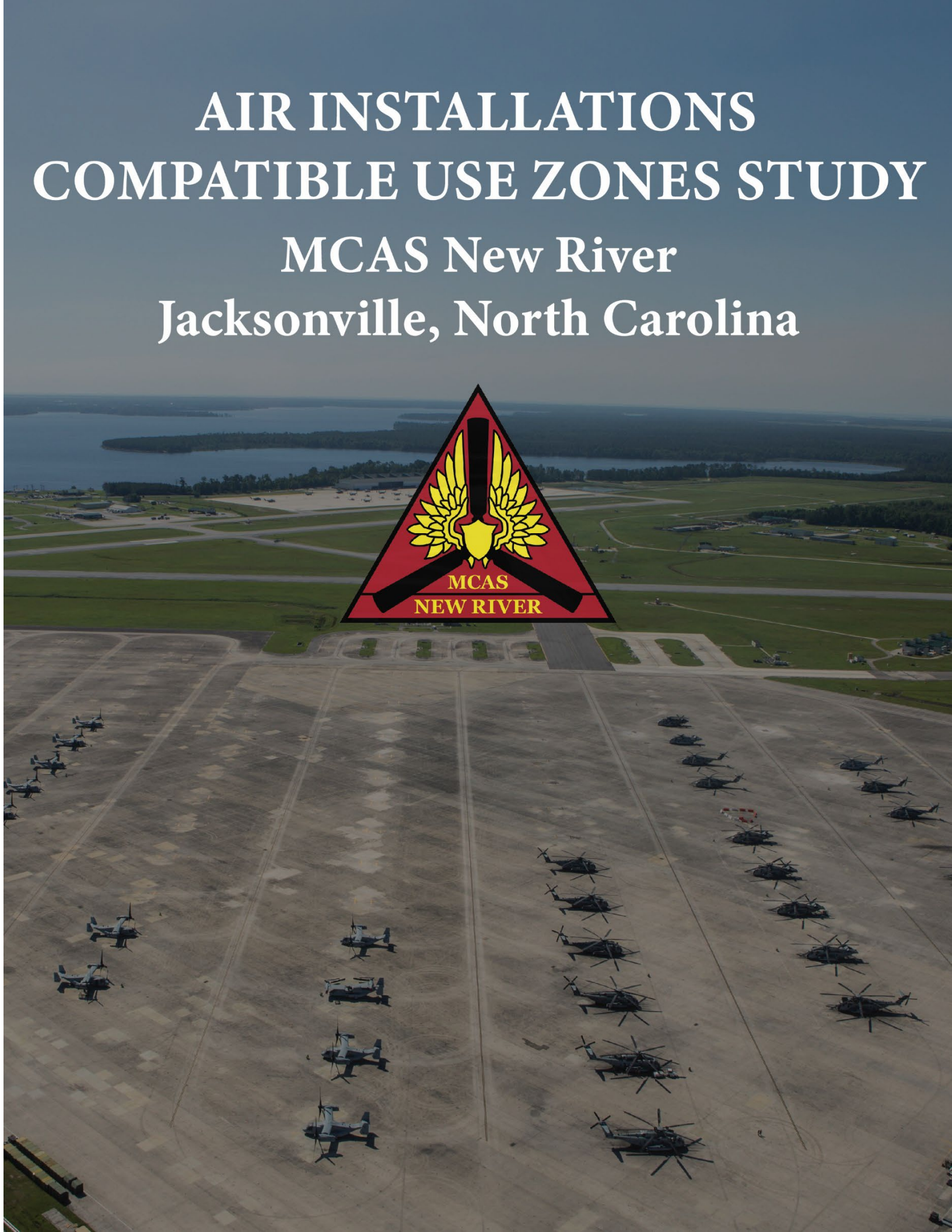
AIR INSTALLATIONS COMPATIBLE USE ZONES STUDY

MCAS New River

Jacksonville, North Carolina



This AICUZ Study has been redacted for Controlled Unclassified Information (CUI).
To request the full AICUZ Study please send a written request to:
Commander (Attn: CP&LO)
Marine Corps Air Station New River
PSC Box 21001
Jacksonville, N.C. 28545-1001

Air Installations Compatible Use Zones Study for Marine Corps Air Station New River North Carolina

June 2011

Prepared by:

UNITED STATES DEPARTMENT OF THE NAVY
Naval Facilities Engineering Command
Atlantic Norfolk, Virginia

Air Installations Compatible Use Zone Study
MCAS New River
Jacksonville, North Carolina
June 2011

Installations and Operations

The Installation's history dates back to World War II.

- **1941 -** The history of MCAS New River began in 1941 when farmland was purchased by the U.S. government to build a military airfield. The airfield was placed under the command of MCB Camp Lejeune and received its first squadron in 1943.

- **1944 -** The airfield was officially commissioned as Peterfield Point, delineating the airfield from MCB Camp Lejeune.

- **1951 -** The airfield was briefly closed after World War II, but it was reopened in 1951 as Marine Corps Air Facility Peterfield Point, Camp Lejeune.

- **1952 -** The facility was renamed Marine Corps Air Facility New River.

- **1968 -** The facility was designated Marine Corps Air Station (Helicopter) New River and became a major operational Marine Corps facility.

- **1972 -** A major Marine Corps reorganization occurred, and the station's airfield was named McCutcheon Field in honor of Brigadier General Keith B. McCutcheon. Since that time, MCAS New River has operated as a major Marine Corps rotary-wing and tilt-rotor operational facility.

MCAS New River is located on the south bank of the New River, in eastern North Carolina, approximately 3 miles south of downtown Jacksonville, the county seat of Onslow County. The air station is comprised of approximately 3,728 acres within the northwestern portion of the larger 129,899-acre MCB Camp Lejeune complex.

Class A Runways
Class A fixed-wing runways are used primarily by light aircraft and are not used intensively by heavy or high-performance aircraft. Typically, less than 10% of all operations involve heavy (e.g., C-130) or high-performance (e.g., F/A-18) aircraft.

MCAS New River's airfield, McCutcheon Field, is 26 feet above mean sea level (MSL). The airfield consists of two asphalt runways, 05/23 and 01/19. Runway 23 is the primary calm wind runway. MCAS New River's runways are designated as Class A fixed-wing runways, and they are also used by rotary-wing and tilt-rotor aircraft.

Mission of MCAS New River

The mission of MCAS New River is to "maintain and operate facilities and provide services and material to support ground combat forces located at MCB Camp Lejeune and perform such other air operations as

requested." The station is the premier Marine Corps helicopter operating facility on the East Coast. Several major tenants of the air station conduct predominantly rotary-wing and tilt-rotor operations, including units of the 2nd Marine Aircraft Wing (MAW), Marine Air Group (MAG) 26 and MAG 29, and their subordinate aircraft squadrons.

Both MAGs provide direct aircraft support to U.S. Marine Corps Forces Command in the form of troop transport, observation, heavy lift capability, command and control, and light attack. Other major commands include Marine Corps Air Station Headquarters and Headquarters Squadron (H&HS), Marine Wing Support Squadron 272, Marine Air Control Squadron 2, the U.S. Air Force's 360th Training Squadron Operating Location "B," Marine Aviation Training Systems Site (MATSS) New River, and Marine Aviation Logistics Squadron (MALS) 26 and MALS 29.

Aircraft Types

MCAS New River is utilized primarily by rotary-wing and tilt- rotor aircraft. Below is a representation of some of the aircraft that are proposed to operate at MCAS New River.

Rotary-wing Aircraft

CH-53E Super Stallion

The Super Stallion is the largest helicopter in the U.S. military inventory. It is used by the Marine Corps to transport personnel and equipment and heavy-lift external loads. With its maximum lift capability of 16 tons, the CH-53E is the only helicopter capable of lifting some of the Marine Corps' new weapon systems, including the M-198 Howitzer and the variants of the Light Armored Vehicle.

AH-1W Super Cobra

The Super Cobra is a day/night marginal weather Marine Corps attack helicopter that provides enroute escort for assault helicopters and their embarked forces. It has an air-to- air and precision guided munitions capabilities. The primary mission of the AH-1W aircraft is as an armed tactical helicopter capable of close air support, low-altitude and high-speed flight, target search and acquisition, reconnaissance by fire, multiple weapons fire support, troop helicopter support, and point target attack of threatening armor.

UH-1N Huey

The UH-1Ns are widely used in transport, airborne battlefield command and control, troop insertion/extraction, fire support coordination, medical evacuation, search and rescue, armed escort/visual reconnaissance, and utility roles throughout the Navy and Marine Corps. The Huey provides utility combat helicopter support to the landing force commander during ship-to-shore movement and in subsequent operations ashore.

Tilt-rotor Aircraft

MV-22B Osprey

The Osprey is a joint-service, multi-mission, tilt-rotor aircraft with vertical take-off and landing capability. It performs vertical take-off and landings as effectively as a conventional helicopter and has the long-range cruise abilities of a twin-turboprop aircraft. It is an assault transport for troops, equipment, and supplies and is capable of operating from ships or from expeditionary airfields ashore. The Osprey replaced the CH-46E at MCAS New River and has a greater range, speed, ceiling, and payload than its predecessor.

Fixed-wing Aircraft

UC-12B Huron

The UC-12B is the U.S. Navy/Marine Corps version of the King Air A200C, a twin-turboprop, fixed-wing aircraft. The basic mission of the UC-12B aircraft is to provide on-call 24-hour, 7-day-a-week transportation of passengers and/or light cargo. The UC-12B will be upgraded to the UC-12W at MCAS New River beginning in 2011.

AICUZ Program

Historically, most military installations were in rural areas, distant from populated and urbanized areas. Over time, however, many of the communities in the vicinity of these installations have grown in terms of population and urban development. As development occurs near and around military bases, more people are exposed to noise and other impacts associated with aircraft and other military operations, resulting in pressures to modify operations, relocate, or even close a military installation. This conflict between urban development and military aircraft and operations is called encroachment.

The AICUZ Program was established in 1977 by the DoD in response to growing incompatible urban development (encroachment) around military airfields. The purpose of the AICUZ Program is to promote compatible development between air installations and neighboring communities by:

- Protecting the health, safety, and welfare of those living and working near military air installations.
- Protecting the Navy and Marine Corps installation investment by safeguarding the installation's operational capabilities.
- Minimizing noise impacts caused by aircraft operations while meeting operational, training, and flight safety requirements on and in the vicinity of the air installation, and
- Informing the public about the AICUZ Program and seeking cooperative efforts to minimize noise and aircraft accident potential and promote land uses that are compatible with aircraft operations.

Encroachment
Encroachment refers to factors that degrade or have the potential to degrade the mission capability of a Marine Corps installation, operational range, training area, associated special use airspace, sea space, radio frequency spectrum and other locations where the Marine Corps conducts current and plans future military testing, training, and general mission activities (U.S. Marine Corps 2010a).

AICUZ studies are updated when an air installation experiences, or is expected to experience, a significant change in aircraft operations (e.g., number of takeoffs and landings), a change in the type of aircraft stationed and operating at the installation, or changes in flight paths and procedures. This study updates the MCAS New River 2001 AICUZ study (U.S. Marine Corps 2001) and has been prepared to address the reasonably foreseeable changes in projected aircraft operational levels, aircraft mix, and flight tracks that can be expected to occur within the next 10- to 15-year planning period. This AICUZ study considers current and projected future changes to aircraft operations at MCAS New River, including:

- New rotary-wing squadrons associated with the U.S. Marine Corps initiative;
- Increased MV-22B Osprey training operations;
- Introduction of the Joint Strike Fighter (F-35B); and
- Establishment of the U.S. Marine Corps' Forces Special Operations Command (MARSOC) at MCB Camp Lejeune.

Projections of aircraft operations are based upon currently available estimates of future mission requirements within the next 10- to 15-year planning period. The projected average number of future operations at MCAS New River, including arrivals, departures, overhead arrivals, and pattern operations, is 92,711 per year.

Aircraft Mix, MCAS New River (2009)

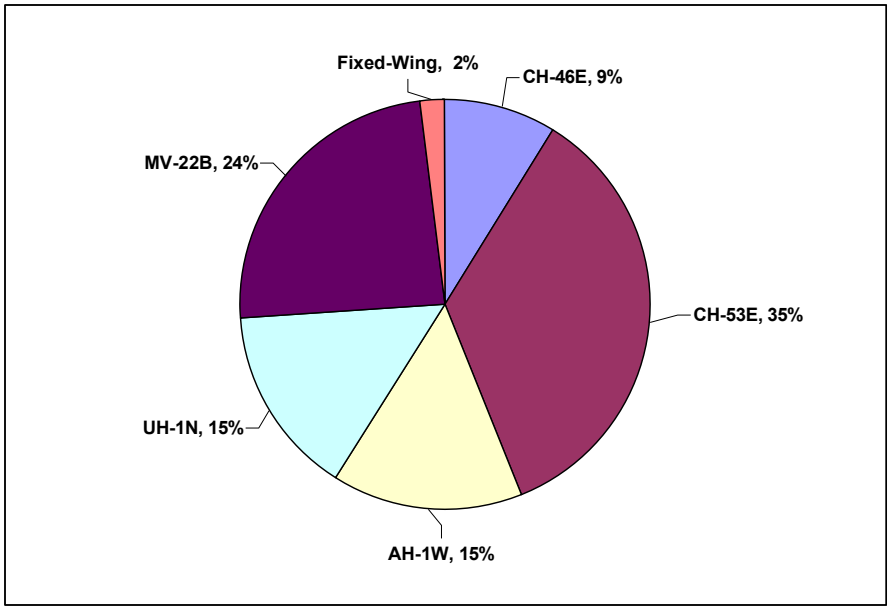


Figure 1.
Source: Wyle 2008
Note: At the time of the noise study (2008), two squadrons of CH-46E aircraft were still stationed at MCAS New River. They have since been replaced by MV-22B aircraft.

Aircraft Noise

The identification of areas impacted by aircraft noise is a critical factor when planning land uses in the vicinity of air facilities. Because the noise from aircraft operations can significantly impact areas surrounding an installation, MCAS New River has prepared noise exposure contours that define land areas adjacent to the airfield that may experience noise impacts.

All sounds come from a sound source. It takes energy to produce this sound, and this energy is transmitted through the air in sound waves. These sound waves impinge upon our ears, creating the sound we hear. Unwanted sound is defined as noise. In this study, all sound or noise levels are measured in A-weighted decibels (dBA), which are units of sound pressure adjusted to the range of human hearing.

A-weighted Decibel
Places a greater emphasis on frequencies that are detected by people with a normal auditory range by de-emphasizing the very low and very high frequency components of sound.

The noise exposure from aircraft at MCAS New River, as with other military installations, is measured using the day-night average sound level noise metric (DNL). The DNL metric, established in 1980 by the Federal Interagency Committee on Urban Noise (FICUN), presents a reliable measure of community sensitivity to aircraft noise and has become the standard metric used in the United States (except California, which uses a similar metric, the Community Noise Equivalent Level).

The DNL, expressed in decibels, represents the average sound exposure during a 24-hour period and does

not represent the sound level for a specific noise event. The DNL also incorporates an additional 10 decibels to events occurring between 10 p.m. and 7 a.m. This 10 decibel "penalty" represents the added intrusiveness of sounds occurring during normal sleeping hours, both because of the increased sensitivity to noise during those hours and because ambient sound levels at night are typically lower. Scientific studies and social surveys conducted to evaluate community annoyance from many types of environmental noise have found the DNL to be the best measure of that annoyance.

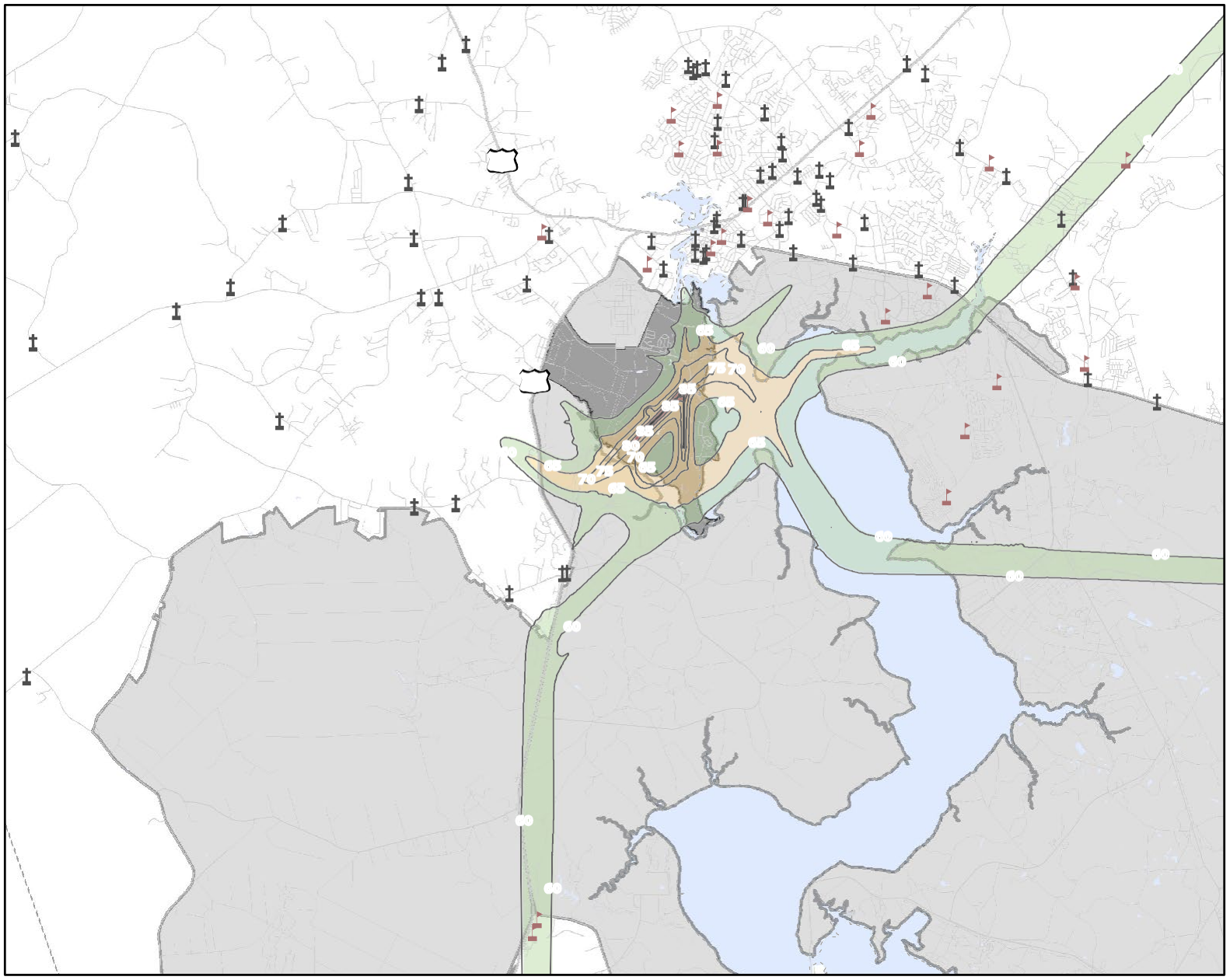
Noise Exposure Contours

In support of this AICUZ study, a noise study was conducted to define noise exposure contours at MCAS New River. The noise exposure contours were prepared using NOISEMAP, a widely accepted computer model that projects noise impacts around military airfields.

Using NOISEMAP, the Marine Corps models noise exposure contours based on prospective aircraft activity at the installation and site-specific operational data such as flight tracks, type and mix of aircraft, aircraft profiles (airspeed, altitude, power settings), and frequency and times of operations. The noise exposure contours graphically illustrate where aircraft noise occurs in and around an airfield and at what sound level. The contours generally follow the flight paths of aircraft.

The noise contours are depicted in 5-dBA increments (60, 65, 70, 75, 80, and 85 DNL). The DNL is depicted visually as a noise exposure contour that connects points of equal value. For land use planning purposes, the contours are divided into the following three noise zones:

- Noise Zone 1 (64 DNL and below) 1 – Generally considered an area of low or no noise impact;
- Noise Zone 2 (65 to 74 DNL) – An area of moderate impact requiring some land use controls; and
- Noise Zone 3 (75 DNL and above) – The most severely impacted area and requiring the greatest degree of land use control.


MCAS
NEW RIVER
Figure 2
2011 AICUZ
Noise Exposure Contours
MCAS New River, NC
Church
Public School
2011 AICUZ
Noise Contour
Water Bodies
Noise Zone
Zone 1
Zone 2
Zone 3
MCAS New River
MCB Camp Lejeune
Source:
ESRI, 2005;
MCAS New River, 2008;
USMC GEOFidelis
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Miles

For purposes of analysis in the AICUZ study, Noise Zone 1 is analyzed between the 60 to 64 DNL noise contours

The 2011 AICUZ noise exposure contours for MCAS New River are shown on Figure 2. The contours are located primarily within the boundaries of MCAS New River and MCB Camp Lejeune or overlie the New River, a natural water body. Three arms of the 2011 AICUZ noise exposure contours, encompassing approximately 2,594 acres, extend outside of the MCAS New River and MCB Camp Lejeune property line. The majority of the noise exposure contours located off-base, encompassing approximately 2,572 acres, are within the 60 to 64 DNL noise zone (Noise Zone 1). A smaller portion, encompassing approximately 22 acres, is within the 65 to 70 DNL noise zone contour (a portion of Noise Zone 2). No noise contour greater than 70 DNL has been identified outside of the MCAS New River and MCB Camp Lejeune property line.

Noise Complaints

Aircraft noise has the potential to impact the quality of life of those experiencing it and can become a major compatibility issue for an air station and the surrounding community. Individual response to noise levels varies and is influenced by many factors, including:

- Activity the individual is engaged in at the time of the noise event;
- General sensitivity to noise;
- Time of day;
- Length of time an individual is exposed to noise;
- Predictability of noise; and
- Weather conditions.

To mitigate adverse noise conditions, MCAS New River continually reviews its airfield operating activities with the aim of minimizing potential noise impacts on the surrounding community. If noise concern arises, members of the public may contact MCAS New River Operations at 910-449-0529 or via email at nrnoisecomplaints@usmc.mil to report a concern. MCAS New River Operations personnel are responsible for collecting, documenting, and researching noise complaints. All noise complaints are investigated by the MCAS New River Operations personnel, and corrective actions are taken, as appropriate. Noise complaint procedures for MCAS New River are established in ASO P3710.7T, Marine Corps Air Station New River Air Operations Manual.

Noise Abatement Procedures at MCAS New River

In recognition of community response to aircraft noise, MCAS New River actively employs operational measures to reduce noise to the extent practicable, commensurate with safety and operational training requirements. Noise abatement procedures are contained in ASO P3710.7T, Marine Corps Air Station New River Air Operations Manual (U.S. Marine Corps 2009). The manual establishes the rules and regulations that apply to aircraft operating in the airspace under the control and cognizance of MCAS New River and vehicle operations on the airfield movement areas (e.g., runway, taxiways). The following are operational noise abatement procedures that have been adopted at MCAS New River:

- Pilots operating from MCAS New River shall be sensitive to the effects of noise on the surrounding communities and take all steps necessary to reduce aircraft noise and minimize annoyance experience by persons on the ground. It is not enough that the pilot is satisfied that persons/property are not endangered. Pilots shall make a definite effort to fly in a manner such that individuals on the ground do not believe they or their property is endangered.

- Pilots shall avoid overflight of populated areas to the maximum extent practicable. When overflying populated areas, pilots shall maintain a minimum altitude of 1,000 feet AGL unless the local course rules specify a lower altitude.

- ATC shall not authorize close-in downwind patterns after sunset.
- ATC shall not authorize use of the local traffic pattern after 11 P.M.

Accident Potential Zones

In the 1970s, the DoD conducted a tri-service study of historic aircraft accident data to identify accident potential in the areas surrounding military airfields. The study found that more aircraft mishaps occur on or near the runway or along the centerline of the runway, diminishing in likelihood with distance. Based on the study, the DoD established APZs. An APZ is a ground area where an aircraft accident is more likely to occur (if one were to occur). The APZs do not predict the probability of an accident but define areas where land use activities should be restricted or limited to protect the public from potential aircraft mishaps. Restricting or limiting land use development in these areas does not provide complete protection from aircraft mishaps but does limit the potential consequences of such an event.

An APZ is comprised of three distinct components: a Clear Zone, APZ I, and APZ II. The size and application of APZs are determined by installation-specific operational considerations, including the following:

- Runway classification,
- Type and volume of flight operations,
- Aircraft traffic patterns (flight tracks), and
- Local command considerations.

While the likelihood of an aircraft mishap is very small, the Marine Corps has identified APZs around MCAS New River's airfield to assist in land-use planning. Based on this information, the Marine Corps recommends that land uses that concentrate large numbers of people (e.g., apartments, churches, schools) be located outside of identified APZs.

Aircraft APZs

Based on the runway classification, operational tempo, existing APZs, and local command considerations, Class A fixed-wing Runway APZs have been applied to MCAS New River's runways. Figure 3 illustrates the configuration of a standard Class A fixed-wing Runway APZ, which includes the following:

Clear Zone. Runway clear zones are areas on the ground located at the ends of each runway. The clear zone is the area with the greatest potential for the occurrence of an aircraft mishap. For this reason, and to protect aircraft operations, a clear zone should remain undeveloped. The clear zone is required for all active runway ends.

For U.S. Navy and Marine Corps installations, a standard Class A clear zone is 3,000 feet long and 1,000 feet wide.

APZ I. APZ I is an area on the ground located beyond the clear zone of the runway. The area has a potential for accidents, and development in these areas should be restricted.

A Class A APZ I is 2,500 feet long and 1,000 feet wide and may be either rectangular or curved to conform to the shape of the predominant flight track.

APZ II. APZ II is an area on the ground located beyond APZ I (or the clear zone if APZ I is not used) that 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.

A Class A APZ II is 2,500 feet long and 1,000 feet wide and may be either rectangular or curved to conform to the shape of the predominant flight track.

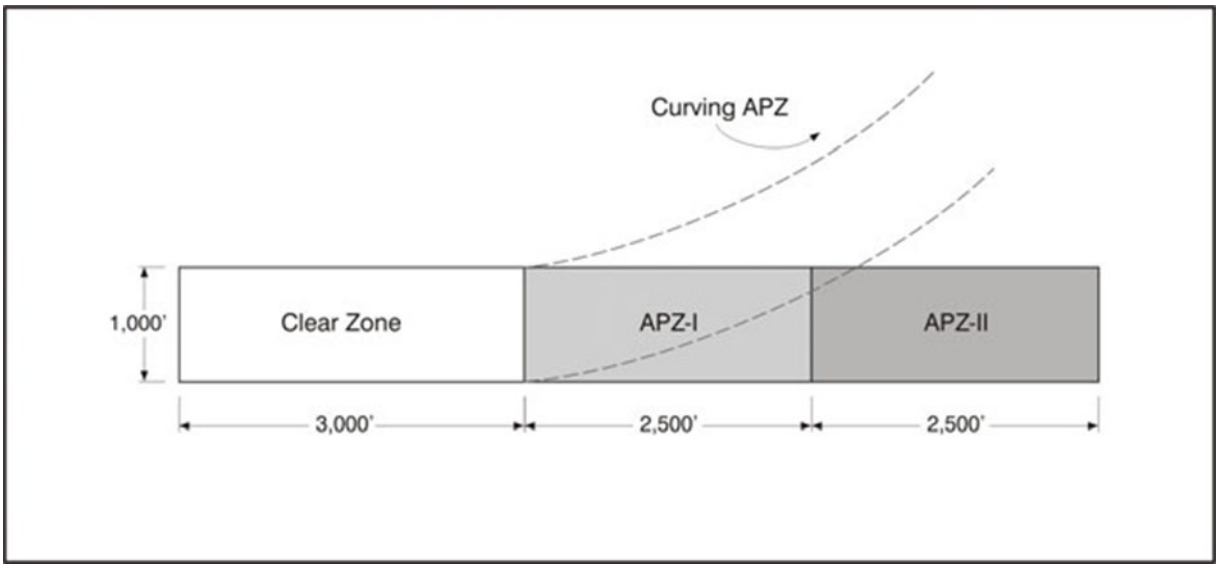
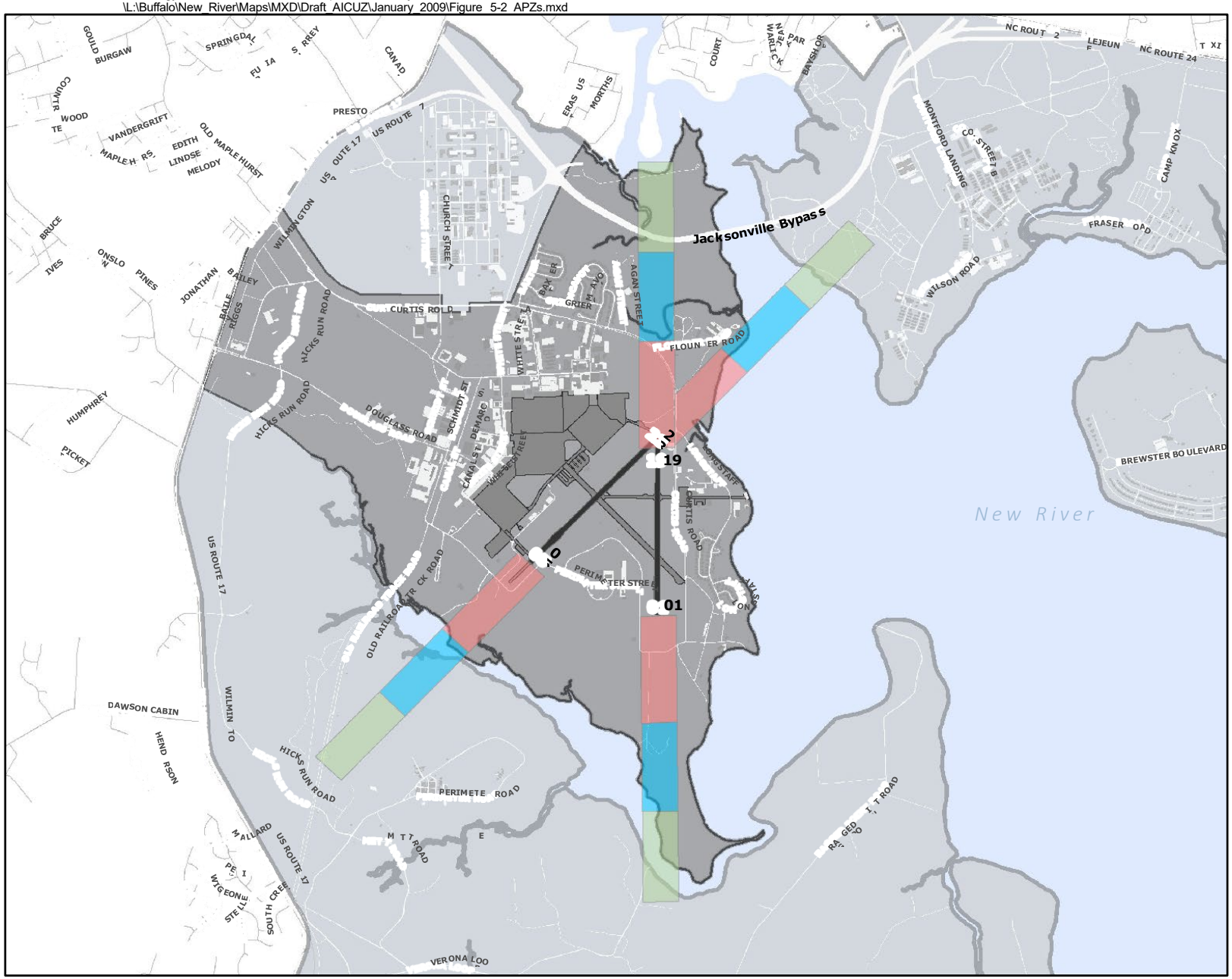


Figure 3. Standard Accident Potential Zones – Class A Fixed-wing Runway

The designated APZs for MCAS New River are illustrated on Figure 4 and are provided for general land-use planning purposes. The APZs comprise a total of 1,205 acres. MCAS New River's APZs, including clear zones, are mostly located within the boundaries of MCAS New River and MCB Camp Lejeune. The only exception is a 2.9-acre area located at the northern tip of Runway 19 APZ II. However, this small area is located over the New River, which is a water body and thus a compatible use for APZ II.



MCAS NEW RIVER

Figure 4
2011 AICUZ
Clear Zones and APZs
MCAS New River, NC

- Airfield Surface Area
- Water Bodies
- Runways
- MCAS New River
- MCB Camp Lejeune

2011 APZ

- Clear Zone
- APZ-I
- APZ-II

Source: Wyle, 2008.

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Miles

Imaginary Surfaces

In addition to the APZs, the FAA and the military have defined flight safety zones (imaginary surfaces) below aircraft arrival and departure flight tracks and areas surrounding the airfield. Imaginary planes and transition surfaces define the required airspace that must remain free of obstructions to ensure safe flight approaches, departures, and patterns. Obstructions may include natural terrain and man-made features (e.g., planted vegetation, buildings, towers, poles) and other vertical obstructions to airspace navigation. The flight safety zones are designed to minimize the potential harm if a mishap were to occur. The dimensions of the imaginary surface area for Class A fixed-wing runways are provided in Table 1. Figure 5 shows the composite imaginary and transitional surfaces at MCAS New River.

Table 1
Imaginary Surfaces – Class A Fixed-wing Runways

Planes and Surfaces	Geographical Dimensions
Class A	
Primary Surface	Aligned longitudinally with each runway. Extends 200 feet beyond the end of the runway and is 1,000 feet wide.
Clear Zone	Extends 3,000 feet beyond the end of the runway and is 1,000 feet wide. Also see Section 5.1.2.
Approach Surface	Longitudinally centered with the runway and extending beyond the primary surface.
Horizontal	Horizontal plane 150 feet above the established airport elevation. Constructed by swinging arcs around the end of the primary surface.
Conical Surface	20:1 slope surface extending beyond the horizontal surface.
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, extended at a slope of 7:1 from the sides of the primary surface and from the sides of the approach surfaces.
Source: U.S. Department of Transportation, Federal Aviation Administration 2006; U.S. Department of the Navy 1981.	

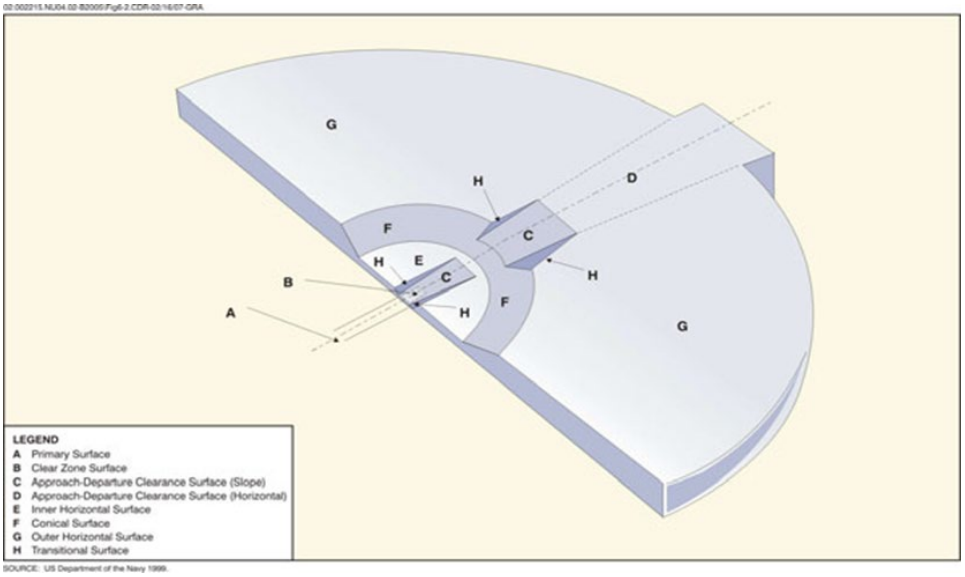

Figure 5. Imaginary & Transition Surfaces for Class A Fixed-wing Runways

Additional Hazards include:

- Uses that would attract birds, especially waterfowl
- Towers, structures, and vegetation that penetrate navigable airspace
- Lighting (direct or reflected) that would impair pilot vision
- Uses that would generate smoke, steam, or dust
- Electromagnetic interference (EMI) with aircraft communication, navigation, or other electrical systems

The FAA and DOD height standards are presented in the U.S. Code of Federal Regulations, Title 14, Part 77, "Objects Affecting Navigable Airspace". The FAA must be notified of any development that is inconsistent with height standards.

Land-Use Compatibility Guidelines and Classifications

The U.S. Marine Corps has developed land-use compatibility guidelines for noise zones and APZs. These recommendations, which are found in OPNAVINST 11010.36C/MCO 11010.16, Air Installations Compatible Use Zones Program, are intended to serve as guidelines for placement of noise zones and APZs and for development of land uses around military air installations (U.S. Navy 2008). The guidelines assume noise-sensitive land uses (e.g., houses, churches, schools) will be placed outside high-noise zones, and people-intensive uses (e.g., apartments, theaters) will not be placed in APZs. Certain land uses are considered incompatible with high-noise zones and APZs, while other land uses may be considered compatible. The land-use compatibility analysis conducted for MCAS New River was based on the Marine Corps' land-use compatibility recommendations, which are presented in Appendix A. In addition, Table 2 shows existing generalized land-use classifications and the associated land-use compatibility with each land use designation for noise zones and APZs.

Table 2
Land Use Classifications and Compatibility Guidelines

	Land Use Compatibility with Noise Zone (DNL)						Land Use Compatibility with APZs		
	Noise Zone 1		Noise Z	ne 2	Noise Zone 3				
	<65	65-84	85-88	70-74	75-79	>80	Clear Zone	APZ I	APZ II
Single-unit, detached (residential)									(1)
Apartment, walk-up (residential)									
Public Assembly									
Educational Services			(2)	(2)					
Business Services				(2)	(2)				(3)
Parks								(4)	(4)

Source: Adapted from OPNAVINST 11010.36C

Notes:
This generalized land use table provides an overview of recommended land use. To determine specific land use compatibility, see Appendix A.

(1) = Maximum density of1-2 dwellings per acre.
(2) = Land use and related structures generally compatible however, measures to achieve NLR 25 or 30 must be incorporated into design and construction of the structures.
(3) = Maximum Floor Area Ratio of 0.22 in APZ II
(4) = Facilities must be low intensity.

Key:
Compatible
Incompatible

'Path: L:\Buffalo\New_River\Maps\MXD\Draft_AICUZ\January_2009\Figure 6-5 Compatibility Concerns Rev03 Feb 2011.mxd

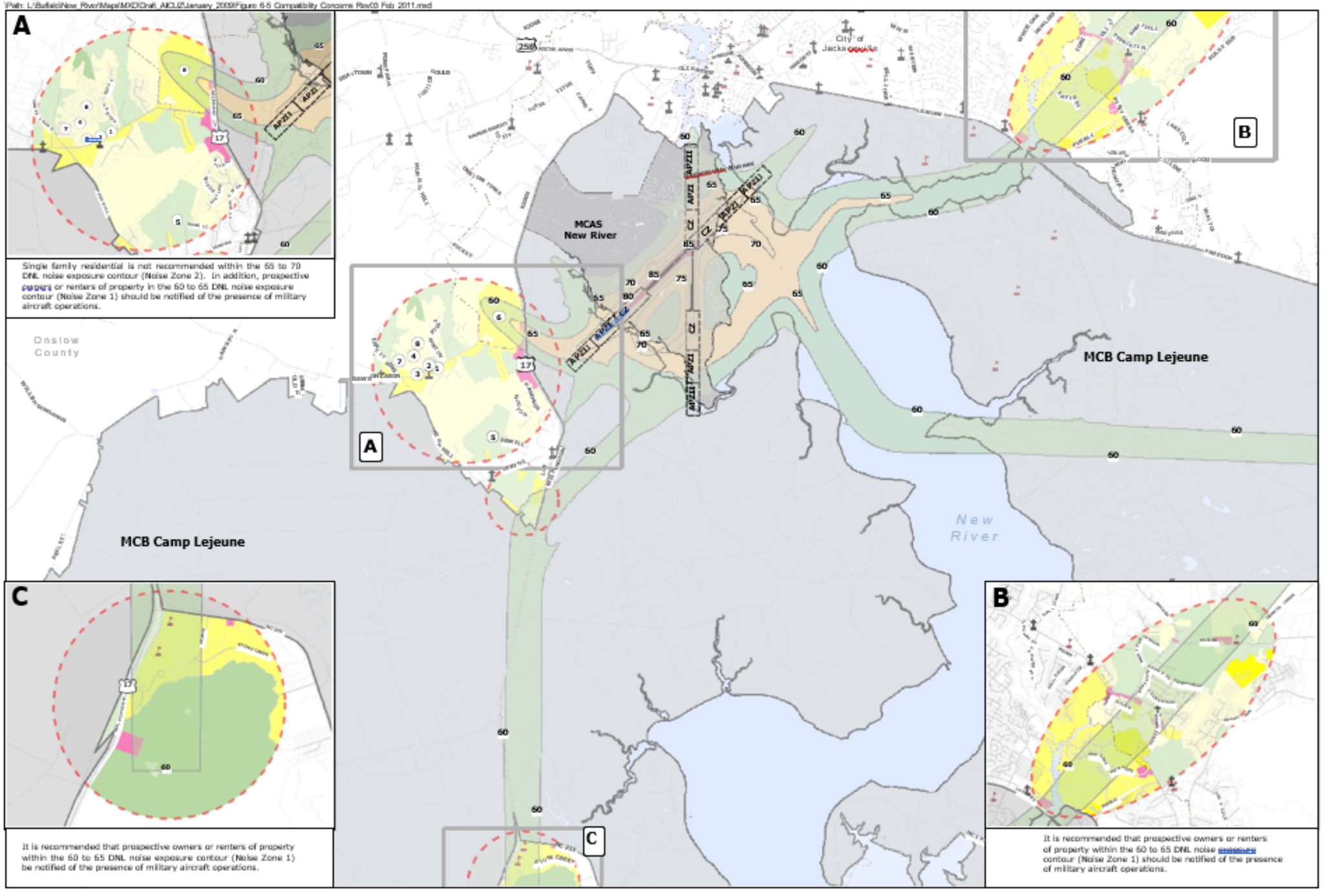

Figure 6

Compatibility Concerns
MCAS New River, NC

- Proposed Residential Subdivision
- Church
- Public School
- Accident Potential Zone
- 2011 AICUZ Noise Contour
- Areas of Concern
- Runways
- City Limits
- County Boundary

ZONE

- ZONE 1
- ZONE 2
- ZONE 3
- MCAS New River
- MCB Camp Lejeune

Zone Code

- Military Use
- Business Zone
- Residential Office
- Conservation
- Industrial
- Water
- Recreation
- Commercial
- Office and Institutional
- Mixed Use
- Low-Density Residential
- Medium-Density Residential
- High-Density Residential
- Rural Agricultural

Source: Onslow County, 2004
ESRI, [illegible]
MCAS New River, 2008;
[illegible]

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Miles

AICUZ Recommendations and Strategies

The goal of the AICUZ Program is to prevent land-use incompatibility, implement the AICUZ study recommendations, protect public health and safety, and safeguard the military's flying mission. Implementing the AICUZ Program at the local level and preventing incompatible land development is the responsibility of many, including the U.S. Marine Corps and Navy, local governments, private citizens, real estate professionals, and land use developers.

The following recommendations have been made to facilitate implementation of MCAS New River's AICUZ Program.

MCAS New River

Release of the AICUZ Study
This AICUZ study will be released to local and state governments and provided to community groups. The AICUZ Program is the installation's defining statement regarding the impact of missions on the surrounding community. In addition, information about the AICUZ Program will be posted on MCAS New River's public web site https://www.newriver.marines.mil/.

Successful implementation of the AICUZ Program depends on a close working relationship between the installation and community leaders. Efforts will be made to implement the AICUZ Program at the local level, including coordinating with federal, state, and local officials to maintain public awareness of the AICUZ Program and encourage land use that is compatible with aircraft operations. Efforts shall include:

- Cooperating in the Land Use Planning Process
- Community Outreach
- AICUZ Educational Programs
- Continue to Maintain the Noise Complaint Hotline
- Review Operational Alternatives in an effort to reduce noise and safety impacts

Local and State Governments

Local and State governments can work with the installation for successful implementation of the AICUZ Study through:

- Communication
- Adoption of AICUZ Study Recommendations
- Regulating Land Uses within Identified Noise Zones and APZs
- Local Development Reviews
- Capital Improvements
- Building Codes

Current Successes of the AICUZ since implementation

Flight Path Overlay District

Onslow County and the city of Jacksonville has developed and adopted as part of its zoning ordinance a Flight Path Overlay District (FPOD) for some lands neighboring the air station. The FPOD prohibits or restricts land use, development, or activities on lands under designated fixed-wing flight paths and rotary-wing landing areas in an effort to ensure compatibility between air operations and civilian development (Onslow County 2007, CoJ 2011).

Land use plans should consider:
- Accident potential zones (APZs)
- Noise Zones
- Military training routes
- Transportation needs
- Open space conservation
- Population growth

Real Estate Disclosure

Under the Residential Property Disclosure Act, the State of North Carolina requires owners of residential real estate (single-family homes, individual condominiums, townhouses, and the like, and buildings with up to four dwelling units) to furnish buyers a Residential Property Owners' Association Disclosure Statement. Sellers are required to disclose any noise, odor, smoke, etc. from military sources that affects the property.

Table 3
Responsibility for Compatible Land Uses

Marine Corps	■ Examine air mission for operational changes that could reduce impacts ■ Conduct noise and APZ studies ■ Develop AICUZ maps ■ Examine local land uses and growth trends ■ Make land-use recommendations ■ Release AICUZ study to public ■ Work with local governments and private citizens ■ Monitor operations and noise complaints ■ Update AICUZ studies, as required
Local Government	■ Incorporate AICUZ study recommendations into comprehensive development plans and municipal zoning ordinances ■ Regulate height and obstruction concerns through an airport ordinance ■ Incorporate sound insulation requirements in new construction building codes ■ Require fair disclosure in real estate for all buyers, renters, lessees, and developers
Private Citizens	■ Educate oneself on the importance of the installation's AICUZ Program ■ Identify AICUZ considerations in all property transactions ■ Understand AICUZ effects before buying, renting, leasing, or developing property
Real Estate Professionals	■ Ensure potential buyers and lessees receive and understand AICUZ information on affected properties ■ When working with builders/developers, ensure an understanding and evaluation of the installation's AICUZ Program
Builders/Developers	■ Develop properties in a manner that appropriately protects the health, safety, and welfare of the civilian population by constructing land-use facilities that are compatible with aircraft operations (e.g., sound attenuation features, densities, and occupations)

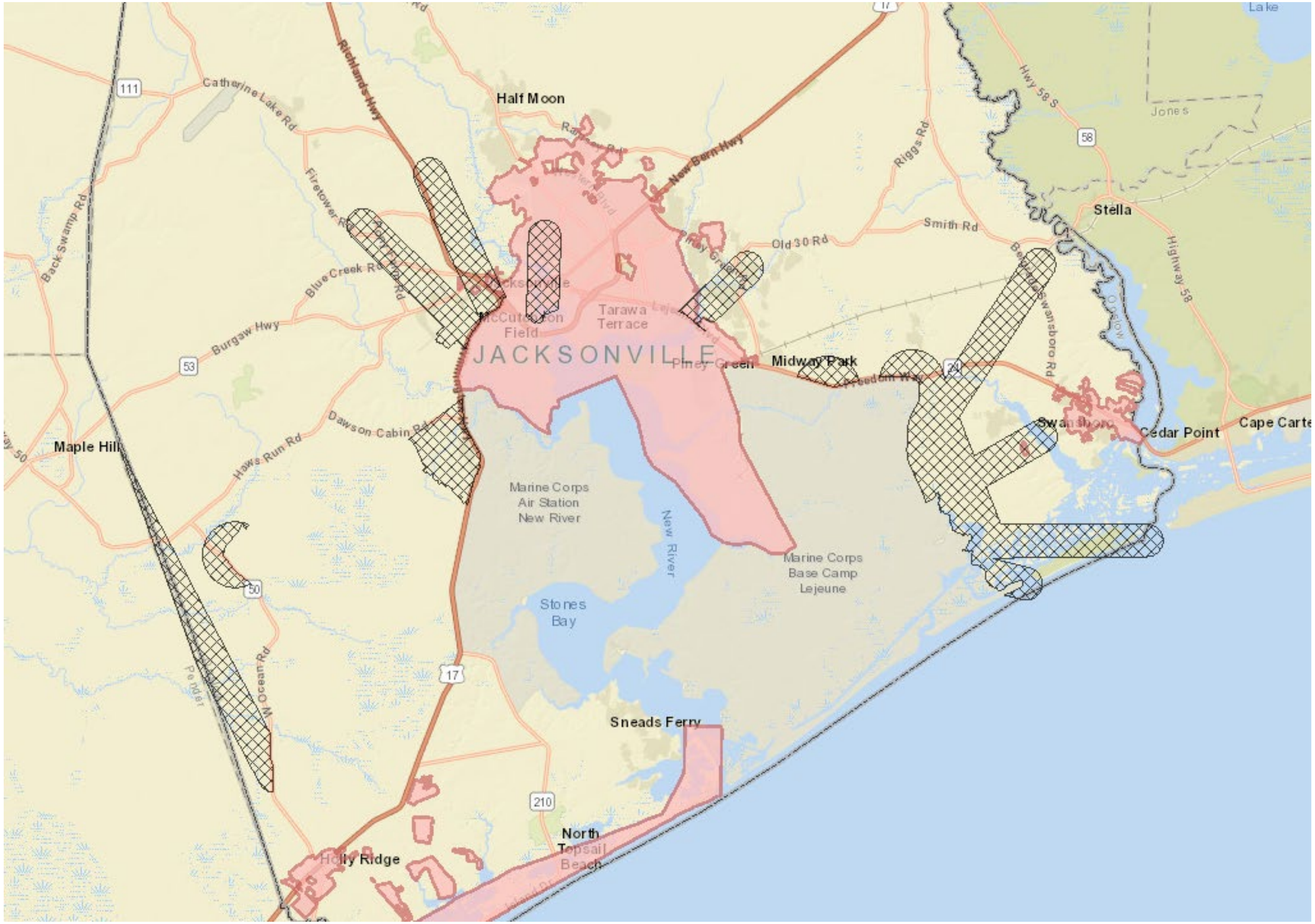

Figure 7

Flight Path Overlay District

MCAS New River

LAND USE COMPATIBILITY RECOMMENDATIONS IN NOISE CONTOURS AND APZS

Recommended Land Use Compatibility in Noise Contours.

a. Table 1 provides compatibility recommendations based on yearly DNL or CNEL on and around installations. The primary land use objective is to discourage noise-sensitive land uses in areas of higher noise exposure.

b. The table is organized based on Standard Land Use Coding Manual (SLUCM) categories; however, it varies from SLUCM as the coding system does not differentiate based on noise- sensitivity. Some uses warrant additional evaluation due to potential for annoyance and activity interference. General notes and specific footnotes at the bottom of the table provide additional information and considerations for compatibility determinations.

c. These recommendations are intended to support compatible land use planning both on and off base; they do not constitute a Federal determination that any use of land is acceptable or unacceptable under local zoning.

Table 4. Land Use Compatibility Recommendations In Noise Contours

LAND USE NAME & SLUCM CATEGORY	A-WEIGHTED DNL/CNEL LEVELS					
	<65 DB	65-70 DB	70-75 DB	75-80 DB	80-85 DB	85+ DB
RESIDENTIAL USE GROUP (SLUCM CATEGORY10)						
Residential uses, inclusive of all residential units i.e. any type of single or multiple dwelling units.	Y	N[1]	N[1]	N	N	N
Mobile home parks or courts	Y	N	N	N	N	N
Transient lodgings	Y	N[1]	N[1]	N[1]	N	N
MANUFACTURING USE GROUP (SLUCM CATEGORIES 20 & 30)						
Manufacturing and industrial uses	Y	Y	Y[2]	Y[3]	Y[4]	N
Precision manufacturing	Y	Y	Y[2]	Y[3]	N	N
TRANSPORTATION, COMMUNICATION AND UTILITIES USE GROUP (SLUCM CATEGORY 40)						
Rail, motor vehicle, aircraft, marine and other transportation and communication systems and utilities	Y	Y	Y[2]	Y[3]	Y[4]	N
Highway and street right-of-way, automobile parking	Y	Y	Y	Y	Y	N
Telephone, cellular and radio communication	Y	Y	Y[2]	Y[3]	N	N

LAND USE NAME & SLUCM CATEGORY	A-WEIGHTED DNL/CNEL LEVELS					
	<65 DB	65-70 DB	70-75 DB	75-80 DB	80-85 DB	85+ DB
TRADE (SLUCM CATEGORY 50)						
Wholesale trade	Y	Y	Y[2]	Y[3]	Y[4]	N
Building materials, hardware and farm equipment sales	Y	Y	Y[2]	Y[3]	Y[4]	N
Mass retailing, super stores, strip malls, shopping centers, discount clubs, home improvement stores, etc.; eating and drinking establishments	Y	Y	Y[2]	Y[3]	N	N
SERVICES (SLUCM CATEGORY 60)						
Finance, insurance and real estate, personal, professional and miscellaneous services; religious activities	Y	Y	Y[2]	Y[3]	N	N
Cemeteries	Y	Y	Y[2]	Y[3]	Y[4]	Y[5]
Warehousing/storage & repair services	Y	Y	Y[2]	Y[3]	Y[4]	N
Hospitals/medical, child care & development services, educational facilities	Y	Y[2]	Y[3]	N	N	N
Nursing homes	Y	N[1]	N[1]	N	N	N
Governmental	Y	Y	Y[2]	Y[3]	N	N
CULTURAL, ENTERTAINMENT AND RECREATIONAL (SLUCM CATEGORY 70)						
Cultural activities, auditoriums & concert halls	Y	Y[2]	Y[3]	N	N	N
Nature exhibits	Y	Y	N	N	N	N
Public assembly	Y	Y	N	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Outdoor sports arenas, spectator sports	Y	Y[6]	Y[6]	N	N	N
Amusements	Y	Y	Y	N	N	N
Outdoor recreational activities	Y	Y	Y[2]	Y[3]	N	N
Resorts, camps, parks & other c/e/r activities	Y	Y	Y[2]	N	N	N
RESOURCE PRODUCTION AND EXTRACTION (SLUCM CATEGORY 80)						
Agriculture and forestry	Y	Y[7]	Y[8]	Y[9]	Y[9]	Y[9]
Livestock farming, animal breeding	Y	Y[7]	Y[8]	N	N	N
Fishing, mining and other resource production or extraction	Y	Y	Y	Y	Y	Y

KEY TO TABLE 4

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

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

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

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

GENERAL NOTES FOR ALL USES:

a. Compatibility designations in Table 1 generally refer to the principal use of the site. If other uses with greater sensitivity to noise are proposed, a determination of compatibility should be based on that use which is most adversely affected by noise and its contribution to the successful use of the property.

b. Where a proposed development falls within two DNL and CNEL noise zones, the land use recommendations of the higher noise should be used. For example, if a proposed development is exposed to 70 dB DNL and CNEL, land use recommendation s for the 70-75 DNL and CNEL noise zones should be applied.

c. When appropriate, noise level reduction (NLR) may be necessary to achieve compatibility. NLR (outdoor to indoor) is achieved through the incorporation of sound attenuation into the design and construction of a structure. Measures to achieve an indoor noise reduction do not necessarily solve noise issues outside the structure and additional evaluation may be warranted. Building location, site planning, design and use of berms and barriers can help mitigate outdoor noise exposure, particularly from aircraft ground maintenance run-ups. Measures that reduce noise at a site should be used wherever practical in preference to measures that only protect interior spaces.

d. Land uses below 65db DNL are generally compatible. However, localities, when evaluating the application of these guidelines, should consider possible annoyance tied to land uses that involve predominately outdoor activities or where quiet is a basis for the use.

e. Land use that involves outdoor activities in areas above 80db DNL are not recommended.

FOOTNOTES SPECIFIC TO CERTAIN USES:

1. Residential

a. Although local conditions regarding the need for housing may require residential use in these zones, residential use is discouraged in DNL 65-70 and strongly discouraged above DNL 70. The absence of viable alternative development options should be determined and an evaluation should be conducted locally prior to local approvals. These evaluations should clearly demonstrate that the community's need for additional residential property could not be met if development were prohibited in these zones and that the expense of additional noise attenuation will not undermine affordable housing goals.

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 65-70 and 30 dB in DNL 70-75 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 75-80.

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.

2. Measures to achieve NLR of 25 dB 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 dB 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 dB 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. Buildings where public is received, are not recommended.

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

7. Where residences are permitted, measures to achieve outdoor to indoor NLR of at least 25 dB should be incorporated into the design.

8. Where residences are permitted, measures to achieve outdoor to indoor NLR of at least 30 dB should be incorporated into the design.

9. Residences are not compatible.

Recommended Land Use Compatibility in APZs.

a. Table 2 provides compatibility recommendations based on historic aircraft mishap locations on or near air installations. The primary land use objective is to discourage people intensive land uses in areas of high accident potential.

b. While the table uses Standard Land Use Coding Manual categories for organization, it varies from SLUCM as the coding system does not differentiate based on population density. Some uses warrant additional evaluation due to the variation of densities of people, intensity of use or other characteristics that could impact safety of flight. Floor area ratio (FAR) recommendations are included within the table to guide suggested maximum density for non- residential uses. General notes and specific footnotes at the bottom of the table provide additional information and compatibility considerations.

c. These recommendations are intended to support compatible land use planning both on and off base; they do not constitute a Federal determination that any use of land is acceptable or unacceptable under local zoning.

Table 5. Land Use Compatibility Recommendations In APZS

LAND USE NAME and SLUCM Category	CLEAR ZONE	APZ-I	APZ-II	MAXIMUM DENSITY
RESIDENTIAL USE GROUP (SLUCM CATEGORY 10)				
Residential uses, inclusive of all residential units i.e. any type of single or multiple dwelling units	N	N	Y[1,2]	Maximum density of 2 dwelling units per acre
Mobile home parks or courts	N	N	N	
Transient lodgings	N	N	N	
MANUFACTURING USE GROUP (SLUCM CATEGORIES 20 & 30)				
Food and kindred products; Textile mill products; manufacturing; Stone, clay, glass, primary metal and fabricated metal products; manufacturing	N	N	Y	Max FAR 0.56 in APZ II
Fabric products; leather and similar materials; chemicals and allied products; petroleum refining and related industries; Rubber and miscellaneous plastic products; manufacturing; Precision manufacturing	N	N	N	
Lumber and wood products; manufacturing furniture and fixtures; paper and allied products; printing, publishing and allied industries Miscellaneous manufacturing	N	Y	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II

TRANSPORTATION, COMMUNICATION AND UTILITIES USE GROUP (SLUCM CATEGORY 40)				
Rail, motor vehicle, aircraft, marine etc. transportation, Highway and street right- of-way, automobile parking and utilities, Telephone, cellular and radio communication	N[3]	Y[4]	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
Solid waste disposal, (landfills, incinerators, etc.)	N	N	N	
TRADE (SLUCM CATEGORY 50)				
Wholesale trade	N	Y	Y	Maximum FAR of 0.28 in APZ I & .56 in APZ II
Retail trade – building materials	N	Y	Y	Maximum FAR of 0.20 in APZ-I and 0.40 in APZ-11;
Retail trade – hardware, paint and farm equipment stores	N	Y	Y	Maximum FAR of 0.12 in APZ I and 0.24 in APZ II
Retail trade – including neighborhood centric shops	N	N	Y	Maximum FAR of 0.16 in APZ II
Mass retailing, super stores, strip malls, shopping centers[5], discount clubs, home improvement stores, etc.; Eating and drinking establishments[12]	N	N	N	
Retail trade – prepared and unprepared food such as groceries, bakeries, confectionaries, meat markets and fast food restaurants with drive-through service[12]	N	N	Y	Maximum FAR of 0.24 in APZ II
Retail trade – automotive, marine craft, aircraft and accessories	N	Y	Y	Maximum FAR of 0.14 in APZ I & 0.28 in APZ II
Retail trade – apparel and accessories, furniture, home, furnishings and equipment	N	N	Y	Maximum FAR of 0.28 in APZ II
Other retail trade	N	N	Y	Maximum FAR of 0.16 in APZ II

SERVICES (SLUCM CATEGORY 60)				
Finance, insurance, real estate, personal, professional and miscellaneous services (office uses only) services	N	N	Y	Maximum FAR of 0.22 in APZ II
Cemeteries	N	Y[6]	Y[6]	
Warehousing and storage services	N	Y	Y	Maximum FAR of 1.0 in APZ I; 2.0 in APZ II
Repair Services and contract construction	N	Y	Y	Maximum FAR of 0.11 APZ I; 0.22 in APZ II
Hospitals, nursing homes and other medical facilities; Educational services, Childcare services, child development centers and nurseries	N	N	N	
Government Services	N	N	Y	Maximum FAR of 0.24 in APZ II
CULTURAL, ENTERTAINMENT AND RECREATIONAL (SLUCM CATEGORY 70)				
Nature exhibits	N	Y[7]	Y[7]	
Cultural activities, auditoriums, concert halls, places of worship; Outdoor music shells, museums, outdoor displays, amphitheaters, sports arenas, spectator sports, resorts and group camps or other places of assembly	N	N	N	
Amusements – fairgrounds, miniature golf, driving ranges; amusement parks, etc.	N	N	Y[11]	50 people per acre
Recreational activities (including golf courses, riding stables, water recreation), parks	N	Y[7]	Y[7]	Maximum FAR of 0.11 in APZ I; 0.22 in APZ II
Other cultural, entertainment and recreation	N	Y[6]	Y[6]	
RESOURCE PRODUCTION AND EXTRACTION (SLUCM CATEGORY 80)				
Agriculture and Livestock farming, including grazing and feedlots	Y**[8]**	Y[8]	Y[8]	

Agriculture related activities	N	Y	Y	Maximum FAR of 0.28 in APZ I; 0.56 in APZ II
Forestry activities[9]	N	Y	Y	Maximum FAR of 0.28 in APZ I; 0.56 in APZ II
Fishing activities	N[10]	Y	Y	Maximum FAR of 0.28 in APZ I; 0.56 in APZ II
Mining activities	N	Y	Y	Maximum FAR of 0.28 in APZ I; 0.56 in APZ II
Other resource production or extraction	N	Y	Y	Maximum FAR of 0.28 in APZ I; 0.56 in APZ II
OTHER (SLUCM CATEGORY 90				
Undeveloped land	Y	Y	Y	
Water areas	N	N	N	

KEY TO TABLE 5

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

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

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

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

GENERAL NOTES FOR ALL USES:

a. The suggested maximum occupancy for commercial, service or industrial buildings or structures in APZ I is 25 people per acre and 50 people per acre in APZ II. 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.

b. Recommended FARs are calculated using standard parking generation rates from Institute of Transportation Engineers trip and parking generation guidance for various land uses, vehicle occupancy rates and desired density in APZ I and II. For APZ I, the formula is FAR = 25 people per 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)).

c. 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. For pilot and public safety, the Clear Zone is subject to the most severe restrictions.

d. Safety of flight should be considered when evaluating development that includes explosive potential; generates smoke, steam, ash or dust; and steam, creates electronic interference; lighting or glare; or tall structures.

e. 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 be analyzed for compatibility on a case-by-case basis that considers both the proposal and potentially affected mission.

f. Water features and other activities that may present bird/wildlife aircraft strike hazards or activities that produce dust or light emissions that could affect pilot vision are generally not compatible and should be evaluated on a case-by-case basis.

g. Evaluation of potential land management actions occurring on public and private lands, such as prescribed burns, should identify the hazard (i.e. visual impairment) to aircraft flight safety and to de-conflict operations occurring at the base (i.e. scheduled exercises and training requirements).

h. This compatibility table identifies places of worship and Tribal ceremonies as a cultural gathering. However, religious institutions provide a wide variety of services and in these instances refer to the applicable category.

FOOTNOTES SPECIFIC TO CERTAIN LAND USES:

1. 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.

2. Above ground passenger terminals and above ground power transmission or distribution lines are not recommended. Prohibited power lines include high-voltage transmission lines and distribution lines that provide power to cities, towns or regional power for unincorporated areas.

3. A shopping center is an integrated group of commercial establishments that is a 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. The maximum recommended FAR should be applied to the gross leasable area of the shopping center.

4. Land uses in the APZs should be passive open space; ancillary places of public assembly are not recommended.

5. Low occupancy facilities are compatible with these uses, however playgrounds and marinas are not recommended.

6. Activities that attract concentrations of birds creating a hazard to aircraft operations are not compatible.

7. Lumber and timber products removed due to establishment, expansion or maintenance of Clear Zone lands owned in fee will be disposed of per applicable DoD guidance.

8. Controlled hunting and fishing may occur for the purpose of wildlife management.

9. 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. Measures that reduce noise at a site should be used wherever practical in preference to measures that only protect interior spaces.

10. "Eating and drinking establishments" are distinguished from retail trade or fast food based on the predominant purpose of the restaurant to provide food and beverage to persons seated on premises. This includes cafes, tea rooms and outdoor cafes that involve low customer turnover and greater numbers of people dining on-site. Restaurants with drive-through service that offer quick, "fast-food" service, often accomplished by a limited menu of already prepared items and that have typically high customer turnover and lower numbers of customers dining on-site fall within the retail trade or fast food category.