5 AIRFIELD SAFETY

Community and airfield safety is paramount to the Navy, and is a shared responsibility between the Navy and the surrounding communities, each playing a vital role in its success. As such, the Navy has established a flight safety program and areas of accident potential around NAS Meridian and NOLF Joe Williams to assist in preserving the health, safety, and welfare of the people living near the airfield. Cooperation between the Navy and the community results in strategic and effective land use planning and development surrounding naval airfields. This AICUZ Study provides the tools to reach the shared safety goal.

Identifying safety issues assists the community in developing land uses compatible with airfield operations. These issues include hazards around the airfield that obstruct or interfere with aircraft arrivals and departures, pilot vision, communications, or aircraft electronics, and areas of accident potential. While the likelihood of an aircraft mishap occurring is remote, one can occur. Aircraft safety and mishaps at NAS Meridian are discussed in detail in this chapter.

In addition, the Navy establishes APZs which are conceptually developed based on historical data for aircraft mishaps that occurred near airfields. This AICUZ Study presents the 2012 AICUZ APZs for NAS Meridian and NOLF Joe Williams. The accident potential concept describes the probable impact areas if an accident were to occur, which is to be distinguished from the probability of an accident occurring.

5.1 FLIGHT SAFETY AND AIRCRAFT MISHAPS

APZs identify probable impact areas if an accident were to occur; however, APZs do not predict the probability of an accident occurring.

Flight safety programs are designed to reduce the hazards that can cause aircraft mishaps; the APZs are designed to minimize the potential harm if a mishap were to occur.

5.1.1 Flight Safety

Flight safety not only includes measures for pilot safety during aircraft operations, but also for the safety of those in the community. The FAA and the military define flight safety zones (imaginary surfaces) below aircraft arrival and departure flight tracks around the airfield. Heights of structures and trees are restricted in these imaginary surfaces, and the FAA evaluates proposed construction to mitigate impacts. The flight safety zones are designed to reduce the hazards that can cause an aircraft mishap. This section discusses hazards to flight safety that should be avoided in the airfield vicinity and measures to avoid potential pilot interferences.

Bird/Animal Strike Hazard

Wildlife can be a significant hazard to flight operations. Birds are drawn to different habitat types found in the airfield environment (edges, grass, brush, forest, water, and even the warm pavement of the runways). Although most bird and animal strikes do not result in crashes, they can cause structural and mechanical damage to aircraft, as well as loss of flight time. Most bird 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 and can cause substantial damage. To reduce the potential of a bird/animal strike hazard (BASH), the FAA and the military recommend locating land uses that attract birds at least 10,000 feet from active movement areas of the airfields. Land uses that attract birds and other wildlife include transfer stations, landfills, golf courses, wetlands, stormwater ponds, dredge disposal sites, and hazardous wildlife attractants.

Windshield Damage from a Vulture Strike

Design modifications also can be used to reduce the attractiveness of these types of land uses to birds and other wildlife.

Electromagnetic Interference (EMI)

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. EMI is defined by the ANSI as any electromagnetic disturbance that interrupts, obstructs, or otherwise degrades or limits the effective performance of electronics/electrical equipment. It can be induced intentionally, as in electronic warfare, or unintentionally, such as high-tension line leakage. Megawatt wind turbines cause EMI and pose a hazard to air navigation. Additionally, EMI may be caused by atmospheric phenomena, such as lightning and precipitation static, and by non-telecommunication equipment, such as vehicles and industry machinery. EMI also affects consumer devices, such as cell phones, FM radios, television reception, and garage door openers.

Lighting

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. This is particularly dangerous at night when the flash can diminish the eye's adaptation to darkness. Partial recovery takes only a few minutes, but full recovery typically requires 40 to 45 minutes. Visible lasers, including low-powered legal laser pointers, are emerging as a safety concern for pilots. Visual interference with pilot performance due to lasers can result in temporary flashblindness, glare, disruptions, and distractions. These are most hazardous during critical phases of flight—landings, take-offs, and emergency maneuvers.

Smoke, Dust, and Steam

Industrial or agricultural sources of smoke, dust, fog, and steam in the airfield vicinity could obstruct a pilot's vision during takeoff, landing, or other periods of low-altitude flight.

Imaginary Surfaces

The Navy and FAA identify a complex series of imaginary planes and transition surfaces that define the airspace that needs 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. Fixed-wing runways and rotary-wing runways/helipads have different imaginary surfaces. Brief descriptions of the imaginary surfaces for fixed-wing Class B runways (NAS Meridian and NOLF Joe Williams are both Class B runways) are provided on Figure 5-1 and in Table 5-1. In general, no aboveground structures are permitted in the primary surface of Clear Zones, 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.

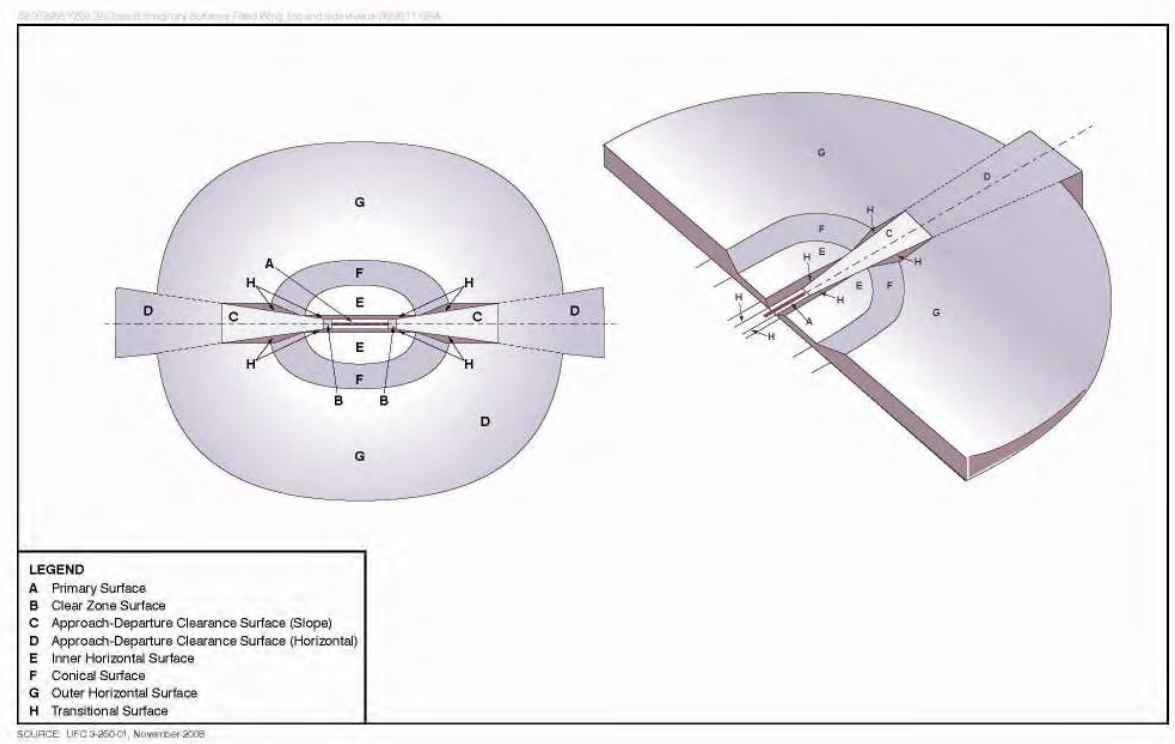


Figure 5-1. Imaginary Surfaces and Transition Planes for Class B Fixed-Wing Runways

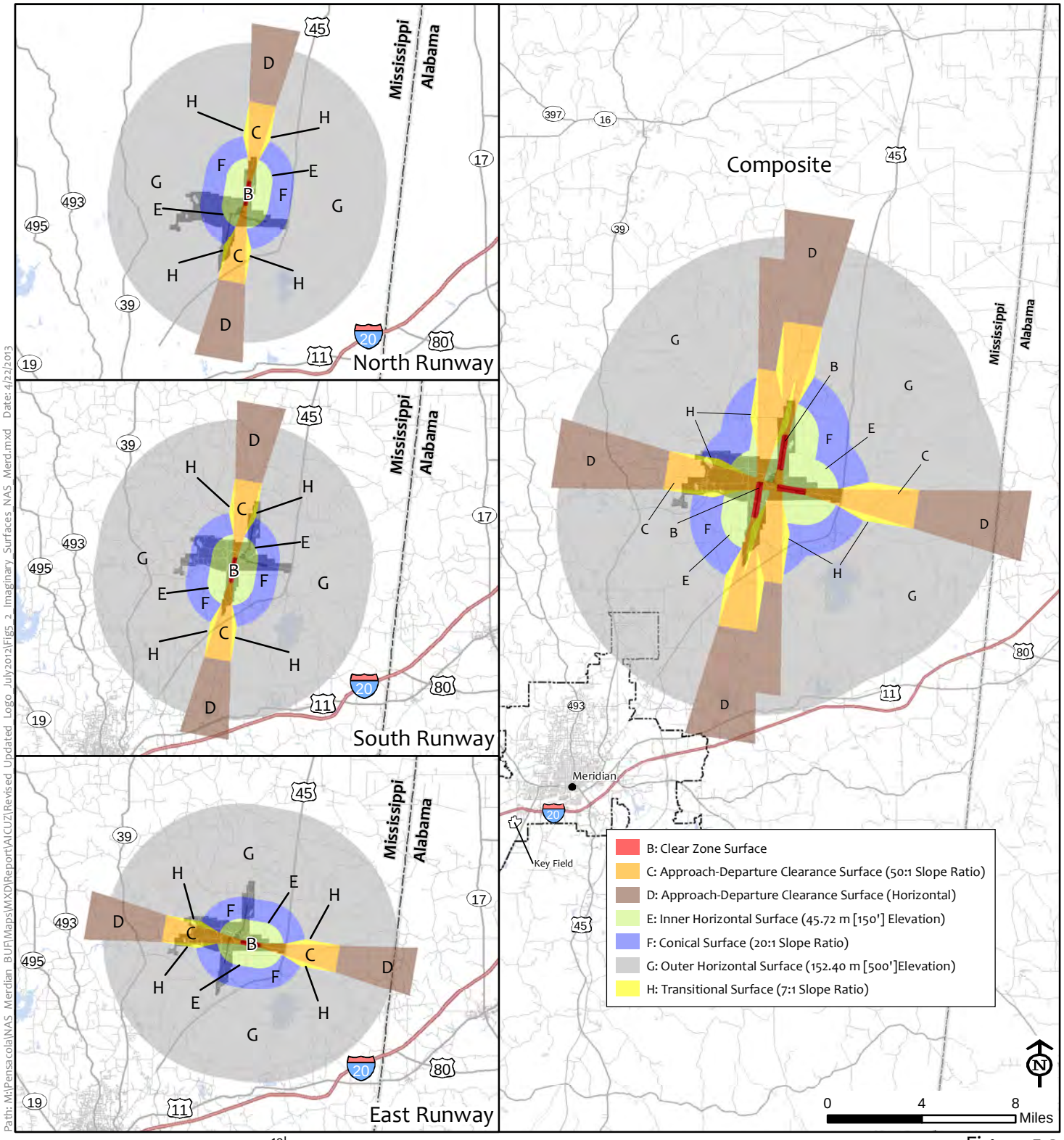
Table 5-1. Imaginary Surfaces – Class B Fixed-Wing Runways

Planes and Surfaces	Geographical Dimensions
Primary Surface	Aligned (longitudinally) with each runway and extending 200 feet from each runway end. The width is 1,500 feet.
Clear Zone	Located immediately adjacent to the end of the runway and extending 3,000 feet beyond the end of the runway. 1,500 feet wide and flaring out to 2,284 feet wide.
Approach-Departure Clearance Surfaces	An inclined or combination inclined and horizontal plane, symmetrical about the runway centerline. The slope of the surface is 50:1 until an elevation of 500 feet and continues horizontally 50,000 feet from origination. The outer width is 16,000 feet.
Inner Horizontal Surface	An oval shaped plane 150 feet above the established airfield elevation. Constructed by scribing an arc with a radius of 7,500 feet around the centerline of the runway.
Outer Horizontal Surface	A horizontal plane located 500 feet above the established airfield elevation, extending outward from the conical surface for 30,000 feet.
Conical Surface	An inclined plane that extends from the inner horizontal surface outward and upward at a 20:1 slope and extends for 7,000 feet and to a height of 500 feet above the established airfield elevation.
Transitional Surface	An inclined plane that connects the primary surface and the approach-departure clearance surface to the inner horizontal surface, conical surface, and outer horizontal surface. These surfaces extend outward and upward at right angles to the runway centerline and extended at a slope of 7:1 from the sides of the primary surface and from the sides of the approach surfaces.

Source: Naval Facilities Engineering Command (NAVFAC) 1982 and DOD 2008

Imaginary surfaces at NAS Meridian and NOLF Joe Williams are depicted on Figures 5-2 and 5-3, respectively. As noted above, each runway has assigned imaginary surfaces; therefore, since NAS Meridian has three runways, imaginary surfaces are applied to each runway. As shown on Figure 5-2, each runway is presented with the imaginary surfaces as well as a composite of the three. NOLF Joe Williams has only one runway and, therefore, one set of imaginary surfaces.

NAS Meridian



NAS Runways: 19L, 01R, 19R, 10, 28, 01L

Interstate_Final
Highway
Secondary Road
Meridian Corporate Boundary
Airfield
State Boundary
Installation Boundary
Waterbody

Figure 5-2
Imaginary Surface
NAS Meridian
Lauderdale County, Mississippi

Source: U.S. Navy 2011, ESRI 2010

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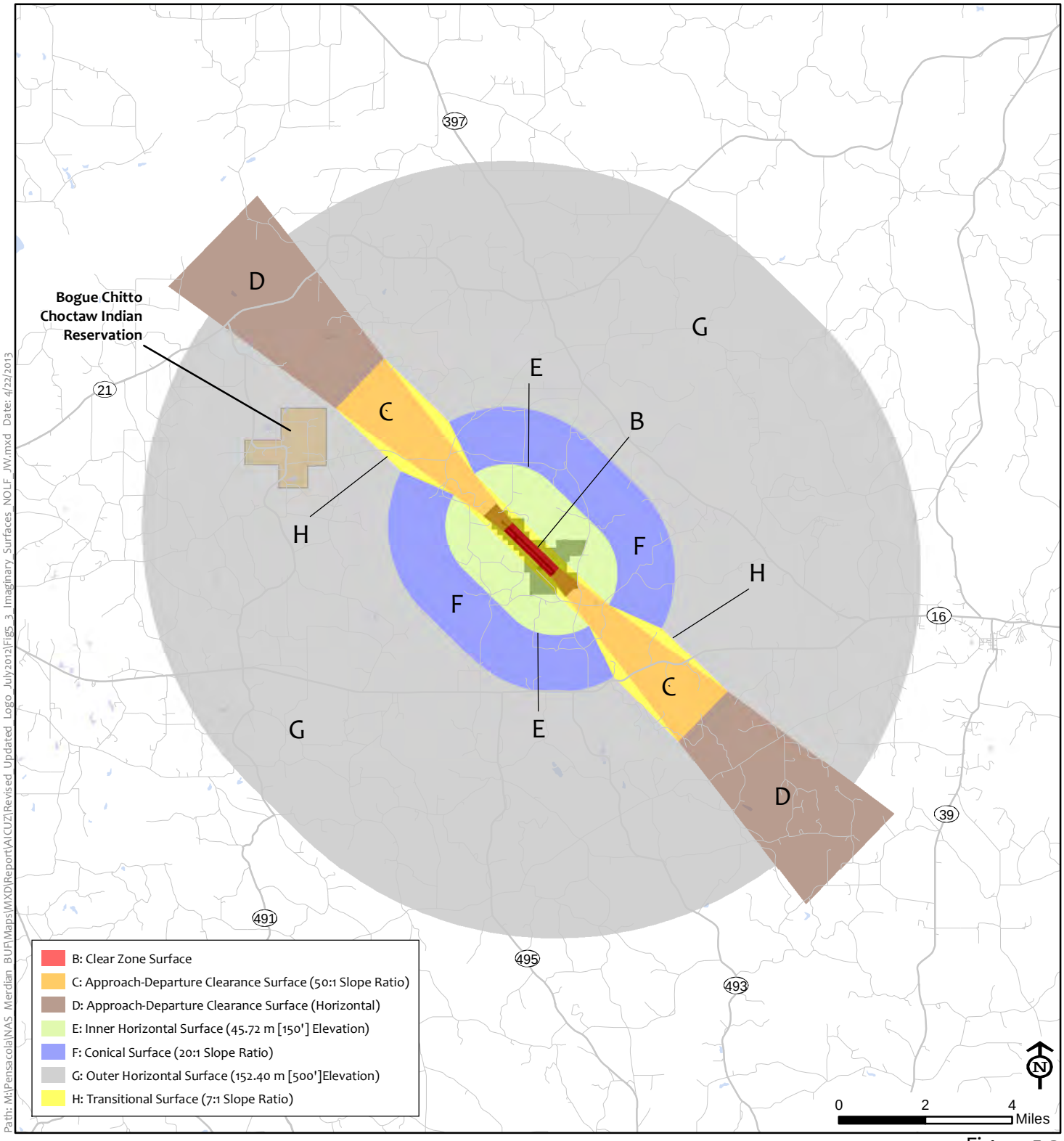
NOLF Joe Williams



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NAVAL AIR STATION MERIDIAN, MS
"LEARNING TO LEAD" "FROM THE SEA"

14
NOLF
Runways
32

Highway
Secondary Road
Airfield
Installation Boundary

Figure 5-3
Imaginary Surface
NOLF Joe Williams
Kemper County, Mississippi

Source: U.S. Navy 2011, ESRI 2010

5.1.2 Aircraft Mishaps

The Navy categorizes aircraft mishaps into one of three groups: Class A, Class B, or Class C. The classification system is based on the severity of injury to individuals involved and the total property damage. The most severe is a Class A mishap and the least severe is a Class C mishap. Table 5-2 summarizes the Navy mishap classifications.

Table 5-2. Naval Aircraft Mishap Classifications

Mishap Class	Total Property Damage	Fatality/Injury
A	$2,000,000 or more and/or aircraft destroyed	Fatality or permanent total disability
B	$500,000 or more but less than $2M	Permanent partial disability or three or more persons hospitalized as inpatients
C	$50,000 or more but less than $500K	Nonfatal injury resulting in loss of time from work beyond day/shift when injury occurred

Source: Naval Safety Center 2010

There have been five Class A mishaps at NAS Meridian since 2000, all involving the T-45C aircraft and all occurring in the vicinity of NAS Meridian. One mishap resulted in a fatality; for all others aircrew ejected and/or survived with minor injuries. There have been other Class B and Class C mishaps which have occurred on or around the airfield, predominantly involving bird strikes. There was one Class B mishap at NOLF Joe Williams in 2008 involving a bird strike.

5.2 ACCIDENT POTENTIAL ZONES

Recognizing the need to identify areas of accident potential, in the 1970s and 1980s the military conducted studies of historic 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 the study, the DOD has identified APZs as areas where an aircraft

accident would most likely occur if an accident were to take place. Subsequently, APZs are not a prediction of the number of accidents or the odds of an accident occurring; APZs only reflect the most likely location of an accident.

The Navy recommends that land uses with a high concentration of people (apartments, churches, schools) be located outside APZs.

APZs follow departure, arrival, and pattern flight tracks. They are based upon analysis of historical data and are designed to minimize the potential harm if a mishap were to occur by limiting activities in the designated APZs. APZs are used by the Navy and local planning agencies to ensure compatible development in close proximity to runway ends and slightly beyond. Although the likelihood of an accident is remote, the Navy recommends that certain land uses that concentrate large numbers of people, such as apartments, churches, and schools, be avoided within the APZs.

All runways at NAS Meridian and NOLF Joe Williams are classified as Class B runways.

APZ configurations and dimensions are derived from the AICUZ Instruction and have been established for all runway classifications. There are three different APZs: Clear Zone, APZ I, and APZ II. APZs are, in part, based on the number of operations conducted at the airfield—more specifically, the number of operations conducted for specific flight tracks. All runways at NAS Meridian and NOLF Joe Williams are classified as Class B runways. The components of standard APZs for Class B runways are defined in the AICUZ Instruction as follows, and identified on Figure 5-4:

- **Clear Zone.** The Clear Zone is a trapezoidal area lying immediately beyond the end of the runway and outward along the extended runway centerline for a distance of 3,000 feet. The Clear Zone measures 1,500 feet in width at the runway threshold and 2,284 feet in width at the outer edge. A Clear Zone is required for all active runways and should remain undeveloped.
- **APZ I.** APZ I is the rectangular area beyond the Clear Zone which still has a measurable potential for aircraft accidents relative to the Clear Zone. APZ I is provided under flight tracks which experience 5,000 or more annual operations (departures or approaches). APZ I is typically 3,000 feet in width and 5,000 feet in length and may be rectangular or curved to conform to the shape of the predominant flight track.

- **APZ II.** APZ II is the rectangular area beyond APZ I (or the Clear Zone, if APZ I is not used) which has a measurable potential for aircraft accidents relative to APZ I or the Clear Zone. APZ II is always provided where APZ I is required. The dimensions of APZ II are typically 3,000 feet in width by 7,000 feet in length and, as with APZ I, may be curved to correspond with the predominant flight track.

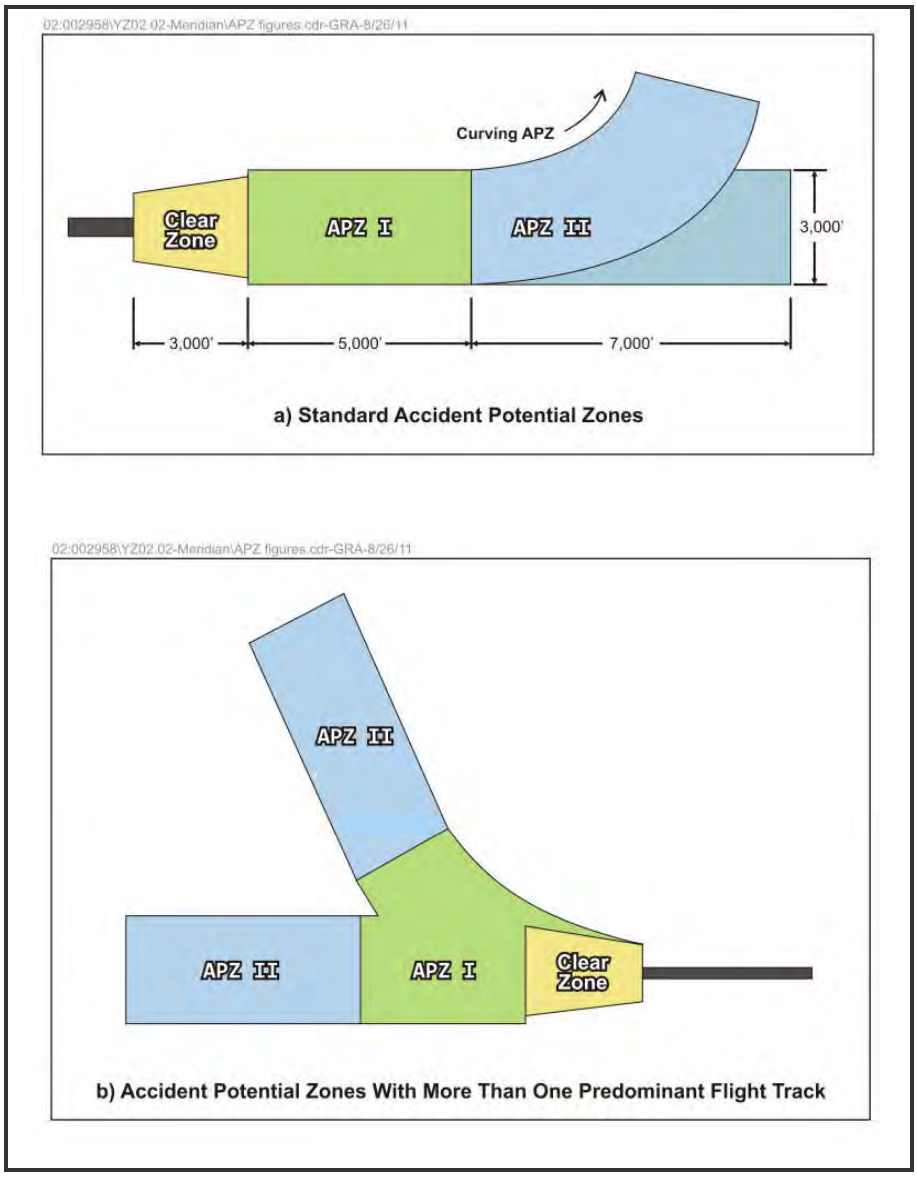


Figure 5-4. Accident Potential Zones for Class B Runways

An accident is more likely to occur in APZ I than in APZ II, and is more likely to occur in the Clear Zone than in APZ I or APZ II. APZs extend from the end of the runway, but apply to the predominant arrival and departure flight tracks used by the aircraft. Therefore, if an airfield has more than one predominant flight track to or from the runway, APZs can extend in the direction of each flight track, as shown on Figure 5-4(b).

Within the Clear Zone, most uses are incompatible with military aircraft operations. For this reason, the Navy's policy is to acquire real property interests in land within the Clear Zone to ensure that incompatible development does not occur. Within APZ I and APZ II, a variety of land uses are compatible; however, people-intensive uses (e.g., schools, apartments, churches) should be restricted because of the greater risk in these areas.

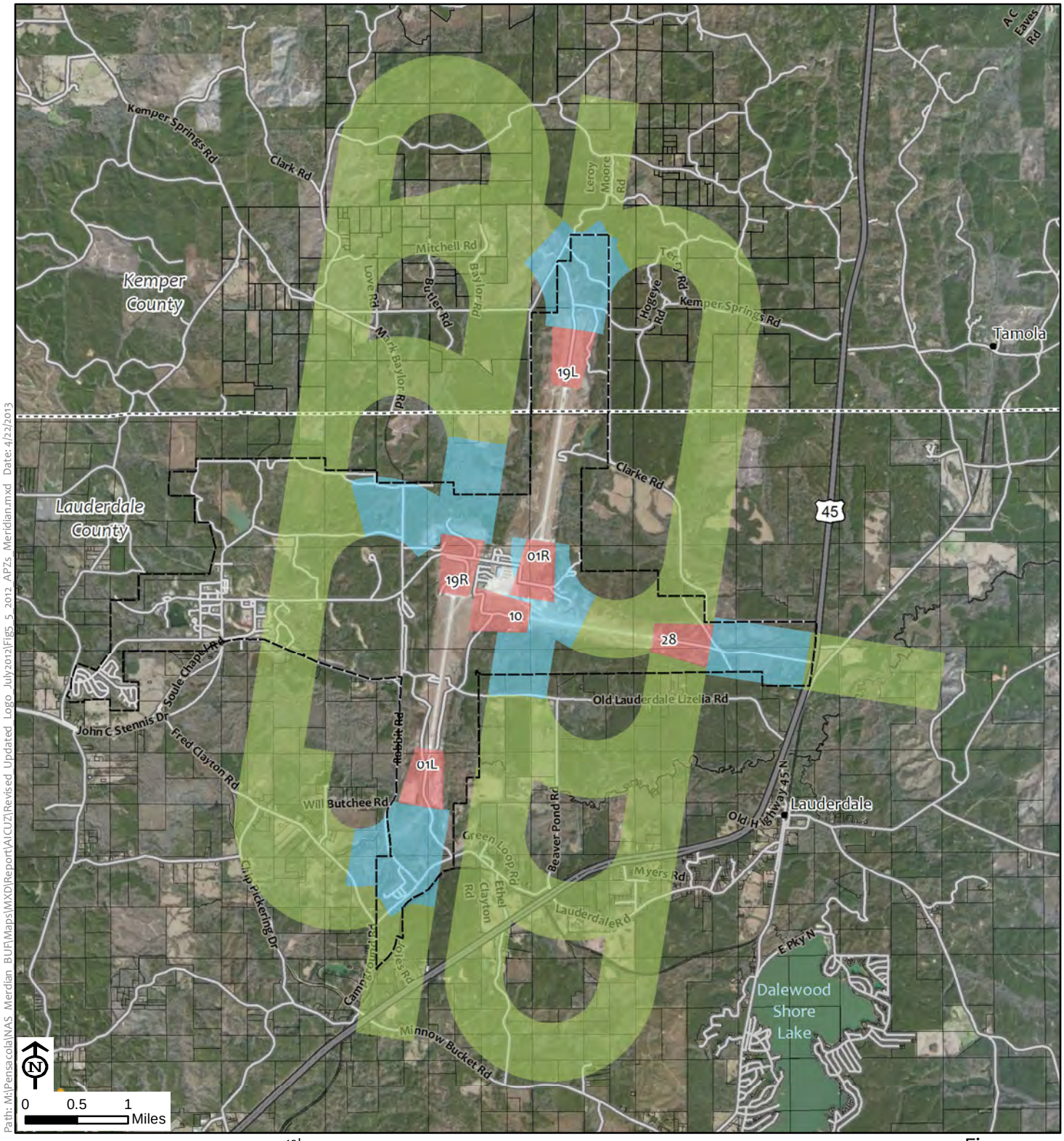
The following sections present the 2012 AICUZ APZs for NAS Meridian and NOLF Joe Williams, including a detailed analysis of areas impacted. Also provided are comparisons and figure overlays for the 2004 AICUZ Study and the 2012 AICUZ APZs. The comparison helps identify changes to APZs based on projected aircraft operations and targets land use recommendations to mitigate incompatible development. Land use and recommendations within APZs for each airfield are provided and discussed in Section 6.3.

5.2.1 2012 AICUZ APZs for NAS Meridian

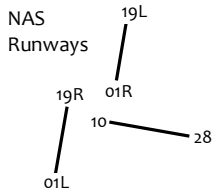
The NAS Meridian 2012 AICUZ APZs have been developed based on annual aircraft operations, the installation's unique training environment, and the need for APZ protection. Figure 5-5 illustrates the 2012 AICUZ APZs as generated as part of this AICUZ Study.

New APZs are warranted for departures (straight out APZs) off of Runways 19R, 19L, 01R, 01L (APZ I only) and 10, carrier break arrivals (curved APZs) onto Runways 19L and 01L, and FLCP pattern (closed loop APZ) onto Runway 19L. New APZs were adopted for carrier break arrivals onto Runway 19L which follow the third and fourth breaks in the pattern.

NAS Meridian



NAS Runways



US Highway
Secondary/Local Road
Installation Boundary
Parcel Boundary
County Boundary

2012 APZs

Clear Zone
APZ I
APZ II

Figure 5-5
2012 AICUZ APZs
NAS Meridian
Lauderdale County, Mississippi

Source: U.S. Navy 2011; ENE 2011; ESRI 2010; Microsoft Virtual Earth 2011

The 2004 AICUZ APZs represent a reasonable reflection of the air stations mission as well as dominant flight tracks currently flown on station. Therefore, the 2004 AICUZ APZs were adopted as part of the 2012 AICUZ APZs due in part to the increased operations at the airfield, unique SNA training environment, congested airspace around the installation, and concerns of incompatible development. The composite 2012 AICUZ APZs (Figure 5-5) reflect the newly developed APZs and the retention of the 2004 AICUZ APZs.

Figure 5-6 compares the 2004 AICUZ APZs with the 2012 AICUZ APZs. Since the 2004 AICUZ APZs were retained in full, the only differences are the new 2012 AICUZ APZs. The 2004 AICUZ Clear Zones were modified to adhere to dimensions provided in the AICUZ Instruction. As such, the land area within the Clear Zones and APZs has increased when compared to the 2004 AICUZ APZs, as shown in Table 5-3.

Table 5-3. Land Area within Clear Zones and Accident Potential Zones for NAS Meridian

APZ Zone	Total Off Station Land Area (acres)
2012 AICUZ Clear Zone	0
2012 AICUZ APZ I	622
2012 AICUZ APZ II	11,805
2012 AICUZ APZ Total Area	**12,427**
2004 AICUZ Clear Zone	0
2004 AICUZ APZ I	559
2004 AICUZ APZ II	8,225
2004 AICUZ APZ Total Area	**8,784**

NAS Meridian

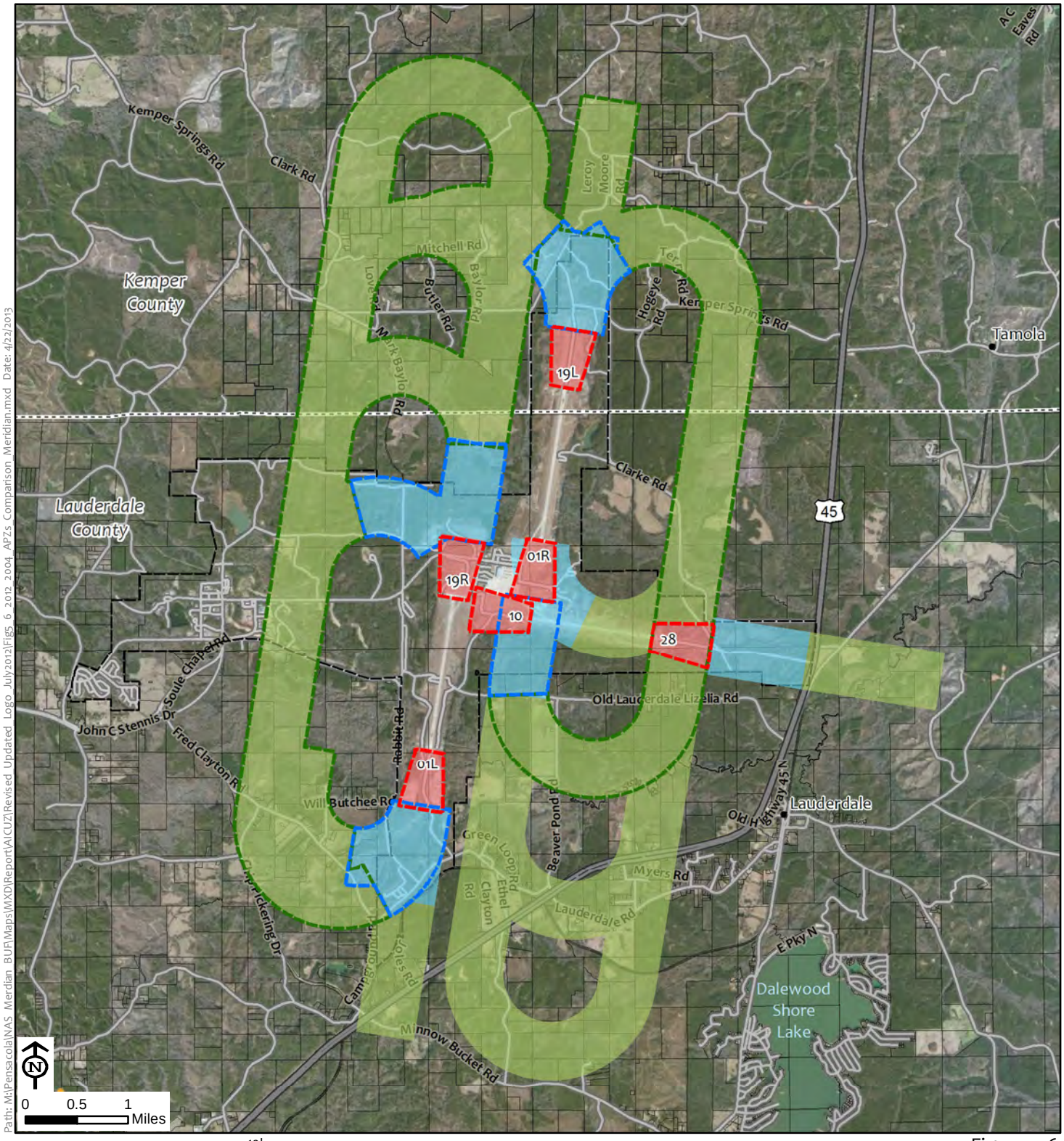


Figure 5-6
Comparison of 2004 and 2012 AICUZ APZs
NAS Meridian
Lauderdale County, Mississippi

Source: U.S. Navy 2011; ENE 2011; ESRI 2010; Microsoft Virtual Earth 2011

5.2.2 2012 AICUZ APZs for NOLF Joe Williams

The NOLF Joe Williams 2012 AICUZ APZs were also developed based on annual aircraft operations and the installation's unique training mission. Figure 5-7 illustrates the 2012 AICUZ APZs generated as part of this AICUZ Study. New APZs are warranted for departure (straight out APZs I) off of Runway 32, and carrier break and pattern arrivals (curved APZs) onto Runways 14 and 32.

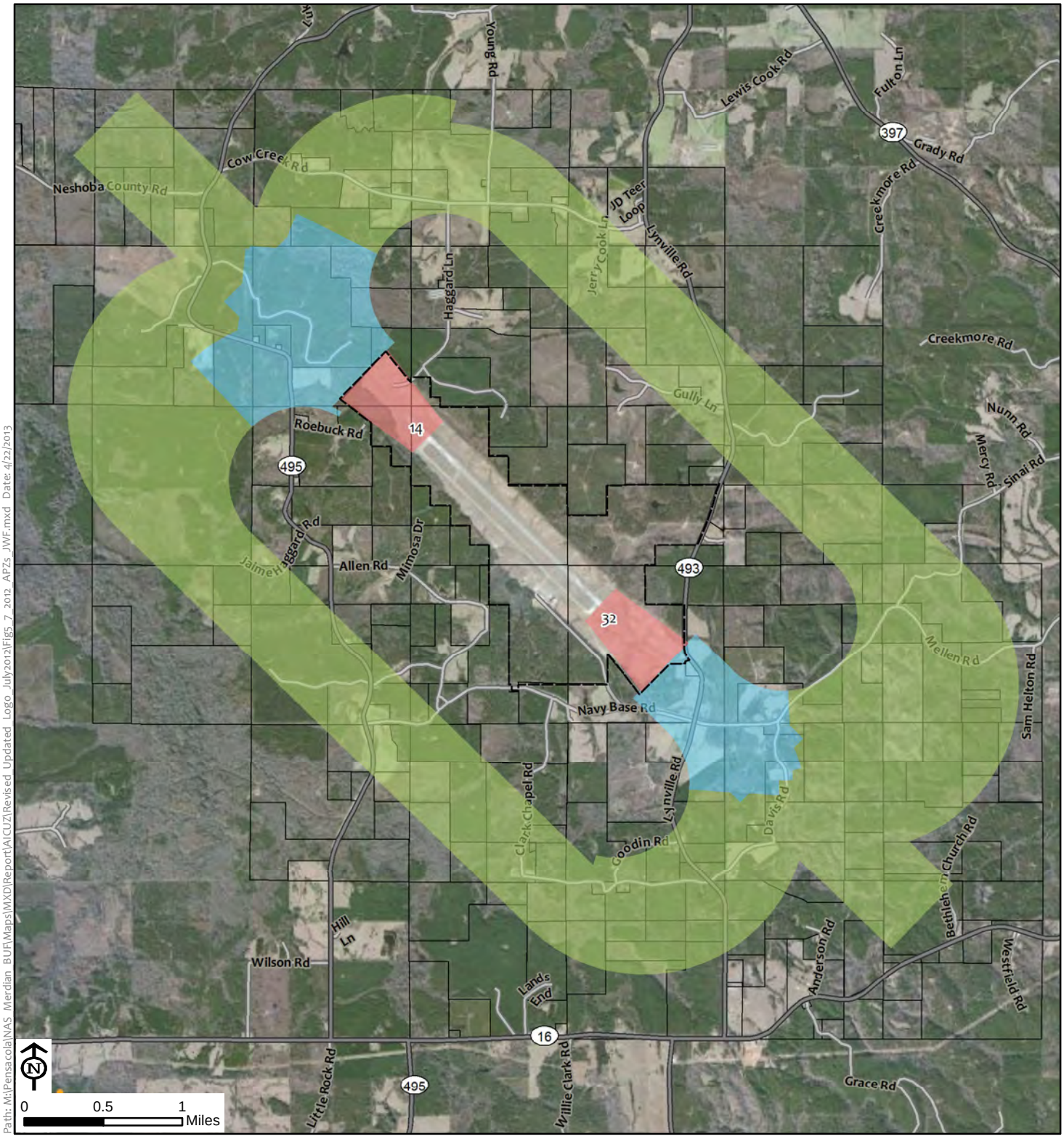
The 2004 AICUZ APZs represent a reasonable reflection of the installation's mission and dominate flight tracks currently flown on station. Therefore, as with NAS Meridian, the 2004 AICUZ APZs for NOLF Joe Williams were adopted as part of the 2012 AICUZ APZs, due in part to the unique SNA training environment and encroachment concerns. The composite 2012 AICUZ APZs (Figure 5-7) reflect the newly developed APZs and the retention of the 2004 AICUZ APZs.

Figure 5-8 compares the 2004 AICUZ APZs with the 2012 AICUZ APZs. Since the 2004 AICUZ APZs were retained in full, the only differences are the new 2012 AICUZ APZs. The 2004 AICUZ Clear Zones were modified to adhere to dimensions provided in the AICUZ Instruction. As such, the off-station land area within the Clear Zones has decreased. The land area within the Clear Zones and APZs has increased when compared to the 2004 AICUZ APZs, as shown in Table 5-4.

Table 5-4. Land Area within Clear Zones and Accident Potential Zones for NOLF Joe Williams

APZ Zone	Total Off Station Land Area (acres)
2012 AICUZ Clear Zone	2
2012 AICUZ APZ I	1,357
2012 AICUZ APZ II	6,820
2012 AICUZ APZ Total Area	**8,179**
2004 AICUZ Clear Zone	28
2004 AICUZ APZ I	1,015
2004 AICUZ APZ II	6,532
2004 AICUZ APZ Total Area	**7,575**

NOLF Joe Williams



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NAVAL AIR STATION MERIDIAN, MS
"TRAINING TO FIGHT... FROM THE SEA"

14
NOLF
Runways
32

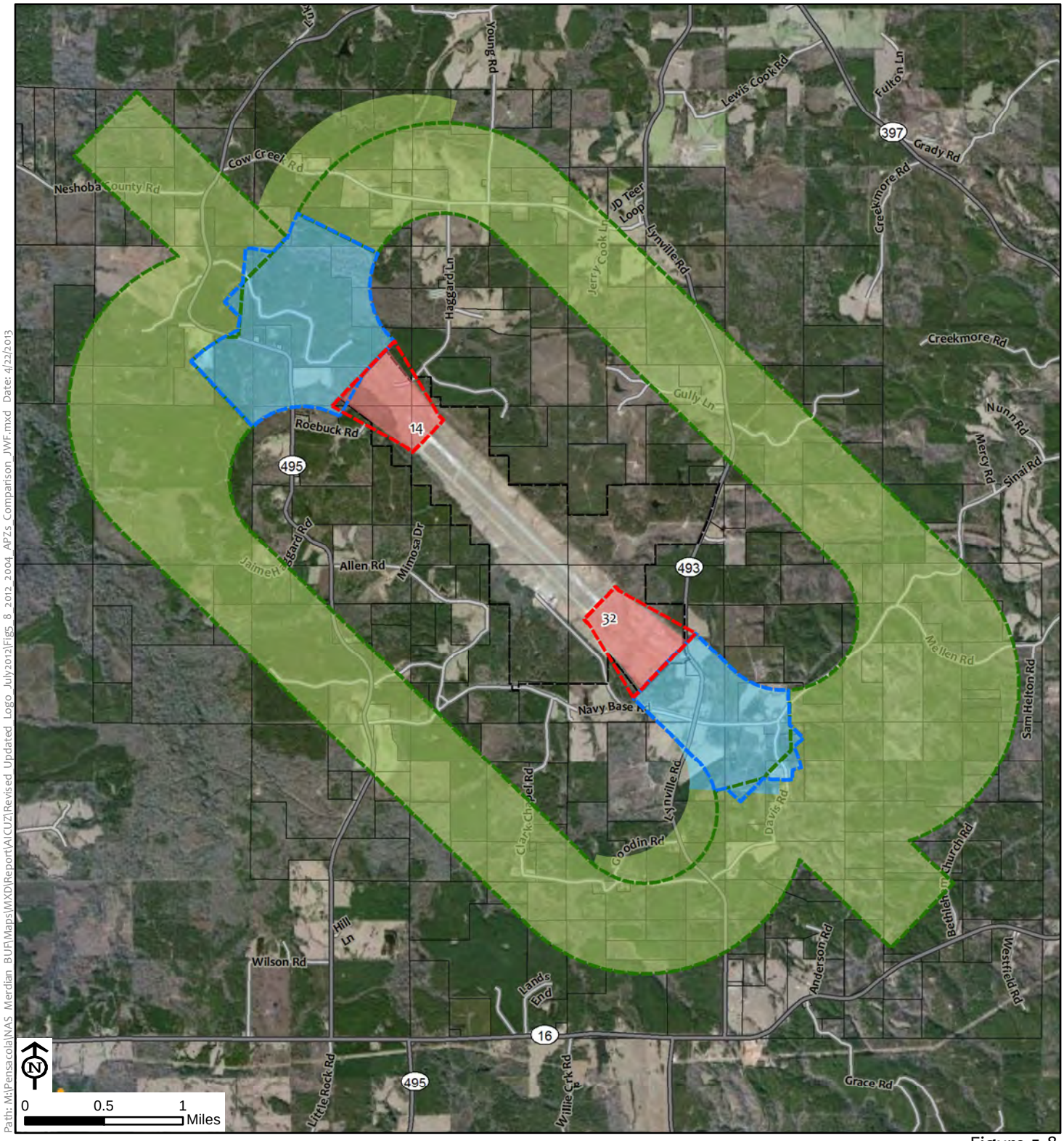
State Highway
Secondary/Local Road
Installation Boundary
Parcel Boundary

2012 APZs
Clear Zone
APZ I
APZ II

Figure 5-7
2012 AICUZ APZs
NOLF Joe Williams
Kemper County, Mississippi

Source: U.S. Navy 2011; ENE 2011; ESRI 2010; Microsoft Virtual Earth 2011

NOLF Joe Williams



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NAVAL AIR STATION MERIDIAN, MS
"TRAINING TO FLY FROM THE SEA"

NOLF Runways
14
32

State Highway
Secondary/Local Road
Installation Boundary
Parcel Boundary

2012 APZs
Clear Zone
APZ I
APZ II

2004 APZs
Clear Zone
APZ I
APZ II

Figure 5-8
Comparison of 2004 and 2012 AICUZ APZs
NOLF Joe Williams
Kemper County, Mississippi

Source: U.S. Navy 2011; ENE 2011; ESRI 2010; Microsoft Virtual Earth 2011

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