FINAL

NOLF CABANISS AND NOLF WALDRON

Air Installations Compatible Use Zones (AICUZ)

Study September 2020

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MARY

EXECUTIVE SUMMARY

ES.1 INTRODUCTION

The United States Department of Defense (DOD)

initiated the Air Installations Compatible Use Zones (AICUZ) Program to assist governments and communities in identifying and planning for compatible land use and development near military installations. The goal of the AICUZ Program is to protect the health, safety, and welfare of the public while also protection the operational capabilities of the military. Today, the AICUZ Program is a vital tool the Navy uses to communicate with neighboring communities, government entities, and individuals regarding compatible land uses and development concerns.

This AICUZ was prepared for Naval Air Station Corpus Christi (NASCC) in accordance with federal regulations, guidelines, and Office of the Chief of Naval Operations Instruction (OPNAVINST 11010.36C) (referred to as AICUZ Instruction), and is an update to the 2009 AICUZ Study. The scope of this AICUZ Study includes NOLF Cabaniss and NOLF Waldron, which both support operations from NASCC. Since the 2009 AICUZ Study, there have been changes that necessitate an AICUZ update. These include changes to number of aircraft, types of aircraft, and operations, as well as changes in local land uses. Pursuant to Navy AICUZ Instruction, this 2020 AICUZ Study evaluates noise contours and accident potential zones (APZs) from the 2009 AICUZ Study, as well as the planning noise contours and APZs as a part of this 2020 AICUZ effort. Noise contours and APZs, together, are commonly called the "AICUZ footprint." The 2020 AICUZ footprint is based on total operations projected out to year 2030. Utilizing the 2020 noise contours and APZs, this AICUZ Study identifies areas of incompatible land use, and recommends actions to encourage compatible land use.

The NASCC complex includes the main airfield (Truax Field) and three outlying landing fields to support training operations: NOLF Waldron, NOLF Cabaniss, and NOLF Goliad. Both Truax Field and NOLF Waldron are located in the Flour Bluff area of Corpus Christi on the Encinal Peninsula. The peninsula is surrounded by the Corpus Christi Bay to the north, Laguna Madre to the east, and the Oso Bay to the west. NOLF Waldron is accessed by Waldron Road which connects to the main highway through Corpus Christi, South Padre Island Drive (also referred to as State Highway 358).

NOLF Cabaniss is located in the southside area of Corpus Christi along the Oso Creek. NOLF Cabaniss is accessed by Saratoga Boulevard and located just east of the Crosstown Expressway (State Highway 286), a major highway in Corpus Christi. Oso Creek is the southern boundary of NOLF Cabaniss and is also the boundary for the city limits of Corpus Christi. South of Oso Creek is unincorporated Nueces County. Figure 1-1
in Chapter 1, Introduction, provides a regional map of the Corpus Christi area and identifies the locations of Truax Field, NOLF Waldron, and NOLF Cabaniss.

NASCC is an aviation training installation with a mission to maintain and operate facilities, as well as to provide services and material to support operations of aviation activities and units within the operating forces of the Navy (NAVFAC n.d.). The overall command assignment is to train pilots.

ES.2 Aircraft Operations

AICUZ studies account for future missions and operations. As such, this 2020 AICUZ Study analyzes and presents two conditions for NOLF Cabaniss and NOLF Waldron. For NOLF Cabaniss, the two conditions are: (1) the 2009 noise contours and APZs, as presented in the 2009 AICUZ Study (Navy 2009); and (2) the 2020 operational data (including a 50 percent increase added to operational data for possible future operational increases [see Section 2.4.1, NOLF Cabaniss Annual Operations,

for additional information]). For NOLF Waldron, two conditions were also analyzed: (1) the 2009 noise contours and APZs, as presented in the 2009 AICUZ Study (Navy 2009); and (2) data derived from the 2018 operational data from the Environmental Assessment (EA) for Providing Outlying Field Capabilities to Support T-6 Undergraduate Pilot Training (see Section 2.4.2, NOLF Waldron Annual Operations, for additional information) for 2020 AICUZ operations.

Compared to the 2009 AICUZ Study, the number of total operations at NOLF Cabaniss has decreased by 25,032 (Table ES-1). The primary factors attributed to the decrease in operations are the reduction in pattern operations flown at the airfield and the removal of the UC-12 aircraft at NOLF Cabaniss. Alternatively, at NOLF Waldron, total operations increased by 64,804 when comparing to the 2009 operation levels (Table ES-1).

TABLE ES-1 COMPARISON OF 2009 AND 2020 AICUZ STUDY ANNUAL OPERATIONS AT NOLF CABANISS AND NOLF WALDRON

2009 AICUZ	**2020 AICUZ**
109,050	**84,018**
NOLF Waldron	
2009 AICUZ	**2020 AICUZ**
185,196	**250,000**

Sources: Navy 2009; BRRC 2020
Note:
See Chapter 2, Aircraft Operations, for more information on operations.

ES.3 AIRCRAFT NOISE

This 2020 AICUZ Study discusses noise associated with aircraft operations, including average noise levels, noise abatement/flight procedures, noise complaints, sources of noise, airfield-specific noise contours, and analysis of changes from the previous (2009 AICUZ) and planning (2020) noise contours.

The operational data used in this 2020 AICUZ Study for NOLF Cabaniss was collected, compiled, and input into computer models that graphically depict noise exposures as noise contours. NOISEMAP is the DOD standard model for assessing noise exposure from military aircraft operations

at air installations. Operational data used in this 2020 AICUZ Study for NOLF Waldron was collected from the 2018 EA for Providing Outlying Field Capabilities to Support T-6 Undergraduate Pilot Training. In support of the 2018 EA, a noise study was conducted where noise contours were generated based on the operational data.

Day-night average sound level (DNL) is depicted on a map as a noise contour that connects points of equal noise value. Contours are displayed in 5-decibel (dB) increments (i.e., 60, 65, 70, 75, 80, and 85 dB DNL). The 2020 noise contours for NOLF Cabaniss are contained within the airfield boundaries. The 2020 noise contours for NOLF Waldron overlay the area in the immediate vicinity of the airfield, with the vast majority of the higher noise contours concentrated within the airfield boundary. A comparison of the 2009 and 2020 AICUZ Study noise contours for NOLF Cabaniss shows some similarities in shape, general location, and DNL levels. The comparison also shows a decrease in overall size and coverage from the historical to the projected noise contours, as depicted in Figure 3-3 in Chapter 3, Aircraft Noise. At NOLF Waldron, a comparison of noise contours shows a decrease in overall size and coverage from the 2009 to the 2020 AICUZ Study noise contours, as depicted in Figure 3-6, also in Chapter 3, Aircraft Noise.

ES.4 AIRFIELD SAFETY

While the likelihood of an aircraft mishap is unlikely, accidents could occur. The Navy has designated areas with an accident potential based on historical data for aircraft mishaps near military airfields to assist in land use planning. APZs identify areas where an aircraft accident is most likely to occur if an accident were to take place. The APZs are not a prediction of accidents or accident frequency. When adopted by local planning authorities, APZs minimize potential harm to the public, pilots, and property if a mishap does occur by limiting incompatible uses in the designated APZ areas.

APZs follow departure, arrival, and pattern flight tracks. There are three types of APZs: the Clear Zone, APZ I, and APZ II. APZs extend from the end of the runway, but apply to the predominant arrival and/or departure flight tracks that the aircraft use. 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.

APZs in this 2020 AICUZ Study have been developed based on the projected aircraft operations (projected out to year 2030) for NOLF Cabaniss, and from the 2018 EA for Providing Outlying Field Capabilities to Support T-6 Undergraduate Pilot Training for NOLF Waldron.

The 2020 AICUZ Clear Zones and APZs for NOLF Cabaniss impact approximately 1,385.4 acres. Approximately 17 percent of the impacted areas are within the airfield boundary. The remaining 83 percent of

impacted areas are off-station. The coverage of the Clear Zones and APZs for NOLF Cabaniss increased from the 2009 to the 2020 AICUZ Study. The acreage increases are attributed, in part, to the closed loops of the APZs associated with Runway 18/36 and Runway 13. While some similarities exist in the structure of the 2009 and 2020 APZs, there are some key differences, including the addition of an APZ I and APZ II to the approach end of Runway 36.

Likewise, the 2020 AICUZ Clear Zones and APZs for NOLF Waldron impact approximately

1,572.2 acres. Approximately 15 percent of the impacted areas are within the airfield boundary. The remaining 85 percent of the impacted areas are off-station. The APZ coverage for the 2020 AICUZ Study increased, compared to the 2009 AICUZ Study. The acreage increases are largely attributed to the addition of the closed loop APZs associated with Runway 13/31 and 18/36. The 2020 APZs expanded when compared to the 2009 AICUZ APZs,
due to the projected increase in annual operations at NOLF Waldron. See Section 4.2.4, Comparison of Clear Zones and APZs For NOLF Waldron, for additional information.

ES.5 Land Use Compatibility Analysis

Successful AICUZ land use compatibility implementation is the collective responsibility of the Navy, state and local governments, and private sector and non-profit organizations. This AICUZ Study discusses federal, state, and local planning authorities, regulations, and programs that encourage compatible land use practices. Ultimate control over land use and development surrounding NOLF Cabaniss and NOLF Waldron is the responsibility of local governments and landowners, therefore, the Navy encourages local governments to plan for compatible development. In addition, the Navy focuses efforts on outreach and coordination with local jurisdictions to provide greater awareness and transparency of the operations in and around the airfields.

The AICUZ footprint (noise contours and APZs) of NOLF Cabaniss (Figure ES-1) is primarily located in Corpus Christi's city limits, as well as small areas of unincorporated Nueces County. The AICUZ footprint of NOLF Waldron (Figure ES-2) is located entirely within the Corpus Christi city limits. Corpus Christi land use planning programs, comprehensive plans, zoning codes, ordinances, and other authorities that have the potential to influence land use near the airfields are discussed as part of this AICUZ Study.

The AICUZ Study presents the land use compatibility analysis that identifies any existing or planned land use, zoning, and development compatibility issues, as well as to provide recommendations to manage existing and future development within and around the AICUZ footprint to ensure long-term land use compatibility between local land development and the Navy's operational mission. The 2020 AICUZ footprint is discussed further in Section 5, Land Use Compatibility Analysis.

The Navy has developed land use compatibility recommendations for noise zones and APZs to foster land use compatibility. For land use planning purposes in AICUZ studies, noise exposure areas are divided into three noise zones, based on DNL measurements. Noise Zone 1 (<65 dB DNL) is an area of low or no impact. Noise Zone 2 (65 to <75 dB DNL) is an area of moderate impact where some land use controls are recommended. Noise Zone 3 (≥75 dB DNL) is the most impacted area where the greatest degree of compatible land use controls are recommended. Likewise, recommended land use compatibility guidelines are established for Clear Zones, APZ I, and APZ II. AICUZ guidelines recommend that land uses that concentrate large numbers of people (e.g., apartments, churches, and schools) be avoided within the APZs.

This AICUZ Study addresses land use compatibility within aircraft noise zones and APZs at NOLF Cabaniss and NOLF Waldron by examining existing and future land uses near the airfields. To analyze whether existing and planned land uses are compatible with aircraft operations, the 2020 AICUZ noise contours and APZs were overlaid on parcel data and land use classification information.

The land use analysis was performed using the Navy's land use compatibility guidance and land use data from the City of Corpus Christi. Noise contours and/or APZs impact areas off the airfield in all directions. While the majority of the areas impacted are contained within the boundaries of the airfield, there are areas of residential development either currently located or planned for within certain APZs and noise zones.

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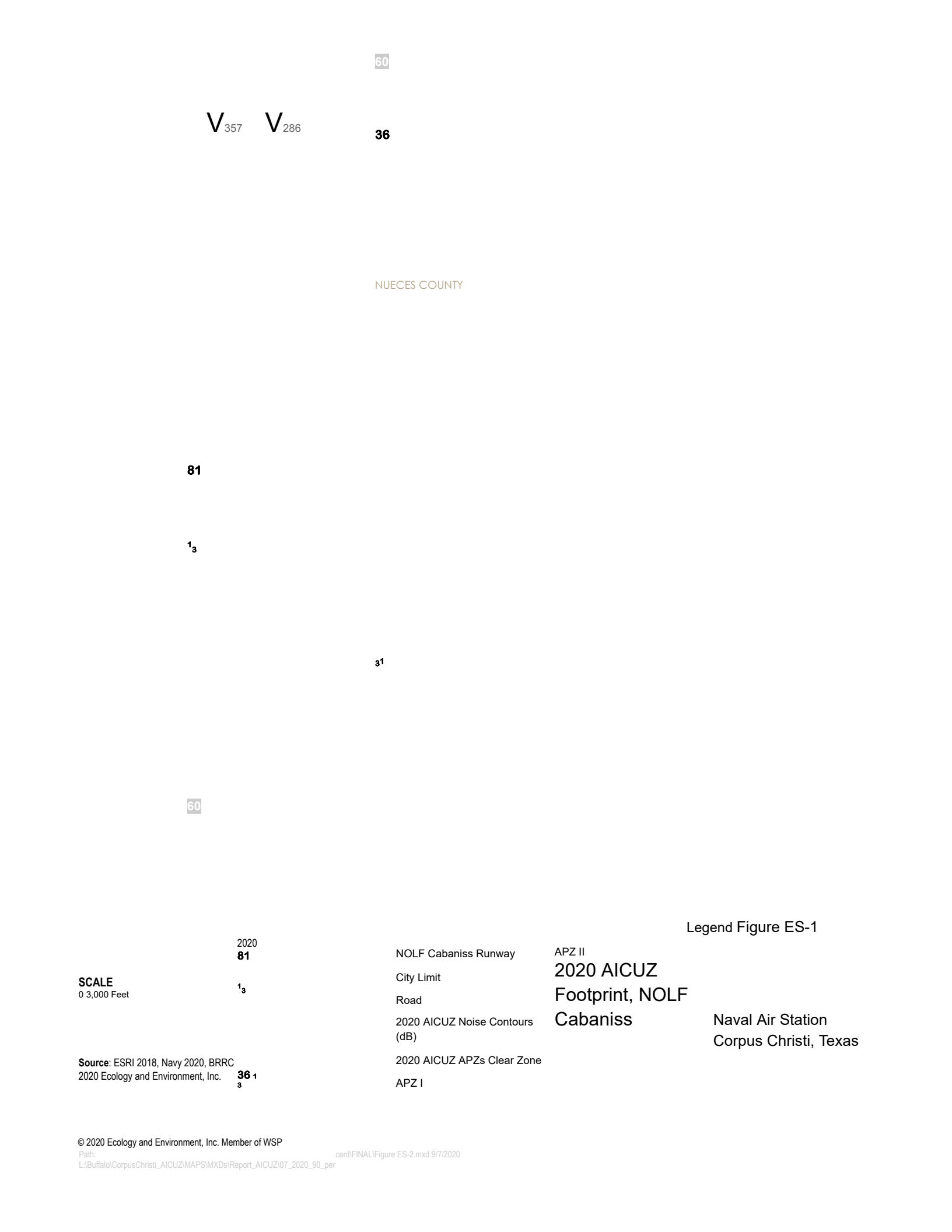
Christi

V 358

Map Extent
Corpus Christi Bay

Corpus



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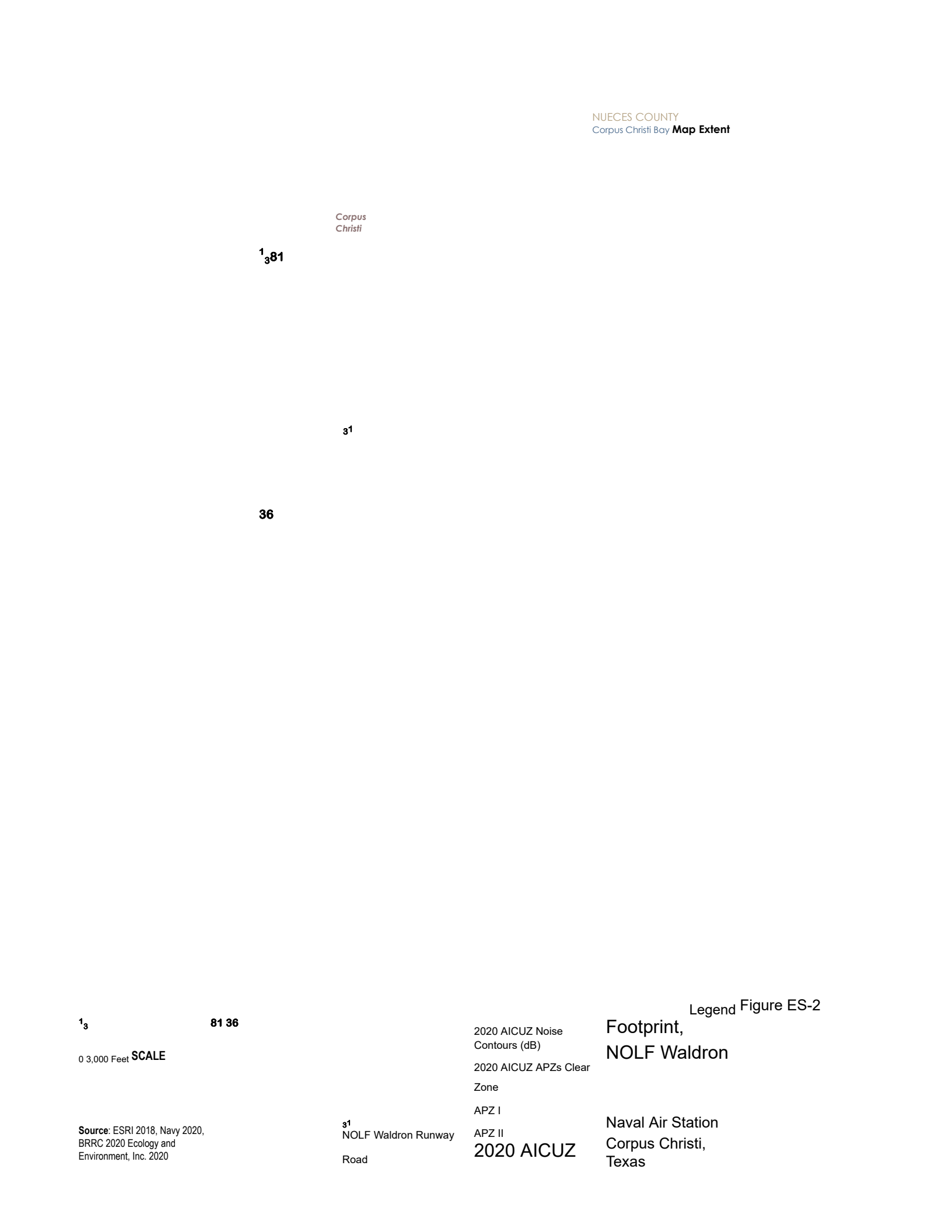
NUECES COUNTY
Corpus Christi Bay Map Extent
Corpus Christi
1 3 81
3 1
36
1 3 81 36
0 3,000 Feet SCALE
Source: ESRI 2018, Navy 2020, BRRC 2020 Ecology and Environment, Inc. 2020
Legend
2020 AICUZ Noise Contours (dB)
2020 AICUZ APZs Clear Zone
APZ I
APZ II
2020 AICUZ
3 1 NOLF Waldron Runway
Road
Figure ES-2
Footprint, NOLF Waldron
Naval Air Station Corpus Christi, Texas

ES.6 Land Use Tools and Recommendations

The goal of the Navy AICUZ Program can most effectively be accomplished by the active participation of all interested parties. Federal, state, regional, and local governments, businesses, real estate professionals, and citizens, along with the Navy, all play key roles in successfully implementing the AICUZ land use compatibility study.

The Navy has the responsibility to communicate and collaborate with local governments on land use planning, zoning, and compatibility concerns that can have an impact on its mission. State and local governments have the authority to implement regulations and programs to control development and direct growth to ensure land use activity is compatible within the AICUZ footprint. Local governments are encouraged to recognize their responsibility in providing land use controls in those areas encumbered by the AICUZ footprint by incorporating AICUZ information into their planning policies and regulations. Cooperation between NASCC and neighboring communities to the airfields is key to the AICUZ Program's success. The AICUZ Study recommendations, when implemented, will continue to advance the goal, "to protect the health, safety, and welfare of those living near military airfields, while preserving the defense flying mission." More information on specific tools and recommendations for areas of compatibility concern can be found in Chapter 6, Land Use Tools and Recommendations.

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ACRONYMS AND ABBREVIATIONS

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AICUZ Air Installations Compatible Use Zones

Air Ops Air Operations

APHIS WS U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services

APZ accident potential zone

ATC Air Traffic Control

BASH bird/animal aircraft strike hazard

BPAS Building Permit Allocation System

CFR Code of Federal Regulations

CNATRA Chief of Naval Air Training

CO Commanding Officer

CBCOG Coastal Bend Council of Governments

CPLO Community Planning and Liaison Officer

dB decibel

dBA A-weighted decibel

DNL day-night average sound level

DOD U.S. Department of Defense

EA environmental assessment

EMI electromagnetic interference

ETJ extraterritorial jurisdiction

FAA Federal Aviation Administration

FCF Functional Check Flights

FCLP field carrier landing practice

GIS geographic information system

HUD U.S. Department of Housing and Urban Development JLUS

Joint Land Use Study

Marine Corps U.S. Marine Corps

NALF Naval Auxiliary Landing Field

NAS Naval Air Station

NASCC Naval Air Station Corpus Christi

NAVFAC Naval Facilities Engineering Command

Navy U.S. Department of the Navy

NEPA National Environmental Policy Act NLR

Noise Level Reduction

NOLF Naval Outlying Landing Field

OPNAVINST Office of the Chief of Naval Operations Instruction

PAO Public Affairs Officer

REPI Readiness and Environmental Protection Integration SB

Senate Bill

SLEP Service Life Expectancy Program

SLUCM Standard Land Use Coding Manual SUA

Special Use Airspace

TCC Texas Commanders Council

TMPC Texas Military Preparedness Commission U.S.C.

United States Code

UFC Unified Facilities Criteria

VFR visual flight rules

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INTRODUCTION

Recognizing the need to foster compatible land and air uses, the U.S. Department of Defense (DOD) initiated the Air Installations Compatible Use Zones (AICUZ) Program in 1973 to help governments and communities identify and plan for coordinated compatible land use and development around installations. The goal of the AICUZ Program is to protect the health, safety, and welfare of the public while also protecting the operational capabilities of the military. This goal is accomplished by achieving compatible land use around an air installation. Mutual cooperation between installations and their neighboring communities is key to the AICUZ Program's success.

The AICUZ Program recommends that noise contours, accident potential zones (APZs), height obstruction criteria, and land use recommendations be incorporated into local community planning policies and activities to minimize impacts to the military mission and the residents in the surrounding communities.

As the communities that surround an airfield grow and develop, the U.S. Department of the Navy (Navy) has the responsibility to communicate and collaborate with local governments on land use planning and mission impacts. As stakeholders in the community, installations provide the local community with an understanding of the military mission and operations in order to ensure the community's health, safety, and welfare. Installations also protect the mission of the Navy.

This 2020 AICUZ Study for Naval Outlying Landing Field (NOLF) Cabaniss and NOLF Waldron was prepared for Naval Air Station (NAS) Corpus Christi (NASCC) in accordance with federal regulations, guidelines, and Office of the Chief of Naval Operations Instruction (OPNAVINST 11010.36C), and is an update to the 2009 AICUZ Study.

INTRODUCTION

1.1 PURPOSE, SCOPE, AND AUTHORITY

The DOD established the AICUZ Program to balance the need for aircraft operations with community concerns regarding aircraft noise and accident potential. The AICUZ Program provides a format to document the effects of aircraft operations in a community, while encouraging compatible development to minimize future conflicts.

These are the objectives of the AICUZ Program, according to the OPNAVINST 11010.36C:

- To protect the health, safety, and welfare of civilians and military personnel by encouraging land use that is compatible with aircraft operations;
- To reduce noise impacts caused by aircraft operations, while meeting operational, training, and flight safety requirements, both on and in the vicinity of air installations;
- To inform the public and seek cooperative efforts to minimize noise and aircraft accident potential impacts by promoting compatible development; and
- To protect Navy and U.S. Marine Corps (Marine Corps) installation investments by safeguarding the installation's operational capabilities.

To help meet AICUZ Program objectives, the Federal Aviation Administration (FAA) and DOD have developed specific instructions and guidance to encourage local communities to restrict development or land uses that could endanger pilots operating aircraft near an airfield. Examples of such development or land uses include lighting (direct or reflected) that would impair pilot vision; towers, tall structures, and vegetation that penetrate navigable airspace or are constructed near an airfield; uses that generate smoke, steam, or dust; uses and/or vegetation that attract birds (especially waterfowl), as well as deer or other wildlife; and electromagnetic interference (EMI) sources that may adversely affect aircraft communication, navigation, or other electrical systems.

To meet the objectives of the AICUZ Program, the Navy recommends that local community planning authorities incorporate development criteria in areas surrounding an installation and incorporate noise exposure contours and APZs into local plans and development ordinances. Noise exposure contours and APZs, which are described in detail in Chapter 3, Aircraft Noise, and Chapter 4, Airfield Safety, are areas of concern for air installations and neighboring communities. Noise contours and APZs, together, are commonly called the "AICUZ footprint." Because the AICUZ footprint often extends beyond the "fence line" of an installation, presenting the AICUZ Study to local governments is essential to fostering mutually beneficial land uses and development.

An AICUZ Study presents analysis of community development trends, land use tools, and mission requirements to recommend strategies for communities to prevent incompatible development. Implementation of these strategies requires cooperation between the Installation Commanding Officer (CO), Community Planning and Liaison Officer (CPLO), and local governments. Key documents that outline the authority for the establishment and implementation of the AICUZ Program, as well as guidance on facility requirements, are derived from:

- DOD Instruction 4165.57, “Air Installations Compatible Use Zones,” dated May 2, 2011 (incorporating Change 2, Effective August 31, 2018);
- OPNAVINST 11010.36C, “Air Installations Compatib Program,” dated October 9, 2008 (referred to as the AICUZ Instruction);
- Unified Facilities Criteria 3-260-01, “Airfield and Heliport Planning and Design,” dated February 4, 2019 (incorporating Change 1, Effective May 5, 2020);

- Naval Facilities Engineering Command (NAVFAC) P-80.3, “Facility Planning Factor Criteria for Navy and Marine Corps Shore Installations: Airfield Safety Clearances,” dated January 1982; and
- United States Department of Transportation, FAA Regulations, Title 14 Code of Federal Regulations (CFR) Part 77, “Objects Affecting Navigable Airspace.”

The scope of this AICUZ Study analyzes the following for NOLF Cabaniss and NOLF Waldron:

- 2009 and 2020 aircraft operations, including arrivals, departures, and pattern work (e.g., touch-and-go);
- Noise contours;
- Clear Zones and APZs;
- Land use compatibility; and
- Compatible land use recommendations.

1.2 Previous AICUZ Efforts, Related Studies, and AICUZ Studies Overview

1.2.1 Previous AICUZ Efforts and Related Studies

There have been various AICUZ studies completed for NASCC and associated outlying fields since the inception of the AICUZ Program. The following list includes previous studies completed for NASCC and NOLFs:

- Original AICUZ Study for NASCC, including Naval Auxiliary Landing Field[1] (NALF) Waldron and NALF Cabaniss, 1978;
- AICUZ Study update for NASCC, including NALF Waldron and NALF Cabaniss, 1986;
- AICUZ Study for NASCC, including NALF Waldron and NALF Cabaniss, 2009; and
- Final Environmental Assessment (EA) for Providing Outlying Field Capabilities to Support T-6 Undergraduate Pilot Training, Training Wing Four, NASCC, Texas, 2018 (hereafter referred to as the 2018 EA [environmental assessment] for T-6 Undergraduate Pilot Training, NASCC).

[1] Previously identified as Naval Auxiliary Landing Fields, airfields are now referred to as Naval Outlying Landing Fields (NOLFs).

1.2.2 Changes that Necessitate an AICUZ Update

AICUZ updates follow DOD and Navy Instruction. Updates are determined necessary based on a variety of factors, but primarily are conducted if an air installation has a significant change or projected change in aircraft operations, a significant increase in nighttime flying activities, a change in the aircraft based and operating at the installation, or changes in flight paths or runway utilization. Other factors include updates to the DOD or Navy Instruction, updates to noise modeling methods, and/or local community land use changes and developments.

This 2020 AICUZ Study was developed in accordance with the AICUZ Instruction and is an update to the 2009 AICUZ Study. The justifications for this 2020 AICUZ Study include:

- The current AICUZ Study was conducted in 2009.
- The mix of aircraft types operating at NOLF Cabaniss and NOLF Waldron have changed.

The number and type of aircraft operations have changed at NOLF Cabaniss and NOLF Waldron.

- The mix of aircraft operations along designated flight tracks resulted in changes to APZs at NOLF Cabaniss and NOLF Waldron.
- Local land use and development patterns have changed around NOLF Cabaniss and NOLF Waldron. Documenting these changes will assist the installation to encourage continued compatible development.

These factors have differing effects on the AICUZ footprint. These effects, as well as the extent of changes from the 2009 AICUZ Study, are discussed further in Chapter 2, Aircraft Operations; Chapter 3, Aircraft Noise; and Chapter 4, Airfield Safety.

1.3 Location

NASCC is located along the southeast coast of Texas within the City of Corpus Christi in Nueces County. Corpus Christi is located on the Corpus Christi Bay, west of Mustang Island. The city and regional areas are characterized by generally flat terrain with predominantly scrub brush and ranch and farmlands. Corpus Christi is located approximately 130 miles southeast of the City of San Antonio and 125 miles north of the United States Mexico border (Figure 1-1).

The NASCC complex includes the main airfield, Truax Field, and three outlying landing fields to support training operations: NOLF Waldron, NOLF Cabaniss, and NOLF Goliad. Both Truax Field and NOLF Waldron are located in the Flour Bluff area of Corpus Christi on the Encinal Peninsula. The peninsula is surrounded by the Corpus Christi Bay to the north, Laguna Madre to the east, and the Oso Bay to the west. NOLF Waldron is accessed by Waldron Road which connects to the main highway through Corpus Christi, South Padre Island Drive (also referred to as State Highway 358).

NOLF Cabaniss is located in the southside area of Corpus Christi along the Oso Creek. NOLF Cabaniss is accessed by Saratoga Boulevard and located just east of the Crosstown Expressway (State Highway 286), a major highway in Corpus Christi. Oso Creek is the southern boundary of NOLF Cabaniss and is also the

boundary for the city limits of Corpus Christi. South of Oso Creek is unincorporated Nueces County. Figure 1-1 provides a regional map of the Corpus Christi area and identifies the locations of Truax Field, NOLF Waldron, and NOLF Cabaniss.

NOLF Goliad is located approximately 65 miles northwest of NASCC within unincorporated Goliad County, Texas, but is not included in this AICUZ Study (a standalone AICUZ Study for NOLF Goliad was completed in 2015). Operational changes described in Section 1.2, Previous AICUZ Efforts, Related Studies, and AICUZ Studies Overview, do not apply to NOLF Goliad.

1.4 HISTORY

The 75th Congress commissioned NASCC in 1938 to provide facilities to train pilots for emergency situations. The first flight training began May 5, 1941. Most notably, George H.W. Bush graduated flight school from NASCC in June 1943 at the age of 18.

NOLF Cabaniss was dedicated July 9, 1941, to honor Commander Robert W. Cabaniss who was killed in a plane crash in 1927. During its first years of service, the auxiliary airfield was primarily utilized for basic and intermediate training. During the Vietnam War, NOLF Cabaniss became a major facility for helicopter repair and maintenance (Global Security n.d.[a]).

NOLF Waldron was dedicated March 5, 1943, in honor of Lieutenant Commander John C. Waldron who was killed in action at the Battle of Midway on June 4, 1942. Presently, NOLF Waldron is used as a touch-and go air training field (Global Security n.d.[b]).

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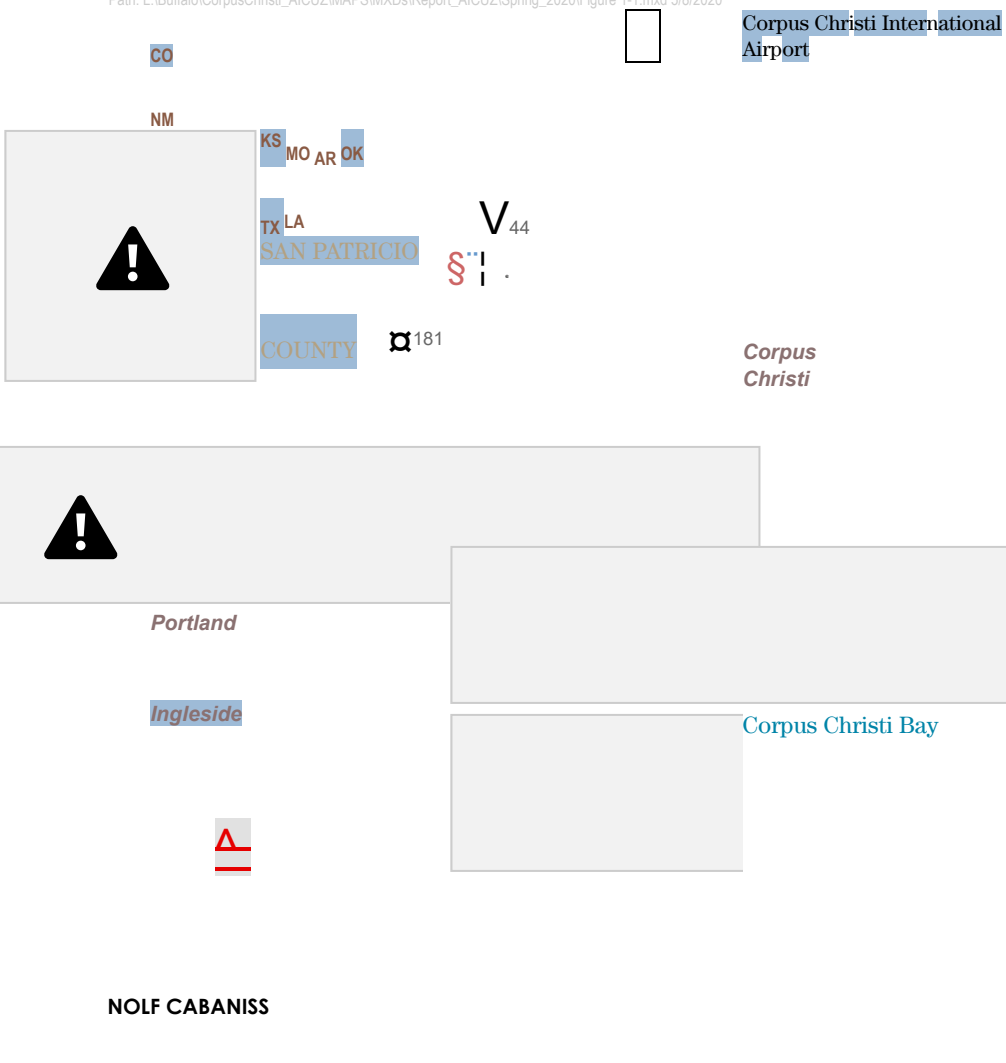


V358

V286

Oso Bay

KLEBERG COUNTY

Laguna Madre

V357

Laguna Largo

NUECES COUNTY

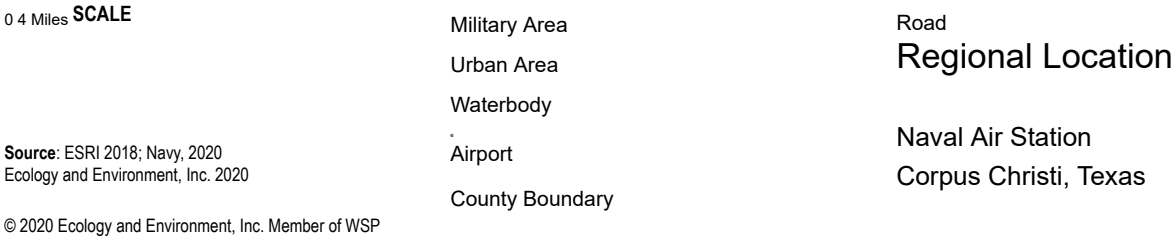
NOLF WALDRON

Gulf of Mexico

V361

V22

Legend Figure 1-1



1.5 Installation Mission

NASCC is an aviation training installation with a mission to maintain and operate facilities, as well as to provide services and material to support operations of aviation activities and units within the operating forces of the Navy. (NAVFAC n.d.). The overall command assignment is to train pilots.

The Chief of Naval Air Training (CNATRA) is headquartered at NASCC and oversees the training operation throughout the Southeast Region. CNATRA's command includes five training air wings, 16 training squadrons, and more than 14,000 Navy and civilian personnel.

1.6 Tenants

NASCC hosts more than 40 tenant commands and activities. Of these, the following is the major command performing aviation activities at NOLF Cabaniss and NOLF Waldron. The aircraft associated with these units and their operations are described in greater detail in Section 2.2.

Training Air Wing 4. According to the Chief Naval Air Training Command History, TW-4 is comprised of four individual units: Training Squadrons TWENTY SEVEN (VT-27), TWENTY-EIGHT (VT-28), THIRTY-ONE (VT-31), and THIRTY-FIVE (VT 35). VT-27 and VT-28 are two of five primary training squadrons within CNATRA (the other three are located at NAS Whiting Field in Milton, Florida). They fly the T-6B Texan II training aircraft. VT-31 and VT-35

provide advanced multi-engine training in the T-44C Pegasus (CNATRA n.d.[a]). VT-31 is also responsible for intermediate phase flight training for future E-2C Hawkeye and C-2A Greyhound pilots. VT-35 was established as a Joint Advanced Multi-Engine Training Squadron in October 1999. Presently, TW-4 trains 600 new qualified aviators each year (CNATRA n.d.[a]).

1.7 Local Economic Impacts and Population Growth

The military provides direct, indirect, and induced economic benefits to the regional and local communities where they are located through jobs and wages, regional sales and production, and contracts (expenditures). Benefits include employment opportunities and increases in local business revenue, property sales, and tax revenue. The military creates a stable and consistent source of revenue for surrounding communities. Working to achieve compatibility with local development and activities, NASCC continues to ensure the viability of their installation and their positive impact on local communities and the surrounding region.

NASCC is the largest employer in Corpus Christi and Nueces County, employing approximately 9,800 military, civilian, and contract personnel and creating $3.62 billion in economic impact to Texas. This results in a gross domestic product of $2.24 billion and $1.47 billion in personal disposable income for the state.

Corpus Christi is the eighth largest city in Texas with a population of 326,554 (a 7 percent increase from 2010). Corpus Christi comprises 90 percent of the total population of Nueces County. Nueces County has a population of 362,295 and experienced a 6.5 percent growth rate between 2010 and 2018. The median income of Corpus Christi and Nueces County are $55,709 and $55,048, per year, respectively, with a poverty rate of approximately 16 percent (U.S. Census Bureau 2019).

Texas is the second most populous state in the United States with a population of 28.7 million in 2018, an increase of 15.3 percent from 25 million in 2010 (U.S. Census Bureau 2019). The population is projected to grow significantly over the following decades. According to the Texas Demographic Center, by 2030, the population of Texas is projected to grow to 35 million and, by 2050, the population will grow to over 47 million (Office of the Texas Governor 2017).

2.1 Airfields

2.2 Aircraft Types

2.3 Engine Maintenance Run-up Operations

2.4 Flight Operations 2.5 Airspace

2.6 Runway and Flight Track Utilization

AIRCRAFT OPERATIONS

This chapter of the AICUZ Study discusses aircraft types and aircraft operations at NOLF Cabaniss and NOLF Waldron, including based aircraft, flight operations, airspace, and flight track use and procedures.

2.1 AIRFIELDS

The following sections present the general airfield features of NOLF Cabaniss and NOLF Waldron, including runways, operating hours, and other features.

2.1.1 NOLF CABANISS

NOLF Cabaniss is a 971-acre training airfield for visual flight rules (VFR) touch-and-go practice for the T-44C aircraft in support of TW-4 pilot training operations at NASCC. No aircraft are permanently staged at the airfield. As previously stated, the airfield is located in the southside area of Corpus Christi, approximately 8.6 miles west of the main airfield, Truax Field (Figure 1-1).

NOLF Cabaniss has two runways, 13/31 and 18/36. Runway 13/31 is 5,000 feet long and 150 feet wide. Runway 18/36 is also 5,000 feet long and 150 feet wide, however a displaced threshold on Runway 18 results in a landing length of approximately 4,500 feet (NASCC 2019). The primary runway is Runway 13 and supports a majority of aircraft operations. The airfield's elevation is approximately 31 feet above mean sea level. The runways at NOLF Cabaniss are Class A runways. Figure 2-1 illustrates the airfield layout and surrounding area.

The airfield's normal hours of operation are Monday through Thursday from 0800 to 2300 and Friday from 0800 to 1900 (all times Central). NOLF Cabaniss is closed Saturday, Sunday, and all federal holidays (NASCC 2019).

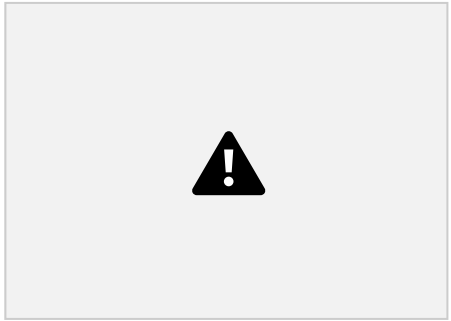
2.1.2 NOLF WALDRON

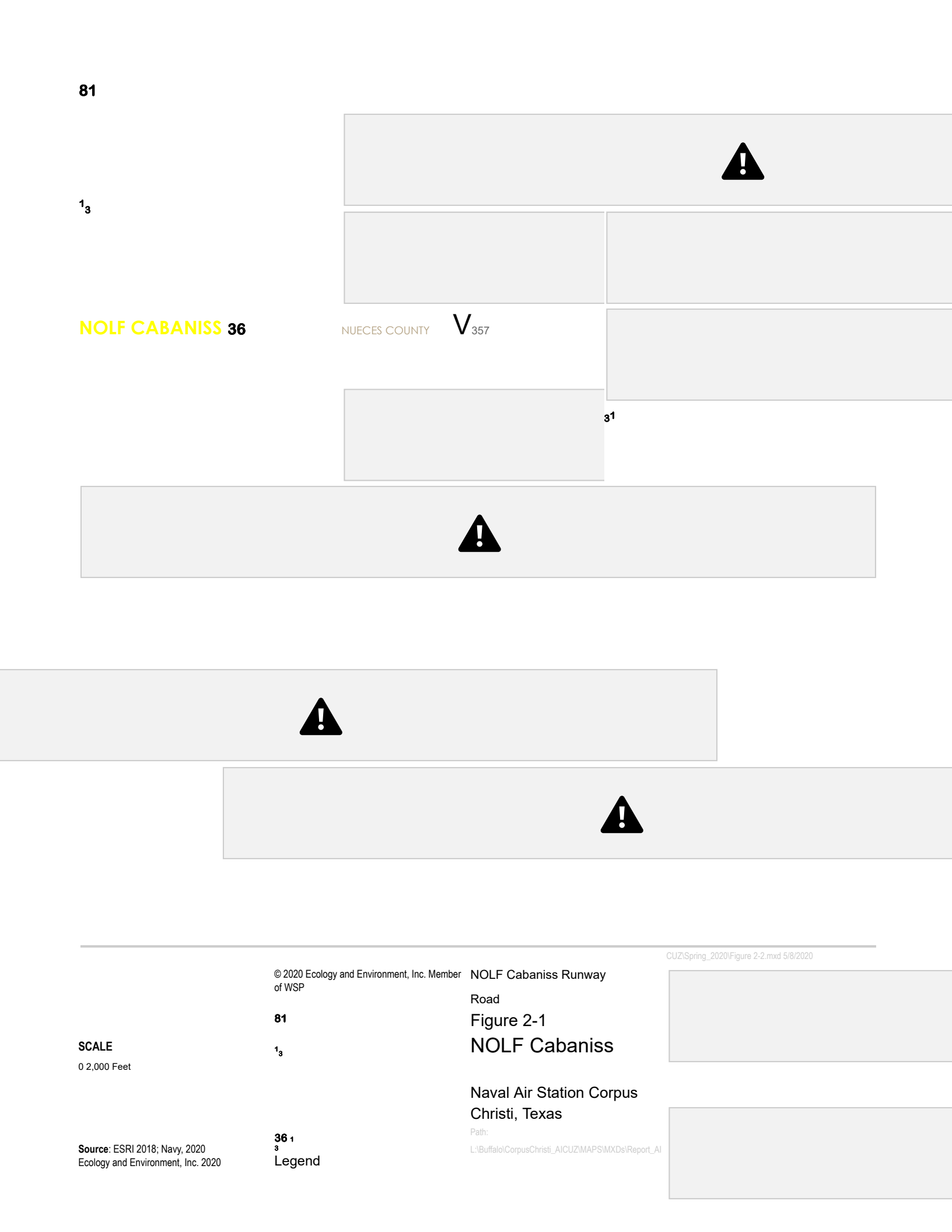
NOLF Waldron is an 851-acre training airfield for VFR touch-and-go practice for the T-6B aircraft in support of TW-4 pilot training operations at NASCC. No aircraft are permanently staged at the airfield. As previously stated, the airfield is located in the Flour Bluff area of Corpus Christi on the Encinal Peninsula, approximately 4 miles southwest of the main airfield, Truax Field (Figure 1-1).

NOLF Waldron has two runways, 13/31 and 18/36. Runway 13/31 is 5,000 feet long and 200 feet wide, and runway 18/36 is also 5,000 feet long and 200 feet wide (NASCC 2019). The primary runway is Runway 13 and supports a majority of aircraft operations. The airfield's elevation is approximately 25 feet above mean sea level. The runways at NOLF Waldron are Class A runways. NOLF Waldron utilizes the Basic Training Outlying fields (T-34) criteria based on a permanent waiver

from the Naval Air Systems Command. Figure 2-2 illustrates the airfield layout and surrounding area.

Monday through Thursday, the airfield's normal hours of operation are based on the hours of Truax Field (0700 to 2300), opening 30 minutes after Truax Field is open and closing at sunset. On Friday, the airfield opens 30 minutes after Truax Field opens, and closes at 1900 or sunset, whichever occurs first. NOLF Waldron is closed Saturday, Sunday, and all federal holidays (NASCC 2019).




81
NOLF CABANISS 36
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V357
SCALE
0 2,000 Feet
Source: ESRI 2018; Navy, 2020
Ecology and Environment, Inc. 2020
Legend
© 2020 Ecology and Environment, Inc. Member of WSP
NOLF Cabaniss Runway
Road
Figure 2-1
NOLF Cabaniss
Naval Air Station Corpus Christi, Texas
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CUZ\Spring_2020\Figure 2-2.mxd 5/8/2020

Extent

Map

NOLF WALDRON

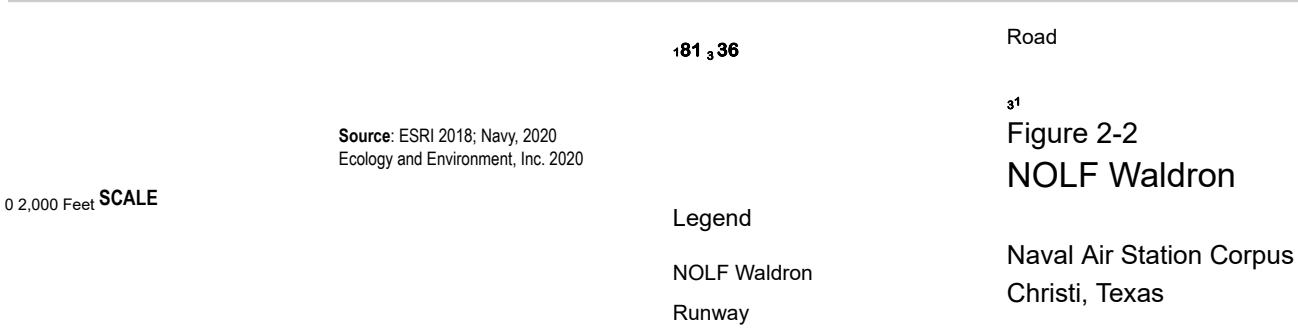


Figure 2-2
NOLF Waldron

Naval Air Station Corpus Christi, Texas

2.2 AIRCRAFT TYPES

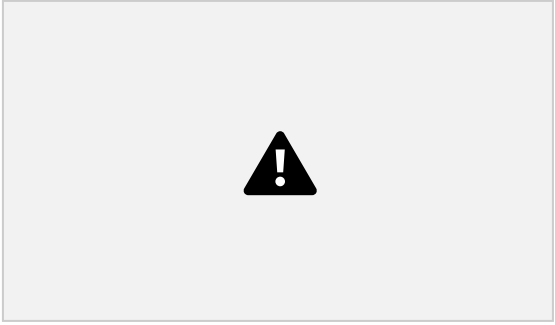
NOLF Cabaniss and NOLF Waldron both support only fixed-wing operations. No rotary-wing operations are conducted at either of these airfields. Additionally, no aircraft are stationed permanently at NOLF Cabaniss nor NOLF Waldron. Transient aircraft rarely conduct operations at NASCC and no transient aircraft visit NOLF Cabaniss or NOLF Waldron.

2.2.1 T-6 "TEXAN II"

The T-6 is a single-engine, tandem seat training aircraft utilized for both day or night VFR or instrument flight rules flight operations. A Pratt & Whitney PT6A-68 free-turbine turboprop engine powers the aircraft. The T-6 has a length of 33.4 feet, a height of 10.8 feet, and a wingspan of 33.5 feet (CNATRA n.d.[b]). Pilots from NASCC fly the T-6B variant of the "Texan II," which has upgraded avionics. The T-6B aircraft is utilized at NOLF Waldron.

2.2.2 T-44 "PEGASUS"

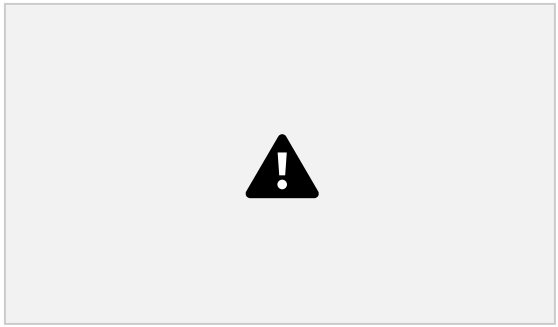
The T-44 is a twin-engine, pressurized aircraft utilized for advanced multi-engine training and intermediate carrier-based turboprop aircraft training at NASCC.



Two 550 shaft horsepower PT6A-34B turboprop engines, manufactured by Pratt & Whitney, power the aircraft. The T-44 has a length of 35.6 feet, a height of 14.3 feet, and a wingspan of 50.3 feet. The aircraft has a maximum range of 1,625 nautical miles and can reach a maximum airspeed of 250 knots (CNATRA n.d.[c]). The T-44C aircraft is utilized at NOLF Cabaniss.

2.2.3 T-45 "Goshawk"

The T-45 aircraft is used for intermediate and advanced portions of the Navy pilot and navigator training program for jet carrier aviation and tactical strike missions. There are two versions of the T-45 aircraft currently in operational use at this time, the T-45A and T-45C derivatives. The T-45A replaced the T-2 Buckeye trainer and the TA-4 trainer with an integrated training system that includes the T-45A Goshawk aircraft, operations and instrument fighter simulators, academics, and a training integration system.



The T-45 Service Life Expectancy Program (SLEP) will be conducted at NASCC for a period of 8 to 10 years. It will consist of complete maintenance overhaul of aircraft and Functional Check Flights (FCF) in and out of NASCC.

2.3 Engine Maintenance Run-up Operations

No pre-flight or engine maintenance run-up operations are performed at NOLF Cabaniss or NOLF Waldron; therefore, these airfields do not have designated run-up locations. Run-up locations are designated areas at an airfield where pilots or mechanics can conduct last minute engine checks without obstructing ground traffic.

2.4 Flight Operations

As a planning document, the AICUZ Study forecasts aircraft operations out 10 to 15 years into the future on a similar planning horizon that local governments use in their planning documents.

Therefore, projected operations are incorporated into this 2020 AICUZ Study.

A flight operation refers to any occurrence of an aircraft taking off or landing on the runway at an airfield. A common example of a takeoff operation is a departure of an aircraft to another location; a landing operation is an aircraft arrival from another location to the airfield. Additionally, a takeoff and landing may be part of a training maneuver or pattern (e.g., touch-and-go), which includes a takeoff and landing back to the same runway. These patterns are considered two separate operations because the departure and arrival each count as a single operation. Typical flight operations at NASCC include:

- Departure: An aircraft takes off to leave the installation/airfield or as part of a training maneuver.
- Straight-In/Full-Stop Arrival: An aircraft lines up on the runway centerline, descends gradually, lands, comes to a full stop, and then taxis off the runway.
- Overhead Break Arrival: An expeditious arrival wherein an aircraft approaches the runway 200 feet above the altitude of the landing pattern, and approximately halfway down the runway, the aircraft performs 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.
- Pattern Work: Refers to traffic pattern training where the pilot performs takeoffs and landings in quick succession by taking off, flying the pattern, and then landing. Traffic pattern training is demanding and utilizes all the basic flying maneuvers a pilot learns: takeoffs, climbs, turns, climbing turns, descents, descending turns, and straight and level landings. Specific types of pattern work include:
    - Touch-and-Go: An aircraft lands and takes off on a runway without coming to a full stop. After touching down, the pilot immediately accelerates to takeoff power and takes off again. A touch and-go pattern is counted as two operations—the landing counts as one operation, and the takeoff as another.
    - Low Approach: An approach to a runway during which the pilot does not make contact with the runway.

Each airfield has designated runways with designated flight procedures that provide for safety, consistency, and control of an airfield. A flight track is the route an aircraft follows while conducting an operation

at the airfield, between airfields, or to/from a military operations area, and demonstrates how the aircraft will fly in relation to the airfield.

Flight tracks are graphically represented as single lines, but how closely an aircraft flies to the specified track can vary due to aircraft performance, pilot technique, and weather conditions, such that the actual flight track could be considered a band or corridor varying from a few hundred feet to several miles wide. Flight tracks are typical or average representations based on pilot and Air Traffic Control (ATC) input. Specific flight tracks for both NOLF Cabaniss and NOLF Waldron are further discussed in Sections 2.4.1, NOLF Cabaniss Annual Operations, and 2.4.2, NOLF Waldron Annual Operations,

respectively.

2.4.1 NOLF Cabaniss Annual Operations

"Annual operations" describe all aircraft operations that occur at NOLF Cabaniss during a calendar year, including based and transient aircraft (no transient aircraft currently operate at NOLF Cabaniss). As described previously, total annual operations account for each arrival and departure, including those conducted as part of a pattern operation. Aircraft operations are tracked using systems maintained by ATC personnel. For this 2020 AICUZ Study, the operational data were gathered and validated. For planning purposes, a 50 percent increase in the operation counts was factored in to account for possible increases in pilot training requirements
or potential additional aircraft. The operational data are projected into the future in a similar planning horizon to that of local governments and their planning documents. This AICUZ Study describes how operational information was gathered and provides a concise interpretation of operations data for the 2009 and the 2020 AICUZ.

2009 AICUZ Study

The operational tempo has fluctuated over time because of changes in mission and utilized aircraft. As missions change, so do training requirements, which change the amount and type of operations flown and flight tracks utilized. The 109,050 annual operations, as presented in the 2009 AICUZ (see Table 2-1), are attributed to the variety of mission operations and aircraft that were at the airfield during calendar year 2009. The T-44C operations were derived from a 5-year average of operations at NOLF Cabaniss between 2004 and 2008. Additionally, the 2009 AICUZ included the VT-35 squadron utilizing the UC-12 aircraft at NOLF Cabaniss. The VT-35 squadron is no longer flying the UC-12 aircraft and has no operations at NOLF Cabaniss.

2020 AICUZ Study

AICUZ studies account for future missions and operations. The 84,018 total annual operations presented in this AICUZ Study (see Table 2-1) reflect current operations and projected future operational increases through the year 2030. A 50 percent increase in the operation counts was factored in to account for possible increases in pilot training requirements associated with new or additional aircraft. It is reasonably foreseeable that the T-44C aircraft could be replaced during the 10-year planning horizon. As shown in Table 2-1, total projected annual operations have decreased by 25,032 when compared with the 2009 operations. Table 2-2 details the differences in projected operations by aircraft type between 2009 and 2020.

The primary factors attributed to the decrease in operations are the reduction in pattern operations flown at the airfield and the removal of the UC-12 aircraft at NOLF Cabaniss. Since the 2009 AICUZ Study, pattern operations decreased by approximately 22,610 operations annually.

TABLE 2-1 COMPARISON OF ANNUAL OPERATIONS BY OPERATION TYPE AT NOLF CABANISS

Operation Type	2009 AICUZ	2020 AICUZ
Arrivals	3,422	2,211
Departures	3,422	2,211
Pattern Operations	102,206	79,596
GRAND TOTAL	**109,050**	**84,018**

Sources: Navy 2009; BRRC 2020
Notes:
[1] No operations are currently conducted between 2200–0700 hours (acoustic nighttime), nor were they in 2009. [2] Includes 564 total operations from the UC-12 aircraft.
[3] Totals reflect the 50 percent increase in 2020 operations to reflect possible increases in future operations.

TABLE 2-2 COMPARISON OF ANNUAL OPERATIONS BY AIRCRAFT TYPE AT NOLF CABANISS

Aircraft Type	2009 AICUZ	2020 AICUZ
T-44C	108,486	84,018
UC-12	564	0
GRAND TOTAL	**109,050**	**84,018**

Sources: Navy 2009; BRRC 2020
Notes:
[1] Totals reflect the 50 percent increase in 2020 operations to reflect possible increases in future operations.

2.4.2 NOLF Waldron Annual Operations

"Annual operations" describe all aircraft operations that occur at NOLF Waldron during a calendar year, including based and transient aircraft (no transient aircraft currently operate at NOLF Waldron). Section 2.4.1, NOLF Cabaniss Annual Operations, details the various factors included in developing the noise contours and APZs. For NOLF Waldron, in this 2020 AICUZ Study, the operational data were gathered and validated from the 2018 Final EA for Providing Outlying Field Capabilities to Support T-6 Undergraduate Pilot Training. The operational data are projected into the future through 2030, in a similar planning horizon to that of local governments and their planning documents.

2009 AICUZ Study

Similar to NOLF Cabaniss, the 2009 AICUZ had 185,196 annual operations (see Table 2-3), which were attributed to the variety of mission operations and aircraft that were at the airfield during calendar year 2009. The 2009 AICUZ Study used modeled operations for NOLF Waldron to account for projected conditions and the replacement of the T-34C aircraft operations with T-6B aircraft operations. Under the conditions presented in the 2009 AICUZ Study, an estimated 80 percent of T-6B OLF operations would be conducted at NOLF Waldron.

2020 AICUZ

Modeled flight operations for this AICUZ are derived from the 2018 EA for Providing Outlying Field Capabilities to Support T-6 Undergraduate Pilot Training. For the noise study produced for this EA, the Navy determined that the maximum capacity of T-6B flight training operations at NOLF Waldron is 250,000 annual airfield operations. The EA was produced to meet the future needs of TRAWING FOUR and their NOLF capacity and support infrastructure. As shown in Table 2-3, operations will increase by 64,804 total operations from the previous counts. Table 2-4 details the differences in operations by aircraft type between 2009 and 2020.

TABLE 2-3 COMPARISON OF ANNUAL OPERATIONS BY OPERATION TYPE AT NOLF WALDRON

Operation Type	2009 AICUZ	2020 AICUZ
Arrivals	12,198	10,417
Departures	12,198	10,417
Pattern Operations	160,800	229,166
GRAND TOTAL	**185,196**	**250,000**

Sources: Navy 2009; BRRC 2017
Notes:
[1] No operations are currently conducted between 2200–0700 hours (acoustic nighttime), nor were they in 2009. [2] Includes 564 total operations from the UC-12 aircraft.
[3] Based off of the 2018 EA.

TABLE 2-4 COMPARISON OF ANNUAL OPERATIONS BY AIRCRAFT TYPE AT NOLF WALDRON

Aircraft Type	2009 AICUZ	2020 AICUZ
T-6B	185,196	250,000
GRAND TOTAL	**185,196**	**250,000**

Sources: Navy 2009; BRRC 2020
Notes:
[1] Based off of the 2018 EA.

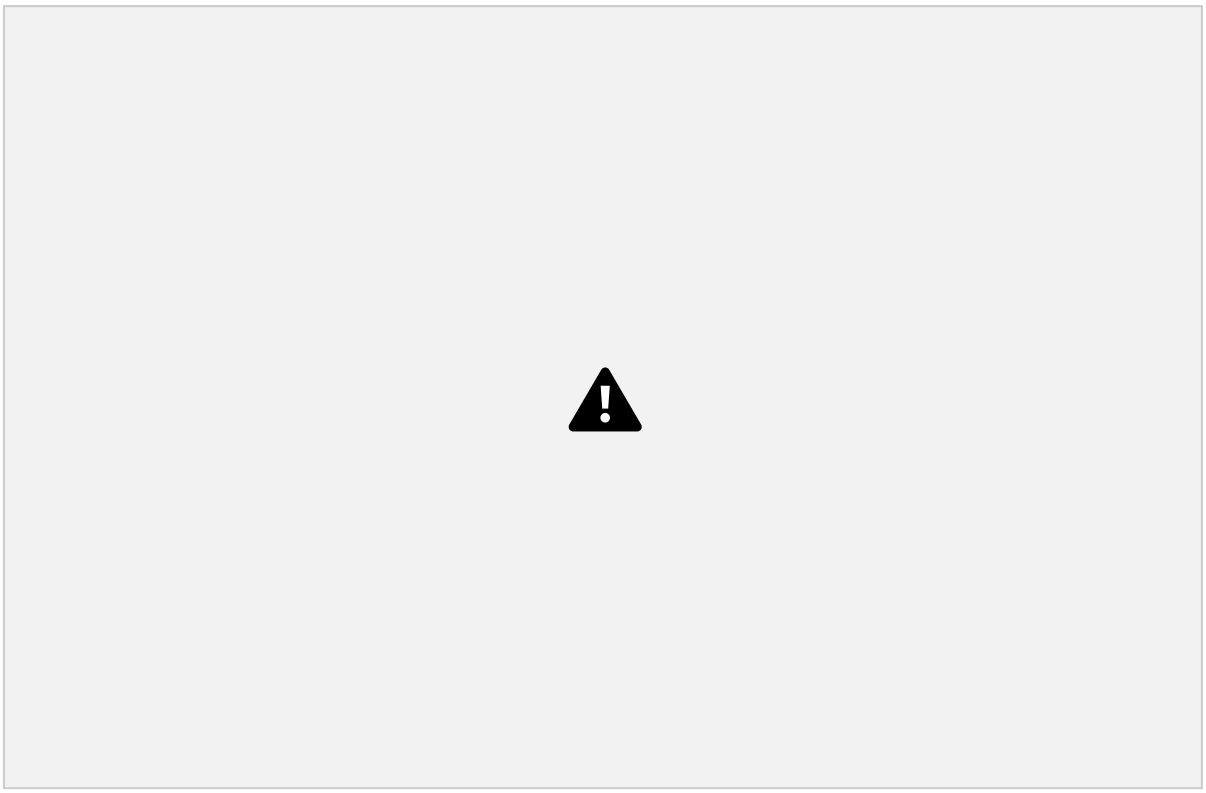
2.5 AIRSPACE

The FAA, which manages the National Airspace System, approves the use of airspace over NOLF Cabaniss and NOLF Waldron. The National Airspace System seeks to ensure the safe, orderly, and efficient flow of commercial, private, and military aircraft.

There are two categories of airspace: regulatory and non-regulatory. Within these two categories, there are four types of airspace: controlled, uncontrolled, special use, and other airspace. Controlled airspace— designated Class A through Class E—includes the airspace within which ATC clearance is required or must maintain two-way radio communication with the ATC facility within the airspace. Uncontrolled airspace is the portion of the airspace not designated as Class A through Class E within which ATC has no authority or responsibility to control air traffic. (FAA 2020) (Figure 2-3).

2. Aircraft Operations Page 2-9
2020 AICUZ Study NOLF Cabaniss and NOLF Waldron

FIGURE 2-3 GENERAL AIRSPACE CLASSIFICATIONS



NOLF Cabaniss and NOLF Waldron airspaces are classified as Class D airspace (Figure 2-4). Class D airspace generally extends from the surface to 2,500 feet above ground level surrounding those airports that have an operational control tower. Each aircraft must establish two-way radio communication with the air traffic controller prior to entering the airspace and maintain communication while flying within the airspace. VFR arrivals must contact Corpus Christi Approach prior to entering the Class D airspace for radar services and sequencing over the appropriate VFR entry points.

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NM
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MO
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LA
SAN PATRICIO COUNTY
Portland
Ingleside
Corpus Christi Bay
NAS CORPUS CHRISTI
Corpus
Christi
NOLF CABANISS
Oso
Bay
NOLF
WALDRON

Figure 2-4
Regional Airspace

Naval Air Station Corpus Christi, Texas

Source: ESRI 2018; Navy, 2020 Ecology

2.6 RUNWAY AND FLIGHT TRACK UTILIZATION

All aircraft operating at NOLF Cabaniss and NOLF Waldron follow the course rules in the NASCC Air Operations Manual, which sets runway use, sets the course rules for the airfield, and establishes the patterns and procedures for aircraft movement. As discussed in Section 2.4, Flight Operations, flight tracks are the general paths aircraft fly while conducting missions or operations. The following factors determine flight track utilization: operations performed, runway utilized for the operation, and flight track followed to conduct the operation. Flight tracks are nominal representations (often a few hundred feet to several miles wide) depicting an aircraft's typical route. Flight tracks demonstrate how and where aircraft fly in relation to an airfield and provide safety, consistency, and control of an airfield. The 2009 AICUZ Study noise modeling files served as a baseline for the flight tracks and utilization data for NOLF Cabaniss, and were then verified and updated. The flight tracks and utilization data for NOLF Waldron were gathered and validated from the 2018 EA for Providing Outlying Field Capabilities to Support T-6 Undergraduate Pilot Training. These sources were utilized in this AICUZ Study to inform the flight operation counts of aircraft flights for the 2009 study and planning

operations. The effect of flight track utilization on noise contours is presented in Chapter 3, Aircraft Noise; the association between flight tracks and APZs is included in Chapter 4, Airfield Safety.

The NOLF Cabaniss airfield is comprised of two asphalt runways: Runways 13/31 and 18/36. The changes in runway utilization from the 2009 AICUZ to 2020 levels are shown in Table 2-5. Historically, Runway 13 has been and continues to be the most active runway and was used 70 percent of the time at the time of the 2009 AICUZ and 62 percent of the time during this AICUZ Study. Figure 2-5 illustrates the representative flight tracks for NOLF Cabaniss, including arrivals, closed patterns, and interfacility departures.

TABLE 2-5 CHANGES IN RUNWAY UTILIZATION AT NOLF CABANISS

Runway	Percent Utilization	
	2009 AICUZ	2020 AICUZ
13	70	62
31	15	4
18	10	17
36	5	17

Sources: Navy 2009; BRRC 2020

The NOLF Waldron airfield is comprised of two asphalt runways: Runways 13/31 and 18/36. The changes in runway utilization from the 2009 AICUZ to 2020 levels are shown in Table 2-6. Historically, Runway 13 has been and continues to be the most active runway and was used 83 percent of the time at the time of the 2009 AICUZ and 70 percent of the time during this AICUZ Study. Figure 2-6 illustrates the representative flight tracks for NOLF Waldron, including arrivals, closed patterns, and interfacility departures.

TABLE 2-6 CHANGES IN RUNWAY UTILIZATION AT NOLF WALDRON

Runway	Percent Utilization	
	2009 AICUZ	2020 AICUZ
13	83	70
31	12	5
18	3	5
36	2	20

Sources: Navy 2009; Navy 2018

2. Aircraft Operations Page 2-13

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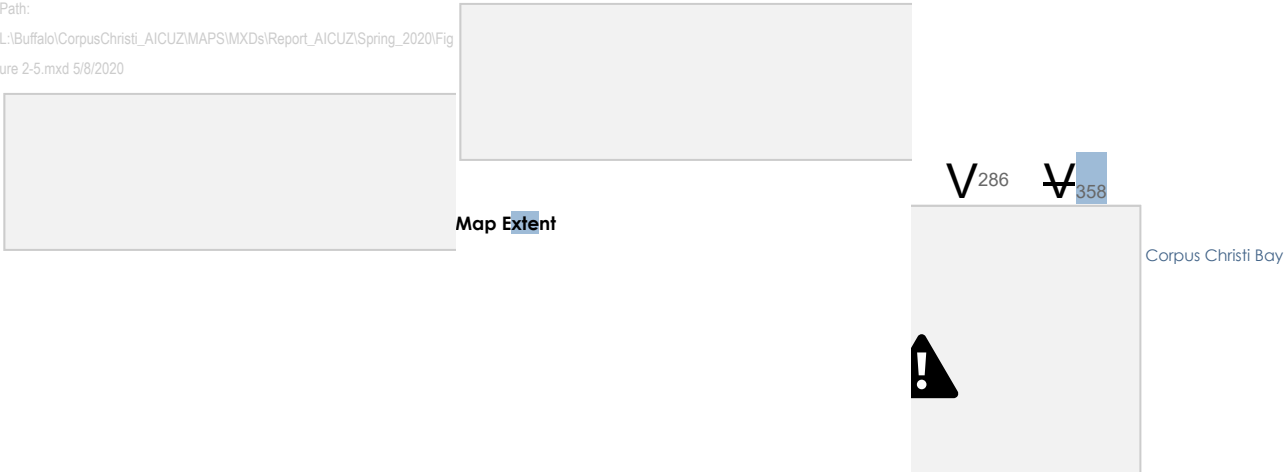

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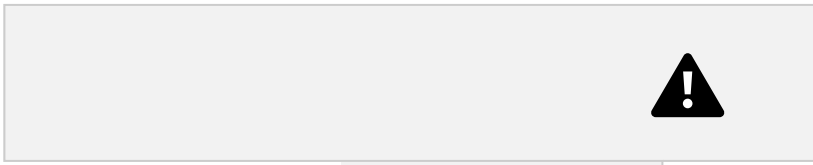

NOLF CABANISS

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NUECES COUNTY

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Legend Figure 2-5

0 4,000 Feet **SCALE**

Source: ESRI 2018; Navy, 2020
Ecology and Environment, Inc. 2020

NOLF Cabaniss Runway
Road
Arrival
Closed Pattern
Interfacility Departure
Representative

Flight Tracks, NOLF Cabaniss

Naval Air Station
Corpus Christi, Texas

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Corpus Christi Bay

V357 V358

V22

Corpus Christi

Map Extent

NOLF WALDRON

NUECES COUNTY

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Legend Figure 2-6

NOLF Waldron Runway

Road

Arrival

Closed Pattern

Interfacility Departure

Representative

Flight Tracks,
NOLF Waldron

Naval Air Station
Corpus Christi, Texas

0 4,000 Feet **SCALE** 1 3

Source: ESRI 2018; Navy, 2020
Ecology and Environment, Inc. 2020

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81

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2020 AICUZ Study NOLF Cabaniss and NOLF Waldron

AIRCRAFT NOISE

Aircraft noise can play a key role in shaping an installation's relationship with an adjacent community. Aircraft noise is also a factor in local land use planning. Because noise from aircraft operations could have an impact on areas near NASCC's NOLFs, the Navy has analyzed the noise resulting from aircraft and has established noise contours around the installation using the guidance provided in the AICUZ Instruction. Noise contours

provide communities and planning organizations with information to better plan for development near airfields. The noise contours developed for this AICUZ Study represent the noise generated by aircraft, based on aircraft type, aircraft operations, and the time of day aircraft are flown. This chapter discusses noise associated with aircraft operations, including average noise levels, noise abatement/flight procedures, noise complaints, sources of noise, airfield-specific noise contours, and analysis of changes from the 2009 AICUZ and the 2020 AICUZ (projected)noise contours. The 2020 AICUZ noise contours for NOLF Cabaniss and NOLF Waldron are presented in the following sections along with detailed descriptions of the noise environments for the NOLFs. Also provided are comparisons and figure overlays of the 2009 AICUZ Study and the 2020 AICUZ Study noise contours.

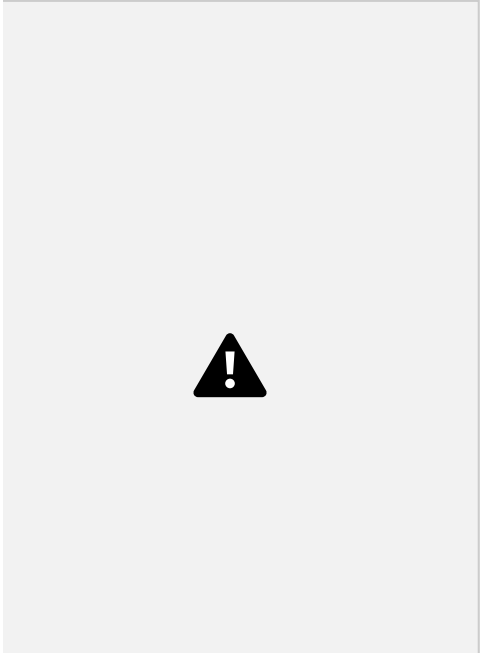
Sound is vibrations in the air that multiple sources can generate. When sound is invasive or unwanted, it is often considered noise. Generally, sound becomes noise to a listener when it interferes with normal activities. Common sources of noise include roadway traffic, recreational activities, railway activities, and aircraft operations. For further discussion of noise and its effect on people and the environment, see Appendix A. In this AICUZ Study, all sound or noise levels are measured in A-weighted decibels (dBA), which represent sound pressure adjusted to better represent human hearing response. Humans are most sensitive to sound frequencies within the range of human speech and less sensitive to lower and higher frequencies. The A-weighted scale emphasizes those mid-range frequencies while de-emphasizing the remaining frequencies.

3.1 Noise Metrics

On an A-weighted scale, barely audible sound is just above 0 dB, and normal speech has a sound level of approximately 60 to 65 dB. Generally, a sound level above 120 dB will cause discomfort to a listener, and the threshold of pain is 140 dB (Berglund and Lindvall 1995).

The noise exposure from aircraft at NOLFs Cabaniss and Waldron is measured using the day-night average sound level (DNL) noise metric. The DNL noise metric, established in 1980 by the Federal Interagency Committee on Urban Noise, presents a reliable measure of community sensitivity to aircraft noise and has become the standard metric used in the United States. DNL averages the sound energy from aircraft operations at a location over a 24-hour period. DNL also adds an additional 10 dB to events occurring during acoustic nighttime hours (between 10:00 p.m. and 7:00 a.m.). These decibel (dB) adjustments represent the added intrusiveness of sounds due to increased sensitivity to noise when ambient sound levels are low.

DNL provides a single measure of overall noise



0 dB – Threshold of Hearing 20 dB – Ticking

Watch
45 dB – Bird Calls (distant) 60 dB – Normal Conversation 70 dB – Vacuum Cleaner (3 ft) 80 dB – Alarm Clock (2 ft)
90 dB – Motorcycle (25 ft) 100 dB – Ambulance Siren (100 ft) 110 dB – Chain Saw
120 dB – Rock Concert
130 dB – Jackhammer
140 dB – Threshold of Pain

combining disparate noise events (e.g., brief events with high noise levels, longer duration events at lower noise levels, and events occurring during different times of day which are more likely to disturb people in the community). Scientific studies and social surveys conducted to evaluate community annoyance with all types of environmental noise have found DNL to be the best measures available for predicting community annoyance (FICUN 1980; FICON 1992). Although DNL provides a single measure of overall noise impact, it does not provide specific information on the number of noise events or the individual sound levels that occur during the day. For example, a DNL of 65 dB could result from only a few noisy events or from a large number of quieter events.

DNL is depicted on a map as a noise contour that connects points of equal noise value. Contours are displayed in 5-dB increments (e.g., 60, 65, 70, 75, 80, and 85 dB DNL). Noise levels inside a contour may be similar to those outside a contour line. Where the contour lines are close together, the change in noise level is greater. Where the lines are far apart, the change in noise level is more gradual. Calculated noise contours do not represent exact measurements and are discussed further in Section 3.4, Noise Complaints and Abatement.

For land use planning purposes, the AICUZ Program divides noise exposure into three categories, known as “noise zones,” based on DNL measurements:

- Noise Zone 1: <65 dB DNL;
- Noise Zone 2: 65 to <75 dB DNL; and
- Noise Zone 3: Greater than or equal to 75 dB DNL (≥75 dB DNL).

Land use recommendations within these zones are discussed and provided in Section 5.4, Land Use Compatibility Analysis. Noise Zone 1 for this study specifically examines noise that is within 60 to 64 dB DNL. However, per the AICUZ Instruction, Noise Zone 1 is essentially an area of low or no impact and, therefore, there are no recommended land use controls for land use within this area (Appendix B).

3.2 Noise Modeling and Airfield Noise Sources

This AICUZ Study presents the 2009 AICUZ and 2020 AICUZ noise contours at NOLF Cabaniss and NOLF Waldron. As part of this AICUZ Study, a noise study was conducted to measure the noise exposure changes at NOLF Cabaniss since the 2009 AICUZ Study. For the noise study, noise contours for aircraft operations occurring at NOLF Cabaniss were developed using NOISEMAP noise modeling

software. In support of the 2018 Final EA For Providing Outlying Field Capabilities to Support T-6 Undergraduate Pilot Training, NASCC conducted a noise analysis. The noise environment for this EA was also modeled using NOISEMAP, and is utilized to measure the noise exposure changes at NOLF Waldron.

NOISEMAP is the DOD standard model for assessing noise exposure from military aircraft operations at air installations. NOISEMAP calculates DNL contours resulting from aircraft operations using variables such as aircraft types and aircraft profiles comprised of changing power settings, speeds, and altitudes as aircraft traverse the airspace. The model analyzes all the operational data (types of aircraft, number of operations, flight tracks, altitude, speed of aircraft, engine power settings, and engine maintenance run-ups), environmental data (average humidity and temperature), and surface hardness and terrain. The result of the modeling is noise contours; lines connecting points of equal value. Noise contours generated from this information represent the
noise environment and planning contours for NOLFs Cabaniss and Waldron.

3.3 AICUZ Noise Contours

Noise contours can be mapped to show noise exposure resulting from modeled aircraft operations. Noise contours, when overlaid with local land uses, can assist NASCC, local community planning organizations, and citizens in locating and addressing incompatible land uses and in planning for future development.

The noise contours provided in this AICUZ Study are identified as either 2009 AICUZ or as 2020. The 2020 AICUZ noise contours and operational data used in this AICUZ Study are projected into the future. The operational tempo over time and the projected operations for NOLFs Cabaniss and Waldron are presented in Chapter 2, Aircraft Operations, and detailed in Tables 2-1 through 2-4.

The 2020 AICUZ noise contours for each NOLF are presented in the following sections, along with detailed descriptions of the noise environment. Also provided are comparisons and figure overlays of the 2009 and 2020 noise contours. The comparison identifies changes to noise exposure (based on changes and projected changes in aircraft operations) and allows the identification of incompatible land use and potential recommendations to reduce noise exposure. Land use and recommendations for addressing incompatibility issues within noise contours are provided and discussed in Chapter 5, Land Use Compatibility Analysis, and Chapter 6, Land Use Tools and Recommendations.

3.3.1 NOLF Cabaniss 2020 Noise Contours

As shown on Figure 3-1, the projected noise contours for NOLF Cabaniss do not extend off the base boundary. Noise contours align with the runways and follow the dominate flight tracks for arrivals,

departures, and closed patterns at the airfield; noise propagates outward from those paths. The 2020 AICUZ noise contours only include a 60 dB DNL noise contour.

The acreage within the projected noise contours was calculated using geographic information system (GIS) overlay analysis. The total area within the projected noise contours all fall within Noise Zone 1 (<65 dB DNL, specifically 60-64 dB DNL) and totals approximately 15 acres. Noise Zone 1 does not extend outside the boundaries of the airfield.

Noise Gradient and Propagation

The sound associated with aircraft operations extends beyond the plotted DNL contours. Figure 3-2 provides a DNL color gradient that illustrates how the noise originating at NOLF Cabaniss dissipates into the surrounding communities. The sequence of sound waves propagates through the air. During the propagation, sound waves are reflected, refracted, and attenuated (i.e., weakened) by the density of the air. Therefore, the highest noise levels are concentrated at the source on NOLF Cabaniss and decrease to lower levels farther out off-station and minimally into the City of Corpus Christi. The noise falls within Noise Zone 1 and is primarily concentrated on base.

3.3.2 Comparison of Noise Contours for NOLF Cabaniss

A comparison of the 2009 and 2020 noise contours shows some similarities in shape, general location, and DNL levels. The comparison also shows a decrease in overall size and coverage from the 2009 to the 2020 noise contours, as depicted on Figure 3-3. The 2009 AICUZ noise contours at NOLF Cabaniss included 60 dB DNL and 65 dB DNL and did not extend beyond the boundaries of the airfield. There are no longer 65 dB DNL noise contours present at NOLF Cabaniss.

The changes between the 2009 and 2020 noise contours are attributed to the decrease in operations flown at the airfield and the removal of the UC-12 aircraft, which were included in the 2009 AICUZ Study, but are no longer utilized at NOLF Cabaniss.

60

60

36

V_{286}

NUECES COUNTY

31

81

V_{357}

13

Legend Figure 3-1

SCALE
0 2,000 Feet

1 3

Source: ESRI 2018; Navy, 2020, BRRC 2020 Ecology and Environment, Inc. 2020

81

36 1 3
NOLF Cabaniss

Runway

Road

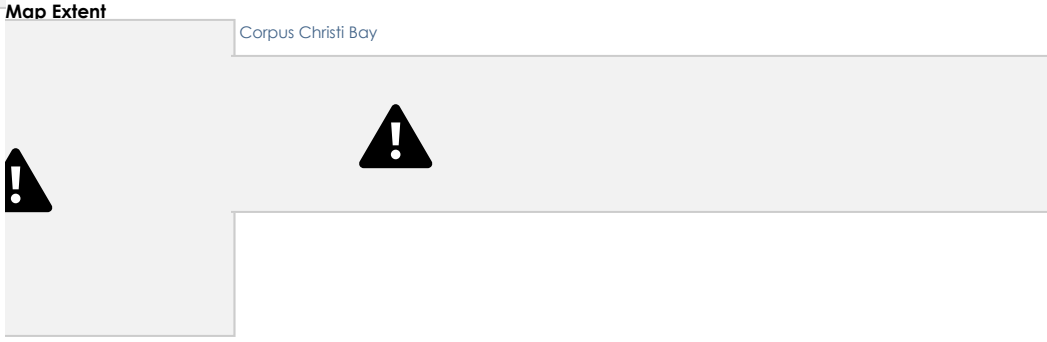
2020 AICUZ Noise Contours (dB)

2020 AICUZ Noise Contours, NOLF Cabaniss

Naval Air Station
Corpus Christi, Texas

Path: L:\Buffalo\CorpusChristi_AICUZ\MAPS\MXDs\Report_AICUZ\Spring_2020\Figure 3-2.mxd 5/8/2020

Map Extent



V286

NUECES COUNTY

V357

81 1 3

3 1

36

Legend

Figure 3-2

SCALE

0 2,000 Feet

Source: ESRI 2018; Navy, 2020, BRRC 2020 Ecology and Environment, Inc. 2020

Path: L:\Buffalo\CorpusChristi_AICUZ\MAPS\MXDs\Report_AICUZ\Spring_2020\Figure 3-3.mxd 5/8/2020

2020 AICUZ Noise Contours (dB)

Noise Gradient (dB)

50

NOLF Cabaniss

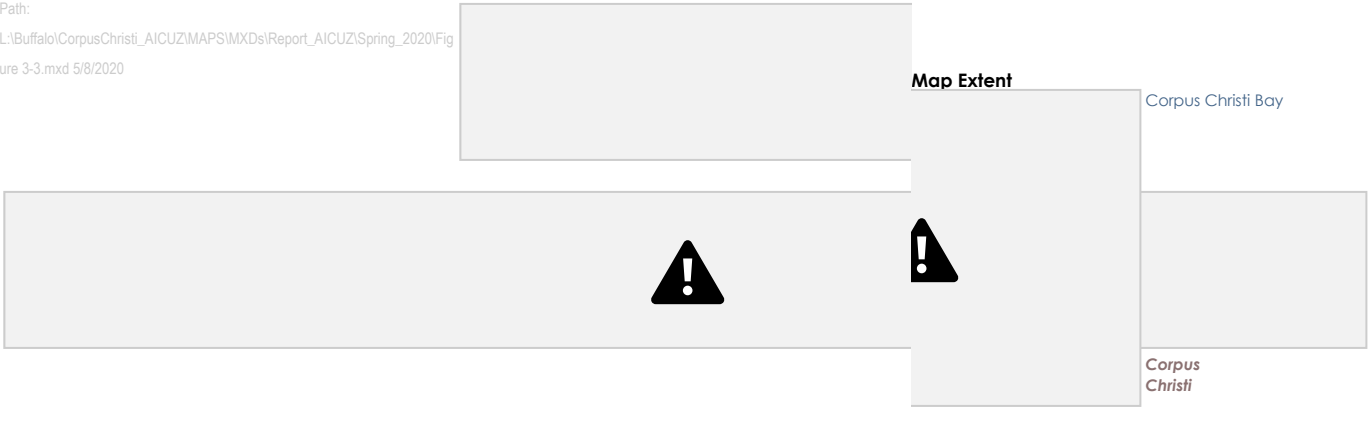
Runway

Road

2020 AICUZ Noise Gradient, NOLF Cabaniss

Naval Air Station Corpus Christi, Texas

Map Extent



81

V_{257}

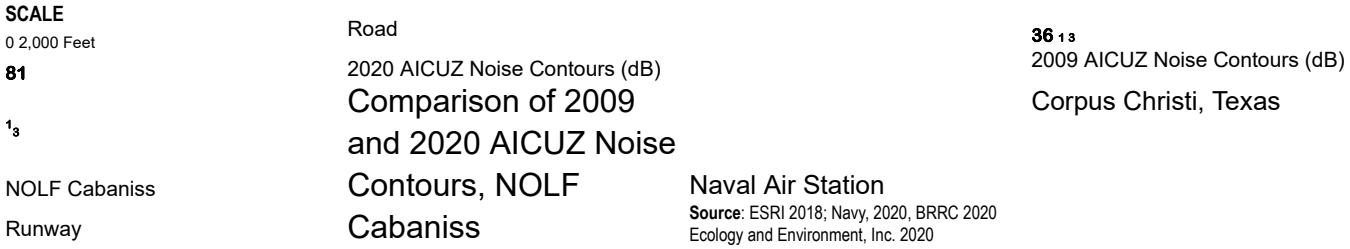
13

36

31

V_{286}

Legend Figure 3-3



2020 AICUZ Study NOLF Cabaniss and NOLF Waldron

3.3.3 NOLF WALDRON 2020 NOISE CONTOURS

The 2020 noise contours for NOLF Waldron extend outside of the airfield boundary, mostly to the northwest and southeast (Figure 3-4). The acreage within the projected noise contours was calculated using a GIS overlay analysis and is presented in Table 3-1. To further describe the noise contours, they are divided into two general areas: inside NOLF Waldron's boundary (on-station) and outside the boundary (off-station). The total area within the projected noise contours is approximately 1,352 acres. There are 580 acres of land outside of the airfield boundary that have a DNL between 60 and 64 dB. Within Noise Zone 2 (65-74 dB DNL) there are approximately 27 acres located off-station. No land within Noise Zone 3 (≥75 dB DNL) is outside of NOLF Waldron's boundary.

TABLE 3-1 AREAS WITHIN THE NOISE ZONES AT NOLF WALDRON

	Noise (DNL)	On-station	Off-station	Total Area (Acres)
2020 AICUZ				
Noise Zone 1	60-64	348.45	579.74	928.19
Noise Zone 2	65-69	230.8	27.34	258.14
	70-74	126.24	0.02	126.26
Noise Zone 3	75-80	32.27	0	32.27
	80-84	6.95	0	6.95
	80+	0	0	0
	TOTAL AREA	**744.7**	**607.1**	**1,351.80**

Sources: Navy 2018; BRRC 2020
Note:
Noise contours shown within Noise Zone 1 include only the 60-64 dB DNL for this analysis. Noise Zone 1 is an area of low or no impact. There are no recommended land use controls for Noise Zone 1 and, as a result, it is not included in the Land Use Compatibility Analysis in Section 5.4.1.

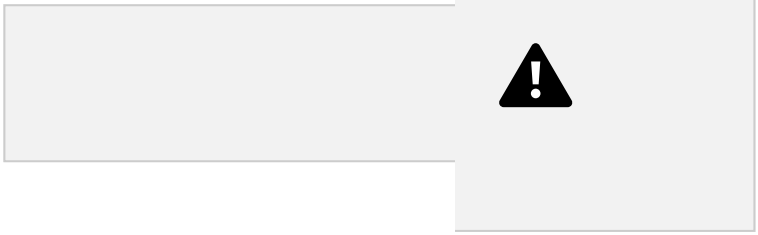
Noise Gradient and Propagation

Similar to NOLF Cabaniss, the sound associated with aircraft operations at NOLF Waldron extends beyond the plotted DNL contours. Figure 3-5 provides a DNL color gradient that illustrates how the noise originating at NOLF Waldron dissipates over the base and the surrounding communities. The highest noise levels are concentrated at the source on NOLF Waldron and decrease to lower levels farther out off-station and into the City of Corpus Christi.

3.3.4 Comparison of Noise Contours for NOLF Waldron

A comparison of the 2009 and 2020 noise contours shows the shape, general location, and DNL levels of each noise footprint. The comparison also shows a decrease in overall size and coverage from the 2009 to the 2020 noise contours, as depicted on Figure 3-6. The 2009 noise footprint covered 2,403 acres, as compared to 1,352 acres for the 2020 footprint (on- and off-station). There was a decrease of approximately 1,101 acres when comparing off-station impacts for the 2009 footprint (1,707.75 acres) to the 2020 footprint (607.1 acres).

The changes between the 2009 and 2020 noise contours are attributed to the number and types of operations projected to occur. Operational changes due to pattern work are projected to increase in comparison to the 2009 AICUZ Study; however, these operations are flown closer to and more centralized within the base, resulting in flight tracks that are closer to the base boundary and extend less into the community.



Corpus Christi Bay **Map Extent**

Corpus Christi

NUECES COUNTY

0

$_{1}$81 $_{3}$

3^{1}

36

Figure 3-4

0 2,000 Feet **SCALE**

1 3

Source: ESRI 2018; Navy, 2020, BRRC 2020
Ecology and Environment, Inc. 2020

36 1 3

81

Legend

NOLF Waldron

Runway

Road

2020 AICUZ Noise Contours (dB)

2020 AICUZ Noise Contours, NOLF

Waldron

Naval Air Station
Corpus Christi, Texas

Path:
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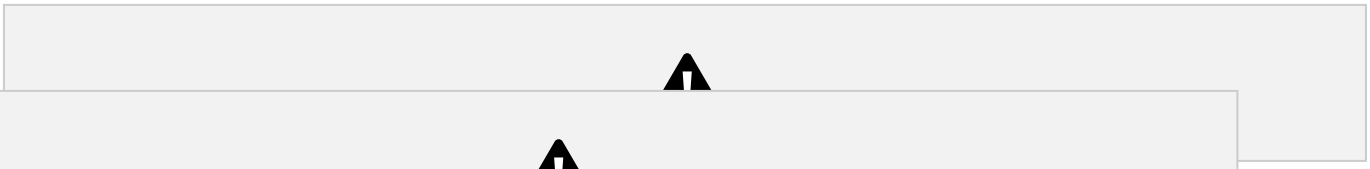
NUECES COUNTY

Corpus Christi



Legend Figure 3-5

0 2,000 Feet **SCALE**

Source: ESRI 2018; Navy, 2020, BRRC 2020 Ecology and Environment, Inc. 2020

18

1 3

81

Path: L:\Buffalo\CorpusChristi_AICUZ\MAPS\MXDs\Report_AICUZ\Spring_2020\Figure 3-6.mxd 5/8/2020

36

NOLF Waldron

Runway

Road

2020 AICUZ Noise Contours (dB)

Noise Gradient (dB)
50

3 1

2020 AICUZ Noise Gradient, NOLF Waldron

Naval Air Station
Corpus Christi, Texas

Corpus Ch

Corpus Ch

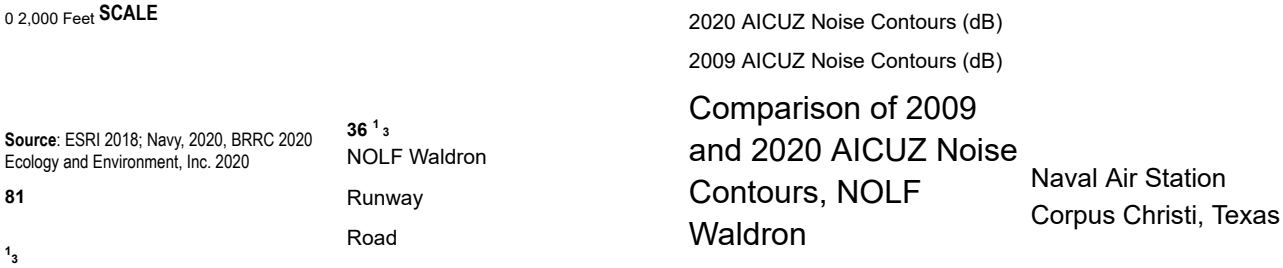
NUECES COUNTY

Map Extent

81 1 3

36

LegendFigure 3-6



3.4 Noise Complaints and Abatement

NASCC employs noise abatement and avoidance procedures for the NOLFs to the best of their ability, commensurate with safety and operational training requirements. Noise abatement procedures are implemented under the Air Ops Manual and are summarized below. The purpose of these procedures is to minimize impacts from aircraft noise. Noise impacts cannot be completely minimized or avoided; therefore, on few occasions, NASCC receives calls from concerned citizens regarding noise and manages those noise concerns and complaints according to the protocol discussed below.

3.4.1 Noise Complaints

There are little to no noise complaints associated with aircraft operations at NOLF Cabaniss and NOLF Waldron. NASCC does not have a designated noise complaint hotline. If a noise complaint is called in, it is typically captured by the receiver and sent to the airfield management office. There, the duty officer processes the complaint and sends it via email to the associated squadron and to the CPLO. The CPLO then processes and responds to it accordingly.

3.4.2 Noise Abatement

There are measures in place to reduce noise impacts for NASCC and the associated outlying fields, including NOLF Cabaniss and Waldron. Noise abatement procedures for NASCC include the following:

- Employ prudent airmanship techniques to reduce aircraft noise impacts on the surrounding community;
- Avoid overflight of schools, including Texas A&M University–Corpus Christi, and nearby local schools; and
- Avoid overflight of the Barney M. Davis Energy Center (NASCC 2019).

AIRFIELD SAFETY

Community and airfield safety are paramount to the Navy. The Navy has established a flight safety program and areas of accident potential around NASCC and the two NOLFs to assist in planning for health, safety, and welfare in communities near the airfields. Cooperation between the Navy and local communities can improve land use planning and development surrounding naval airfields. APZs in this 2020 AICUZ Study were developed based on NASCC's unique training environment based on the projected annual aircraft operation as described in Chapter 3, Aircraft Noise. The following sections present the 2020 AICUZ APZs for NOLF Cabaniss and NOLF Waldron, including a detailed analysis of the areas within them. Also provided are comparisons and figure overlays for the 2020 AICUZ Study and the 2009 AICUZ APZs. These comparisons help identify changes to the APZs based on projected aircraft operations and help target land use recommendations to mitigate incompatible development. Identifying safety issues assists the community in developing land uses compatible with airfield operations. These issues include areas of accident potential and hazards around the airfield that obstruct or interfere with aircraft arrivals and departures, pilot vision, communications, or aircraft electronics. While aircraft mishaps are rare, they do occur. Flight safety programs are designed to reduce hazards that cause aircraft mishaps; APZs are designed to minimize harm if a mishap occurs. Flight safety not only includes measures for pilot safety during aircraft operations, but also for the safety of those in the community. APZs are not a prediction of the

number of accidents that have occurred or the odds of an accident occurring. APZs only reflect the most likely location of an accident. Airfield safety at NOLF Cabaniss and NOLF Waldron is discussed in detail in this chapter.

4.1 Accident Potential Zones

Recognizing the need to identify areas of accident potential, in the 1960s, 1970s, and 1980s the military conducted studies of historical accidents 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 studies, the DOD identified APZs as areas where an aircraft accident would most likely occur, if one were to occur.

APZs align with departure, arrival, and pattern flight tracks. While APZs are not a prediction of the number of accidents or the odds of an accident occurring, APZs reflect the most likely location of an accident and are designed to minimize potential harm if a mishap were to occur by limiting activities in these locations. The Navy and local planning authorities use APZs to ensure compatible development in proximity to runway ends and slightly beyond. Although the likelihood of an accident is remote, the Navy recommends that land uses that concentrate large numbers of people, such as apartments, churches, and schools, are not located within APZs.

4.1.1 Clear Zone and APZ Requirements and Dimensions

APZ configurations and dimensions are derived from the AICUZ Instruction and are established for all runway classifications. There are three 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.

DOD fixed-wing runways are separated into two classes, Class A and Class B. Class A runways are primarily used by light aircraft and do not have the potential for intensive use by heavy or high-performance aircraft. Class B runways are all other fixed-wing runways. The runways at NOLF Cabaniss and NOLF Waldron are designated as Class A. The AICUZ Instruction defines the components of standard APZs for Class A runways as shown on Figure 4-1 and described below:

- Clear Zone. The Clear Zone extends 3,000 feet immediately beyond the end of the runway. The Clear Zone measures 1,000 feet in width at the runway threshold and to its outer edges. 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 that still has a measurable potential for aircraft accidents relative to the Clear Zone. APZ I is provided under flight tracks that experience 5,000 or more annual operations (departures or approaches). APZ I is 1,000 feet in width and 2,500 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) 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. The dimensions of APZ II are 1,000 feet in width by 2,500 feet in length and, as with APZ I, may be curved to correspond with the

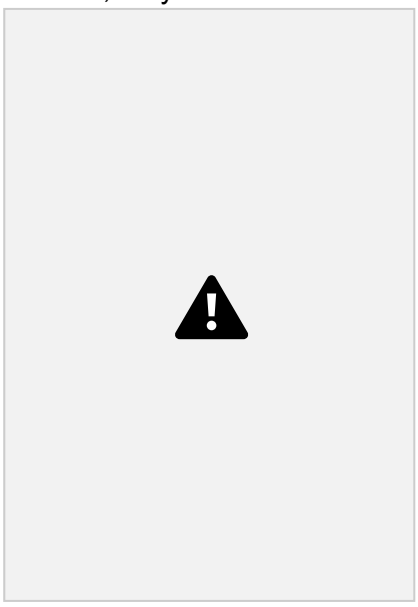


FIGURE 4-1 STANDARD CLASS A RUNWAY, FIXED-WING APZS

APZs extend from the end of the runway, but apply to the predominant arrival and/or departure flight tracks used by the aircraft. The AICUZ Instruction permits modification of APZ dimensions for safety purposes and specific operations. Per the AICUZ Instruction, if the APZ annual operations threshold is fulfilled due to Field Carrier Landing Practice (FCLP) or similar pattern operations, then APZ II can extend the entire length of the FCLP track, resulting in a closed loop for the entire pattern. Modification can result in varying lengths of APZ II based on the specific flight track and the point at which it exits the Clear Zone.

Due to safety concerns, most land uses within the Clear Zone are incompatible with military aircraft operations. Within APZ I and APZ II, some land uses are compatible; however, people-intensive uses (e.g., schools, apartments, churches) should be restricted because of the greater risk. Chapter 5, Land Use Compatibility Analysis, further explains land use compatibility within Clear Zones and APZs.

4.2 AICUZ Clear Zones and APZs

The following sections present the 2020 APZs for NOLF Cabaniss and NOLF Waldron, including a detailed analysis of their development and the areas exposed to them. Also provided are comparisons and figure overlays with the historic 2009 APZs. The comparisons identify changes to

APZs based on projected aircraft operations. An analysis of land use and compatibility within the APZs for the airfields are provided and discussed in Section 5.4, Land Use Compatibility Analysis.

4.2.1 NOLF Cabaniss 2020 Clear Zones and APZs

Clear Zones and APZs that were developed according to projected annual aircraft operations for NOLF Cabaniss are presented in Figure 4-2. The projected APZs graphically represent the detailed aircraft operations counts, flight tracks, and runway utilization data presented in Section 2.4.1, NOLF Cabaniss Annual Operations, and according to AICUZ Instruction APZ development guidance. All runways at NOLF Cabaniss are active; therefore, Clear Zones are applied. The APZ closed loops associated with Runway 18/36 are located closely
together; as such, small gaps of areas between the two sets of APZs were closed in to create a larger area for simplicity in the land use compatibility analysis. This way, there are not small areas of land between the two APZ closed loops where there would not be any compatibility recommendations. Acreages associated with the projected APZs are provided in Table 4-1 and are discussed in this section and in Chapter 5, Land Use Compatibility Analysis.

TABLE 4-1 AREAS WITHIN THE CLEAR ZONES AND APZS AT NOLF CABANISS

	On-station	Off-station	Total Area (Acres)
2020 AICUZ			
Clear Zone	162.5	112.9	275.4
APZ I	3.5	364.1	367.6
APZ II	64.5	677.9	742.4
TOTAL AREA	**230.5**	**1,154.90**	**1,385.40**

4.2.2 Comparison of Clear Zones and APZs for NOLF Cabaniss

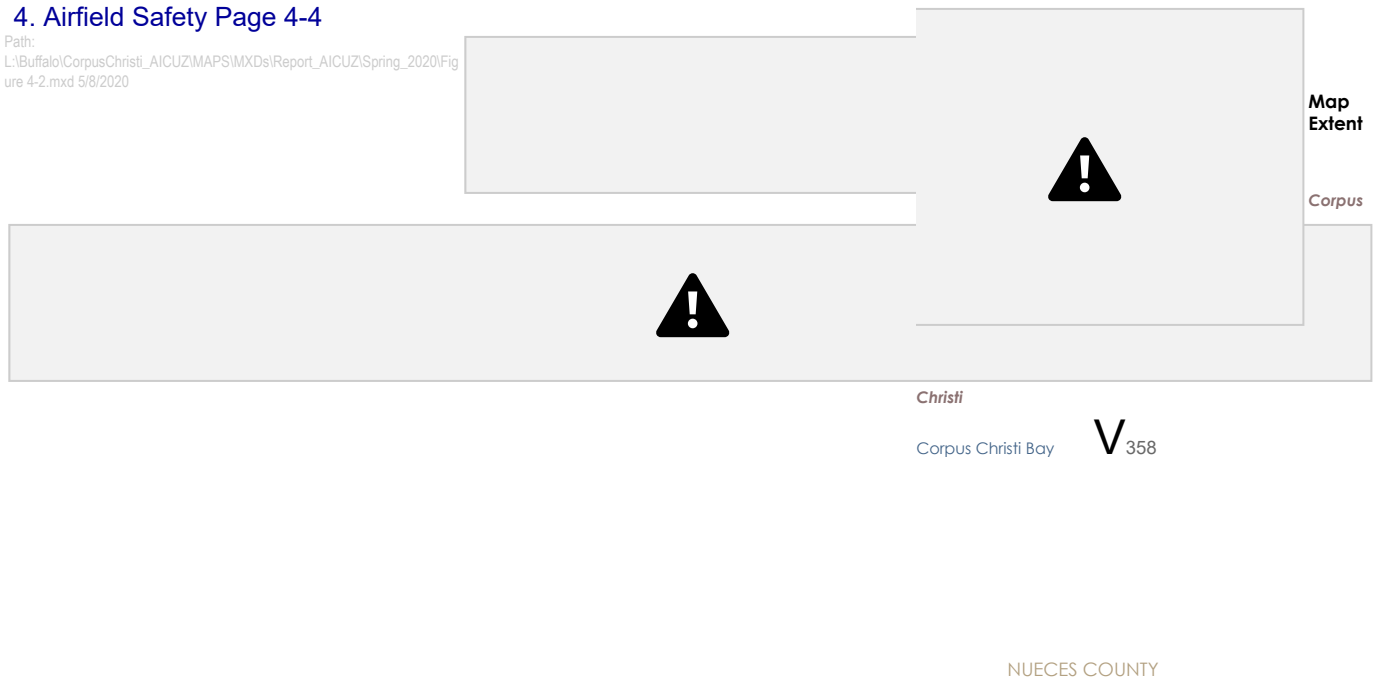
Figure 4-3 compares NOLF Cabaniss' Clear Zones and APZs in the 2009 AICUZ and 2020 AICUZ. The Clear Zones and APZs are organized by on-station and off-station. When comparing acreage under the 2009 AICUZ and the 2020 AICUZ Clear Zones and APZs , the following should be noted:

- The 2009 AICUZ Clear Zone and APZ footprints covered 1,276.50 acres, as compared to 1,385.4 acres for the 2020 AICUZ (on- and off-station);
- There was an increase of 62.8 acres when comparing off-station impacts for the 2009 AICUZ (1,092.10 acres) to the 2020 AICUZ (1,154.90 acres); and

There are 112.9 acres within the Clear Zones at NOLF Cabaniss that are located outside the base boundary.

The acreage increases are attributed, in part, to the closed loops of the APZs associated with Runway 18/36 and Runway 13. While some similarities exist in the structure of the 2009 and 2020 APZs, there are some key differences, including the addition of an APZ I and APZ II to the approach end of Runway 36. The pattern operations meet the APZ criteria, resulting in closed loop APZ I and APZ II for the entire flight pattern. Pattern operations at NOLF Cabaniss include touch-and-go flight patterns which are similar to FCLP patterns.[2] In the 2009 AICUZ, only a Clear Zone was applied to the approach end of Runway 36. Additionally, changes in operations dictate the alterations in the projected APZs compared to the historic.

[2] FCLPs are training procedures that simulate landing an aircraft on the flight deck of an aircraft carrier. Similar to a touch-and go, FCLPs have specific altitudes, turning radii, and power settings in order to replicate, as closely as possible, the procedures of landing on an aircraft carrier. The pattern operations at NOLF Cabaniss were considered FCLPs for APZ development purposes in accordance with OPNAVINST 11010.36C, Air Installations Compatible Use Zones (AICUZ) Program.



81

V_{357}

1 3

V_{286}

3 1

36

Legend Figure 4-2

SCALE
0 2,000 Feet

81

1 3

Source: ESRI 2018; Navy, 2020, BRRC 2020 Ecology and Environment, Inc. 2020

36 1

Path: L:\Buffalo\CorpusChristi_AICUZ\MAPS\MXDs\Report_AICUZ\Spring_2020\Figure 4-3.mxd 5/8/2020

3

NOLF Cabaniss Runway

Road

2020 AICUZ APZs Clear Zone

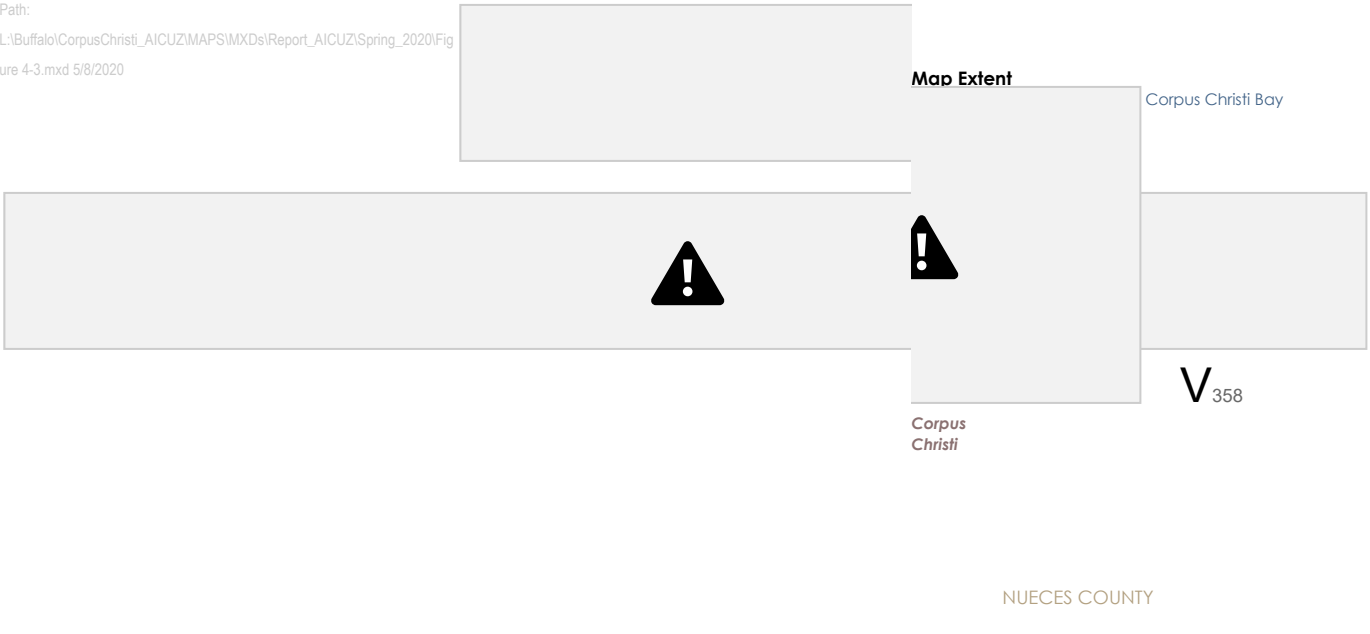
APZ I

APZ II

2020 AICUZ Clear Zones and Accident Potential Zones, NOLF

Cabaniss

Naval Air Station Corpus Christi, Texas



81

V_{357}

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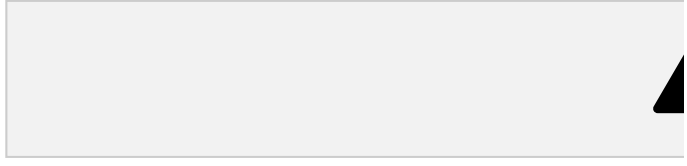
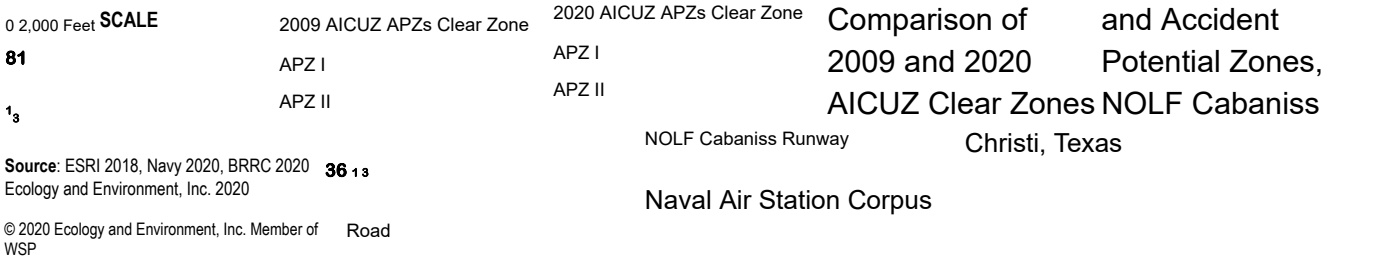
$^{36}_{3}{}^{1}$

V_{286}



Legend Figure 4-3



2020 AICUZ Study NOLF Cabaniss and NOLF Waldron

4.2.3 NOLF WALDRON 2020 CLEAR ZONES AND APZS

Clear Zones and APZs that were developed according to projected annual aircraft operations for NOLF Waldron are presented in Figure 4-4. The APZs graphically represent the detailed aircraft operations counts, flight tracks, and runway utilization data presented in Section 2.4.2, NOLF Waldron Annual Operations, and according to AICUZ Instruction APZ development guidance. All runways at NOLF Waldron are active; therefore, Clear Zones are applied. Acreages associated with the planning APZs are provided in Table 4-2 and are discussed in this section and in Chapter 5, Land Use Compatibility Analysis.

TABLE 4-2 AREAS WITHIN THE CLEAR ZONES AND APZS AT NOLF WALDRON

	On-station	Off-station	Total Area (Acres)
2020 AICUZ			
Clear Zone[1]	207.8	65.3	273.1
APZ I	27.2	497.4	524.6

APZ II	3.4	771.1	774.5
TOTAL AREA	**238.4**	**1,333.80**	**1,572.20**

Notes:
[1] The Clear Zones for Runway 13 and Runway 18 overlap with each other. The total amount of overlap between the two Clear Zones is 1.96 acres.

4.2.4 Comparison of Clear Zones and APZs for NOLF Waldron

Figure 4-5 compares NOLF Waldron's Clear Zones and APZs in the 2009 AICUZ and 2020 AICUZ. The Clear Zones and APZs are organized by on-station and off-station. When comparing acreage under the 2009 AICUZ and 2020 AICUZ Clear Zones and APZs, the following should be noted:

- The 2009 AICUZ Clear Zone and APZ footprints covered 1,020.30 acres, as compared to 1,572.2 acres for the 2020 AICUZ (on- and off-station);
- There was an increase of 533.30 acres when comparing off-station impacts for the 2009 AICUZ (800.50 acres) to the 2020 AICUZ (1,333.80 acres); and
- There are 65.3 acres within the Clear Zones at NOLF Waldron that are located outside the base boundary.

The acreage increases are largely attributed to the addition of the closed loop APZs associated with Runway 13/31 and 18/36. The 2020 APZs expanded compared to the 2009 AICUZ APZs due to the projected increase in annual operations at NOLF Waldron. Section 2.4.2, NOLF Waldron Annual Operations, details the projected increase in operations based on the 2018 Final EA for Providing Outlying Field Capabilities to Support T-6 Undergraduate Pilot Training. The operational increase at NOLF Waldron is mostly due to pattern work. The pattern operations meet the APZ criteria, resulting in closed loop APZ I and APZ II for the entire flight pattern. Pattern operations at NOLF Waldron include touch-and-go flight patterns which are similar to FCLP

patterns.[3] This change in operations lead to changes in flight tracks, and therefore, APZs, resulting in APZs that are primarily the result of closed loop APZs.

[3] FCLPs are training procedures that simulate landing an aircraft on the flight deck of an aircraft carrier. Similar to a touch-and go, FCLPs have specific altitudes, turning radii, and power settings in order to replicate, as closely as possible, the procedures of landing on an aircraft carrier. The pattern operations at NOLF Waldron were considered FCLPs for APZ development purposes in accordance with OPNAVINST 11010.36C, Air Installations Compatible Use Zones (AICUZ) Program.

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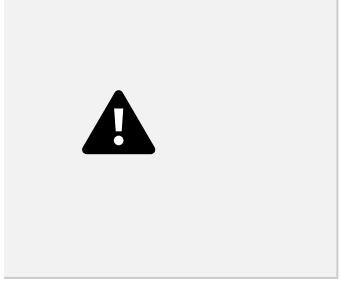

Corpus Christi Bay **Map Extent**

Corpus Christi

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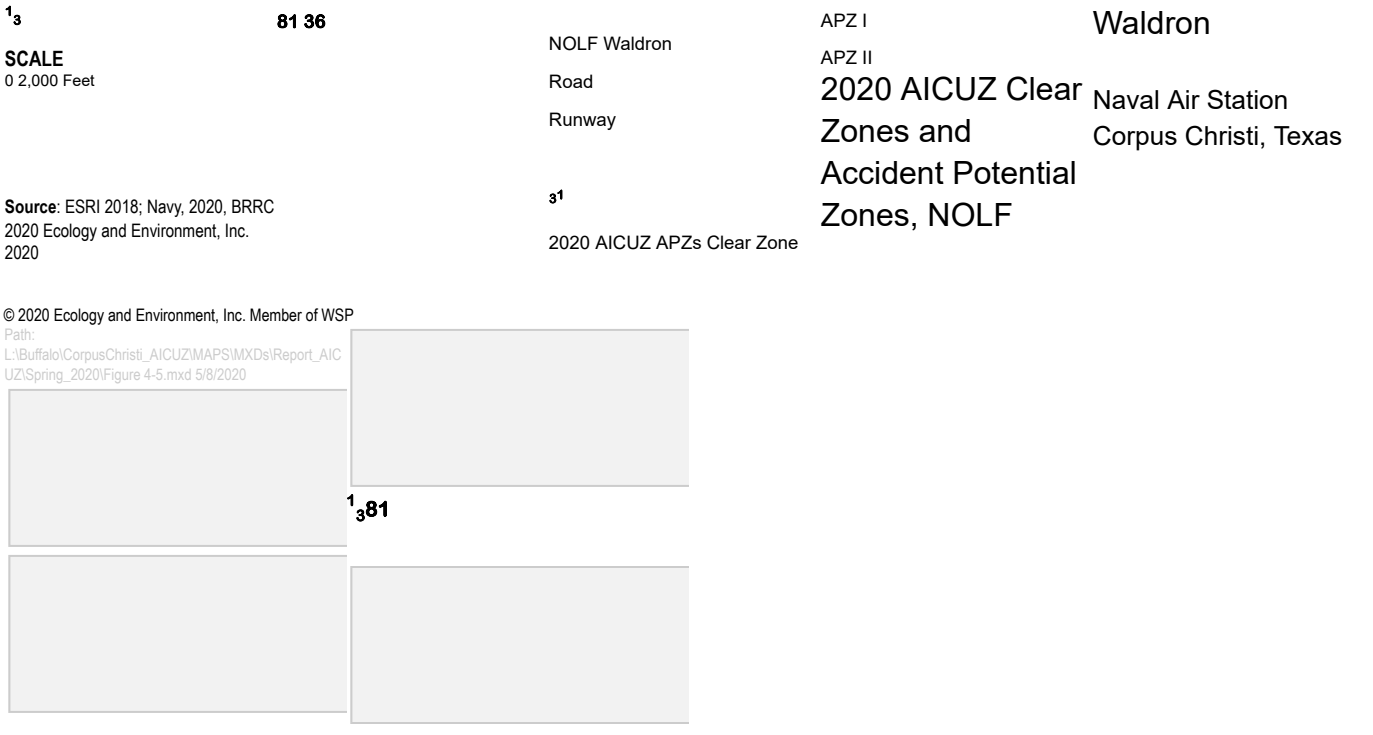

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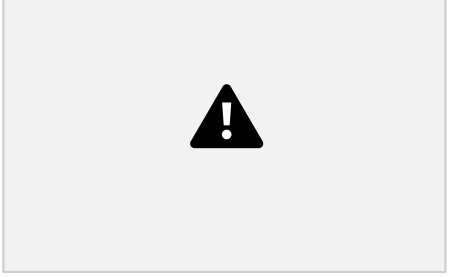

Corpus Christi Bay **Map Extent**

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Corpus Christi

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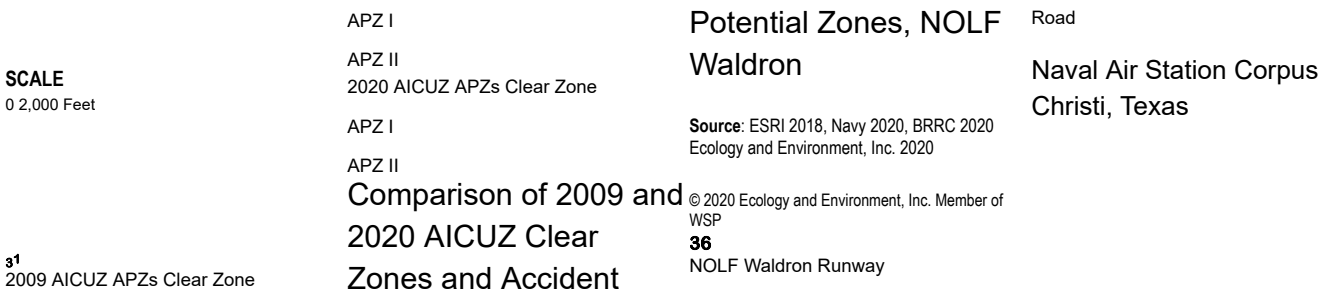
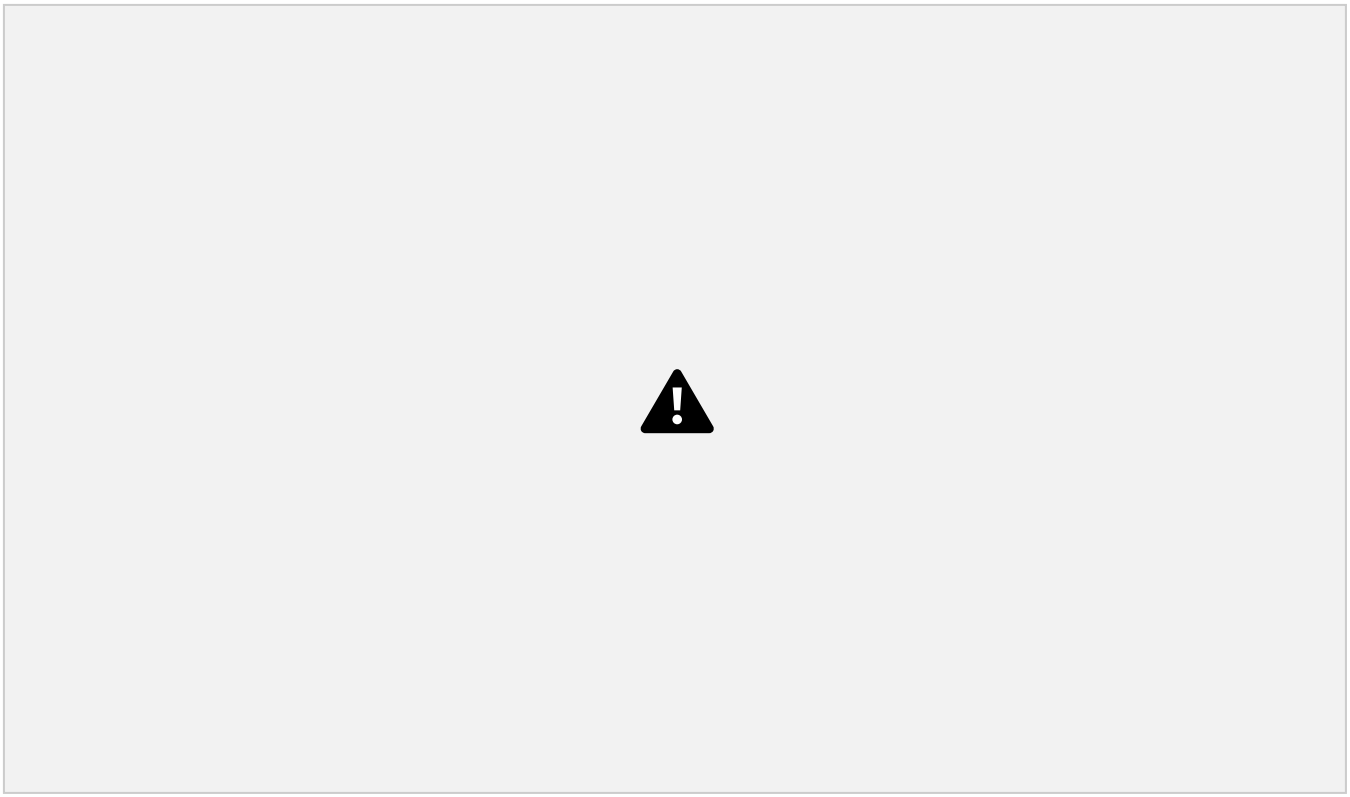


2020 AICUZ Study NOLF Cabaniss and NOLF Waldron

4.3 IMAGINARY SURFACES

The Navy and the 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. In general, no aboveground structures are permitted in the primary surface of Clear Zones, and height restrictions apply to transitional surfaces as well as approach and departure surfaces. Height restrictions are more stringent nearing the runway and flight path. As discussed previously, all runways at NOLF Cabaniss and NOLF Waldron are Class A runways, with NOLF Waldron utilizing the Basic Training Outlying Fields (T-34) criteria based on a permanent waiver from the Naval Air Systems Command. An illustration of the imaginary surfaces for fixed-wing Class A runways is provided as Figure 4-6, and an illustration of the isometric airspace/imaginary surfaces for Basic Training Outlying Fields (T-34) is provided as Figure 4-7. Figures 4-8 and 4-9 illustrate the imaginary surfaces specific to NOLF Cabaniss and NOLF Waldron, respectively.

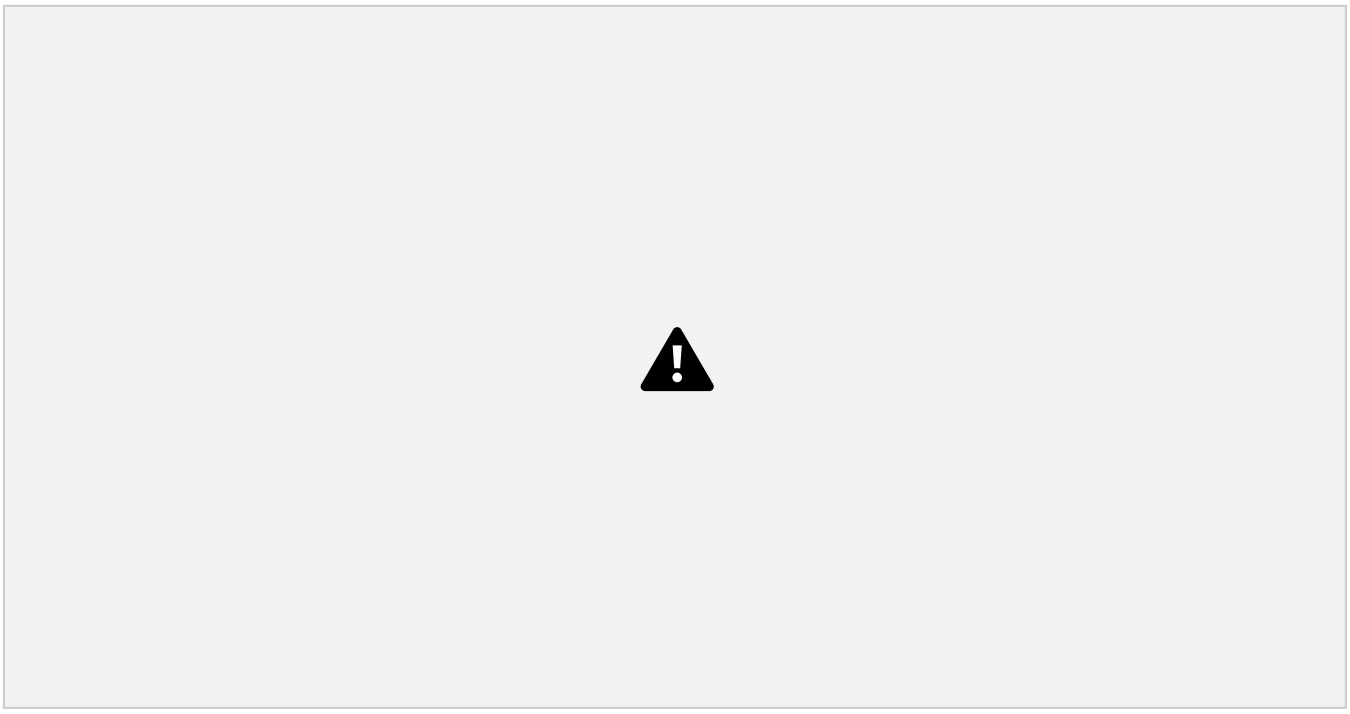
FIGURE 4-6 IMAGINARY SURFACES AND TRANSITION PLANES FOR CLASS A RUNWAY



Source: UFC 2-200-05N, Figure II-1, Appendix E

4. Airfield Safety Page 4-11
2020 AICUZ Study NOLF Cabaniss and NOLF Waldron

FIGURE 4-7 ISOMETRIC AIRSPACE/IMAGINARY SURFACES FOR BASIC TRAINING OUTLYING FIELD (T-34 AIRCRAFT)



Source: UFC 2-200-05N, Figure II-12, Appendix E

4. Airfield Safety Page 4-12

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Portland

V361

Ingleside

Corpus Christi Bay

¤77

V44

Approach

Departure Clearance Surface (Horizontal) Approach

Departure Clearance Surface (Slope) Clear Zone

Conical Surface

Inner Horizontal Surface Laguna

Outer Horizontal Surface Largo

Primary Surface

Transitional Surface

Madre

Gulf of Mexico

Laguna

NAS CORPUS CHRISTI/TRUAX FIELD

NUECES COUNTY

KLEBERG COUNTY

Airfield Imaginary Surface

V22 V361 **NOLF WALDRON**

Oso Bay

81

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Military Area

Urban Area

Source: ESRI 2018; Navy, 2020 Road Ecology and Environment, Inc. 2020

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Legend

Waterbody

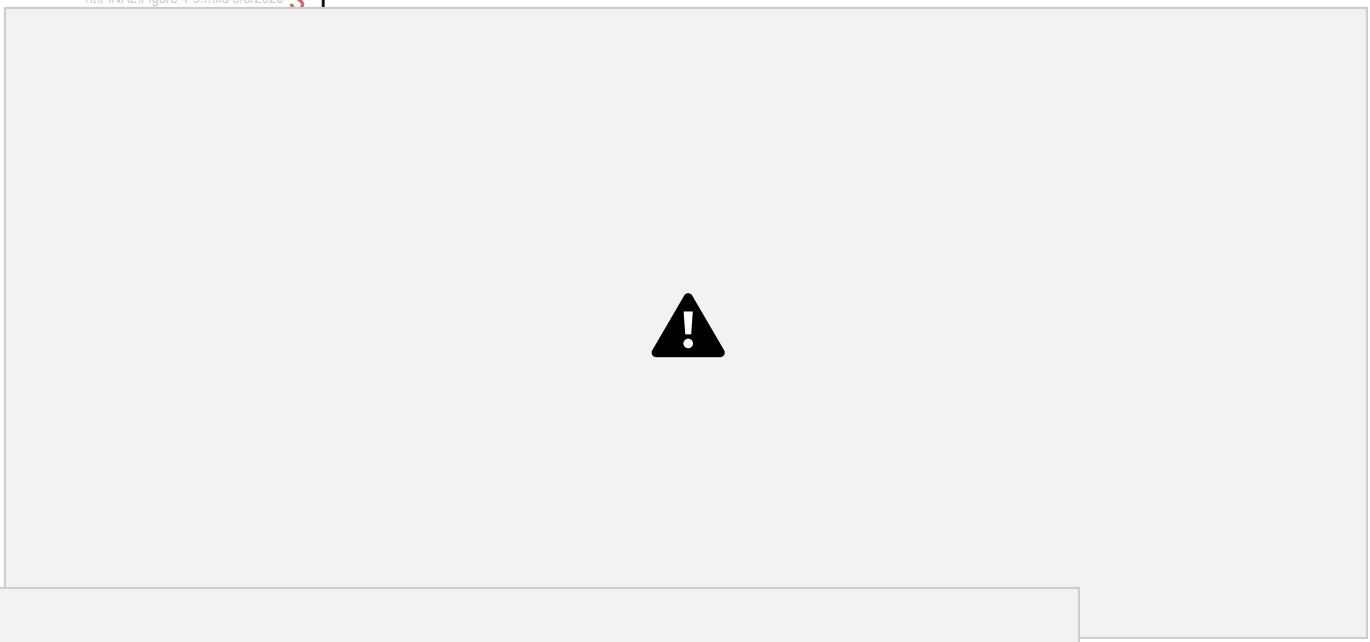
Airport

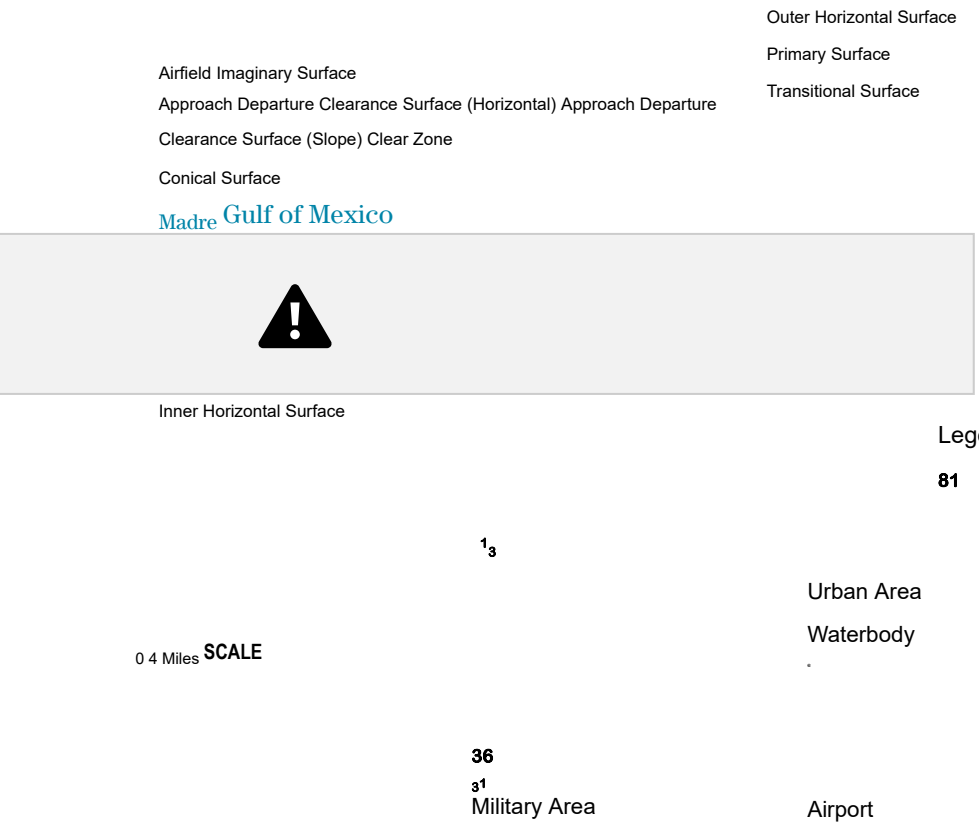
County Boundary

Figure 4-8

Imaginary Surfaces for NOLF Cabaniss

Naval Air Station
Corpus Christi, Texas





4.4 HEIGHT AND OBSTRUCTION

CONCERNS 4.4.1 BIRD/ANIMAL AIRCRAFT

STRIKE HAZARDS

Bird/animal aircraft strike hazards (BASH) are another safety concern to aircraft operations. Birds and wildlife are drawn to different habitat types found in the airfield environment (e.g., edges, grass, brush, forest, water, and warm pavement). Because of the speed of the aircraft, collisions with wildlife can have considerable force and can cause substantial damage. 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. To reduce 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, and dredge disposal sites. Design modifications can reduce the appeal of these land uses for birds and other wildlife.

The Navy BASH program aims to minimize the risk of collisions involving birds/wildlife and aircraft and the subsequent loss of life and property. The BASH abatement program accomplishes this through awareness, avoidance, monitoring, and actively controlling bird and animal population movements. Some of the procedures outlined include monitoring the airfield for bird and other wildlife

activity, issuing bird hazard warnings, installing and maintaining bird/wildlife avoidance measures, initiating bird/wildlife avoidance procedures when potentially hazardous bird/wildlife activities are reported, and submitting BASH reports for all incidents. NASCC has an effective BASH program that involves the distribution of information and active and passive measures to control how birds use the critical areas around the airfield. Methods outlined in the plan to reduce BASH risk at the airfield include habitat management, bird dispersal, depredation, and bird avoidance.

The United States Navy, Commander Navy Installations Command has entered into an agreement with the U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services (APHIS WS) to provide assistance to mitigate potential and realized wildlife hazards at Navy air stations. APHIS WS is recognized as the appropriate agency to conduct wildlife hazard management at military installations, as well as civilian airports, to reduce wildlife hazards. APHIS WS has assigned two full-time wildlife biologists at NASCC
to conduct Wildlife Hazard Assessments and mitigate wildlife hazards on the airfield. NASCC also has a natural resources manager who works with the two BASH staff at the installation to mitigate potential wildlife hazards. Aircrews flying in and around NASCC will continue to adhere to the BASH program and flight operations standard operating procedures, using all available resources to minimize exposure during higher risk times of day and migration periods.

4.4.2 Electromagnetic Interference

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 activities that create electromagnetic interference (EMI). The American National Standards Institute defines EMI as any electromagnetic disturbance that interrupts, obstructs, or otherwise degrades or limits the effective

performance of electronics/electrical equipment. EMI can be intentional, 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. For air operations, EMI is a concern because it can disrupt navigation and communications equipment. There also have been reports of EMI affecting aircraft fuel systems, warning lights, and propulsion. Any of these disruptions could lead to loss of aircraft and life. Questions about EMI with existing and/or proposed development can be directed to NASCC's CPLO.

4.4.3 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 can cause a spot, or "halo," to remain at the center of the visual field for a few seconds or more, rendering a pilot 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 can take 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 flash blindness, glare, disruptions, and distractions. These are most hazardous during critical phases of flight—landings, takeoffs, and emergency maneuvers. There is also concern about urban lighting that is not downward-directed, as well as the potential impacts of light-emitting diode, or "LED," lights on pilots who are training with night vision goggles.

4.4.4 Smoke, Steam, and Dust

Land uses that generate sources of smoke, dust, and steam in the airfield vicinity could obstruct the pilot's vision during takeoff, landing, or other periods of low-altitude flight. Examples include dust from agricultural activities and thermal plumes from geothermal industries.

4.5 Other Potential Compatibility Concerns

In addition to the typical height obstruction concerns that most Navy installations plan and mitigate for, NASCC also has local issues that they monitor and work toward alleviating. Construction activities around Corpus Christi occasionally require cranes. Near NOLF Cabaniss in particular, the installation has experienced issues with cranes going up in Class D airspace. The FAA states that anything taller than 200 feet and located within 50,000 feet of a military airfield must file a notification prior to construction. On several instances, NASCC has experienced cranes erected near NOLF Cabaniss and has had difficulty coordinating with the FAA. As the cranes are off base, the installation has no authority to remove them, however they can file an objection with the FAA. The issue is then at the FAA's discretion on whether to allow the crane to remain. If the FAA denies the installation's objection, the Navy files a Notice to Airmen, so aviators are aware of the obstruction.

NASCC also closely monitors wind energy development in the area. Texas ranks first nationally for both installed and under construction wind capacity in the United States, with over 29 gigawatts of wind production (AWEA 2020). In the past, wind development in the state has been largely unregulated and allowed to be

located relatively close to military installations. In 2017, the Texas State Legislature passed a bill which exempted all wind farms within 25 nautical miles of a military base from receiving tax incentives. As wind development continues in Texas, the military is working closely with state officials to better guide where wind development would be appropriate, so as not to interfere with military operations. In south Texas, including in the vicinity of NASCC, wind development has and continues to surge. In 2017, the 81-turbine Chapman Ranch Wind Farm began operating. This wind farm is located just south of Corpus Christi, near the Chapman Ranch area, approximately 6.5 miles southwest of NOLF Cabaniss and 12 miles west of NOLF Waldron. Base officials will continue to monitor proposed wind developments in the area and work closely with local landowners, wind developers, CNATRA, as well as local, state, and federal governments to coordinate suitable locations for wind development where military activities would not be impacted.

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5.1 Planning Authorities

5.2 Land Use, Zoning, and Proposed Development

5.3 Land Use Compatibility Guidelines and

Land Use Compatibility

Analysis

5.1 Planning Authorities

Successful AICUZ land use compatibility implementation is the collective responsibility of the Navy, state and local governments, and private sector and non profit organizations. This chapter discusses federal, state, and local planning authorities, regulations, and programs that encourage compatible land use.

This AICUZ Study presents data to encourage cooperative land use planning between NASCC and the surrounding communities so that operational impacts on adjacent lands are minimized and future growth and development are compatible with the operational missions.

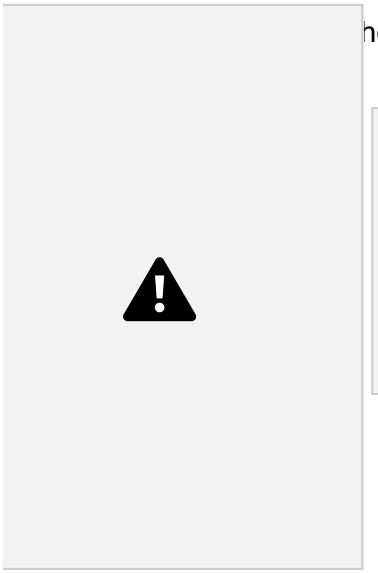
NASCC's NOLF Cabaniss and NOLF Waldron are located within the City of Corpus Christi in Nueces County. The majority of the AICUZ footprint for each NOLF is located within the City of Corpus Christi. Development and control of land use outside the installation are beyond the jurisdiction of the Installation CO. Therefore, federal, state, and local land use planning programs; ordinances; and regulations manage this land. These programs, ordinances, and regulations often have specific coordination efforts and considerations related to NASCC, as described in the following sections.

5.1.1 City of Corpus Christi

Corpus Christi City Council established comprehensive planning as a government function to guide, regulate, and manage development within the corporate limits and extraterritorial jurisdiction (ETJ) of the city to assure best uses of resources and public interest, as noted in the City Charter. The City Council adopted the Comprehensive Plan, called Plan CC, in September 2016. Plan CC provides a 20-year framework to guide planning in Corpus Christi and is comprised of several elements, including Comprehensive Policy Statements, Area Development Plans, Specific Area Plans, a Future Land Use Master Plan, a Transportation Master Plan, an Annexation Plan, and several utility master plans (City of Corpus Christi 2016).

State law and the City Charter require Comprehensive Plans to be approved and adopted as ordinances by the City Council. After adoption, future city improvements, ordinances, and regulations approved by City Council must be consistent with the Comprehensive Plan. The

City's Planning Commission ("Commission") is an non advisory board to the City Council and is responsible for reviewing land use activity and proposed development to ensure consistency with the Comprehensive Plan. Additionally, they make and amend a master plan for the physical development of the City, recommend to the City Council approval or disapproval of proposed changes in the zoning plan, and exercise control over platting or subdividing land within the corporate limits of the city and within an area extending 5 miles beyond city limits. The Commission has nine members appointed by the City Council for three-year staggered terms and may appoint an ex officio,



ne Navy.

Zoning is an instrument granted by the State of Texas which allows cities to develop in a comprehensive and coordinated manner. In Corpus Christi, zoning ensures proper land use relationships; provides sufficient land area for each development type; and allows a change to more intensive uses only in areas with adequate facilities and services, such as streets, schools, recreation areas, and utility systems. The Development Services Department is responsible for administering a number of land development ordinances as well as providing information to the public on zoning and platting. The Corpus Christi Unified Development Code establishes the zoning regulations and districts that have been made in accordance with the City's Comprehensive Plan and for the purpose of promoting the public's general welfare and interest (City of Corpus Christi 2020[a]).

Airport Zoning Board Commission

The Corpus Christi Airport Zoning Board Commission works to preserve, protect, and maintain the importance of the operations of the Corpus Christi International Airport and military flight training mission NASCC. NASCC's CPLO coordinates and communicates with the Commission for updates that may affect the base.

Municipal and County Zoning Authority around Airports

In Texas, municipal zoning is limited to the extent of the city limits. County governments do not have zoning authority to control land use and development in the unincorporated areas except as provided for by the Texas Local Government Code 241, "Municipal and County Zoning Authority around Airports." Cities can enforce subdivision regulations through platting approval within their ETJ, which is the unincorporated area contiguous to the corporate boundaries of the municipality area of land. The extent of a city's ETJ varies from 0.5 mile to 5 miles, based on the number of inhabitants of the municipality, and cannot overlap the ETJ of another city. A city's platting authority is extended to their ETJ under the Texas Local Government Code Chapter 212.

Under House Bill 1640, Texas Local Government Code §397.005 was amended to require defense communities to notify the base of proposed development within 1.5 statute miles from the

centerline of the

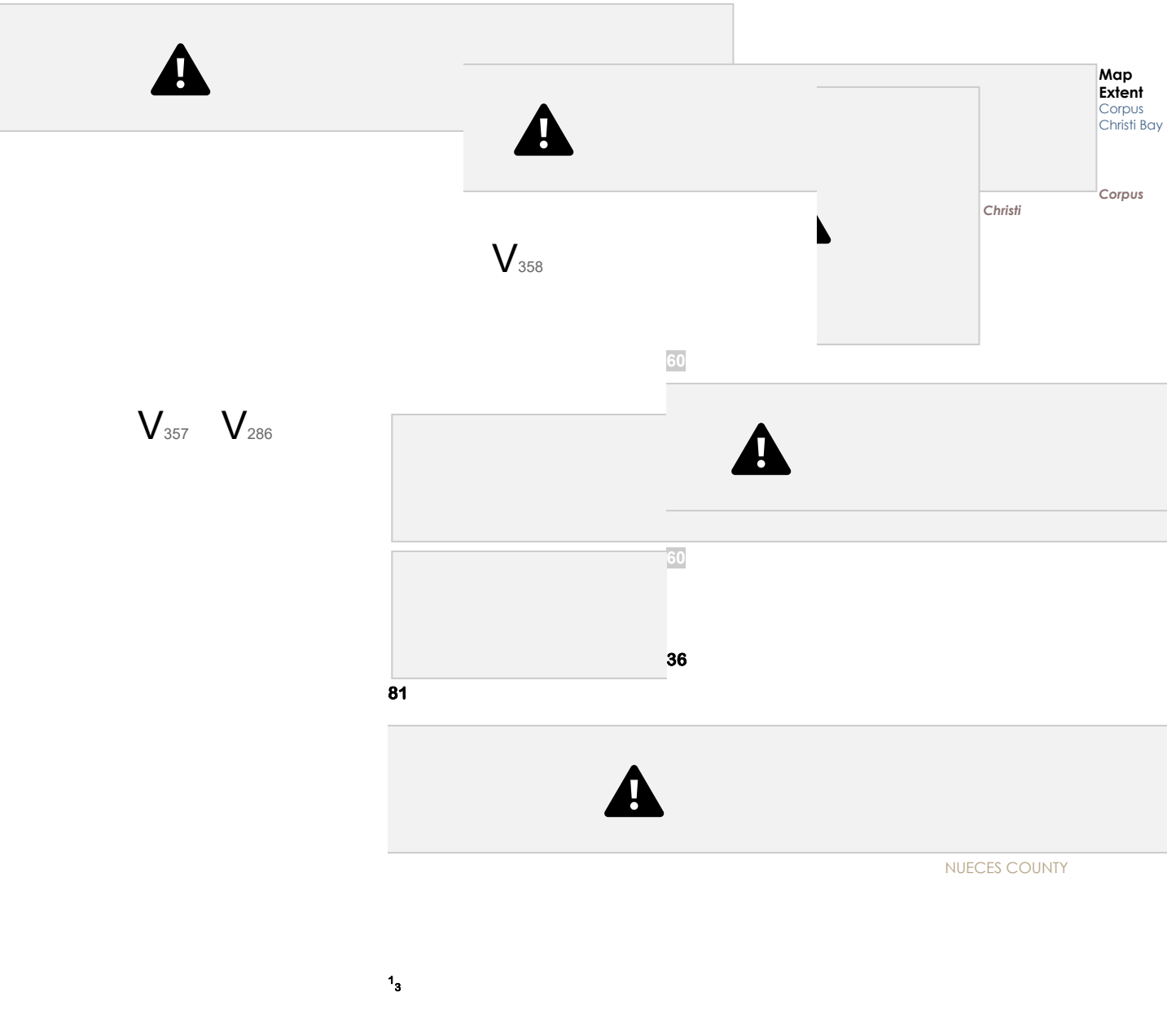
runway and 5 miles from each end of the paved surface of the runway. This coordination helps the base communicate concerns to the communities regarding issues of compatibility with CZs and APZs that could result in mission impacts.

5.2 Land Use, Zoning, and Proposed Development

The AICUZ land use compatibility analysis identifies existing land uses near NOLF Cabaniss and NOLF Waldron to determine compatibility conditions. Existing land use is assessed to determine current land use activities. To analyze and plan for potential growth areas in the city, future land use and zoning data was also analyzed on a more general level. The composite AICUZ footprints (Clear Zones, APZs, and noise contours) for NOLF Cabaniss and NOLF Waldron are used as the basis for the land use compatibility analysis (Figures 5-1 and 5-2, respectively). Recommended strategies for AICUZ implementation are based on the findings from the land use analysis.

5.2.1 Existing Land Use

Existing land use and parcel data were evaluated to ensure an accurate account of land use activities regardless of conformity to zoning classifications or designated planning or permitted use. Zoning districts do not always indicate the actual land use. Typical land use categories include residential, commercial, public use, agricultural, parks/open space, and industrial. Additionally, local management plans, policies, ordinances, and zoning regulations were evaluated to determine the type and extent of land use allowed in specific areas. Land use data was provided by the City of Corpus Christi GIS Services parcel data and, then, verified through aerial photographs and land use maps from the City of Corpus Christi.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Legend Figure 5-1

SCALE
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Source: ESRI 2018, Navy 2020, BRRC 2020 Ecology and Environment, Inc. 2020

36 1
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NOLF Cabaniss Runway

City Limit

Road

2020 AICUZ Noise Contours (dB)

2020 AICUZ APZs Clear Zone

APZ I

APZ II

2020 AICUZ Footprint, NOLF Cabaniss

Naval Air Station Corpus Christi, Texas

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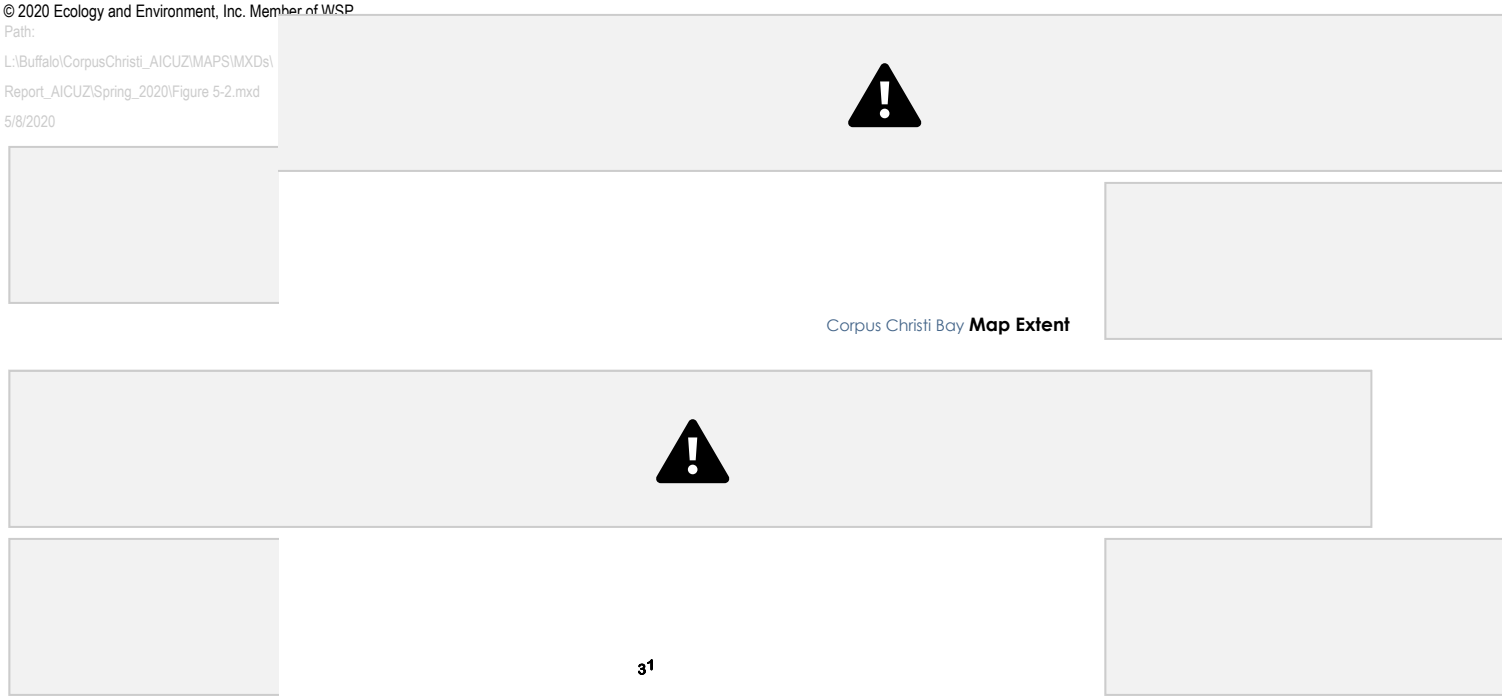

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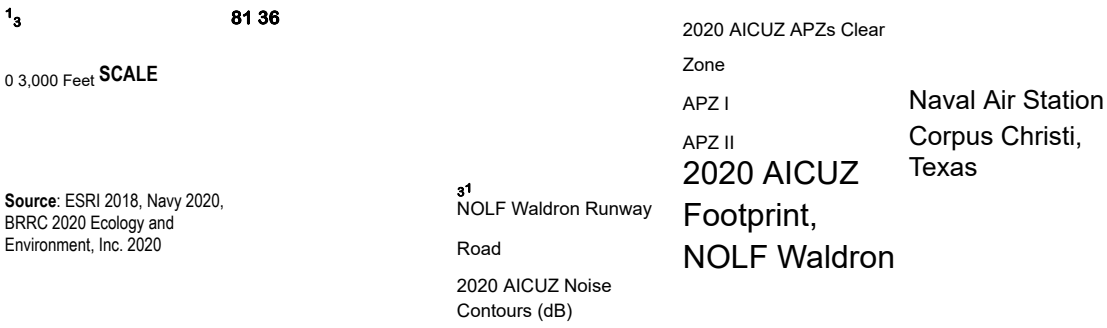

2020 AICUZ Study NOLF Cabaniss and NOLF Waldron

5.2.1.1 NOLF CABANISS

NOLF Cabaniss is located wholly within the City of Corpus Christi city limits. The southern border of the airfield, however, is also the edge of the city limits. Unincorporated Nueces County is

located immediately south of the airfield. The area surrounding the airfield is a mix of rural, agricultural land to the south and more urban to the north, east, and west. Figure 5-3 illustrates the existing land uses surrounding NOLF Cabaniss.

North of the airfield are multiple public use areas, including schools. A high school and elementary school are located north of NOLF Cabaniss across Saratoga Boulevard. Additionally, Corpus Christi Independent School District recently broke ground on the new location of a high school. The high school is being rebuilt and moved from its current location on Weber Road, approximately 2.5 miles northeast of NOLF Cabaniss, to the corner of Saratoga Boulevard and Kostoryz Road (approximately 0.5 mile northeast of the airfield). Set to open in the fall of 2022, the new high school will occupy 60 acres. The Cabaniss Athletic Complex is located adjacent to the airfield along the north entrance road, Ranger Avenue. Other existing land uses north of the airfield include low and medium density residential, mobile home developments, agricultural land, and scattered commercial uses.

Other existing land uses surrounding the airfield include primarily commercial and light industrial uses directly to the east, agricultural lands to the south, and a mix of commercial and light industrial uses to the west. South of the airfield in unincorporated Nueces County, existing land uses are primarily agricultural with some scattered light industrial and residential estates. Table 5-1 lists the total acreage of existing land uses within the APZs of NOLF Cabaniss. As discussed in Section 3.3.1, NOLF Cabaniss 2020 Noise Contours, the noise contours of the airfield are located entirely on military land and therefore not listed in the table. An evaluation of specific land use compatibility concerns is discussed in Section 5.4.1, Compatibility Concerns.

TABLE 5-1 EXISTING LAND USES WITHIN THE NOLF CABANISS APZS

Existing Land Use	Clear Zone	APZ I	APZ II
Agriculture	39.38	154.96	177.29
Conservation/Preservation	-	1.92	30.05
Commercial	-	27.71	37.74
Drainage Corridor	-	0.92	18.34
Estate	<0.01	1.01	-
Light Industrial	0.08	40.27	25.28
Low Density Residential	-	32.19	99.26
Medium Density Residential	-	-	9.32
Mobile Home	-	10.73	26.68
Park	-	-	9.11
Professional Office	-	-	3.66
Public, Semi-Public	33.0	24.68	60.26
Vacant	4.33	30.51	80.25
Water	12.52	0.13	5.65
TOTAL	**89.30**	**325.04**	**582.87**

Notes:
[1] Total acreage presented in Table 5-1 may differ from the off-station acreages presented in Table 4-1 due to available GIS polygons for road rights-of-way.