escambia, Santa Rosa, Okaloosa, Walton, Bay, Washington, and Holmes.

6.2.2.2 Unincorporated Okaloosa County

The Planning Division of the Growth Management Department of Okaloosa County is responsible for developing and implementing the Okaloosa County 2020 Comprehensive Plan.

6.2.2.3 City of Valparaiso

The Comprehensive Plan for the City of Valparaiso was published in 1990 and as of 2009 updated Zoning and Future Land Use Maps have been prepared. The Comprehensive Plan sets the policy that guides city decision makers as they implement the plan and achieve the envisioned future for the city. The City has also developed a Strategic Plan 2015 to guide future planning efforts.

6.2.2.4 City of Niceville

The Niceville Comprehensive Plan - 2035 was published in 2010 and is administered by the City of Niceville Planning Department. The Comprehensive Plan sets the policy that guides city decision makers as they carry out comprehensive planning and land development regulation powers and implement the plan and achieve the envisioned future for the city. The plan also provides public policy mechanisms for growth management in order to serve the residents and maintain and improve the quality of life for its citizens.

6.3 Land Use and Proposed Development

6.3.1 Existing Land Use

Existing land use for AICUZ noise contours and CZs/APZs are shown on Figure 6-1 and Figure 6-2 for Eglin AFB, Figure 6-3 for Duke Field, and Figure 6-4 for NOLF Choctaw. The land uses are based on the Okaloosa County Assessor land use codes. The county-wide, parcel-based dataset was provided by the Okaloosa County Comprehensive Planning Department. For AICUZ planning purposes, similar land uses were consolidated into the seven generalized categories as discussed in upcoming Section 6.4. See Appendix A for additional details.

Eglin AFB airfield operations primarily affect areas within the cities of Valparaiso and Niceville, which are located immediately adjacent to the airfield. The city of Valparaiso, bordering the northeastern installation boundary, can be characterized as moderate-density urban development with areas of undeveloped land north of the installation. Single family residential uses exist in small pockets throughout Valparaiso and in the

extreme northwest corner of Niceville. Strip commercial uses dominate land uses along John Sims Parkway, Valparaiso Parkway, and along Government Avenue.

For Duke Field, noise contours remain within the Eglin AFB installation. APZ II extends off the installation into unincorporated Okaloosa County. The APZ covers 196.5 acres and includes a parcel of public/quasi-public land that is occupied by the Okaloosa Correctional Institution and Okaloosa Youth Academy/Development Center, two residential structures, a mining operation, and open space along Silver Creek.

6.3.2 Current Zoning

Zoning is the legal regulation of property use to protect the health, safety, and welfare of citizens; protect property rights; conserve resources; and avoid incompatible uses. In Florida, counties and cities enact zoning ordinances to implement respective comprehensive plan objectives. Current zoning data for unincorporated Okaloosa County was provided by the Okaloosa County Comprehensive Planning Department. For AICUZ planning purposes, similar zoning categories were consolidated into the seven generalized categories as discussed in Section 6.4. See Appendix A for additional details.

The Cities of Valparaiso and Niceville and Okaloosa County have had zoning ordinances in place for over 40 years in an effort to guide development within their borders. While these ordinances did not initially contain specific restrictions on development within areas beneath flight paths from Eglin AFB, recent studies have promoted stronger guidelines for the CZs/APZs. With the completion of the 2009 JLUS effort, a set of recommendations that included establishment of noise level reduction construction standards for new construction, implementation of a lighting ordinance to avoid glare and reflections, identification of CZs/APZs on city maps and public reports, ensuring military representation on planning commissions, establishing Military Influence Planning Area (MIPA) Zoning Overlay District and updating comprehensive plans and land development codes to strengthen the compatibility of proposed developments were incorporated into city and county regulations.

As described in Section 6.3.1, zoning classifications are generalized to illustrate compatibility across common zoning types. Figure 6-5 shows current zoning and AICUZ noise contours in the areas surrounding Eglin AFB. Figure 6-6 presents zoning within Eglin AFB's CZs and APZ I and II.

Commercially zoned land continues as the major use along the major corridors of Government Avenue and John Sims Parkway in Valparaiso and State Road 85 in Niceville. Land along Boggy Bayou, shoreline east of John Sims Parkway, is zoned as a Conservation District. Zoning has also been incorporated to protect the CZ and APZ, with industrial and commercial being the primary zoning classification.

Figure 6-7 presents zoning within Duke Field's APZ II. This area's zoning reflects the public/quasi-public use and open space along Silver Creek.

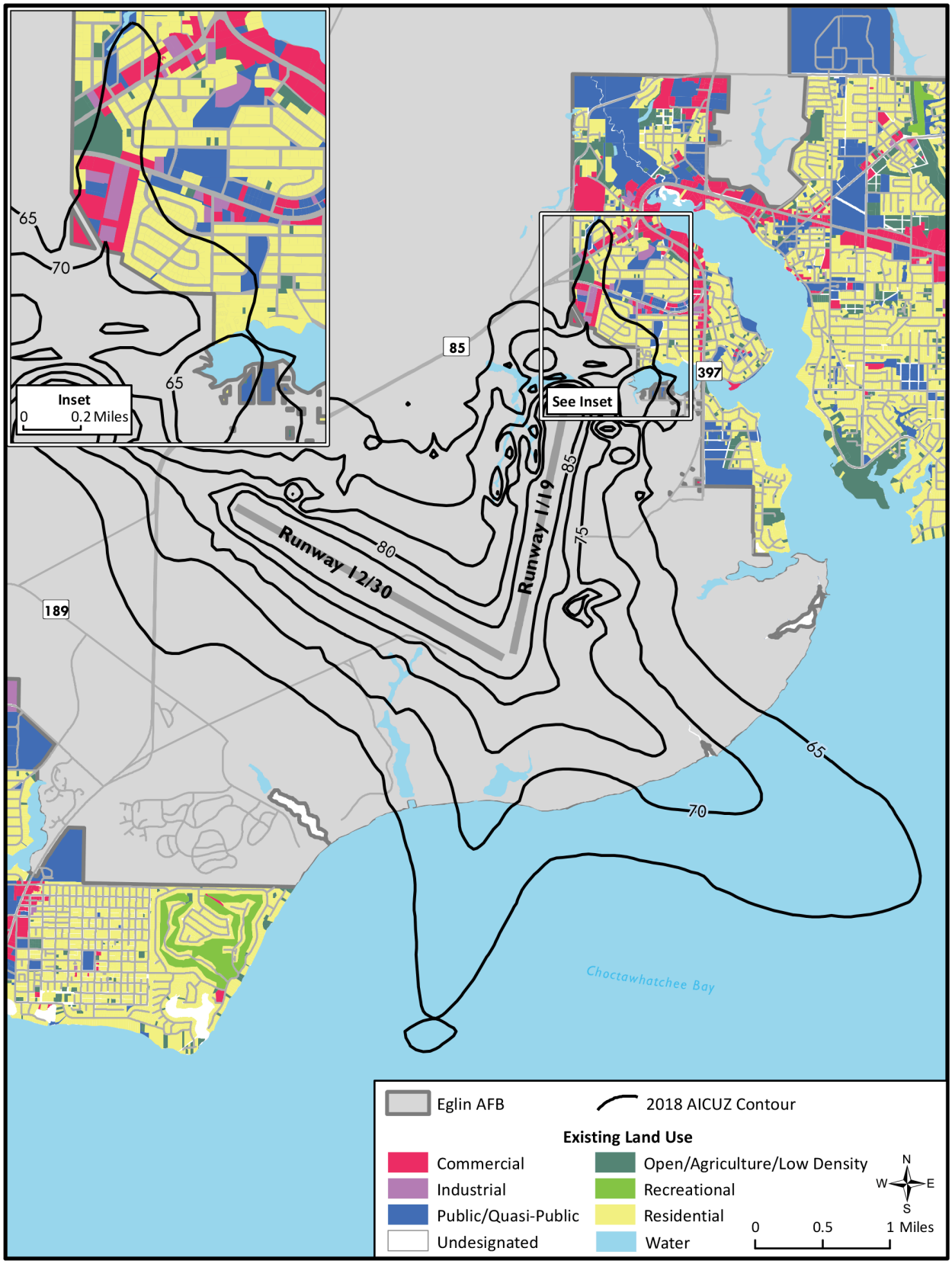


Figure 6-1. Generalized Existing Land Use and AICUZ Noise Contours for Eglin AFB

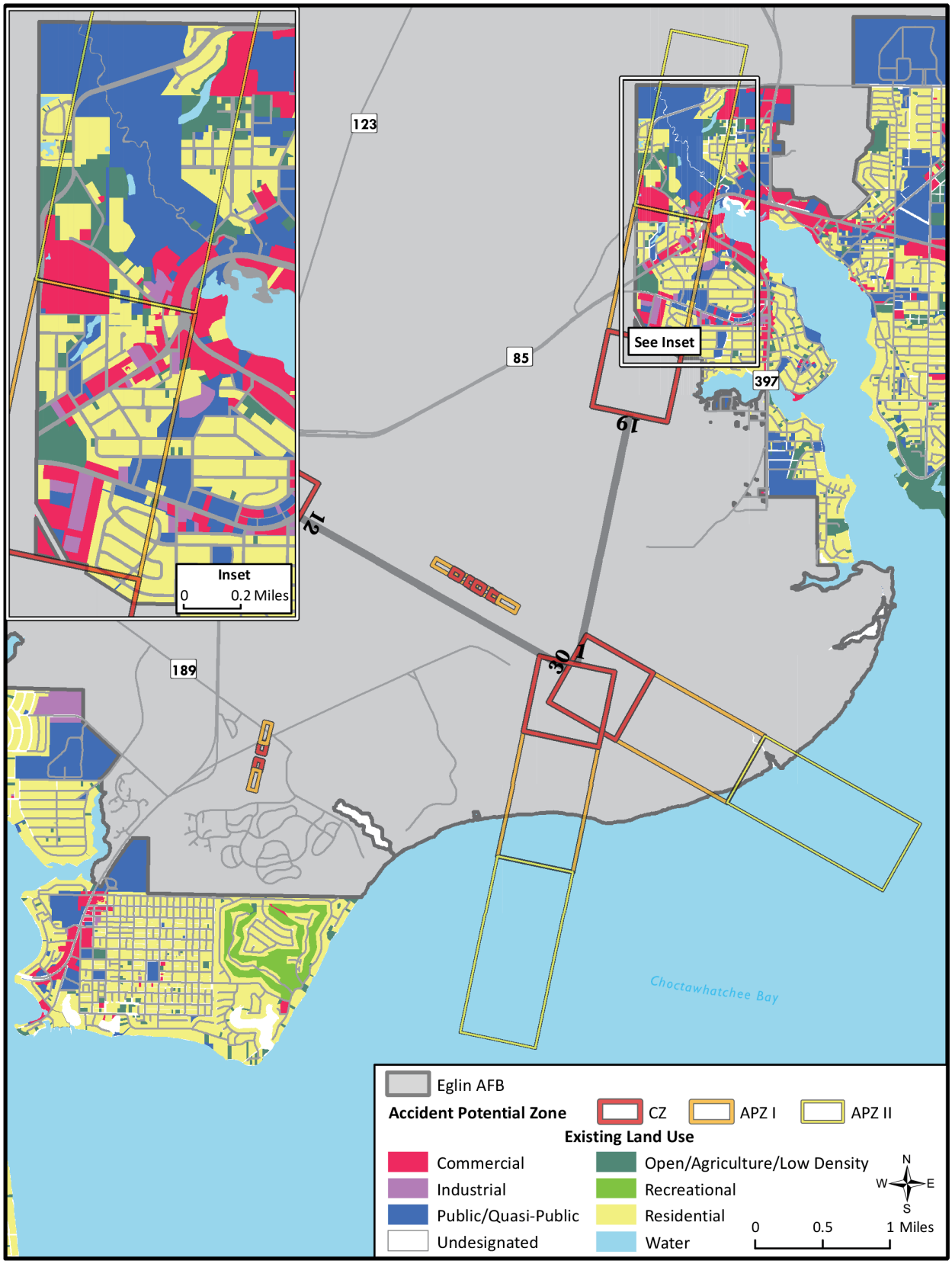


Figure 6-2. Generalized Existing Land Use and Accident Potential/Clear Zones for Eglin AFB

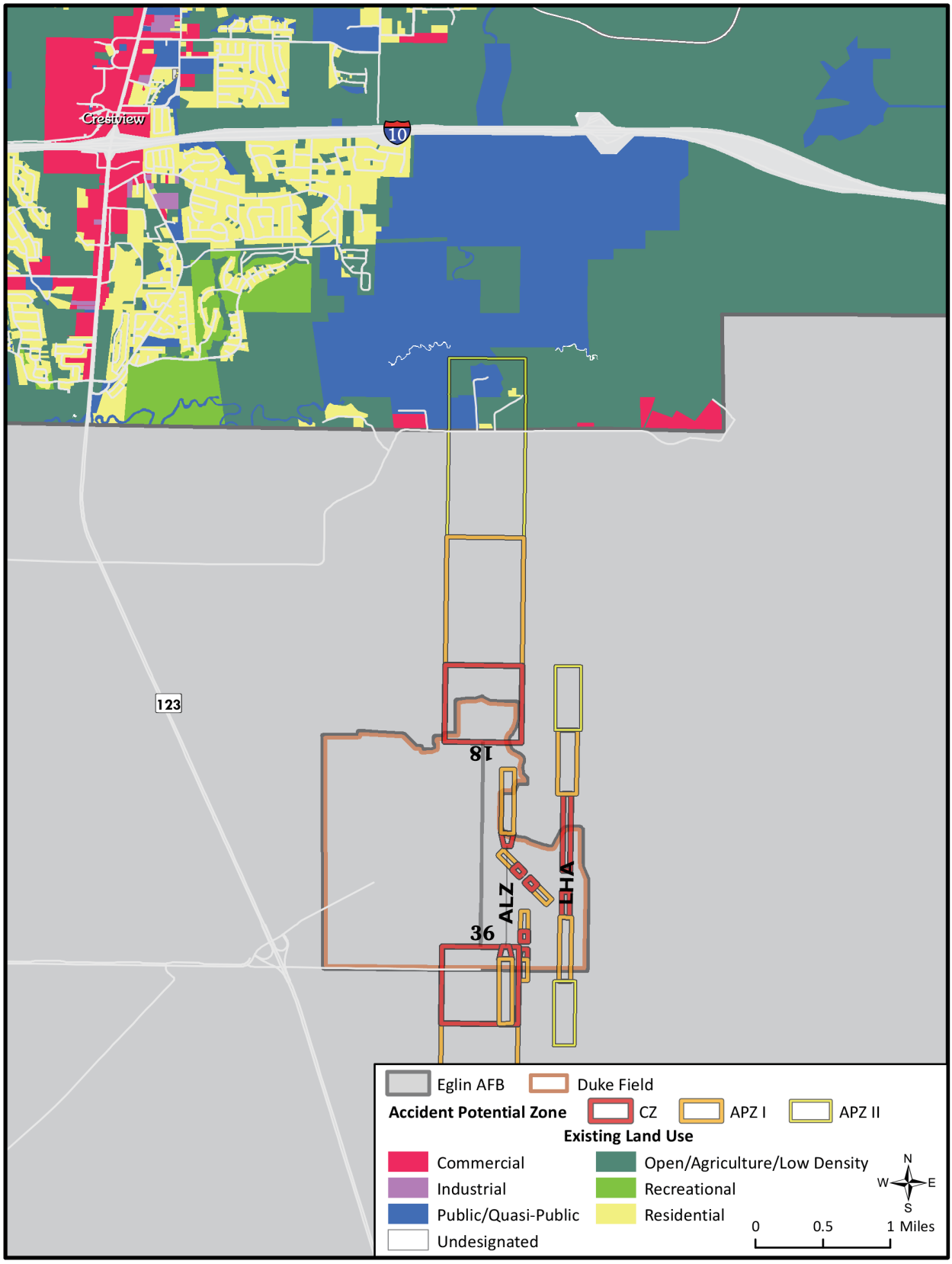


Figure 6-3. Generalized Existing Land Use and Accident Potential Zones/Clear Zones for Duke Field

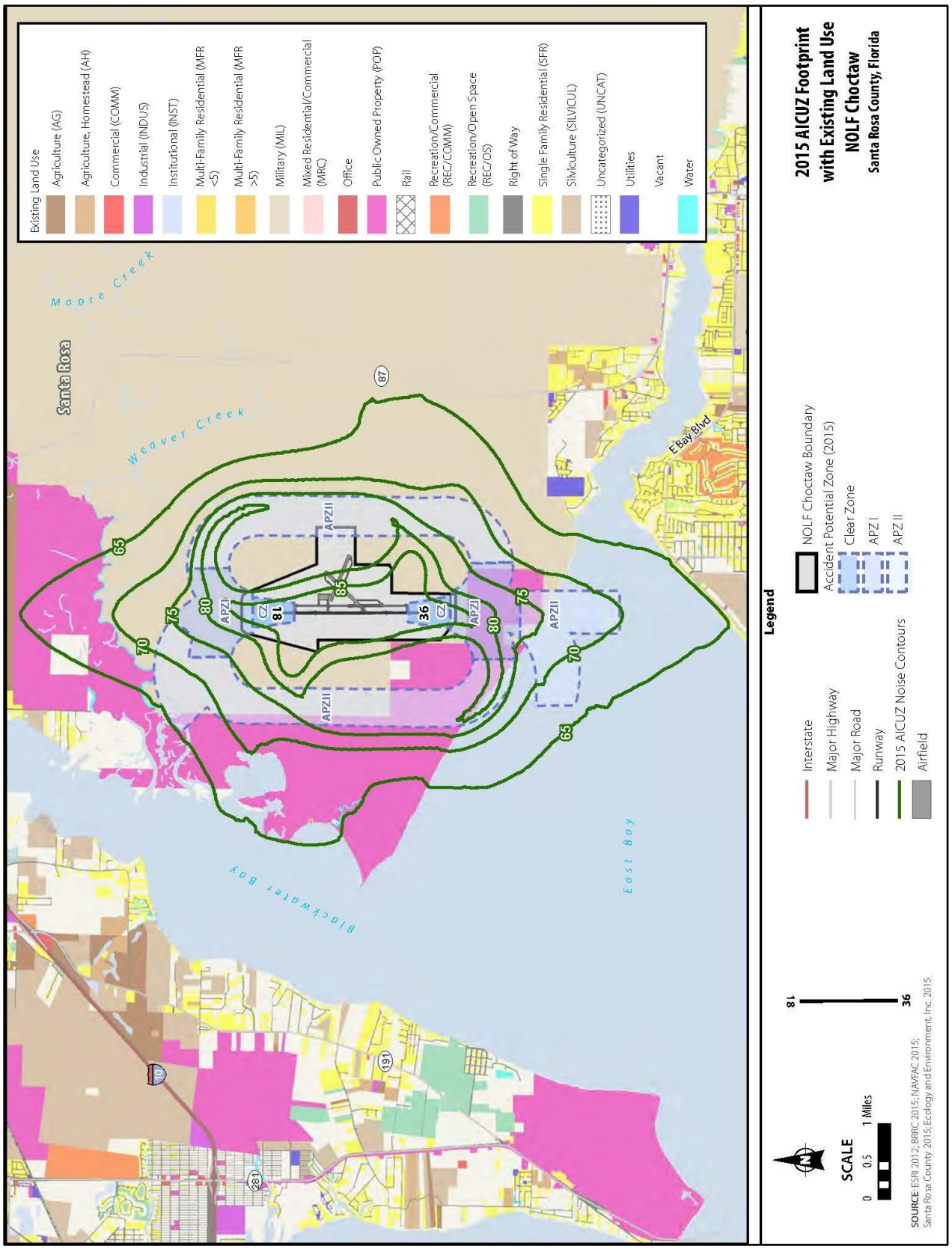


Figure 6-4. Generalized Existing Land Use and Accident Potential Zones/Clear Zones for NOLF Choctaw

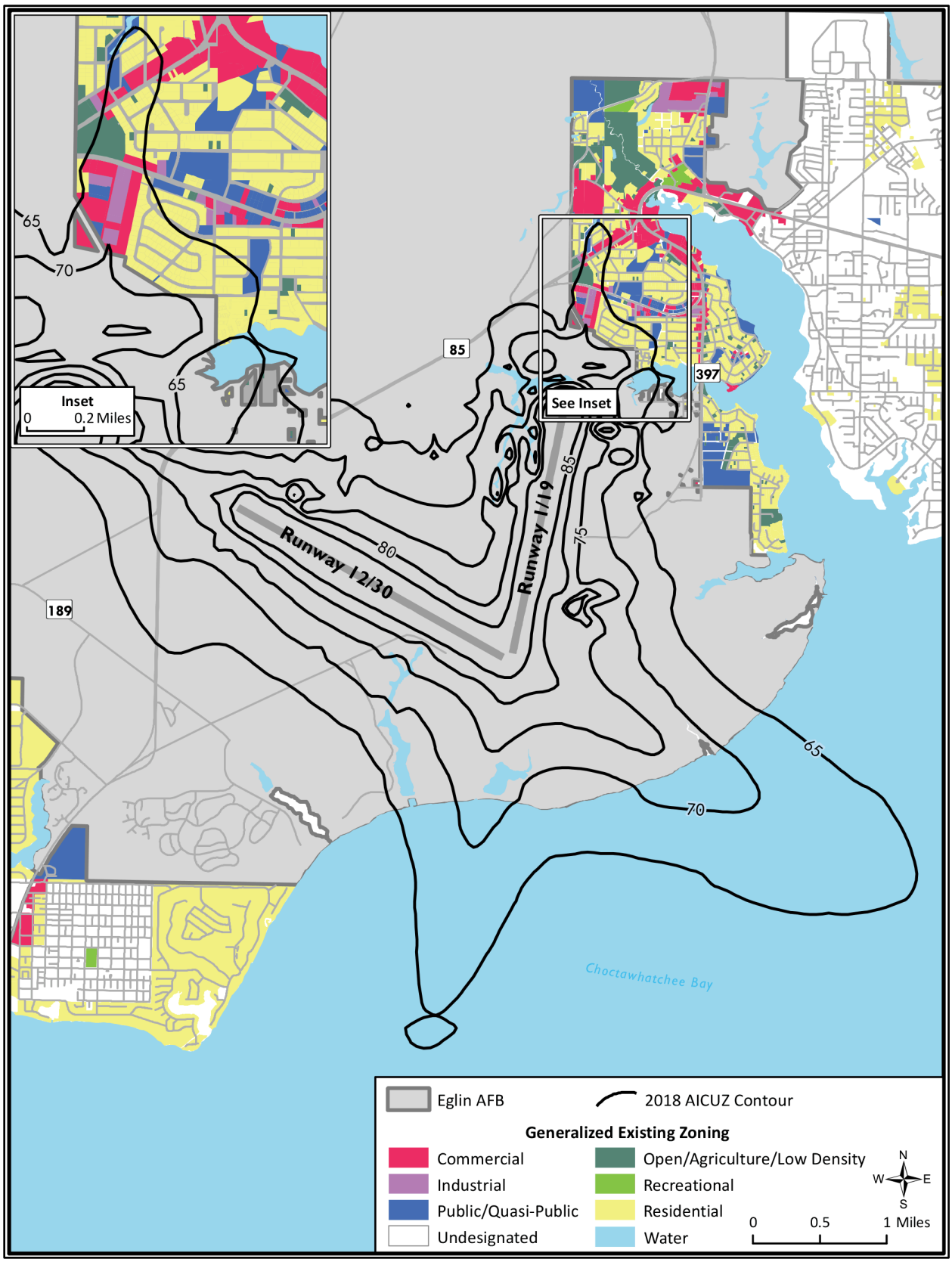


Figure 6-5. Generalized Existing Zoning and AICUZ Noise Contours for Eglin AFB

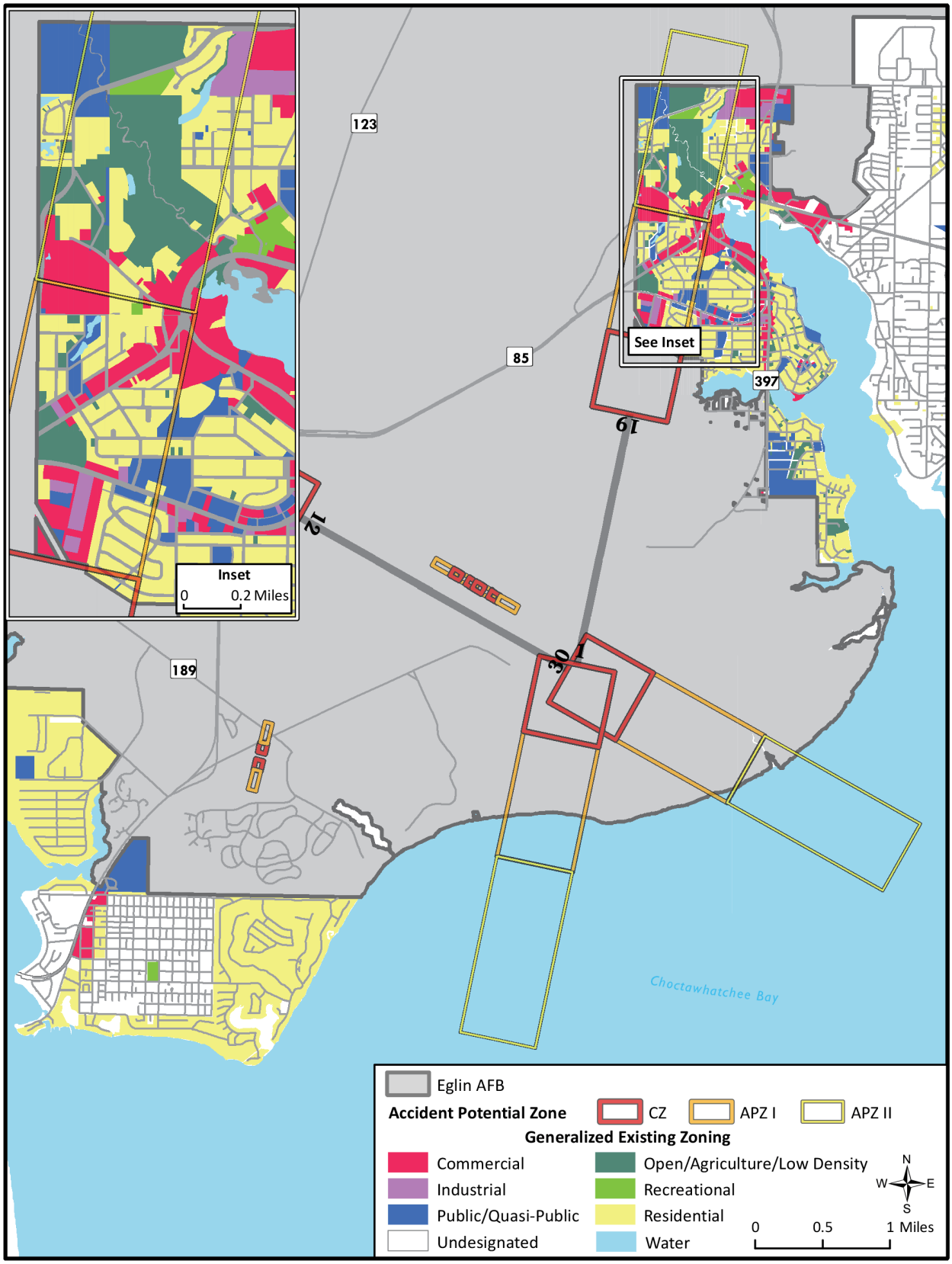


Figure 6-6. Generalized Existing Zoning and Accident Potential/Clear Zones for Eglin AFB

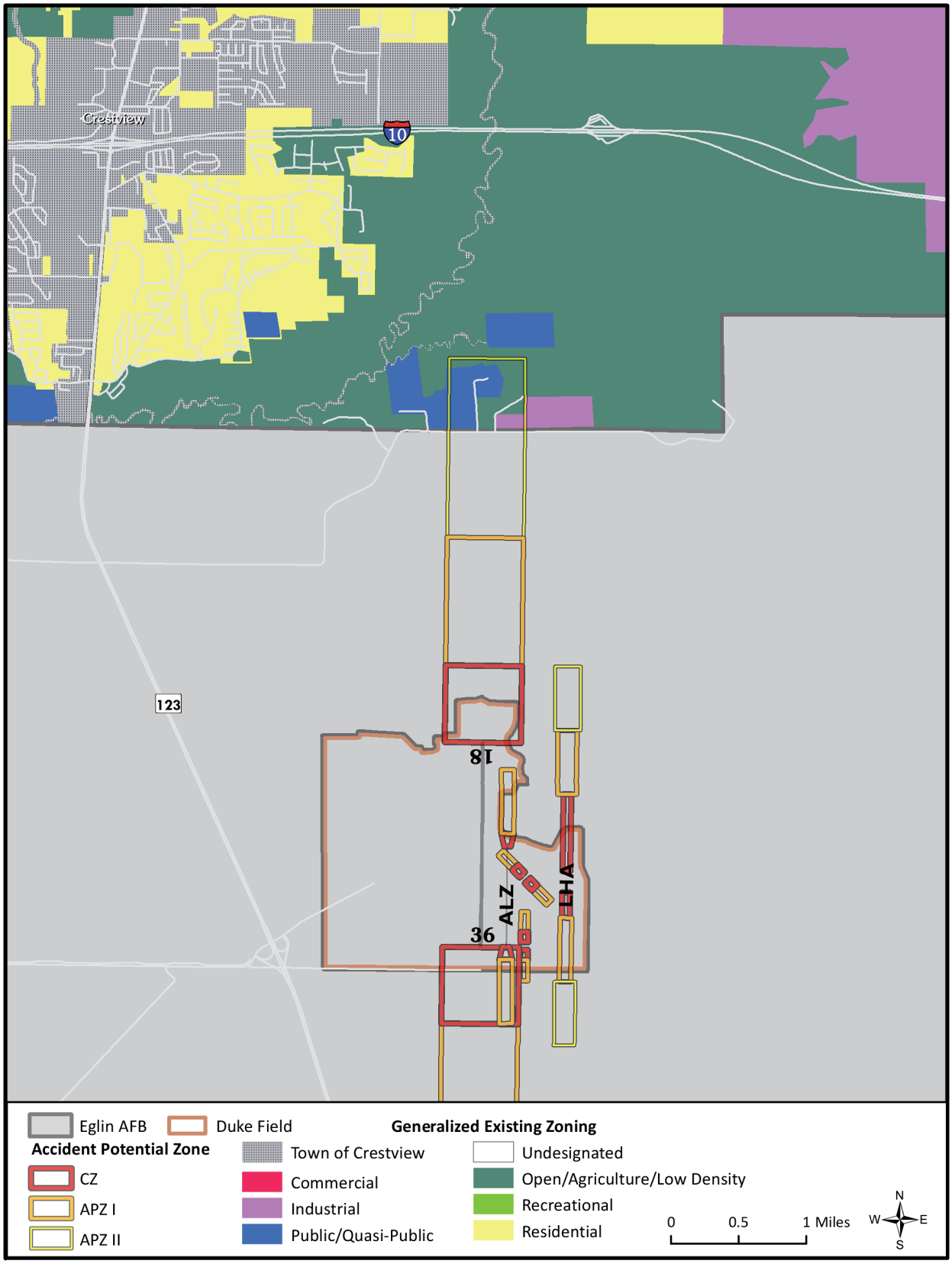


Figure 6-7. Generalized Existing Zoning and Accident Potential/Clear Zones for Duke Field

6.3.3 *Future Land Use*

Future land use for both Valparaiso and Niceville will continue to reflect the historic mixture of residential, commercial, and public uses. Any development in these areas is expected to consist of infill and redevelopment. Consequently, future land use patterns east of the Eglin AFB airfield will reflect existing land use patterns. Continued commercial development is anticipated to occur along the major corridors of Government Avenue and John Sims Parkway in Valparaiso and State Road 85 in Niceville. Zoning has also been established to protect the CZ and APZ, with industrial and commercial being the primary zoning classification. Planned industrial uses are targeted for the north and south side of Government Avenue near the southern boundary of Runway 19 APZ I.

Future land use within Duke Field's APZs II is anticipated to remain public/quasi-public to accommodate the Okaloosa Correctional Institution and Okaloosa Youth Academy/Development Center. Future residential development will be discouraged with zoning in-place for open space and industrial uses.

6.4 Compatibility Concerns

6.4.1 *Land Use Analysis*

Land use describes how land is modified and managed, and is characterized by the dominant function occurring within an area. To compare land use consistently across jurisdictions, this analysis uses generalized land use classifications illustrating land use compatibility across common land use types. These generalized land use categories do not exactly represent the local community's land use designations, but combine similar uses into the one of the following seven categories:

- **Residential:** This category includes 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:** This category includes offices, retail stores, restaurants and other types of commercial establishments.
- **Industrial:** This category includes manufacturing, warehouses and other similar uses.
- **Public/Quasi-Public**: This category includes publicly owned lands and land to which the public has access, including military reservations and training grounds, public buildings, schools, churches, cemeteries, and hospitals.
- **Recreational:** This category includes land areas designated for recreational activity, such as parks, wilderness areas and reservations, conservation areas, and areas designated for trails, hikes, camping, etc.
- **Open/Agriculture/Low Density**: This category includes undeveloped land areas, agricultural areas, grazing lands and areas with residential activity at densities less than or equal to one dwelling unit per acre.

- **Undesignated**: This category was applied for parcels that had no value or were listed as "undesignated" in the original datasets.

For the purpose of this analysis, the DoD AICUZ compatibility guidelines (Tables A-1 and A-2 of Appendix A) have been consolidated into the seven generalized land use classifications. The generalized compatibility guidelines are shown in Table 6-1. Land use compatibility falls into one of four categories: (1) Compatible, (2) Compatible with Restrictions, (3) Not Compatible, and (4) Not Compatible with Exceptions. The conditionally compatible land use, i.e., categories 2 and 4, may require incorporation of noise attenuation measures into the design and construction of structures and further evaluation to be considered "compatible" or density limitations for land in APZs.

Any land that lies outside of Eglin AFB boundaries and within the 65 to 85 dB DNL contours and CZs/APZs was evaluated to determine the land use compatibility.

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

Generalized Land Use Category [1]	Noise Zone (dB DNL)						CZ	APZ I	APZ II
	<65	65–69	70–74	75–79	80–84	85+			
Residential	Yes	No[2]	No[2]	No	No	No	No	No	No
Commercial	Yes	Yes	Yes[3]	Yes	No	No	No	Yes[3]	Yes[3]
Industrial	Yes	Yes	Yes	Yes	Yes[3]	No	No	Yes[3]	Yes[3]
Public/Quasi-Public	Yes	Yes[3]	Yes[3]	Yes[3]	No	No	No	No	Yes[3]
Recreation	Yes	Yes[3]	Yes[3]	No	No	No	No	Yes[3]	Yes[3]
Open/Agriculture/Low Density	Yes	Yes[3]	Yes[3]	Yes[3]	Yes[3]	Yes[3]	No	Yes[3]	Yes[3]
Undesignated	Yes	No	No	No	No	No	No	No	No

[1] Refer to Appendix A for details
[2] Incompatible with exceptions
[3] Compatible with restrictions

6.4.2 *Existing Land Use Compatibility Concerns*

Existing land use compatibility acreages for areas exposed to DNL greater than or equal to 65 dB for Eglin AFB are provided in Table 6-2. CZ and APZ related land use acreages are provided in Table 6-3. Figure 6-8 shows the location of all incompatible existing land uses with the AICUZ noise contours. Figure 6-9 shows the location of all incompatible land uses in the CZs and APZs for Eglin AFB Runway 1/19. Figure 6-10 shows the location of all incompatible land uses in the CZs and APZs for Duke Field.

The area exposed to between 65 and 69 dB DNL includes 76 acres of residential, 30 acres of commercial, 10 acres of industrial, 15 acres of public/quasi-public, 10 acres of open/agricultural/low-density, and 26 acres of undesignated land. The residential areas include the single-family subdivision that encompasses Andrews, Charles, and Judith Drives, and Edwards Circle, located west of Nordberg Avenue and south of Valparaiso Parkway. It also includes Hidden Cove townhomes, adjacent to the Eglin AFB boundary and single-family homes north of Government Avenue between Detroit and Escanaba Avenues. Residences are considered incompatible above 65 dB DNL. Although local conditions regarding the need for housing may require residential use, such use in these zones is still incompatible with air operations. 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. If the community still decides to go ahead with residential development, it is recommended that appropriate noise level reduction be built into the structures.

Table 6-2. Off-Base Existing Land Use Acreage with the AICUZ Noise Contours at Eglin AFB

Designation	Generalized Land Use Category	Noise Zone (dB DNL)				Total
		65–69	70–74	80–84	*85+	
Incompatible	Residential	75.9	0.1			**76**
	Commercial					
	Industrial					
	Public/Quasi-Public					
	Recreation					
	Open/Agriculture/Low Density					
	Undesignated					
Compatible	Residential					
	Commercial	30.3	0.2			**30.5**
	Industrial	10.4				**10.4**
	Public/Quasi-Public	15.2				**15.2**
	Recreation					
	Open/Agriculture/Low Density	10.4				**10.4**
	Undesignated	26				**26**
Subtotals	**Incompatible**	**75.9**	**0.1**			**76**
	Compatible	**92.3**	**0.2**			**92.5**
TOTAL		**168.2**	**0.3**			**168.5**

Table 6-3. Off-Base Existing Land Use Acreage within the Accident Potential/Clear Zones Runway 1/19 at Eglin AFB

Designation	Generalized Land Use Category	CZ	APZ I	APZ II	Total
Incompatible	Residential	5.5	110.3	69.4	185.2
	Commercial				
	Industrial				
	Public/Quasi-Public	0.2	24		24.2
	Recreation				
	Open/Agriculture/Low Density				
	Undesignated				
Compatible	Residential				
	Commercial		56.9	51.6	108.5
	Industrial		16.9	4.2	21.1
	Public/Quasi-Public			149.7	149.7
	Recreation				
	Open/Agriculture/Low Density		22.9	44.9	67.8
	Undesignated	1.1	0.4	0.1	1.6
Subtotals	Incompatible	5.7	134.3	69.4	209.4
	Compatible	1.1	97.1	290.5	388.7
TOTAL		**6.8**	**231.4**	**359.9**	**598.1**

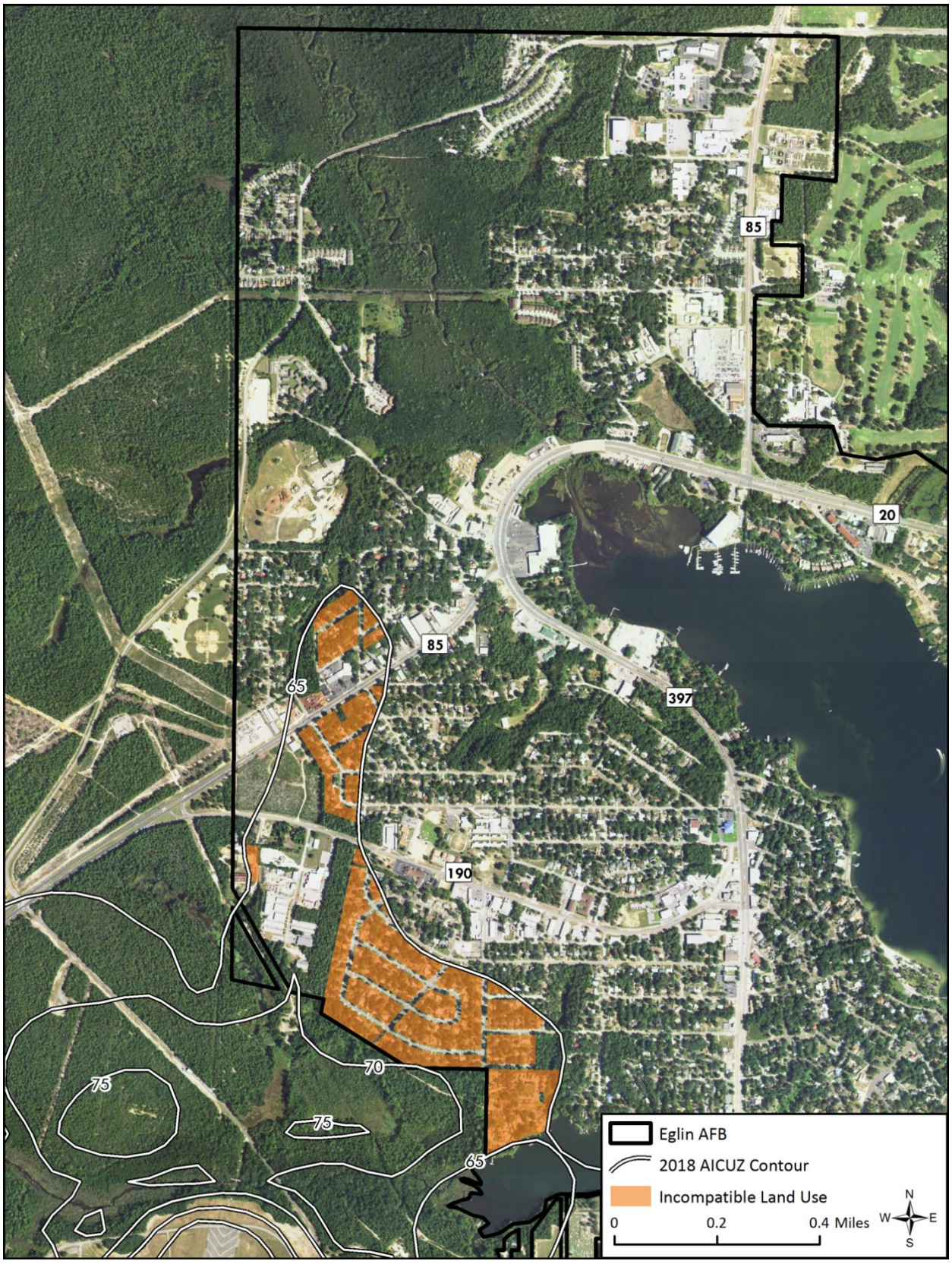


Figure 6-8. Location of Incompatible Existing Land Uses with the AICUZ Noise Contours

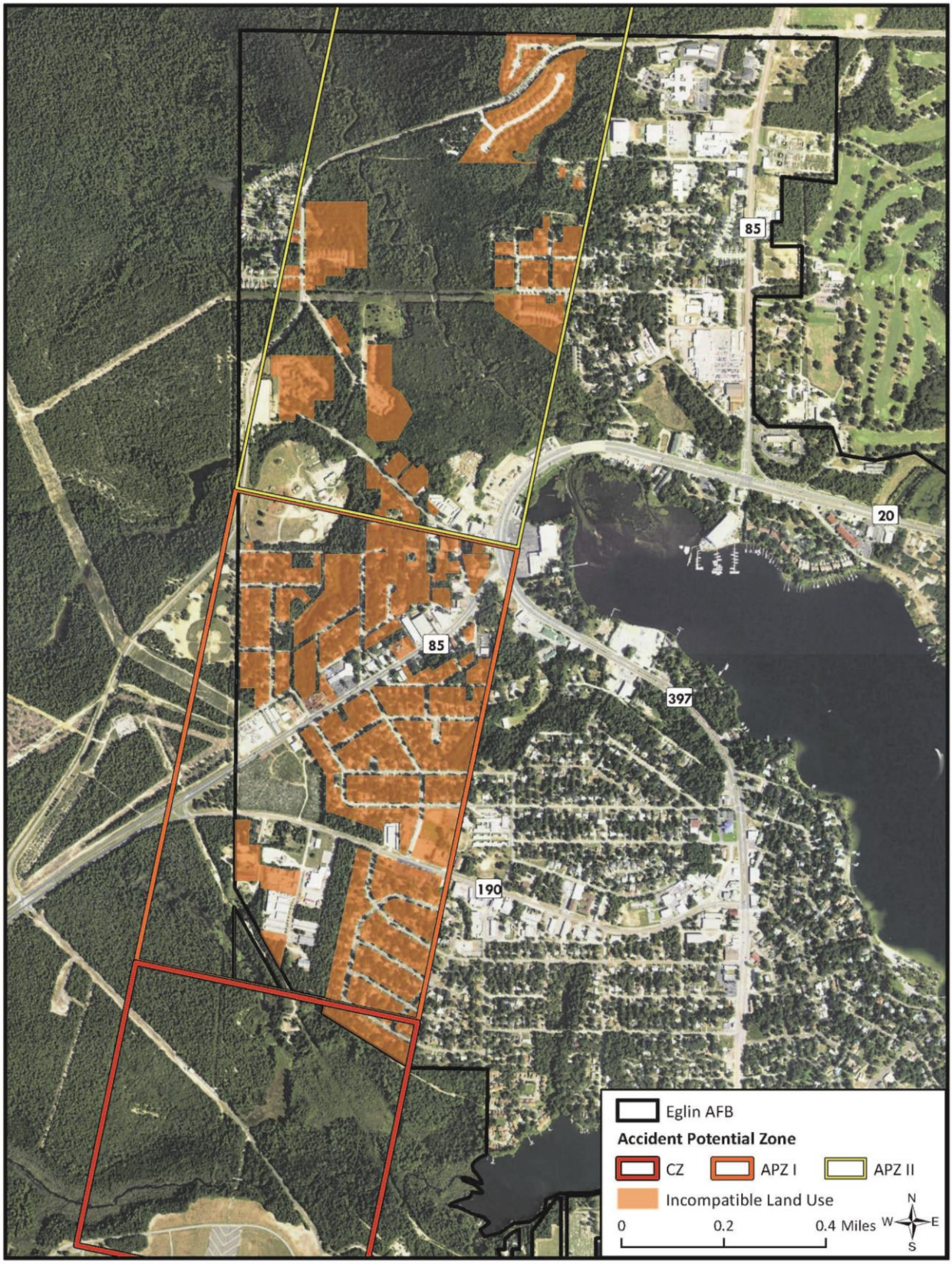


Figure 6-9. Location of Incompatible Land Uses in the Clear Zones and Accident Potential Zones for Eglin AFB Runway 1/19

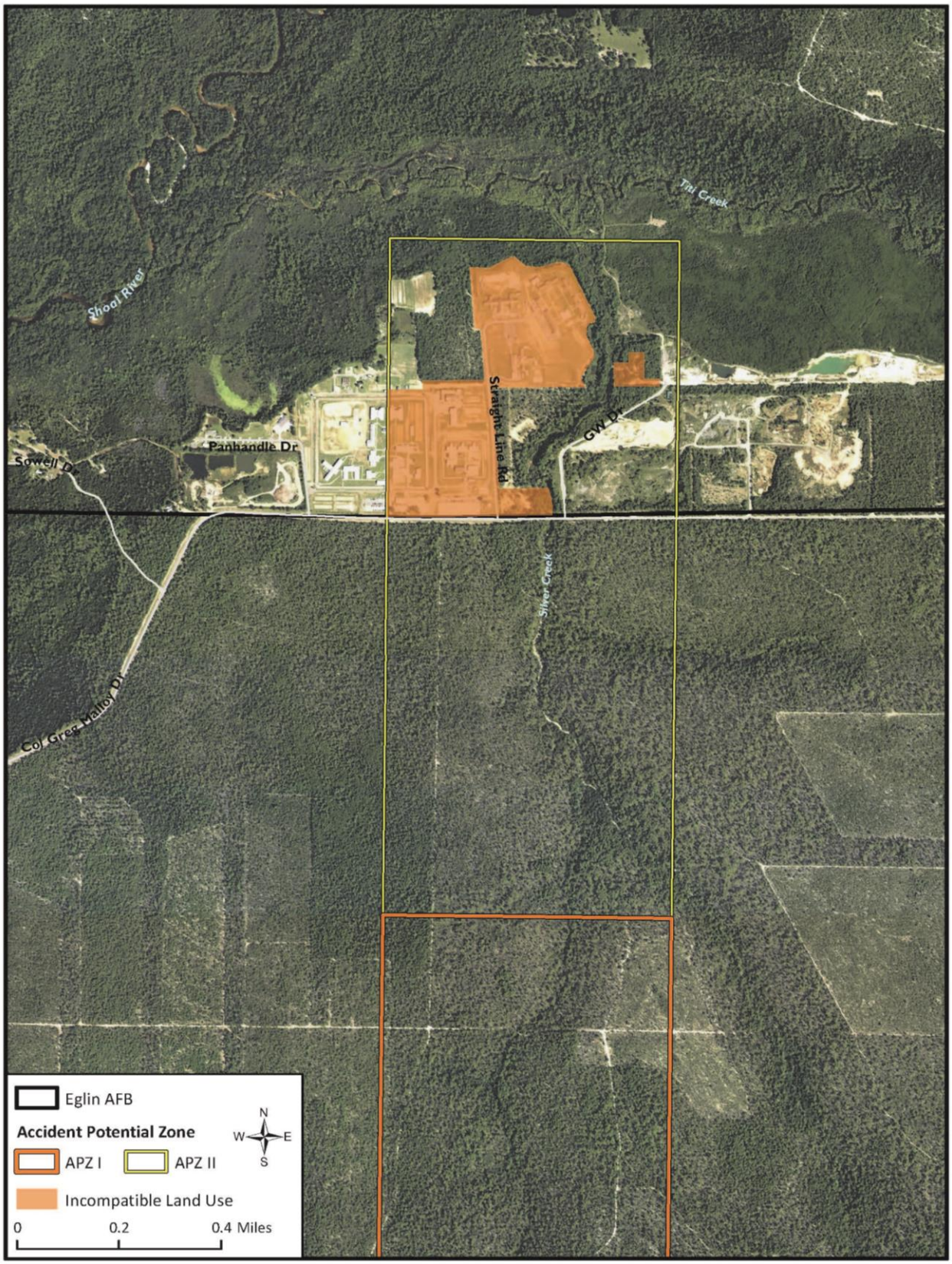


Figure 6-10. Location of Incompatible Land Uses in the Clear Zones and Accident Potential Zones for Duke Field

Very small amounts of residential and commercial land are exposed to 70 to 74 dB DNL. The compatibility of these land uses is similar to compatibility between 65 and 69 dB, but noise-sensitive facilities or portions of facilities are recommended to include an even greater level of structural noise attenuation than is required at 65 to 69 dB DNL.

With the exception of the CZ on approach to Runway 19, all Eglin AFB and Duke Field CZs are owned by the Air Force. The CZ on approach to Runway 19 includes 7 acres of privately owned land on Andrews Drive, of which 6 acres are currently residential. This residential land is incompatible in the CZ, but open space is compatible with AICUZ land use recommendations.

With the exception of the APZ I on approach to Runway 19, all APZ I area at Eglin AFB and Duke Field is either owned by the Air Force or open water. The APZ I on approach to Runway 19 includes 110 acres of residential land, 24 acres of public/quasi-public, 57 acres of commercial, and 17 acres of industrial land. Residential land is incompatible in APZ I. Public/quasi-public land is considered incompatible in APZ I where it results in high concentrations of people per unit area. Commercial and industrial land is, for the most part, compatible in APZ I, if it does not result in high concentrations of people. The compatibility of specific land uses and acceptable concentrations of people associated with those land uses in APZ I are described in Appendix A.

The APZ II on approach to Eglin Runway 19 and Duke Field Runway 18 include off-base land. At Eglin AFB, APZ II includes 70 acres of residential, 52 acres of commercial, 4 acres of industrial, and 150 acres of public/quasi-public land. At Duke Field, APZ II land includes 6 acres of residential, 69 acres of public/quasi-public, and 121 acres of open/ agricultural/low-density land.

Table 6-4. Off-Base Existing Land Use Acreage within the Accident Potential/Clear Zones at Duke Field

Designation	Generalized Land Use Category	CZ	APZ I	APZ II	Total
Incompatible	Residential			6.0	6.0
	Commercial				
	Industrial				
	Public/Quasi-Public			69.3	69.3
	Recreation				
	Open/Agriculture/Low Density				
	Undesignated				
Compatible	Residential				
	Commercial				
	Industrial				
	Public/Quasi-Public				
	Recreation				
	Open/Agriculture/Low Density			121.2	121.2
	Undesignated				
Subtotals	Incompatible			75.3	75.3
	Compatible			121.2	121.2
TOTAL				**196.5**	**196.5**

Residential land is incompatible in APZ II where there are more than two dwelling units per acre. Public/quasi-public land uses are incompatible if they result in high concentrations of people. Industrial, commercial, and agricultural land uses are

generally compatible in APZ II so long as they do not lead to high concentrations of people. Appendix A lists land use recommendations in APZ II for specific land use types and acceptable concentrations of people associated with those land uses.

6.4.3 Future Land Use Compatibility Concerns

The generalized AICUZ compatibility guidelines in Table 6-1 were compared to future land use plans to determine what type of compatibility was associated with aircraft-generated noise and CZs/APZs at Eglin AFB and Duke Field.

Much of the incompatibilities within the cities of Valparaiso and Niceville would not change under future conditions unless significant redevelopment of existing residential development was proposed.

Under future conditions, incompatible land uses would still occur within unincorporated Okaloosa County with the continued presence of the Okaloosa Correctional Institution and Okaloosa Youth Academy/Development Center.

7.0 Implementation

Implementation of the AICUZ Study must be a joint effort between Eglin AFB and adjacent communities. This AICUZ Study provides the best source of information to ensure land use planning decisions made by the local municipalities are compatible with a future installation presence. This chapter discusses the roles of all the partners in the collaborative planning.

7.1 Air Force Role

The goal of the Air Force AICUZ program is to minimize the noise and safety concerns on the surrounding communities and to advise these communities on potential impacts from base operations on the safety, welfare, and quality of life of their citizens.

Eglin AFB's AICUZ responsibilities encompass the areas of flight safety, noise abatement, and participation in the land use planning process.

The Air Force sees its responsibilities as encompassing the areas of flying safety, noise abatement, and participation in the land use planning process. Well-maintained aircraft and well-trained aircrews do a great deal to ensure that aircraft accidents are avoided. Superior aircrew training and aircraft maintenance helps to ensure that the chances of an accident are remote—however, mishaps can occur.

Air Force policy and guidance requires that base leadership periodically review existing practices for flight operations and evaluate these factors in relationship to populated areas and other local situations.

- Eglin AFB should ensure that, wherever possible, flights are routed over sparsely populated areas as to reduce the exposure of lives and property to a potential accident.
- Eglin AFB should periodically review existing traffic patterns, instrument approaches, weather conditions, and operating practices and evaluate these factors in relationship to populated areas and other local situations. This is done in order to limit, reduce, and control the impact of noise from flying operations on surrounding communities.
- Eglin AFB should coordinate closely and exchange information, as described in Florida Statue 163.3175, with local government and county planners on zoning and land use issues. Eglin AFB should review and comment on proposed changes to comprehensive plans, plan amendments, and proposed changes to land development regulations that, if approved, would affect the intensity, density, or use of the land adjacent to or in close proximity to the military installation.
- Eglin AFB should provide copies of AICUZ studies to local, county, tribal, and regional planning departments and zoning administrators to aid in the planning process. Also provide copies of the AICUZ Study to appropriate state and federal agencies.

Preparation and presentation of this Eglin AFB AICUZ Study is one phase of the continuing Air Force participation in the local planning process. The Air Force recognizes that as the local community updates its land use plans, Eglin AFB must be ready to provide additional input as needed.

7.2 State/Regional Roles

7.2.1 State Roles

The Florida Defense Support Task Force was created in 2011 with the mission to make recommendations to preserve and protect military installations, support the state's position in research and development related to military missions and contracting, and improve the state's military-friendly environment for service members, military families, veterans and businesses that bring military and defense-related jobs to the state. The Florida Defense Support Task Force Grant Program is administered by Enterprise Florida, and grants are awarded annually, on a project priority basis. For example, in 2013, the City of Niceville received $25,000 for the development of Geographic Information System (GIS) mapping to implement the JLUS with Eglin AFB to prevent possible encroachment to the base.

7.2.2 Regional/County Roles

After the 2005 BRAC decisions to identify Eglin AFB as the recipient of two new missions—the 7 SFG(A) and the F-35 Joint Strike Fighter Integrated Training Center—and the completion of the 2006 AICUZ Study, regional and county organizations were able to secure technical and financial assistance from the DoD Office of Economic Adjustment.

First, the JLUS was started, and completed by 2009. A number of recommended actions have been developed and implemented following the JLUS. They include:

- Prepare and distribute education handout materials to cities and counties for their use in educating developers and builders on Radio Frequency Interference.
- Provide technical assistance in the development of a retrofit program for sound attenuation for occupied buildings in high noise areas (greater than 65 dBA).
- Participate in the formalizing of policy to Include Military Participation and Cross-Jurisdiction Coordination in Development Review and Planning Process.
- Provide support for the DoD acquisition of properties in the Runway 19 CZ.
- Implement Outdoor Lighting Requirements on Eglin AFB property similar to controls proposed for local communities.
- Continue to support ex-officio representation on the Planning Commissions for the counties and cities in the tri-county area.
- Amend Comprehensive Plan and Land Development Code in Santa Rosa County Article 11 to Limit Object Heights.

- Establish Military Influence Planning Area (MIPA) Zoning Overlay District creating MIPA designations (I, II, or III).
- Expand Choctaw Field Military Airport Zone (MAZ); included in the Santa Rosa Comprehensive Plan, Policy 3.3.A.1 expands MAZ to include maximum mission high-level noise areas.

Following the JLUS a second planning effort, the Comprehensive Tri-County Growth Management Plan, was completed during the 2008–2010 timeframe. While this Plan focused on projected growth and the infrastructure needed to support the future populations, the Plan did recommend Smart Growth Principles and cross jurisdictional communications between local jurisdictions and the Air Force.

A key recommendation from the JLUS and the Plan was to conduct Small Area Studies of the areas to the north and east of the Eglin Reservation. The Small Area Studies began in 2011 and were completed in October 2012. Along with the start-up of the Small Area Studies, the Tri-County Military Sustainability Partnership was formed through interlocal agreements between Okaloosa, Santa Rosa, and Walton Counties, and many of the municipalities within the three counties. The Executive Committee of the Military Sustainability Partnership comprises a representative and an alternate designated by each jurisdiction. The work of the Executive Committee is assisted by the Military Growth Advisory Group, which is composed of technical experts and planning and engineering staff from the participating jurisdictions. These groups are intended to provide an ongoing partnership after all the studies are completed to continue the support and promotion of the military presence in the tri-county area.

7.3 Local Government Role

The role of the local government is to enact planning, zoning, and development principles and practices that are compatible with the base and which protect the base's mission. The residents of the surrounding community have a long history of working with personnel from Eglin AFB. Adoption of the following recommendations during the revision of relevant land use planning or zoning regulations will strengthen this relationship, increase the health and safety of the public, and help protect the integrity of the installation's flying mission:

- Continue to recommend incorporation of AICUZ policies and guidelines into the comprehensive plans of Okaloosa County, Valparaiso, and Niceville. Use AICUZ overlay maps and Air Force Land Use Compatibility Guidelines (see Appendix A) to evaluate existing and future land use proposals.
- Ensure that new development applications or "changed use of property" are reviewed by Eglin AFB's ex officio member on local planning and zoning boards. Eglin's representative will work with on-base personnel to assess those applications for potential impacts to Eglin's missions.

- Recommend zoning ordinances be adopted or modified to reflect the compatible land uses outlined in the AICUZ study including the creation of military airport overlay zones.
- Recommend local government and county planners establish procedures to consult on land use matters within overlapping extra-territorial jurisdictions near Eglin AFB**.**
- Recommend local governments review their capital improvement plan, infrastructure investments and development policies to ensure they do not encourage incompatible land use patterns near Eglin AFB, with particular emphasis on utility extension and transportation planning.
- Recommend local governments continue to implement height and obstruction ordinances that reflect current Air Force and 14 CFR Part 77 requirements, presented in this study as Hazards to Aircraft Flight Zones.
- Recommend fair disclosure ordinances be enacted to require disclosure to the public for those AICUZ items that directly relate to aircraft operations at Eglin AFB.
- Recommend local governments require real estate disclosures for individuals purchasing property within noise contours or CZs/APZs.
- Enact or modify building/residential codes to ensure that any new construction near Eglin AFB has the recommended noise-level reduction measures incorporated into the design and construction of structures.
- Recommend government planning bodies monitor proposals for tall structures such as wind turbines and communication towers to ensure that new construction does not pose a hazard to navigable airspace around Eglin AFB. Where appropriate coordinate with the FAA on height of structures.
- Recommend that local government land use plans and ordinances reflect AICUZ recommendations for development density in CZs/APZs and noise zones.
- Recommend local governments continue to consult with Eglin AFB on planning and zoning actions that have the potential to affect base operations.
- Maintain Air Force leadership as an ex officio member on boards, commissions and regional councils addressing long-range development and other planning policy.
- Encourage the development of a working group of city, county, and Eglin AFB representatives to discuss land use concerns and major development proposals on an as-needed basis that could affect aircraft operations.

7.4 Community Role

Neighboring residents and base personnel have a long-established history of working together for the mutual benefit of the Eglin AFB mission and local community. Adoption of the following recommendations will strengthen this relationship, protect the health and ensure the safety of the public, and help protect the integrity of the installation's flying mission:

Real Estate Professionals and Brokers:

- Know where the noise zones and CZs/APZs encumber land near the airbase and invite base representative to brokers' meeting to discuss the AICUZ program with the real estate professionals.
- Disclose noise impact to all prospective buyers of properties within areas greater than 65 dB DNL or within the CZs/APZs.
- Require the Multiple Listing Service to disclose noise zones and CZs/APZs on all listings.

Developers:

- Know where the noise zones and CZs/APZs encumber land near the airbase. Consult with Eglin AFB on proposed developments within the AICUZ.
- Participate in local discussions regarding existing zoning ordinances and subdivision regulations to support the compatible land uses outlined in this study through implementation of a zoning overlay district based on noise contours and CZs/APZs.

Local Citizens:

- Participate in local forums with the base to learn more about the base's missions.
- 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 base representatives about noise and accident potential.

Whereas the base and community are separated by a fence, what the Air Force does affects the community and, conversely, what the community does 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.

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Appendix A Land Use Compatibility Tables

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

SLUCM NO.	LAND USE NAME	CLEAR ZONE Recommendation[1]	APZ-I Recommendation[1]	APZ-II Recommendation[1]	DENSITY 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

Table A-1. Land Use Compatibility Recommendations in APZs and CZs *(continued)*

SLUCM NO.	LAND USE NAME	CLEAR ZONE Recommendation[1]	APZ-I Recommendation[1]	APZ-II Recommendation[1]	DENSITY Recommendation[1]
20	Manufacturing3 (continued)				
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 transportation	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

Table A-1. Land Use Compatibility Recommendations in APZs and CZs *(continued)*

SLUCM NO.	LAND USE NAME	CLEAR ZONE Recommendation[1]	APZ-I Recommendation[1]	APZ-II Recommendation[1]	DENSITY Recommendation[1]
40	Transportation, communication, and utilities (continued)[3, 4]				
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
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

Table A-1. Land Use Compatibility Recommendations in APZs and CZs *(continued)*

SLUCM NO.	LAND USE NAME	CLEAR ZONE Recommendation[1]	APZ-I Recommendation[1]	APZ-II Recommendation[1]	Density Recommendation[1]
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	

Table A-1. Land Use Compatibility Recommendations in APZs and CZs *(continued)*

SLUCM NO.	LAND USE NAME	CLEAR ZONE Recommendation[1]	APZ-I Recommendation[1]	APZ-II Recommendation[1]	Density Recommendation[1]
70	Cultural, entertainment and recreational (continued)				
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]	
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

Table A-1. Land Use Compatibility Recommendations in APZs and CZs *(continued)*

SLUCM NO.	LAND USE NAME	CLEAR ZONE Recommendation[1]	APZ-I Recommendation[1]	APZ-II Recommendation[1]	Density Recommendation[1]
80	Resource production and extraction (continued)				
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]	

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 Clear Zone areas on or off the air installation. The Clear Zone is subject to the most severe restrictions.

5. Roads within the graded portion of the Clear Zone are prohibited. All roads within the Clear Zone 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.

Table A-1. Land Use Compatibility Recommendations in APZs and CZs *(concluded)*

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. No chapels or houses of worship are allowed 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 Clear Zone 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			SUGGESTED LAND USE COMPATIBILITY			
SLUCM NO.	LAND USE NAME	DNL or CNEL 65-69	DNL or CNEL 70-74	DNL or CNEL 75-79	DNL or CNEL 80-84	DNL or CNEL 85+
11	Household units	N[1]	N[1]	N	N	N
11.11	Single units: detached	N[1]	N[1]	N	N	N
11.12	Single units: semidetached	N[1]	N[1]	N	N	N
11.13	Single units: attached row	N[1]	N[1]	N	N	N
11.21	Two units: side-by-side	N[1]	N[1]	N	N	N
11.22	Two units: one above the other	N[1]	N[1]	N	N	N
11.31	Apartments: walk-up	N[1]	N[1]	N	N	N
11.32	Apartment: elevator	N[1]	N[1]	N	N	N
12	Group quarters	N[1]	N[1]	N	N	N
13	Residential hotels	N[1]	N[1]	N	N	N
14	Mobile home parks or courts	N	N	N	N	N
15	Transient lodgings	N[1]	N[1]	N[1]	N	N
16	Other residential	N[1]	N[1]	N	N	N
20	Manufacturing					
21	Food and kindred products; manufacturing	Y	Y[2]	Y[3]	Y[4]	N
22	Textile mill products; manufacturing	Y	Y[2]	Y[3]	Y[4]	N
23	Apparel and other finished products; products made from fabrics, leather, and similar materials; manufacturing	Y	Y[2]	Y[3]	Y[4]	N
24	Lumber and wood products (except furniture); manufacturing	Y	Y[2]	Y[3]	Y[4]	N
25	Furniture and fixtures; manufacturing	Y	Y[2]	Y[3]	Y[4]	N
26	Paper and allied products; manufacturing	Y	Y[2]	Y[3]	Y[4]	N
27	Printing, publishing, and allied industries	Y	Y[2]	Y[3]	Y[4]	N
28	Chemicals and allied products; manufacturing	Y	Y[2]	Y[3]	Y[4]	N
29	Petroleum refining and related industries	Y	Y[2]	Y[3]	Y[4]	N

Table A-2. Recommended Land Use Compatibility for Noise Zones *(continued)*

LAND USE		SUGGESTED LAND USE COMPATIBILITY				
SLUCM NO.	LAND USE NAME	DNL or CNEL 65-69	DNL or CNEL 70-74	DNL or CNEL 75-79	DNL or CNEL 80-84	DNL or CNEL 85+
30	Manufacturing (continued)					
31	Rubber and misc. plastic products; manufacturing	Y	Y[2]	Y[3]	Y[4]	N
32	Stone, clay and glass products; manufacturing	Y	Y[2]	Y[3]	Y[4]	N
33	Primary metal products; manufacturing	Y	Y[2]	Y[3]	Y[4]	N
34	Fabricated metal products; manufacturing	Y	Y[2]	Y[3]	Y[4]	N
35	Professional scientific, and controlling instruments; photographic and optical goods; watches and clocks	Y	25	30	N	N
39	Miscellaneous manufacturing	Y	Y[2]	Y[3]	Y[4]	N
40	Transportation, communication and utilities					
41	Railroad, rapid rail transit, and street railway transportation	Y	Y[2]	Y[3]	Y[4]	N
42	Motor vehicle transportation	Y	Y[2]	Y [3]	Y[4]	N
43	Aircraft transportation	Y	Y[2]	Y[3]	Y[4]	N
44	Marine craft transportation	Y	Y[2]	Y[3]	Y[4]	N
45	Highway and street right-of-way	Y	Y	Y	Y	N
46	Automobile parking	Y	Y	Y	Y	N
47	Communication	Y	25[5]	30[5]	N	N
48	Utilities	Y	Y[2]	Y[3]	Y[4]	N
49	Other transportation, communication and utilities	Y	25[5]	30[5]	N	N
50	Trade					
51	Wholesale trade	Y	Y[2]	Y[3]	Y[4]	N
52	Retail trade – building materials, hardware and farm equipment	Y	25	30	Y[4]	N
53	Retail trade – including shopping centers, discount clubs, home improvement stores, electronics superstores, etc.	Y	25	30	N	N

Table A-2. Recommended Land Use Compatibility for Noise Zones *(continued)*

LAND USE		SUGGESTED LAND USE COMPATIBILITY				
SLUCM NO.	LAND USE NAME	DNL or CNEL 65-69	DNL or CNEL 70-74	DNL or CNEL 75-79	DNL or CNEL 80-84	DNL or CNEL 85+
50	Trade (continued)					
54	Retail trade – food	Y	25	30	N	N
55	Retail trade – automotive, marine craft, aircraft and accessories	Y	25	30	N	N
56	Retail trade – apparel and accessories	Y	25	30	N	N
57	Retail trade – furniture, home, furnishings and equipment	Y	25	30	N	N
58	Retail trade – eating and drinking establishments	Y	25	30	N	N
59	Other retail trade	Y	25	30	N	N
60	Services					
61	Finance, insurance and real estate services	Y	25	30	N	N
62	Personal services	Y	25	30	N	N
62.4	Cemeteries	Y	Y[2]	Y[3]	Y[4,11]	Y[6,11]
63	Business services	Y	25	30	N	N
63.7	Warehousing and storage	Y	Y[2]	Y[3]	Y[4]	N
64	Repair services	Y	Y[2]	Y[3]	Y[4]	N
65	Professional services	Y	25	30	N	N
65.1	Hospitals, other medical facilities	25	30	N	N	N
65.16	Nursing homes	N[1]	N[1]	N	N	N
66	Contract construction services	Y	25	30	N	N
67	Government services	Y[1]	25	30	N	N
68	Educational services	25	30	N	N	N
68.1	Child care services, child development centers, and nurseries	25	30	N	N	N
69	Miscellaneous Services	Y	25	30	N	N
69.1	Religious activities (including places of worship)	Y	25	30	N	N
70	Cultural, entertainment and recreational					
71	Cultural activities	25	30	N	N	N
71.2	Nature exhibits	Y[1]	N	N	N	N
72	Public assembly	Y	N	N	N	N
72.1	Auditoriums, concert halls	25	30	N	N	N
72.11	Outdoor music shells, amphitheaters	N	N	N	N	N
72.2	Outdoor sports arenas, spectator sports	Y[7]	Y[7]	N	N	N

Table A-2. Recommended Land Use Compatibility for Noise Zones *(continued)*

LAND USE		SUGGESTED LAND USE COMPATIBILITY				
SLUCM NO.	LAND USE NAME	DNL or CNEL 65-69	DNL or CNEL 70-74	DNL or CNEL 75-79	DNL or CNEL 80-84	DNL or CNEL 85+
70	Cultural, entertainment and recreational (continued)					
73	Amusements	Y	Y	N	N	N
74	Recreational activities (including golf courses, riding stables, water recreation)	Y	25	30	N	N
75	Resorts and group camps	Y	25	N	N	N
76	Parks	Y	25	N	N	N
79	Other cultural, entertainment and recreation	Y	25	N	N	N
80	Resource production and extraction					
81	Agriculture (except live-stock)	Y^{8}	Y^{9}	Y^{10}	$Y^{10,11}$	$Y^{10,11}$
81.5-81.7	Agriculture-Livestock farming including grazing and feedlots	Y^{8}	Y^{9}	N	N	N
82	Agriculture related activities	Y^{8}	Y^{9}	Y^{10}	$Y^{10,11}$	$Y^{10,11}$
83	Forestry activities	Y^{8}	Y^{9}	Y^{10}	$Y^{10,11}$	$Y^{10,11}$
84	Fishing activities	Y	Y	Y	Y	Y
85	Mining activities	Y	Y	Y	Y	Y
89	Other resource production or extraction	Y	Y	Y	Y	Y

KEY:

SLUCM – Standard Land Use Coding Manual, U.S. Department of Transportation

Y (Yes) – Land use and related structures compatible without restrictions.

N (No) – Land use and related structures are not compatible and should be prohibited.

Y^{X} – Yes with restrictions. The land use and related structures generally are compatible. However, see note(s) indicated by the superscript.

N^{X} – No with exceptions. The land use and related structures are generally incompatible. However, see note(s) indicated by the superscript.

25, 30, or 35 – The numbers refer to noise level reduction (NLR) levels. NLR (outdoor to indoor) is achieved through the incorporation of noise attenuation into the design and construction of a structure. Land use and related structures are generally compatible; however, measures to achieve NLR of 25, 30, or 35 must be incorporated into design and construction of structures. However, measures to achieve an overall noise reduction do not necessarily solve noise difficulties outside the structure and additional evaluation is warranted. Also, see notes indicated by superscripts where they appear with one of these numbers.

DNL – Day-Night Average Sound Level.

CNEL – Community Noise Equivalent Level (normally within a very small decibel difference of DNL)

Ldn – Mathematical symbol for DNL.

Table A-2. Recommended Land Use Compatibility for Noise Zones *(concluded)*

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.

Appendix B Abbreviations and Acronyms

6 RTBn	6th Ranger Training Battalion
7 SFG(A)	7th Special Forces Group (Airborne)
20 SPCS	20th Space Control Squadron
33 FW	33d Fighter Wing
53 WG	53d Wing
96 CEG	96th Civil Engineer Group
96 MDG	96th Medical Group
96 MSG	96th Mission Support Group
96 MXG	96th Maintenance Group
96 OG	96th Operations Group
96 RN	96th Range Group
96 SK	Air Force Seek Eagle Office
96 TW	96th Test Wing
492 SOW	492nd Special Operations Wing
919 SOW	919th Special Operations Wing
ACC	Air Combat Command
AFB	Air Force Base
AFI	Air Force Instruction
AFLCMC/EB	Armament Directorate
AFMC	Air Force Materiel Command
AFOTEC	Air Force Operational Test and Evaluation Center
AFRL/RW	Air Force Research Lab Munitions Directorate
AFSOC	Air Force Special Operations Command
AICUZ	Air Installations Compatible Use Zones
ALZ	Assault Landing Zone
ANG	Air National Guard
APZs	Accident Potential Zones
ATC	Air Traffic Control
BASH	bird/animal aircraft strike hazard
BRAC	Base Realignment and Closure
CFR	Code of Federal Regulations
CNEL	Community Noise Equivalent Level
CZs	Clear Zones
dB	decibels
dBA	A-weighted decibels
DNL	day-night average sound level
DoD	Department of Defense
DTRA	Defense Threat Reduction Agency
Du/ac	detached unit per acre
EMI	Electromagnetic Interference
EOD	explosive ordnance disposal
EPA	U.S. Environmental Protection Agency
ETTC	Eglin Test and Training Complex
FAA	Federal Aviation Administration

FAR	Floor Area Ratio
GIS	Geographic Information System
HAFZ	Hazards to Aircraft Flight Zone
Hz	hertz
JLUS	Joint Land Use Study
LHA	Landing Helicopter Assault
MAZ	Military Airport Zone
MIPA	Military Influence Planning Area
MSL	mean sea level
NAVSCOLEOD	Naval School Explosive Ordnance Disposal
NLR	Noise Level Reduction
NOLF	Naval Outlying Landing Field
OPNAVINST	Chief of Naval Operations Instruction
PUD	planned unit development
RF	Radio Frequency
Rwy	Runway
SEIS	Supplemental Environmental Impact Statement
SFO	simulated flame-out
SLUCM	Standard Land Use Coding Manual
SOW	1st Special Operations Wing
STOVL	short take-off vertical landing
WFRPC	West Florida Regional Planning Council
WMDs	weapons of mass destruction

Appendix C 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, a 10-dB penalty is applied to events occurring during the acoustical nighttime period (10:00 PM through 7:00 AM). See Section 4.4 for additional information.

Decibel – Ten times the common logarithm of two like quantities. For aircraft noise, the two quantities are sound pressures—the sound pressure of the source and a reference sound pressure.

Flight Profiles – Flight profiles consist of aircraft conditions (e.g., altitude, speed, power setting) 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 Eglin AFB. The location for each track is representative for the specific track and may vary due to Air Traffic Control, weather, and other reasons (e.g., one pilot may fly the track on one side of the depicted track, while another pilot may fly the track slightly to the other side).

Maximum Sound Level (L_{max}) – The highest sound level measured during a single event in which the sound level changes value with time (e.g., an aircraft overflight) is called the maximum sound level, or L_{max}. At any given time during the event, the measured sound level is actually an average taken over one-eighth of a second.

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).

Sound Exposure Level (SEL) – Sound Exposure Level combines both the intensity of a sound and its duration. For an aircraft flyover, SEL includes the maximum and all lower noise levels produced as part of the overflight, together with how long each part lasts. It represents the total sound energy in the event.

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