Final

Environmental Impact Statement

for T-7A Recapitalization at
Columbus Air Force Base, Mississippi

April
2024

Privacy Advisory

This Environmental Impact Statement (EIS) has been provided for public comment in accordance with the National Environmental Policy Act (NEPA), Council on Environmental Quality Regulations for Implementing NEPA (Title 40 Code of Federal Regulations [CFR] Parts 1500–1508), and 32 CFR Part 989, *Environmental Impact Analysis Process (EIAP)*. EIAP provides an opportunity for public input on United States Department of the Air Force (DAF) decision-making, allows the public to offer input on alternative ways for DAF to accomplish what it is proposing, and solicits comments on DAF's analysis of environmental effects.

Public input allows DAF to make better-informed decisions. Letters or other written or verbal comments provided may be published in this EIS. Providing personal information is voluntary. Private addresses will be compiled to develop a mailing list for those requesting copies of this EIS. However, only the names of the individuals making comments and specific comments will be disclosed. Personal information, home addresses, telephone numbers, and email addresses will not be published in this EIS.

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ABBREVIATIONS AND ACRONYMS

°F	degrees Fahrenheit
ACAM	Air Conformity Applicability Model
ACM	asbestos-containing material
AETC	Air Education and Training Command
AFB	Air Force Base
AFFF	aqueous film forming foam
AFH	Air Force Handbook
AFI	Air Force Instruction
AFMAN	Air Force Manual
AGL	above ground level
AICUZ	Air Installations Compatible Use Zones
AmaTerra	AmaTerra Environmental, Inc.
APE	area of potential effect
APZ	accident potential zone
BASH	Bird/Wildlife Aircraft Strike Hazard
BMP	best management practices
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CL&W	Columbus Light and Water
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	equivalent emissions of CO_2
CUD	Compatible Use District
CWA	Clean Water Act
CY	calendar year
CZ	clear zone
DAF	Department of the Air Force
dB	decibels
dBA	A-weighted decibels
DNL	Day-Night Average Sound Level
DoD	Department of Defense
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EISA	Energy Independence and Security Act
EO	Executive Order
ERP	Environmental Restoration Program
ESA	Endangered Species Act
ESQD	Explosive Safety Quantity Distance
FAA	Federal Aviation Administration
FBF	Fighter/Bomber Fundamentals
FEMA	Federal Emergency Management Agency
FSRM	facilities sustainment, restoration, and modernization
ft^2	square foot
FTW	Flying Training Wing
GBTS	ground-based training system
GHG	greenhouse gas
GIS	Geographic Information System
Gryphon	Gryphon Environmental LLC
HDR	HDR, Inc.
HMMH	Harris Miller Miller & Hanson, Inc.
HWMP	Hazardous Waste Management Plan
IDP	Installation Development Plan
IFF	Introduction to Fighter Fundamentals
INRMP	Integrated Natural Resources Management Plan
ISWMP	Integrated Solid Waste Management Plan
JBSA	Joint Base San Antonio
JLUS	Joint Land Use Study
LBP	lead-based paint
L_{dnmr}	Onset-Rate Adjusted Monthly Day-Night Average Sound Level
L_{eq}	Equivalent Sound Level
L_{max}	Maximum Sound Level
MBTA	Migratory Bird Treaty Act
MDAH	Mississippi Department of Archives and History

MDEQ	Mississippi Department of Environmental Quality
MILCON	military construction
MMRP	Military Munitions Response Program
MNHP	Mississippi Natural Heritage Program
MOA	Military Operations Area
MSL	mean sea level
MTR	Military Training Route
N/A	not applicable
NA	Number of events (at or) above a specified threshold
$NA75L_{max}$	total number of events that meet or exceed 75 dB L_{max}
NA90SEL	total number of events that exceed 90 dB SEL
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NH_3	ammonia
NHPA	National Historic Preservation Act
NIPTS	Noise Induced Permanent Threshold Shifts
NOI	Notice of Intent
NOTAM	Notice to Air Missions
NO_X	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRHP	National Register of Historic Places
O_3	ozone
OSHA	Occupational Safety and Health Administration
PCBs	polychlorinated biphenyls
PCI	Pavement Condition Index
pCi/L	picocuries per liter
PFAS	polyfluoroalkyl substances
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonate
PHC	Prospect Hill Consulting LLC
PHL	Potential for Hearing Loss
PM_{10}	particulate matter less than or equal to 10 microns in diameter
$PM_{2.5}$	particulate matter less than or equal to 2.5 microns in diameter
POI	Points of Interest
PPE	personal protective equipment
PSD	Prevention of Significant Deterioration
PSL	project screening level
RCRA	Resource Conservation and Recovery Act
ROI	Region of Influence
SEL	Sound Exposure Level
SHPO	State Historic Preservation Officer
SO_X	sulfur oxides
SPCC	Spill Prevention, Control, and Countermeasure
SUA	special use airspace
SWPPP	Storm Water Pollution Prevention Plan
TA	Time (at or) above a Specified Threshold
$TA75L_{max}$	total time that meets or exceeds 75 dB
tpy	tons per year
U.S.	United States
UFC	Unified Facilities Criteria
UMMC	unspecified minor military construction
UMT	unit maintenance training
UPT	Undergraduate Pilot Training
USC	United States Code
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
VOC	volatile organic compounds

Cover

Environmental Impact Statement
for T-7A Recapitalization at Columbus AFB, Mississippi

Responsible Agency: United States Department of the Air Force (DAF), Air Education and Training Command (AETC).

Affected Locations: Columbus Air Force Base (AFB) in Lowndes County, Mississippi; the airspace of Military Operations Areas Columbus 1, Columbus 2, Columbus 3, Birmingham, and Birmingham 2; Sea Ray Range (R-4404); and Military Training Routes IR-066, IR-068, IR-091, VR-1014, and VR-1031 in northern Alabama, eastern Arkansas, northern Mississippi, and southern Tennessee.

Report Designation: Final Environmental Impact Statement (EIS)

Abstract: DAF has prepared this EIS to address AETC's proposal to recapitalize the T-38C Talon flight training program at Columbus AFB with T-7A Red Hawk aircraft. This proposal supports the Secretary of the Air Force's strategic basing decisions to recapitalize existing T-38C pilot training installations and is referred to as the Proposed Action. Columbus AFB is the second of five installations to be analyzed environmentally for possible recapitalization. Recapitalization would entail introduction of T-7A aircraft and flight operations at Columbus AFB and associated special use airspace to replace all T-38C aircraft assigned to the installation; introduction of nighttime (between 10 p.m. and 7 a.m.) T-7A flight operations; changes to the number of personnel and dependents in the Columbus AFB region; and construction and upgrade of operations, support, and maintenance facilities. DAF is considering three alternative ways to implement the Proposed Action (i.e., Alternatives 1, 2, and 3), the No Action Alternative, and several military construction (MILCON)/unspecified minor military construction (UMMC) project alternatives.

For Alternative 1, Columbus AFB would receive up to 61 T-7A aircraft and perform sufficient operations for sustaining pilot training while simultaneously phasing out the T-38C aircraft. Alternative 2 would also result in up to 61 T-7A aircraft being delivered to Columbus AFB; however, T-7A operations would be performed at an intensity approximately 25 percent greater than Alternative 1 to cover a scenario in which DAF requires a surge or increase in pilot training operations above the current plan. Alternative 3 is intended to provide DAF with operational flexibility, and inclusion of this alternative in this EIS provides analysis to evaluate future capacity needs. For Alternative 3, Columbus AFB would receive up to 77 T-7A aircraft and annual T-7A operations would occur at a level that is 25 percent greater than Alternative 1 and equal to the annual operations proposed for Alternative 2. Alternative 3 also incorporates a UMMC project alternative to install up to 12 additional shelters to accommodate the additional T-7A aircraft. If Alternative 3 were selected for implementation, the Secretary of the Air Force would issue another strategic basing decision memorandum for record to authorize the additional T-7A aircraft. The No Action Alternative would not implement T-7A recapitalization at Columbus AFB.

Alternatives 1, 2, and 3 satisfy the purpose of and need for the Proposed Action and meet all selection standards that determine reasonability. Therefore, these three alternatives have been carried forward with the No Action Alternative for analysis in this EIS. The UMMC project alternative to install up to 58 T-7A shelters has been carried forward for analysis as part of Alternative 3. None of the other MILCON/UMMC project alternatives have been carried forward for analysis in this EIS because each failed to meet one or more selection standards.

Inquiries: Inquiries regarding this document should be directed by mail to Chinling Chen, AFCEC/CIE, Attn: Columbus AFB T-7A Recapitalization EIS, Headquarters AETC Public Affairs, 100 H. East Street, Suite 4, Randolph AFB, Texas 78150.

Cost to Prepare this EIS: $1,111,150.00.

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Final

ENVIRONMENTAL IMPACT STATEMENT

FOR

T-7A RECAPITALIZATION

AT

COLUMBUS AIR FORCE BASE, MISSISSIPPI

AIR EDUCATION AND TRAINING COMMAND

APRIL 2024

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Table of Contents

Appendices

Figures

Tables

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1. Purpose of and Need for the Proposed Action

1.1 Introduction and Background

This Environmental Impact Statement (EIS) addresses the United States (U.S.) Department of the Air Force (DAF), Air Education and Training Command (AETC) proposal to recapitalize the T-38C Talon flight training program at Columbus Air Force Base (AFB), Mississippi, with T-7A Red Hawk aircraft. This proposal is referred to as the Proposed Action. This EIS analyzes the environmental impacts associated with T-7A recapitalization at Columbus AFB and its alternatives, including the No Action Alternative.

The environmental documentation process associated with preparing this EIS was carried out in compliance with DAF's *Environmental Impact Analysis Process* (EIAP) (32 Code of Federal Regulations [CFR] Part 989), the National Environmental Policy Act (NEPA), and the Council on Environmental Quality's (CEQ) Regulations for Implementing NEPA (Title 40 CFR Parts 1500–1508).[1] NEPA is a federal statute requiring the identification and analysis of potential environmental impacts associated with proposed federal actions before those actions are taken. NEPA helps decision-makers make well-informed decisions based on an understanding of the potential environmental consequences and take actions to protect, restore, or enhance the environment. CEQ regulations specify that an EIS be prepared to provide full and fair discussion of significant environmental impacts and inform decision-makers and the public of the reasonable alternatives that would avoid or minimize adverse impacts or enhance the quality of the human environment.

In compliance with NEPA, DAF has prepared this EIS as the appropriate EIAP level for the Proposed Action. The primary purpose of an EIS is to ensure agencies consider the environmental impacts of their actions in decision-making. This EIS would also be used to guide DAF in implementing the Proposed Action in a manner consistent with DAF standards for environmental stewardship, should the Proposed Action be approved for implementation.

1.1.1 The T-7A Recapitalization Program

1.1.1.1 Aircraft and the T-7A Recapitalization Program

The T-38C is a twin-engine, high-altitude, supersonic jet used by DAF and other nations for pilot training. The T-38C trains airmen for various fighter and bomber aircraft, including the A-10 Thunderbolt, B-1B Lancer, F-15C Eagle, F-15E Strike Eagle, F-16 Fighting Falcon, F-22 Raptor, and F-35 Lightning II (DAF 2014a). AETC operates the T-38C from five pilot training installations: Joint Base San Antonio (JBSA)-Randolph in Texas, Columbus AFB in Mississippi, Laughlin AFB in Texas, Vance AFB in Oklahoma, and Sheppard AFB in Texas.

[1] EIAP for this EIS began on March 29, 2022, when the Notice of Intent (NOI) to prepare this EIS was published in the *Federal Register*. The NOI was published prior to the promulgation of CEQ's April 20, 2022, final rule updating the regulations implementing the procedural provisions of NEPA, and as such, this EIS was developed in accordance with the 2020 CEQ NEPA regulations that were in effect on March 29, 2022.

The T-38C was originally developed in the 1950s with production occurring between 1961 and 1972. The fleet has undergone periodic upgrades over time, including in 2001 when modern avionics and upgraded propulsion components were installed to provide increased performance and superior reliability (DAF 2014a). Nevertheless, as an older aircraft, training with the T-38C does not prepare pilots adequately for the technological advancements of modern fourth and fifth generation aircraft,[2] including nighttime flight training. Furthermore, T-38C aircraft incur greater maintenance requirements as they age. Greater maintenance issues lead to more individual aircraft downtime, which threatens the availability of pilot training hours. The T-38C is expected to reach the end of its service life within the next decade.

DAF plans to recapitalize the T-38C fleet with T-7A aircraft to provide a training environment suitable for modern aircraft. Program-wide, DAF expects to procure approximately 350 T-7A aircraft from Boeing and deliver these aircraft to the five T-38C pilot training installations using a geographically phased replacement plan.

1.1.1.2 Why Columbus AFB?

In a strategic basing decision memorandum for record, dated February 16, 2018, the Secretary of the Air Force identified JBSA-Randolph and Columbus, Laughlin, Sheppard, and Vance AFBs for T-7A recapitalization. DAF pilot training relies on a unique runway structure and special use airspace (SUA) capable of supporting high volume pilot training. As such, the potential locations for T-7A aircraft are limited to the five existing pilot training installations. DAF evaluated each of the five installations using criteria that included mission factors (e.g., weather and the ability to meet syllabus requirements), infrastructure capacity, and potential environmental constraints and costs. In a second strategic basing decision memorandum for record, dated June 19, 2022, the Secretary of the Air Force selected JBSA-Randolph as the first installation to undergo recapitalization because it provides the majority of instructor pilot training and is an Introduction to Fighter Fundamentals (IFF) location. Recapitalizing JBSA-Randolph would serve as an essential first step in establishing a T-7A instructor pilot pipeline and would set the conditions to transition to T-7A training at the other four pilot training installations (DAF 2018).

On January 29, 2021, the Acting Secretary of the Air Force approved the preferred alternative sequencing and locations for the four installations following JBSA-Randolph to possibly undergo T-7A recapitalization. Acting on AETC recommendations, the Acting Secretary selected Columbus AFB to be the second installation to be analyzed environmentally for possible recapitalization. Recapitalizing Columbus AFB second would result in the least impact on continued pilot production during the transition between aircraft types, provide the most cost-efficient student production and management plan, and align with AETC's student pipeline flow for the Undergraduate Pilot Training (UPT), IFF, and soon to be developed Fighter/Bomber Fundamentals (FBF) curricula. Laughlin, Vance, and Sheppard AFBs would follow as the third, fourth, and fifth installations, respectively (DAF 2021a).

[2] "Fourth generation aircraft" refers to those aircraft developed or manufactured with updated variants in the later part of the 20th century, such as the F-15E or the F-16. "Fifth generation aircraft" refers to modern aircraft with advanced avionics developed in the early part of the 21st century, such as the F-22 and F-35.

For the purposes of this EIS, the Proposed Action is T-7A recapitalization at Columbus AFB. DAF has already prepared a separate EIS addressing T-7A recapitalization at JBSA-Randolph, and DAF is preparing another EIS addressing T-7A recapitalization at Laughlin AFB. Subsequent T-7A recapitalization actions may occur at Vance and Sheppard AFBs, but those are separate actions that are not ready for NEPA analysis and are not considered within the scope of this Proposed Action. NEPA documentation for later T-7A recapitalization program locations will be addressed in subsequent NEPA analyses when the scope of those efforts is better understood.

1.2 Location

1.2.1 Columbus AFB and SUA

Columbus AFB. Columbus AFB is in rural, northeast Mississippi, approximately 10 miles north of the city of Columbus. The installation occupies 4,919 acres and is surrounded by unincorporated lands within Lowndes County. Monroe and Clay Counties are immediately to the north and west, respectively (see **Figure 1-1**) (Columbus AFB 2022a).

Columbus AFB is home to the 14th Flying Training Wing (FTW) of AETC's 19th Air Force. The FTW provides UPT using the T-6 Texan II for basic aircraft control and navigation. Specialized training is provided with T-1A Jayhawk aircraft for pilots bound for tanker and airlift aircraft and T-38C aircraft for pilots bound for fighter and bomber aircraft (Columbus AFB 2016).

The Columbus AFB airfield has three parallel, northwest-southeast runways: 13R/31L, 13C/31C, and 13L/31R. Runway 13R/31L is the inside runway and used primarily for T-6 traffic. Runway 13C/31C is the main runway, accounting for approximately 65 percent of all traffic, and used primarily for transient aircraft and student instrument approach instruction. Runway 13L/31R is the outside runway and used primarily for T-38C traffic (Columbus AFB 2017a). **Figure 1-2** shows the Columbus AFB airfield.

SUA. T-38C aircraft stationed at Columbus AFB use SUA in northern Alabama, eastern Arkansas, northern Mississippi, and southern Tennessee to perform aircraft operations and supplement training. Such SUA is approved by the Federal Aviation Administration (FAA) and designated on published aeronautical charts. The SUA where Columbus AFB T-38C aircraft perform operations are as follows:

- **Military Operations Areas (MOA):** Columbus 1, Columbus 2, Columbus 3, Birmingham, and Birmingham 2
- **Restricted Area:** Sea Ray Range (R-4404)
- **Military Training Routes (MTR):** IR-066, IR-068, IR-091, VR-1014, and VR-1031.

Figure 1-3 shows the designated SUA used for T-38C pilot training at Columbus AFB.

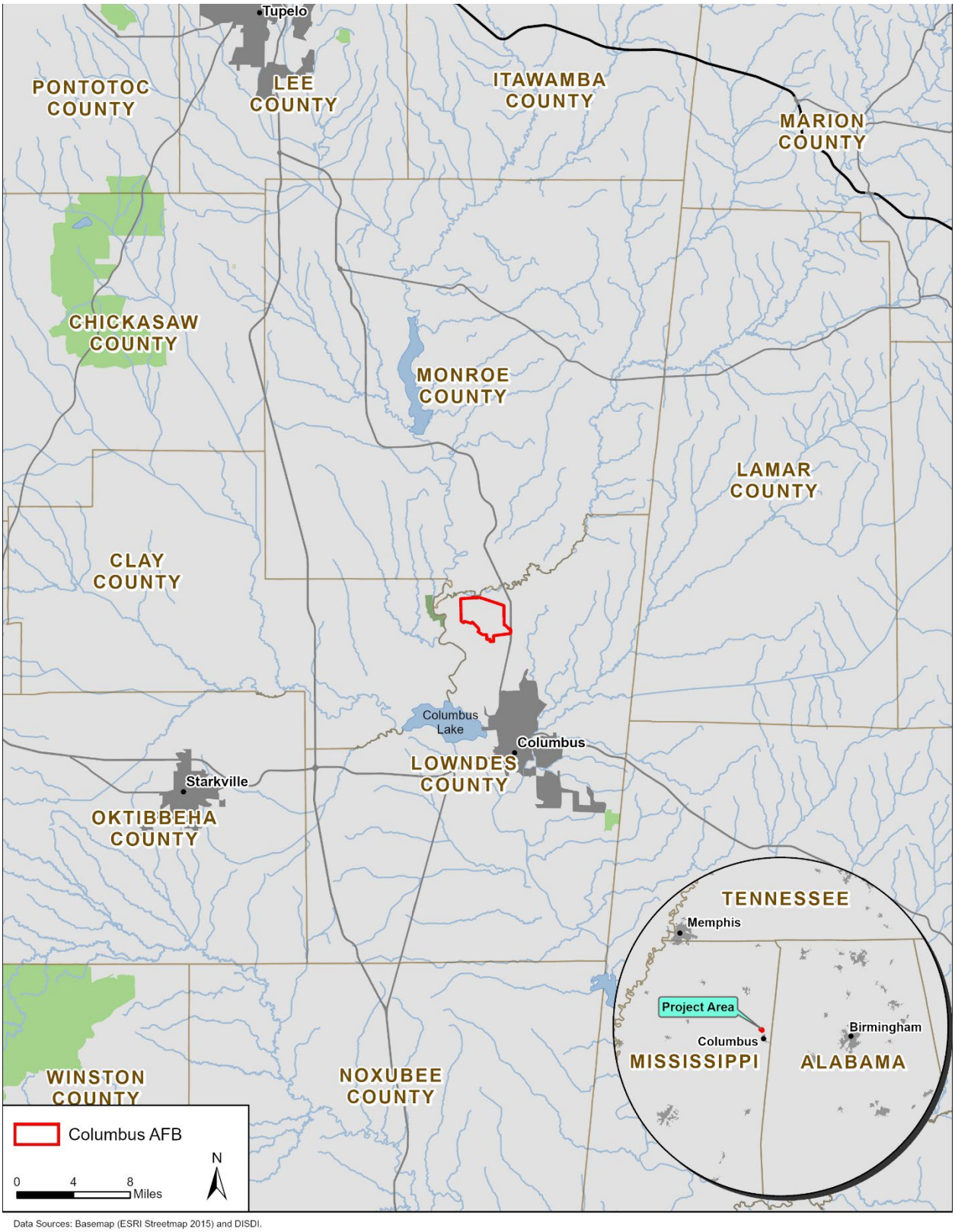

Figure 1-1. Columbus AFB and Vicinity

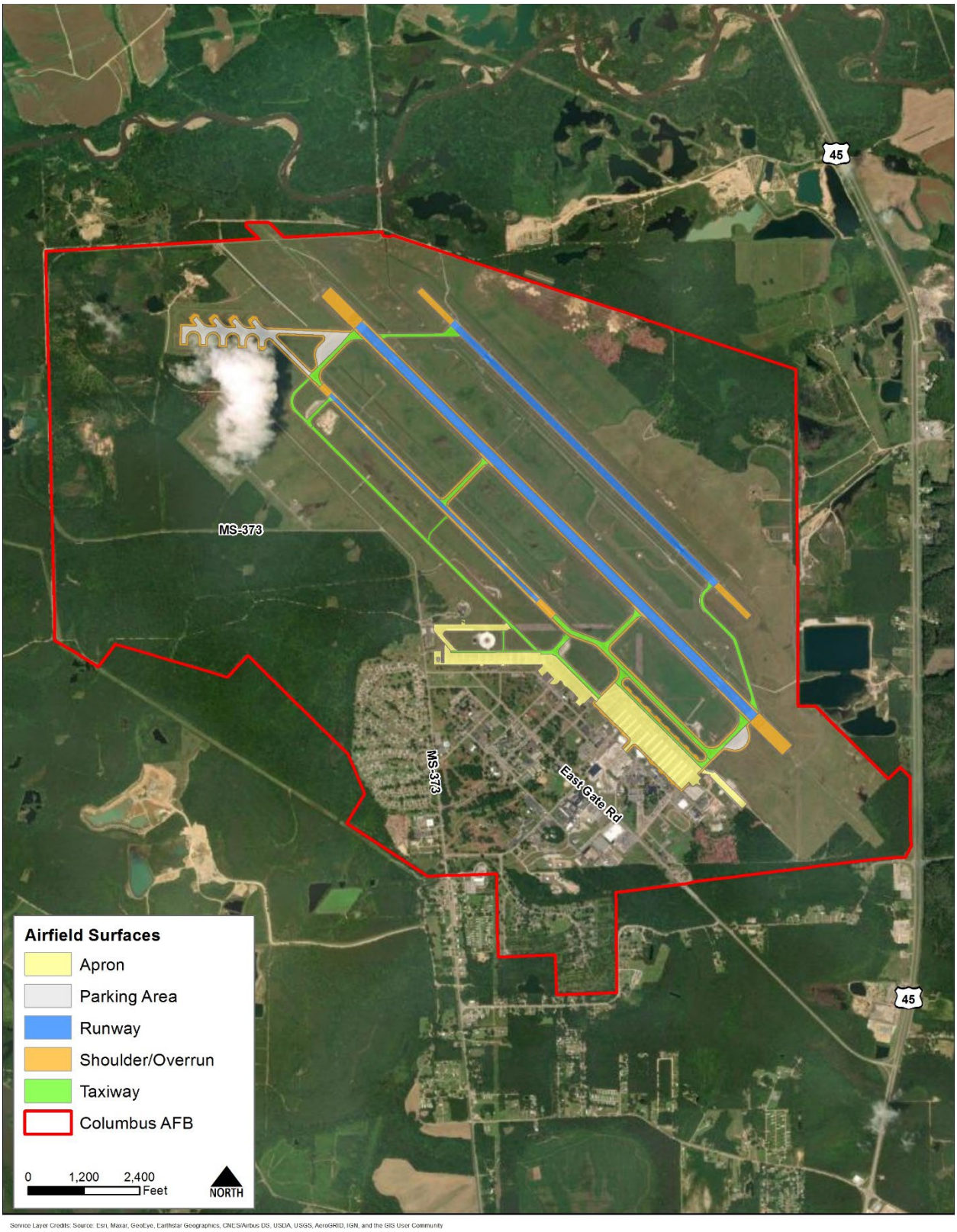

Figure 1-2. Columbus AFB Airfield

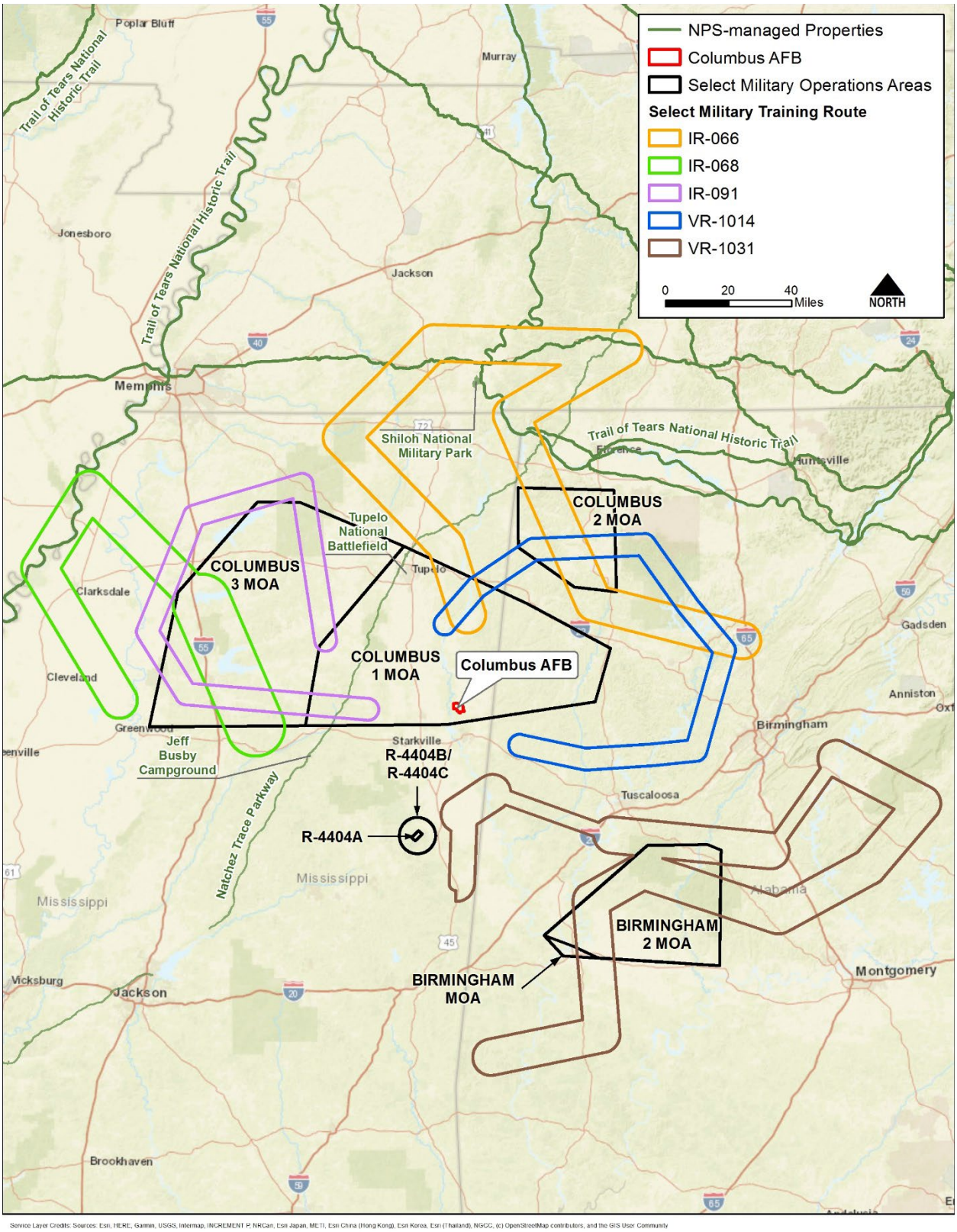

Figure 1-3. Columbus AFB T-38C and T-7A Training SUA

1.3 Purpose of and Need for the Proposed Action

1.3.1 Purpose of the Proposed Action

As noted in the Secretary of the Air Force's strategic basing decisions from February 16, 2018, and January 29, 2021, DAF plans to recapitalize AETC's T-38C aircraft fleet with T-7A aircraft at the five pilot training installations to provide a training environment suitable for modern aircraft. The purpose of the Proposed Action addressed in this EIS is to continue the T-7A recapitalization program by recapitalizing Columbus AFB to prepare pilots to operate modern fourth and fifth generation aircraft.

1.3.2 Need for the Proposed Action

The Proposed Action is needed because current training practices with older T-38C aircraft do not prepare pilots adequately for the technological advancements of fourth and fifth generation aircraft. By 2031, more than 60 percent of the Combat Air Force will be comprised of fifth generation aircraft, requiring a modern, capable training platform with capabilities beyond those available with the T-38C. Additionally, training systems provided with the newer T-7A aircraft allow for enhanced and improved flight and simulator training. The T-7A recapitalization program will allow DAF to provide more efficient and effective instructor and pilot training for operating fourth and fifth generation aircraft. T-7A recapitalization at Columbus AFB would allow DAF to continue the geographically phased T-7A recapitalization sequence, ensuring DAF pilot training requirements are met.

1.4 Intergovernmental and Stakeholder Coordination

NEPA requirements help ensure that environmental information is made available to the public during the decision-making process and prior to actions being taken. CEQ NEPA regulations state, "Agencies shall use an early and open process to determine the scope of issues for analysis in an environmental impact statement, including identifying the significant issues and eliminating from further study non-significant issues." Executive Order (EO) 12372, *Intergovernmental Review of Federal Programs*, as amended by EO 12416, *Intergovernmental Review of Federal Programs*, requires federal agencies to provide opportunities for input from elected officials of state and local governments that would be directly affected by a federal proposal.

1.4.1 Cooperating Agencies

The lead agency for this EIS is DAF. AETC is the DAF major command developing this EIS on behalf of DAF and as the proponent for this proposal. No cooperating agencies have been identified for this EIS. FAA is not a cooperating agency because no changes to the SUA configuration (i.e., size, shape, or location) would be required for T-7A recapitalization at Columbus AFB.

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2. Description of the Proposed Action and Alternatives

2.1 Proposed Action

The Proposed Action is recapitalization of the T-38C flight training program at Columbus AFB with T-7A aircraft. This is the second location of the T-7A recapitalization program, described in **Section 1.1.1**. Recapitalization entails the following elements:

- Replacement of all T-38C aircraft assigned to Columbus AFB with T-7A aircraft.
- Transition of aircraft operations at Columbus AFB and associated SUA from the T-38C to the T-7A.
- Introduction of nighttime (between 10 p.m. and 7 a.m.) T-7A operations.
- Changes to the number of personnel and dependents in the Columbus AFB region.
- Construction of and upgrades to operations, support, and maintenance facilities through 11 projects—five military construction (MILCON)/unspecified minor military construction (UMMC) projects and six facilities sustainment, restoration, and modernization (FSRM) projects—to support pilot training and aircraft operation and maintenance.

2.2 Alternatives

Considering alternatives helps to avoid unnecessary impacts and allows for an analysis of reasonable ways to achieve the stated purpose. CEQ requires use of the NEPA process to identify and assess reasonable alternatives to proposed actions that would avoid or minimize the adverse effects of the actions upon the quality of the human environment. CEQ NEPA guidance identifies reasonable alternatives as those that are economically and technically practical or feasible and that show evidence of common sense (CEQ 1986).

2.2.1 Alternatives to Columbus AFB

As discussed in **Section 1.1.1**, the Acting Secretary of the Air Force expressed preference for Columbus AFB to be the second of five pilot training installations to undergo possible T-7A recapitalization (i.e., behind JBSA-Randolph and ahead of Laughlin, Vance, and Sheppard AFBs). The Secretary's preference was based on several factors, such as minimizing impact on continued pilot production during the transition of aircraft types, providing the most cost-efficient student production and management plan, and aligning with AETC's student pipeline flow for the UPT, IFF, and the soon to be developed FBF curricula. For these reasons, the Proposed Action identified and evaluated within this EIS focuses on the Columbus AFB recapitalization effort, and no alternatives to Columbus AFB will be addressed in this EIS.

2.2.2 Alternative Ways to Implement the Proposed Action

DAF considered three alternative ways to implement T-7A recapitalization at Columbus AFB (i.e., Alternatives 1, 2, and 3). These alternatives consider different numbers of T-7A aircraft stationed at Columbus AFB and different numbers of T-7A operations at Columbus AFB and associated SUA. **Sections 2.2.2.1**, **2.2.2.2**, and **2.2.2.3** describe the three alternatives, and **Section 2.2.2.4** evaluates the alternatives against selection standards to determine the alternatives carried forward for analysis in this EIS.

2.2.2.1 Alternative 1

For Alternative 1, Columbus AFB would receive up to 61 T-7A aircraft and phase in T-7A operations at a level sustaining pilot training while simultaneously phasing out the T-38C and phasing in the T-7A. The aircraft, aircraft operations, personnel and dependents, and facility requirements of Alternative 1 are described in the following subsections.

2.2.2.1.1 Aircraft

T-7A aircraft would be delivered to Columbus AFB from the manufacturer (Boeing) beginning in 2028 and continuing through 2030. When all T-7A deliveries are complete at the end of 2030, up to 61 T-7A aircraft would be assigned to Columbus AFB. As T-7A aircraft are delivered and placed into service, T-38C aircraft would be withdrawn from service. The first T-38Cs would be withdrawn in 2028 and the last in 2030. In total, all 85 T-38C aircraft assigned to Columbus AFB would be withdrawn from service and considered for retirement or repurposed for use at other locations. The potential reuse of T-38C aircraft at other locations is a separate DAF action and subject to separate environmental analysis not addressed by this EIS. **Table 2-1** provides Columbus AFB's proposed T-7A delivery and T-38C withdrawal schedule for Alternative 1.

Table 2-1. T-38C and T-7A Aircraft Changes for Alternatives 1 and 2

Aircraft Type	2021 Baseline	2028	2029	2030	2031 and Thereafter
Annual Aircraft Withdrawn from/ Delivered to Columbus AFB					
T-38C (withdrawn)	N/A	23	45	17	0
T-7A (delivered)	N/A	21	31	9	0
Total T-38C/T-7A Aircraft at Columbus AFB					
T-38C	85	62	17	0	0
T-7A	0	21	52	61	61
Total Aircraft	**85**	**83**	**69**	**61**	**61**

Sources: AETC 2021a, AETC 2022
Key: N/A = not applicable

2.2.2.1.2 Aircraft Operations

Aircraft operations at Columbus AFB and its associated SUA (i.e., MOAs, Ranges, and MTRs) would transition from the T-38C to the T-7A over the 3-year aircraft delivery and withdrawal period. T-7A operations would begin in 2028 and increase to steady state in 2030. T-38C operations would begin to decrease in 2028 and conclude by the end of 2029. No further T-38C operations would occur in 2030 or thereafter. **Table 2-2** provides the approximate number of annual aircraft operations for the T-38C and T-7A for Alternative 1.

What is an Aircraft Operation?

In **Table 2-2** for Alternative 1 and the corresponding table for Alternatives 2 and 3, the number of projected aircraft operations is provided as a means to analyze both the air quality and noise impacts from aircraft flights. For the purposes of these tables, an aircraft operation is defined as (1) a single takeoff, (2) a single landing, (3) the approach phase of a closed pattern, or (4) the takeoff phase of a closed pattern. A closed pattern is a "touch-and-go" where an aircraft approaches the airfield, momentarily touches its wheels or flies close to the runway, and departs the airfield for additional flight maneuvers.

Aircraft operations are often discussed using the term "sorties." A single aircraft sortie includes one takeoff and one landing and may include closed patterns during flight. Aircraft operating from pilot training installations, such as Columbus AFB, typically perform multiple closed patterns with each sortie. In the case of the operations at Columbus AFB, approximately 2.2 closed patterns (totaling 4.4 closed pattern operations) are conducted during each sortie (AFCEC/CZN 2021a). Actual sorties flown may include fewer closed patterns, and some will include more than the average number used to calculate the total number of operations.

An example of how sortie information was used to calculate the number of operations presented for the alternatives follows: If 10,000 sorties were flown in any single year, the table would show a total of 64,000 aircraft operations for that year (10,000 of the operations would be takeoffs, 10,000 would be landings, and the remaining 44,000 operations would be closed pattern operations [22,000 approach phase of a closed pattern and 22,000 takeoff phase of a closed pattern]).

Table 2-2. T-38C and T-7A Aircraft Operations for Alternative 1

Aircraft Type	2021 Baseline	2028	2029	2030 and Thereafter
Operations at Columbus AFB				
Annual Aircraft Operations (Daytime)				
T-38C	139,284	101,595	27,857	0
T-7A	0	32,497	80,468	94,395
Total	**139,284**	**134,092**	**108,325**	**94,395**
Annual Aircraft Operations (Nighttime)[1]				
T-38C	0	0	0	0
T-7A	0	163	404	474
Total	**0**	**163**	**404**	**474**
Operations within SUA (MOAs, Ranges, and MTRs)				
Annual Aircraft Operations within SUA[2]				
Columbus 1	7,488 with T-38C	7,488 with T-38C and T-7A	7,488 with T-38C and T-7A	7,488 with T-7A
Columbus 2	3,552 with T-38C	3,552 with T-38C and T-7A	3,552 with T-38C and T-7A	3,552 with T-7A
Columbus 3	2,268 with T-38C	2,268 with T-38C and T-7A	2,268 with T-38C and T-7A	2,268 with T-7A
Birmingham and Birmingham 2	1,896 with T-38C	1,896 with T-38C and T-7A	1,896 with T-38C and T-7A	1,896 with T-7A
R-4404	1,164 with T-38C	1,164 with T-38C and T-7A	1,164 with T-38C and T-7A	1,164 with T-7A
IR-066	876 with T-38C	876 with T-38C and T-7A	876 with T-38C and T-7A	876 with T-7A
IR-068	276 with T-38C	276 with T-38C and T-7A	276 with T-38C and T-7A	276 with T-7A
IR-091	348 with T-38C	348 with T-38C and T-7A	348 with T-38C and T-7A	348 with T-7A
VR-1014	300 with T-38C	300 with T-38C and T-7A	300 with T-38C and T-7A	300 with T-7A
VR-1031	120 with T-38C	120 with T-38C and T-7A	120 with T-38C and T-7A	120 with T-7A
Annual Aircraft Operations Below 3,000 feet AGL within the SUA[3]				
Birmingham and Birmingham 2	948 with T-38C	948 with T-38C and T-7A	948 with T-38C and T-7A	948 with T-7A
R-4404	582 with T-38C	582 with T-38C and T-7A	582 with T-38C and T-7A	582 with T-7A
IR-066	438 with T-38C	438 with T-38C and T-7A	438 with T-38C and T-7A	438 with T-7A
IR-068	138 with T-38C	138 with T-38C and T-7A	138 with T-38C and T-7A	138 with T-7A
IR-091	174 with T-38C	174 with T-38C and T-7A	174 with T-38C and T-7A	174 with T-7A
VR-1014	300 with T-38C	300 with T-38C and T-7A	300 with T-38C and T-7A	300 with T-7A
VR-1031	120 with T-38C	120 with T-38C and T-7A	120 with T-38C and T-7A	120 with T-7A

Sources: HMMH 2022, AETC 2021a, 14 FTW 2021, AFCEC/CZN 2021a

Key: AGL = above ground level

[1] Annual aircraft operations (nighttime) is the number of operations at Columbus AFB between 10 p.m. and 7 a.m. provided for noise modeling purposes. The T-38C does not currently perform operations between these hours.

[2] Annual aircraft operations within the SUA is the busiest month extrapolated conservatively over 1 year (i.e., busiest month multiplied by 12).

[3] Annual aircraft operations below 3,000 feet AGL within the SUA is provided for air quality modeling purposes. No operations would occur below 3,000 feet AGL in the Columbus 1, 2, and 3 MOAs. The Birmingham and Birmingham 2 MOAs; R-4404; and IR-066, IR-068, and IR-091 have ceilings greater than 3,000 feet AGL; therefore, it is assumed 50 percent of operations would occur below 3,000 feet AGL. The ceilings for VR-1014 and VR-1031 are less than 3,000 feet AGL; therefore, all operations would occur below this level.

AETC calculated the annual operations in **Table 2-2** as the baseline operations necessary for sustaining pilot training while simultaneously phasing out the T-38C aircraft. The T-7A would have fewer end state operations than T-38C baseline levels because the training curriculum would include increased simulator time.

No changes to Columbus AFB's airfield traffic patterns would occur from T-7A recapitalization. All routine T-38C and T-7A traffic would use runway 13L/31R (the outside runway), while all routine T-6 traffic would continue to use runway 13R/31L (the inside runway). Runway 13C/31C would continue to serve transient aircraft and student instrument approach instruction. Consistent with T-38C practices, no auxiliary fields—such as Shuqualak Auxiliary Field—or other nearby military airfields would be used for Columbus AFB T-7A aircraft operations.

With the T-7A's enhanced capabilities and avionics, the Proposed Action includes evening and nighttime T-7A operations. Evening operations include those from dusk until 10 p.m. and are already performed with the T-38C at Columbus AFB. Nighttime operations, as defined for aircraft noise modeling, occur between 10 p.m. and 7 a.m. and are not currently performed with the T-38C at Columbus AFB, although other aircraft at the installation—such as the T-1 and T-6—do perform nighttime operations (14 FTW 2021). The Proposed Action would allow T-7A operations to occur at any time during each 24-hour day. It is likely that, as times of sunrise and sunset change throughout the seasons, the daily and hourly distribution of flight operations may vary to accommodate training curriculum requirements. At full implementation, up to 474 annual nighttime T-7A operations would occur at Columbus AFB for Alternative 1, which is approximately 0.5 percent of annual T-7A operations. Nighttime T-7A operations would be conducted in the vicinity of the Columbus AFB airfield and would not enter the SUA (i.e., MOAs and MTRs).

T-7A pilot training would use the same SUA used currently by the T-38C. This SUA is MOAs Columbus 1, Columbus 2, Columbus 3, Birmingham, and Birmingham 2; Range R-4404; and MTRs IR-066, IR-068, IR-091, VR-1014, and VR-1031, as shown in **Figure 1-3.** No changes to SUA configurations (i.e., size, shape, or location) are required for T-7A recapitalization. Should DAF desire to change the configurations of these SUA following T-7A recapitalization or as a result of new training practices with other aircraft, separate NEPA analysis would be performed in conjunction with the FAA when the scope of that effort is better understood. T-7A would be limited to sub-sonic speeds in all phases of pilot training (AFCEC/CZN 2021b).

2.2.2.1.3 Personnel and Dependents

An increase of approximately 43 personnel is projected at Columbus AFB during the aircraft transition period (i.e., 2028 and 2029). This increase would occur during the transition period because DAF would be training pilots with and maintaining two types of aircraft, resulting in a temporary increase in workforce requirements for operations, civilian simulator instructors, and maintenance. The initial increase in workforce would subside as T-38C aircraft are removed from service. The steady state personnel requirement at Columbus AFB is projected to be approximately 31 persons fewer than the current baseline staffing levels and 74 persons fewer than peak staffing levels (AFCEC/CZN 2021a).

Associated with the workforce change is a corresponding change in the number of dependents (e.g., spouses, children, other family members) who would accompany the personnel. DAF estimates that 1.9 dependents accompanied active-duty personnel in 2020 (DAF 2021b). Therefore, 82 dependents would accompany the 43 additional personnel during the aircraft transition period, for a total of 125 additional people in the Columbus AFB vicinity during 2028 and 2029, as compared to current baseline staffing levels. After the aircraft transition period, the loss of 31 personnel from Columbus AFB would remove 59 dependents and 90 total people from the Columbus AFB vicinity, as compared to current baseline staffing levels.

2.2.2.1.4 Facility Requirements

Eleven facility construction or renovation projects would potentially occur at Columbus AFB to provide modern facilities and infrastructure to support T-7A aircraft maintenance, training, and operational requirements. These projects are categorized by funding mechanism into five MILCON/UMMC projects and six FSRM projects. The proposed MILCON/UMMC projects are described in **Section 2.2.2.1.4.1**, and the proposed FSRM projects are described in **Section 2.2.2.1.4.2**.

2.2.2.1.4.1 MILCON/UMMC Projects

The five MILCON/UMMC projects are described in the following subsections. **Figure 2-1** shows the proposed locations of the MILCON/UMMC projects.

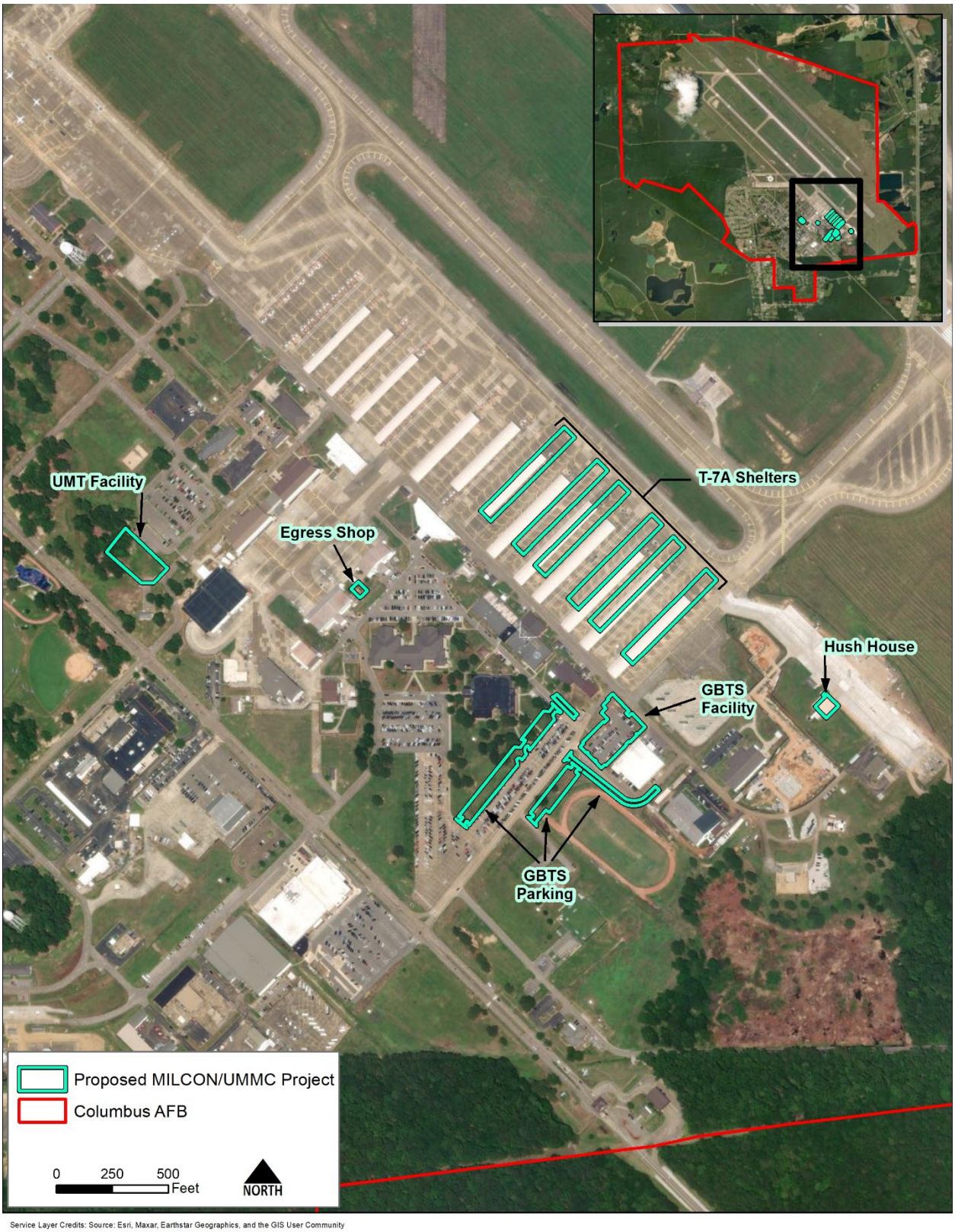

Figure 2-1. MILCON/UMMC Project Locations

Ground Based Training System Facility. This MILCON project would construct an approximately 33,000-square foot (ft^2) ground-based training system (GBTS) facility. The proposed facility would provide flight simulation instruction to students and include classroom and equipment storage space. The proposed, one-story facility would be sited on a parking lot adjacent to Building 216. It would be constructed with a reinforced concrete foundation and concrete floor slab with a moisture barrier beneath the foundation and floor slab, a structural steel frame, and a standing seam metal roof and exterior. The facility would include fire suppression systems, all utilities, pavements, communications, site improvements, and associated supporting facilities to provide a complete and usable facility. An adjacent parking lot would be expanded to provide approximately 176 additional parking spaces (USACE 2021a, AETC 2021b). The precise site layout plan for the proposed GBTS facility is still being developed but would be similar to that shown in **Figure 2-2**.

Source: USACE 2021a

Legend: maroon = GBTS facility footprint; gray = roads and parking lot improvements (asphalt pavement); tan = sidewalks (concrete pavement); green = landscaped and revegetated disturbed areas.

Figure 2-2. GBTS Facility Site Plan

Unit Maintenance Training Facility. This MILCON project would construct an approximately 12,000 ft^2 aircraft unit maintenance training (UMT) facility. The proposed facility would house administrative space, classroom space, a tool crib, a communications room, and maintenance simulators. The proposed, one-story facility would be sited on an undeveloped field behind Building 440. It would be constructed with a reinforced concrete foundation, concrete floor slab, structural steel frame, and brick and metal panel exterior walls. The facility would include fire suppression systems, all utilities, pavements, communications, site improvements, and associated supporting facilities to provide a complete and usable facility. No additional parking would be required because an adjacent parking lot already provides sufficient parking capacity for the proposed facility (USACE 2021b, AETC 2021b). The precise site layout plan for the proposed UMT facility is still being developed but would be similar to that shown in **Figure 2-3**.

Source: USACE 2021b

Legend: maroon = UMT facility footprint; gray = roads and parking lot improvements (asphalt pavement); tan = sidewalks (concrete pavement); green = landscaped and revegetated disturbed areas.

Figure 2-3. UMT Facility Site Plan

Hush House. A hush house is an enclosed unit that contains noise suppressing equipment to accommodate in-frame or out-of-frame aircraft engine testing. This UMMC project would construct a new hush house adjacent to Columbus AFB's existing hush house. Construction would include a reinforced concrete pad with thick edges and paved shoulders for the hush house enclosure. The concrete pad would have an anchor block in the center to keep the aircraft stationary while performing full-power aircraft engine diagnostics testing and would provide the appropriate base for hush house placement. Approach pavements and supporting utilities would be extended to the proposed hush house (AETC 2021b). **Figure 2-1** shows the location of the current hush house.

***T-7A Shelters*.** This UMMC project would construct up to 46 shelters (sunshades) on the existing T-38C aircraft parking apron to protect T-7A aircraft from adverse weather. Only up to 46 shelters (rather than a shelter for all up to 61 aircraft) would be constructed because one-quarter (25 percent) of the T-7A fleet would be parked inside of hangars for shelter (e.g., 61 aircraft × 75 percent = 45.75 shelters, rounded up to 46). Existing T-38C shelters would be removed, and T-7A shelters would be spaced appropriately to accommodate the planned T-7A parking requirements on a schedule determined to best support the aircraft transition. Taxi lines would be removed and repainted. Electrical utilities, proper lighting, and tie-downs and grounding points would be installed for each shelter (AETC 2021b). **Figure 2-1** shows the proposed T-7A shelters' locations.

***Egress Shop*.** This MILCON project would construct a new building for an egress shop between Building 452 (Hangar 3) and Building 454 (Hangar 4). The proposed egress shop would be used to store and repair the ejection seat components for the T-7A aircraft, and it would be constructed with a reinforced concrete foundation, concrete floor slab, structural steel frame, and standing seam metal roof and exterior (AETC 2021b). **Figure 2-1** shows the proposed egress shop's location.

2.2.2.1.4.2 FSRM Projects

Table 2-3 summarizes the six FSRM projects that would occur at Columbus AFB to support T-7A recapitalization. **Figure 2-4** shows the proposed FSRM project locations.

Table 2-3. FSRM Project Descriptions

Project Name	Project Description
Renovate Building 452 (Hangar 3)	Renovate Building 452 (Hangar 3) into a four-bay T-7A hangar. Modify hangar doors to ensure T-7A safety clearances are met. Building 452 is currently used minimally and includes a wash rack. The wash rack would be relocated to Building 454 (Hangar 4) as a separate FSRM project.
Wash Rack Renovation (Building 454)	Construct a wash rack at Building 454 (Hangar 4) to replace the one displaced from the renovation of Building 452 (Hangar 3) into a four-bay T-7A hangar.
Antenna Farm	Incorporate an antenna farm into the GBTS facility design.
Squadron Operations Buildings Renovations	Renovate the interior of the Squadron Operations Buildings (Buildings 216 and 234).
Airfield Improvements	Remark the T-38C ramp to the width of the T-7A. Install new moorings and anchor rods for T-7A aircraft. Replace aircraft arresting system. Remove aboveground Centralized Aircraft Support System service modules.
Trim Pad	Construct a new trim pad across from the hush house on the engine run-up apron. Install proper concrete and a T-7A anchor block. Relocate the Compass Rose to another magnetically quiet site.

Sources: AETC 2021b, AFCEC/CZN 2021a

2.2.2.1.4.3 New Impervious Surfaces

Table 2-4 summarizes the estimated amount of new impervious surfaces resulting from the MILCON/UMMC and FSRM projects. MILCON/UMMC and FSRM projects not listed in the table (e.g., interior renovations) would entail no ground disturbance and would add no new impervious surfaces.

Table 2-4. Estimated New Impervious Surfaces from the MILCON/UMMC and FSRM Projects

Project	Construction Element (ft^2)	Current Site Condition	New Impervious Surfaces (ft^2)
GBTS Facility	Building – 33,000 Paved Parking Lot – 57,000	Paved Parking Lot Grass Area	0 57,000 (1.31 acres)
UMT Facility	Building – 12,000	Grass Area	12,000 (0.28 acre)
Hush House	Pad – 25,000	Grass Area	25,000 (0.57 acre)
T-7A Shelters/ Airfield Improvements	Aircraft Pavement	Paved Aircraft Parking Ramp	0
Egress Shop	Building – 4,000	Grass Area	4,000 (0.09 acre)
Total New Impervious Surfaces			**98,000 (2.25 acres)**

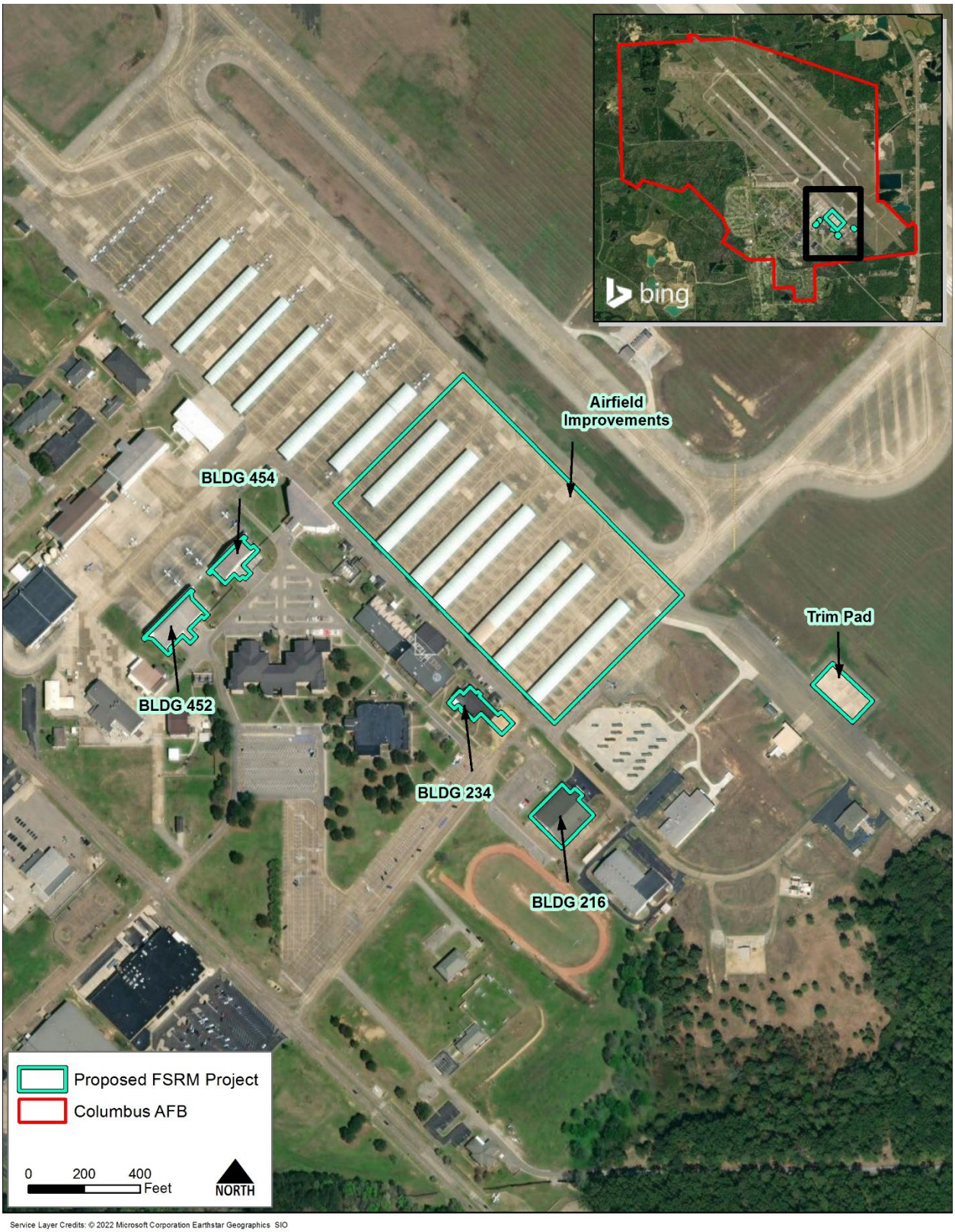

Figure 2-4. FSRM Project Locations

2.2.2.2 Alternative 2

For Alternative 2, Columbus AFB would receive up to 61 T-7A aircraft and perform T-7A operations at a level that is approximately 25 percent greater than Alternative 1. Alternative 2 is intended to cover a scenario in which, for either broad strategic or tactical operational reasons, DAF requires a surge or increase in pilot training operations above current plan. Like Alternative 1, Columbus AFB would receive up to 61 T-7A aircraft from the manufacturer with all aircraft arriving no later than 2030, T-7A operations would reach full capacity in 2030, and T-38C operations would conclude by the end of 2029. For Alternative 2, beginning in 2028, T-7A aircraft would perform annual operations at Columbus AFB and associated SUA at an intensity that is approximately 25 percent greater than Alternative 1 to meet potential surge requirements. T-7A nighttime operations would occur with up to 595 annual nighttime operations at Columbus AFB. Nighttime T-7A operations would not enter the SUA. The approximate annual aircraft operations for Alternative 2 are defined in **Table 2-5**. All other aspects of Alternative 2, including the number of personnel and dependents and the MILCON/UMMC and FSRM projects, would be identical to those described for Alternative 1 in **Section 2.2.2.1**.

2.2.2.3 Alternative 3

Alternative 3 is intended to provide DAF with operational flexibility, and inclusion of this alternative in this EIS provides analysis to evaluate future capacity needs. For Alternative 3, Columbus AFB would receive up to 77 T-7A aircraft. The T-7A operational tempo would be the same as Alternative 1, but due to the 25 percent increase in the number of aircraft over Alternatives 1 and 2, the total annual T-7A operations would occur at a level that is 25 percent greater than Alternative 1 and equal to the annual operations proposed for Alternative 2 in **Table 2-5**. **Table 2-6** provides Columbus AFB's proposed T-7A delivery and T-38C withdrawal schedule for Alternative 3. If Alternative 3 were selected for implementation, the Secretary of the Air Force would issue another strategic basing decision memorandum for record to authorize the additional T-7A aircraft.

Columbus AFB would receive up to 77 T-7A aircraft from the manufacturer with all aircraft arriving no later than 2030, T-7A operations would reach full capacity in 2030, and T-38C operations would conclude by the end of 2029. Identical to Alternative 2, Alternative 3 includes annual T-7A operations at Columbus AFB and associated SUA at an intensity that is approximately 25 percent greater than Alternative 1. T-7A nighttime operations would occur with up to 595 annual nighttime operations at Columbus AFB. Nighttime T-7A operations would not enter the SUA. The annual aircraft operations for Alternative 3 are defined in **Table 2-5**. Alternative 3 also incorporates a UMMC project alternative to install up to 58 T-7A shelters (rather than up to 46) to accommodate the additional T-7A aircraft (see **Section 2.2.3.2**). All other aspects of Alternative 3 would be identical to those described for Alternative 1 in **Section 2.2.2.1**.

For both Alternatives 2 and 3, the T-7A would perform the same types of operations within the training SUA as described for Alternative 1. Like Alternative 1, no changes to the configuration (i.e., size, shape, or location) of that SUA would be required to support Alternatives 2 or 3. No changes to Columbus AFB's airfield traffic patterns would occur.

Table 2-5. T-38C and T-7A Aircraft Operations for Alternatives 2 and 3

Aircraft Type	2021 Baseline	2028	2029	2030 and Thereafter
Operations at Columbus AFB				
Annual Aircraft Operations (Daytime)				
T-38C	139,284	101,595	27,857	0
T-7A	0	40,622	100,588	117,997
Total	**139,284**	**142,217**	**128,445**	**117,997**
Annual Aircraft Operations (Nighttime)[1]				
T-38C	0	0	0	0
T-7A	0	205	507	595
Total	0	205	507	595
Operations within SUA (MOAs, Ranges, and MTRs)				
Annual Aircraft Operations within SUA[2]				
Columbus 1	7,488 with T-38C	9,360 with T-38C and T-7A	9,360 with T-38C and T-7A	9,360 with T-7A
Columbus 2	3,552 with T-38C	4,440 with T-38C and T-7A	4,440 with T-38C and T-7A	4,440 with T-7A
Columbus 3	2,268 with T-38C	2,832 with T-38C and T-7A	2,832 with T-38C and T-7A	2,832 with T-7A
Birmingham and Birmingham 2	1,896 with T-38C	2,376 with T-38C and T-7A	2,376 with T-38C and T-7A	2,376 with T-7A
R-4404	1,164 with T-38C	1,452 with T-38C and T-7A	1,452 with T-38C and T-7A	1,452 with T-7A
IR-066	876 with T-38C	1,092 with T-38C and T-7A	1,092 with T-38C and T-7A	1,092 with T-7A
IR-068	276 with T-38C	348 with T-38C and T-7A	348 with T-38C and T-7A	348 with T-7A
IR-091	348 with T-38C	432 with T-38C and T-7A	432 with T-38C and T-7A	432 with T-7A
VR-1014	300 with T-38C	372 with T-38C and T-7A	372 with T-38C and T-7A	372 with T-7A
VR-1031	120 with T-38C	156 with T-38C and T-7A	156 with T-38C and T-7A	156 with T-7A
Annual Aircraft Operations Below 3,000 feet AGL within the SUA[3]				
Birmingham and Birmingham 2	948 with T-38C	1,188 with T-38C and T-7A	1,188 with T-38C and T-7A	1,188 with T-7A
R-4404	582 with T-38C	726 with T-38C and T-7A	726 with T-38C and T-7A	726 with T-7A
IR-066	438 with T-38C	546 with T-38C and T-7A	546 with T-38C and T-7A	546 with T-7A
IR-068	138 with T-38C	174 with T-38C and T-7A	174 with T-38C and T-7A	174 with T-7A
IR-091	174 with T-38C	216 with T-38C and T-7A	216 with T-38C and T-7A	216 with T-7A
VR-1014	300 with T-38C	372 with T-38C and T-7A	372 with T-38C and T-7A	372 with T-7A
VR-1031	120 with T-38C	156 with T-38C and T-7A	156 with T-38C and T-7A	156 with T-7A

Sources: Extrapolated from HMMH 2022, AETC 2021a, 14 FTW 2021, AFCEC/CZN 2021a

[1] Annual aircraft operations (nighttime) is the number of operations at Columbus AFB between 10 p.m. and 7 a.m. provided for noise modeling purposes. The T-38C does not currently perform operations between these hours.

[2] Annual aircraft operations within the SUA is the busiest month extrapolated conservatively over 1 year (i.e., busiest month multiplied by 12).

[3] Annual aircraft operations below 3,000 feet AGL within the SUA is provided for air quality modeling purposes. No operations would occur below 3,000 feet AGL in the Columbus 1, 2, and 3 MOAs. The Birmingham and Birmingham 2 MOAs; R-4404; and IR-066, IR-068, and IR-091 have ceilings greater than 3,000 feet AGL; therefore, it is assumed 50 percent of operations would occur below 3,000 feet AGL. The ceilings for VR-1014 and VR-1031 are less than 3,000 feet AGL; therefore, all operations would occur below this level.

Table 2-6. T-38C and T-7A Aircraft Changes for Alternative 3

Aircraft Type	2021 Baseline	2028	2029	2030	2031 and Thereafter
Annual Aircraft Withdrawn from/ Delivered to Columbus AFB					
T-38C (withdrawn)	N/A	23	45	17	0
T-7A (delivered)	N/A	37	31	9	0
Total T-38C/T-7A Aircraft at Columbus AFB					
T-38C	85	62	17	0	0
T-7A	0	37	68	77	77
Total Aircraft	**85**	**99**	**85**	**77**	**77**

Sources: AETC 2022, Extrapolated from DAF 2022 and AETC 2021a
Key: N/A = not applicable

2.2.2.4 Selection Standards for the Proposed Action

The three alternatives described in **Sections 2.2.2.1**, **2.2.2.2**, and **2.2.2.3** were evaluated against selection standards to determine reasonability. Reasonable alternatives will be carried forward for analysis in this EIS, while unreasonable alternatives will be dismissed from further analysis. These alternatives were evaluated against the following selection standards, which are determined as necessary to execute the T-7A mission at this location:

1. An alternative must not result in major operational constraints to existing missions. Operational constraints would occur if a currently ongoing operation, activity, or mission were limited by proposed activities.
2. An alternative must be adaptable and compatible with current infrastructure capabilities.
3. An alternative should minimize the need for new construction and land disturbance versus renovation or reuse of existing facilities.

Table 2-7 summarizes the evaluation of the three action alternatives against the selection standards.

Table 2-7. Evaluation of Alternatives for the Proposed Action

Alternative	Selection Standard		
	1	2	3
Alternative 1. Up to 61 T-7A aircraft and T-7A operations at a level sustaining pilot training while simultaneously phasing out the T-38C and phasing in the T-7A.	✓	✓	✓
Alternative 2. Up to 61 T-7A aircraft and T-7A operations at 25 percent greater than Alternative 1.	✓	✓	✓
Alternative 3. Up to 77 T-7A aircraft and T-7A operations at 25 percent greater than Alternative 1.	✓	✓	✓

Key: ✓ = Meets selection standard.

2.2.3 Alternatives to the MILCON/UMMC Projects

Section 2.2.2.1.4 describes the five MILCON/UMMC and six FSRM projects that would occur at Columbus AFB to provide modern facilities and infrastructure to support the T-7A aircrafts' maintenance, training, and operational requirements. DAF considered different designs and locations for the MILCON/UMMC projects and evaluated each of these alternatives against MILCON/UMMC project selection standards to determine the alternatives that would be carried forward for analysis in this EIS. **Section 2.2.3.1** describes the MILCON/UMMC project selection standards, and **Section 2.2.3.2** describes the MILCON/UMMC project alternatives and evaluation against the MILCON/UMMC project selection standards. No alternatives were developed for the FSRM projects given their limited scope.

2.2.3.1 Selection Standards for the MILCON/UMMC Projects

Alternatives to the MILCON/UMMC projects were evaluated against the following selection standards:

1. A MILCON/UMMC project alternative must not result in operational constraints. Operational constraints would occur if a currently ongoing operation, activity, or mission were limited by proposed facility construction or renovation activities.
2. The facility construction must agree with installation land use patterns and be compatible with surrounding uses. Facilities requiring flightline access must be sited accordingly. The facility construction or renovation must provide an efficient solution to support the intended use.
3. Facilities must accommodate the updated capabilities of the T-7A aircraft and the associated changes in training operations parameters.
4. New facility construction must have minimal environmental impact.

2.2.3.2 MILCON/UMMC Project Alternatives

The MILCON/UMMC project alternatives and evaluation are presented in the following subsections. **Table 2-8** summarizes the MILCON/UMMC project alternatives considered and evaluated against MILCON/UMMC project selection standards.

Table 2-8. Evaluation of Alternatives for the MILCON/UMMC Projects

Alternative	Selection Standard			
	1	2	3	4
GBTS Facility				
Construct the GBTS facility as described in **Section 2.2.2.1.4.1**.	✓	✓	✓	✓
Alternative 1. Construct the GBTS facility at another site on Columbus AFB.	✗	✗	✓	✓
Alternative 2. Renovate the existing flight simulator buildings on Columbus AFB (i.e., Buildings 216 and 234) for the GBTS.	✗	✗	✗	✓
Alternative 3. Renovate Buildings 216 and 234 and perform new construction for the GBTS facility.	✗	✗	✗	✓
Alternative 4. Lease space for the GBTS facility.	✗	✗	✗	✓
Alternative 5. Contract out GBTS services.	✗	✗	✗	✓
UMT Facility				
Construct the UMT facility as described in **Section 2.2.2.1.4.1**.	✓	✓	✓	✓
Alternative 1. Construct the UMT facility at another site on Columbus AFB.	✗	✗	✗	✓
Alternative 2. Renovate existing maintenance training buildings on Columbus AFB for the UMT facility.	✗	✗	✗	✓
Alternative 3. Renovate existing maintenance training buildings on Columbus AFB and perform new construction for the UMT facility.	✗	✗	✗	✓
Alternative 4. Lease space for the UMT facility.	✗	✗	✗	✓
Alternative 5. Contract out UMT services.	✗	✗	✗	✓
Hush House				
Construct the hush house as described in **Section 2.2.2.1.4.1**.	✓	✓	✓	✓
Alternative 1. Construct a new hush house on a different part of Columbus AFB.	✗	✗	✓	✗
T-7A Shelters				
Install up to 46 T-7A shelters as described in **Section 2.2.2.1.4.1**.	✓	✓	✓	✓
Alternative 1. Install up to 58 T-7A shelters.	✓	✓	✓	✓
Egress Shop				
Construct a facility between Buildings 452 and 454 as described in **Section 2.2.2.1.4.1**.	✓	✓	✓	✓
Alternative 1. Replace Building 452.	✓	✓	✓	✗

Sources: USACE 2021a, USACE 2021b, AETC 2021b

Key: ✓ = Meets selection standard; ✗ = Does not meet selection standard

GBTS Facility. AETC considered five action alternatives for the GBTS facility, in addition to that proposed in **Section 2.2.2.1.4.1** (USACE 2021a). The alternatives were as follows:

1. Construct the GBTS facility at another site on Columbus AFB.
2. Renovate the existing flight simulator buildings on Columbus AFB (i.e., Buildings 216 and 234) for the GBTS.
3. Renovate Buildings 216 and 234 and perform new construction for the GBTS facility.
4. Lease space for the GBTS facility.
5. Contract out GBTS services.

All five alternatives were determined to fail at least one of the MILCON/UMMC project selection standards outlined in **Section 2.2.3.1**. To avoid operational constraints and provide an efficient solution to support the intended use, the proposed GBTS facility must be sited in close proximity to the existing flight simulator buildings on Columbus AFB (i.e., Buildings 216 and 234). Therefore, constructing the GBTS facility at another site on Columbus AFB or leasing space for the GBTS facility would not meet all of the selection standards. Additionally, Buildings 216 and 234 lack sufficient space to be renovated to house the GBTS. Therefore, the alternatives that include renovating Buildings 216 and 234 do not meet MILCON/UMMC project selection standards. Finally, contracting out GBTS services does not meet MILCON/UMMC project selection standards because contracting such services would not meet an inherent mission of Columbus AFB. Therefore, all five alternatives for the GBTS facility have been dismissed from further analysis in this EIS. Only the GBTS facility proposal described in **Section 2.2.2.1.4.1** meets all MILCON/UMMC project selection standards and is carried forward for analysis in this EIS. **Table 2-8** presents the GBTS facility alternatives considered and evaluated against the MILCON/UMMC project selection standards.

UMT Facility. Five action alternatives for the UMT facility, in addition to that proposed in **Section 2.2.2.1.4.1**, were considered by AETC (USACE 2021b). These alternatives were as follows:

1. Construct the UMT facility at another site on Columbus AFB.
2. Renovate existing maintenance training buildings on Columbus AFB for the UMT facility.
3. Renovate existing maintenance training buildings on Columbus AFB and perform new construction for the UMT facility.
4. Lease space for the UMT facility.
5. Contract out UMT services.

All five alternatives were determined to fail the first three MILCON/UMMC project selection standards outlined in **Section 2.2.3.1**. The proposed UMT facility must be sited close to the installation's existing maintenance campus to avoid operational constraints, provide an efficient solution to support the intended use, and accommodate T-7A training operations. Therefore, constructing the UMT facility at another site on Columbus AFB or leasing space for the UMT facility would not meet the MILCON/UMMC project selection standards. Additionally, there are no existing maintenance training buildings on Columbus AFB with sufficient space to be

renovated to house the UMT facility. Therefore, the alternatives that include renovating existing maintenance training buildings do not meet the MILCON/UMMC project selection standards. Finally, contracting out UMT services does not meet the MILCON/UMMC project selection standards because contracting such services would not meet an inherent mission of Columbus AFB. Therefore, all five alternatives for the UMT facility have been dismissed from further analysis in this EIS. Only the UMT facility proposal described in **Section 2.2.2.1.4.1** meets all MILCON/UMMC project selection standards and is carried forward for analysis in this EIS. **Table 2-8** presents the UMT facility alternatives considered and evaluated against the MILCON/UMMC project selection standards.

***Hush House*.** AETC investigated constructing the proposed hush house elsewhere on Columbus AFB (as opposed to constructing it adjacent to the existing hush house, as described in **Section 2.2.2.1.4.1**). AETC determined that the existing hush house has proven to be a good location for access and for minimizing noise to neighboring areas from hush house engine run-ups. Locating the hush house in a different part of the airfield would likely require new airfield traffic patterns, maintenance procedures, and potentially varying controls—such as hours of operations—to ensure noise is contained properly. As such, there are no alternative locations for the hush house that meet MILCON/UMMC project selection standards 1 and 2 (see **Table 2-8**). As such, no alternative locations for the hush house are carried forward for analysis in this EIS. Constructing the hush house adjacent to the existing hush house, as described in **Section 2.2.2.1.4.1**, is the only alternative that meets all MILCON/UMMC project selection standards and is carried forward for analysis in this EIS.

***T-7A Shelters*.** One alternative, in addition to that proposed in **Section 2.2.2.1.4.1**, was considered for the T-7A shelters. This alternative would only be needed if Alternative 3 (see **Section 2.2.2.3**) is selected for implementation. For this alternative, up to 58 T-7A shelters would be installed rather than the up to 46 proposed in Alternatives 1 and 2. The up to 12 additional shelters would accommodate three-quarters (75 percent) of the up to 16 additional T-7A aircraft that could be assigned to Columbus AFB (e.g., 77 total aircraft × 75 percent = 57.75 shelters, rounded up to 58). The remaining one-quarter (25 percent) of the T-7A fleet would be parked inside hangars for shelter (see **Section 2.2.2.1.4.1** for further information on this calculation). This alternative meets all MILCON/UMMC project selection standards (see **Table 2-8**) and is carried forward for analysis in this EIS as part of Alternative 3. Installing up to 46 T-7A shelters, as described in **Section 2.2.2.1.4.1**, also meets all MILCON/UMMC project selection standards and is carried forward for analysis in this EIS as part of Alternatives 1 and 2.

Egress Shop. One alternative, in addition to that proposed in **Section 2.2.2.1.4.1**, was considered for the egress shop. For this alternative, Building 452 (Hangar 3) would be demolished and replaced with a new hangar that would include the proposed Egress Shop. AETC determined that replacement of Building 452 is not necessary because it is structurally sound. Additionally, replacement would cost approximately three times that of construction of the proposed egress shop, and it is likely to entail greater environmental impacts (AETC 2021b). For this reason, replacement of Building 452 with a new hangar that includes an egress shop does not meet MILCON/UMMC project selection standard 4 (see **Table 2-8**) and has been dismissed from further analysis in this EIS. The Egress Shop MILCON project, as described in

Section 2.2.2.1.4.1, meets all MILCON/UMMC project selection standards and is carried forward for analysis in this EIS.

2.2.4 Alternatives Carried Forward for Analysis

Alternatives 1, 2, and 3 meet all the selection standards listed in **Section 2.2.2.4**. Therefore, these three alternatives have been carried forward for analysis in this EIS.

Alternatives 1 and 2 include installation of up to 46 T-7A shelters. The UMMC project alternative to install up to 58 T-7A shelters has been carried forward for analysis as part of Alternative 3. No other MILCON/UMMC project alternatives have been carried forward for analysis in this EIS because each failed to meet one or more of the MILCON/UMMC project selection standards identified in **Section 2.2.3.1**.

2.3 No Action Alternative

CEQ and DAF NEPA regulations require consideration of the No Action Alternative to assess any environmental consequences that may occur if the Proposed Action is not implemented. The T-7A recapitalization program will be implemented regardless of whether the No Action Alternative is selected. If the No Action Alternative is selected, DAF would re-evaluate their T-7A strategic basing decisions. The No Action Alternative serves as a baseline against which the impacts of the Proposed Action and other potential action alternatives can be evaluated.

For the No Action Alternative, DAF would not implement T-7A recapitalization at Columbus AFB. T-7A aircraft manufacturing has been contracted; therefore, if the No Action Alternative were implemented, the T-7A aircraft disposition would be determined separately. Columbus AFB's existing fleet of T-38C aircraft would continue to be used in their current capacity even though they will reach the end of their service lives within the next decade. Maintenance requirements for these aircraft would continue to increase. No changes to current flight operations would likely occur until the end of the T-38Cs' service life. The retention and continued use of the T-38C aircraft would not change the number of personnel on Columbus AFB. The number and types of T-38C aircraft operations would remain the same, consistent with the current training curriculum and operations shown in **Table 2-2** for the 2021 baseline. The SUA (MOAs, Range, and MTRs) for T-38C operations, identified in **Section 1.2**, would continue to be used at the same tempo and in a similar manner. No MILCON/UMMC or FSRM projects would be undertaken to support the T-7A program at Columbus AFB.

2.4 Identification of the Preferred Alternative

As noted in **Section 1.1.1**, the Acting Secretary of the Air Force expressed preference for Columbus AFB to be the second installation (behind JBSA-Randolph) to undergo possible T-7A recapitalization in the strategic basing memorandum, dated January 29, 2021. Recapitalizing Columbus AFB second would have the least impact on continued pilot production during the transition of aircraft types, provide the most cost-efficient student production and management plan, and align with AETC's student pipeline flow for UPT, IFF, and the soon to be developed FBF curricula. Laughlin, Vance, and Sheppard AFBs would follow as the third, fourth, and fifth installations to be recapitalized, respectively.

DAF identified Alternative 1 (i.e., addressing recapitalization at Columbus AFB with up to 61 T-7A aircraft and performing sufficient operations for sustaining pilot training while simultaneously phasing out the T-38C aircraft) as its preferred alternative in the Draft EIS. Following the Draft EIS public comment period, DAF switched its preferred alternative to Alternative 3 (i.e., addressing recapitalization at Columbus AFB with up to 77 T-7A aircraft and performing T-7A operations at a level that is approximately 25 percent greater than Alternative 1) because of anticipated changes in the pilot training curriculums and syllabuses. Alternative 3 is preferred because it provides sufficient operational capacity for AETC's foreseeable pilot production needs and provides operational flexibility for future capacity needs. As noted in **Section 2.2.2.3**, if Alternative 3 were selected for implementation, the Secretary of the Air Force would issue another strategic basing decision memorandum for record to authorize the additional T-7A aircraft.

2.5 Environmental Comparison of the Alternatives

Table 2-9 provides a summary of the environmental impacts associated with each alternative.

Table 2-9. Summary of Environmental Impacts

No Action Alternative	Proposed Action		
	Alternative 1	**Alternative 2**	**Alternative 3 – Preferred Alternative**
Brief Description of the Alternatives			
T-7A recapitalization at Columbus AFB would not occur. T-38C training would continue to occur in its current capacity.	T-7A recapitalization at Columbus AFB would occur with up to 61 T-7A aircraft and T-7A operations at a level sustaining pilot training while simultaneously phasing out the T-38C and phasing in the T-7A.	T-7A recapitalization at Columbus AFB would occur with up to 61 T-7A aircraft and T-7A operations at a level 25 percent greater than Alternative 1.	T-7A recapitalization at Columbus AFB would occur with up to 77 T-7A aircraft and T-7A operations at a level 25 percent greater than Alternative 1. Compared to Alternatives 1 and 2, up to 12 additional T-7A shelters would be constructed.
Air Quality and Climate Change			
No impacts would occur.	Short- and long-term, less than significant, adverse and beneficial impacts would occur. The short-term impacts would occur from the use of heavy equipment during construction. The long-term impacts would occur from operation and heating of new facilities and flight operations. The proposed flight operations would result in annual net increases and decreases in criteria pollutants and greenhouse gases (GHG) depending on the location, year, and pollutant in question. Increases in criteria pollutant emissions would not exceed the *de minimis* level threshold or insignificance indicators. GHG emissions would not contribute meaningfully to the potential effects of global climate change. Alternative 1 would emit the least amount of GHG, with the least potential to contribute to ongoing climate change, when compared to the other two action alternatives. No future climate scenario or potential climate stressor would have significant effects on any element of Alternative 1.	The short-term impacts from construction and the long-term impacts from operation and heating of the new facilities would be similar to those described for Alternative 1. While greater air emissions would occur from the proposed flight operations compared to Alternative 1, these emissions would result in annual net increases and decreases in criteria pollutants and GHGs depending on the location, year, and pollutant in question. Increases in criteria pollutant emissions would not exceed the *de minimis* level threshold or insignificance indicators. GHG emissions from construction would be identical to those for Alternative 1. While GHG emissions from flight operations would be greater than those for Alternative 1, such emissions would not contribute meaningfully to the potential effects of global climate change. No future climate scenario or potential climate stressor would have significant effects on any element of Alternative 2.	The short- and long-term impacts would be similar to those described for Alternatives 1 and 2. While greater air emissions would occur compared to Alternatives 1 and 2, these emissions would result in annual net increases and decreases in criteria pollutants and GHGs depending on the location, year, and pollutant in question. Increases in criteria pollutant emissions would not exceed the *de minimis* level threshold or insignificance indicators. GHG emissions would be greater than those for Alternatives 1 and 2, but such emissions would not contribute meaningfully to the potential effects of global climate change. No future climate scenario or potential climate stressor would have significant effects on any element of Alternative 3.

No Action Alternative	Proposed Action		
	Alternative 1	**Alternative 2**	**Alternative 3 – Preferred Alternative**
Noise			
No impacts would occur.	Short- and long-term, less than significant, adverse impacts on the noise environment would occur. Short-term impacts would be due to noise generated by heavy equipment during construction. Long-term impacts would be due to the introduction of the T-7A aircraft and nighttime operations (those between 10 p.m. and 7 a.m.). Long-term changes in operational noise would increase areas of incompatible land use on and adjacent to Columbus AFB. Land acreage within the 65-A-weighted decibels (dBA) day-night average sound level (DNL) or greater area would increase on-installation by 524 acres and off-installation by 3,442 acres. The estimated population within the 65-dBA DNL or greater would increase by 434 on-installation and 160 off-installation.	Short-term impacts from construction would be the same as those described for Alternative 1. Compared to Alternative 1, long-term noise impacts would be slightly greater due to the greater number of aircraft operations. Land acreage within the 65-dBA DNL or greater area would increase on-installation by 637 acres and off-installation by 4,479 acres. The estimated population within the 65-dBA DNL or greater area would increase by 689 on-installation and 244 off-installation.	Short-term impacts from construction would be similar to those described for Alternative 1. Long-term impacts from aircraft operations would be the same as those described for Alternative 2.

No Action Alternative	Proposed Action		
	Alternative 1	**Alternative 2**	**Alternative 3 – Preferred Alternative**
Biological Resources			
No impacts would occur.	Short- and long-term, less than significant, adverse impacts on vegetation and wildlife would occur at Columbus AFB from the MILCON/UMMC and FSRM projects. Long-term, less than significant, adverse impacts on wildlife may occur from aircraft strikes and noise from the proposed aircraft operations. Nighttime aircraft operations would increase the risk of bird and bat strikes. The Proposed Action may affect, but is not likely to adversely affect, 8 federally listed or candidate species and would not affect the remaining 73 federally listed or candidate species with a potential to occur on Columbus AFB or within or underlying the SUA proposed for flight operations. No appreciable effects on state-listed or sensitive species would occur.	The short-term impacts would be the same as those described for Alternative 1. The long-term impacts would be slightly greater than those described for Alternative 1 because the additional aircraft operations would increase the risk of bird and bat strikes compared to Alternative 1.	Impacts would be the same as those described for Alternative 2.

No Action Alternative	Proposed Action		
	Alternative 1	**Alternative 2**	**Alternative 3 – Preferred Alternative**
Cultural Resources			
No impacts would occur.	The only aspects of the Proposed Action with potential to effect historic properties are the MILCON/UMMC and FSRM projects. DAF determined that these projects would have no adverse effect on built environment historic properties and received concurrence from the Mississippi State Historic Preservation Officer (SHPO) on that determination in a letter dated June 21, 2023. Concurrence was conditional on the following for Buildings 452 and 454: one, the new vertical lift doors must be installed within the existing openings and two, metal panels that are similar in appearance as the existing wall cladding must be used. DAF has also determined that there would be no effect to archaeological resources and received concurrence from the Mississippi SHPO on that determination in a letter dated August 2, 2023.	Impacts would be the same as those described for Alternative 1.	Impacts would be the same as those described for Alternative 1.

No Action Alternative	Proposed Action		
	Alternative 1	**Alternative 2**	**Alternative 3 – Preferred Alternative**
Land Use			
No impacts would occur.	The proposed MILCON/UMMC and FSRM projects would be sited, designed, and constructed consistent with the Installation Development Plan (IDP) and would be largely compatible and consistent with applicable land use plans and regulations. The Proposed Action would meet FAA regulations specific to minimum altitude and avoidance distances. The clear zones (CZ) and accident potential zones (APZ) for Columbus AFB would remain unchanged. As noted in Noise, additional land area and population would fall within the Alternative 1 noise contours as compared to the baseline noise contours, resulting in a potential increase in incompatible land uses. Residential land use would represent less than 3 percent of the total off-installation area within the baseline and Alternative 1 noise contours; therefore, impacts would be less than significant.	Impacts would be largely similar to those described for Alternative 1. As noted in Noise, additional land area and population would fall within the Alternative 2 noise contours as compared to the Alternative 1 noise contours, resulting in a potential increase in incompatible land uses. As with the baseline and Alternative 1 noise contours, residential land use would represent less than 3 percent of the total off-installation area within the Alternative 2 noise contours; therefore, impacts would be less than significant.	Impacts would be the same as those described for Alternative 2.

No Action Alternative	Proposed Action		
	Alternative 1	**Alternative 2**	**Alternative 3 – Preferred Alternative**
Hazardous Materials and Wastes			
No impacts would occur.	Short-term, less than significant, adverse impacts would occur from the use of hazardous materials and petroleum products and the generation of hazardous wastes during construction for the MILCON/UMMC and FSRM projects and from aircraft maintenance during the aircraft transition period. No long-term impacts would occur from aircraft maintenance because the use of hazardous materials and petroleum products and the generation of hazardous wastes is expected to return to similar or slightly lower levels than baseline by 2030. Short-term, less than significant, adverse impacts could occur from the renovation of Buildings 216, 452, and 454 because these buildings potentially contain toxic substances in building materials. Long-term, less than significant, beneficial impacts would occur from renovation of these buildings by reducing the potential for future human exposure to toxic substances. Short-term, less than significant, adverse impacts from per- and polyfluoroalkyl substances (PFAS) would occur because the UMT facility is proposed immediately adjacent to the delineated groundwater plume of an aqueous film forming foam (AFFF) release area (i.e., Site SS005P). No impacts on or from radon would occur.	Impacts would be slightly greater than those described for Alternative 1, because the 25 percent increase in aircraft operations would require additional quantities of hazardous materials, hazardous wastes, and petroleum products (most notably jet fuel) to be delivered, stored, used, and disposed of appropriately at Columbus AFB.	Impacts would be slightly greater than those described for Alternative 2, because the 25 percent increase in aircraft operations, relative to Alternative 1, and the up to 16 additional aircraft to maintain would require additional quantities of hazardous materials, hazardous wastes, and petroleum products (most notably jet fuel) to be delivered, stored, used, and disposed of appropriately at Columbus AFB.

No Action Alternative	Proposed Action		
	Alternative 1	**Alternative 2**	**Alternative 3 – Preferred Alternative**
Infrastructure and Transportation			
No impacts would occur.	Long-term, less than significant, beneficial impacts on airfield infrastructure would occur from the addition of up to 46 T-7A shelters and the FSRM projects to improve the airfield. Short-term, less than significant, adverse and long-term, less than significant, adverse and beneficial impacts on utility services (i.e., liquid fuel, electrical system, natural gas system, water supply system, wastewater system, stormwater system, communications system, and solid waste management) would occur. Temporary utility service disruptions could occur when buildings are disconnected from or connected to the applicable utility services during construction, and construction would temporarily increase the demand for these utility services. Long-term reductions in personnel and annual aircraft operations compared to the baseline likely would reduce demand for utility services slightly. Short-term, less than significant, adverse impacts on the transportation system would occur from construction traffic. Long-term, less than significant, adverse and beneficial impacts on the transportation system would occur from the personnel changes and additional parking spaces.	Compared to Alternative 1, the 25 percent increase in T-7A operations would slightly increase wear on the airfield pavement and the amount of jet fuel consumed in the long-term. However, a 25 percent increase in operations is still less than baseline operations; therefore, the overall impact would remain beneficial. Impacts on the remaining infrastructure components—namely utility services and transportation—would be identical to Alternative 1.	Impacts would be similar to those described for Alternative 2. The addition of up to 58 T-7A shelters would increase the aircraft parking capacity and provide sufficient shelter for the additional aircraft.

No Action Alternative	Proposed Action		
	Alternative 1	**Alternative 2**	**Alternative 3 – Preferred Alternative**
	Safety		
No impacts would occur.	Short-term, less than significant, adverse impacts on contractor health and safety would occur during construction for the MILCON/UMMC and FSRM projects. Long-term, less than significant, adverse impacts on flight safety would occur from nighttime aircraft operations resulting in an increased potential for Bird/Wildlife Aircraft Strike Hazard (BASH) incidents and other mishaps. The CZs and APZs would remain unchanged.	The impacts on contractor health and safety would be the same as those described for Alternative 1. The impacts on flight safety from 25 percent greater aircraft operations would be slightly greater than those described for Alternative 1.	Impacts would be the same as those described for Alternative 2.
	Water Resources		
No impacts would occur.	Short- and long-term, less than significant, indirect, adverse impacts on groundwater and surface water would occur. The MILCON/UMMC and FSRM projects would increase impervious surface area and decrease area for groundwater infiltration by approximately 98,000 ft^2 (2.25 acres), leading to potentially decreased recharge of groundwater and increased stormwater runoff into nearby surface water bodies. Temporary increases in hazardous materials and petroleum product use would negligibly increase the potential for an accidental release to occur and for the contamination to reach nearby groundwater aquifers and surface water features. No direct impacts on wetlands would occur. The MILCON/UMMC and FSRM projects would not occur within or near the 100- or 500-year floodplains.	Impacts would be similar to those described for Alternative 1. Increased aircraft operations would slightly increase the potential for an accidental release of hazardous materials or petroleum products to contaminate groundwater aquifers and surface waters.	Impacts would be similar to those described for Alternative 2. Compared to Alternative 2, the additional aircraft to maintain would slightly increase the potential for an accidental release of hazardous materials or petroleum products to contaminate groundwater aquifers and surface waters.

No Action Alternative	Proposed Action		
	Alternative 1	**Alternative 2**	**Alternative 3 – Preferred Alternative**
Environmental Justice			
No impacts would occur.	Alternative 1 would have a disproportionately high and adverse impact on environmental justice and sensitive receptor populations within three of the five Census Block Groups that coincide with the 65 dBA noise contour for Alternative 1. These three Census Block Groups contain environmental justice populations at levels either above 50 percent of the total population or greater than 10 percent of the community of comparison for minority, low-income, youth, or elderly populations. Compared to baseline conditions, aircraft noise would result in a higher number of classroom learning interference events and an increase in the time above metric at the two schools analyzed in this EIS; therefore, Alternative 1 would have a disproportionate, adverse impact on children.	Impacts would be slightly greater than those described for Alternative 1 because noise and air emissions would be greater. A small portion of one additional Census Block Group, which contains an environmental justice population, would be within the 65 dBA noise contour for Alternative 2. Like Alternative 1, Alternative 2 would have a disproportionately high and adverse impact on children from classroom learning interference.	Impacts would be the same as those described for Alternative 2. A disproportionately high and adverse impact on environmental justice and sensitive receptor populations would occur.

3. Affected Environment and Environmental Consequences

This chapter describes the environmental resources and baseline conditions that the Proposed Action could affect. It also presents an analysis of the potential environmental consequences from the three action alternatives and the No Action Alternative. The three action alternatives and No Action Alternative were evaluated for their potential environmental consequences on environmental resources in accordance with CEQ NEPA regulations at 40 CFR § 1508.8.

This section also addresses mitigation measures, best management practices (BMP), and environmental protection measures necessary to implement the Proposed Action. Mitigation measures are actions that would serve to avoid, minimize, or compensate for effects caused by a proposed action. Mitigation measures differ from BMPs and environmental protection measures in that BMPs are actions that reduce potential impacts and are required by statutes, regulations, or to fulfill permitting or consultation requirements and environmental protection measures are actions used to minimize impacts and are not required as part of statutes, regulations, or to fulfill permitting requirements but are typically measures taken during design and construction phases of a project to reduce impacts on the environment. No mitigation measures are required for the Proposed Action. BMPs and environmental protection measures are discussed for each resource area in Chapter 3 to describe how a project's level of impact could be minimized. None of the BMPs or environmental protection measures described herein are needed to bring an impact below the threshold of significance.

In compliance with NEPA, CEQ, and DAF EIAP regulations and guidelines, this EIS focuses on only those environmental resources considered potentially subject to significant impacts from the Proposed Action. DAF used the scoping process to identify environmental issues to be carried forward for analysis and deemphasize insignificant issues. The environmental resources analyzed in detail in this EIS are air quality and climate change, noise, biological resources, cultural resources, land use, hazardous materials and wastes, infrastructure and transportation, safety, water resources, and environmental justice. The environmental resources not analyzed in detail in this EIS, because they were clearly insignificant or no impacts would occur, include airspace, geological resources, and socioeconomics. The rationale explaining why those three resources were dismissed from detailed analysis in this EIS is provided below.

Airspace. SUA consists of defined-dimension airspace wherein activities must be confined because of their nature, limitations are imposed upon aircraft operations that are not a part of those activities, or both. SUA is also defined in terms of floor and ceiling altitudes as well as times for which the airspace is active. SUA for this action includes five MOAs, one Restricted Area, and five MTRs.

MOAs are SUA established to separate certain nonhazardous military activities from Instrument Flight Rules traffic and to identify where those activities are performed for Visual Flight Rules traffic. Restricted Areas are typically used by the military where local controlling authorities have determined that air traffic must be restricted or prohibited for safety or security concerns. Flight corridors, referred to as MTRs, are used to connect MOAs and Restricted Areas. MTRs

are established for use by the military for the purpose of performing low-altitude, high-speed training. Routes above 1,500 feet AGL are developed to be flown, to the maximum extent possible, using Instrument Flight Rules. Routes at 1,500 feet AGL and below are generally developed to be flown using Visual Flight Rules. **Table 3-1** provides a list and description of the SUA used for T-38C and proposed for T-7A training at Columbus AFB. These SUA are shown in **Figure 1-3**.

The Proposed Action would have no impacts on existing SUA configurations (e.g., shape, size, altitudes) or their active times. T-7A pilot training would occur within the same SUA used for such training with the T-38C (i.e., Columbus 1, Columbus 2, Columbus 3, Birmingham, and Birmingham 2 MOAs; Range R-4404; and MTRs IR-066, IR-068, IR-091, VR-1014, and VR-1031). No changes to SUA configurations would be required for T-7A recapitalization. Should DAF desire to change the configurations of these SUA following T-7A recapitalization or as a result of new training practices with other aircraft, separate NEPA analysis would be performed in conjunction with the FAA when the scope of that effort is better understood. As such, further SUA configuration impact analysis is unnecessary for this EIS. Impacts on environmental resources within the SUA are analyzed, as appropriate, in those discussions (e.g., air quality, noise, biological resources, environmental justice).

Geological Resources. The Proposed Action would have no significant impacts on geological resources. No impacts on regional geology and local topography would occur. Construction for the MILCON/UMMC and FSRM projects would be small enough in scope that they would not alter geological structures or features. The projects would occur on mostly flat land, and no appreciable changes to local topography would occur. Lowndes County, Mississippi, has a low potential for damaging earthquakes, with 10 damaging earthquakes expected per 10,000 years (USGS 2022a). Therefore, seismic hazards would have no impact on new construction.

The U.S. Department of Agriculture has identified the soils within the footprint of the MILCON/UMMC and FSRM projects as Prentiss-Urban land complex and Urban Land (USDA NRCS 2022). The projects would occur within highly urbanized areas on Columbus AFB where it is likely that these soil complexes have been disturbed from previous construction and landscaping and little natural soil structure remains. Appropriate geotechnical surveys would be completed during project design to ensure that soil limitations are identified and addressed, as necessary. Neither the Prentiss-Urban land complex nor Urban Land have the physical properties necessary for classification as prime farmland soils; therefore, these soils are not subject to the Farmland Protection Policy Act.

Construction for the MILCON/UMMC and FSRM projects would disturb soil, potentially resulting in the loss of structure, compaction, and erosion of soil as well as changes to local water infiltration and drainage patterns. Soil erosion and sediment control measures would be implemented, as appropriate, and could include installing silt fencing and sediment traps, applying water to disturbed soil to prevent wind erosion, and vegetating disturbed areas as soon as possible. Erosion and Sediment Control Plans would be prepared and implemented, as necessary, to reduce soil erosion and sedimentation. Stormwater control measures that favor infiltration would be implemented to minimize the potential for erosion and sediment production from storm events (see **Section 3.10.2** for water resources impacts).

Table 3-1. SUA for T-38C and T-7A Training at Columbus AFB

SUA Designation	Type of SUA	Short Description[1]
Columbus 1	MOA	Located over portions of Fayette, Lamar, Marion, and Walker Counties in Alabama and Calhoun, Chickasaw, Clay, Itawamba, Lee, Lowndes, Monroe, Oktibbeha, Pontotoc, and Webster Counties in Mississippi. Altitudes are from 8,000 feet above mean sea level (MSL) up to but not including 18,000 feet above MSL. Time of use is Monday through Friday from sunrise to sunset and other times by Notice to Air Missions (NOTAM).
Columbus 2	MOA	Located over portions of Colbert, Franklin, Marion, and Winston Counties in Alabama. Altitudes are from 8,000 feet above MSL up to but not including 18,000 feet above MSL. Time of use is Monday through Friday from sunrise to sunset and other times by NOTAM.
Columbus 3	MOA	Located over portions of Calhoun, Carroll, Chickasaw, Grenada, Lafayette, Lee, Leflore, Marshall, Montgomery, Panola, Pontotoc, Tallahatchie, Union, Webster, and Yalobusha Counties in Mississippi. Altitudes are from 8,000 feet above MSL up to but not including 18,000 feet above MSL. Time of use is Sunday through Friday from sunrise to sunset and other times by NOTAM.
Birmingham	MOA	Located over portions of Bibb, Dallas, Greene, Hale, Marengo, Perry, and Sumter Counties in Alabama. Altitudes are from 10,000 feet above MSL up to but not including 18,000 feet above MSL. Time of use is from 7 a.m. to 10 p.m. daily and other times by NOTAM.
Birmingham 2	MOA	Located over portions of Bibb, Dallas, Greene, Hale, Marengo, Perry, and Sumter Counties in Alabama. Altitudes are from approximately 500 feet AGL up to but not including 10,000 feet above MSL. Time of use is from 7 a.m. to 10 p.m. daily.
Sea Ray Range (R-4404)	Restricted Area	Restricted range located over Noxubee County, Mississippi. Altitudes are from the surface to 16,000 feet above MSL. Time of use is intermittent between 7 a.m. and 6 p.m. daily and other times as activated by NOTAM 24 hours in advance.
IR-066	MTR	Located over portions of Blount, Colbert, Cullman, Franklin, Lauderdale, Marion, Winston, and Walker Counties in Alabama; Benton, Itawamba, Lee, Monroe, Prentiss, Tippah, Tishomingo, and Union Counties in Mississippi; and Chester, Decatur, Hardeman, Hardin, Lawrence, McNairy, and Wayne Counties in Tennessee. Altitudes are from 100 feet AGL to 4,000 feet above MSL. Time of use is Monday through Friday from sunrise to sunset.
IR-068	MTR	Located over portions of Lee and Phillips Counties in Arkansas and Bolivar, Calhoun, Carroll, Coahoma, Grenada, Leflore, Montgomery, Panola, Quitman, Sunflower, Tallahatchie, Tunica, Webster, and Yalobusha Counties in Mississippi. Altitudes are from 100 feet AGL to 4,000 feet above MSL. Time of use is Monday to Friday from sunrise to sunset.

SUA Designation	Type of SUA	Short Description[1]
IR-091	MTR	Located over portions of Benton, Calhoun, Carroll, Chickasaw, Clay, Grenada, Lafayette, Marshall, Montgomery, Panola, Pontotoc, Quitman, Tallahatchie, Tate, Union, and Webster Counties in Mississippi. Altitudes are from the surface to 4,000 feet above MSL. Time of use is Monday to Friday from sunrise to sunset.
VR-1014	MTR	Located over portions of Blount, Cullman, Franklin, Jefferson, Lawrence, Marion, Pickens, Tuscaloosa, Walker, and Winston Counties in Alabama and Itawamba and Monroe Counties in Mississippi. Altitudes are from 500 feet to 1,500 feet AGL. Time of use is from sunrise to sunset daily.
VR-1031	MTR	Located over portions of Autauga, Bibb, Chilton, Choctaw, Clarke, Clay, Coosa, Dallas, Elmore, Greene, Hale, Marengo, Perry, Pickens, Shelby, St. Clair, Talladega, Tallapoosa, Tuscaloosa, and Wilcox Counties in Alabama and Kemper, Lowndes, and Noxubee Counties in Mississippi. Altitudes are from 500 feet to 1,500 feet AGL. Time of use is from 11 a.m. to 6 p.m. daily.

Sources: FAA 2021, DoD 2021

[1] The MTRs include several parts or "legs" that are designated by specific coordinates. Some legs within the same MTR have differing properties, such as minimum/maximum altitudes, times of operation, speeds, etc. The short description provided in this table is a general overview of the MTR. A complete description of the MTRs and their respective legs is available in the Department of Defense (DoD) Flight Information Publication AP/1B, Area Planning MTRs, North and South America.

Socioeconomics. The Proposed Action would have insignificant socioeconomic impacts. As described in **Section 2.2.2.1.3**, an increase of approximately 43 personnel at Columbus AFB would occur during the aircraft transition period (i.e., 2028 and 2029), but the initial increase in personnel would subside as T-38C aircraft are removed from service, and the steady state personnel requirement is projected to be approximately 31 persons fewer than the current baseline staffing levels (AFCEC/CZN 2021a). Associated with the personnel change is a corresponding change in the number of dependents. DAF estimates that 82 dependents would accompany the 43 additional personnel during the aircraft transition period, for a total of 125 additional people in the vicinity of Columbus AFB during 2028 and 2029, as compared to current baseline staffing levels. After the aircraft transition period, the loss of 31 personnel from Columbus AFB would remove 59 dependents and 90 total people from the Columbus AFB vicinity, as compared to current baseline staffing levels.

As of July 2021, Lowndes County, Mississippi, is home to 58,150 people and experienced an approximately 2.8 percent negative population change between 2010 and 2021 (USAFACTS 2022). The demand for housing, schools, health care, and other public services in Lowndes County would increase slightly in 2028 and 2029 during the aircraft transition period from the addition of the estimated 43 personnel and their 82 dependents. However, this temporary and slight increase would not be noticeable given the slight reduction in the population of Lowndes County over the past 10 years and the overall size of the county's population relative to the number of new personnel and dependents. The temporary and slight increase in demand for housing, schools, health care, and other public services would be followed by a permanent and slight decrease in the demand for these services in the years after 2029 when the aircraft

transition period is over. Therefore, the temporary addition of approximately 125 new residents followed by the long-term subtraction of approximately 90 residents (compared to baseline levels) would have insignificant socioeconomic impacts.

Beneficial impacts on the local economy would occur from the sale of construction materials and employment of local construction workers to construct the MILCON/UMMC and FSRM projects. However, the increase in tax revenue and regional availability of building materials and labor would not be affected noticeably because of the limited scope and temporary duration of each project.

3.1 Cumulative Effects

As stated in **Section 1.1**, the EIAP for this EIS began on March 29, 2022, when the NOI to prepare this EIS was published in the *Federal Register*. The NOI was published prior to the promulgation of CEQ's final rule updating the regulations implementing NEPA's procedural provisions on April 20, 2022. As such, this EIS was developed in accordance with the 2020 CEQ NEPA regulations that were in effect on March 29, 2022. The 2020 CEQ NEPA regulations do not require DAF to characterize impacts as direct or indirect or to perform an analysis of the environmental impacts from the Proposed Action combined with potential cumulative effects from reasonably foreseeable actions. Nevertheless, DAF has decided to include a cumulative effects assessment in this EIS to inform readers of all potential environmental impacts.

Cumulative effects are defined under 40 CFR § 1508.1(g)(3) as the effects on the environment that result from the incremental effects of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over time. Past actions are those actions and their associated impacts that have shaped a project area's current environmental conditions. Therefore, the impacts of past actions are now part of the existing environment and are included in the affected environment described in **Sections 3.2** through **3.11**. Reasonably foreseeable actions that could contribute to cumulative effects on the human environment are described in **Table 3-2**. The impacts of these actions, combined with the impacts of the three action alternatives analyzed in this EIS, are described for each resource area in **Sections 3.2** through **3.11** in the Cumulative Effects subsections.

Table 3-2. Reasonably Foreseeable Actions at Columbus AFB and Associated Region

Action Name	Location	Timeframe	Description
Military Actions			
Various FSRM Projects	Columbus AFB	Future (2024)	Implement various FSRM projects on Columbus AFB. These projects would include facility repairs at Buildings 158 and 236; utility system repairs at Buildings 268, 385, and 964; airfield lights/airfield lighting vault repairs; add/alter decontamination areas at Buildings 262, 406, and 414; auxiliary field runway/taxiway repairs; and storm drainage repairs.
Construct New Water Storage Tank	Columbus AFB	Future (2025)	Construct a 750,000-gallon water storage tank west of Independence Drive between D and Imes Streets behind the south parking area for the installation's clinic. Site preparation and construction would include the construction of a paved access road, parking area, and security fence. The project would include modifications to the installation's water distribution system to integrate the new storage tank, cut off the old storage tank, and meet the new configuration's flow demands. Additionally, the project would include demolition of the current 400,000-gallon water storage tank (Columbus AFB 2021).
Construct New Fitness Center	Columbus AFB	Future (2025)	Construct an approximately 60,000 ft^2 fitness center on the southern corner of Imes and 7th Streets. The new fitness center would require demolition of Buildings 704 and 9311, which measure approximately 28,000 ft^2, and would be designed in accordance with Unified Facilities Criteria (UFC) (Columbus AFB 2021).
State and Local Actions			
U.S. Highway 45 Corridor Improvement District Project	U.S. Highway 45 Corridor	Future	Perform capital improvements to U.S. Highway 45. Such improvements include adding streetlights, signage, landscaping, public art, sidewalks, crosswalks or trails, and bicycle friendly amenities. This project would address highway safety, traffic, and access issues (City of Columbus 2022).

3.2 Air Quality and Climate Change

Air quality is defined by the concentration of various pollutants in the atmosphere. A region's air quality is influenced by many factors, including the type and amount of pollutants emitted into the atmosphere, the size and topography of the air basin, and the prevailing meteorological conditions. Most air pollutants originate from human-made sources, including mobile sources (e.g., aircraft, cars, trucks, buses) and stationary sources (e.g., factories, refineries, power plants, materials handling, use of cleaning solvents). Air pollutants also are released from natural sources, such as forest fires. Air pollution occurs when one or more pollutants (e.g., dust, fumes, gas, mist, odor, smoke, vapor) are present in the outdoor atmosphere in quantities great enough to cause harm to the natural environment, including human, plant, and animal life.

Criteria Pollutants, National Ambient Air Quality Standards, and the General Conformity Rule. The six pollutants that are the main indicators of air quality, called "criteria pollutants," are carbon monoxide (CO), sulfur dioxide, nitrogen dioxide, ozone (O_3), suspended particulate matter (measured less than or equal to 10 microns in diameter [PM_{10}] and less than or equal to 2.5 microns in diameter [$PM_{2.5}$]), and lead. CO, sulfur oxides (SO_X), nitrogen oxides (NO_X), lead, and some particulates are emitted directly into the atmosphere from emissions sources. NO_X, O_3, and some particulates are formed through atmospheric chemical reactions that are influenced by weather, ultraviolet light, and other atmospheric processes. Volatile organic compounds (VOC) and NO_X emissions are precursors of O_3 and used to represent O_3 generation.

Under the Clean Air Act (42 United States Code [USC] Chapter 85), the U.S. Environmental Protection Agency (USEPA) established National Ambient Air Quality Standards (NAAQS) (40 CFR Part 50) for the criteria pollutants. The NAAQS were established to protect against acute and chronic adverse health and welfare effects from poor air quality. Each state has the authority to adopt air quality standards stricter than those established under the federal NAAQS. The state of Mississippi accepts the federal NAAQS (Mississippi Code § 49-17 et seq.).

Areas that are and have historically been in compliance with NAAQS, or have not been evaluated for NAAQS compliance, are designated as attainment areas. Areas that violate a federal air quality standard are designated as nonattainment areas. Areas that have transitioned from nonattainment to attainment are designated as maintenance areas. Nonattainment and maintenance areas are required to adhere to a State Implementation Plan to reach attainment or ensure continued attainment.

The USEPA General Conformity Rule applies to federal actions occurring in nonattainment or maintenance areas. A general conformity determination is required when the total emissions of nonattainment and maintenance pollutants (or their precursors) exceed specified thresholds. The emissions thresholds that trigger requirements for a conformity determination are called *de minimis* levels and are specified at 40 CFR § 93.153. *De minimis* levels (in tons per year [tpy]) vary by pollutant and depend on the severity of the nonattainment status for the air quality management area in question. If the results of the applicability analysis indicate that the total emissions would not exceed the *de minimis* levels, then the conformity process is completed,

and a general conformity determination is not required. The General Conformity Rule does not apply to federal actions occurring in attainment areas.

Climate Change and GHGs. Global climate change refers to long-term fluctuations in temperature, precipitation, wind, sea level, and other elements of Earth's climate system. GHGs are gas emissions that trap heat in the atmosphere and include water vapor, carbon dioxide (CO_2), methane, nitrous oxide, tropospheric O_3, and several fluorinated and chlorinated gaseous compounds. To estimate global warming potential, all GHGs are expressed relative to a reference gas, CO_2, which is assigned a global warming potential equal to one (1). All GHGs are multiplied by their global warming potential, and the results are added to calculate the total equivalent emissions of CO_2 (CO_2e). The dominant GHG emitted is CO_2, accounting for 79 percent of all GHG emissions as of 2020, the most recent year for which data are available (USEPA 2022a).

Most GHGs occur in the atmosphere naturally, but increases in concentrations result from human activities, such as burning fossil fuels. Scientific evidence indicates a trend of increasing global temperature over the past century because of an increase in GHG emissions from human activities. The climate change associated with this global warming is predicted to produce negative economic and social consequences across the globe.

EO 13990, *Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis*, signed January 20, 2021, reinstated the *Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews*, issued on August 5, 2016, by CEQ that required federal agencies to consider GHG emissions and the effects of climate change in NEPA reviews (CEQ 2016). The CEQ *National Environmental Policy Act Interim Guidance on Consideration of Greenhouse Gas Emissions and Climate Change*, issued on January 9, 2023, recommends quantifying a proposed action's GHG emissions in appropriate context. In accordance with the 2016 final guidance and the 2023 interim guidance, estimated CO_2e emissions associated with the Proposed Action are provided in this EIS for informative purposes. CEQ guidance does not identify a particular quantity of GHG emissions that would "significantly" affect the quality of the human environment and NEPA does not require a monetary cost-benefit analysis of GHGs (CEQ 2016, CEQ 2023).

Per CEQ's 2023 interim guidance, "Agencies should exercise judgment when considering whether to apply this guidance to the extent practicable to an on-going NEPA process." DAF guidance on applying and conducting a social cost of GHG analysis is under development. Therefore, no social cost of GHG analysis has been prepared for this EIS, which was ongoing when the CEQ's interim guidance was issued.

EO 14008, *Tackling the Climate Crisis at Home and Abroad*, further strengthens EO 13990 by implementing objectives to reduce GHG emissions and bolster resilience to the impacts of climate change and requiring federal agencies to develop and implement climate action plans. DAF's *Climate Action Plan* recognizes the department's role in contributing to climate change and aims to address the challenges and risks posed by climate change through the implementation of climate priorities, including making climate-informed decisions, optimizing energy use, and pursuing alternative energy sources. DAF also follows the DoD *Climate*

Adaptation Plan and considers the DoD *Climate Risk Analysis* for climate change planning (DAF SAF/IE 2022). *The Long-term Strategy of the United States: Pathways to Net-Zero Greenhouse Gas Emissions by 2050 sets target benchmarks to achieve net-zero GHG emissions by no later than 2050* through emission-reducing investments, such as carbon-free power generation, zero-emission vehicles, energy-efficient buildings, and expansion and protection of forest areas (DOS and EOP 2021).

USEPA implements the GHG Reporting Program, requiring certain facilities to report GHG emissions from stationary sources if such emissions exceed 25,000 metric tons of CO_2e per year (40 CFR Part 98). Major source permitting requirements for GHGs are triggered when a facility exceeds the major threshold of 100,000 tpy for stationary source CO_2e emissions.

3.2.1 Affected Environment

The Proposed Action potentially impacts a large spatial area that has been broken into four separate air quality Regions of Influence (ROI) based on their regulatory requirements and the physical, spatial distribution of the emissions sources associated with the action. For air quality impact assessments, an ROI is a three-dimensional, vertical column of air up to 3,000 feet AGL (or the mixing zone) where pollutant emissions associated with an action will occur. The four ROI for the Proposed Action are the Columbus AFB ROI, within which all Columbus AFB airfield operations (i.e., takeoffs, landings, and closed patterns) and construction actions would occur; the Birmingham and Birmingham 2 MOAs ROI; the Range R-4404 ROI; and the MTR ROI. An air quality assessment was conducted for each individual ROI. For the Proposed Action, no aircraft operations would occur below 3,000 feet AGL within Columbus 1, 2, or 3 MOAs; therefore, these areas were not considered part of an air quality ROI.

USEPA Region 4 regulates air quality in Mississippi, Alabama, and Tennessee. USEPA Region 6 regulates air quality in Arkansas. State agencies regulating air quality in Mississippi, Alabama, Tennessee, and Arkansas are the Mississippi Department of Environmental Quality (MDEQ), Alabama Department of Environmental Management, Tennessee Department of Environment and Conservation, and Arkansas Department of Environmental Quality, respectively.

Columbus AFB is in Lowndes County, Mississippi, which is within the Northeast Mississippi Intrastate Air Quality Control Region (40 CFR § 81.62). In addition to Lowndes County, the approaches and departures below 3,000 feet AGL for Columbus AFB occur in Monroe and Clay Counties. USEPA has designated Lowndes, Monroe, and Clay Counties as in attainment for all criteria pollutants (USEPA 2022b).

The MTRs, MOAs, and Range R-4404 cover more than 70 counties in 4 states. **Table 3-3** outlines the attainment statuses and the *de minimis* level thresholds under the General Conformity Rule for the counties containing the MTRs, MOAs, and Range R-4404. Three of the counties within the MTRs (i.e., Jefferson County, Shelby County, and Walker County, Alabama) have been designated as maintenance for the $PM_{2.5}$ NAAQS; therefore, the General Conformity Rule is potentially applicable to $PM_{2.5}$ emissions as well as emissions of NO_X, VOCs, SO_X, and ammonia (NH_3) (because they are precursors to $PM_{2.5}$) from aircraft operations within MTRs VR-1014, VR-1031, and IR-066. As outlined in 40 CFR § 93.153(b), the applicable *de minimis*

level threshold for these pollutants is 100 tpy. Because the areas designated as maintenance are within the MTRs only, the 100 tpy *de minimis* level threshold is applicable only to emissions within the MTR ROI. Counties within the other three ROI (i.e., Columbus AFB, Birmingham and Birmingham 2 MOAs, and Range R-4404) are in attainment or unclassified for all criteria pollutants. As these ROI are considered attainment for all NAAQS, the General Conformity Rule does not apply to emissions associated with the Proposed Action within these areas.

Table 3-3. Air Attainment Status for Areas Within the MTRs, MOAs, and Range R-4404

County, State	SUA Designation	Attainment Status	*de minimis* Threshold
Jefferson County, Alabama	VR-1014	Maintenance for the $PM_{2.5}$ NAAQS	100 tpy for $PM_{2.5}$ 100 tpy for NO_X 100 tpy for VOCs 100 tpy for SO_X 100 tpy for NH_3
Shelby County, Alabama	VR-1031	Maintenance for the $PM_{2.5}$ NAAQS	100 tpy for $PM_{2.5}$ 100 tpy for NO_X 100 tpy for VOCs 100 tpy for SO_X 100 tpy for NH_3
Walker County, Alabama	IR-066, VR-1014	Maintenance for the $PM_{2.5}$ NAAQS	100 tpy for $PM_{2.5}$ 100 tpy for NO_X 100 tpy for VOCs 100 tpy for SO_X 100 tpy for NH_3
All other counties	All other areas	Unclassifiable/Attainment	None.

Note: 100 tpy is the *de minimis* threshold for $PM_{2.5}$ maintenance areas. 250 tpy is the insignificance indicator for $PM_{2.5}$ attainment areas.
Sources: 40 CFR § 93.153(b), USEPA 2022b

Part of Colbert County and Lauderdale County, Alabama, have been designated as maintenance for SO_X, and a part of Jefferson County, Alabama, has been designated as maintenance for lead. These maintenance areas were not identified as being within the MTRs, MOAs, or Range R-4404; therefore, the General Conformity Rule does not apply to direct emissions of SO_X and lead in these counties.

Climate Change and GHGs. Lowndes County has an average high temperature of 91 degrees Fahrenheit (°F) in the hottest month of July and an average low temperature of 32°F in the coldest month of January. The region has an average annual precipitation of 54.6 inches per year. The wettest month of the year is February, with an average rainfall of 5.4 inches (USA.com 2022).

Ongoing climate change in Mississippi, including Lowndes County, has contributed to rising seas and retreating shores, increased storm intensity, increased precipitation, increased frequency of flooding, disruption of natural ecosystems, and human health effects. Cities, ports, roads, and water supplies in Mississippi are vulnerable to the impacts of storm and sea level rise. High air temperatures can cause adverse health effects, such as heat stroke and

dehydration, especially in vulnerable populations (i.e., children, elderly, sick, and low-income populations), which can affect cardiovascular and nervous systems. Warmer air can also increase the formation of ground-level O_3, which has a variety of health effects, including aggravation of lung diseases and increased risk of death from heart or lung disease (USEPA 2016). In 2017, Lowndes County produced 4,895,907 tons of GHGs (USEPA 2021a). In 2019, Mississippi produced 62.5 million metric tons of CO_2 emissions, and was ranked the thirtieth highest producer of CO_2 in the United States (USEIA 2019).

3.2.2 Environmental Consequences

This air quality analysis estimates the effects on air quality and climate change that would result from the Proposed Action. Effects on air quality are evaluated by comparing the annual net change in emissions for each criteria pollutant against the General Conformity Rule *de minimis* values for nonattainment and maintenance areas or the DAF emissions insignificance indicators for attainment areas. Per the *Air Force Air Quality Environmental Impact Analysis Process (EIAP) Guide, Volume II – Advanced Assessments*, DAF applies insignificance indicators to actions occurring in an area that is in attainment or unclassified for the NAAQS to provide an indication of the significance of potential impacts to air quality. The insignificance indicator used by DAF is the 250 tpy Prevention of Significant Deterioration (PSD) threshold, as defined by USEPA, and is applied to the emissions for all criteria pollutants, besides lead, occurring in attainment areas. The insignificance indicator for lead is 25 tpy. The insignificance indicators do not denote a significant impact; however, they do provide a threshold to identify actions that have insignificant impacts to air quality. Any action with net emissions below the insignificance indicators for all criteria pollutants is considered so insignificant that the action would not cause or contribute to an exceedance of one or more NAAQS (AFCEC 2020).

Air quality impacts from T-7A recapitalization at Columbus AFB were reviewed for significance. Based on compliance with NAAQS, the General Conformity Rule is potentially applicable to emissions of $PM_{2.5}$, NO_X, VOCs, SO_X, and NH_3 from aircraft operations within the MTR ROI. The applicable *de minimis* level threshold for these pollutants is 100 tpy (40 CFR § 93.153[b]). For the attainment pollutants within the MTR ROI and for all criteria pollutants in the other three ROI (i.e., Columbus AFB, Birmingham and Birmingham 2 MOAs, and Range R-4404), the PSD threshold (i.e., 250 tpy for all criteria pollutants, besides lead, and 25 tpy for lead) is used as an insignificance indicator to determine air quality impact significance.

Separate assessments were performed for each ROI. The DAF Air Conformity Applicability Model (ACAM), version 5.0.17b, was used to estimate potential air emissions from the Proposed Action, and to assess the potential air quality impacts in accordance with Air Force Manual (AFMAN) 32-7002; the EIAP Guide (32 CFR Part 989); and the General Conformity Rule (40 CFR Part 93 Subpart B). Construction, demolition, and renovation emissions were estimated for fugitive dust, on- and off-road diesel equipment and vehicles, worker trips, architectural coatings, and paving off-gases. Operational emissions were estimated for changes in flight operations, trim-tests, test cell operations, aerospace ground equipment, personnel, and heating the new facilities. The aircraft operations below the mixing height of 3,000 feet AGL were included in the assessment for each ROI. **Appendix A** contains the ACAM record of air analysis and record of conformity analysis reports for each ROI under all action alternatives. Additional air quality analysis supporting documentation, including the

detailed ACAM reports containing the air emission calculations, can be downloaded from the project website at https://columbus.t-7anepadocuments.com/documents and paper copies are available upon request.

Consistent with EO 14008 and the 2016 CEQ final guidance, this EIS examines GHGs as a category of air emissions. It also examines potential future climate scenarios to determine whether elements of the Proposed Action would be affected by climate change. This EIS does not attempt to measure the actual incremental impacts of GHG emissions from the Proposed Action, as there is a lack of consensus on how to measure such impacts. Global and regional climate models have substantial variation in output and do not have the ability to measure the actual incremental impacts of a project on the environment.

3.2.2.1 Alternative 1

Alternative 1 would result in short- and long-term, less than significant, adverse and beneficial impacts on air quality. The short-term (i.e., 2024 through 2028), adverse impacts would occur from construction in the Columbus AFB ROI. The long-term (i.e., 2028 and beyond), adverse and beneficial impacts would occur from annual net changes of criteria pollutants and GHGs in the Columbus AFB, Birmingham and Birmingham 2 MOAs, Range R-4404, and MTR ROI. The rate at which the T-38C and T-7A aircrafts' engines emit each air pollutant is different. As such, some pollutants—such as VOC, NO_X, SO_X, and CO_2e—would experiences net increases while other pollutants—such as CO, PM_{10}, and $PM_{2.5}$—would experience net reductions.

Table 3-4 provides the estimated total net change in emissions for the Columbus AFB ROI, which includes all construction activities, building operations, personnel changes, and airfield operations. The total net change in annual emissions from Alternative 1 would not exceed the *de minimis* level threshold or insignificance indicator of 250 tpy for all criteria pollutants (25 tpy for lead).

Table 3-4. Estimated Annual Net Change in Emissions in the Columbus AFB ROI for Alternative 1

Year	VOC (tpy)	NO_X (tpy)	CO (tpy)	SO_X (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	Lead (tpy)	NH_3 (tpy)	CO_2e (tpy)
2024 (construction)	0.205	1.005	1.689	0.004	0.284	0.035	<0.001	0.001	397.5
2025 (construction)	1.069	4.712	7.091	0.017	8.445	0.182	<0.001	0.004	1,603.9
2026 (construction)	1.804	7.095	10.840	0.024	0.620	0.240	<0.001	0.010	2,363.7
2027 (construction)	1.009	2.459	4.117	0.009	0.086	0.086	<0.001	0.003	886.1
2028 (construction and operations)	17.466	53.652	-200.780	7.675	-6.253	-4.297	<0.001	0.006	6,325.7
2029 (operations)	30.134	129.447	-637.064	2.783	-18.912	-13.078	<0.001	0.006	11,635.4
2030 and later (operations)	29.647	150.497	-815.025	2.619	-23.807	-16.495	<0.001	-0.010	11,586.6
Maximum	30.134	150.497	10.840	2.783	8.445	0.240	<0.001	0.010	11,635.4
Insignificance indicator[1]	250	250	250	250	250	250	25	250	N/A
Exceeds insignificance indicator?	No	No	No	No	No	No	No	No	N/A

[1] The counties within the Columbus AFB ROI (i.e., Lowndes, Monroe, and Clay Counties) are considered in attainment for all NAAQS. Therefore, the PSD threshold of 250 tpy (25 tpy for lead) was used as an insignificance indicator.

Key: N/A = not applicable

Air emissions from MILCON/UMMC and FSRM project construction during the construction period (i.e., 2024 through 2028) would result in short-term, less than significant, adverse impacts on air quality. Criteria pollutant and GHG emissions would be produced directly from operation of heavy construction equipment, heavy duty diesel vehicles hauling demolition debris and construction materials to and from the project areas, workers commuting daily to and from the project areas, and ground disturbance. All such emissions would be temporary in nature and produced only when construction is occurring, from August 2024 through August 2028. The total net annual emissions from construction would not exceed the insignificance indicator of 250 tpy (25 tpy for lead).

The air pollutants of greatest concern during the construction period are CO and particulate matter, such as fugitive dust. CO is produced from internal combustion engines, such as those found in gasoline-powered equipment and generators. Fugitive dust is produced from earth-moving activities and vehicle and equipment travel over paved and unpaved roads. Emissions of CO and particulate matter from construction would be temporary and would cease once construction is complete. Additionally, the estimated emissions provided in **Table 3-4** do not account for BMPs and environmental control measures, which are likely to reduce uncontrolled CO and particulate matter emissions. Construction contractors would employ BMPs and environmental control measures, to the greatest extent practicable, as follows:

1. Electricity from the installation would be used preferentially over the use of generators. All generator use would be pre-approved by the installation air quality manager and adhere to applicable operating procedures.
2. All non-road diesel equipment would comply with the Federal Clean Air Non-road Diesel Rule, which regulates emissions from non-road diesel engines and sulfur content in non-road diesel fuel.
3. All stockpiles of excavated materials located within construction areas would be covered completely with tarping and weighed down sufficiently to prevent uncontrolled dust and material from entering the atmosphere.
4. Dust suppression techniques would be used during construction to reduce air pollution. Recommended methods include application of water, soil stabilizers, or vegetation; use of wind break enclosures; use of covers on soil stockpiles and dump truck loads; use of silt fences; and suspension of earth-movement activities during high-wind conditions (gusts exceeding 25 miles per hour).
5. Measures to reduce diesel emissions would be implemented to the greatest extent feasible. These measures could include switching to cleaner fuels, retrofitting current equipment with emission reduction technologies, repowering older equipment with modern engines, replacing older vehicles, and reducing idling through operator training and contracting policies.
6. Vegetation surrounding new construction would be restored, to the maximum extent possible, as part of landscaping efforts following construction. Restoration of vegetation would help to control fugitive dust emissions from exposed soil areas. In addition, vegetation can improve air quality through uptake and filtering of airborne molecules of criteria pollutants and GHGs, thus reducing adverse impacts on air quality.

Table 3-5 provides the estimated total net change in emissions for the Birmingham and Birmingham 2 MOAs, Range R-4404, and MTR ROI for Alternative 1.

Table 3-5. Estimated Annual Net Change in Emissions in the Birmingham and Birmingham 2 MOAs, Range R-4404, and MTR ROI for Alternative 1

Year	Net Emissions for the Birmingham and Birmingham 2 MOAs ROI								
	VOC (tpy)	**NO_X (tpy)**	**CO (tpy)**	**SO_X (tpy)**	**PM_{10} (tpy)**	**$PM_{2.5}$ (tpy)**	**Lead (tpy)**	**NH_3 (tpy)**	**CO_2e (tpy)**
2028 (aircraft operations)	1.517	25.205	-9.093	0.483	-0.262	0.096	<0.001	<0.001	1,461.6
2029 (aircraft operations)	1.517	25.205	-9.093	0.483	-0.262	0.096	<0.001	<0.001	1,461.6
2030 and later (aircraft operations)	3.034	50.410	-18.187	0.965	-0.525	0.191	<0.001	<0.001	2,923.3
Maximum	3.034	50.410	-9.093	0.965	-0.262	0.191	<0.001	<0.001	2,923.3
Insignificance indicator [1]	250	250	250	250	250	250	25	250	N/A
Exceeds insignificance indicator?	No	No	No	No	No	No	No	No	N/A
Year	**Net Emissions for the Range R-4404 ROI**								
	VOC (tpy)	**NO_X (tpy)**	**CO (tpy)**	**SO_X (tpy)**	**PM_{10} (tpy)**	**$PM_{2.5}$ (tpy)**	**Lead (tpy)**	**NH_3 (tpy)**	**CO_2e (tpy)**
2028 (aircraft operations)	0.929	15.435	-5.568	0.296	-0.161	0.059	<0.001	<0.001	895.1
2029 (aircraft operations)	0.929	15.435	-5.568	0.296	-0.161	0.059	<0.001	<0.001	895.1
2030 and later (aircraft operations)	1.858	30.869	-11.136	0.591	-0.321	0.117	<0.001	<0.001	1,790.2
Maximum	1.858	30.869	-5.568	0.591	-0.161	0.117	<0.001	<0.001	1,790.2
Insignificance indicator [1]	250	250	250	250	250	250	25	250	N/A
Exceeds insignificance indicator?	No	No	No	No	No	No	No	No	N/A
Year	**Net Emissions for the MTR ROI**								
	VOC (tpy)	**NO_X (tpy)**	**CO (tpy)**	**SO_X (tpy)**	**PM_{10} (tpy)**	**$PM_{2.5}$ (tpy)**	**Lead (tpy)**	**NH_3 (tpy)**	**CO_2e (tpy)**
2028 (aircraft operations)	-4.540	31.743	-94.308	-0.526	-2.249	-0.916	<0.001	<0.001	-1,585.8
2029 (aircraft operations)	-4.540	31.743	-94.308	-0.526	-2.249	-0.916	<0.001	<0.001	-1,585.8
2030 and later (aircraft operations)	-2.453	66.406	-106.827	0.136	-2.610	-0.784	<0.001	<0.001	418.8
Maximum	-2.453	66.406	-94.308	0.136	-2.249	-0.784	<0.001	<0.001	418.8
***De minimis* Threshold or Insignificance indicator [2]**	100	100	250	100	250	100	25	100	N/A
Exceeds *de minimis* threshold or insignificance indicator?	No	No	No	No	No	No	No	No	N/A

[1] The Birmingham and Birmingham 2 MOAs ROI and the Range R-4404 ROI are in attainment for all NAAQS. Therefore, the insignificance indicator for all pollutants, including $PM_{2.5}$, emitted at these two ROI is the PSD threshold of 250 tpy (25 tpy for lead).

[2] Three counties within the MTR ROI are maintenance for $PM_{2.5}$. As a result, for the MTR ROI only, the General Conformity Rule is potentially applicable to emissions of $PM_{2.5}$ and its precursors (i.e., NO_X, VOCs, SO_X, and NH_3), and the *de minimis* level threshold for these pollutants is 100 tpy. The insignificance indicator for the pollutants not potentially subject to the General Conformity Rule (i.e., for CO, PM_{10}, and lead) in the MTR ROI is the PSD threshold of 250 tpy (25 tpy for lead).

Key: N/A = not applicable

Long-term, less than significant, adverse impacts on air quality would occur for Alternative 1 from criteria pollutants. Air emissions would be produced directly from operating and heating the new facilities within the Columbus AFB ROI and T-7A aircraft operations within all ROI. Long-term, operational air emissions would begin in 2028 and continue indefinitely. The annual operational air emissions from Alternative 1 are summarized in **Table 3-4** and **Table 3-5**. The annual net change of criteria pollutant emissions starting in 2028 would not exceed the *de minimis* level threshold of 100 tpy for emissions of $PM_{2.5}$, NO_X, VOCs, SO_X, and NH_3 in the MTR ROI or the 250 tpy (25 tpy for lead) insignificance indicators for all criteria pollutants in the other three ROI. Therefore, adverse air quality impacts from operational air emissions of these pollutants would not be significant.

The pollutant of greatest concern from aircraft operations is NO_X, which is emitted when fuel is burned at high temperatures. The majority of operational NO_X emissions would result from aircraft operations to an altitude of 3,000 feet AGL and across several square miles that compose airspace overlying Columbus AFB. At or higher than this altitude, the projected NO_X emissions would be dispersed through the atmosphere to the point where they would not result in substantial ground-level impacts on a localized area.

Table 3-4 and **Table 3-5** show that Alternative 1 would result in an annual net decrease of CO and PM_{10} for all ROI; an annual net decrease of $PM_{2.5}$ for the Columbus AFB and MTR ROI; a net decrease of VOCs for the MTR ROI; and an annual net decrease of NH_3 for the Columbus AFB ROI. Alternative 1 would result in the greatest annual net decrease of any criteria pollutant when comparing the three alternatives. Any air emissions reduction from operations for Alternative 1 would result in long-term, less than significant, beneficial impacts on air quality.

Climate Change and GHGs. Construction would produce a yearly maximum of approximately 2,363.7 tons (2,144 metric tons) of direct CO_2e in 2026, representing less than 0.05 percent of annual CO_2e emissions in Lowndes County. By comparison, 2,144 metric tons of CO_2e is approximately the GHG footprint of 462 passenger vehicles driven for 1 year or 270 homes' energy use for 1 year (USEPA 2022c). As such, air emissions produced during construction would not contribute meaningfully to the potential effects of global climate change and would not considerably increase the total CO_2e emissions produced in Lowndes County. Therefore, construction would result in short-term, less than significant, adverse impacts from GHGs. Alternative 1 would result in an annual net decrease of 1,586 tons of CO_2e in 2028 and 2029 for the MTR ROI, which would result in short-term, less than significant, beneficial impacts. Over the construction and aircraft transition periods, between 2024 and 2029, Alternative 1 would generate an estimated net total of 24,754 tons (22,456 metric tons) of CO_2e in all ROI.

Operational CO_2e emissions for Alternative 1 would be highest in 2030 and later years, with a total of 16,718 tons (15,167 metric tons) of CO_2e produced in all ROI annually. By comparison, 15,167 metric tons of CO_2e is approximately the GHG footprint of 3,268 passenger vehicles driven for 1 year or 1,910 homes' energy use for 1 year (USEPA 2022c). Total annual operational CO_2e emissions would represent less than 0.03 percent of the total emissions in Mississippi. As such, air emissions produced during operations would not contribute meaningfully to the potential effects of global climate change and would not considerably increase the total CO_2e emissions produced in the state. Therefore, operations for Alternative 1

would result in long-term, less than significant, adverse impacts from GHGs. Annual emissions from stationary sources (i.e., heating and cooling systems) for Alternative 1 would not exceed USEPA's 25,000 metric tpy reporting threshold; therefore, Columbus AFB would not be required to report annual GHG emissions.

Table 3-6 compares each alternative's estimated annual net GHG emissions to the other alternatives and to the statewide, nationwide, and global GHG emissions. When compared to the three action alternatives, Alternative 1 would result in the least amount of GHG emissions, with the least potential to contribute to ongoing climate change. In alignment with the DAF *Climate Action Plan*, climate priorities would be considered during the design phase for new buildings. Enhanced energy efficiency, lower GHG emitting technology, reduced embodied carbon in construction materials, sustainable building practices, and carbon-free power generation could offset the predicted increases in operational CO_2e emissions.

Table 3-6. Estimated Annual Net Change in GHG Emissions

Scale	CO_2e Emissions (MMT per year)	Compared to Alternative 1
Global	33,621.5	221,194,079%
United States	5,158.7	33,938,816%
Mississippi	62.5	411,184%
Alternative 1	0.0152	100%
Alternative 2	0.0275	181%
Alternative 3	0.0309	203%
No Action Alternative	0.0000	0%

Source: USEIA 2019
Key: MMT = million metric tons

Ongoing changes to climate patterns in Mississippi are described in **Section 3.2.1**. These climate changes are unlikely to affect DAF's ability to implement the Proposed Action. **Table 3-7** outlines potential climate stressors and their effects on the Proposed Action, including Alternative 1. All elements of the Proposed Action in-and-of-themselves are only indirectly dependent on any of the elements associated with future climate scenarios (e.g., meteorological changes). At this time, no future climate scenario or potential climate stressor would have appreciable effects on any element of the Proposed Action.

Table 3-7. Effects of Potential Climate Stressors

Potential Climate Stressor	Effects on the Proposed Action
Rising seas and retreating shores	Negligible
Increased storm intensity	Minor
Increased precipitation	Minor
Increased frequency of flooding	Minor
Disruption of natural ecosystems	Negligible
Human health effects	Negligible

Source: USEPA 2016

3.2.2.2 Alternative 2

Alternative 2 would entail scaling up to approximately 25 percent greater T-7A flight operations than Alternative 1 starting in 2028. Alternative 2 would result in short- and long-term, less than significant, adverse and beneficial impacts on air quality. Short-term (i.e., 2024 through 2028), less than significant, adverse impacts would occur from construction in the Columbus AFB ROI. Long-term (i.e., 2028 and beyond), less than significant, adverse impacts would occur from annual net increases of criteria pollutants and GHGs. Less than significant, beneficial impacts would occur from annual net reductions of criteria pollutants in the Columbus AFB, Birmingham and Birmingham 2 MOAs, Range R-4404, and MTR ROI. As with Alternative 1, the total net change in annual emissions from Alternative 2 would not exceed the *de minimis* level threshold or insignificance indicator for any criteria pollutant.

Table 3-8 provides the estimated total net change in emissions for the Columbus AFB ROI, which includes all construction activities, building operations, personnel changes, and aircraft maintenance and airfield operations. As with Alternative 1, air emissions from construction of the MILCON/UMMC and FSRM projects during the construction period would result in short-term, less than significant, adverse impacts on air quality. All such emissions would be temporary in nature and produced only when construction activities are occurring (i.e., August 2024 through August 2028). As with Alternative 1, the total net annual emissions from construction would not exceed the *de minimis* level threshold or insignificance indicator of 250 tpy for all criteria pollutants (25 tpy for lead). Construction contractors would employ BMPs and environmental control measures to reduce criteria pollutant emissions from construction activities to the greatest extent practicable, as identified in **Section 3.2.2.1**.

Table 3-8. Estimated Annual Net Change in Emissions in the Columbus AFB ROI for Alternative 2

Year	VOC (tpy)	NO_X (tpy)	CO (tpy)	SO_X (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	Lead (tpy)	NH_3 (tpy)	CO_2e (tpy)
2024 (construction)	0.205	1.005	1.689	0.004	0.284	0.035	<0.001	0.001	397.5
2025 (construction)	1.069	4.712	7.091	0.017	8.445	0.182	<0.001	0.004	1,603.9
2026 (construction)	1.804	7.095	10.840	0.024	0.620	0.240	<0.001	0.010	2,363.7
2027 (construction)	1.009	2.459	4.117	0.009	0.086	0.086	<0.001	0.003	886.1
2028 (construction and operations)	27.562	67.791	-181.515	2.782	-6.070	-4.137	<0.001	0.006	9,688.1
2029 (operations)	55.137	164.465	-589.356	5.525	-18.485	-12.683	<0.001	0.006	19,962.7
2030 and later (operations)	58.978	191.576	-759.059	5.836	-23.274	-16.031	<0.001	-0.010	21,355.0
Maximum	58.978	191.576	10.840	5.836	8.445	0.240	<0.001	0.010	21,355.0
Insignificance indicator[1]	250	250	250	250	250	250	25	250	N/A
Exceeds insignificance indicator?	No	No	No	No	No	No	No	No	N/A

[1] All counties within the Columbus AFB ROI (i.e., Lowndes, Monroe, and Clay Counties) are considered in attainment for all NAAQS. Therefore, the PSD threshold of 250 tpy (25 tpy for lead) was used as an insignificance indicator.
Key: N/A = not applicable

Table 3-9 provides the estimated total net change in emissions for the Birmingham and Birmingham 2 MOAs, Range R-4404, and MTR ROI for Alternative 2. As with Alternative 1, long-term, less than significant, adverse impacts on air quality from criteria pollutants would occur for Alternative 2. Air emissions would be produced directly during operation and heating of new facilities within the Columbus AFB ROI and T-7A aircraft operations within all ROI. Long-term, operational air emissions would begin in 2028 and continue indefinitely. The annual operational air emissions from Alternative 2 are summarized in **Table 3-8** and **Table 3-9**. The annual net change of criteria pollutant emissions starting in 2028 would not exceed the *de minimis* level threshold of 100 tpy for emissions of $PM_{2.5}$, NO_X, VOCs, SO_X, and NH_3 in the MTR ROI or the 250 tpy (25 tpy for lead) insignificance indicator for all criteria pollutants in the other three ROI. Therefore, adverse air quality impacts from operational air emissions of these pollutants would not be significant.

Alternative 2 would result in an annual net decrease of CO and PM_{10} for all ROI; an annual net decrease of $PM_{2.5}$ for the Columbus AFB and MTR ROI; an annual net decrease of VOCs for the MTR ROI; and an annual net decrease of NH_3 for the Columbus AFB ROI. Any reduction of air emissions from operations for Alternative 2 would result in long-term, less than significant, beneficial impacts on air quality.

Climate Change and GHGs. As with Alternative 1, construction for Alternative 2 would produce a yearly maximum of approximately 2,363.7 tons (2,144 metric tons) of direct CO_2e in 2026, which is the GHG footprint of 462 passenger vehicles driven for 1 year or 270 homes' energy use for 1 year (USEPA 2022c). GHG emissions from construction during the highest CO_2e emission year for Alternative 2 would represent less than 0.05 percent of the annual CO_2e emissions in the county. As such, air emissions produced during construction would not contribute meaningfully to the potential effects of global climate change and would not considerably increase the total CO_2e emissions produced in Lowndes County. Therefore, construction for Alternative 2 would result in short-term, less than significant, adverse impacts from GHGs. Alternative 2 would result in an annual net decrease of 307.6 tons of CO2e in 2028 and 2029 for the MTR ROI, which would result in short-term, less than significant, beneficial impacts. Alternative 2 would generate an estimated net total of 41,978 tons (38,082 metric tons) of CO_2e in all ROI over the construction and aircraft transition periods between 2024 and 2029, an increase of approximately 70 percent from Alternative 1.

Table 3-9. Estimated Annual Net Change in Emissions in the Birmingham and Birmingham 2 MOAs, Range R-4404, and MTR ROI for Alternative 2

Year	Net Emissions for the Birmingham and Birmingham 2 MOAs ROI								
	VOC (tpy)	**NO_X (tpy)**	**CO (tpy)**	**SO_X (tpy)**	**PM_{10} (tpy)**	**$PM_{2.5}$ (tpy)**	**Lead (tpy)**	**NH_3 (tpy)**	**CO_2e (tpy)**
2028 (aircraft operations)	2.031	31.919	-6.015	0.791	-0.133	0.127	<0.001	<0.001	2,393.1
2029 (aircraft operations)	2.031	31.919	-6.015	0.791	-0.133	0.127	<0.001	<0.001	2,393.1
2030 and later (aircraft operations)	3.932	63.505	-17.411	1.396	-0.462	0.247	<0.001	<0.001	4,224.8
Maximum	3.932	63.505	-6.015	1.396	-0.133	0.247	<0.001	<0.001	4,224.8
Insignificance indicator [1]	250	250	250	250	250	250	25	250	N/A
Exceeds insignificance indicator?	No	No	No	No	No	No	No	No	N/A

Year	Net Emissions for the Range R-4404 ROI								
	VOC (tpy)	**NO_X (tpy)**	**CO (tpy)**	**SO_X (tpy)**	**PM_{10} (tpy)**	**$PM_{2.5}$ (tpy)**	**Lead (tpy)**	**NH_3 (tpy)**	**CO_2e (tpy)**
2028 (aircraft operations)	1.237	19.453	-3.726	0.480	-0.083	0.077	<0.001	<0.001	1,452.6
2029 (aircraft operations)	1.237	19.453	-3.726	0.480	-0.083	0.077	<0.001	<0.001	1,452.6
2030 and later (aircraft operations)	2.395	38.706	-10.642	0.849	-0.284	0.150	<0.001	<0.001	2,569.1
Maximum	2.395	38.706	-3.726	0.849	-0.083	0.150	<0.001	<0.001	2,569.1
Insignificance indicator [1]	250	250	250	250	250	250	25	250	N/A
Exceeds insignificance indicator?	No	No	No	No	No	No	No	No	N/A

Year	Net Emissions for the MTR ROI								
	VOC (tpy)	**NO_X (tpy)**	**CO (tpy)**	**SO_X (tpy)**	**PM_{10} (tpy)**	**$PM_{2.5}$ (tpy)**	**Lead (tpy)**	**NH_3 (tpy)**	**CO_2e (tpy)**
2028 (aircraft operations)	-3.833	40.966	-90.081	-0.103	-2.071	-0.873	<0.001	<0.001	-307.6
2029 (aircraft operations)	-3.833	40.966	-90.081	-0.103	-2.071	-0.873	<0.001	<0.001	-307.6
2030 and later (aircraft operations)	-1.219	84.394	-105.766	0.726	-2.523	-0.708	<0.001	<0.001	2,203.8
Maximum	-1.219	84.394	-90.081	0.726	-2.071	-0.708	<0.001	<0.001	2,203.8
***De minimis* Threshold or Insignificance indicator [2]**	100	100	250	100	250	100	25	100	N/A
Exceeds *de minimis* threshold or insignificance indicator?	No	No	No	No	No	No	No	No	N/A

[1] The Birmingham and Birmingham 2 MOAs ROI and the Range R-4404 ROI are in attainment for all NAAQS. Therefore, the insignificance indicator for all pollutants, including $PM_{2.5}$, emitted at these two ROI is the PSD threshold of 250 tpy (25 tpy for lead).

[2] Three counties within the MTR ROI are maintenance for $PM_{2.5}$. As a result, for the MTR ROI only, the General Conformity Rule is potentially applicable to emissions of $PM_{2.5}$ and its precursors (i.e., NO_X, VOCs, SO_X, and NH_3), and the *de minimis* level threshold for these pollutants is 100 tpy. The insignificance indicator for the pollutants not potentially subject to the General Conformity Rule (i.e., for CO, PM_{10}, and lead) in the MTR ROI is the PSD threshold of 250 tpy (25 tpy for lead).

Key: N/A = not applicable

Operational CO_2e emissions for Alternative 2 would be highest in 2030 and later years, with a total of 30,352.7 tons (27,536 metric tons) produced in all ROI annually, which is 181 percent of the CO_2e emissions compared to Alternative 1 (see **Table 3-6**). By comparison, 27,536 metric tons of CO_2e is approximately the GHG footprint of 5,933 passenger vehicles driven for 1 year or 3,468 homes' energy use for 1 year (USEPA 2022c). Total operational CO_2e emissions would represent approximately 0.62 percent of the total CO_2e emissions in the county and less than 0.05 percent of the total emissions in Mississippi. As such, air emissions produced during operations would not contribute meaningfully to the potential effects of global climate change and would not considerably increase the total CO_2e emissions produced in Lowndes County or the state. Therefore, operations for Alternative 2 would result in long-term, less than significant, adverse impacts from GHGs. Annual emissions from stationary sources (i.e., heating and cooling systems) for Alternative 2 would not exceed the USEPA's 25,000 metric tpy reporting threshold; therefore, Columbus AFB would not be required to report annual GHG emissions. As with Alternative 1, climate priorities would be considered during the design phase of new buildings in alignment with the DAF *Climate Action Plan*.

Ongoing changes to climate patterns in Mississippi are described in **Section 3.2.1**. These climate changes are unlikely to affect DAF's ability to implement Alternative 1. **Table 3-7** outlines potential climate stressors and their effects on the Proposed Action, including Alternative 2. All elements of Alternative 2 in-and-of-themselves are only indirectly dependent on any of the elements associated with future climate scenarios (e.g., meteorological changes). At this time, no future climate scenario or potential climate stressor would have appreciable effects on any element of Alternative 2.

3.2.2.3 Alternative 3

Alternative 3 would entail both scaling up to approximately 25 percent greater T-7A flight operations than Alternative 1 and increasing the number of T-7A aircraft delivered to Columbus AFB starting in 2028. To accommodate the additional aircraft, Alternative 3 also includes construction of up to 12 more aircraft shelters than what was analyzed for Alternatives 1 and 2.

Alternative 3 would result in short- and long-term, less than significant, adverse and beneficial impacts on air quality. Short-term (i.e., 2024 through 2028), less than significant, adverse impacts would occur from construction activities in the Columbus AFB ROI. Long-term (i.e., 2028 and beyond), less than significant, adverse impacts would occur from annual net increases of criteria pollutants and GHGs. Less than significant, beneficial impacts would occur from annual net criteria pollutant reductions in the Columbus AFB, Birmingham and Birmingham 2 MOAs, Range R-4404, and MTR ROI. As with Alternatives 1 and 2, the total net change in annual emissions from Alternative 3 would not exceed the *de minimis* level threshold or insignificance indicator for any criteria pollutant.

Table 3-10 provides the estimated total net change in emissions for the Columbus AFB ROI, which includes all construction activities, building operations, personnel changes, and airfield operations. As with Alternatives 1 and 2, air emissions from construction of the MILCON/UMMC and FSRM projects during the construction period for Alternative 3 would result in short-term, less than significant, adverse impacts on air quality. All such emissions would be temporary in nature and produced only when construction activities are occurring (i.e., August 2024 through

August 2028). The total net annual emissions from construction would not exceed the insignificance indicator of 250 tpy (25 tpy for lead) for all criteria pollutants. Construction contractors would employ BMPs and environmental control measures, to the greatest extent practicable, as identified in **Section 3.2.2.1**, to reduce criteria pollutant emissions from construction activities.

Table 3-10. Estimated Annual Net Change in Emissions in the Columbus AFB ROI for Alternative 3

Year	VOC (tpy)	NO_X (tpy)	CO (tpy)	SO_X (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	Lead (tpy)	NH_3 (tpy)	CO_2e (tpy)
2024 (construction)	0.205	1.005	1.689	0.004	0.284	0.035	<0.001	0.001	397.5
2025 (construction)	1.069	4.712	7.091	0.017	8.445	0.182	<0.001	0.004	1,603.9
2026 (construction)	1.819	7.205	10.925	0.025	0.623	0.244	<0.001	0.010	2,403.3
2027 (construction)	1.009	2.459	4.117	0.009	0.086	0.086	<0.001	0.003	886.1
2028 (construction and operations)	27.732	68.731	-178.614	2.837	-6.004	-4.078	<0.001	0.006	20,129.2
2029 (operations)	55.307	165.405	-586.455	5.580	-18.392	-12.624	<0.001	0.006	20,129.2
2030 and later (operations)	59.147	192.516	-756.158	5.891	-23.208	-15.972	<0.001	-0.010	21,521.5
Maximum	59.147	192.516	10.925	5.891	8.445	0.244	<0.001	0.010	21,521.5
Insignificance indicator[1]	250	250	250	250	250	250	25	250	N/A
Exceeds insignificance indicator?	No	No	No	No	No	No	No	No	N/A

[1] The counties within the Columbus AFB ROI (i.e., Lowndes, Monroe, and Clay Counties) are considered in attainment for all NAAQS. Therefore, the PSD threshold of 250 tpy (25 tpy for lead) was used as an insignificance indicator.

Key: N/A = not applicable

Construction and operational emissions in the Columbus AFB ROI for Alternative 3 would be slightly higher than those for Alternative 2 because of the construction for the additional up to 12 aircraft shelters and aircraft maintenance and engine testing for the additional up to 16 T-7A aircraft.

Table 3-11 provides the estimated total net change in emissions for the Birmingham and Birmingham 2 MOAs, Range R-4404, and MTR ROI for Alternative 3. As with Alternatives 1 and 2, long-term, less than significant, adverse impacts on air quality from criteria pollutants would occur for Alternative 3. Air emissions would be produced directly from operating and heating the new facilities within the Columbus AFB ROI and T-7A aircraft operations within all ROI. Long-term, operational air emissions would begin in 2028 and continue indefinitely. The annual operational air emissions from Alternative 3 are summarized in **Table 3-10** and **Table 3-11**. The annual net change of criteria pollutant emissions starting in 2028 would not exceed the *de minimis* level threshold of 100 tpy for emissions of $PM_{2.5}$, NO_X, VOCs, SO_X, and NH_3 in the MTR ROI or the 250 tpy (25 tpy for lead) insignificance indicators for all criteria pollutants in the other three ROI. Therefore, adverse air quality impacts from operational air emissions of these pollutants would not be significant.

Table 3-11. Estimated Annual Net Change in Emissions in the Birmingham and Birmingham 2 MOAs, Range R-4404, and MTR ROI for Alternative 3

Year	Net Emissions for the Birmingham and Birmingham 2 MOAs ROI								
	VOC (tpy)	**NO_X (tpy)**	**CO (tpy)**	**SO_X (tpy)**	**PM_{10} (tpy)**	**$PM_{2.5}$ (tpy)**	**Lead (tpy)**	**NH_3 (tpy)**	**CO_2e (tpy)**
2028 (aircraft operations)	2.031	31.919	-6.015	0.791	-0.133	0.127	<0.001	<0.001	2,393.1
2029 (aircraft operations)	2.031	31.919	-6.015	0.791	-0.133	0.127	<0.001	<0.001	2,393.1
2030 and later (aircraft operations)	3.932	63.505	-17.411	1.396	-0.462	0.247	<0.001	<0.001	4,224.8
Maximum	3.932	63.505	-6.015	1.396	-0.133	0.247	<0.001	<0.001	4,224.8
Insignificance indicator [1]	250	250	250	250	250	250	25	250	N/A
Exceeds insignificance indicator?	No	No	No	No	No	No	No	No	N/A

Year	Net Emissions for the Range R-4404 ROI								
	VOC (tpy)	**NO_X (tpy)**	**CO (tpy)**	**SO_X (tpy)**	**PM_{10} (tpy)**	**$PM_{2.5}$ (tpy)**	**Lead (tpy)**	**NH_3 (tpy)**	**CO_2e (tpy)**
2028 (aircraft operations)	1.237	19.453	-3.726	0.480	-0.083	0.077	<0.001	<0.001	1,452.6
2029 (aircraft operations)	1.237	19.453	-3.726	0.480	-0.083	0.077	<0.001	<0.001	1,452.6
2030 and later (aircraft operations)	2.395	38.706	-10.672	0.849	-0.284	0.150	<0.001	<0.001	2,569.1
Maximum	2.395	38.706	-3.726	0.489	-0.083	0.150	<0.001	<0.001	2,569.1
Insignificance indicator [1]	250	250	250	250	250	250	25	250	N/A
Exceeds insignificance indicator?	No	No	No	No	No	No	No	No	N/A

Year	Net Emissions for the MTR ROI								
	VOC (tpy)	**NO_X (tpy)**	**CO (tpy)**	**SO_X (tpy)**	**PM_{10} (tpy)**	**$PM_{2.5}$ (tpy)**	**Lead (tpy)**	**NH_3 (tpy)**	**CO_2e (tpy)**
2028 (aircraft operations)	2.793	43.887	-8.292	1.085	-0.183	0.174	<0.001	<0.001	3,252.9
2029 (aircraft operations)	2.793	43.887	-8.292	1.085	-0.183	0.174	<0.001	<0.001	3,282.9
2030 and later (aircraft operations)	5.408	87.315	-23.977	1.914	-0.635	0.339	<0.001	<0.001	5,794.3
Maximum	5.408	87.315	-8.292	1.914	-0.183	0.339	<0.001	<0.001	5,794.3
***De minimis* Threshold or Insignificance indicator [2]**	100	100	250	100	250	100	25	100	N/A
Exceeds *de minimis* threshold or insignificance indicator?	No	No	No	No	No	No	No	No	N/A

[1] The Birmingham and Birmingham 2 MOAs ROI and the Range R-4404 ROI are in attainment for all NAAQS. Therefore, the insignificance indicator for all pollutants, including $PM_{2.5}$, emitted at these two ROI is the PSD threshold of 250 tpy (25 tpy for lead).

[2] Three counties within the MTR ROI are maintenance for $PM_{2.5}$. As a result, for the MTR ROI only, the General Conformity Rule is potentially applicable to emissions of $PM_{2.5}$ and its precursors (i.e., NO_X, VOCs, SO_X, and NH_3), and the *de minimis* level threshold for these pollutants is 100 tpy. The insignificance indicator for the pollutants not potentially subject to the General Conformity Rule (i.e., for CO, PM_{10}, and lead) in the MTR ROI is the PSD threshold of 250 tpy (25 tpy for lead).

Key: N/A = not applicable

Alternative 3 would result in an annual net decrease of CO and PM_{10} for all ROI and an annual net decrease of $PM_{2.5}$ and NH_3 for the Columbus AFB ROI. Any reduction of air emissions from operations for Alternative 3 would result in long-term, less than significant, beneficial impacts on air quality.

Climate Change and GHGs. Construction for Alternative 3 would produce a yearly maximum of approximately 2,403.3 tons (2,180 metric tons) of direct CO_2e in 2026, which is the GHG footprint of 470 passenger vehicles driven for 1 year or 275 homes' energy use for 1 year (USEPA 2022c). Emissions from construction during the highest CO_2e emission year for Alternative 3 would be approximately 1.7 percent higher than those for Alternative 1; however, like Alternatives 1 and 2, GHG emissions from Alternative 3 would represent less than 0.05 percent of the total CO_2e emissions in the county. As such, air emissions produced during construction would not contribute meaningfully to the potential effects of global climate change and would not considerably increase the total CO_2e emissions produced in Lowndes County. Therefore, construction for Alternative 3 would result in short-term, less than significant, adverse impacts from GHGs. Alternative 3 would generate an estimated net total of 59,776 tons (54,231 metric tons) of CO_2e in all ROI over the construction and aircraft transition periods between 2024 and 2029, an increase of approximately 42 percent from Alternative 2.

Operational CO_2e emissions for Alternative 3 would be highest in 2030 and later years, with a total of 34,109.7tons (30,944 metric tons) of CO_2e produced per year, which is 203 percent of the CO_2e emissions compared to Alternative 1 (see **Table 3-6**). By comparison, 30,944 metric tons of CO_2e is approximately the GHG footprint of 6,667 passenger vehicles driven for 1 year or 3,898 homes' energy use for 1 year (USEPA 2022c). Total operational CO_2e emissions would represent approximately 0.7 percent of the total CO_2e emissions in the county and less than 0.05 percent of the total emissions in the state of Mississippi. As such, air emissions produced during operations would not contribute meaningfully to the potential effects of global climate change and would not considerably increase the total CO_2e emissions produced in Lowndes County or the state. Therefore, operations for Alternative 3 would result in long-term, less than significant, adverse impacts from GHGs. Annual emissions from stationary sources (i.e., heating and cooling systems) for Alternative 3 would not exceed the USEPA's 25,000 metric tpy reporting threshold; therefore, Columbus AFB would not be required to report annual GHG emissions. As with Alternatives 1 and 2, climate priorities would be considered during the design phase for new buildings, in alignment with the DAF *Climate Action Plan*.

Ongoing changes to climate patterns in Mississippi are described in **Section 3.2.1**. These climate changes are unlikely to affect DAF's ability to implement Alternative 3. **Table 3-7** outlines potential climate stressors and their effects on the Proposed Action, including Alternative 3. All elements of Alternative 3 in-and-of-themselves are only indirectly dependent on any of the elements associated with future climate scenarios (e.g., meteorological changes). At this time, no future climate scenario or potential climate stressor would have appreciable effects on any element of Alternative 3.

3.2.2.4 No Action Alternative

For the No Action Alternative, the affected environment at Columbus AFB would remain as described in **Section 3.2.1**. The No Action Alternative would not impact air quality. No

construction would occur, and there would be no changes in aircraft operations. Air quality conditions, including ongoing GHG emissions, would remain unchanged.

3.2.3 Cumulative Effects

Short- and long-term, less than significant, adverse, cumulative effects on air quality would occur from T-7A recapitalization and the reasonably foreseeable actions (see **Table 3-2**). Criteria pollutants would be emitted directly from building construction, renovation, and demolition; aircraft operations; and heating new building space. Cumulatively, construction associated with T-7A recapitalization, and the reasonably foreseeable actions, would result in short-term, intermittent increases in air pollutant emissions on and near the installation during phases of construction that may overlap. Air emissions from construction activities would be temporary in nature and produced only when such activities are occurring. The BMPs and environmental control measures outlined in **Section 3.2.2.1**, including dust suppression, would minimize air quality impacts from construction for T-7A recapitalization and the reasonably foreseeable actions. Increased automobile traffic from potential increases in personnel from the reasonably foreseeable actions would produce new air emissions, but these air emissions, when combined with similar emissions from T-7A recapitalization, would not degrade air quality appreciably within Lowndes County.

3.3 Noise

Sound is a physical phenomenon consisting of vibrations that travel through a medium, such as air, and are sensed by the human ear. Noise is defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise intrusive. Human response to noise varies depending on the type and characteristics of the noise, distance between the noise source and the receptor, receptor sensitivity, and time of day. Noise is often generated by activities essential to a community's quality of life, such as aircraft operations, construction, or vehicular traffic.

Sound varies by intensity and frequency. Sound pressure level, described in decibels (dB), is used to quantify sound intensity. The dB is a logarithmic unit that expresses the ratio of a sound pressure level to a standard reference level. Hertz are used to quantify sound frequency. The human ear responds differently to different frequencies. "A-weighting" of dBs, measured in A-weighted decibels (dBA), approximates a frequency response expressing humans' perception of sound. This EIS uses only dBA, thus, for brevity, only "dB" is cited. Sounds encountered in daily life and their A-weighted sound levels are outlined in **Table 3-12**.

Table 3-12. Common Sounds and Their Levels

Common Outdoor Sounds	Sound Level (dBA)	Common Indoor Sounds
Car horn at 3 feet	100	Rock band
Gas lawnmower at 3 feet	90	Food blender at 3 feet
Noisy urban environment	80	Garbage disposal
Busy highway at 50 feet	70	Vacuum cleaner at 10 feet
Commercial area	60	Normal speech at 3 feet
Quiet urban environment	50	Dishwasher in next room
Quiet rural environment	40	Theater, large conference room

Source: FAA 2022a

Aircraft noise events are seldom steady; therefore, noise metrics have been developed to describe exposure from single events and cumulative exposure from multiple events. Single event metrics include:

- Maximum Sound Level (L_{max}) – L_{max} is the maximum sound level of the event in dBA.
- Sound Exposure Level (SEL) – SEL is a measure of the total energy of an acoustic event. It represents the level of a 1-second-long constant sound that would generate the same energy as the actual time-varying noise event, such as an aircraft overflight. SEL provides a measure of the net effect of a single acoustic event, but it does not directly represent the sound level at any given time. SEL is presented typically in dBA.

The sound from multiple aircraft events must also be described, giving rise to the following metrics to describe a cumulative noise environment:

- Equivalent Sound Level (L_{eq}) – Leq describes the constant sound level having the same acoustic energy as the time-varying sound over the same period. The period of interest is usually 24-hours ($L_{eq(24h)}$), or an 8-hour school-day ($L_{eq(8h)}$). $L_{eq(24h)}$ is used to assess the potential for long-term hearing loss for individuals living on and around airfields. An outdoor $L_{eq(8h)}$ of 60 dB is used to screen for potential classroom learning interference.
- DNL – DNL is the average sound energy in a 24-hour period with an adjustment added to the nighttime levels. DNL is equal to $L_{eq(24h)}$ for the same period if there are no nighttime activities. Due to their potential to be particularly intrusive, noise events occurring between 10 p.m. and 7 a.m. are assessed a 10 dB adjustment when calculating DNL. DNL is a useful descriptor for aircraft noise because (1) it averages ongoing yet intermittent noise, and (2) it measures total sound energy over a 24-hour period. DNL provides a measure of the overall acoustical environment, but, as with SEL, it does not directly represent the sound level at any given time. For well-distributed sound, $L_{eq(24h)}$ is approximately 6.4 dB lower than DNL.
- Onset-Rate Adjusted Monthly Day-Night Average Sound Level (L_{dnmr}) for SUA operations – L_{dnmr} is identical to DNL but includes an onset-rate adjustment for high-speed, low-altitude aircraft events causing startle and assesses SUA operations

over the average flying day during the busiest month to account for the sporadic nature of SUA events.

- Number of events (at or) above a specified threshold (NA). As its name implies, the NA metric describes the number of events that meet or exceed a user-specified decibel threshold in the period of interest. L_{max} or SEL thresholds can be used with NA.
    - $NA75L_{max}$ is the total number of events that meet or exceed 75 dB L_{max}. $NA75L_{max}$ is used to assess the potential for outdoor daytime speech interference or school-day classroom learning interference.
    - NA90SEL is the total number of events that exceed 90 dB SEL. NA90SEL is used in assessing the potential for nighttime sleep disturbance.
- Time (at or) above a specified threshold (TA). As its name implies, the TA metric describes the time (in minutes) the specified threshold is met or exceeded in the period of interest. Only an L_{max} threshold can be used with TA.
    - $TA75L_{max}$ is the total time that meets or exceeds 75 dB. $TA75L_{max}$ is typically used in assessing the potential for classroom learning interference, along with $NA75L_{max}$ and $L_{eq(8)}$.

For DAF NEPA documents, DNL is the primary aircraft noise metric. The DoD's guidelines for the use of supplemental metrics (DNWG 2009) were used to identify relevant supplemental metrics, other than SEL, L_{max}, and L_{eq}, used in this EIS. These metrics are provided in **Table 3-13** and are explained further in the following paragraphs.

Speech Interference. The threshold at which aircraft noise begins to interfere with speech intelligibility is 50 dB indoors, and speech interference is often described in terms of $NA75L_{max}$ to account for 25 dB of noise attenuation provided by buildings, such as houses and schools (DNWG 2009).

Sleep Disturbance. The potential for sleep disturbance was assessed for residential areas only and used the NA90SEL metric.

Classroom Learning Interference. The classroom learning interference analysis assumed school day hours from 8 a.m. to 4 p.m., occurring entirely within the DNL daytime period. It was also assumed that schools are operational year-round.

Classroom Speech Interference. Classroom speech interference is assessed only for the hours of instruction. Depending on the institution, 8 hours is typical but that number could vary. First, a screening analysis with the L_{eq} metric is applied to identify schools that may have an interference issue. Schools with outdoor L_{eq} less than 60 dB are screened out and would not likely be affected. For schools with L_{eq} greater than or equal to 60 dB, NA and TA metrics are computed with an L_{max} threshold of 60 dB. All classroom speech interference analyses herein assume evenly distributed flight and runup operations throughout the day for whole hour increments. The school's operating hours were the surrogate for the hours of classroom instruction.

Table 3-13. Guideline Values (Outdoor Values) for Supplemental Noise Metrics

Application	Metric	Unit	Time Period	Recommended Outdoor Thresholds for Reporting Purposes
Speech Interference	NA	Number of Events	15-hour day (DNL daytime; 7 a.m. to 10 p.m.)	75 dB L_{max}
Sleep Disturbance	NA	Number of Events	9-hour night (DNL nighttime; 10 p.m. to 7 a.m.)	90 dB SEL
Classroom Speech Interference	L_{eq}	Decibel	School hours (typically 8-hours)	60 dB (for screening)
Classroom Speech Interference	NA	Number of Events	School hours (typically 8-hours)	75 dB L_{max}
Classroom Speech Interference	TA	Time (minutes)	School hours (typically 8-hours)	75 dB L_{max}
Potential for Hearing Loss	PHL	Decibel	Yearly DNL (Average Annual Day)	80 dB (for screening)
Potential for Hearing Loss	PHL	Decibel	Yearly $L_{eq(24)}$ (Average Annual Day)	80 dB $L_{eq(24h)}$
Wildlife Impacts	L_{max}	Decibel	Overall	(Species specific)

Source: DNWG 2009
PHL = Potential for Hearing Loss

Potential for Hearing Loss (PHL). PHL applies to people living long-term (40 years) in high noise environments. The initial screening criterion for assessing PHL is people exposed to DNL greater than or equal to 80 dB. The threshold for assessing PHL is people exposed to an $L_{eq(24h)}$ of at least 80 dB. Those 1-dB increments in $L_{eq(24h)}$ are associated with average Noise Induced Permanent Threshold Shifts (NIPTS) and tenth percentile NIPTS, which describe a person's permanent change in hearing threshold or level. The tenth percentile NIPTS is the NIPTS exceeded by 10 percent of the population, and it is reserved for the most sensitive individuals (DNWG 2013). In addition, the Occupational Safety and Health Administration (OSHA) and DAF have adopted a 140-dB instantaneous noise level threshold as the threshold for short-term exposure that may induce hearing loss.

Wildlife Impacts. **Section 3.4** provides information on noise impacts to wildlife.

Damage to Structures. Noise from low-level aircraft overflights can cause buildings under their flight path to vibrate, which the occupants experience as the structure shaking and windows rattling. However, based on experimental data and models, noise and vibrations from subsonic aircraft overflights do not cause structural damage to buildings. An impulsive-type noise (i.e., blast noise or sonic boom) above 140 dB is required to generate sufficient energy to damage structures (Siskind et al. 1980 and Siskind et al. 1989).

Regulatory Review and Land Use Planning. The Noise Control Act of 1972 directs federal agencies to comply with applicable federal, state, and local noise control regulations. The Noise Control Act specifically exempts aircraft operations and military training activities from state and local noise ordinances. There are no federal, state, or local noise regulations applicable directly to the Proposed Action. Air Force Handbook (AFH) 32-7084, *AICUZ Program Manager's Guide,* denotes that land use guidelines for noise exposure at military airfields are provided in DoD Instruction 4165.57, *Air Installations Compatible Use Zones* (AICUZ), Appendix 3C. **Table 3-14** provides a general overview of recommended aircraft operations noise limits for land use planning purposes.

Table 3-14. Recommended Noise Limits for Land Use Planning

General Level of Noise	Aircraft Noise (DNL)	General Recommended Uses
Low	<65 dB	Noise sensitive land uses acceptable
Moderate	65 to 75 dB	Noise sensitive land uses normally not recommended
High	>75 dB	Noise sensitive land uses not recommended

Source: DAF 2017

The noise effects from aircraft operations were calculated using the NOISEMAP[3] computer program suite, which was developed and is used by DAF for this purpose. NOISEMAP is a suite of computer programs and components developed by DAF to predict noise exposure in the vicinity of an airfield due to aircraft flight and ground run-up operations. The legacy core program within the suite, NMAP Version 7.3, was used to calculate the noise exposure for existing and proposed aircraft operations at Columbus AFB. MOA Range NOISEMAP (MRNMAP) Version 3.0, also part of the NOISEMAP suite, was used to calculate the noise from aircraft operations in SUA, such as MOAs, MTRs, and restricted airspace.

A component of NOISEMAP is NOISEFILE. NOISEFILE is a comprehensive database of measured military and civil aircraft noise data. The NOISEFILE version used for this EIS contained flight and ground run-up noise measurements that were recorded in August 2019 from a T-7A prototype.

NOISEMAP was used to compute noise exposure in DNL from airfield operations at Columbus AFB. DNL for the airfield was computed based on annual average daily flight and runup operations.

NOISEMAP was used to compute noise exposure in DNL from range activity (i.e., the Birmingham Range and the Sea Ray Range [R-4404]), because operations there are said to occur on discrete flight tracks with little or no dispersion and are like closed pattern operations

[3] The Department of the Navy submitted a report to Congress in November 2021 that addresses the accuracy of the NOISEMAP modeling results versus real-time aircraft sound monitoring. The report concluded that the DoD approved noise models operate as intended and provide an accurate prediction of noise exposure levels from aircraft operations for use in impact assessments and long-term land use planning (DON 2021). This report is available to view on the project website at https://columbus.t-7anepadocuments.com/documents.

modeled for an airfield. DNL for these two ranges were computed based on average flying day operations during the busiest month. DNL from ranges were added to L_{dnmr} from other SUA and labeled as L_{dnmr}. For brevity, range DNL is referred to as L_{dnmr}.

Acreage and population within bands of cumulative noise exposure (typically DNL) were calculated for Columbus AFB and two SUA. The estimated populations are based on the percent of the area within individual census blocks, which is the smallest available georeferenced population dataset, contained within the individual contour band. 2020 U.S. Census data was used for this analysis.

3.3.1 Affected Environment

This section outlines background noise, baseline aircraft noise, and noise abatement procedures at Columbus AFB and the associated SUA.

3.3.1.1 Columbus AFB

3.3.1.1.1 Aircraft Noise

The baseline condition is for calendar year (CY) 2021. The baseline condition includes approximately 405,700 annual flight operations (i.e., single take-offs, landings, and patterns combined) performed at Columbus AFB, or 1,112 average annual daily flight operations. Most of Columbus AFB's annual flight operations (61 percent) use based[4] T-6 Texan II (single-engine turboprop) aircraft. Based T-38C Talon aircraft (twin-engine afterburning jet trainer, capable of supersonic flight), combining IFF and UPT groups, compose 34 percent of the annual flight operations and are described in detail in **Section 2.2.2.1.2**. The rest of the annual flight operations are by based T-1 Jayhawk (twin-engine jet aircraft based on the Beechjet 400 business jet) and various transient aircraft types.

Nighttime flight operations (less than 2 percent of the overall annual flight operations) at Columbus AFB are performed by the T-1 and T-6 aircraft. None of the current T-38C operations occur during the DNL nighttime period (10 p.m. to 7 a.m.). All T-38C departures use afterburners until reaching approximately 150 feet AGL, which occurs approximately 1 nautical mile from brake release.

Figure 3-1 shows the DNL contours for the existing conditions, which are plotted in 5 dB increments, ranging from 65 to 80 dB DNL at Columbus AFB. The existing 65 dB DNL contour at Columbus AFB extends approximately 2 miles to the north and south of the runway ends of Runway 13C/31C, 1.8 miles from the northern end and 2.3 miles from the southern end of Runway 13R/31L, and 1.8 miles from the northern end and 2 miles from the southern end of Runway 13L/31R. At its farthest lateral points, the contour extends west approximately 1.7 miles and east approximately 2.1 miles from the centerline of Runway 13C/31C. Aircraft DNL less than 65 dB is generally compatible with all land uses.

Existing noise exposure conditions include modeling CY 2021 maintenance run-up activity by the three based aircraft types, including activity in the existing hush house.

[4] In this context, "based" refers to aircraft assigned to Columbus AFB. The antonym of based is transient. Transient aircraft are not assigned to Columbus AFB and are visiting from other installations. Based and transient operations are modeled and counted separately to account for differences in runway use, flight tracks, and flight profiles.

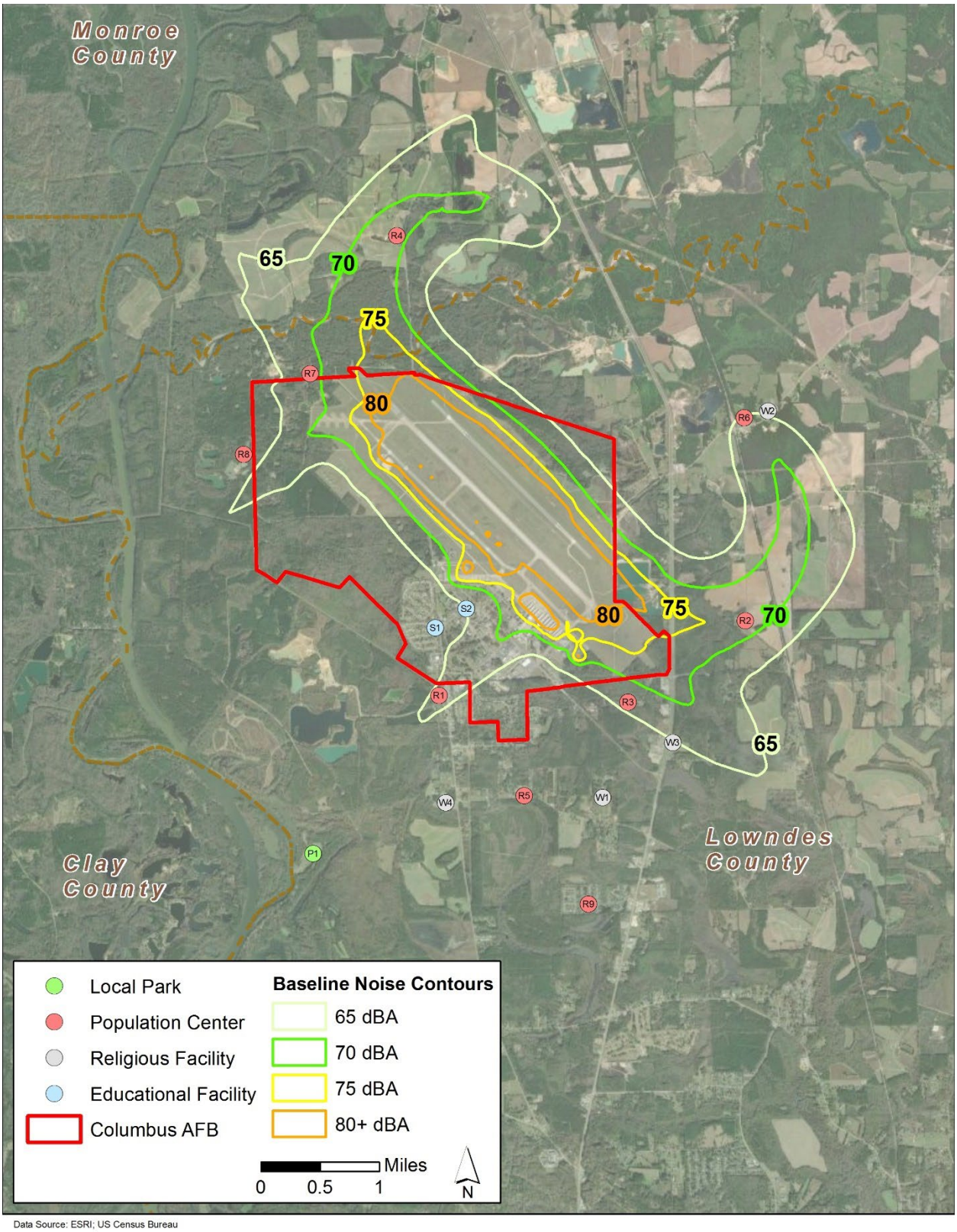

Figure 3-1. Aircraft DNL Contours for Existing Conditions at Columbus AFB

These noise levels, which are often shown graphically as contours on maps, are not discrete lines that sharply divide louder areas from land largely unaffected by noise. Instead, they are part of a planning tool that depicts the general noise environment around the installation based on typical aviation activities. Areas with DNL less than 65 dB can also experience levels of appreciable (single event) noise, depending upon training intensity or weather conditions. In addition, DNL contours may vary from year to year due to fluctuations in operational tempo due to unit deployments, funding levels, and other factors.

Table 3-15 and **Table 3-16** provide the existing land acreage and estimated population exposed to noise levels 65 dB DNL or greater, respectively. There are approximately 4,137 acres and 238 residents off-installation and 3,116 acres and 72 residents on-installation exposed to DNL of at least 65 dB at Columbus AFB.

Table 3-15. Acreage within DNL Contour Bands for Existing Conditions at Columbus AFB

DNL Contour Band (dB)	On-Installation	Off-Installation	Total
65 to 70	879	2,740	3,619
70 to 75	580	1,152	1,732
75 to 80	529	216	745
80 to 85	643	29	672
≥85	485	-	485
Total	**3,116**	**4,137**	**7,253**

Source: HMMH 2022
Note: DNL bands are exclusive of upper bounds

Table 3-16. Estimated Population within DNL Contour Bands for Existing Conditions at Columbus AFB

DNL Contour Band (dB)	On-Installation	Off-Installation	Total
65 to 70	64	171	235
70 to 75	1	54	55
75 to 80	2	10	12
80 to 85	3	3	6
≥85	2	-	2
Total	**72**	**238**	**310**

Sources: HMMH 2022, U.S. Census Bureau 2020
Notes: 1. Estimated population based on area within individual census blocks.
2. DNL bands are exclusive of upper bounds

The population exposed to a DNL of at least 80 dB have a PHL. The population estimation method yields five people on-installation and three people off-installation exposed to DNL of at least 80 dB. See **Section 3.3.1.1.2** for further analysis.

Noise-sensitive locations typically include residential areas, schools, places of worship, and hospitals. Based on data collected from Columbus AFB personnel and a review of Geographic Information System (GIS) shapefiles for school data in the area affected by the 60 dB DNL contour, 16 representative noise sensitive locations, also known as Points of Interest (POI), were identified, and shown in **Figure 3-1**. The POI consist of one park (Dwayne Hayes Recreation Park), nine residential areas, two schools, and four places of worship. No hospitals were identified in the vicinity of the installation. Centralized intersections were identified within residential areas to represent adjacent residences and neighborhoods and are identified as Residential Areas 1 through 9 (POI ID R1 through R9). All of the POI, except the two schools, are located off of Columbus AFB.

Both schools are on-installation. They are the Child Development Center (S1) and the Education Center (S2). S1 is open from 6:30 a.m. to 5:30 p.m. (i.e., a half hour of the DNL nighttime period and 10.5 hours of the DNL daytime period). The Education Center (S2) is open from 8 a.m. to 2 p.m. (6 hours).

Table 3-17 provides the existing DNL for the 16 POI. Six of the nine residential areas and one school (Education Center) are exposed to DNL greater than (or equal to) 65 dB and are considered incompatible existing land uses. The other nine POI are exposed to DNL less than 65 dB.

Table 3-17. Overall DNL at Representative Locations for Existing Conditions at Columbus AFB

ID	Representative Location	Type	DNL (dB)
P1	Dwayne Hayes Recreation Park	Park	50.8
R1	Residential Area 1	Residential	**66.4**
R2	Residential Area 2	Residential	**72.7**
R3	Residential Area 3	Residential	**66.6**
R4	Residential Area 4	Residential	**71.1**
R5	Residential Area 5	Residential	52.9
R6	Residential Area 6	Residential	**65.5**
R7	Residential Area 7	Residential	**69.1**
R8	Residential Area 8	Residential	62.0
R9	Residential Area 9	Residential	51.2
S1	Child Development Center	School	62.7
S2	Education Center	School	**65.2**
W1	Cedar Grove Missionary Baptist	Place of Worship	55.6
W2	Kolola Springs Baptist Church	Place of Worship	63.9
W3	Victory Tabernacle	Place of Worship	64.7
W4	Faith Christian Center Baptist Church	Place of Worship	53.5

Source: HMMH 2022

3.3.1.1.2 Supplemental Metrics Analyses

Supplemental metrics exhibit noise exposure related to potential noise effects, including sleep disturbance, hearing loss, classroom learning interference, and speech interference. These analyses focus on specific POI in the vicinity of Columbus AFB described in **Section 3.3.1.1.1**.

Individual Aircraft Overflights. **Table 3-18** provides single-event noise metrics for the T-38C. During takeoffs, the T-38C aircraft keeps the afterburner on until it reaches approximately 150 feet AGL. T-38C pilots then disengage the afterburner and maintain military power to continue their climb. At the reference altitude of 1,000 feet AGL, the T-38C generates an SEL of 106 dB. For other types of operations, the T-38C generates SEL between 80 and 85 dB at the altitudes and configurations listed in the table.

Table 3-18. Single-Event Sound Levels for T-38C

Flight Condition	Slant Distance to Receptor (feet)	SEL (dBA)	L_{max} (dBA)	Power (%RPM)	Speed (kts)
Afterburner or Military Power Takeoff (1,000 feet AGL)	1,000	106	100	100	300
Arrival (straight-in, 1,000 feet AGL, gear down)	1,000	85	76	85	200
Overhead Break/Visual Flight Rules/Instrument Flight Rules Pattern Downwind Legs (Downwind leg, 1,700 feet above MSL, gear up)	Approx. 1,500	80	70	80	230

Source: HMMH 2022

Notes: 1. All numbers are rounded.
2. Columbus AFB nominal elevation: 218 feet above MSL.
3. Weather is 65°F, Relative Humidity is 65.9 percent, and Station Pressure is 29.9 Inches of Mercury.
4. Engine Powers given in Percent Revolutions per Minute (% RPM). Speed is given in knots (Nautical Miles per Hour; kts)
5. All T-38C departures use afterburner for takeoff roll; afterburner secured and power set to military power upon reaching 150 feet AGL.

Speech Interference. **Table 3-19** provides the number of aircraft events greater than (or equal to) 75 dB L_{max} outdoors for relevant POI near Columbus AFB that occur from 7 a.m. to 10 p.m. ($NA75L_{max,day}$). Fewer than 0.05 speech-interfering events per daytime hour, on average, are estimated for Dwayne Hayes Recreation Park (P1), Residential Area 5 (R5), and Faith Christian Center Baptist Church (W4). On average, speech interference for residential areas, besides R5, ranges from 0.1 to nearly 20 events per daytime hour, and speech interference for places of worship, other than W4, ranges from 0.1 to approximately 8 events per daytime hour. No run-up events are estimated to cause speech interference.

Table 3-19. Potential for Speech Interference for Existing Conditions at Columbus AFB

ID	Representative Location	Events Per Daytime Hour
P1	Dwayne Hayes Recreation Park	<0.05
R1	Residential Area 1	6.0
R2	Residential Area 2	6.3
R3	Residential Area 3	14.4
R4	Residential Area 4	3.4
R5	Residential Area 5	<0.05
R6	Residential Area 6	3.5
R7	Residential Area 7	19.9
R8	Residential Area 8	6.2
R9	Residential Area 9	0.1
W1	Cedar Grove Missionary Baptist	0.1
W2	Kolola Springs Baptist Church	3.5
W3	Victory Tabernacle	7.6
W4	Faith Christian Center Baptist Church	<0.05

Source: HMMH 2022
Note: NA75L_{max}; POI assessed for daytime (7 a.m. to 10 p.m.)

Classroom Learning Interference. **Table 3-20** provides the L_{eq} for the school POI. For the on-installation Child Development Center (S1), $L_{eq(11h)}$ was calculated by scaling the DNL nighttime operations by 0.06 (i.e., 0.5÷9) and by scaling the DNL daytime operations by 0.7 (i.e., 10.5÷15). For the on-installation Education Center (S2), $L_{eq(6h)}$ was calculated by scaling the DNL daytime operations by 0.4 (i.e., 6÷15).

Table 3-20. Screening for Potential Classroom Speech Interference for Existing Conditions at Columbus AFB

ID	Representative School	School-Day L_{eq} (dB)
S1	Child Development Center	63.9 dB $L_{eq(11h)}$
S2	Education Center	66.8 dB $L_{eq(6h)}$

Source: HMMH 2022

S1 and S2 have an L_{eq} greater than 60 dB, necessitating discussion of NA and TA. The NA and TA metrics for the representative schools are provided in **Table 3-21**, with S1 experiencing approximately 7 events per hour and 11 minutes per day (at or) above 75 dB L_{max}. S2 experiences approximately 6 events per hour and 11 minutes per day (at or) above 75 dB L_{max}.

Table 3-21. Potential for Classroom Speech Interference for Existing Conditions at Columbus AFB

ID	Representative School	$NA75L_{max}$ (events/hour)	$TA75L_{max}$ (minutes/day)
S1	Child Development Center	7.3	11.0
S2	Education Center	6.3	11.3

Source: HMMH 2022

Sleep Disturbance. **Table 3-22** provides the number of annual average hourly nighttime events meeting or exceeding 90 dB SEL at the nine residential POI. Three of the nine POI (R1, R3, and R7) experience 0.1 sleep disturbing events per night or less, on average. R8 experiences fewer than 0.05 hourly sleep disturbing events per night, on average. The remaining five POI experience no sleep disturbing events per night, on average. All nighttime sleep disturbance is attributed to T-6 flight operations only.

Table 3-22. Potential for Sleep Disturbance for Existing Conditions at Columbus AFB

ID	Representative Location	Average Hourly Nighttime Events (NA90SEL)
R1	Residential Area 1	0.1
R2	Residential Area 2	-
R3	Residential Area 3	0.1
R4	Residential Area 4	-
R5	Residential Area 5	-
R6	Residential Area 6	-
R7	Residential Area 7	0.1
R8	Residential Area 8	<0.05
R9	Residential Area 9	-

Source: HMMH 2022

Potential for Hearing Loss. As shown in **Figure 3-1**, the 80 dB DNL contour extends beyond the boundaries of the installation, thus requiring an analysis of $L_{eq(24h)}$ for PHL. The 80 dB $L_{eq(24h)}$ contour for the existing conditions, shown in **Figure 3-2,** extends over and into the drainage ponds to the east of the installation, between the installation boundary and U.S. Highway 45. There are currently no on- or off-installation residences or individuals at Columbus AFB that are exposed to $L_{eq(24h)}$ of at least 80 dB; therefore, there is no PHL for the existing conditions.

Individual aircraft events at Columbus AFB do not generate instantaneous noise levels above 140 dB for the off-installation population; thus, hearing damage is not anticipated from existing conditions.

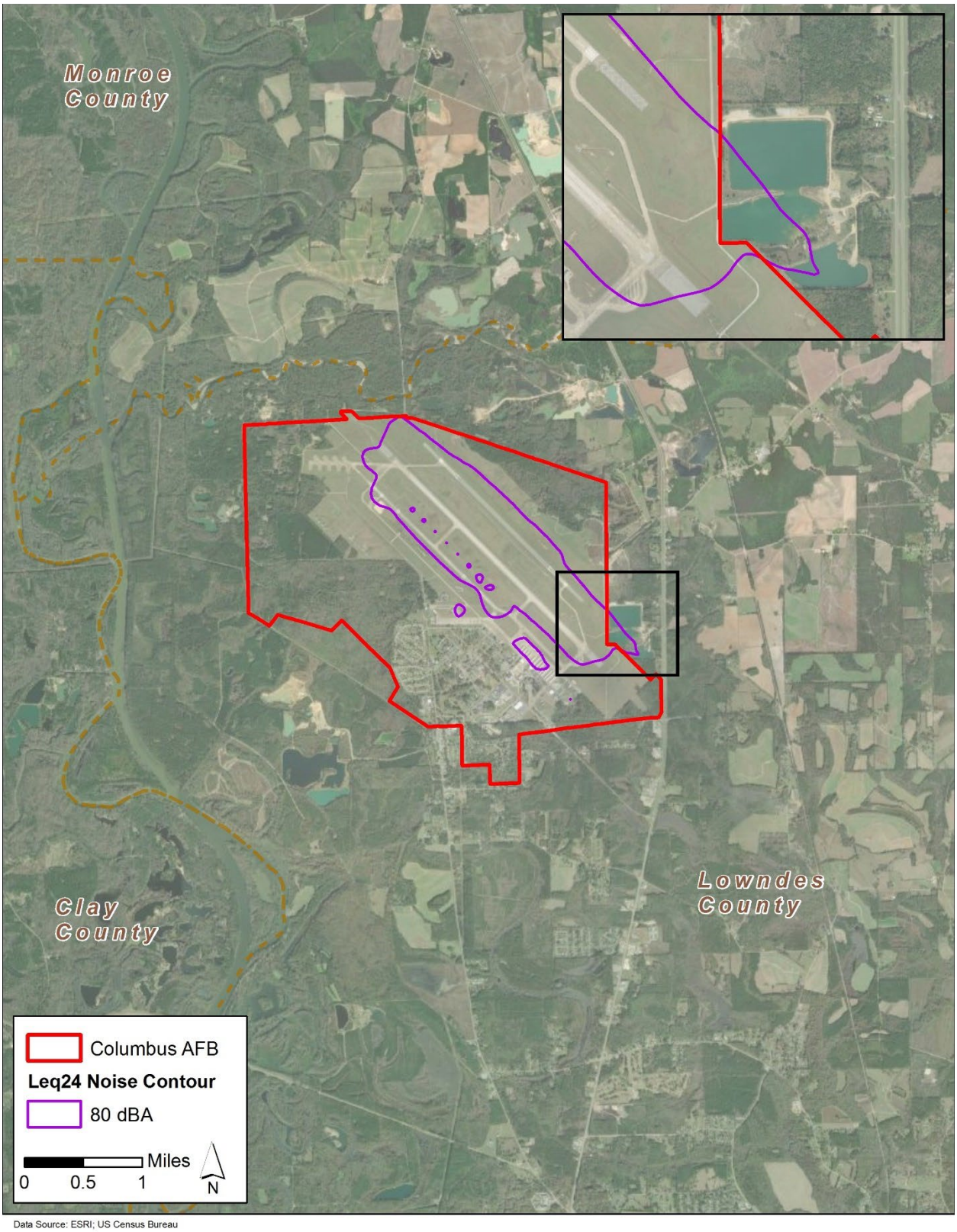

Figure 3-2. 24-Hour Equivalent Sound Level Contour of 80 dB for Existing Conditions at Columbus AFB

Damage to Structures. Individual aircraft events at Columbus AFB do not generate impulsive-style noise levels above 140 dB; therefore, there is no potential damage to structures from aircraft noise.

3.3.1.1.3 Existing Noise Abatement Procedures for Columbus AFB

This section provides an overview of the existing noise abatement procedures and strategies that have been developed primarily through the installation's AICUZ program, the community's Joint Land Use Study (JLUS), and the Airport Zoning Ordinance.

AICUZ. Columbus AFB has an active AICUZ program that informs the public about its aircraft noise environment and recommends specific actions for local jurisdictions with planning and zoning authority that can enhance the health, safety, and welfare of those living near the installation. To implement the AICUZ program, the installation is required to take the following actions:

- Prepare periodic AICUZ updates to quantify aircraft noise zone areas and provide compatible land use recommendations to local municipalities.
- Develop a prospective, long-term (5 to 10 years) analysis and develop a strategy to promote compatible development in the community to address future changes.
- Coordinate with federal, state, and local agencies and community leaders to maintain public awareness of the AICUZ program.
- Promote encroachment partnering projects to achieve long-term encroachment protection.

The current AICUZ plan for Columbus AFB was published in 2012 (Columbus AFB 2012), and it is considered a current noise-management measure that describes the DAF's planning perspective for compatible land use (DAF 2017).

As outlined in the AICUZ plan, DAF strives to be a good neighbor and actively pursues operational measures to control aircraft noise effectively. Noise abatement procedures apply to flight operations, as well as to engine run-up and maintenance operations conducted on the installation. To the greatest extent possible, flights are routed over sparsely populated areas to reduce the exposure to noise. As part of DAF regulations, commanders are required to periodically review existing traffic patterns, instrument approaches, weather constrictions, and operating practices in relation to populated areas and other local situations.

JLUS. Whereas the AICUZ plan represents DAF's compatible land use recommendations to the community, a JLUS is a community-developed document. The community-led JLUS encourages collaborative planning and communication while encouraging compatible development near military installations as those communities adjoining military installations experience growth. In 2013, the city of Columbus and Lowndes County completed a JLUS in collaboration with DAF and the communities surrounding Columbus AFB (Columbus-Lowndes Development Link 2013).

Columbus AFB Air Installation Land Use Zoning Ordinance (Compatible Use District [CUD] Ordinance). Also referred to as the Airport Zoning Ordinance, this ordinance

was adopted by Lowndes County in 1994, pursuant to the Airport Zoning Law as authorized by Mississippi Code § 61-7-1 et. seq. The CUD Ordinance was adopted for the purposes of preserving and promoting the public health, safety, and general welfare of Lowndes County inhabitants by controlling the creation or establishment of airport hazards and the elimination, removal, alteration, mitigation, or marking and lighting of existing airport hazards.

Further information on the AICUZ, JLUS, and Airport Zoning Ordinance is provided in **Section 3.6.1**.

3.3.1.2 Special Use Airspace

Airspaces assessed in this analysis include the flight areas within the SUA listed in **Table 3-1**, (i.e., Columbus 1, 2, and 3 MOAs; Birmingham and Birmingham 2 MOAs; Sea Ray Range [R-4404]; and five MTRs). MTRs consist of IR-066, IR-068, IR-091, VR-1014, and VR-1031. Primarily, only Columbus AFB-based aircraft use these SUA, but that does not preclude the possibility of occasional use by other DoD aviation assets in the region.

The Columbus MOAs have a floor of 8,000 feet above MSL while the Birmingham MOAs have a floor of 500 feet AGL. The Sea Ray Range airspace and one of the MTR floors (i.e., IR-091) extend to the surface. The other modeled MTRs extend to 100 or 500 feet AGL.

Table 3-23 provides the CY 2021 SUA usage by each based aircraft at Columbus AFB. None of the existing condition sorties using SUA occur during the L_{dnmr} nighttime (10 p.m. to 7 a.m.). T-38C aircraft use Columbus 1, 2, and 3 and Birmingham and Birmingham 2 MOAs, along with the Sea Ray Range. Birmingham MOA contains an additional range used by T-38C pilots.

The specific flight areas within the SUA analyzed for this project are shown in **Figure 1-3** and provided in **Table 3-23**. For the MOAs, the modeled flight areas consist primarily of sectors within each MOA. Activity at Sea Ray Range was modeled with discrete flight tracks, like closed patterns at an airfield. The entire lengths of the MTRs were modeled with their established route widths.

Table 3-23. Modeled SUA and Sorties for Existing Conditions

SUA	Altitudes	Busiest Month (CY 2021)	T-38C Busiest Month Sorties	T-1 Busiest Month Sorties	T-6 Busiest Month Sorties	Total Busiest Month Sorties
Columbus 1 MOA	8,000 feet to 17,999 feet above MSL	April	624	2*	475	1,101
Columbus 2 ("Echo") MOA	8,000 feet to 17,999 feet above MSL	June	296	9*	-	305
Columbus 3 MOA	8,000 feet to 17,999 feet above MSL	April	189	194	27	410
Birmingham 1 & 2 MOA	500 feet AGL to 17,999 feet above MSL	April	158	3*	-	161
R-4404A/B/C ("Sea Ray" Range)	Surface to 16,000 feet above MSL	August	97	-	-	97
IR-066	100 feet AGL to 4,000 feet above MSL	December	73	-	-	73
IR-068	100 feet AGL to 4,000 feet above MSL	June	23	-	-	23
IR-091	Surface to 4,000 feet above MSL	July	29	-	-	29
VR-1014	500 feet to 1,500 feet AGL	August	25	-	87	112
VR-1031	500 feet to 1,500 feet AGL	February	10	26	-	36

Source: HMMH 2022
* not modeled

3.3.1.2.1 Aircraft Noise

Table 3-24 provides the existing L_{dnmr} for areas beneath the modeled SUA. Of these airspaces, only the Birmingham MOAs and the Sea Ray Range have L_{dnmr} greater than 65 dB. The existing L_{dnmr} for all other areas are less than 65 dB and compatible with all land uses.

POI around Birmingham Range include 15 representative residences, one park, and three places of worship, shown in **Figure 3-3**. No hospitals or schools in the vicinity of the resulting DNL contours were identified in an internet search. Centralized intersections within residential areas were identified to represent adjacent residences and neighborhoods and are identified as POI ID BHM-R01 through BHM-R15.

Table 3-24. Overall Noise Exposure for Modeled SUA for Existing Conditions

SUA	Modeled Flight Area or Overlap	Maximum or Uniformly Distributed L_{dnmr} (dB)
Columbus 1 MOA	CBM 1 123	<45
Columbus 1 MOA	CBM 1 456	<45
Columbus 1 MOA	T6CBM1	<45
Columbus 1 MOA	Maximum Overlap[1]	<45
Columbus 2 (“Echo”) MOA	CBM 2	<45
Columbus 2 (“Echo”) MOA	Maximum Overlap[2]	<45
Columbus 3 MOA	T1CBM3B7	<45
Columbus 3 MOA	T1CBM3B8	<45
Columbus 3 MOA	T38CBM3	<45
Columbus 3 MOA	T6CBM3	<45
Columbus 3 MOA	Maximum Overlap[3]	<45
Birmingham 1 & 2 MOA*	Birmingham MOA	<45
Birmingham 1 & 2 MOA*	Birmingham Range	**75.4**
Birmingham 1 & 2 MOA*	Maximum Overlap[4]	<45
R-4404A/B/C (“Sea Ray” Range) *	N/A	**72.8**
IR-066	N/A	<45
IR-068	N/A	<45
IR-091	N/A	<45
VR-1014	N/A	<45
VR-1031	N/A	<45

Source: HMMH 2022

Bold text indicates L_{dnmr} values of at least 65 dB

* Maximum DNL values shown for Birmingham and Sea Ray ranges

[1] CBM 1 intersects VR-1014 and IR-066

[2] CBM 2 ECHO intersects VR-1014 and IR-066

[3] CBM 3 intersects IR-068 and IR-091

[4] Birmingham MOAs intersect VR-1031

Key: N/A = not applicable

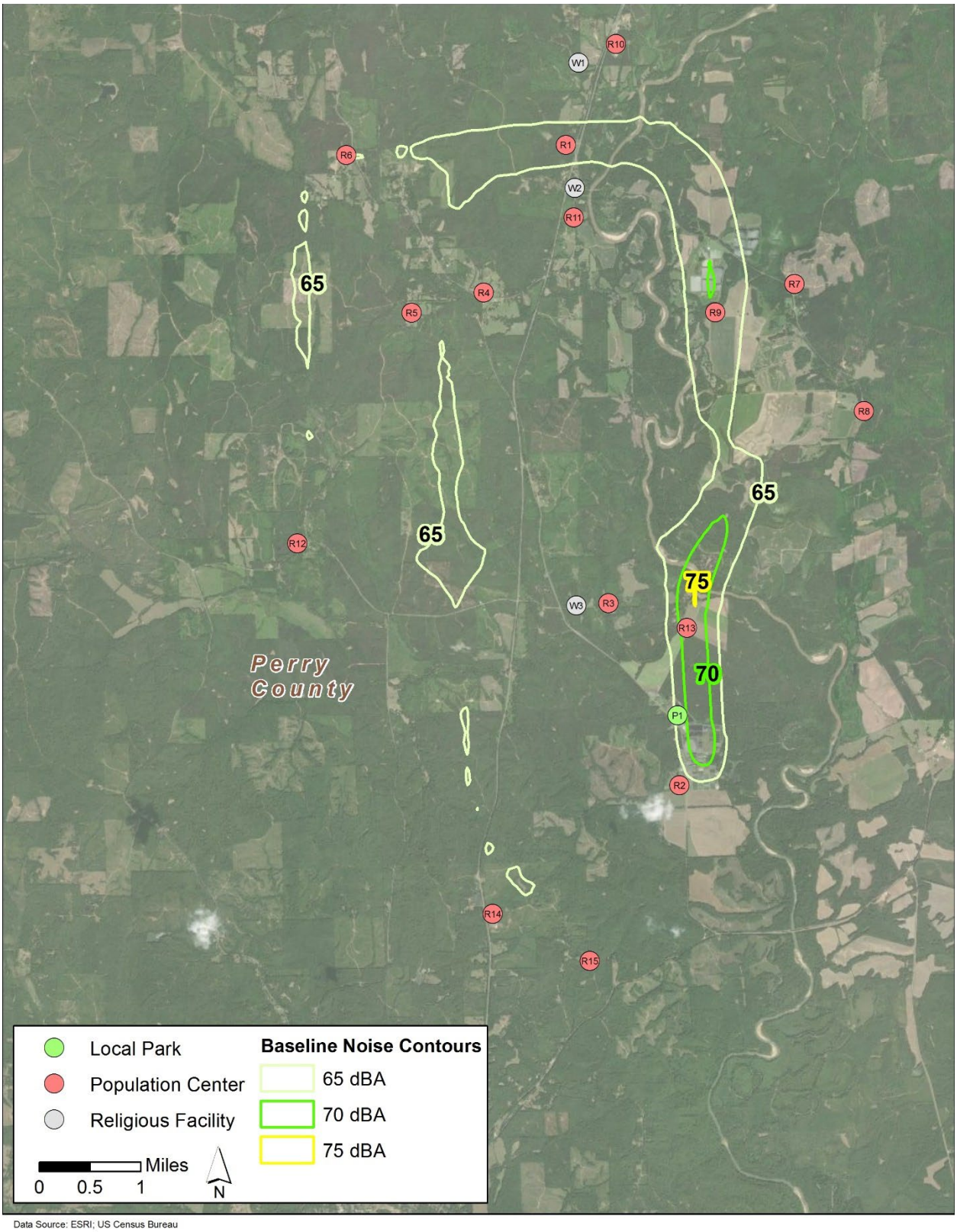

Figure 3-3. Aircraft DNL Contours for Existing Conditions at the Birmingham Range

Figure 3-3 shows the DNL contours for the Birmingham Range. The cumulative noise exposure results from the DNL range modeling and the L_{dnmr} modeling of the MTR VR-1031 and airspaces Birmingham MOA and Birmingham Surprise POP Area. The resultant exposure is called DNL, for brevity.

The highest DNL contour (of the provided 5-dB increments) caused by existing aircraft operations for the Birmingham Range is 75 dB DNL, which forms a sliver 1,300 feet tall and 100 feet wide just west of the intersection of Old Town Creek and the Cahaba River. This area is within the 70 dB DNL contour, which begins 1.6 miles north of the Route 14 and 175 junction and extends north approximately 2.4 miles with a width of approximately 1,500 feet.

The 65 dB DNL contour forms an inverted "L" shape with two additional lobes on the west. The inverted "L" extends 6.4 miles north from a starting area 1.5 miles north of the Route 14 and 175 junction. The contour varies in width from 700 to 4,400 feet. At its northern edge (the base of the inverted "L"), the contour extends west for 2.7 miles and crosses Route 5. The next largest lobe runs parallel to Route 5, approximately 2,500 feet west. This lobe extends approximately 2.6 miles north with a width that shrinks from 3,500 feet in the south to 800 feet along most of the lobe.

Table 3-25 and **Table 3-26** provide the acreage and population within DNL contour bands for the Birmingham Range, respectively. There are 3,346 acres and 19 residents exposed to DNL of at least 65 dB at the Birmingham Range. No people are exposed to DNL of 70 dB or greater.

Table 3-25. Acreage within DNL Contour Bands for Existing Conditions at Birmingham Range

DNL Contour Band (dB)	Acreage
65 to 70	2,939
70 to 75	407
75 to 80	3
≥80	-
Total	**3,346**

Source: HMMH 2022
Note: DNL bands are exclusive of upper bounds

Table 3-26. Estimated Population within DNL Contour Bands for Existing Conditions at Birmingham Range

DNL Contour Band (dB)	Population
65 to 70	19
70 to 75	-
75 to 80	-
Total	**19**

Sources: HMMH 2022, U.S. Census Bureau 2020
Notes: 1. Estimated population based on area within individual census blocks.
2. DNL bands are exclusive of upper bounds

Table 3-27 provides the existing DNL for the POI around Birmingham Range. Four of the 15 residential areas are exposed to DNL greater than (or equal to) 65 dB, as is the Perry Lake Recreational Area. The remaining 11 residential areas are exposed to DNL less than 65 dB. The three places of worship are exposed to DNL less than 65 dB.

Table 3-27. Overall DNL at Representative Locations for Existing Conditions at Birmingham Range

ID	Representative Location	Type	DNL (dB)
BHM-P01	Perry Lake Recreation Area	Residential	**66.2**
BHM-R01	Residence	Residential	**67.1**
BHM-R02	Residential Area	Residential	61.2
BHM-R03	Community Near Marietta Church	Residential	55.2
BHM-R04	Heiberger Community	Residential	57.0
BHM-R05	Residential Area	Residential	60.4
BHM-R06	Residential Area	Residential	64.9
BHM-R07	Residential Area	Residential	56.9
BHM-R08	Residential Area	Residential	49.7
BHM-R09	Residential Area	Residential	**69.6**
BHM-R10	Residential Area	Residential	51.4
BHM-R11	Residential Area	Residential	56.2
BHM-R12	Residential Area	Residential	58.8
BHM-R13	Residential Area	Residential	**72.8**
BHM-R14	Residential Area	Residential	56.4
BHM-R15	Residential Area	Residential	52.9
BHM-W01	Little Rock Church	Place of Worship	54.3
BHM-W02	Heiberger Methodist Church	Place of Worship	60.5
BHM-W03	Marietta Church	Place of Worship	54.3

Source: HMMH 2022

POI around Sea Ray Range include 11 representative residences and three places of worship, as shown in **Figure 3-4**. No hospitals or schools in the vicinity of the range were identified in a GIS review and an internet search. Centralized intersections within residential areas were identified to represent adjacent residences and neighborhoods and are identified as POI ID Sea-R01 through Sea-R11.

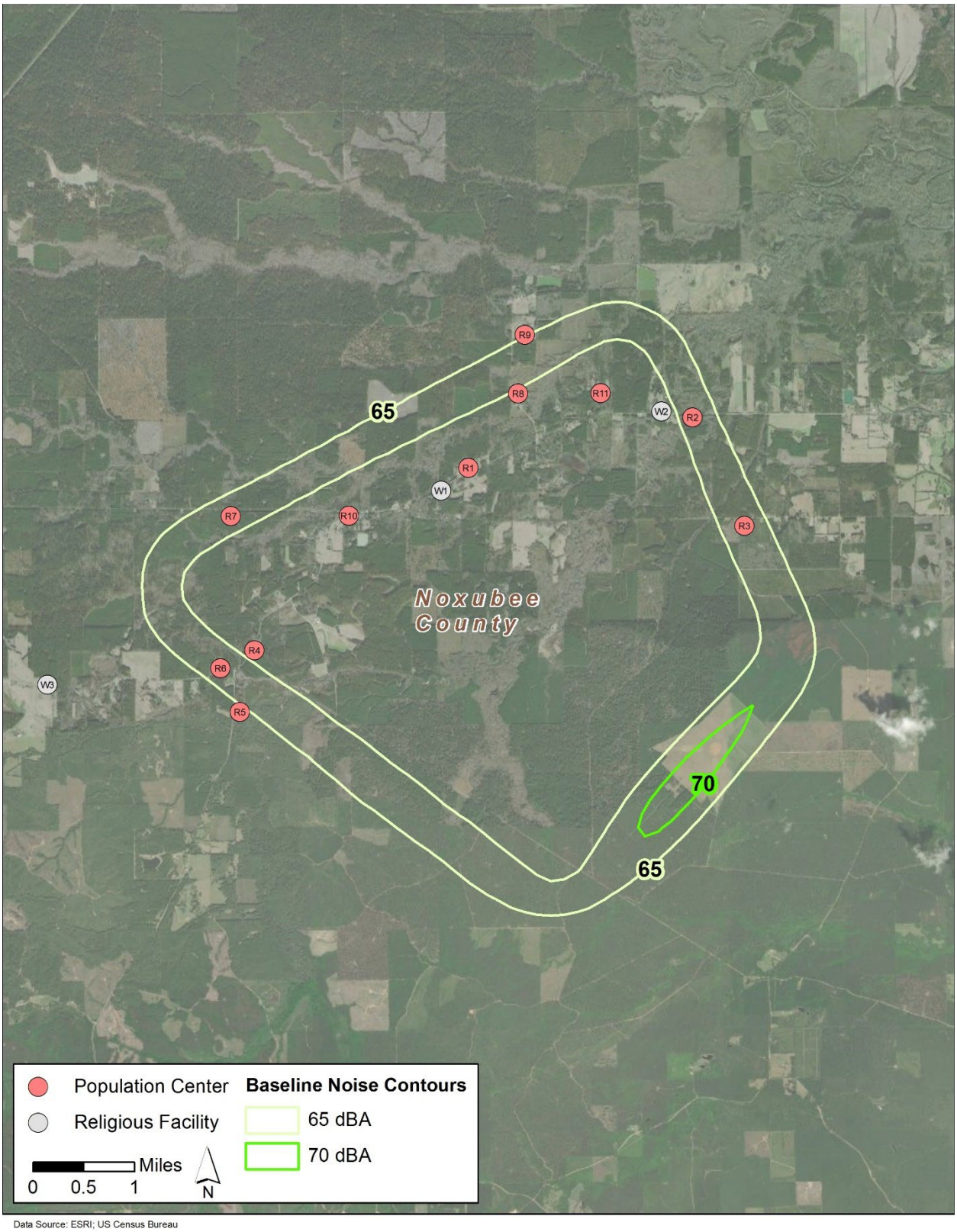

Figure 3-4. Aircraft DNL Contours for Existing Conditions at the Sea Ray Range

Figure 3-4 shows the DNL contours for the Sea Ray Range. The cumulative noise exposure results from the DNL modeling of the Range; other SUA, such as MTR VR-1031 and IR-068, would not contribute meaningfully to the cumulative noise exposure at the Sea Ray Range. The highest DNL contour (in the 5-dB increments) caused by existing aircraft operations for the Sea Ray Range is 70 dB DNL. The 70 dB DNL contour is centered on the range's target area and is approximately 8,500 feet long and 1,600 feet wide. The 65 dB DNL contour follows the range's Tactical Training looping flight track and varies in width from approximately 3,400 to 2,100 feet. For the existing conditions, the noise exposure is caused primarily by the T-38C Tactical Training activity.

Table 3-28 and **Table 3-29** provide the acreage and population within DNL contour bands for the Sea Ray Range, respectively. There are 5,023 acres and 59 residents exposed to DNL of at least 65 dB at the Sea Ray Range. There are no people exposed to DNL of 70 dB or greater.

Table 3-28. Acreage within DNL Contour Bands for Existing Conditions at Sea Ray Range

DNL Contour Band (dB)	Acreage
65 to 70	4,770
70 to 75	253
≥75	-
Total	**5,023**

Source: HMMH 2022
Note: DNL bands are exclusive of upper bounds

Table 3-29. Estimated Population within DNL Contour Bands for Existing Conditions at Sea Ray Range

DNL Contour Band (dB)	Population
65 to 70	59
70 to 75	-
Total	**59**

Sources: HMMH 2022, U.S. Census Bureau 2020
Notes: 1. Estimated population based on area within individual census blocks.
2. DNL bands are exclusive of upper bounds

Table 3-30 provides the existing DNL for the 14 POI around Sea Ray Range. Four of the 11 residential areas are exposed to DNL greater than (or equal to) 65 dB. The remaining seven residential POI are exposed to DNL less than 65 dB. The three places of worship are exposed to DNL less than 65 dB.

Table 3-30. Overall DNL at Representative Locations for Existing Conditions at Sea Ray Range

ID	Representative Location	Type	DNL (dB)
Sea-R01	Residential Area	Residential	60.0
Sea-R02	Community Near Mount Olive Church	Residential	**66.6**
Sea-R03	Residence (979 Flatwoods Road)	Residential	**67.6**
Sea-R04	Residential	Residential	63.3
Sea-R05	Residential	Residential	63.7
Sea-R06	Residence (3103 MS-490)	Residential	**67.4**
Sea-R07	Residential	Residential	**67.4**
Sea-R08	Residence (522 Simmons Road)	Residential	64.4
Sea-R09	Residence (1116 Simmons Road)	Residential	64.8
Sea-R10	Mashulaville	Residential	59.5
Sea-R11	Residential	Residential	60.9
Sea-W01	Mount Moriah Church	Place of Worship	60.0
Sea-W02	Mount Olive Church	Place of Worship	63.1
Sea-W03	Touch Cotton Evangelistic Ministry	Place of Worship	45.6

Source: HMMH 2022

3.3.1.2.2 Supplemental Metrics Analyses

The supplemental metrics required for the analysis of the potential noise effects at the SUA are sleep disturbance, classroom learning interference, and speech interference for specific POI in the vicinity of the SUA. There are 19 POI located near the contours of the Birmingham Range and 14 POI near the contours of the Sea Ray Range. However, an internet review of school locations did not identify any schools within approximately 5 miles of the 65 dB DNL contours for the SUA. Therefore, classroom learning interference was not included in the supplemental metric analyses provided for the SUA. Additionally, since the MOAs are not used at night, no sleep disturbance analysis was performed.

Speech Interference. **Table 3-31** provides the number of aircraft events greater than (or equal to) 75 dB L_{max} outdoors for relevant POI near Birmingham Range from 7 a.m. to 10 p.m. ($NA75L_{max,day}$). Places of worship around the contours of the Birmingham Range currently experience between 1.0 and 4.9 speech-interfering events per daytime hour. Residential POI receive between 1.0 and 4.9 speech-interfering events per daytime hour.

Table 3-31. Potential for Speech Interference for Existing Conditions at Birmingham Range

ID	Representative Location	Events Per Daytime Hour
BHM-P01	Perry Lake Recreation Area	1.0
BHM-R01	Residence	4.9
BHM-R02	Residential Area	1.0
BHM-R03	Community Near Marietta Church	2.1
BHM-R04	Heiberger Community	2.8
BHM-R05	Residential Area	2.8
BHM-R06	Residential Area	3.9
BHM-R07	Residential Area	4.9
BHM-R08	Residential Area	2.8
BHM-R09	Residential Area	4.9
BHM-R10	Residential Area	4.9
BHM-R11	Residential Area	4.9
BHM-R12	Residential Area	1.0
BHM-R13	Residential Area	2.1
BHM-R14	Residential Area	1.0
BHM-R15	Residential Area	1.0
BHM-W01	Little Rock Church	4.9
BHM-W02	Heiberger Methodist Church	4.9
BHM-W03	Marietta Church	1.0

Source: HMMH 2022
Note: NA75L_{max}; POI assessed for daytime (7 a.m. to 10 p.m.)

Table 3-32 provides the number of aircraft events greater than (or equal to) 75 dB L_{max} outdoors for relevant POI near Sea Ray Range from 7 a.m. to 10 p.m. (NA75$L_{max,day}$). The Touch Cotton Evangelistic Ministry (W03) currently experiences zero noise-interfering events per daytime hour. Residences Sea-R06 and Sea-R07 receive approximately 1.4 speech-interfering events per daytime hour. The other places of worship POI receive approximately 2.1 speech-interfering events per daytime hour and the other nine residential POI receive approximately 2.1 speech-interfering events per daytime hour.

Table 3-32. Potential for Speech Interference for Existing Conditions at Sea Ray Range

ID	Representative Location	Events Per Daytime Hour
Sea-R01	Residential Area	2.1
Sea-R02	Community Near Mount Olive Church	2.1
Sea-R03	Residence (979 Flatwoods Road)	2.1
Sea-R04	Residential	2.1
Sea-R05	Residential	2.1
Sea-R06	Residence (3103 MS-490)	1.4
Sea-R07	Residential	1.4
Sea-R08	Residence (522 Simmons Road)	2.1
Sea-R09	Residence (1116 Simmons Road)	2.1
Sea-R10	Mashulaville	2.1
Sea-R11	Residential	2.1
Sea-W01	Mount Moriah Church	2.1
Sea-W02	Mount Olive Church	2.1
Sea-W03	Touch Cotton Evangelistic Ministry	0.0

Source: HMMH 2022
Note: NA75L_{max}; POI assessed for daytime (7 a.m. to 10 p.m.)

3.3.2 Environmental Consequences

This section discusses noise from construction, noise from aircraft, potential changes to land use compatibility, and potential noise effects to humans due to implementing Alternative 1 (**Section 3.3.2.1**), Alternatives 2 and 3 (**Section 3.3.2.2**), and the No Action Alternative (**Section 3.3.2.3**).

The noise section differs from the other environmental resources sections analyzed in this EIS because it combines Alternatives 2 and 3 in the same section (i.e., **Section 3.3.2.2**). The analysis for these two alternatives was combined into the same section for simplicity because both alternatives entail aircraft operations that are 25 percent greater than Alternative 1, and the impacts on noise result from aircraft operations. The delivery of up to 16 additional T-7A aircraft to Columbus AFB and the construction of up to 12 additional T-7A shelters on the Columbus AFB aircraft parking ramp for Alternative 3 (as compared to Alternative 2) would have no additional impacts on noise, except construction-related noise would last slightly longer.

Because the T-7A is a new aircraft and not yet accepted into the DAF inventory or flown for DAF training, the exact T-7A flight parameters, such as flight tracks and altitudes, are unavailable until DAF introduces the T-7A and begins flying it for pilot training. T-7A flight tracks and altitudes were assumed to be the same as the T-38C operations. Unlike the T-38C, the T-7A would use the afterburner for only 5 percent of its departures, compared to the T-38C's 100 percent of departures. The T-7A would shut off its afterburners at approximately the same

altitude and distance as the T-38C (i.e., 150 feet AGL at approximately one nautical mile from brake release).

The T-7A aircraft has distinctly different operating characteristics than the T-38C, and, if the T-7A is introduced, DAF would determine the safest, most efficient, and least intrusive flight operations for T-7A training at Columbus AFB. Once the T-7A aircraft begin to arrive at Columbus AFB, DAF would (1) analyze T-7A flying patterns and operational settings, (2) update the installation's AICUZ plan, and (3) support the community in developing a JLUS for the installation and surrounding community. These actions would allow DAF to continue its active AICUZ program at Columbus AFB, which strives to pursue operational measures to effectively control aircraft noise and recommend specific actions for local jurisdictions to enhance the health, safety, and welfare of those living near the installation.

3.3.2.1 Alternative 1

Alternative 1 would result in short- and long-term, less than significant, adverse impacts on the noise environment. Short-term impacts would be due to noise generated by heavy equipment during construction. Long-term impacts would be due to the introduction of the T-7A aircraft and the introduction of nighttime operations (i.e., those between 10 p.m. and 7 a.m.). Long-term changes in operational noise would increase in areas of incompatible land use on and adjacent to Columbus AFB.

3.3.2.1.1 Columbus AFB

3.3.2.1.1.1 Construction Noise

Construction associated with this project would require the use of heavy equipment that would generate short-term increases in noise near the project areas. Maximum noise levels associated with common construction equipment at 50 feet generally range from 73 dB for a power generator to 101 dB for a pile driver.[5] With multiple types of equipment operating concurrently, noise levels can be higher within several hundred feet of active construction and demolition areas.

DoD Instruction 4715.13, *DoD Operational Noise Program*, does not indicate a threshold of significance for construction noise impacts. This instruction does not reference other construction noise guidance; therefore, this analysis refers to Federal Highway Administration guidance for evaluating construction noise. Federal Highway Administration policy considers an hourly Equivalent Sound Level ($L_{eq(h)}$) of 67 dB an exterior impact for residential and recreational uses (23 CFR Part 772, Table 1).

Construction activities would include the laydown area for modular construction and general requirements for equipment access and material delivery; the storage of materials, equipment, and tools; employee access and vehicle parking; utility impairment requirements; and safety

[5] 50 feet is the standard reference distance used in U.S. Department of Transportation, Federal Highway Administration guidance, including guidance for the evaluation of construction equipment noise (U.S. Department of Transportation, Federal Highway Administration. *FHWA Roadway Construction Noise Model, Version 1.0 User's Guide*, Table 1. January 2006. Available at: https://www.gsweventcenter.com/Draft_SEIR_References/2006_01_Roadway_Construction_Noise_Model_User_Guide_FHWA.pdf.)

requirements. Nighttime and weekend work is not planned as a part of the construction schedule.

All construction in support of the Proposed Action would be within the Columbus AFB boundary, be collocated with other existing noise-compatible activities, and end with the facility construction and modification phase. **Figure 3-5** shows the locations of the MILCON/UMMC and FSRM project areas relative to the POI. Based on the minimum 3,100-foot distance between the construction areas and the nearest off-installation noise sensitive land uses (i.e., POI R1 and R3), there would be no anticipated noise impacts to off-installation residents from construction activities.

There are no noise-sensitive receptors within 2,000 feet of the construction areas, and the on-installation Education Center (POI S2) is the nearest receptor to a construction area at approximately 2,040 feet. Based on estimated equipment usage percentages, construction noise levels were calculated at 2,000 feet, as shown in **Table 3-33**. Temporary construction noise is not expected to result in significant impacts on any noise-sensitive site. Project construction is anticipated to produce L_{max} of approximately 58 dB at 2,000 feet from the site and is well below the 67 dB criterion. In addition, various facilities within the Columbus AFB operations area, including flightline activity where routine daily activities contribute to a higher-than-normal ambient noise level, are within this distance. The $L_{eq(h)}$ would remain well below the 67 dB criterion for a significant noise impact at residential or recreational facilities. Operation of the new facilities at Columbus AFB is not expected to generate any additional noise levels.

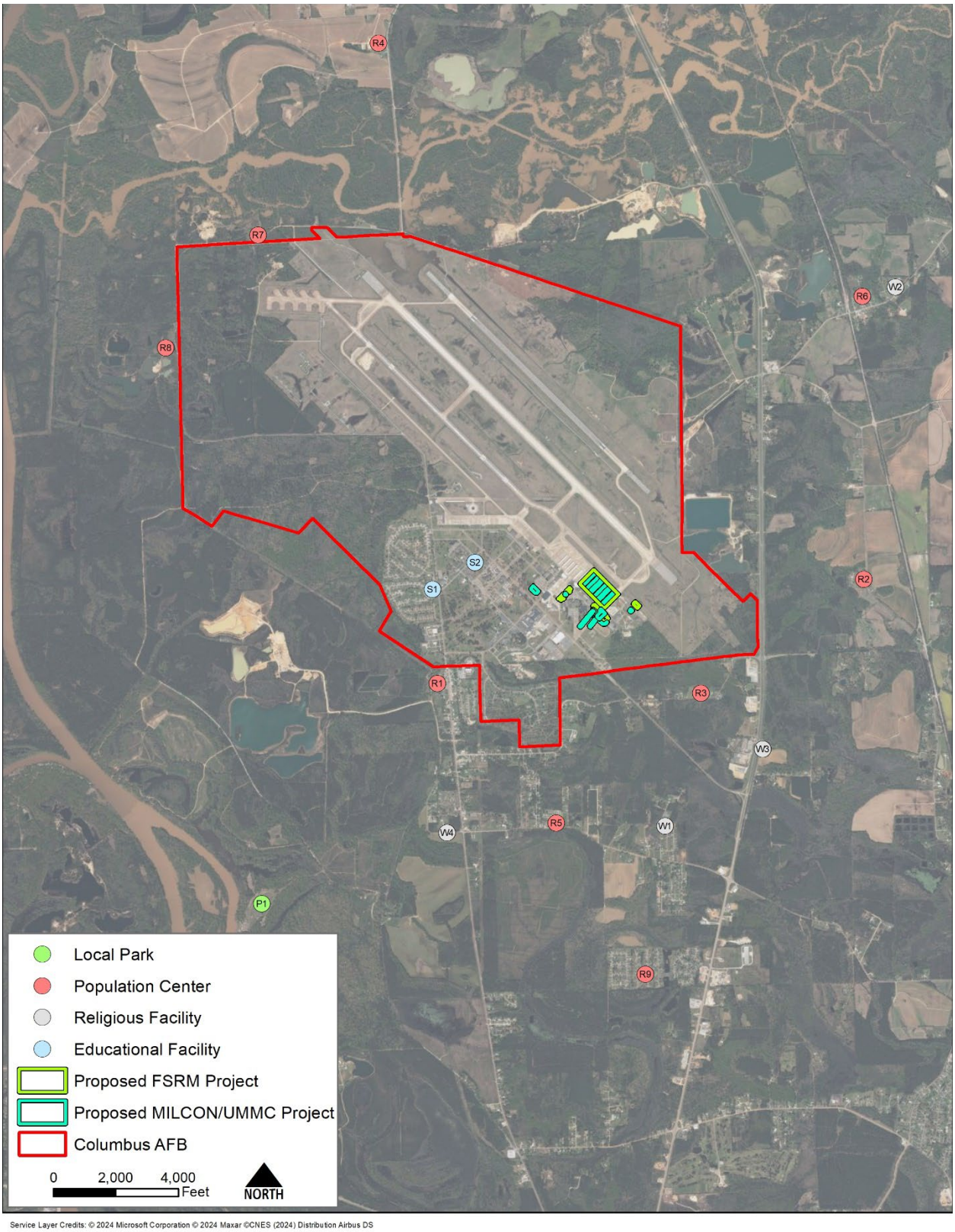

Figure 3-5. Proposed Construction Activities at Columbus AFB

Table 3-33. Estimated Noise Levels for Proposed Construction Equipment at Nearby Properties

Equipment Description	Equipment Usage (percent)[1]	Noise Level at 50 feet, L_{max} (dB)[2]	L_{max} at 2,000 feet from Construction Site (dB)	Hourly L_{eq} at 2,000 feet from Construction Site (dB)
Paver	50	77	45	42
Dump Truck	40	77	44	40
Pickup Truck	40	75	43	39
Roller	20	80	48	41
Dozer	40	82	50	46
Excavator	40	81	49	45
Chain Saw	20	84	52	45
Compactor (ground)	20	83	51	44
Concrete Saw	20	90	58	51
Crane	16	81	49	41
		Total	**58[3]**	**55[4]**

Source: HMMH 2022

[1] Usage percentage is the amount of time that a piece of equipment is anticipated to be in operation during each hour of a 24-hour day.

[2] Construction Noise Handbook Accessed August 3, 2022. Available at: https://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/handbook06.cfm

[3] Total L_{max} is the value for the loudest piece of equipment at 2,000 feet (i.e., concrete saw).

[4] Total L_{eq} is the combined average of all equipment at 2,000 feet.

An hourly L_{eq} of at least 67 dB would result in a noise impact.

3.3.2.1.1.2 Aircraft Noise

For Alternative 1, approximately 362,569 total flight operations (i.e., single take-offs, landings, and patterns combined) would be performed at Columbus AFB each year, which is an average of 993 flight operations per day. Most of Columbus AFB's annual flight operations (68 percent) would be performed by based T-6 Texan II aircraft. Based T-7A Red Hawk aircraft (single-engine jet trainer; capable of supersonic flight), combining FBF and UPT groups, would represent 26 percent of the annual flight operations. The rest of the annual flight operations would be performed by based T-1 aircraft and various transient aircraft types. No based T-38C operations would remain after full conversion to the T-7A. No change in operations is forecast for the T-1, T-6, or transient aircraft.

Nighttime flight operations (approximately 2 percent of the overall annual flight operations) at Columbus AFB would be performed by the T-7A, T-1, and T-6 aircraft. T-7A aircraft would account for 8 percent of the DNL nighttime operations (approximately 474 flight operations).

The T-7A aircraft are proposed for arrival and immediate use beginning in 2028. The increase in T-7A aircraft and associated training operations would be incremental through 2030. In 2030, the full complement of T-7A aircraft would arrive at Columbus AFB and the number of T-7A

aircraft operations would stabilize to the full rate of Alternative 1 implementation. During the period from 2028 to 2030, the rate of increased area and population within the 65-dB DNL contour would increase incrementally.

With improved avionics and advanced capabilities, the T-7A aircraft will be able to operate at any time, day or night. This would enable pilots to conduct nighttime training operations, which are not performed currently at Columbus AFB with the T-38C aircraft. Currently, operations occur on an approximate dawn to dusk schedule, and hours vary seasonally throughout the year. The introduction of nighttime flight operations at Columbus AFB would expand the hours of associated aircraft noise in the area, exposing communities surrounding the installation to T-7A nighttime training operations. Approximately 474 T-7A nighttime flight operations would occur at Columbus AFB annually.

Noise exposure for Alternative 1 also includes modeling proposed maintenance run-up activity by the existing based aircraft types and the proposed T-7A, including activity in the proposed hush house. Alternative 1 would include replacing the existing hush house facility, which is located at the north end of the airfield's aircraft parking area, adjacent to the taxiway near the southeastern end of Runway 13C/31C. The jet engine orientation while in the proposed hush house would be the same as the existing hush house.

Noise levels on and adjacent to Columbus AFB with the proposed T-7A aircraft were calculated based on full implementation of Alternative 1 in 2030. **Figure 3-6** shows the modeled DNL contours for Alternative 1. With full implementation of Alternative 1 in 2030, the 65 dB DNL contour at Columbus AFB would extend approximately 2.3 miles from both ends of Runway 13C/31C, 2.3 miles from the north end and 2.8 miles from the south end of Runway 13L/31R, and 2.4 miles from both ends of Runway 13R/31L. At its farthest lateral points, the contour would extend approximately 1.8 miles west and 3.1 miles east from the centerline of Runway 13C/31C. Aircraft DNL less than 65 dB is generally compatible with all land uses.

Table 3-34 and **Table 3-35** provide the land acreage and population exposed to DNL of at least 65 dB for Alternative 1 at Columbus AFB, respectively. Off- and on-installation acreage contained within the 65 dB DNL contour would be 7,579 and 3,640 acres, respectively. Alternative 1 would expose nearly 400 people off-installation to DNL of at least 65 dB.

Population exposed to DNL of at least 80 dB would have a PHL. The population estimation method yields four on-installation people and five off-installation people potentially exposed to DNL of at least 80 dB. See **Section 3.3.2.1.1.3** for further analysis on PHL.

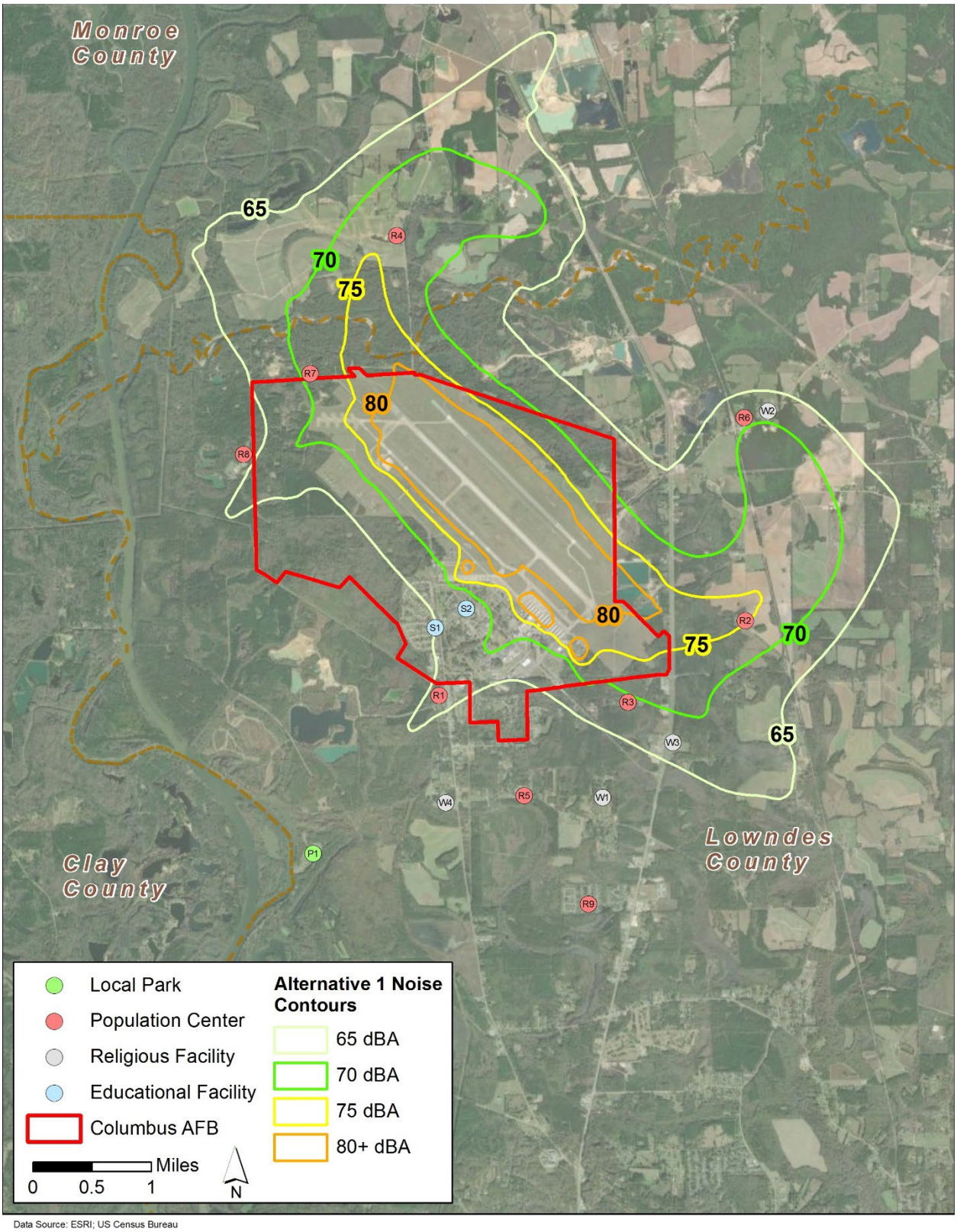

Figure 3-6. Aircraft DNL Contours for Alternative 1 at Columbus AFB

Table 3-34. Acreage within DNL Contour Bands for Alternative 1 and Change in Acreage from Existing Conditions at Columbus AFB

DNL Contour Band (dB)	On-Installation Acreage	Off-Installation Acreage	Total Acreage	Change in On-Installation Acreage	Change in Off-Installation Acreage	Change in Total Acreage
65 to 70	1,047	4,404	5,451	168	1,664	1,832
70 to 75	718	2,573	3,291	138	1,421	1,559
75 to 80	675	543	1,218	146	327	473
80 to 85	700	59	759	57	30	87
≥85	500	-	500	15	-	15
Total	**3,640**	**7,579**	**11,219**	**524**	**3,442**	**3,966**

Source: HMMH 2022
Note: DNL bands are exclusive of upper bounds

Table 3-35. Estimated Population within DNL Contour Bands for Alternative 1 and Change in Population from Existing Conditions at Columbus AFB

DNL Contour Band (dB)	On-Installation Population	Off-Installation Population	Total Population	Change in On-Installation Population	Change in Off-Installation Population	Change in Total Population
65 to 70	496	258	754	432	87	519
70 to 75	3	107	110	2	53	55
75 to 80	1	28	29	-1	18	17
80 to 85	2	5	7	1	2	3
≥85	2	-	2	-	-	-
Total	**504**	**398**	**902**	**434**	**160**	**594**

Sources: HMMH 2022, U.S. Census Bureau 2020
Notes: 1. Estimated population based on area within individual census blocks at full implementation of Alternative 1 with the full complement of T-7A aircraft.
2. DNL bands are exclusive of upper bounds

Figure 3-7 shows a comparison of the 65 dB DNL contours for the existing condition and Alternative 1. Alternative 1 would result in a general expansion of the 65 dB DNL contour to the north and south along runway headings and to the northeast. Along the center runway line (Runway 13C/31C), the Alternative 1 65 dB DNL contour would extend approximately 1,500 feet past the extents of the existing 65 dB DNL contour. The 65 dB DNL contour on the east side of the installation would be extended approximately 2,000 feet, and the 65 dB DNL lobe north of Columbus AFB would be extended approximately 1 mile past the existing 65 dB DNL contour.

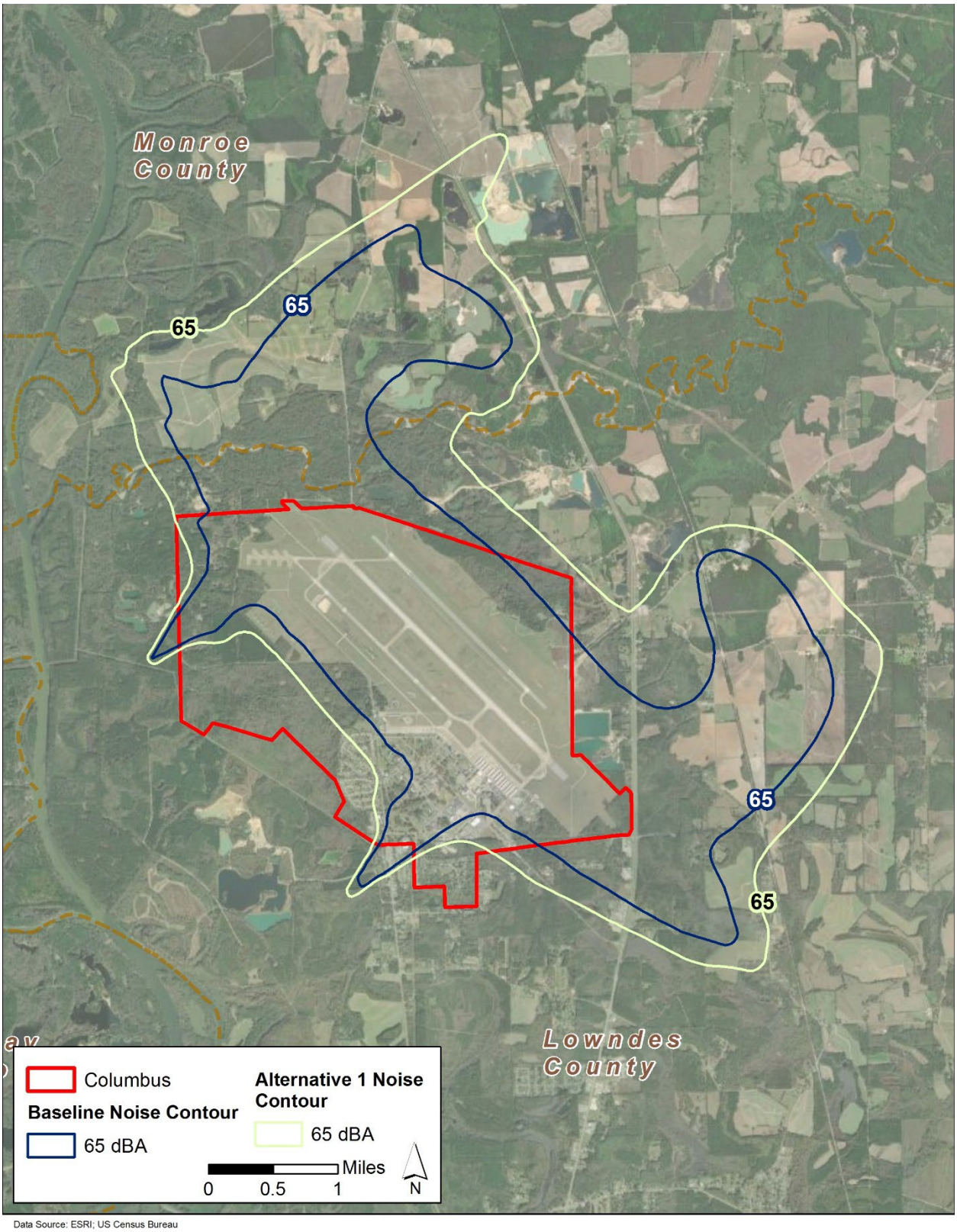

Figure 3-7. Comparison of the 65 dB DNL Contours for Alternative 1 and Existing Conditions at Columbus AFB

Table 3-34 and **Table 3-35** provide the change in acreage and population within the DNL contour bands for Alternative 1, respectively, relative to existing conditions. Compared to existing conditions, the acreage within the off-installation 65 dB DNL contour for Alternative 1 would increase by 83 percent (to 7,579 acres) while the population would increase by 67 percent (to 398 people).

The additional 3,442 acres and 160 people would constitute an expansion primarily on the east side of the airfield. The DNL contour would expand almost to the border of Clay and Monroe Counties in the northwest, the intersection of Flower Farm Road and the railroad tracks in the northeast, almost as far east as Wiley Road, and nearly as far south as Ridge Road in Wells. These newly exposed areas encompass numerous land uses, including residential, commercial, undeveloped, and agricultural.

Expansion of the DNL contours would be due to the introduction of the T-7A aircraft and the expected nighttime training operations. The expansion to the southeast of the airfield would be due primarily to daytime and nighttime T-7A departures. The expansion of the DNL contours to the northeast of the airfield would be due primarily to the departure phase of T-7A pattern work, particularly outside and inside downwind patterns, along with the addition of T-7A nighttime operations. The contour expansion off the northern runway end would be for similar reasons given for the southern end.

Table 3-36 provides the DNL for the 16 POI under Alternative 1. Six of the nine residential areas, two of the four places of worship (W2 and W3), and the two schools (S1 and S2) would be exposed to DNL greater than (or equal to) 65 dB and would be considered incompatible land uses. The other six POI would be exposed to DNL less than 65 dB.

The nine residential areas would be exposed to DNL increases between 0.4 and 4 dB. The two schools would be exposed to DNL increases between approximately 2 and 3 dB. The four places of worship would be exposed to DNL increases between approximately 2 and 4 dB. The increases would be due to the introduction of the T-7A, its associated aircraft and engine characteristics, and the introduction of nighttime training operations.

None of the modeled residential areas would be newly exposed to DNL of at least 65 dB. The Child Development Center (S1) and two of the places of worship (W2 and W3) would be newly exposed to DNL of at least 65 dB due to T-7A operations, compared to existing conditions.

Table 3-36. Overall DNL at Representative Locations for Alternative 1 at Columbus AFB

ID	Representative Location	Existing Conditions DNL (dB)	Alternative 1 DNL (dB)	Change in DNL (dB)
P1	Dwayne Hayes Recreation Park	50.8	51.7	0.9
R1	Residential Area 1	**66.4**	**66.8**	0.4
R2	Residential Area 2	**72.7**	**75.3**	2.6
R3	Residential Area 3	**66.6**	**69.2**	2.6
R4	Residential Area 4	**71.1**	**74.1**	3.0
R5	Residential Area 5	52.9	56.9	4.0
R6	Residential Area 6	**65.5**	**68.6**	3.1
R7	Residential Area 7	**69.1**	**71.3**	2.2
R8	Residential Area 8	62.0	63.6	1.6
R9	Residential Area 9	51.2	54.8	3.6
S1	Child Development Center	62.7	**65.0**	2.3
S2	Education Center	**65.2**	**67.8**	2.6
W1	Cedar Grove Missionary Baptist	55.6	59.9	4.3
W2	Kolola Springs Baptist Church	63.9	**68.2**	4.3
W3	Victory Tabernacle	64.7	**67.2**	2.5
W4	Faith Christian Center Baptist Church	53.5	55.5	2.0

Source: HMMH 2022

3.3.2.1.1.3 Supplemental Metrics Analyses

The supplemental metrics required analyses of noise exposure relating to potential noise effects, including sleep disturbance, hearing loss, classroom learning interference, and speech interference. These analyses focus on specific POI in the vicinity of Columbus AFB and are described in **Section 3.4.2.1.1**.

Individual Aircraft Overflights. **Table 3-37** compares the SEL and L_{max} of the based T-38C and the proposed based T-7A for typical conditions at the airfield and in the SUA. T-7A departure flight profiles would be identical to the T-38C in terms of securing afterburner, altitudes, and speeds. However, as mentioned in **Section 3.3.2**, only 5 percent of T-7A departures would use afterburner, compared to 100 percent of the T-38C departures. For the three airfield conditions shown (first three rows of **Table 3-37**), the T-7A would be within 3 dB of the T-38C's SELs. The T-7A would have L_{max} values between 1 dB and 6 dB greater than the T-38C. For the two airspace conditions shown (last two rows of **Table 3-37**), the T-7A SEL and L_{max} would be within 1 dB of the T-38C for the low-level (MTR) condition but 9 dB greater than the T-38 for the Basic Flight Maneuvers condition.

Table 3-37. Comparison of Single-Event Sound Levels for T-38C and T-7A

Operation	Slant Distance to Receptor (feet)	T-38C SEL (dB)	T-38C L_{max} (dB)	T-38C Power (%RPM)	T-38C Speed (kts)	T-7A SEL (dB)	T-7A L_{max} (dB)	T-7A Power (%N2)	T-7A Speed (kts)
Afterburner or Military Power Takeoff (1,000 feet AGL)	1,000	106	100	100	300	109	105	93	300
Arrival (Straight-in, 1,000 feet AGL, gear down)	1,000	85	76	85	200	87	82	79	200
Overhead Break/Visual Flight Rules/ Instrument Flight Rules Pattern Downwind Legs (Downwind leg, 1,700 feet above MSL, gear up)	Approx. 1,500	80	70	80	230	79	71	79	230
Low Level (500 feet AGL)	500	92	88	90	400	91	89	82	400
Basic Flight Maneuvers Training (8,000 feet AGL)	8,000	84	77	100	400	93	86	94	400

Source: HMMH 2022

Notes:
1. All numbers are rounded.
2. Columbus AFB nominal elevation: 218 feet above MSL.
3. Weather is 65°F, Relative Humidity is 65.9 percent, and Station Pressure is 29.9 Inch of Mercury.
4. Engine Powers given in Percent Revolutions per Minute (%RPM) and Percent High Pressure Compressor Revolutions per Minute (%N2). Speed is given in knots (Nautical Miles per Hour; kts).
5. All T-38C departures use afterburner for takeoff roll; afterburner secured and power set to military power upon reaching 150 feet AGL.
6. Five percent of T-7A departures would use afterburner for takeoff roll; afterburner would be secured and power would be reduced to 93%N2 upon reaching 150 feet AGL.

Speech Interference. **Table 3-38** provides the $NA75L_{max,day}$ for Alternative 1. On average, fewer than 0.05 speech-interfering events per daytime hour are estimated for Dwayne Hayes Recreation Park (P1) and Faith Christian Center Baptist Church (W4). The average speech interference for the nine residential areas would range from approximately 1 to 19 events per daytime hour. The average speech interference for the places of worship, other than W4, would range from approximately 3 to 9 events per daytime hour. Run-up activity would not factor into any of the POI events.

Alternative 1 would cause up to approximately 6 additional speech-interfering events per hour across the relevant POI, because the T-7A would have higher single event noise levels (see **Table 3-37**) for climbs to pattern altitude than the T-38C. Alternative 1 would cause speech interference events to *decrease* at R2, R3, R7, and W2 by less than 1 and up to as many as approximately 2 events per hour, because the T-7A would conduct fewer overall flight operations.

Table 3-38. Potential for Speech Interference for Alternative 1 at Columbus AFB

ID	Representative Location	Existing Events per Daytime Hour	Alternative 1 Events per Daytime Hour	Change in Events per Daytime Hour
P1	Dwayne Hayes Recreation Park	<0.05	<0.05	<0.05
R1	Residential Area 1	6.0	12.2	6.2
R2	Residential Area 2	6.3	4.8	-1.5
R3	Residential Area 3	14.4	13.4	-1.0
R4	Residential Area 4	3.4	4.0	0.6
R5	Residential Area 5	<0.05	1.8	1.8
R6	Residential Area 6	3.5	5.6	2.1
R7	Residential Area 7	19.9	19.4	-0.5
R8	Residential Area 8	6.2	10.0	3.8
R9	Residential Area 9	0.1	1.3	1.2
W1	Cedar Grove Missionary Baptist	0.1	4.7	4.6
W2	Kolola Springs Baptist Church	3.5	3.3	-0.2
W3	Victory Tabernacle	7.6	9.1	1.5
W4	Faith Christian Center Baptist Church	<0.05	-<0.05	<0.05

Source: HMMH 2022
Note: NA75L_{max}; POI assessed for daytime (7 a.m. to 10 p.m.)

Classroom Learning Interference. **Table 3-39** shows that the Child Development Center (S1) and the Education Center (S2) would have L_{eq} greater than (or equal to) 60 dB and would require further analysis for NA and TA metrics.

Table 3-39. Screening for Potential Classroom Speech Interference for Alternative 1 at Columbus AFB

ID	Representative School	School-Day L_{eq} (dB)
S1	Child Development Center	66.2 dB $L_{eq(11h)}$
S2	Education Center	69.4 dB $L_{eq(6h)}$

Source: HMMH 2022

The NA and TA metrics for the affected schools are provided in **Table 3-40** and **Table 3-41**, respectively. The Child Development Center would experience an increase of approximately 3 events per hour and 16 minutes per day (at or) above 75 dB L_{max}, and the Education Center

would experience an increase of 2 events per hour and 3 minutes per day (at or) above 75 dB L_{max}. The increases would be due to T-7A operations.

Table 3-40. Potential for Classroom Speech Interference for Alternative 1 at Columbus AFB ($NA75L_{max}$)

ID	Representative School	Existing Conditions $NA75L_{max}$ (events/hour)	Alternative 1 $NA75L_{max}$ (events/hour)	Change in $NA75L_{max}$ (events/hour)
S1	Child Development Center	7.3	10.5	3.2
S2	Education Center	6.3	8.5	2.2

Source: HMMH 2022

Table 3-41. Potential for Classroom Speech Interference for Alternative 1 at Columbus AFB (TA75 L_{max})

ID	Representative School	Existing Conditions $TA75L_{max}$ (minutes/day)	Alternative 1 $TA75L_{max}$ (minutes/day)	Change in $TA75L_{max}$ (minutes/day)
S1	Child Development Center	11.0	27.6	16.6
S2	Education Center	11.3	14.6	3.3

Source: HMMH 2022

Sleep Disturbance. **Table 3-42** provides the number of average annual hourly nighttime events that would meet or exceed 90 dB SEL at the nine residential POI for Alternative 1. On average, six of the nine POI would experience less than 0.05 events per night, while POI R1, R3, and R7 would experience 0.1 potentially sleep disturbing events per night.

Alternative 1 would cause an increase of less than 0.05 potentially sleep disturbing events per hour, on average, at five residential POI (i.e., R2, R4, R6, R8, and R9) and up to 0.1 events per hour at one other residential POI (i.e., R3), relative to the existing conditions. These increases would be due to the introduction of T-7A nighttime operations. At R3, the increase of 0.1 events per hour would result from increased nighttime closed pattern operations on Runways 13C and 13L, relative to existing conditions. Three POI (i.e., R1, R5, and R7) would not experience any increase in sleep disturbing events per night.

Table 3-42. Potential for Sleep Disturbance for Alternative 1 at Columbus AFB

ID	Representative Location	Existing Conditions Average Hourly Nighttime Events (NA90SEL)	Alternative 1 Average Hourly Nighttime Events (NA90SEL)	Change in Average Hourly Nighttime Events (NA90SEL)
R1	Residential Area 1	0.1	0.1	-
R2	Residential Area 2	-	<0.05	<0.05
R3	Residential Area 3	0.1	0.2	0.1
R4	Residential Area 4	-	<0.05	<0.05
R5	Residential Area 5	-	-	-
R6	Residential Area 6	-	<0.05	<0.05
R7	Residential Area 7	0.1	0.1	-
R8	Residential Area 8	<0.05	<0.05	<0.05
R9	Residential Area 9	-	<0.05	<0.05

Source: HMMH 2022

The specified average number of events noted would not likely occur in evenly spaced increments throughout the night, nor would they likely occur every night. Nighttime flights would occur as the training syllabus directs and would likely occur in "grouped" sessions, meaning that several overflights may occur during a short period of time on one specific night, and there may be nights where no nighttime flying occurs. It is not possible to forecast when nighttime events would occur due to scheduling changes, aircraft maintenance, weather, and other unpredictable events; therefore, this analysis portrays the impact with operations averaged throughout the night, for each night. Columbus AFB would operate night flights in a manner to minimize nighttime aircraft noise to the community, to the maximum extent practicable.

Potential for Hearing Loss. As shown in **Figure 3-6**, the 80 dB DNL contour would extend beyond the boundaries of the installation, thus requiring an analysis of $L_{eq(24h)}$ for PHL. The 80 dB $L_{eq(24h)}$ contour shown in **Figure 3-8** for Alternative 1 extends into the drainage ponds to the east of the installation, between the installation boundary and US Highway 45. It would also extend slightly north of the installation boundary over forested areas near Burton Ferry Road, toward the Butahatchee River. There would not be any on- or off-installation residences or individuals at Columbus AFB predicted to be exposed to 80 dB $L_{eq(24h)}$ or greater; therefore, no PHL would be anticipated for Alternative 1.

Damage to Structures. Individual aircraft events at Columbus AFB would not generate impulsive-style aircraft noise levels above 140 dB; therefore, damage to structures from Alternative 1 would not likely occur.

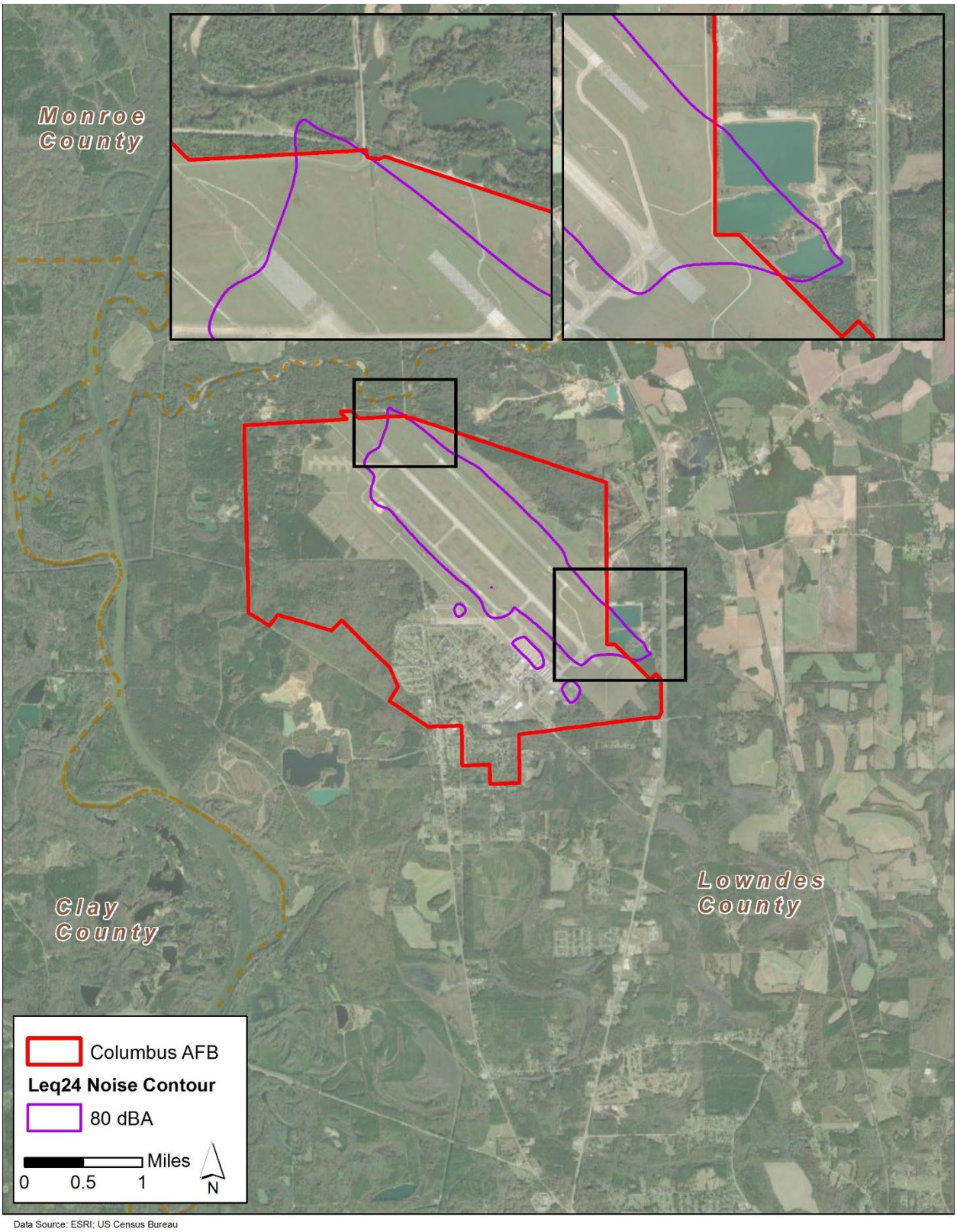

Figure 3-8. 24-Hour Equivalent Sound Level Contour of 80 dB for Alternative 1 at Columbus AFB

3.3.2.1.2 Special Use Airspace

3.3.2.1.2.1 Aircraft Noise

With Alternative 1, sorties within the modeled SUA and MTRs (see **Figure 1-3** and **Table 3-1**) would not change from the existing conditions, aside from the replacement of T-38C aircraft with T-7A. T-6 and T-1 sorties would remain the same as the existing conditions.

Table 3-43 provides the resultant Alternative 1 L_{dnmr} for areas beneath these SUA and the change in L_{dnmr} from the existing conditions. Of these airspaces, only the Birmingham MOAs and the Sea Ray Range would have L_{dnmr} greater than 65 dB. The Alternative 1 L_{dnmr} for all other modeled flight areas would be less than 65 dB and compatible with all land uses. The modeled SUA, other than the Birmingham MOAs and the Sea Ray Range, would have at least part of their area with L_{dnmr} greater than 45 dB. The highest L_{dnmr} for these other SUA is nearly 51 dB, including where two MTRs overlap with the Columbus 1 MOA (nearly 51 dB).

Changes in L_{dnmr} would range from 0 to 14 dB due to Alternative 1. However, none of the increases would cause any of the modeled SUA to be newly introduced to cumulative exposure of 65 dB L_{dnmr} or greater. These changes in cumulative exposure are due solely to the replacement of based T-38C aircraft with the proposed based T-7A aircraft. The Birmingham and Sea Ray Ranges are discussed further below.

Figure 3-9 shows the DNL contours for Alternative 1 at the Birmingham Range. The highest DNL contour (in the 5-dB increments) caused by proposed aircraft operations for the Birmingham Range would be 75 dB DNL.

There would be two lobes of 80 dB DNL contours. The larger one would begin in the southeastern area of the range, approximately 8,600 feet north of the Route 14 and 175 junction, and run north approximately 2.5 miles. This contour would be approximately 1,600 feet wide. The smaller of the two 80 dB DNL lobes would be nearly 2 miles north of the northernmost extent of the larger lobe. This smaller lobe would extend north 5,400 feet with a 1,100-foot width.

The 65 dB DNL area is approximately 4.7 miles wide (at its widest extent) and 7 miles long. The skull-shaped 65 dB contour extends south to the northern corner of the city of Marion, Alabama, east to the edge of Little Creek, north to Cave Mountain, and west to the intersection of County Road 29 and Walter Boyles Road.

Table 3-44 and **Table 3-45** provide the acreage and population within DNL contour bands for the Birmingham Range, respectively. Approximately 15,000 acres and 145 people would be exposed to DNL of at least 65 dB at the Birmingham Range for Alternative 1. No one would be exposed to 80 dB DNL or greater.

Table 3-43. Overall Noise Exposure for Modeled SUA for Alternative 1

SUA	Modeled Flight Area or Overlap	Existing Conditions Maximum or Uniformly Distributed L_{dnmr} (dB)	Alternative 1 Maximum or Uniformly Distributed L_{dnmr} (dB)	Change in L_{dnmr} (dB)
Columbus 1 MOA	CBM 1 (1, 2, 3)	<45	50.6	13.5
Columbus 1 MOA	CBM 1 (4, 5, 6)	<45	50.7	13.5
Columbus 1 MOA	T6 CBM 1	<45	<45	-
Columbus 1 MOA	Maximum Overlap[1]	<45	50.8	11.0
Columbus 2 (“Echo”) MOA	CBM 2	<45	46.3	11.3
Columbus 2 (“Echo”) MOA	Maximum Overlap[2]	<45	46.7	7.9
Columbus 3 MOA	T1 CBM 3B7	<45	<45	-
Columbus 3 MOA	T1 CBM 3B8	<45	<45	-
Columbus 3 MOA	T38 CBM 3	<45	<45	-
Columbus 3 MOA	T6 CBM 3	<45	<45	-
Columbus 3 MOA	Maximum Overlap[3]	<45	<45	-0.3
Birmingham 1 & 2 MOA*	Birmingham MOA	<45	<45	-
Birmingham 1 & 2 MOA*	Birmingham Range	**75.4**	**76.9**	1.5
Birmingham 1 & 2 MOA*	Maximum Overlap[4]	<45	<45	<0.1
R-4404A/B/C (“Sea Ray” Range) *	N/A	**72.8**	**75.6**	2.8
IR-066	N/A	<45	<45	-0.7
IR-068	N/A	<45	<45	-1.4
IR-091	N/A	<45	<45	-0.7
VR-1014	N/A	<45	<45	-0.5
VR-1031	N/A	<45	<45	-0.5

Source: HMMH 2022

Bold text indicates values above 65 dB

* Birmingham and Sea Ray ranges reflect maximum DNL value calculated

[1] CBM 1 intersects VR-1014 and IR-066

[2] CBM 2 ECHO intersects VR-1014 and IR-066

[3] CBM 3 intersects IR-068 and IR-091

[4] Birmingham MOAs intersection VR-1031

Key: N/A = not applicable

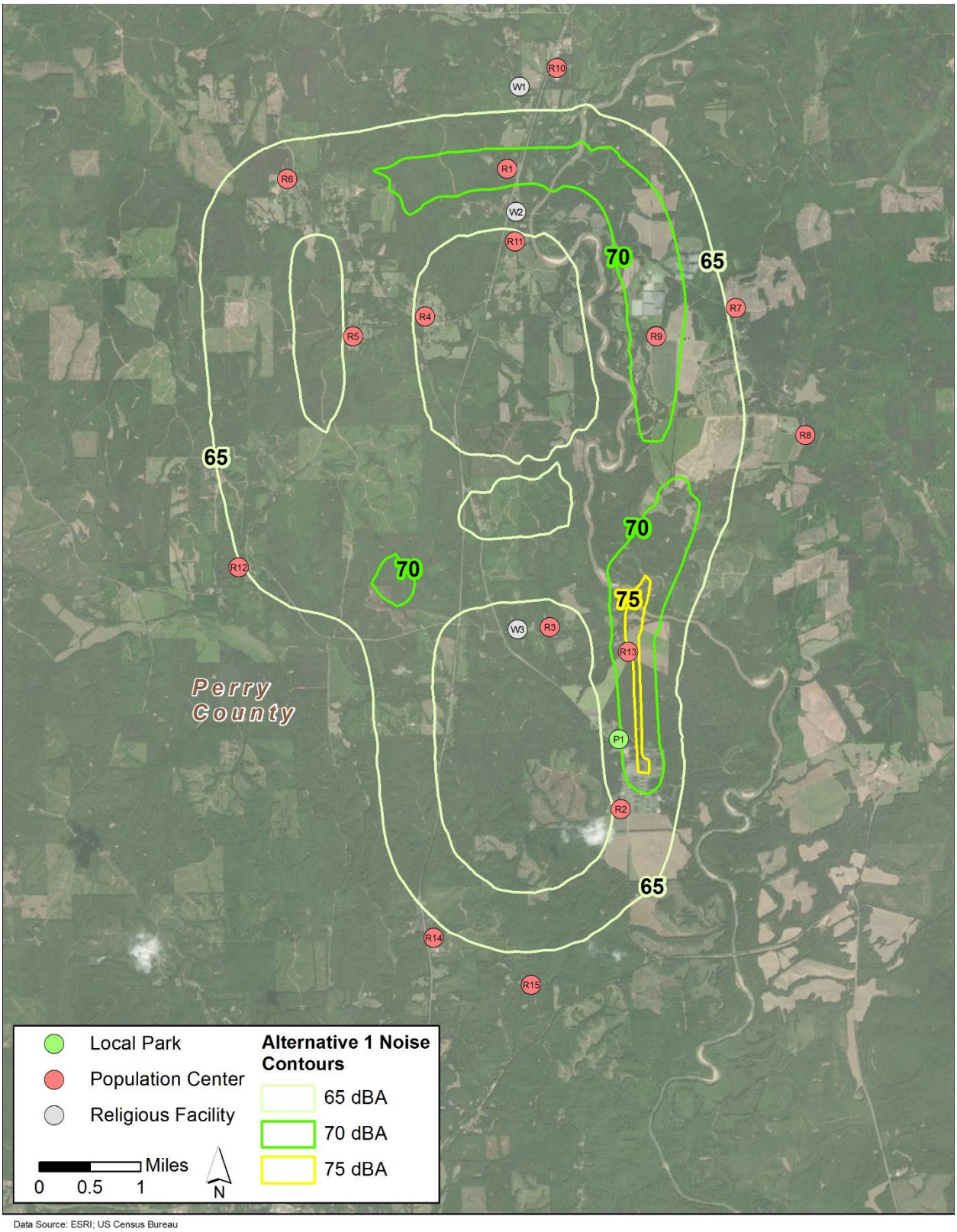

Figure 3-9. Aircraft DNL Contours for Alternative 1 at the Birmingham Range

Table 3-44. Acreage within DNL Contour Bands for Alternative 1 and Change in Acreage from Existing Conditions at Birmingham Range

DNL Contour Band (dB)	Acreage for Existing Condition	Acreage for Alternative 1	Change in Acreage
65 to 70	2,939	12,671	9,732
70 to 75	407	2,345	1,938
75 to 80	3	116	113
≥80	-	-	-
Total	**3,349**	**15,132**	**11,783**

Source: HMMH 2022
Note: DNL bands are exclusive of upper bounds

Table 3-45. Estimated Population within DNL Contour Bands for Alternative 1 and Change in Population from Existing Conditions at Birmingham Range

DNL Contour Band (dB)	Population for Existing Condition	Population for Alternative 1	Change in Population
65 to 70	19	134	115
70 to 75	-	11	11
≥75	-	-	-
Total	**19**	**145**	**126**

Sources: HMMH 2022, U.S. Census Bureau 2020
Notes: 1. Estimated population based on area within individual census blocks.
2. DNL bands are exclusive of upper bounds

Figure 3-10 compares the 65 dB DNL contours for Alternative 1 and existing conditions at the Birmingham Range. The extents of the 65 dB DNL contours would increase between approximately 3,300 and 6,500 feet for the Birmingham Range, relative to existing conditions. For Alternative 1, the noise exposure would be caused primarily by T-7A closed pattern operations. Tactical training would be the biggest contributor. The T-7A's Level and Strafe Training would also be a large contributor.

Table 3-44 and **Table 3-45** provide the change in acreage and population within DNL contour bands for Alternative 1, respectively, relative to existing conditions at the Birmingham Range. The acreage exposed to DNL of at least 65 dB would more than triple (to 15,132 acres), while the population would increase by nearly a factor of 10 (to 145 people) compared to existing conditions.

Table 3-46 provides the DNL for the 19 POI around Birmingham Range for Alternative 1. Six of the 15 residential areas and one of the places of worship would be exposed to DNL greater than (or equal to) 65 dB. Three of the residential areas would be exposed to DNL greater than (or equal to) 70 dB. The remaining six residential areas and two places of worship would be exposed to DNL less than 65 dB.

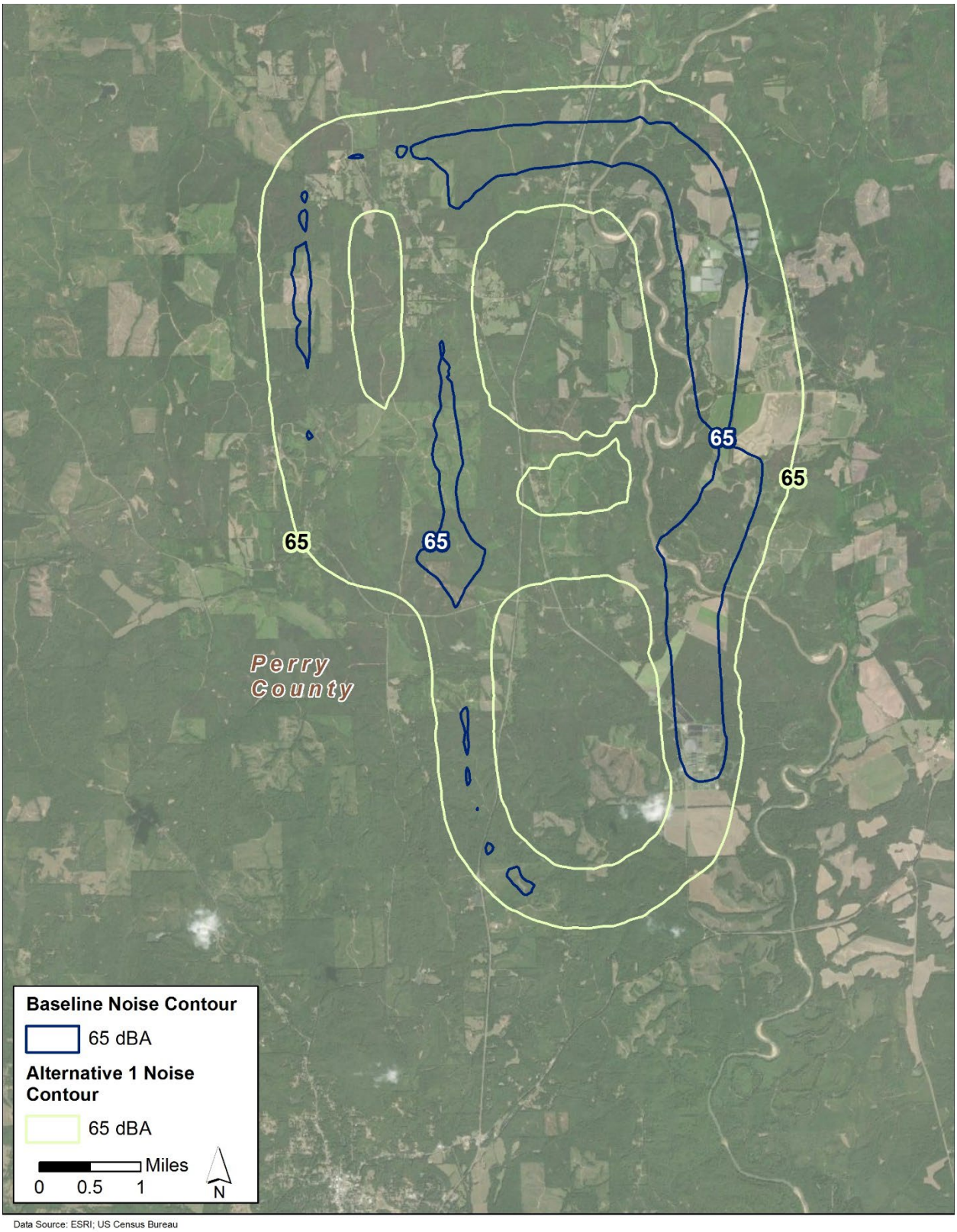

Figure 3-10. Comparison of 65 dB DNL Contours for Alternative 1 and Existing Conditions at the Birmingham Range

Table 3-46. Overall DNL at Representative Locations for Alternative 1 at Birmingham Range

ID	Representative Location	Existing Conditions DNL (dB)	Alternative 1 DNL (dB)	Change in DNL (dB)
BHM-P01	Perry Lake Recreation Area	66.2	69.4	3.2
BHM-R01	Residence	67.1	71.2	4.1
BHM-R02	Residential Area	61.2	66.0	4.8
BHM-R03	Community Near Marietta Church	55.2	62.2	7.0
BHM-R04	Heiberger Community	57.0	63.4	6.4
BHM-R05	Residential Area	60.4	65.9	5.5
BHM-R06	Residential Area	64.9	69.1	4.2
BHM-R07	Residential Area	56.9	63.7	6.8
BHM-R08	Residential Area	49.7	57.9	8.2
BHM-R09	Residential Area	69.6	72.8	3.2
BHM-R10	Residential Area	51.4	59.7	8.3
BHM-R11	Residential Area	56.2	63.8	7.6
BHM-R12	Residential Area	58.8	64.1	5.3
BHM-R13	Residential Area	72.8	74.6	1.8
BHM-R14	Residential Area	56.4	62.1	5.7
BHM-R15	Residential Area	52.9	59.4	6.5
BHM-W01	Little Rock Church	54.3	62.0	7.7
BHM-W02	Heiberger Methodist Church	60.5	66.6	6.1
BHM-W03	Marietta Church	54.3	61.5	7.2

Source: HMMH 2022

The residential POI around Birmingham Range would be exposed to DNL increases between 1.8 and 8.3 dB. The park POI around Birmingham Range would be exposed to DNL increases of 3.2 dB, and the DNL for places of worship would increase between 6.1 and 7.7 dB. The increases would be due to the introduction of the T-7A and its associated aircraft and engine characteristics.

Figure 3-11 shows the DNL contours for Alternative 1 at the Sea Ray Range. The highest DNL contour (in the 5-dB increments) caused by proposed aircraft operations for the Sea Ray Range would be 80 dB DNL. The 80 dB DNL contour is centered on the range's target area and is approximately 3,700 feet long and 900 feet wide. The 65 dB DNL contour follows the range's tactical training looping flight track and covers the entire area within the loop, except for a spot in the center that is approximately 2.4 miles across.

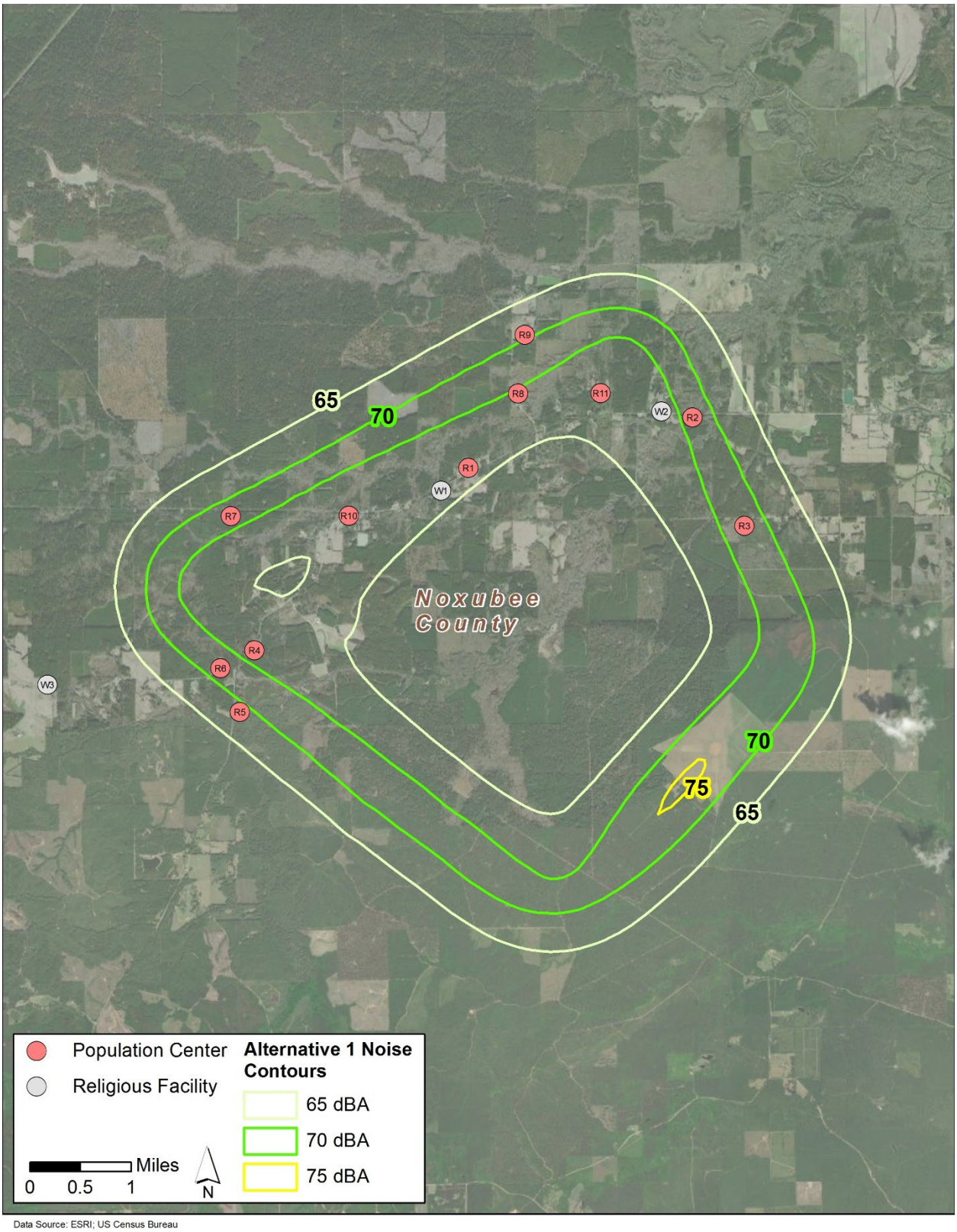

Figure 3-11. Aircraft DNL Contours for Alternative 1 at the Sea Ray Range

Table 3-47 and **Table 3-48** provide the acreage and population within DNL contour bands for the Sea Ray Range, respectively. For Alternative 1, approximately 14,500 acres and 210 people would be exposed to DNL of at least 65 dB at the Sea Ray Range. No one would be exposed to 75 dB DNL or greater.

Table 3-47. Acreage within DNL Contour Bands for Alternative 1 and Change in Acreage from Existing Conditions at Sea Ray Range

DNL Contour Band (dB)	Acreage for Existing Condition	Acreage for Alternative 1	Change in Acreage
65 to 70	4,770	9,955	5,185
70 to 75	253	4,557	4,304
75 to 80	-	51	51
≥80	-	-	-
Total	**5,023**	**14,563**	**9,540**

Source: HMMH 2022
Note: DNL bands are exclusive of upper bounds

Table 3-48. Estimated Population within DNL Contour Bands for Alternative 1 and Change in Population from Existing Conditions at Sea Ray Range

DNL Contour Band (dB)	Population for Existing Condition	Population for Alternative 1	Change in Population
65 to 70	59	158	99
70 to 75	-	52	52
≥75	-	-	-
Total	**59**	**210**	**151**

Sources: HMMH 2022, U.S. Census Bureau 2020
Notes: 1. Estimated population based on area within individual census blocks.
2. DNL bands are exclusive of upper bounds

Figure 3-12 compares the 65 dB DNL contours for Alternative 1 and existing conditions at the Sea Ray Range. The extents of the 65 dB DNL contours would increase up to 5,300 feet for the Sea Ray Range, relative to existing conditions. For Alternative 1, the noise exposure would be caused primarily by T-7A closed pattern operations. T-7A tactical training would be the biggest contributor.

Table 3-47 and **Table 3-48** provide the change in acreage and population within DNL contour bands for Alternative 1, respectively, relative to the existing conditions at the Sea Ray Range. The acreage within the 65 dB DNL contour would nearly triple (to 14,563 acres) while the population would increase by nearly a factor of four (to 210 people) compared to existing conditions.

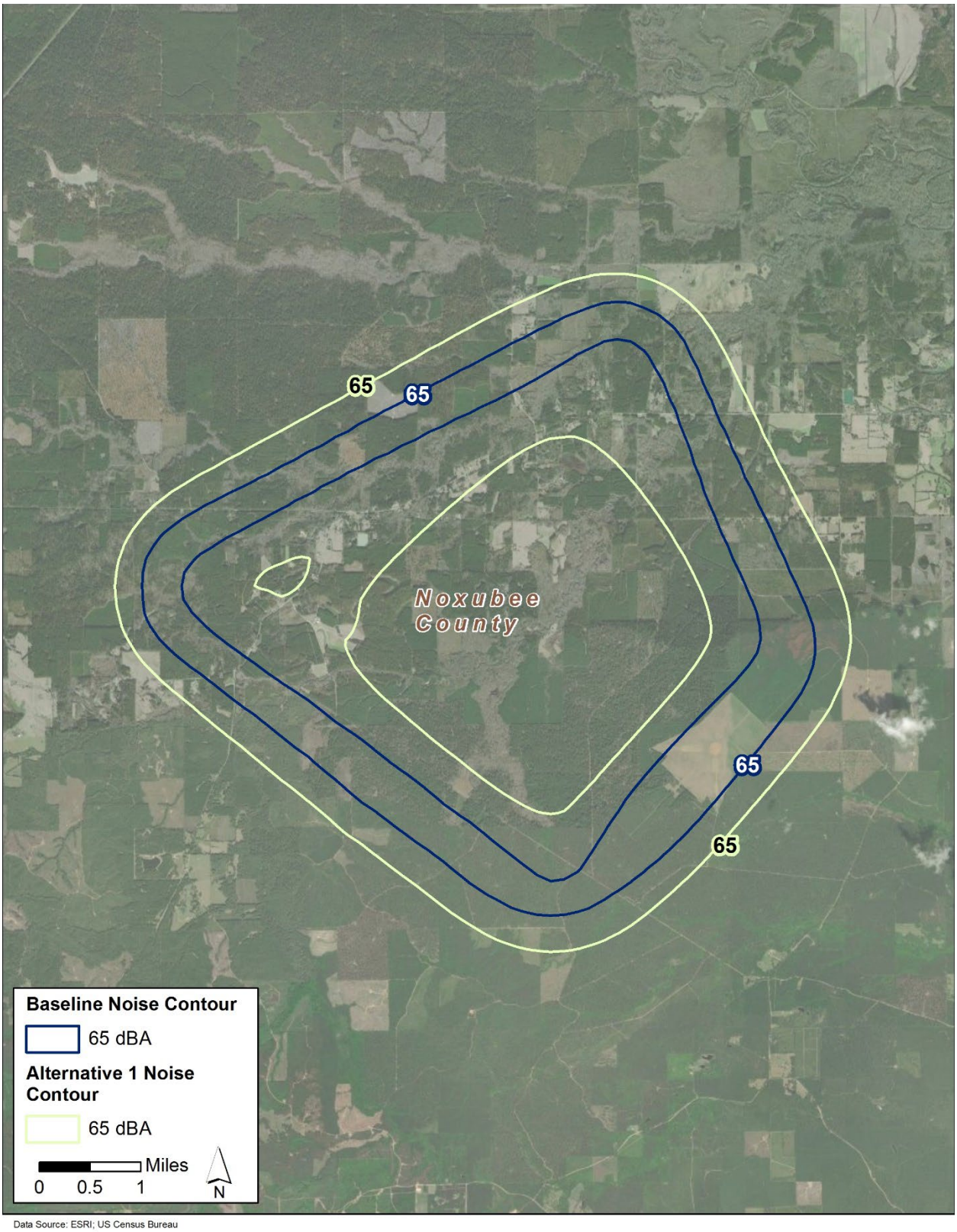

Figure 3-12. Comparison of 65 dB DNL Contours for Alternative 1 and Existing Conditions at the Sea Ray Range

Table 3-49 provides the estimated DNL for the 14 POI around Sea Ray Range for Alternative 1. The DNL at the Touch Cotton Evangelistic Ministry is estimated to be less than 65 dB. The remaining 13 POI are exposed to DNL greater than (or equal to) 65 dB. Four residential areas (Sea-R02, Sea-R03, Sea-R06, and Sea-R07) would be newly exposed to estimated DNL greater than 70 dB.

Table 3-49. Overall DNL at Representative Locations for Alternative 1 at Sea Ray Range

ID	Representative Location	Existing Conditions DNL (dB)	Alternative 1 DNL (dB)	Change in DNL (dB)
Sea-R01	Residential Area	60.0	66.3	6.3
Sea-R02	Community Near Mount Olive Church	66.6	70.9	4.3
Sea-R03	Residence (979 Flatwoods Road)	67.6	71.7	4.1
Sea-R04	Residential	63.3	68.7	5.4
Sea-R05	Residential	63.7	68.7	5.0
Sea-R06	Residence (3103 MS-490)	67.4	71.3	3.9
Sea-R07	Residential	67.4	71.2	3.8
Sea-R08	Residence (522 Simmons Road)	64.4	69.5	5.1
Sea-R09	Residence (1116 Simmons Road)	64.8	69.5	4.7
Sea-R10	Mashulaville	59.5	66.1	6.6
Sea-R11	Residential	60.9	67.2	6.3
Sea-W01	Mount Moriah Church	60.0	66.2	6.2
Sea-W02	Mount Olive Church	63.1	68.6	5.5
Sea-W03	Touch Cotton Evangelistic Ministry	45.6	54.5	8.9

Source: HMMH 2022

The POI around Sea Ray Range would be exposed to DNL increases between 3.8 and 6.3 dB. The places of worship around Sea Ray Range would be exposed to DNL increases between 5.5 and 8.9 dB. The increases would be due to the introduction of the T-7A and its associated aircraft and engine characteristics.

3.3.2.1.2.2 Supplemental Metrics Analyses

The supplemental noise metrics considered are sleep disturbance, hearing loss, classroom learning interference, and speech interference. Since the SUA are not open at night (10 p.m. to 7 a.m.), no sleep disturbance metrics were calculated. Noise levels at the SUA would not reach 80 dB DNL; therefore, there is no PHL and this supplemental metric is not included. In addition, an internet review of school locations did not identify any schools within approximately 5 miles of the 65 dB DNL contours for the SUA. Therefore, classroom learning interference was not included in the supplemental metric analyses provided for the SUA. Only the speech interference supplemental metric is carried forward for analysis for the SUA.

Speech Interference. **Table 3-50** provides the number of aircraft events greater than (or equal to) 75 dB L_{max} outdoors for relevant POI near Birmingham Range from 7 a.m. to 10 p.m. ($NA75L_{max,day}$). Places of worship around the contours of the Birmingham Range would experience between 8.3 and 11.2 speech-interfering events per daytime hour. Residential POI would experience between 6.2 and 11.2 speech-interfering events per daytime hour.

Table 3-50. Potential for Speech Interference for Alternative 1 at Birmingham Range

ID	Representative Location	Existing Events per Daytime Hour	Alternative 1 Events per Daytime Hour	Change in Events per Daytime Hour
BHM-P01	Perry Lake Recreation Area	1.0	7.3	6.3
BHM-R01	Residence	4.9	11.2	6.3
BHM-R02	Residential Area	1.0	6.3	5.3
BHM-R03	Community Near Marietta Church	2.1	8.3	6.2
BHM-R04	Heiberger Community	2.8	11.2	8.4
BHM-R05	Residential Area	2.8	11.2	8.4
BHM-R06	Residential Area	3.9	11.2	7.3
BHM-R07	Residential Area	4.9	11.2	6.3
BHM-R08	Residential Area	2.8	10.1	7.3
BHM-R09	Residential Area	4.9	11.2	6.3
BHM-R10	Residential Area	4.9	11.2	6.3
BHM-R11	Residential Area	4.9	11.2	6.3
BHM-R12	Residential Area	1.0	9.4	8.4
BHM-R13	Residential Area	2.1	8.3	6.2
BHM-R14	Residential Area	1.0	6.3	5.3
BHM-R15	Residential Area	1.0	6.3	5.3
BHM-W01	Little Rock Church	4.9	11.2	6.3
BHM-W02	Heiberger Methodist Church	4.9	11.2	6.3
BHM-W03	Marietta Church	1.0	8.3	7.3

Source: HMMH 2022
Note: $NA75L_{max}$; POI assessed for daytime (7 a.m. to 10 p.m.)

Alternative 1 would cause speech-interfering events at residential POI to increase by approximately 5.2 to 8.4 events per daytime hour. Places of worship would experience increases of 6.3 to 7.3 speech-interfering events per daytime hour. These changes would occur because the T-7A has higher single event noise levels (see **Table 3-37**) at military power than the T-38C it would replace.

Table 3-51 provides the number of aircraft events greater than (or equal to) 75 dB L_{max} outdoors for relevant POI near Sea Ray Range from 7 a.m. to 10 p.m. ($NA75L_{max,day}$) for Alternative 1. The Touch Cotton Evangelistic Ministry (W03) would experience 1.4 noise-interfering events per daytime hour. All 13 other POI would experience 2.8 noise-interfering events per daytime hour.

Table 3-51. Potential for Speech Interference for Alternative 1 at Sea Ray Range

ID	Representative Location	Existing Events per Daytime Hour	Alternative 1 Events per Daytime Hour	Change in Events per Daytime Hour
Sea-R01	Residential Area	2.1	2.8	0.7
Sea-R02	Community Near Mount Olive Church	2.1	2.8	0.7
Sea-R03	Residence (979 Flatwoods Road)	2.1	2.8	0.7
Sea-R04	Residential	2.1	2.8	0.7
Sea-R05	Residential	2.1	2.8	0.7
Sea-R06	Residence (3103 MS-490)	1.4	2.8	1.4
Sea-R07	Residential	1.4	2.8	1.4
Sea-R08	Residence (522 Simmons Road)	2.1	2.8	0.7
Sea-R09	Residence (1116 Simmons Road)	2.1	2.8	0.7
Sea-R10	Mashulaville	2.1	2.8	0.7
Sea-R11	Residential	2.1	2.8	0.7
Sea-W01	Mount Moriah Church	2.1	2.8	0.7
Sea-W02	Mount Olive Church	2.1	2.8	0.7
Sea-W03	Touch Cotton Evangelistic Ministry	0.0	1.4	1.4

Source: HMMH 2022
Note: NA75L_{max}; POI assessed for daytime (7 a.m. to 10 p.m.)

Alternative 1 would cause speech-interfering events to increase by approximately 1.4 events per hour at two residential areas and one church (Sea-RO6, Sea-R07 and Sea-W03). The other 11 POI would experience increases of 0.7 speech-interfering events per hour. These changes would occur because the T-7A has higher single event noise levels (see **Table 3-37**) at military power than the T-38C it would replace.

3.3.2.2 Alternatives 2 and 3

As noted in **Section 3.3.2**, the noise discussion combines the analyses for Alternatives 2 and 3 into the same section because both alternatives would entail aircraft operations that are 25 percent greater than Alternative 1. The delivery of up to 16 additional T-7A aircraft to Columbus AFB and the construction of up to 12 additional T-7A shelters on the Columbus AFB aircraft parking ramp for Alternative 3 (as compared to Alternative 2) would have no additional impacts on noise, except construction-related noise would last slightly longer.

Implementation of Alternatives 2 and 3 would result in short- and long-term, less than significant, adverse effects on the noise environment. Short-term effects would be due to noise generated by heavy equipment during construction, and the nature and overall level of the short-term effects would be identical to those described for Alternative 1.

As with Alternative 1, long-term effects would be due to the introduction of T-7A aircraft operations, including nighttime operations (i.e., those between 10 p.m. and 7 a.m.) Long-term changes in operational noise would increase in areas of incompatible land use on and adjacent to Columbus AFB. Like Alternative 1, the introduction of T-7A aircraft would be incremental, beginning in 2028 and reaching full implementation in 2030. Compared to Alternative 1, the nature and overall level of these long-term effects would be slightly greater than Alternative 1 but still less than significant.

3.3.2.2.1 Columbus AFB

3.3.2.2.1.1 Construction Noise

Construction noise levels and impacts for Alternatives 2 and 3 would be the same as those described for Alternative 1 in **Section 3.3.2.1.1.1.** However, construction-related noise for Alternative 3 would last slightly longer with the construction of up to 12 additional T-7A shelters on the Columbus AFB aircraft parking ramp.

3.3.2.2.1.2 Aircraft Noise

With Alternatives 2 and 3, approximately 386,300 flight operations (i.e., single take-offs, landings, and patterns combined) would be performed at Columbus AFB each year, which is an average of 1,058 per day. Most of Columbus AFB's annual flight operations (64 percent) would use based T-6 Texan II aircraft. Based T-7A Red Hawk aircraft for both FBF and UPT groups would represent 33 percent of the annual flight operations. The rest of the annual flight operations would be based T-1 aircraft and various transient aircraft types. No T-38C operations would remain after the full complement of T-7A aircraft is received and operational. No change in operations is forecast for the T-1, T-6, or transient aircraft.

Nighttime flight operations (approximately 2 percent of overall annual flight operations) at Columbus AFB would be conducted by the T-7A, T-1, and T-6 aircraft. With approximately 595 T-7A nighttime flight operations, T-7A aircraft would account for 10 percent of the DNL nighttime operations.

The T-7A aircraft are proposed to arrive and be used immediately beginning in 2028. The increase in T-7A aircraft and associated training operations would be incremental through 2030. In 2030, the full complement of T-7A aircraft would arrive at Columbus AFB and the number of T-7A aircraft operations would stabilize to the full rate of Alternatives 2 and 3 in 2030. During the period between 2028 to 2030, the area and population within the 65-dB DNL contour would increase incrementally.

With improved avionics and advanced capabilities, the T-7A aircraft will be able to operate at any time, day or night. This would enable pilots to conduct nighttime training operations that are not conducted currently with T-38C aircraft at Columbus AFB, although other aircraft at the installation—such as the T-1 and T-6—do perform nighttime operations. Currently, T-38C operations occur on an approximate dawn to dusk schedule and hours vary seasonally throughout the year. The introduction of T-7A nighttime flight operations from Columbus AFB would expand aircraft noise in the area by exposing communities surrounding the installation to

nighttime T-7A training operations. Approximately 595 T-7A nighttime flight operations would occur at Columbus AFB annually.

Noise exposure for Alternatives 2 and 3 also includes modeling proposed maintenance run-up activity by the existing based aircraft types and the proposed T-7A, including activity in the proposed hush house. Identical to Alternative 1, Alternatives 2 and 3 would include replacement of the existing hush house facility located at the north end of the airfield's aircraft parking area, adjacent to the taxiway near the southeastern end of Runway 13C/31C. The orientation of the jet engine while in the proposed hush house would be the same as for the existing hush house.

The proposed T-7A aircraft's noise levels on and adjacent to Columbus AFB were calculated based on full implementation of Alternatives 2 and 3 in 2030. **Figure 3-13** shows the modeled DNL contours for the two alternatives. With full implementation of Alternatives 2 and 3 in 2030, the 65 dB DNL contour at Columbus AFB would extend approximately 2 miles from both ends of Runway 13C/31C, 2 miles from the north end and 2.2 miles from the south end of Runway 13L/31R, and 3 miles from both ends of Runway 13R/31L. At its farthest lateral points, the contour would extend approximately 10 miles west and 20 miles east from the centerline of Runway 13C/31C. Aircraft DNL less than 65 dB is generally compatible with all land uses.

Table 3-52 and **Table 3-53** provide the land acreage exposed to DNL of at least 65 dB for Alternatives 2 and 3 at Columbus AFB, respectively. Off- and on-installation acreage contained in the 65 dB DNL contour would be 8,616 and 3,753 acres, respectively. Alternatives 2 and 3 would expose nearly 500 off-installation people to DNL of at least 65 dB.

The population exposed to DNL of at least 80 dB would have a PHL. The population estimation method yields four on-installation people, and seven off-installation people who would be exposed to DNL of at least 80 dB. See **Section 3.3.2.2.1.3** for further analysis on PHL.

Figure 3-14 provides a comparison of the 65 dB DNL contours for the existing conditions and Alternatives 2 and 3. Alternatives 2 and 3 would cause a general expansion of the 65 dB DNL contours to the north and south along runway headings and to the northeast. For Alternatives 2 and 3, the 65 dB DNL contour along the runway centerline (Runway 13C/31C) would extend approximately 1,500 feet past the extents of the existing 65 dB DNL contour. The 65 dB DNL contour on the east side of the installation would be extended approximately 2,000 feet, and the 65 dB DNL lobe north of Columbus AFB would be extended approximately 1 mile past the existing 65 dB DNL contour.

Table 3-52 and **Table 3-53** provide the change in acreage and population within DNL contour bands for Alternatives 2 and 3, respectively, relative to the existing conditions. Compared to existing conditions, the acreage within the off-installation 65 dB DNL contour for Alternatives 2 and 3 would increase by 108 percent (to 8,616 acres) while the population would increase by 103 percent (to 482 people).

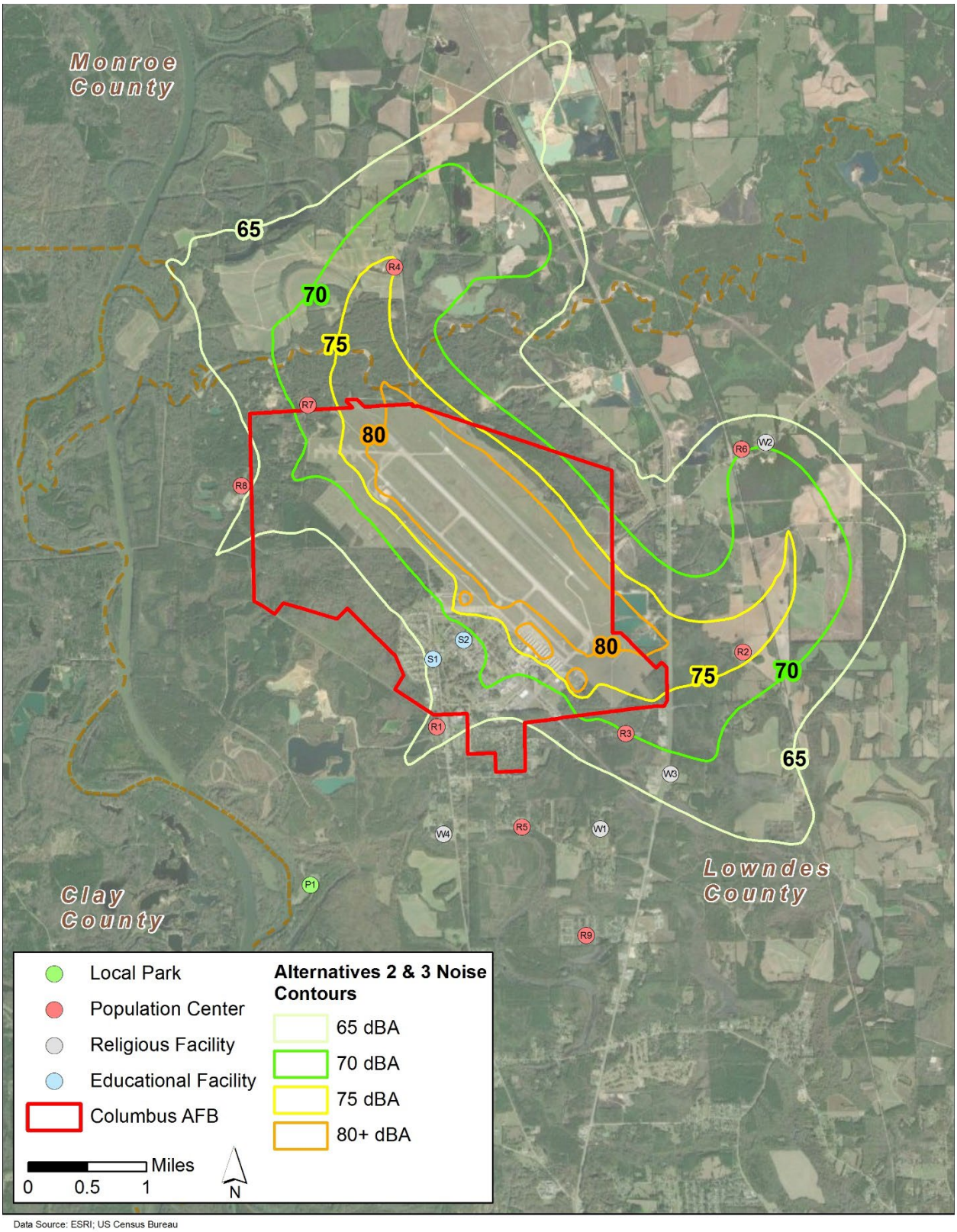

Figure 3-13. Aircraft DNL Contours for the Alternatives 2 and 3 at Columbus AFB

Table 3-52. Acreage within DNL Contour Bands for Alternatives 2 and 3 and Change in Acreage from Existing Conditions at Columbus AFB

DNL Contour Band (dB)	On-Installation Acreage	Off-Installation Acreage	Total Acreage	Change in On-Installation Acreage	Change in Off-Installation Acreage	Change in Total Acreage
65 to 70	1,052	4,807	5,859	173	2,067	2,240
70 to 75	729	2,896	3,625	149	1,744	1,893
75 to 80	696	817	1,513	167	601	768
80 to 85	689	96	785	46	67	113
≥85	587	-	587	102	-	102
Total	**3,753**	**8,616**	**12,369**	**637**	**4,479**	**5,116**

Source: HMMH 2022
Note: DNL bands are exclusive of upper bounds

Table 3-53. Estimated Population within DNL Contour Bands for Alternatives 2 and 3 and Change in Population from Existing Conditions at Columbus AFB

DNL Contour Band (dB)	On-Installation Population	Off-Installation Population	Total Population	Change in On-Installation Population	Change in Off-Installation Population	Change in Total Population
65 to 70	750	313	1,063	686	142	828
70 to 75	3	126	129	2	72	74
75 to 80	2	36	38	-	26	26
80 to 85	2	7	9	1	4	5
≥85	2	-	2	-	-	-
Total	**759**	**482**	**1,241**	**689**	**244**	**933**

Sources: HMMH 2022, U.S. Census Bureau 2020
Notes: 1. Estimated population based on areas within individual census blocks at full implementation of Alternatives 2 or 3 with the full complement of T-7A aircraft.
2. DNL bands are exclusive of upper bounds

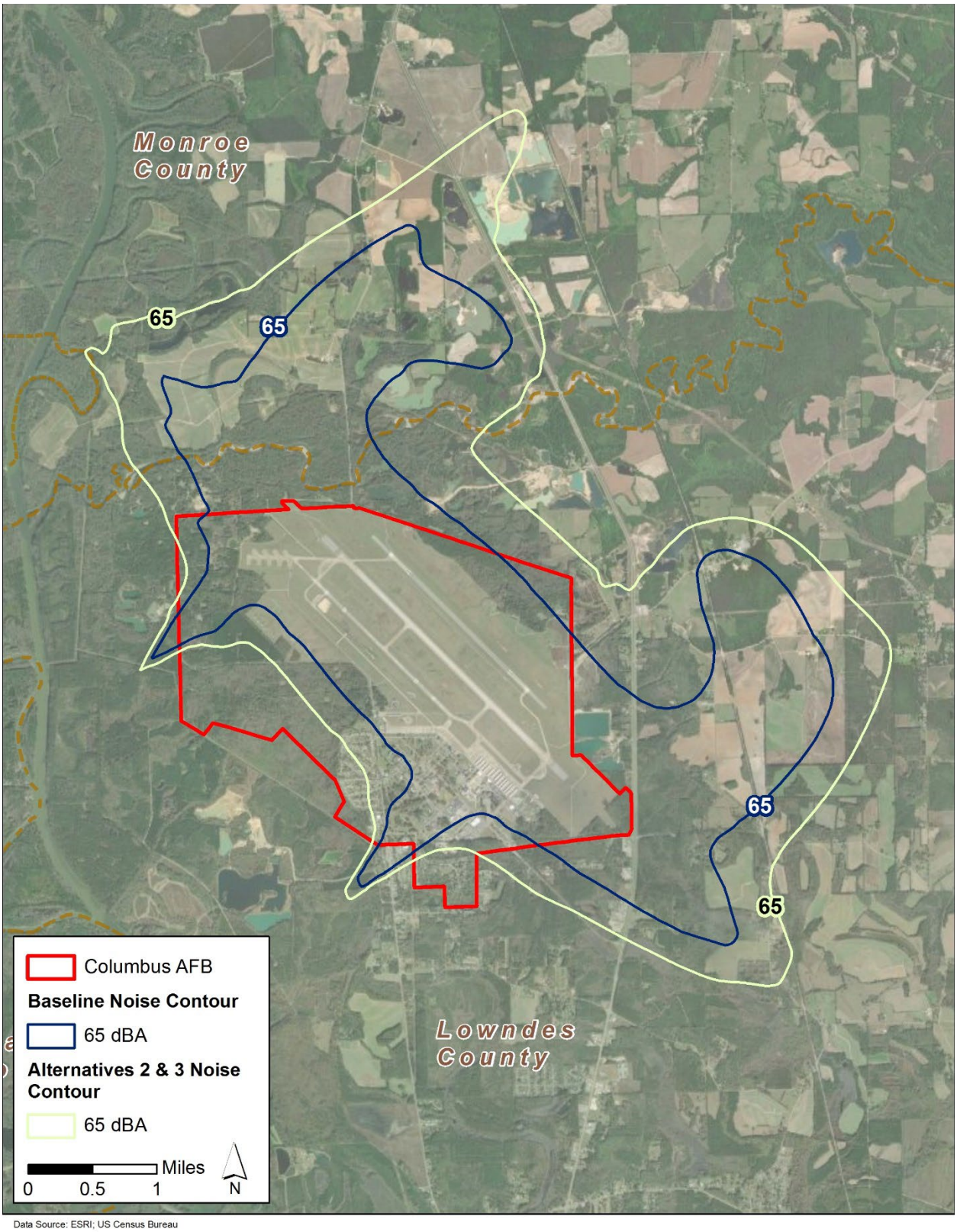

Figure 3-14. Comparison of the 65 dB DNL Contours for Alternatives 2 and 3 and Existing Conditions at Columbus AFB

The additional 4,479 acres and 244 people would constitute an expansion primarily on the east side of the airfield, expanding almost to the border of Clay and Monroe Counties in the northwest, the intersection of Flower Farm Road and Gravel Pit Road to the northeast, almost as far east as Black Creek, and nearly as far south as Ridge Road in Wells. These newly exposed areas encompass numerous land uses, including residential, commercial, undeveloped, and agricultural.

The expansion of the DNL contours would be due to the introduction of the T-7A aircraft and the expectation of performing nighttime training operations. The expansion to the southeast of the airfield would be due primarily to daytime and nighttime T-7A departures. The expansion of the DNL contours to the northeast of the airfield would be due primarily to the T-7A departure phase of pattern work, particularly outside and inside downwind patterns, along with the addition of nighttime operations with the T-7A. The contour expansion off the northern runway end would be for similar reasons as the southern end.

Table 3-54 provides the DNL for the 16 POI under Alternatives 2 and 3. Six of the nine residential areas, two of the four places of worship (W2 and W3), and the two schools (S1 and S2) would be exposed to DNL greater than (or equal to) 65 dB and would be considered incompatible land uses. The remaining six POI would be exposed to DNL less than 65 dB.

Table 3-54. Overall DNL at Representative Locations for the Alternatives 2 and 3 at Columbus AFB

ID	Representative Location	Existing Conditions DNL (dB)	Alternatives 2 and 3 DNL (dB)	Change in DNL (dB)
P1	Dwayne Hayes Recreation Park	50.8	51.9	1.1
R1	Residential Area 1	**66.4**	**67.0**	0.6
R2	Residential Area 2	**72.7**	**76.3**	3.6
R3	Residential Area 3	**66.6**	**70.0**	3.4
R4	Residential Area 4	**71.1**	**75.1**	4.0
R5	Residential Area 5	52.9	57.7	4.8
R6	Residential Area 6	**65.5**	**69.5**	4.0
R7	Residential Area 7	**69.1**	**72.0**	2.9
R8	Residential Area 8	62.0	64.0	2.0
R9	Residential Area 9	51.2	55.4	4.2
S1	Child Development Center	62.7	**65.5**	2.8
S2	Education Center	**65.2**	**68.5**	3.3
W1	Cedar Grove Missionary Baptist	55.6	60.7	5.1
W2	Kolola Springs Baptist Church	63.9	**69.1**	5.2
W3	Victory Tabernacle	64.7	**68.0**	3.3
W4	Faith Christian Center Baptist Church	53.5	56.0	2.5

Source: HMMH 2022

The nine residential areas would be exposed to DNL increases between 0.6 and 4.8 dB. The two schools would be exposed to DNL increases of approximately 3 dB. The four places of worship would be exposed to DNL increases between 2.5 and 5.2 dB. The increases would be due to the introduction of T-7A operations.

The Child Development Center (S1) and two of the places of worship (W2 and W3) would be newly exposed to DNL of at least 65 dB, compared to existing conditions, due to the introduction of the T-7A operations.

3.3.2.2.1.3 Supplemental Metrics Analyses

The supplemental metrics required analyses of noise exposure related to potential effects of noise, including sleep disturbance, classroom learning interference, and speech interference. These analyses focus on specific POI in the vicinity of Columbus AFB described in **Section 3.3.1.1.1**.

Individual Aircraft Overflights. The single-event noise metrics described for Alternative 1 in **Section 3.3.1.1.2** are also applicable to Alternatives 2 and 3. See **Table 3-18** for a comparison of the SEL and L_{max} for the based T-38C and the proposed based T-7A aircraft.

Speech Interference. **Table 3-55** provides the $NA75L_{max,day}$ for Alternatives 2 and 3. Fewer than 0.05 speech-interfering events per daytime hour, on average, are estimated for Dwayne Hayes Recreation Park (P1) and Faith Christian Center Baptist Church (W4). Speech interference for the nine residential areas would range from approximately 2 to nearly 21 events per daytime hour. The speech interference for the places of worship, other than W4, would range from approximately 4 to 10 events per daytime hour, on average. Run-up activity would not factor into any POI's events.

Alternatives 2 and 3 would cause speech-interfering events to increase by up to approximately 8 per hour across the relevant POI because the T-7A would have higher single event noise levels (see **Table 3-37**) for climbs to pattern altitude than the T-38C it would replace. Alternatives 2 and 3 would cause speech interference events to decrease at R2 by less than 1 event per hour, because the T-7A would conduct fewer overall flight operations.

Table 3-55. Potential for Speech Interference for Alternatives 2 and 3 at Columbus AFB

ID	Representative Location	Existing Events per Daytime Hour	Alternatives 2 and 3 Events per Daytime Hour	Change in Events per Daytime Hour
P1	Dwayne Hayes Recreation Park	<0.05	-<0.05	<0.05
R1	Residential Area 1	6.0	13.8	7.8
R2	Residential Area 2	6.3	6.0	-0.3
R3	Residential Area 3	14.4	14.8	0.4
R4	Residential Area 4	3.4	5.0	1.6
R5	Residential Area 5	<0.05	2.2	2.2
R6	Residential Area 6	3.5	7.0	3.5
R7	Residential Area 7	19.9	20.5	0.6
R8	Residential Area 8	6.2	11.0	4.8
R9	Residential Area 9	0.1	1.6	1.5
W1	Cedar Grove Missionary Baptist	0.1	5.9	5.8
W2	Kolola Springs Baptist Church	3.5	4.1	0.6
W3	Victory Tabernacle	7.6	10.3	2.7
W4	Faith Christian Center Baptist Church	<0.05	<0.05	<0.05

Source: HMMH 2022
Note: NA75L_{max}; POI assessed for daytime (7 a.m. to 10 p.m.)

Classroom Learning Interference. **Table 3-56** shows that the Child Development Center (S1) and the Education Center (S2) would have L_{eq} greater than (or equal to) 60 dB and would require further analysis for NA and TA metrics.

Table 3-56. Screening for Potential Classroom Speech Interference for Alternatives 2 and 3 at Columbus AFB

ID	Representative School	School-Day L_{eq} (dB)
S1	Child Development Center	66.8 dB $L_{eq(11h)}$
S2	Education Center	70.1 dB $L_{eq(6h)}$

Source: HMMH 2022

The NA and TA metrics for the affected schools are provided in **Table 3-57** and **Table 3-58**, respectively. The Child Development Center would experience an increase of approximately 5 events per hour and 23 minutes per day at or above 75 dB L_{max}, and the Education Center would experience an increase of approximately 4 events per hour and 7 minutes per day (at or) above 75 dB L_{max}. The increases would be due to the introduction of the T-7A operations.

Table 3-57. Potential for Classroom Speech Interference for Alternatives 2 and 3 at Columbus AFB ($NA75L_{max}$)

ID	Representative School	Existing Conditions $NA75L_{max}$ (events per hour)	Alternatives 2 and 3 $NA75L_{max}$ (events per hour)	Change (events per hour)
S1	Child Development Center	7.3	12.5	5.2
S2	Education Center	6.3	10.6	4.3

Source: HMMH 2022

Table 3-58. Potential for Classroom Speech Interference for Alternatives 2 and 3 at Columbus AFB ($TA75L_{max}$)

ID	Representative School	Existing Conditions $TA75L_{max}$ (minutes per day)	Alternatives 2 and 3 $TA75L_{max}$ (minutes per day)	Change (minutes per day)
S1	Child Development Center	11.0	34.3	23.3
S2	Education Center	11.3	18.3	7.0

Source: HMMH 2022

Sleep Disturbance. **Table 3-59** provides the number of average annual hourly nighttime events that would meet or exceed 90 dB SEL at the nine residential POI for Alternatives 2 and 3. Six of the nine POI would experience an average of fewer than 0.05 events per night. POI R1, R3, and R7 would experience 0.1 or 0.2 potentially sleep disturbing events per night, on average.

Alternatives 2 and 3 would cause increases of less than 0.05 potentially sleep disturbing events per hour, on average, at five residential POI (i.e., R2, R4, R6, R8, and R9) and up to 0.1 events per hour at one other residential POI (i.e., R3), relative to the existing conditions. These increases would be due to the introduction of T-7A nighttime operations. At R3, the increase of 0.1 events per hour would result from increased nighttime closed pattern operations on Runways 13C and 13L, relative to the existing conditions. Three POI (R1, R5, and R7) would not experience any increase in sleep disturbing events per night.

The specified average number of events would not likely occur in evenly spaced increments throughout the night, nor would they likely occur every night. Nighttime flights would occur as the training syllabus directs and would likely occur in "grouped" sessions, meaning that several overflights may occur during a short period of time on one specific night, and there may be nights where no nighttime flying occurs. Due to scheduling changes, aircraft maintenance, weather, and other unpredictable events, it is not possible to forecast when nighttime events would occur; therefore, this analysis portrays the impact with operations averaged throughout the night, for each night. Columbus AFB would operate night flights in a manner to minimize nighttime aircraft noise to the community, to the maximum extent practicable.

Table 3-59. Potential for Sleep Disturbance for Alternatives 2 and 3 at Columbus AFB

ID	Representative Location	Existing Conditions Average Hourly Nighttime Events (NA90SEL)	Alternatives 2 and 3 Average Hourly Nighttime Events (NA90SEL)	Change in Average Hourly Nighttime Events (NA90SEL)
R1	Residential Area 1	0.1	0.1	-
R2	Residential Area 2	-	<0.05	<0.05
R3	Residential Area 3	0.1	0.2	0.1
R4	Residential Area 4	-	<0.05	<0.05
R5	Residential Area 5	-	-	-
R6	Residential Area 6	-	<0.05	<0.05
R7	Residential Area 7	0.1	0.1	-
R8	Residential Area 8	<0.05	<0.05	<0.05
R9	Residential Area 9	-	<0.05	<0.05

Source: HMMH 2022

Potential for Hearing Loss. As shown in **Figure 3-13,** the 80 dB DNL contour would extend beyond the boundaries of the installation requiring an analysis of $L_{eq(24h)}$ for PHL. The 80 dB $L_{eq(24h)}$ contour shown in **Figure 3-15** would extend over drainage ponds to the east of the installation, between the installation boundary and US Highway 45. It would also extend slightly north of the installation boundary over forested areas near Burton Ferry Road, toward the Butahatchee River. There would not be any on- or off-installation residences or individuals at Columbus AFB predicted to be exposed to 80 dB $L_{eq(24h)}$ or greater; therefore, no PHL would be anticipated for Alternatives 2 and 3.

Damage to Structures. Individual aircraft events at Columbus AFB would not generate impulsive-style aircraft noise levels above 140 dB; therefore, damage to structures from Alternatives 2 and 3 would not likely occur.

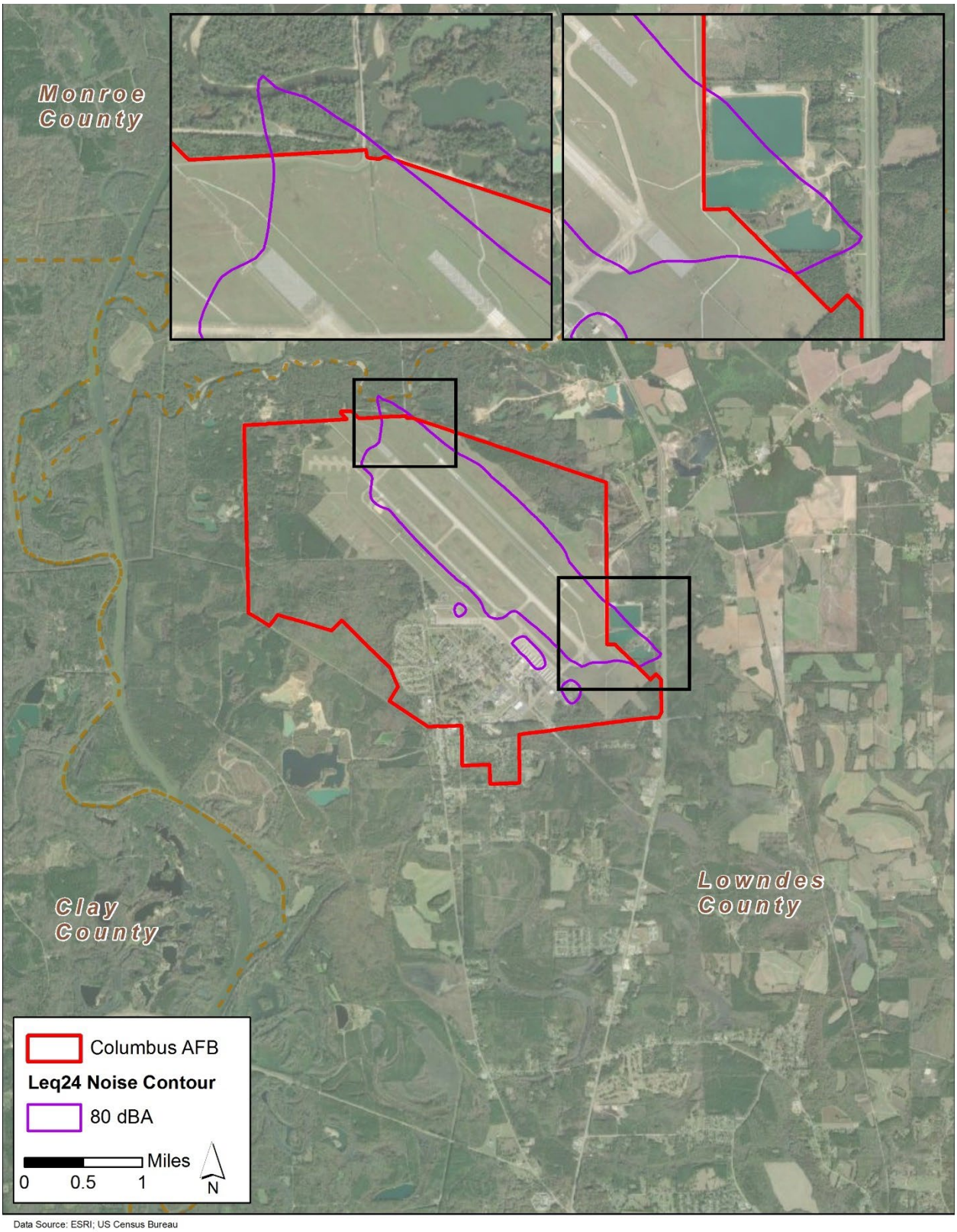

Figure 3-15. 24-Hour Equivalent Sound Level Contour of 80 dB for Alternatives 2 and 3 at Columbus AFB

3.3.2.2.2 Special Use Airspace

3.3.2.2.2.1 Aircraft Noise

With Alternatives 2 and 3, sorties within the modeled SUA (see **Figure 1-3** and **Table 3-1**) would not change from the existing conditions, aside from the replacement of T-38C aircraft with T-7A and the increase of T-7A sorties by 25 percent. T-6 and T-1 sorties would remain the same as the existing conditions.

Table 3-60 provides the L_{dnmr} for Alternatives 2 and 3 for areas beneath these SUA and the change in L_{dnmr} from the existing conditions. Of these airspaces, only the Birmingham MOAs and the Sea Ray Range would have L_{dnmr} greater than 65 dB. The L_{dnmr} for Alternatives 2 and 3 for all other modeled flight areas would be less than 65 dB DNL and compatible with all land uses.

Changes in L_{dnmr} would range from 0 to 15 dB due to Alternatives 2 and 3. However, none of the increases would cause any of the modeled SUA to be newly introduced to cumulative exposure of 65 dB L_{dnmr} or greater. These changes in cumulative exposure are due solely to the replacement of based T-38C sorties with the proposed based T-7A aircraft and proposed increase in T-7A sorties for Alternatives 2 and 3. Birmingham and Sea Ray Ranges are discussed further below.

Figure 3-16 shows the DNL contours for Alternatives 2 and 3 at the Birmingham Range. The highest DNL contour (in the 5-dB increments) caused by the Alternative 2 and 3 aircraft operations for the Birmingham Range would be 75 dB DNL. There would be one 1.9 mile by 0.25-mile streak of 75 dB or greater contours between the Cahaba River and Alabama Route 175, near Perry Lakes Park. The southern end of the contour would start at Marion County Fish Hatchery Dam 1 and travel north 1.9 miles.

The area of 65 dB DNL is approximately 5.5 miles wide at its widest extent and 8.4 miles long. The figure-8 shaped 65 dB contour extends south to the northern corner of Marion, Alabama, east to the edge of Little Creek, north to Cave Mountain, and west to the intersection of County Road 29 and Walter Boyles Road.

Table 3-61 and **Table 3-62** provide the acreage and population within DNL contour bands for the Birmingham Range, respectively. Approximately 17,601 acres and 177 people would be exposed to DNL of at least 65 dB at the Birmingham Range for Alternatives 2 or 3. No one would be exposed to 75 dB DNL or greater.

Figure 3-17 compares the 65 dB DNL contours for Alternatives 2 and 3 and existing conditions at the Birmingham Range. The extents of the 65 dB DNL contours would increase between approximately 3,000 and 6,500 feet, relative to existing conditions. For Alternatives 2 and 3, the noise exposure would be caused primarily by the T-7A closed pattern operations. Tactical Training would be the biggest contributor and the T-7A's Levels and Strafe Training would also be significant contributors.

Table 3-60. Overall Noise Exposure for Modeled SUA for Alternatives 2 and 3

SUA	Modeled Flight Area or Overlap	Existing Conditions Maximum or Uniformly Distributed L_{dnmr} (dB)	Alternatives 2 and 3 Maximum or Uniformly Distributed L_{dnmr} (dB)	Change in L_{dnmr} (dB)
Columbus 1 MOA	CBM 1 (1, 2, 3)	<45	51.6	14.5
Columbus 1 MOA	CBM 1 (4, 5, 6)	<45	51.7	14.5
Columbus 1 MOA	T6 CBM 1	<45	<45	-
Columbus 1 MOA	Maximum Overlap[1]	<45	51.8	12.0
Columbus 2 (“Echo”) MOA	CBM 2	<45	47.2	12.2
Columbus 2 (“Echo”) MOA	Maximum Overlap[2]	<45	47.6	8.8
Columbus 3 MOA	T1 CBM 3B7	<45	<45	-
Columbus 3 MOA	T1 CBM 3B8	<45	<45	-
Columbus 3 MOA	T38 CBM 3	<45	<45	-
Columbus 3 MOA	T6 CBM 3	<45	<45	-
Columbus 3 MOA	Maximum Overlap[3]	<45	<45	-
Birmingham 1 & 2 MOA*	Birmingham MOA	<45	<45	-
Birmingham 1 & 2 MOA*	Birmingham Range	**75.4**	**77.9**	2.5
Birmingham 1 & 2 MOA*	Maximum Overlap[4]	<45	<45	-
R-4404A/B/C (“Sea Ray” Range)*	N/A	**72.8**	**76.6**	3.8
IR-066	N/A	<45	<45	0.3
IR-068	N/A	<45	<45	-0.4
IR-091	N/A	<45	<45	0.2
VR-1014	N/A	<45	<45	0.1
VR-1031	N/A	<45	<45	0.1

Source: HMMH 2022
Bold text indicates values above 65 dB
* Birmingham and Sea Ray ranges have maximum DNL value calculated
[1] CBM 1 intersects VR-1014 and IR-066
[2] CBM 2 ECHO intersects VR-1014 and IR-066
[3] CBM 3 intersects IR-068 and IR-091
[4] Birmingham MOAs intersect VR-1031
Key: N/A = not available

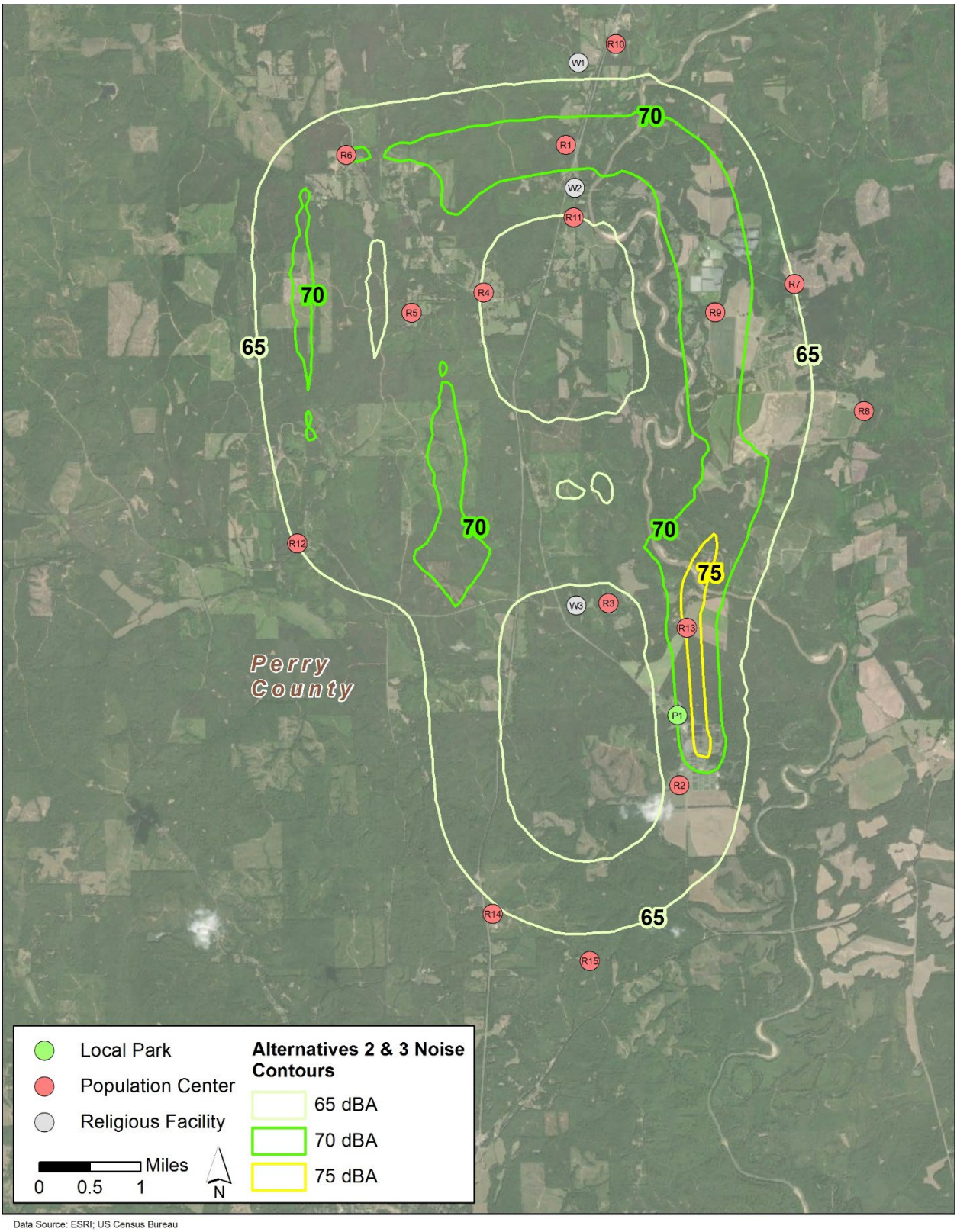

Figure 3-16. Aircraft DNL Contours for Alternatives 2 and 3 at the Birmingham Range

Table 3-61. Acreage within DNL Contour Bands for Alternatives 2 and 3 and Change in Acreage from Existing Conditions at Birmingham Range

DNL Contour Band (dB)	Acreage for Existing Conditions	Acreage for Alternatives 2 and 3	Change in Acreage
65 to 70	2,939	13,574	10,635
70 to 75	407	3,795	3,388
75 to 80	3	232	229
≥80	-	-	-
Total	**3,349**	**17,601**	**14,252**

Source: HMMH 2022
Note: DNL bands are exclusive of upper bounds

Table 3-62. Estimated Population within DNL Contour Bands for Alternatives 2 and 3 and Change in Population from Existing Conditions at Birmingham Range

DNL Contour Band (dB)	Population for Existing Conditions	Population for Alternatives 2 and 3	Change in Population
65 to 70	19	156	137
70 to 75	-	21	21
≥75	-	-	-
Total	**19**	**177**	**158**

Sources: HMMH 2022, U.S. Census Bureau 2020
Notes: 1. Estimated population based on area within individual census blocks.
2. DNL bands are exclusive of upper bounds

Table 3-61 and **Table 3-62** provide the change in acreage and population within DNL contour bands for the Alternatives 2 and 3, respectively, relative to existing conditions at the Birmingham Range. The acreage exposed to DNL of at least 65 dB would increase by more than a factor of five (to 17,601 acres) while the population would increase by nearly a factor of 10 (to 177 people), compared to the existing condition.

Table 3-63 provides the expected DNL for the 19 POI around Birmingham Range in the scenario for Alternatives 2 and 3. Perry Lake Recreation Area would be exposed to DNL greater than or equal to 70 dB. Seven residential POI would be exposed to DNL greater than or equal to 65 dB. Four residential POI would be exposed to DNL greater than or equal to 70 dB, and one residential POI would be exposed to DNL greater than or equal to 75 dB. The remaining eight residential POI would be exposed to DNL less than 65 dB. One place of worship would be exposed to DNL greater than or equal to 65 dB. The remaining two places of worship would be exposed to DNL less than 65 dB.

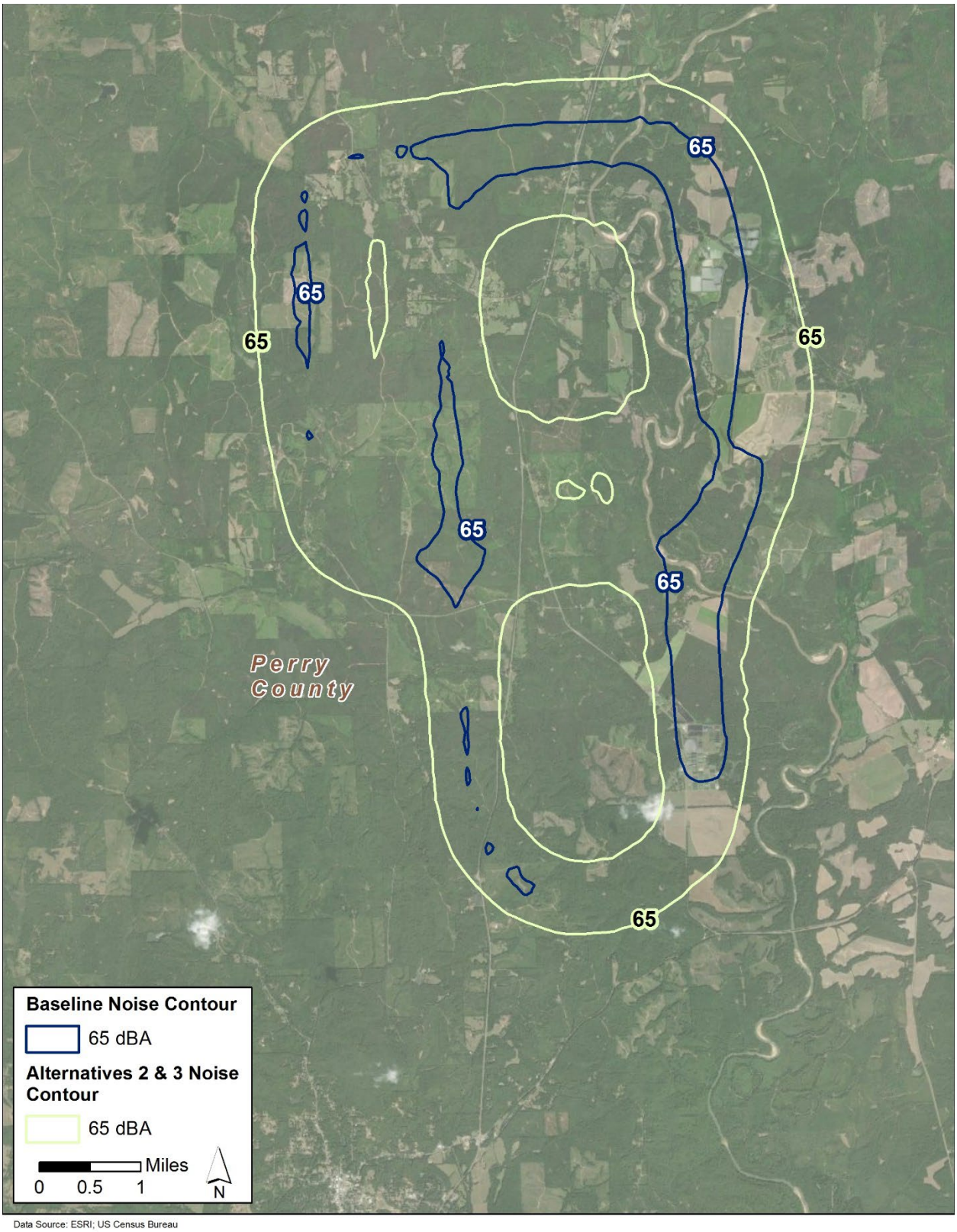

Figure 3-17. Comparison of 65 dB DNL Contours for Alternatives 2 and 3 and Existing Conditions at the Birmingham Range

Table 3-63. Overall DNL at Representative Locations for Alternatives 2 and 3 at Birmingham Range

ID	Representative Location	Existing Conditions DNL (dB)	Alternatives 2 and 3 DNL (dB)	Change in DNL (dB)
BHM-P01	Perry Lake Recreation Area	66.2	70.4	4.2
BHM-R01	Residence	67.1	72.2	5.1
BHM-R02	Residential Area	61.2	67	5.8
BHM-R03	Community Near Marietta Church	55.2	63.2	8
BHM-R04	Heiberger Community	57	64.4	7.4
BHM-R05	Residential Area	60.4	66.8	6.4
BHM-R06	Residential Area	64.9	70.1	5.2
BHM-R07	Residential Area	56.9	64.7	7.8
BHM-R08	Residential Area	49.7	58.9	9.2
BHM-R09	Residential Area	69.6	73.8	4.2
BHM-R10	Residential Area	51.4	60.7	9.3
BHM-R11	Residential Area	56.2	64.8	8.6
BHM-R12	Residential Area	58.8	65	6.2
BHM-R13	Residential Area	72.8	75.6	2.8
BHM-R14	Residential Area	56.4	63.1	6.7
BHM-R15	Residential Area	52.9	60.4	7.5
BHM-W01	Little Rock Church	54.3	62.9	8.6
BHM-W02	Heiberger Methodist Church	60.5	67.6	7.1
BHM-W03	Marietta Church	54.3	62.5	8.2

Source: HMMH 2022

The residential POI around Birmingham would be exposed to DNL increases between 2.8 and 9.3 dB. The park POI around Birmingham Range would be exposed to DNL increase of 4.2 dB and the DNL for places of worship would increase between 7.1 and 8.6 dB. The increases would be due to the introduction of the T-7A and its associated aircraft and engine characteristics.

Figure 3-18 shows the DNL contours for Alternatives 2 and 3 at the Sea Ray Range. The highest DNL contour (in the 5-dB increments) caused by Alternatives 2 and 3 aircraft operations for the Sea Ray Range would be 75 dB DNL. The 75 dB DNL contour is centered on the range's target area and is approximately 1.2 miles long and 1,700 feet wide. The 65 dB DNL contour follows the range's tactical training looping flight track and covers the entire area within the loop, except for a spot in the center that is approximately 2.7 miles across.

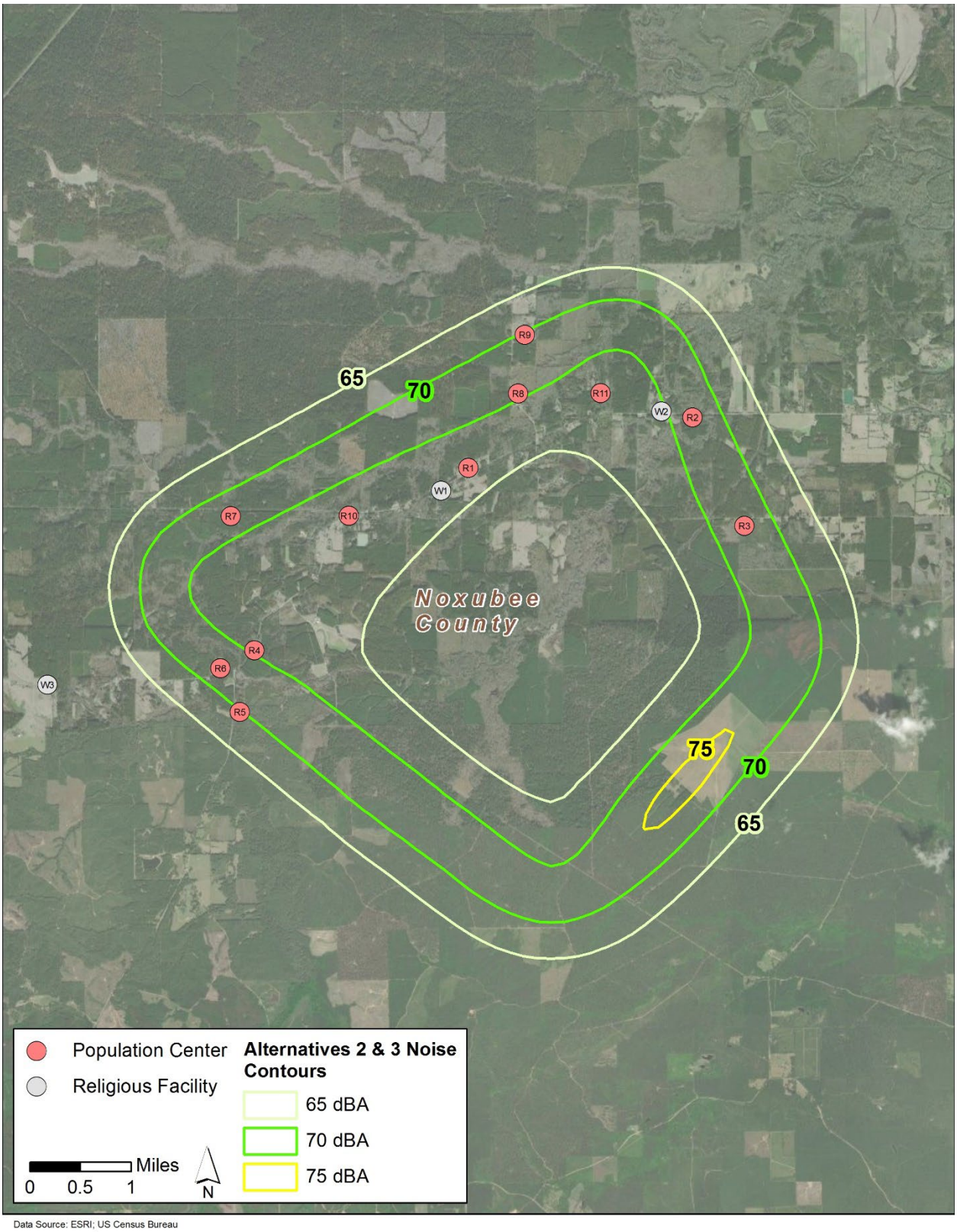

Figure 3-18. Aircraft DNL Contours for Alternatives 2 and 3 at the Sea Ray Range

Table 3-64 and **Table 3-65** provide the acreage and population within DNL contour bands for the Sea Ray Range, respectively. Approximately 16,350 acres and 235 people would be exposed to DNL of at least 65 dB at the Sea Ray Range for Alternatives 2 and 3. No one would be exposed to 75 dB DNL or greater.

Table 3-64. Acreage within DNL Contour Bands for Alternatives 2 and 3 and Change in Acreage from Existing Conditions at Sea Ray Range

DNL Contour Band (dB)	Acreage for Existing Conditions	Acreage for Alternatives 2 and 3	Change in Acreage
65 to 70	4,770	9,958	5,188
70 to 75	253	6,211	5,958
75 to 80	-	173	173
≥80	-	-	-
Total	**5,023**	**16,342**	**11,319**

Source: HMMH 2022
Note: DNL bands are exclusive of upper bounds

Table 3-65. Estimated Population within DNL Contour Bands for Alternatives 2 and 3 and Change in Population from Existing Conditions at Sea Ray Range

DNL Contour Band (dB)	Population for Existing Conditions	Population for Alternatives 2 and 3	Change in Population
65 to 70	59	161	102
70 to 75	-	74	74
≥75	-	-	-
Total	**59**	**235**	**176**

Sources: HMMH 2022, U.S. Census Bureau 2020
Notes: 1. Estimated population based on area within individual census blocks
2. DNL bands are exclusive of upper bounds

Figure 3-19 compares the 65 dB DNL contours for Alternatives 2 and 3 and existing conditions at the Sea Ray Range. The outward extents of the 65 dB DNL contours would increase up to 2,300 feet for the Sea Ray Range, relative to existing conditions. The inward extents of the 65 dB DNL contours would increase up to 1.5 miles relative to existing conditions. For Alternatives 2 and 3, the noise exposure would be caused primarily by the T-7A closed pattern operations. T-7A tactical training would be the biggest contributor.

Table 3-64 and **Table 3-65** provide the change in acreage and population within DNL contour bands for Alternatives 2 and 3, respectively, relative to existing conditions at the Sea Ray Range. The acreage within the 65 dB DNL contour would more than triple (to 16,342 acres) while the population would increase by nearly a factor of four (to 235 people), compared to existing conditions.

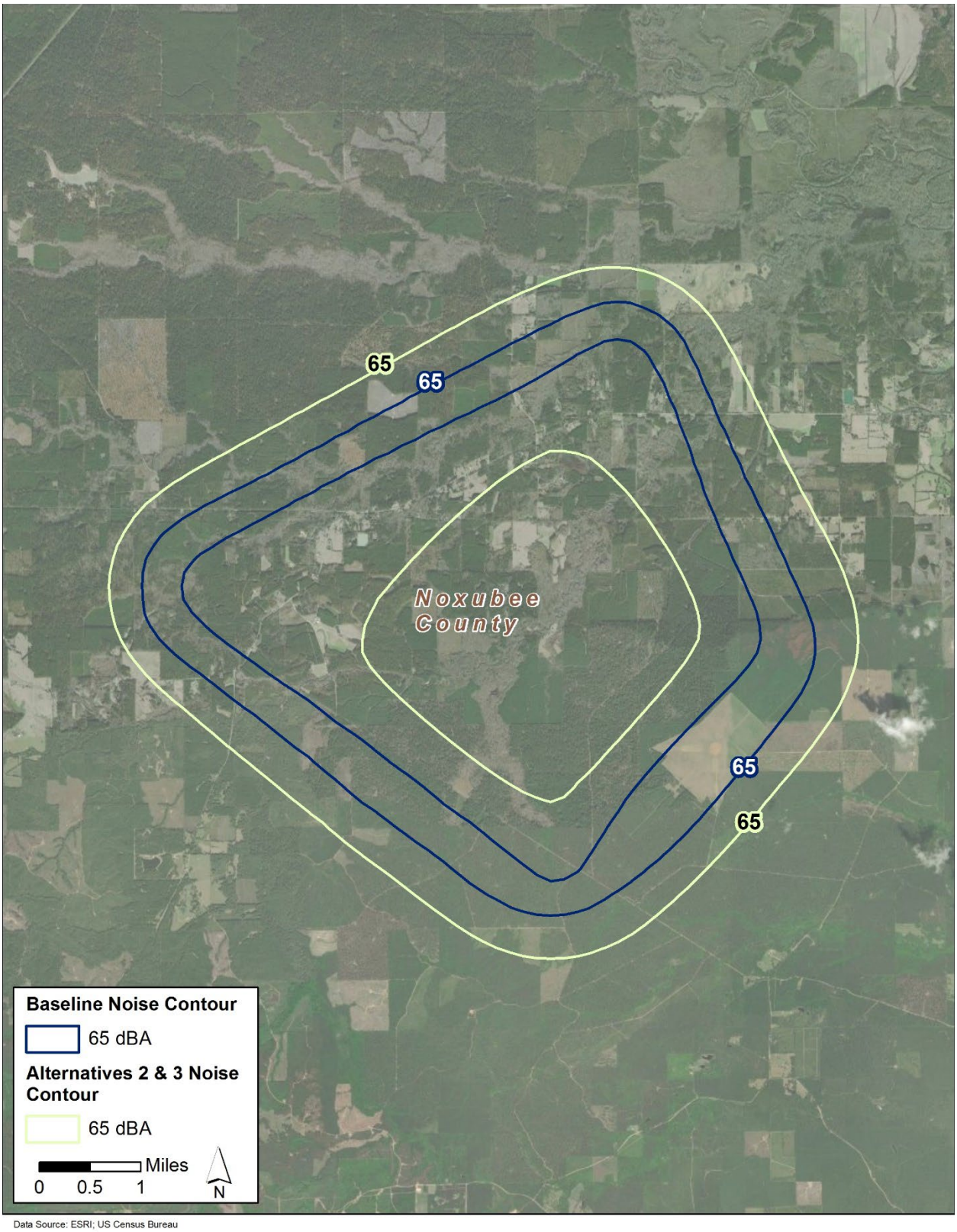

Figure 3-19. Comparison of 65 dB DNL Contours for Alternatives 2 and 3 and Existing Conditions at the Sea Ray Range

Table 3-66 provides the estimated DNL for the 14 POI around Sea Ray Range for Alternatives 2 and 3. The DNL at the Touch Cotton Evangelistic Ministry is estimated to be less than 65 dB. The remaining 13 POI would be exposed to DNL greater than (or equal to) 65 dB. Six residential areas (Sea-R02, Sea-R03, Sea-R06, Sea-R07, Sea-R08, and Sea-R09) would be newly exposed to estimated DNL greater than 70 dB.

Table 3-66. Overall DNL at Representative Locations for Alternatives 2 and 3 at Sea Ray Range

ID	Representative Location	Existing Conditions DNL (dB)	Alternatives 2 and 3 DNL (dB)	Change in DNL (dB)
Sea-R01	Residential Area	60	67.3	7.3
Sea-R02	Community Near Mount Olive Church	66.6	71.9	5.3
Sea-R03	Residence (979 Flatwoods Road)	67.6	72.7	5.1
Sea-R04	Residential	63.3	69.7	6.4
Sea-R05	Residential	63.7	69.6	5.9
Sea-R06	Residence (3103 MS-490)	67.4	72.2	4.8
Sea-R07	Residential	67.4	72.2	4.8
Sea-R08	Residence (522 Simmons Road)	64.4	70.5	6.1
Sea-R09	Residence (1116 Simmons Road)	64.8	70.5	5.7
Sea-R10	Mashulaville	59.5	67	7.5
Sea-R11	Residential	60.9	68.2	7.3
Sea-W01	Mount Moriah Church	60	67.2	7.2
Sea-W02	Mount Olive Church	63.1	69.6	6.5
Sea-W03	Touch Cotton Evangelistic Ministry	45.6	55.5	9.9

Source: HMMH 2022

The POI around Sea Ray Range would be exposed to DNL increases between 4.8 and 7.5 dB. The places of worship around Sea Ray Range would be exposed to DNL increases between 6.5 and 9.9 dB. The increases would be due to the introduction of the T-7A and its associated aircraft and engine characteristics.

3.3.2.2.2.2 Supplemental Metrics Analyses

The supplemental noise metrics considered are sleep disturbance, hearing loss, classroom learning interference, and speech interference. Since the SUA are not open at night (10 p.m. to 7 a.m.), no sleep disturbance metrics were calculated. Noise levels at the SUA would not reach 80 dB DNL; therefore, there is no PHL and this supplemental metric is not included. In addition, an internet review of school locations did not identify any schools within approximately 5 miles of the 65 dB DNL contours for the SUA. Therefore, classroom learning interference was not included in the supplemental metric analyses provided for the SUA. Only the speech interference supplemental metric is carried forward for analysis for the SUA.

Speech Interference. **Table 3-67** provides the number of aircraft events greater than (or equal to) 75 dB L_{max} outdoors for relevant POI near Birmingham Range from 7 a.m. to 10 p.m. ($NA75L_{max,day}$). Places of worship around the contours of the Birmingham Range would experience between 10.4 and 13.6 speech-interfering events per daytime hour. Residential POI would receive between 7.8 and 13.6 speech-interfering events per daytime hour.

Table 3-67. Potential for Speech Interference for Alternatives 2 and 3 at Birmingham Range

ID	Representative Location	Existing Events per Daytime Hour	Alternatives 2 and 3 Events per Daytime Hour	Change in Events per Daytime Hour
BHM-P01	Perry Lake Recreation Area	1	9.1	8.1
BHM-R01	Residence	4.9	13.6	8.7
BHM-R02	Residential Area	1	7.8	6.8
BHM-R03	Community Near Marietta Church	2.1	10.4	8.3
BHM-R04	Heiberger Community	2.8	13.6	10.8
BHM-R05	Residential Area	2.8	13.6	10.8
BHM-R06	Residential Area	3.9	13.6	9.7
BHM-R07	Residential Area	4.9	13.6	8.7
BHM-R08	Residential Area	2.8	12.3	9.5
BHM-R09	Residential Area	4.9	13.6	8.7
BHM-R10	Residential Area	4.9	13.6	8.7
BHM-R11	Residential Area	4.9	13.6	8.7
BHM-R12	Residential Area	1	11.7	10.7
BHM-R13	Residential Area	2.1	10.4	8.3
BHM-R14	Residential Area	1	7.8	6.8
BHM-R15	Residential Area	1	7.8	6.8
BHM-W01	Little Rock Church	4.9	13.6	8.7
BHM-W02	Heiberger Methodist Church	4.9	13.6	8.7
BHM-W03	Marietta Church	1	10.4	9.4

Source: HMMH 2022
Note: $NA75L_{max}$; POI assessed for daytime (7 a.m. to 10 p.m.)

Alternatives 2 and 3 would increase the number of speech-interfering events at residential POI by approximately 6.8 to 10.8 events per daytime hour. Places of worship would experience increases of 8.7 to 9.4 speech-interfering events per daytime hour. These changes are because the T-7A would have higher single event noise levels (see **Table 3-37**) at military power than the T-38C it would replace.

Table 3-68 provides the number of aircraft events greater than (or equal to) 75 dB L_{max} outdoors for relevant POI near Sea Ray Range from 7 a.m. to 10 p.m. ($NA75L_{max,day}$). The Touch Cotton

Evangelistic Ministry (Sea-W03) would experience 1.8 noise-interfering events per daytime hour. The other 13 POI would experience approximately 3.5 speech-interfering events per daytime hour.

Table 3-68. Potential for Speech Interference for Alternatives 2 and 3 at Columbus AFB

ID	Representative Location	Existing Events per Daytime Hour	Alternatives 2 and 3 Events per Daytime Hour	Change in Events per Daytime Hour
Sea-R01	Residential Area	2.1	3.5	1.4
Sea-R02	Community Near Mount Olive Church	2.1	3.5	1.4
Sea-R03	Residence (979 Flatwoods Road)	2.1	3.5	1.4
Sea-R04	Residential	2.1	3.5	1.4
Sea-R05	Residential	2.1	3.5	1.4
Sea-R06	Residence (3103 MS-490)	1.4	3.5	2.1
Sea-R07	Residential	1.4	3.5	2.1
Sea-R08	Residence (522 Simmons Road)	2.1	3.5	1.4
Sea-R09	Residence (1116 Simmons Road)	2.1	3.5	1.4
Sea-R10	Mashulaville	2.1	3.5	1.4
Sea-R11	Residential	2.1	3.5	1.4
Sea-W01	Mount Moriah Church	2.1	3.5	1.4
Sea-W02	Mount Olive Church	2.1	3.5	1.4
Sea-W03	Touch Cotton Evangelistic Ministry	0	1.8	1.8

Source: HMMH 2022
Note: $NA75L_{max}$; POI assessed for daytime (7 a.m. to 10 p.m.)

Alternatives 2 and 3 would increase the number of speech-interfering events at two residential areas (SEA-R06 and SEA-R07) by approximately 2.1 events per hour. The number of speech-interfering events at the Touch Cotton Evangelistic Ministry (Sea-W02) would increase by 1.8 events per hour. The other 11 POI would experience an increase of approximately 1.4 speech-interfering events per hour. This is because the T-7A would have higher single event noise levels (see **Table 3-37**) at military power than the T-38C it would replace.

3.3.2.3 No Action Alternative

The No Action Alternative would not result in impacts on the noise environment. No facility construction would occur, and there would be no changes in aircraft operations. Noise exposure would remain unchanged compared to the existing conditions described in **Section 3.3.1**.

3.3.3 Cumulative Effects

Construction of the proposed MILCON/UMMC and FSRM projects for T-7A recapitalization and the reasonably foreseeable actions on the installation and within the surrounding area (see

Table 3-2) would produce noise from heavy equipment operation. Noise generated from construction would be short-term, intermittent, and temporary in nature. Given the proposed construction activities' distance to nearby noise-sensitive areas and the existing noise environment, the cumulative effects from construction noise on sensitive receptors from the reasonably foreseeable actions would be less than significant. The Proposed Action and reasonably foreseeable actions would adhere to all applicable federal, state, and local noise regulations, when appropriate. Additionally, by adhering to standard construction BMPs, such as maintaining heavy equipment mufflers and limiting heavy equipment use to normal weekday business hours, the cumulative noise produced during construction for the Proposed Action and reasonably foreseeable actions would result in temporary and less than significant increases in ambient noise levels.

While aircraft operations from the Proposed Action would result in long-term, less than significant, adverse impacts on the noise environment at Columbus AFB and within the surrounding area, none of the reasonably foreseeable actions are anticipated to have a long-term impact on the noise environment. Additionally, construction for each reasonably foreseeable action is anticipated to be complete before T-7A operations begin in 2028, resulting in no overlap of construction and T-7A operational noises. Therefore, no long-term, cumulative effects on noise would occur.

3.4 Biological Resources

Biological resources include native or naturalized plants and animals and the habitats (e.g., grasslands, forests, wetlands) in which they exist. Protected and sensitive biological resources include Endangered Species Act (ESA) listed species (threatened or endangered) as well as those that are proposed or candidates for ESA-listing, as designated by the U.S. Fish and Wildlife Service (USFWS) (terrestrial and freshwater organisms), and migratory birds. Migratory birds are protected species under the Migratory Bird Treaty Act (MBTA). Sensitive habitats include areas designated or proposed by USFWS as critical habitat protected by the ESA and as sensitive ecological areas designated by State or other federal rulings. Sensitive habitats also include wetlands, plant communities that are unusual or limited in distribution, and important seasonal use areas for wildlife (e.g., migration routes, breeding areas, and crucial summer and winter habitats).

Endangered Species Act. The ESA (16 USC § 1531 et seq.) established a federal program to protect and recover imperiled species and the ecosystems upon which they depend. The ESA requires federal agencies, in consultation with USFWS, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species. Under the ESA, "jeopardy" occurs when an action is reasonably expected, directly or indirectly, to diminish numbers, reproduction, or distribution of a species so that the likelihood of survival and recovery in the wild is appreciably reduced. The ESA defines an "endangered species" as any species in danger of extinction throughout all or a significant portion of its range. The ESA defines a "threatened species" as any species likely to become an endangered species in the foreseeable future. The ESA also prohibits any action that causes a "take" of any listed animal. "Take" is defined as, "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect

or attempt to engage in any such conduct." Listed plants are not protected from take, although it is illegal to collect or maliciously harm them on federal land.

Critical habitat is designated if USFWS determines that the habitat is essential to the conservation of a threatened or endangered species. Federal agencies must ensure that their activities do not adversely modify designated critical habitat to the point that it would no longer aid in the species' recovery.

Migratory Bird Treaty Act. The MBTA of 1918 (16 USC §§ 703–712), as amended, and EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, require federal agencies to minimize or avoid impacts on migratory birds. Unless otherwise permitted by regulations, the MBTA makes it unlawful to (or attempt to) pursue, hunt, take, capture, or kill any migratory bird, nest, or egg. Federal agencies with activities that could have measurable negative impacts on migratory birds are directed by EO 13186 to develop and implement a Memorandum of Understanding with USFWS to promote the conservation of migratory bird populations.

Bald and Golden Eagle Protection Act. Bald Eagles (*Haliaeetus leucocephalus*) and Golden Eagles (*Aquila chrysaetos*) are protected under the Bald and Golden Eagle Protection Act (16 USC §§ 668–668c), which prohibits the "take" of Bald or Golden Eagles in the United States without a 50 CFR § 22.80 permit. The Bald and Golden Eagle Protection Act defines "take" as to, "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb." For the purposes of these guidelines, "disturb" means "to agitate or bother a Bald or Golden Eagle to a degree that causes or is likely to cause: (1) injury to an eagle; (2) a decrease in its productivity by substantially interfering with normal breeding, feeding, or sheltering behavior; or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior." In addition to immediate impacts, this definition also covers impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that interferes with or interrupts normal breeding, feeding, or sheltering habits and causes injury, death, or nest abandonment.

3.4.1 Affected Environment

The affected environment for biological resources consists of the land within Columbus AFB and the SUA (i.e., MOAs Columbus 1, Columbus 2, Columbus 3, Birmingham, and Birmingham 2; MTRs IR-066, IR-068, IR-091, VR-1014, and VR-1031; and Range R-4404 in northern Alabama, eastern Arkansas, northern Mississippi, and southern Tennessee) where the T-7A would perform aircraft operations (see **Table 3-1** and **Figure 1-3**). For Columbus AFB, avian, bat, and terrestrial species within or near the installation have potential to be impacted from construction, aircraft takeoffs and landings, or aircraft operations and are therefore considered in this EIS. For the SUA, only avian and bat species have potential to be impacted during flight operations and, therefore, are considered in this EIS.

Vegetation. Columbus AFB is located in the Southeastern Floodplains and Low Terraces Level III ecoregion, which is historically forested with occasional pastures in better-drained areas. Historically, oak, pine, and some western mixed mesophytic forests have been dominant in this portion of Mississippi (Chapman et al. 2004). The interior portions of Columbus AFB, where the

MILCON/UMMC and FSRM projects are proposed, has been developed with buildings, streets, and runways to support the installation's missions. Only approximately 20 percent of the installation remains undeveloped. The installation's undeveloped areas are almost entirely in its westernmost portions, away from the proposed areas of construction. Most vegetative cover in the areas of proposed construction consists of nonnative grass species, including centipede grass (*Eremochloa ophiuroides*), bermudagrass (*Cynodon dactylon*), zoysia (*Zoysia* spp.), and annual ryegrass (*Lolium multiflorum*), though numerous weed species are likely present (Columbus AFB 2020a). An urban tree inventory conducted in 2004 identified that landscape trees and shrubs within the installation consist mostly of loblolly pine (*Pinus taeda*), water oak (*Quercus nigra*), crepe myrtle (*Lagerstroemia indica*), willow oak (*Quercus phellos*), and sweetgum (*Liquidambar styraciflua*) (Columbus AFB 2020a). However, there are no trees within the MILCON/UMMC and FSRM project locations.

Wetlands on Columbus AFB are limited to the small ponds and lakes and along the ephemeral streams (i.e., streams with flowing water only during and for a short time after precipitation events) that lead to Stinson Creek and the Buttahatchee River. No wetlands are present at the MILCON/UMMC and FSRM project locations, and the nearest wetland is approximately 0.25 mile from the project locations. **Section 3.10** contains further details on wetlands.

Wildlife. The highly developed nature of the MILCON/UMMC and FSRM project locations results in limited habitat to support wildlife species. No trees are within the MILCON/UMMC and FSRM project locations to provide habitat for various birds and small mammal species. However, scattered large trees provide such habitat within the vicinity of these project locations. Wildlife species found at Columbus AFB are those typically found in disturbed small forest patches and open field habitats throughout the Middle Coastal Plains Section of the Southern Mixed Forest Province. Wildlife present varies with the age and density of timber stands, percent of deciduous trees, proximity to openings, and presence of bottomland forest types. Terrestrial mammal species documented during various wildlife surveys at the installation include white-tailed deer (*Odocoileus virginianus*), coyotes (*Canis latrans*), cottontail rabbits (*Sylvilagus floridanus*), fox squirrels (*Sciurus niger*), gray squirrels (*S. carolinensis*), raccoon (*Procyon lotor*), red fox (*Vulpes vulpes*), gray fox (*Urocyon cinereoargenteus*), opossum (*Didelphis virginiana*), beaver (*Castor canadensis*), bobcat (*Lynx rufus*), otter (*Lontra canadensis*), muskrats (*Ondatra zibethicus*), nine-banded armadillo (*Dasypus novemcinctus*), and the non-native nutria (*Myocastor coypus*) (Columbus AFB 2020a). Small mammals include eastern chipmunk (*Tamias striatus*), house mouse (*Mus musculus*), and eastern mole (*Scalopus aquaticus*).

According to the Mississippi Department of Wildlife, Fisheries, and Parks, 15 bat species have been documented in Mississippi, and at least nine bat species have been confirmed at Columbus AFB. During a 2017 acoustic bat survey, the hoary bat (*Lasiurus cinereus*), Rafinesque's big-eared bat (*Corynorhinus rafinesquii*), southeastern myotis bat (*Myotis austroriparius*), tricolored bat (*Perimyotis subflavus*), northern yellow bat (*Lasiurus intermedius*), big brown bat (*Eptesicus fuscus*), Brazilian free-tailed bat (*Tadarida brasiliensis*), eastern red bat (*Lasiurus borealis*), and evening bat (*Nycticeius humeralis*) were identified at the installation (Schwab 2018).

Common avian species, many of which are protected by the MBTA, are found throughout the Columbus AFB region. These include the Eastern Meadowlark (*Sturnella magna*), Field Sparrows (*Spizella pusilla*), and Savanna Sparrows (*Passerculus sandwichensis*), which are found in open fields; the Pine Warbler (*Dendroica pinus*), Summer Tanager (*Piranga rubra*), White-eyed Vireo (*Vireo griseus*), and Hooded Warbler (*Wilsonia pusilla*), which are found in mature forests; the Eastern Wild Turkey (*Meleagris gallopavo sylvestris*), Bobwhite (*Colinus virginianus*), and Mourning Dove (*Zenaida macroura*), which prefer forest edges near openings; and birds of urban and park settings that include American Robins (*Turdus migratorius*) and Rock Pigeons (*Columba livia*). More than 100 bird species have been documented on the installation during avian surveys (Columbus AFB 2020a). Columbus AFB falls within the Mississippi Flyway migratory route. According to the National Audubon Society, more than 325 bird species make the round-trip each year along the Mississippi Flyway.

Numerous herpetofaunal species have been identified on the installation during surveys of wetland habitats. These include at least nine frog and toad species (i.e., southern cricket frog [*Acris gryllus*], American toad [*Anaxyrus americanus*], Fowler's toad [*Anaxyrus fowleri*], eastern narrowmouth toad [*Gastrophryne carolinensis*], bird-voiced treefrog [*Hyla avivoca*], green treefrog [*Hyla cinerea*], bullfrog [*Lithobates catesbeianus*], leopard frog [*Lithobates pipiens*], and bronze frog [*Rana clamitans*]), three salamander species (i.e., spotted salamander [*Ambystoma maculatum*], marbled salamander [*Ambystoma opacum*], and two-lined salamander [*Eurycea bislineata*]), two turtle species (i.e., common snapping turtle [*Chelydra serpentina*] and stripneck musk turtle [*Stenotherus minor*]), three lizard species (i.e., eastern fence lizard [*Sceloporus undulatus*], green anole [*Anolis carolinensis*], and ground skink [*Scincella lateralis*]), and eleven snake species (i.e., copperhead [*Agkistrodon contortrix*], cottonmouth moccasin [*Agkistrodon piscivorus*], timber rattlesnake [*Crotalus horridus*], rat snake [*Elaphe obsolete*], mud snake [*Farancia abacura*], rainbow snake [*Farancia crythrogammas*], eastern hog-nosed snake [*Heterodon platyrhinos*], king snake [*Lampropeltis spp.*], coachwhip [*Masticophis flagellum*], yellow-bellied water snake [*Nerodia erythrogaster flavigaster*], and garter snake [*Thamnophis spp.*]). In addition, at least six fish species (i.e., common carp [*Cyprinus carpio*], white catfish [*Ictalurus catus*], black bullhead [*Ictalurus melas*], bluegill bream [*Lepomis macrochirus*], largemouth bass [*Micropterus slamoides*], and white crappie [*Pomoxis annularis*]) have been documented on the installation or stocked in Strategic Air Command Lake (Columbus AFB 2020a).

Urban-adapted species known to occur commonly in urban and backyard habitats include the Northern Mockingbird (*Mimus polyglottos*), Sparrows (*Passer spp.*), Northern Cardinal (*Cardinalis cardinalis*), Blue Jay (*Cyanocitta cristata*), Carolina Wren (*Thryothorus ludovicianus*), Mourning Dove, Carolina Chickadee (*Poecile carolinensis*), Tufted Titmice (*Baeolophus bicolor*), American Robin, Eastern Bluebird (*Sialia sialis*), garter snake, black racer (*Coluber constrictor*), king snake, white-tailed deer, racoon, cottontail rabbit, opossum, nine-banded armadillo, and the striped skunk (*Mephitis mephitis*) (Brzuszek et al. 2020).

Special Status Species. The Columbus AFB Integrated Natural Resources Management Plan (INRMP) (Columbus AFB 2020a), Endangered Species of Mississippi (MMNS 2014), and USFWS's Information for Planning and Consultation reports for Columbus AFB and the SUA were reviewed to determine if any federally listed, proposed, or candidate species, or their

habitats, could occur in the vicinity of the installation and the SUA. Seventy-nine federally listed species and two candidate species that could be listed within the timeframe of the Proposed Action were identified as having the potential to occur on Columbus AFB and in its associated SUA (USFWS 2022a, USFWS 2022b, and USFWS 2022c).

Of the 81 species, only 12 have potential to occur on Columbus AFB, and none of the 12 species have been documented during rare species surveys conducted at the installation (Columbus AFB 2020a, Schwab 2018, USFWS 2022a). These 12 species are the northern long-eared bat (*Myotis septentrionalis)*, the Wood Stork (*Mycteria americana)*, the monarch butterfly (*Danaus plexippus*) (which is a candidate species), eight clams (i.e., Alabama moccasinshell [*Medionidus acutissimus*], black clubshell [*Pleurobema curtum*], heavy pigtoe [*Pleurobema taitianum*], inflated heelsplitter [*Potamilus inflatus*], orangenacre mucket [*Lampsilis perovalis*], ovate clubshell [*Pleurobema perovatum*], southern clubshell [*Pleurobema decisum],* and southern combshell [*Epioblasma penita*]), and the white fringeless orchid (*Platanthera integrilabia*). These species could potentially be impacted by the proposed activities at the installation—such as the MILCON/UMMC and FSRM projects, landings and takeoffs at the Columbus AFB airfield, and increased noise levels on and near the installation.

The remaining 69 species were identified as having potential to occur in the SUA proposed for T-7A flight training operations. The only potential for effect on these species would be from aircraft strikes to flying species. The flying species with potential to occur in the SUA are the gray bat (*Myotis grisescens*), Indiana bat (*Myotis sodalist*), Eastern Black Rail (*Laterallus jamaicensis spp. Jamaicensis*), Ivory-billed Woodpecker (*Campephilus principalis*), Piping Plover (*Charadrius melodus*), Red Knot (*Calidris canutus rufa*), Red-cockaded Woodpecker (*Picoides borealis*), and Mitchell's satyr butterfly (*Neonympha mitchellii mitchellii*), as well as the northern long-eared bat, Wood Stork, and monarch butterfly mentioned for Columbus AFB itself. A table of the federally listed and candidate species and the Information for Planning and Consultation reports are presented in **Appendix B** (i.e., as part of the consultation with USFWS).

No designated critical habitat is located within Columbus AFB (USFWS 2022a). There is designated critical habitat for 23 species (including an amphibian, clams, fish, and a plant) in the land and water areas underlying the SUA that would be used to support T-7A training (USFWS 2022b, USFWS 2022c). Because none of the species or habitats identified occur in areas that would be affected by aircraft training operations, they are not discussed further in this EIS.

The Mississippi Department of Wildlife, Fisheries, and Parks manages state-listed threatened, endangered, and sensitive species in Mississippi. There are 120 state sensitive species in Lowndes County (MDWFP 2022a). Of these species, 14 state sensitive or state-listed species have been documented within Columbus AFB. Relevant information on these 14 species is as follows:

- *Bats.* The hoary bat occurs in pine-hardwood forests in the eastern United States and roosts primarily among foliage in deciduous or coniferous trees. Females may travel as far as 19 kilometers to forage. The Rafinesque's big-eared bat has been found in nearly every habitat type within its range. In Mississippi, populations have been found in forested regions of the upper and lower coastal plains, loess hills, interior flatwoods, and

the Mississippi Delta. This species often forages within 1 meter of the ground in forested habitats. The southeastern myotis bat occurs in or near habitats associated with permanent water. Bottomland hardwood forests are usually preferred foraging and roosting habitat, especially during the summer season. The southeastern myotis bat usually forages in association with water bodies, where it forages close to the water surface. The tricolored bat is generally found in forested areas that are partly open and contain large trees with plentiful woodland edges. This species can also be found roosting in caves, abandoned mines, rock crevices, and human-made structures, such as culverts. The tricolored bat forages along forested edges and over ponds and waterways. They emerge early in the evening and forage twice each night, just after sunset and again around midnight. The tricolored bat's foraging areas are typically located within 4.3 kilometers of the roost. The northern yellow bat occupies a variety of woodland habitats in close proximity to permanent water. This species can be found roosting in Spanish moss or on dried palm fronds. The northern yellow bat feeds 5 to 6 meters above open areas and among scattered trees, forest edges, dunes, grasslands, and open water (Mississippi Bat Working Group 2020).

- *Mammals.* The old field mouse (*Peromycus polinotus*) inhabits diverse environments but typically occur in early successional habitats, such as abandoned fields, beach dunes, and scrub habitats (Wilson and Ruff 1999). The eastern spotted skunk (*Spilogale putorius)* occurs in brushy, rocky, and woody habitats with extensive vegetation and rarely occurs in open areas or around wetlands (Bullock 2018). Suitable habitat for the old field mouse and eastern spotted skunk occurs in the unmaintained areas throughout Columbus AFB, away from the airfield.
- *Birds.* The Grasshopper Sparrow (*Ammodramus savannarum*), Cooper's Hawk (*Accipiter cooperii*), and Mississippi Sandhill Crane (*Grus canadensis pulla*) are possible transients on Columbus AFB. The Grasshopper Sparrow inhabits grasslands, hayfields, and prairies and breeds in rather dry fields, especially those with fairly tall grass and weeds and a few scattered shrubs (National Audubon Society 2022a). The Cooper's Hawk inhabits mature forest, open woodlands, wood edges, and river groves. This species is also found among trees along rivers through open country, and increasingly in suburbs and cities where some tall trees exist for nest sites (National Audubon Society 2022b). The Mississippi Sandhill Crane inhabits coastal prairies and pine savannas as well as associated bayheads and swamps (MMNS 2014). These areas are seasonally wet, open to semi-open herbaceous communities dominated mainly by grasses and sedges with scattered, often poorly formed shrubs and trees.
- *Fish.* The largescale stoneroller (*Campostoma oligolepis)* is a type of minnow that inhabits rocky riffles and runs of clear creeks and small to medium rivers (Page and Burr 2011). Because the Proposed Action does not involve construction or training operations in aquatic habitats where this species occurs, no impacts on this species are anticipated.
- *Vegetation.* The short hair sedge (*Carex crinite var. brevicrinis*) is a wetland plant that grows in moist to wet woodlands (PNHP 2007). The swamp hickory (*Carya glabra var. hirsute*) occurs on bottomland sites and terraces (Hodges et al. 2004). The lobed

tickseed (*Coreopsos auroculata*) occurs in open woodlands in the southeast United States (Missouri Botanical Garden 2022). Short hair sedge, swamp hickory, and lobed tickseed do not occur within the areas where the proposed MILCON/UMMC and FSRM projects are planned or near where aircraft operations would be performed. Therefore, no effects on these species would occur from the Proposed Action.

In 2017, acoustic bat surveys found no presence of the federally threatened northern long-eared bat on Columbus AFB, but five state-ranked bat species were identified on the installation (Schwab 2018). These state-ranked species included the hoary bat, Rafinesque's big-eared bat, southeastern myotis bat, tricolored bat, and the northern yellow bat. The state-ranked species are considered rare or vulnerable in Mississippi but have no legal protection.

Bird observations recorded in 2005 included three state-ranked species: Grasshopper Sparrow, Cooper's Hawk, and Mississippi Sandhill Crane (Columbus AFB 2020a). No Bald Eagles, Golden Eagles, or nest sites have been found on the installation (Columbus AFB 2020a).

A Mississippi Natural Heritage Program's (MNHP) Natural Heritage Database search, conducted in 2019 as part of the most recent INRMP update, returned observational records of the old field mouse (2001), eastern spotted skunk (1938), largescale stoneroller (1986), short hair sedge (1994), swamp hickory (1993), and the lobed tickseed (1993) on the installation (Columbus AFB 2020a). An updated MNHP Natural Heritage Database Search was conducted in May 2022. The database found records for 55 species of concern within 2 miles of Columbus AFB; however, the database search did not specify specific locations or the year in which the species were observed (MDWFP 2022b).

3.4.2 Environmental Consequences

The biological resources analysis discusses impacts on vegetation, wildlife, and protected and sensitive species from the Proposed Action's construction and aircraft operations. The evaluation of impacts on biological resources considers whether the action would result in a direct injury or mortality of an individual, particularly a protected or sensitive species. Each species has unique, fundamental needs for food, shelter, water, and space and can be sustained only where their specific combination of habitat requirements is available. Removing of sustaining elements of a species' habitat impacts its ability to exist. Therefore, evaluation of impacts on biological resources is also based on whether the action would cause habitat displacement resulting in reduced feeding or reproduction, removal of critical habitat for sensitive species, and/or behavioral avoidance of available habitat as a result of noise or human disturbance. The level of impacts is based on (1) the importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource, (2) the proportion of the resource that would be affected relative to its occurrence in the region, (3) the sensitivity of the resource to the proposed activities, and (4) the duration of ecological ramifications. Impacts on biological resources would be considered significant if species or special habitats would be adversely affected over large areas, or disturbances would cause reductions in population size or distribution of a species of special concern.

3.4.2.1 Alternative 1

***Vegetation*.** Some of the MILCON/UMMC and FSRM projects would require the temporary or permanent removal of vegetation, which would result in short- and long-term, less than significant, adverse impacts on vegetation at Columbus AFB. No trees would be removed, and most of the MILCON/UMMC and FSRM projects would be situated within highly urban areas or on already impervious surfaces, resulting in minimal vegetation loss and less than significant impacts on vegetation. Vegetation within the footprint of new construction would be lost permanently. Vegetation surrounding new construction would be restored, to the maximum extent possible, as part of landscaping efforts following construction.

No impacts on vegetation beneath the SUA would occur. The phased delivery of T-7A aircraft and removal of T-38C aircraft, operations from these aircraft, and the personnel changes associated with Alternative 1 would have no impacts on vegetation.

***Wildlife*.** Short- and long-term, less than significant, adverse impacts on wildlife at Columbus AFB would occur from construction of the MILCON/UMMC and FSRM projects. Wildlife that could occur near the project areas would avoid the areas temporarily during construction due to intermittent increases in noise from heavy equipment. As a result, direct injury to individuals would be unlikely. Many of the wildlife species on Columbus AFB are urban-adapted and would likely return to normal behavior once construction is complete and the proposed facilities and infrastructure are operational. No trees would be removed for construction of any of the MILCON/UMMC and FSRM projects, resulting in no loss of tree nesting habitat. The proposed GBTS facility and associated parking and UMT facility would be sited on managed grasslands and would require the permanent removal and modification of the existing nonnative grassland. Wildlife species, such as small mammals and grassland birds, may use these areas for foraging and possibly nesting. These areas would be altered permanently and experience more frequent, year-round maintenance resulting in avoidance of the areas by individual wildlife that may move to adjacent available habitat. Because the proposed facilities would not affect large populations of wildlife and many of the species are urban-adapted and would return to normal behavior shortly after construction is complete, the impacts would be less than significant.

During construction, measures would be implemented to protect wildlife and avoid or minimize habitat reduction, deterrence, or depredation. After construction is complete, reclamation or landscaping designs would be implemented as a BMP in accordance with the installation's INRMP (Columbus AFB 2020a). Post-construction erosion control measures to avoid or minimize effects on wildlife, nesting habitat, or foraging habitat would be stipulated in the erosion and sedimentation control plan required as part of the construction effort.

Long-term, less than significant, adverse impacts on wildlife from aircraft strikes and noise may occur from aircraft operations during the T-38C to T-7A transition period, at full T-7A implementation, and with the introduction of nighttime T-7A operations at Columbus AFB. Such aircraft operations would increase the risk of bird and bat strikes. To minimize the potential for bird and bat strikes, DAF would update the installation's BASH Plan to include the proposed aircraft operations at Columbus AFB. Measures would be followed, as described in the installation's BASH Plan, to reduce the potential for bird and bat strikes.

Nighttime T-38C operations do not occur currently at Columbus AFB; however, nighttime operations with other types of aircraft do occur. To minimize impacts on bats leaving and entering roosting sites at dusk and dawn when nighttime T-7A operations begin, DAF would follow the installation's BASH Plan (Columbus AFB 2018) and AFMAN 13-204, *Air Traffic Control*. DAF would also monitor bat activity in the area and, if possible, use alternative runways during peak hours and months for bat activity (i.e., the hours of dusk between April and early October).

Appendix 2 to Annex D of the BASH Plan documents current wildlife hazards at Columbus AFB. It notes that vultures and soaring raptors account for a majority of the damaging bird strikes. A year-round threat, these raptors' presence may intensify during hunting and migration seasons. Increased activity has also been observed ahead of cold fronts moving through the area. Vultures are probably the greatest concern, as they tend to soar at altitudes up to 2,000 feet from the surface and loiter for long periods. Early morning and evening roosts are typically on transmission and communication towers. They take flight early to mid-morning from their roost in search of food (carrion, i.e., dead animals). During their "social soaring" behavior that normally occurs in the mid-afternoon, a large number (kettle) of vultures will congregate at altitudes coinciding with normal aircraft operating altitudes. Clearing vigilance is the best recourse for threat avoidance. In addition to vultures and other soaring raptors, meadowlarks, grackles, and crows can also cause bird strikes. These birds stay in open grassy areas and are evident in the areas along the three runways at Columbus AFB. Periodic bird shoots have proven effective for periods of a few weeks and up to a few months. Grass control along the runways is also used to reduce these species' numbers. According to the BASH Plan, mammals such as deer and coyotes are a current wildlife hazard. Although less of a hazard near the runways, hunting and trapping have been effective control measures for these species.

Appendix 3 of Annex B in the BASH Plan provides general, non-installation-specific measures on reducing hazards to aircraft associated with a variety of types of birds and wildlife, including some documented on the installation in the INRMP. Although not specifically identified as current hazards in the BASH Plan, broad categories of birds identified at the installation and measures that could be employed to reduce the likelihood of strikes, include the following:

- Many different types of wildlife can be managed simply by maintaining grass heights between 7 and 14 inches.
- Conflicts with birds and bats in general can be reduced by avoiding flights near dawn and dusk.
- Flocks or other concentrated populations of birds that pose a risk can be frightened off through the use of pyrotechnics.
- Waterfowl and wading birds can be controlled through removal of emergent vegetation, steepening pond bank sides, and, when possible, elimination of fish as a food source from ponds.
- Ravens, blackbirds, cowbirds, and starlings should have roost sites removed near flight areas.

- Songbirds and other small birds typically eat either insects or seeds and can be managed through insect control and appropriate mowing and maintenance of grasses and other vegetation. The BASH Plan notes that strikes with most of these types of birds are rare and generally do not cause significant damage.

Annex B of the BASH Plan delineates tasks and responsibilities for organizations to execute the installation's BASH Plan. Implementation of these tasks and responsibilities would continue to reduce the potential for strikes around the installation's airfield and vicinity, although the potential cannot be eliminated entirely.

The phased delivery of T-7A aircraft and removal of T-38C aircraft and the personnel changes associated with Alternative 1 would have no impacts on wildlife.

Special Status Species. Alternative 1 may affect, but is not likely to adversely affect, 8 federally listed or candidate species and would have no effect on the remaining 73 federally listed or candidate species with potential to occur on Columbus AFB or within or underlying the SUA proposed for flight operations. The species subject to the determination of may affect, but is not likely to adversely affect, are the northern long-eared bat, Wood Stork, monarch butterfly, gray bat, Indiana bat, Eastern Black Rail, Piping Plover, and Red Knot.

The northern long-eared bat dwells and forages in forested areas beneath the canopy, and the Wood Stork is a marsh bird that typically occurs in freshwater wetlands and water features. No suitable habitat for the northern long-eared bat or Wood Stork occurs at the MILCON/UMMC and FSRM project areas or at the ends of the airfield; therefore, it is unlikely that these species would be in those areas and be affected by construction or aircraft noise. The monarch butterfly is found in fields, roadside areas, open areas, wet areas, and urban gardens, and milkweed and flowering plants are needed for monarch habitat. Suitable habitat is located near the proposed MILCON/UMMC and FSRM projects and near the airfield at Columbus AFB; therefore, it is possible this candidate species could be affected by construction or aircraft noise. Impacts on these three species from potential strikes during T-7A flight operations are discussed in the next paragraph.

While the proposed T-7A flight operations would occur within the same SUA used currently for T-38C operations, the addition of nighttime T-7A operations may slightly increase the potential for an incidental strike with certain flying species compared to the current potential. Incidental strikes with the northern long-eared bat, Wood Stork, and monarch butterfly could occur during takeoffs, landings, and closed patterns at the Columbus AFB airfield and during high-altitude operations in the SUA. In addition, incidental strikes with the gray bat, Indiana bat, Eastern Black Rail, Piping Plover, and Red Knot could occur during high-altitude operations in the SUA. FAA estimates that approximately 97 percent of bird and wildlife aircraft strikes occur at the takeoff and landing stages of flight at or near an airfield. The remaining approximately 3 percent occur in the cruise phase of flight (FAA 2022b). With Alternative 1, operations are expected to occur as low as 500 feet AGL within certain SUA. Continued adherence to the Columbus AFB BASH Plan would help avoid and minimize the potential for avian or bat strikes in the event of an incidental occurrence of a federally listed/candidate species. If determined to be necessary, new measures would be developed to reduce the potential for impacts to occur, and the BASH Plan would be updated accordingly.

No effect would occur on the Ivory-billed Woodpecker, Red-cockaded Woodpecker, and Mitchell's satyr butterfly because these flying species do not fly at a high enough altitude to be affected by aircraft operations. Additionally, the eight clam species with potential to occur on Columbus AFB are found exclusively in aquatic habitat, and no activities are proposed that would affect aquatic resources. The white fringeless orchid grows in the wet soils of bogs, marshes, fens, swamps, stream heads, and on sloping areas kept moist by groundwater seeping to the surface. The proposed MILCON/UMMC and FSRM projects occur on either impervious cover, existing structures, or maintained, non-native grasslands or lawns that do not provide suitable habitat for the eight clam species or the white fringeless orchid. Therefore, Alternative 1 would have no effect on these 12 federally listed species and all non-flying species with potential to occur in the SUA.

DAF consulted with the USFWS Mississippi Field Office under Section 7 of the ESA regarding this determination of effect. USFWS concurred with DAF's determination of effect in a letter dated February 15, 2023. Copies of the USFWS consultation letters are included in **Appendix B**.

No appreciable effects on state-listed and sensitive species would result from Alternative 1. As noted previously, 14 state sensitive or state-listed species (i.e., hoary bat, Rafinesque's big-eared bat, southeastern myotis bat, tricolored bat, northern yellow bat, old field mouse, eastern spotted skunk, Grasshopper Sparrow, Cooper's Hawk, Mississippi Sandhill Crane, largescale stoneroller, short hair sedge, swamp hickory, and lobed tickseed) have been documented within Columbus AFB and therefore have the possibility to occur again. The INRMP does not specify frequencies or locations of documented occurrences; however, it is likely that many of these species would prefer undeveloped or less-developed areas of the installation, away from human activity, rather than the MILCON/UMMC and FSRM project areas, which are in the most developed portion of the installation. Eight of the species are birds or bats and could easily fly away from construction-related disturbances, should they be located in this area at the time of construction. Additionally, the old field mouse and eastern skunk, as terrestrial mammals, could similarly relocate.

The largescale stoneroller is an aquatic species, and none of the other three plants occur in the maintained habitat of the MILCON/UMMC and FSRM project areas; therefore, these four species would not be affected by construction or aircraft operations.

Suitable habitat for the old field mouse and eastern spotted skunk occurs in the unmaintained areas throughout Columbus AFB, away from the airfield. Noise from aircraft operations might cause individuals of these species to migrate to similar habitat elsewhere on, or entirely off the installation. Such changes would not represent significant impacts on the species.

The proposed aircraft operations would increase the risk of bird and bat strikes to the federally and state-listed species of this type. To minimize the potential for such strikes, the installation's BASH Plan would be followed. Such measures are described in the Wildlife subsection.

3.4.2.2 Alternative 2

Ground disturbance activities would be the same as Alternative 1 resulting in identical impacts on vegetation and wildlife. T-7A operations that are 25 percent greater than Alternative 1 would

increase the potential for BASH incidents slightly. Measures and BMPs similar to those described for Alternative 1 would be implemented to minimize the potential for bird and bat strikes.

3.4.2.3 Alternative 3

The impacts on biological resources from T-7A operations that are 25 percent greater than Alternative 1 and the delivery of up to 16 additional T-7A aircraft would be identical to those described for Alternative 2. Although Alternative 3 would disturb more area by installing up to 58 T-7A shelters on the Columbus AFB ramp (rather than up to 46 shelters for Alternatives 1 and 2), construction impacts on biological resources would be the same as those described for Alternative 1 because of the total lack of vegetation and wildlife habitat on the Columbus AFB ramp.

3.4.2.4 No Action Alternative

The No Action Alternative would not contribute to new or additional impacts on biological resources. No facility construction would occur, and there would be no changes in aircraft operations. No vegetation removal would occur, and no impacts on wildlife, including protected and sensitive species, would occur. Biological resources conditions at Columbus AFB would remain unchanged compared to the existing conditions described in **Section 3.4.1**.

3.4.3 Cumulative Effects

Short- and long-term, less than significant, adverse cumulative effects on vegetation and associated habitats would occur from construction related to T-7A recapitalization and the reasonably foreseeable actions (see **Table 3-2**). Most of the areas sited for construction are within highly urban areas or on previously disturbed surfaces, and vegetation permanently lost from construction would be minimal.

Short- and long-term, less than significant, adverse cumulative effects on wildlife would occur from ground disturbance, which would remove habitat and displace wildlife species. It is assumed that displaced wildlife would return soon after construction concludes and vegetation surrounding the new construction is restored, as practicable. Long-term, adverse, cumulative effects on wildlife would occur from the permanent loss of potential wildlife habitat, such as trees or forested areas.

3.5 Cultural Resources

Cultural resources are historic districts, sites, buildings, structures, or objects considered important to a culture, subculture, or community for scientific, traditional, religious, or other purposes. Depending on the retention of original characteristics and historic use, such resources might provide insight into the cultural practices of previous civilizations, or they might retain cultural and religious significance to modern groups. Cultural resources are typically subdivided into archaeological resources, architectural resources, and resources of traditional or religious significance. Archaeological resources are areas where human activity has measurably altered the earth or deposits of physical remains are found (e.g., projectile points and bottles) but standing structures do not remain. Architectural resources include standing buildings, structures, objects, and designed landscapes of historic significance. Resources of

traditional, religious, or cultural significance can include archaeological resources, sacred sites, structures, districts, prominent topographic features, habitats, plants, animals, or minerals considered essential for the preservation of traditional culture.

Several federal laws and regulations govern the protection of cultural resources, including the National Historic Preservation Act (NHPA) (1966), the Archeological and Historic Preservation Act (1974), the American Indian Religious Freedom Act (1978), the Archaeological Resources Protection Act (1979), and the Native American Graves Protection and Repatriation Act (1990). Columbus AFB is required to comply with DAF regulations and instructions regarding cultural resources, including AFMAN 32-7003, *Environmental Conservation*. DAF consults with federally recognized tribes in accordance with the laws listed previously; DoD Instruction 4710.02, *DoD Interactions with Federally Recognized Tribes*; and DAF Instruction 90-2002, *Interactions with Federally Recognized Tribes*.

NHPA authorized the Secretary of the Interior to expand and maintain the criteria for assessing the significance of cultural resources. Resources that are listed or eligible for listing in the National Register of Historic Places (NRHP) are termed "historic properties." Cultural resources must be 50 years or older to warrant consideration for the NRHP. More recent resources might warrant listing if they are of exceptional importance and have attained significance within the past 50 years. Section 106 of the NHPA directs federal agencies to seek ways to avoid, minimize, or mitigate impacts to historic properties through consultation with the appropriate SHPO and federally recognized tribes.

Area of Potential Effect (APE). Federal agencies assess the potential impact of their undertakings on historic properties located within an APE. DAF has defined this undertaking as the Proposed Action and has defined the APE as the potential impact area from all activities, including all areas of potential direct and indirect effects. Direct effects include, but are not limited to, ground disturbance, vibration, building modification and new construction, and staging and equipment storage. Indirect effects include, but are not limited to, noise and aesthetic interference. For this undertaking, the APE is defined as the footprint of all buildings proposed for interior and exterior alteration, all areas of new construction and additions, all landscape features (such as airfield markings) that are proposed for alteration, all new parking lots, and a 50-foot buffer around those areas to account for construction staging and temporary physical impacts from ground disturbing activity. The APE captures all anticipated direct and indirect effects as all new construction is anticipated to be one-story and not exceed 40 feet in total building height. There are no NRHP-listed or eligible historic districts, sites, buildings, structures, or objects that would be visually or audibly affected by the proposed undertaking. In addition, the only vertical incursions planned are the antennas that would be located atop the proposed GBTS facility, which would project approximately 15 to 20 feet above the one-story building. Thus, the total vertical projection of the proposed GBTS facility and antennas is approximately 55 to 60 feet combined. The APE totals approximately 36.9 acres and is shown in **Figure 3-20**.

Figure 3-20. Cultural Resources Area of Potential Effect

The APE for this undertaking does not include the SUA where the T-7A aircraft would perform operations (see **Table 3-1**) because this SUA already is used for such operations with the T-38C aircraft, and this undertaking would not change the configuration (e.g., shape, size, altitudes) or active times of this SUA. As noted in **Sections 3.3.2.1.2.1** and **3.3.2.2.2.1**, noise modeling for the SUA using the proposed T-7A operations indicates that noise levels would not result in a L_{dnmr} greater than 65 dB in any SUA except the Birmingham MOAs and the Sea Ray Range, which are already exposed to an L_{dnmr} greater than 65 dB from T-38C flight training. Based on this information, T-7A flight training would have no potential to effect historic properties—including adobe structures and traditional cultural properties—beneath any SUA, and the SUA do not warrant inclusion in the APE for this undertaking.

3.5.1 Affected Environment

Installation History. The Columbus Army Airfield was established June 26, 1941, as a training facility for pilots. Originally named Kaye Field, the name was changed to Columbus Army Flying School in 1942. The installation was active during World War II and decommissioned in 1946. When the United States entered the Korean Conflict in 1950, the installation was reactivated as Strategic Air Command and Second Air Force. The change in its military mission prompted an active building program and an increase of 3,600 acres. Today, Columbus AFB remains active with continued focus on air education and training (Columbus AFB 2014).

Cultural Resources of the APE. Several prior cultural resource investigations have been performed within the APE. The National Park Service (NPS) performed a cultural resource survey of Columbus AFB in 1986. The survey concluded it was highly unlikely that any significant resources would be discovered in the immediate future, and the Mississippi Department of Archives and History (MDAH) concurred with this conclusion (tDAR 2022). Subsequent inquiries by MDAH also concluded there were no eligible properties and future discoveries were unlikely (Columbus AFB 1995). Columbus AFB prepared a built environment inventory in December 2003 to assess buildings, structures, and objects related to the Cold War-Era (Columbus AFB 2003).

Resources of Traditional or Religious Significance. Eighteen federally recognized tribes have an expressed or potential interest in cultural resources at Columbus AFB and the SUA. These tribes are the Alabama-Coushatta Tribe of Texas, Alabama-Quassarte, Apache Tribe of Oklahoma, Cherokee Nation, Chickasaw Nation, Choctaw Nation of Oklahoma, Coushatta Tribe of Louisiana, Eastern Band of Cherokee Indians, Mississippi Band of Choctaw Indians, Jena Band of Choctaw Indians, Kialegee Tribal Town, Muscogee Creek Nation, Osage Nation, Poarch Creek Indians, Quapaw Nation, Shawnee Tribe of Oklahoma, Eastern Shawnee Tribe of Oklahoma, and Tunica-Biloxi Tribe of Louisiana. DAF consults with tribes on issues related to cultural resource management, the unanticipated discovery of human remains and cultural items under the Native American Graves Protection and Repatriation Act, and on project specific effects under Section 106 of the NHPA. During prior consultations, these tribes have not identified any sacred sites or traditional cultural properties on the installation.

3.5.2 Environmental Consequences

Impacts on cultural resources result from actions that change culturally valued elements of a resource or restrict access to cultural resources. Impacts on cultural resources may be short- or long-term and direct or indirect. Direct impacts can result from physically altering, damaging, or destroying all or part of a resource. Indirect impacts can occur from alterations to characteristics of the surrounding environment that contribute to the importance of the resource. This includes introducing visual, atmospheric, or audible elements that are out of character with the property or that alter its setting or feeling. Under Section 106 of the NHPA, DAF must determine if the Proposed Action would result in an "adverse effect" on historic properties and must avoid, minimize, or mitigate such effects if they would occur. For the purposes of Section 106, an adverse effect is one that changes elements or characteristics of a historic property that make the property eligible for listing in the NRHP. This analysis focuses on cultural resources that are listed in or eligible for listing in the NRHP and incorporates DAF findings of effect under Section 106 of the NHPA.

3.5.2.1 Alternative 1

In and of itself, a change in the type of aircraft flown or the timing (e.g., daytime or nighttime) and frequency of flight operations would have no potential to impact historic properties. As noted in **Section 3.3.2.1.1.2**, T-7A operations at Columbus AFB would increase noise levels at POI in the region by a maximum of 4 dB. A similar magnitude increase would be anticipated at historic properties in the region, but such a magnitude increase would not be anticipated to impact any historic properties. A change to personnel numbers at Columbus AFB would also have no potential to impact historic properties. The only aspects of Alternative 1 that have the *potential* to impact historic properties are the five MILCON/UMMC and six FSRM projects proposed at the installation. **Table 3-69** lists the MILCON/UMMC and FSRM projects and summarizes their impact on historic properties.

Three FSRM projects would entail alterations to three historic-age buildings. These three projects are interior renovations of a squadron operations building, Building 216 (built 1961); renovation of Building 452 (Hangar 3, built 1958); and relocation of the wash rack from Building 452 to Building 454 (Hangar 4, built 1959). Additionally, Building 216 is partially within the APE of the proposed GBTS facility, and Buildings 452 and 454 are within the APE of the proposed egress shop. However, all three buildings would not be physically altered by construction from these projects. Those three resources of the built environment that would be impacted (Building 216, Building 452, and Building 454) are now over 50 years old and were evaluated for potential eligibility for listing in the NRHP. No other historic-age buildings would be impacted by the proposed MILCON/UMMC and FSRM projects.

Table 3-69. Cultural Resources Components of the Proposed Action and Impact on Historic Properties

Building Name/Number	Project Component	NRHP Status	Date Constructed	Assessment of Effect
MILCON/UMMC Projects				
GBTS Facility	Construct an approximately 33,000 ft^2 facility on a parking lot adjacent to Building 216 (built 1961). Proposed one-story building, approximately 40-feet-tall, with concrete floor slab. Existing adjacent parking lot would be expanded by approximately 176 spaces.	Building 216 determined not eligible with SHPO concurrence November 17, 2022	N/A – Non-historic parking lot Building 216 (built 1961), partially within the APE, would not be altered from construction of the proposed GBTS facility	No effect to historic properties
UMT Facility	Construct an approximately 12,000 ft^2 facility on an undeveloped field behind Building 440. Proposed one-story building with concrete floor slab. No additional parking needed.	N/A – New construction	N/A – Vacant field	No effect to historic properties
Hush House	Construct a new, one-story facility adjacent to existing hush house (Building 227, built 1992).	N/A – New construction	N/A – Non-historic apron	No effect to historic properties
T-7A Shelters	Construct up to 46 shelters (sunshades) on existing aircraft parking ramp and remove existing non-historic T-38C prefabricated shelters (installed in 2012).	N/A – New construction Existing shelters are non-historic	N/A – Non-historic ramp Existing T-38C shelters installed in 2012	No effect to historic properties
Egress Shop	Construct a facility between Building 452 (Hangar 3, built 1958) and Building 454 (Hangar 4, built 1959).	Buildings 452 and 454 determined eligible by SHPO March 28, 2023	N/A – Vacant grass area Building 452 (built 1958) and Building 454 (built 1959), within the APE, would not be altered from construction of the proposed facility	Determined no adverse effect with SHPO concurrence June 21, 2023

Building Name/Number	Project Component	NRHP Status	Date Constructed	Assessment of Effect
FSRM Projects				
Renovate Building 452 (Hangar 3)	Convert building to a four-bay T-7A hangar. (Hangar 3, built 1958).	Building 452 determined eligible by SHPO March 28, 2023	1958	Provided that two conditions are met, determined no adverse effect with SHPO concurrence June 21, 2023
Wash Rack Renovation	Construct a wash rack at Building 454 (Hangar 4, built 1959).	Building 454 determined eligible by SHPO March 28, 2023	1959	Provided that two conditions are met, determined no adverse effect with SHPO concurrence June 21, 2023
Antenna Farm	Incorporate an antenna farm into the design of the proposed GBTS facility. Antenna to be located atop the roof, projecting approximately 15 to 20 feet above the approximately 40-foot-tall building.	N/A – New construction	N/A – Non-historic parking lot	No effect to historic properties
Squadron Operations Buildings Renovations	Renovate the interior of the Squadron Operations Buildings 216 (built 1961) and 234 (built 2008).	Building 216 determined not eligible with SHPO concurrence November 17, 2022. Building 234 is non-historic.	1961 and 2008	No effect to historic properties

Building Name/Number	Project Component	NRHP Status	Date Constructed	Assessment of Effect
Airfield Improvements	Remark the T-38C ramp to the width of the T-7A.	N/A – Signage markings on non-historic ramp	N/A – Non-historic ramp	No effect to historic properties
	Install new moorings and anchor rods for T-7A aircraft.	N/A – Attached to non-historic ramp	N/A – Non-historic ramp	No effect to historic properties
	Replace existing aircraft arresting system.	N/A – Attached to non-historic ramp	N/A – Non-historic ramp	No effect to historic properties
	Remove Centralized Aircraft Support System's aboveground service modules.	Modules are not of historic age and do not meet Criterion Consideration G	1985	No effect to historic properties
Trim Pad	Construct a new trim pad across from the hush house on the engine run-up apron. Relocate the Compass Rose to another magnetically quiet site.	N/A – Trim pad because it is new construction Compass rose is non-historic	N/A – Trim Pad on vacant site Compass Rose painted in 2015	No effect to historic properties

Key: N/A = not applicable

Columbus AFB prepared a built environment inventory in December 2003 to assess buildings, structures, and objects related to the Cold War-Era (Columbus AFB 2003). The 2003 inventory recommended Buildings 216, 452, and 454 as not eligible for inclusion in the NRHP based on a lack of integrity and failure to meet the exceptional significance threshold required under Criterion Consideration G. The 2003 inventory document was reviewed by the MDAH, but no formal determination was made. Buildings 216, 452, and 454 now meet the 50-year minimum threshold for NRHP assessment. DAF consultation with the SHPO dated November 17, 2022, determined that Building 216 was not eligible for listing in the NRHP and consultation dated March 28, 2023, determined that Buildings 452 and 454 are eligible for listing in the NRHP. Following the determination that Buildings 452 and 454 are eligible, DAF continued consultation with SHPO and requested a finding of no adverse effect for both buildings. SHPO provided concurrence with the finding of no adverse effect, in a letter dated June 21, 2023, provided that the following two conditions are met.

1. The proposed installation of the new vertical lift doors must occur within the existing openings for both buildings.
2. The application of a brick veneer to the exterior of both buildings must be eliminated. New exterior wall cladding must consist of metal panels similar in appearance as the existing exterior wall cladding.

Five MILCON/UMMC and FSRM projects (GBTS facility, UMT facility, Hush House, Egress Shop, and Trim Pad) would require ground disturbance. The ground disturbance areas for these projects are in previously developed portions of the installation, and no historic sites or artifacts have ever been identified during construction, infrastructure sustainment, or repair on Columbus AFB. Therefore, there is little to no potential for archaeological resources within the construction areas. Additionally, NPS conducted a cultural resource survey of Columbus AFB in 1986. The survey concluded it was highly unlikely that any significant resources would be discovered in the immediate future (Columbus AFB 1995). As such, no archaeological surveys were recommended for the APE by SHPO, in consultation dated November 17, 2022. However, on January 17, 2023, during Native American tribal consultation, the Choctaw Nation of Oklahoma requested an archaeological survey of the APE because Columbus AFB lies within the tribe's Trail of Tears Removal Corridor. To satisfy the tribe's request, DAF performed an archaeological survey of the APE. The archaeological survey determined that the APE has very low sensitivity for containing significant archaeological deposits, and the survey resulted in a recommendation of no effect to archaeological resources. The results of that survey were approved by the SHPO and requesting tribe in correspondences received during August 2023. **Appendix B** contains copies of those correspondences.

The remaining MILCON/UMMC and FSRM projects would have no potential to impact cultural resources because they would entail no ground disturbance or modification of historic-age buildings. The proposed T-7A shelters and airfield improvements would occur on the existing concrete of the aircraft parking ramp or apron, which is non-historic. The construction of the T-7A shelters would also require the removal of the existing, prefabricated T-38C shelters, which are non-historic and were installed in 2012. The Compass Rose was painted in 2015 and is not historic. Additionally, the proposed interior renovation of squadron operations Building 234 would have no effect on historic resources as it was constructed in 2008. Furthermore, the

modules of the Centralized Aircraft Support System are not of historic age (built in 1985) and do not meet Criterion Consideration G for exceptional significance. Finally, the proposed antenna farm would be located on the roof of the proposed GBTS facility, which has not yet been constructed, and the total vertical projection of the one-story building and antennas is not anticipated to exceed 60 feet.

An adverse effect is one that changes elements or characteristics of a historic property that make the property eligible for listing in the NRHP. DAF has applied the Criteria of Adverse Effect and has determined that Alternative 1 would have no adverse effect to historic properties. On July 26, 2023, DAF consulted with the Mississippi SHPO to request their concurrence with the no adverse effect to historic properties determination. The Mississippi SHPO concurred with this determination in a letter dated August 2, 2023. **Appendix B** contains copies of the consultation letters.

Resources of Traditional or Religious Significance. DAF also consulted with the 18 Native American Tribes with interest in Columbus AFB and the SUA (see **Section 3.5.1** for a list of those tribes) to confirm no relevant sacred sites or traditional cultural properties are present. Each tribe was initially contacted in late March 2022 as part of the public scoping process. Only the Choctaw Nation of Oklahoma and Cherokee Nation responded to the initial scoping contact. The Choctaw Nation of Oklahoma requested to become a consulting party and requested access to the GIS shapefiles and coordinates of the project area to determine if any known tribal, cultural, or sacred sites exist within the project area. They also requested all project materials, including cultural resources surveys, and a description of all ground disturbing activities. DAF responded by sending the GIS shapefiles of the Columbus AFB installation boundary and the areas proposed to be disturbed by the MILCON/UMMC and FSRM projects. The Cherokee Nation stated that Lowndes County, Mississippi, was outside their Area of Interest and therefore defer to the federally recognized tribes that have an interest in this area. No further consultation with the Cherokee Nation is necessary for this undertaking.

A second government-to-government consultation letter was sent by DAF in October 2022 to the 17 tribes (excluding the Cherokee Nation) requesting assistance in identifying any relevant historic properties of religious and cultural significance to tribal nations. Two tribes responded to that letter: the Chickasaw Nation and Choctaw Nation of Oklahoma. On November 16, 2022, the Chickasaw Nation stated they support the proposed undertaking, are presently unaware of any specific historic properties in the APE, and request to be notified if historic properties are discovered. On January 17, 2023, the Choctaw Nation of Oklahoma requested an archaeological survey of the APE because Columbus AFB lies within the tribe's Trail of Tears Removal Corridor. DAF performed an archaeological survey of the project sites with ground disturbance, and the results were negative for cultural resources, resulting in a recommendation of no effect on archaeological resources. The results of that survey were provided to the Choctaw Nation of Oklahoma and Mississippi Band of Choctaw Indians as well as the Mississippi SHPO, and each of those parties concurred with the results of the archaeological survey, in correspondences received during August 2023. **Appendix B** contains copies of those correspondences.

The 17 tribes were notified of the availability of the Draft EIS in October 2023. Only the Quapaw Nation responded to this notification. The Quapaw Nation determined the project was not located within their tribal area of interest and declined to provide comments. They also requested to be removed from further consultation. **Section 4.3** provides further information on the comments received from notification of the Draft EIS.

3.5.2.2 Alternative 2

Impacts on cultural resources from T-7A operations that are 25 percent greater than Alternative 1 would be identical to those described for Alternative 1. The proposed increase in flight operations would have no potential to impact historic properties. Thus, like Alternative 1, no effect on historic properties would occur from Alternative 2.

3.5.2.3 Alternative 3

Impacts on cultural resources from T-7A operations that are 25 percent greater than Alternative 1 and the delivery of up to 16 additional T-7A aircraft, would be identical to those described for Alternatives 1 and 2. Identical impacts on historic properties would occur from the installation of up to 58 T-7A shelters (rather than up to 46 shelters for Alternatives 1 and 2) because all shelters would be constructed on the existing, non-historic ramp. Thus, like Alternatives 1 and 2, no effect on historic properties would occur from Alternative 3.

3.5.2.4 No Action Alternative

The No Action Alternative would not impact historic properties. No facility construction would occur, and there would be no changes in aircraft operations. Cultural resources at Columbus AFB would remain unchanged when compared to the existing conditions described in **Section 3.5.1**.

3.5.3 Cumulative Effects

The MILCON/UMMC and FSRM projects and reasonably foreseeable actions at Columbus AFB and within the surrounding area (see **Table 3-2**) and are not anticipated to result in cumulative effects on cultural resources. As stated in **Sections 3.5.2.1**, **3.5.2.2**, and **3.5.2.3**, no effect on historic properties would occur from the Proposed Action. Although the reasonably foreseeable actions would involve some level of ground disturbance, each action would occur in a highly developed area where it is not anticipated that any effects on archaeological resources would occur. Known cultural resources sites would be avoided; however, if avoidance is not possible, then mitigation measures would be developed in accordance with Section 106 of the NHPA. The proponent for each reasonably foreseeable action would consult with the Mississippi SHPO and relevant Native American tribes, as necessary. Therefore, the Proposed Action, when combined with the reasonably foreseeable actions, would not result in a significant cumulative effect on cultural resources.

3.6 Land Use

Land use refers to the human use or modification of lands for various purposes and the management of those uses. Land use classifications refer to real property descriptions that indicate either natural conditions or the types of human activity occurring on a land parcel.

Primary objectives of land use management and planning are to ensure orderly and appropriate growth and compatibility between uses among adjacent property parcels or areas. Various administrative tools (i.e., policy plans, zoning ordinances, easements, subdivision regulations, deed restrictions, and covenants) are typically used to manage the development of land and facilitate desired use patterns, including protection of specially designated or environmentally sensitive uses.

Land use classifications denote predominant uses and/or characteristics of real property to provide a basis for spatial analysis and comparisons. Natural conditions of property can be described or categorized as unimproved, undeveloped, conservation or preservation area, and natural or scenic area. Descriptive classifications for human development and activity include residential, commercial, industrial, military, agricultural, institutional, transportation, communications and utilities, and recreational.

The regulatory setting for land use includes federal, state, and local statutes, regulations, plans, policies, and programs applicable to land use management on installations and adjacent areas. The primary DAF directives and guidance applicable to the Proposed Action are discussed as follows.

Federal Interagency Committee on Urban Noise. In 1980, the Federal Interagency Committee on Urban Noise published guidelines (FICUN 1980) relating DNL to compatible land uses. This committee was comprised of representatives from DoD; Transportation, Housing, and Urban Development; USEPA; and the Veterans Administration. Since the issuance of these guidelines, federal agencies have generally adopted them for their noise analyses.

Following the lead of the committee, DoD and FAA adopted the concept of land-use compatibility as the accepted measure of aircraft noise effect. FAA included the committee's guidelines in the Federal Aviation Regulations. Although these guidelines are not mandatory, they provide the best means for determining noise impact in airport communities. In general, residential land uses are not normally compatible with outdoor DNL values above 65 dBA, and the extent of land areas and populations exposed to DNL of 65 dBA and higher provides the best means for assessing the noise impacts of alternative aircraft actions. In some cases, a change in noise level, rather than an absolute threshold, may be a more appropriate measure of impact.

Air Force Instruction (AFI) 32-1015, Integrated Installation Planning, and AFH 32-7084, AICUZ Program Manager's Guide. AFI 32-1015 establishes the AICUZ discretionary program to promote compatible land use surrounding military airfields. The goal of the AICUZ program is to protect the health, safety, and welfare of people living near an airfield, while preserving the operational integrity of the defense flying mission. Components of the AICUZ program, as defined in AFH 32-7084, include CZs, APZs, Hazards to Aircraft Flight Zones, and noise zones.

Installations use the AICUZ program to provide land use compatibility guidelines to areas exposed to increased safety risks and noise near airfields. Aircraft noise zones, APZs, and height restrictions for nearby structures are usually identified in installation specific AICUZ plans. These plans provide information on off-installation land uses and identify uses that are compatible, incompatible, or conditionally compatible (may require noise attenuation measures) with installation noise and accident zones. In accordance with AFI 32-1015, land use can be deemed incompatible with an installation if it adversely affects the utility of DAF training and readiness missions, thereby affecting the ability of an installation to fulfill its mission.

AFI 32-1015 also establishes the Comprehensive Planning Program, which is designed to establish a framework for land use decision-making regarding development of DAF installations. The program incorporates operational, environmental, urban planning, and related considerations to identify and assess development alternatives and ensure compliance with applicable laws, regulations, and policies. Under AFI 32-1015, all major installations are required to develop an IDP to guide land use management and decisions.

3.6.1 Affected Environment

Installation Land Use. Columbus AFB completed a comprehensive IDP in 2017 to promote the installation leadership's strategic vision. The IDP focused on achieving the goals and objectives for future development at Columbus AFB (Columbus AFB 2017a). The installation setting and constraint and capacity considerations of the IDP were updated in 2022 (Columbus AFB 2022b). According to the IDP, Columbus AFB has 12 existing and future land uses, and the proposed MILCON/UMMC and FSRM projects would occur primarily in two of these land uses: "Aircraft Operations and Maintenance" and "Airfield Pavement." These two land uses encompass the airfield, taxiways, parking aprons, and mission related flightline facilities. A small portion of the proposed GBTS facility's parking lot may also occur within the "Outdoor Recreation" land use.

JLUS. A JLUS for Columbus AFB was completed in June of 2013. It included a policy committee and technical working group with representatives from the city of Columbus, Lowndes County, Columbus AFB, Golden Triangle Regional Airport, Columbus-Lowndes Development LINK, the Lowndes County Board of Education, members of Congress, the North Mississippi Industrial Development Authority, and others. In February 2015, a Compatibility Reference Guide was developed as part of the JLUS implementation effort. The purpose of the Guide is to educate, inform, and guide decision-makers regarding actions that pose a compatibility risk for Columbus AFB (Columbus-Lowndes Development Link 2013).

Overall, the JLUS Compatibility Reference Guide provides detailed descriptions of the types of tools that can be deployed, including advice as to when, where, and how to use them. It offers suggestions on how awareness and collaboration can be enhanced to the benefit of the communities surrounding Columbus AFB and preserve the mission and the installation's capabilities. It also makes clear that the guidance provided in the JLUS Compatibility Reference Guide is a supplement to, and not a replacement for, the current Columbus AFB Air Installation Land Use Ordinance (CUD Ordinance) in Lowndes County, which was implemented in 1994 (also known as the Airport Zoning Ordinance) (Columbus-Lowndes Development Link 2013).

Some topic areas outlined in the JLUS Compatibility Reference Guide that should be considered and require coordination to maintain a mutually beneficial relationship between the local municipalities and Columbus AFB include:

- Annual budgets
- Capital facilities (water/sewer/power/communication)
- Transportation
- Land use
- Cellular and wind energy tower siting
- Land acquisition
- Farmland preservation
- Building codes
- Public facility siting
- Housing
- Economic development.

***Columbus AFB AICUZ Program*.** The most recent AICUZ plan for Columbus AFB was completed in 2012 (Columbus AFB 2012). It identified off-installation land uses within CZs, APZs, and within the 65 dB DNL noise contour. Noted compatibility concerns within the 2012 AICUZ plan for Columbus AFB include residential developments in the southern APZs and in certain 65 dB DNL noise contours immediately outside the installation boundary. According to the 2012 AICUZ plan, this area amounted to 50 acres total between those residential land uses within the APZs and the 65 to 70 dB DNL noise contours.

As part of this EIS, new baseline noise contours were modeled for Columbus AFB; therefore, impacts from the Proposed Action on land use and noise are compared with the new baseline noise contours rather than the 2012 AICUZ plan's noise contours. In addition, because there are no proposed changes to the CZs or APZs associated with Columbus AFB as part of the Proposed Action, those topics are not discussed within the land use section. The CZs and APZs are further discussed as part of the safety analysis in **Section 3.9**.

Columbus AFB Air Installation Land Use Zoning Ordinance (CUD Ordinance). This ordinance, also referred to as the Airport Zoning Ordinance, was adopted in 1994 pursuant to the Airport Zoning Law as authorized by Mississippi Code § 61-7-1 et. seq. The CUD Ordinance was adopted for the purposes of preserving and promoting the public health, safety, and general welfare of the inhabitants of Lowndes County by controlling the creation or establishment of airport hazards and the elimination, removal, alteration, mitigation, or marking and lighting of existing airport hazards.

The CUD Ordinance established 13 districts to formally designate geographic areas where military and civilian uses may intersect. By encouraging compatible developments within these districts, it would serve to protect the military's mission while also reducing potential impacts on

civilian uses. The CUD Ordinance is a baseline for addressing compatible land uses in proximity to Columbus AFB. The ordinance is outdated and does not incorporate the many additional and new factors that may result in encroachment. The CUD Ordinance is based on the installation's 1994 AICUZ plan, and the noise contours and other elements of the activities at Columbus AFB have changed over time (Columbus-Lowndes Development Link 2013).

Readiness and Environmental Protection Integration Program. The DoD's Readiness and Environmental Protection Integration Program strives to protect the military's ability to accomplish its training, testing, and operational mission by helping to avoid or remove land-use conflicts near installations and addressing regulatory restrictions that may inhibit military activities (DoD 2022). The program funds projects across three primary integrated components: encroachment management, landscape partnerships, and stakeholder engagement. Encroachment management projects encourage compatible land use and the preservation of natural lands through cost-sharing, land acquisition, or easement strategies with state and local governments and private conservation organizations. Landscape partnerships seek to address broader, large-scale landscape conservation initiatives with federal and state partners. The development of policy, regulatory, and planning solutions to incompatible development and sustainability issues are pursued collaboratively with stakeholder governments (federal, state, and local), often in concert with associated encroachment and landscape initiatives.

Although there are currently no Readiness and Environmental Protection Integration projects at Columbus AFB, it continues to be a DoD program that could be used to help address compatibility concerns around the installation and preserve the overall mission.

2022 Baseline Noise Contours. As part of the development of the noise contours associated with this EIS, new baseline noise contours were developed, which are slightly different than the previous noise contours presented in the 2012 AICUZ plan. The 2022 baseline noise contours (presented in **Section 3.3.1**) are shown in **Figure 3-1**. The off-installation land areas covered by the 2022 baseline noise contours are provided in **Table 3-70**. Overall, the 2022 baseline noise contours are slightly larger than the 2012 AICUZ plan noise contours, covering larger off-installation land areas. Lowndes County does not have specific land use or zoning data. Therefore, to develop **Table 3-70**, land uses were digitized based on the 2012 AICUZ plan as well as aerial photography interpretation and best professional judgement.

Table 3-70. Columbus AFB Off-Installation Land Use within the Baseline Noise Contours

Category	Noise Zones (acres)			
	65 to 70 dB DNL	70 to 75 dB DNL	75 to 80 dB DNL	Greater than 80 dB DNL
Residential	64.5	29.9	0.7	0.0
Commercial	11.6	7.4	0.0	0.0
Industrial	97.7	19.2	54.2	29.2
Public/Quasi-Public	0.2	0.0	3.6	0.0
Open/Recreation/Agriculture/Low-Density Residential	2,566.0	1,095.0	157.7	<0.1
Total	**2,740.0**	**1,151.5**	**216.2**	**29.2**

Source for noise contours: HMMH 2022

Land uses were digitized based on Figure 5-1 of the 2012 AICUZ plan for Columbus AFB (Columbus AFB 2012) along with interpreting aerial photography from Google Earth imagery and best professional judgement.

3.6.2 Environmental Consequences

Land use impacts would be considered adverse if the effect was inconsistent or noncompliant with land use management plans or policies, precluded the viability of existing land use, precluded continued use or occupation of an area, was incompatible with adjacent land use to the extent public health or safety would be threatened, or conflicted with planning criteria established to ensure the safety and protection of human life. Although there is no quantitative threshold to denote a significant land use impact, actions with small increases in incompatible land use can generally be regarded as less than significant.

3.6.2.1 Alternative 1

***Installation Land Use*.** Alternative 1 would involve on-installation construction at Columbus AFB for the proposed MILCON/UMMC and FSRM projects. These projects would be largely compatible and consistent with applicable land use plans and regulations, and development would be compatible within the "Aircraft Operations and Maintenance" and "Airfield Pavement" land uses. Based on the proposed location of the expanded parking lot for the GBTS facility, a small portion of the "Outdoor Recreation" land use could be impacted; however, the precise site layout for this facility is still being developed. As currently shown, it would not interfere with the existing athletic track in this land use area (see **Figure 2-2**). "Outdoor Recreation" is the existing land use for this area according to the IDP, but the future land use is "Administrative." The expanded GBTS facility parking lot would be compatible with this future land use. Each MILCON/UMMC and FSRM project would be sited, designed, and constructed consistent with Columbus AFB's IDP and would have no significant impacts on the land use.

Land Use and Airspace. No changes in SUA configurations or boundaries are proposed; therefore, Alternative 1 would meet FAA regulations specific to minimum altitude and avoidance distances. The CZs and APZs for Columbus AFB would remain unchanged.

The primary impact of project implementation on land use would be associated with noise generated by T-7A aircraft operations, because T-7A aircraft feature louder operating characteristics compared to T-38C aircraft.

NOISEMAP was used to complete the noise analysis and develop estimated areas and population within the noise contours, providing a comparison between existing baseline conditions and each action alternative. DAF recommends land use compatibility for 5 dBA incremental DNL zones above 65 dBA DNL. Residential use is recommended as incompatible with any noise zone above 65 dB DNL. Although local conditions regarding the need for housing may require residential use in these zones, residential use is discouraged in DNL 65 to 70 dB and strongly discouraged in DNL 70 to 75 dB. Existing residential development is considered pre-existing, non-conforming land use. Analysis of aircraft noise in **Section 3.3** shows that an additional 519 people (432 on-installation and 87 off-installation) would live within the proposed 65 to 70 dB DNL noise zone, an additional 55 people (2 on-installation and 53 off-installation) would live within the 70 to 75 dB DNL noise zone, an additional 17 people (loss of 1 on-installation and 18 off-installation) would live within the 75 to 80 dB DNL noise zone, and 3 people (1 on-installation and 2 off-installation) would live within the 80 to 85 dB DNL noise zone for Alternative 1.

Table 3-71 provides the estimated changes in off-installation acreage under the noise contours at Columbus AFB for Alternative 1. Overall, there would be an increase of approximately 3,442 acres off-installation within the 65 dBA or greater DNL, which is an increase of approximately 83 percent over baseline conditions. However, most land uses surrounding Columbus AFB are considered Open/Recreation/Agriculture/Low-Density Residential (see **Table 3-70**), which would minimize the adverse impact on land use.

Table 3-71. Columbus AFB Off-Installation Land Use within Alternative 1 Noise Contours

Noise Contour	Change in Areas Under Noise Contours (acres) – Alternative 1			
	On-Installation	Percent Change	Off-Installation	Percent Change
65 to 70 dB DNL	168	19.1	1,664	60.7
70 to 75 dB DNL	138	23.8	1,421	123.4
75 to 80 dB DNL	146	27.6	327	151.4
Greater than 80 dB DNL	72	6.4	30	103.4
Total	**524**	**16.8**	**3,442**	**83.2**

Source: HMMH 2022

Although residential land uses are discouraged in the 65 dBA DNL or higher noise zone, residential land use represents less than 3 percent of the total off-installation area within the 65 dBA DNL or higher noise zone for both the baseline conditions and Alternative 1. Although there would be an increase in potentially incompatible land uses within Alternative 1 noise zones, it would not be considered significant. These areas already are exposed to aircraft noise under baseline conditions, and the small increase in potentially incompatible land uses would

not preclude the viability of existing land use, preclude continued use or occupation of the area, be incompatible with adjacent land use to the extent public health or safety would be threatened, or conflict with planning criteria established to ensure the safety and protection of human life.

DAF is committed to working with Lowndes, Monroe, and Clay Counties; the city of Columbus; the Golden Triangle Regional Airport; Columbus-Lowndes Development LINK; and other local communities to analyze compatible uses surrounding Columbus AFB. As part of that commitment, DAF would continue to partner with local governments to perform the following tasks:

- Prepare an AICUZ plan update to address any increases of land area within the greater than 65 dBA DNL noise contour for Columbus AFB.
- Coordinate with state and local agencies on compatible land uses and potential encroachment concerns inside and outside of the DNL footprint and/or the CUD Ordinance area, as applicable (i.e., large-scale developments, transportation projects that could encourage development, or tall structures such as cellular towers that could penetrate airfield imaginary surfaces).
- Encourage municipalities to promote the highest and best use of land by updating local zoning ordinances and building construction standards, especially for high-noise areas.
- Encourage municipalities to adopt legislative initiatives to acquire interest in developed properties to curb and mitigate encroachment near military installations and protect the public from noise exposure and accident potential.

DAF would also continue to pursue DoD Readiness and Environmental Protection funds to further implement strategic land use acquisitions, controls, and landscape improvements associated with incompatible use concerns.

3.6.2.2 Alternative 2

Additional impacts on land use from Alternative 2 would arise from T-7A operations that are 25 percent greater than Alternative 1, which would create noise contours that would cover more land area than those of Alternative 1 (see **Table 3-72**). The analysis of aircraft noise in **Section 3.3** shows that 828 additional people (686 on-installation and 142 off-installation) would live within the 65 to 70 dB DNL noise zone, an additional 74 people (2 on-installation and 72 off-installation) would live within the 70 to 75 dB DNL noise zone, an additional 26 people (0 on-installation and 26 off-installation) would live within the 75 to 80 dB DNL noise zone, and 5 people (1 on-installation and 4 off-installation) would live within the 80 to 85 dB DNL noise zone for Alternatives 2 and 3.

Table 3-72. Columbus AFB Off-Installation Land Use within the Noise Contours for Alternatives 2 and 3

Noise Contour	Change in Areas Under Noise Contours (acres) – Alternatives 2 and 3			
	On-Installation	Percent Change	Off-Installation	Percent Change
65 to 70 dB DNL	173	19.7	2,067	75.4
70 to 75 dB DNL	149	25.7	1,744	151.4
75 to 80 dB DNL	167	31.6	601	278.2
Greater than 80 dB DNL	148	13.1	67	231.0
Total	**637**	**20.4**	**4,479**	**108.3**

Source: HMMH 2022

As noted for Alternative 1, residential land uses are discouraged in the 65 dB DNL or higher noise zones. As with Alternative 1, the areas within the Alternative 2 noise zones that are considered residential land uses represent less than 3 percent of the total off-installation area within the 65 dBA DNL or higher noise zone. Therefore, although there would be an increase in potentially incompatible land uses within the Alternative 2 noise contours, it would not be considered significant. These areas already are exposed to aircraft noise under baseline conditions, and the small increase in potentially incompatible land uses would not preclude the viability of existing land use, preclude continued use or occupation of the area, be incompatible with adjacent land use to the extent public health or safety would be threatened, or conflict with planning criteria established to ensure the safety and protection of human life. As noted for Alternative 1, Columbus AFB would work with local jurisdictions to continue to encourage compatible land uses within the noise contours.

3.6.2.3 Alternative 3

No new impacts on land use would occur from the delivery of up to 16 additional T-7A aircraft, and the impacts to on- and off-installation land uses would be identical to those described for Alternative 2. The up to 12 additional T-7A shelters would be constructed within the "Airfield Pavement" land use and would be compatible. The areas within the Alternative 3 noise contours would be identical to the Alternative 2 noise contours (see **Table 3-72**).

3.6.2.4 No Action Alternative

The No Action Alternative would not result in any changes in land use, either on-installation or within the surrounding areas off Columbus AFB. The proposed MILCON/UMMC and FSRM projects would not occur, and no changes in aircraft operations would occur. Land use on- and off-installation would remain unchanged compared with existing conditions. The off-installation land use within the noise contours would remain the same as those described in **Table 3-70**.

3.6.3 Cumulative Effects

T-7A recapitalization and the reasonably foreseeable actions on the installation and within the surrounding area (see **Table 3-2**) would result in less than significant cumulative effects on land use. The proposed MILCON/UMMC and FSRM projects for T-7A recapitalization and the

reasonably foreseeable actions on the installation would be sited, designed, and constructed consistent with the installation's IDP. Although an increase in potentially incompatible land uses would arise from the Proposed Action's larger noise contours, Columbus AFB would work with local jurisdictions to continue to encourage compatible future development within the noise contours to minimize these less than significant, adverse impacts on land use compatibility.

3.7 Hazardous Materials and Wastes

Hazardous Materials, Hazardous Wastes, and Petroleum Products. Hazardous materials are defined by 49 CFR § 171.8 as hazardous substances, hazardous wastes, marine pollutants, elevated temperature materials, materials designated as hazardous in the Hazardous Materials Table (49 CFR § 172.101), and materials that meet the defining criteria for hazard classes and divisions in 49 CFR Part 173. Hazardous wastes are defined by the Resource Conservation and Recovery Act (RCRA) at 42 USC § 6903(5), as amended by the Hazardous and Solid Waste Amendments, as "a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may (A) cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed, or otherwise managed." Petroleum products include crude oil or any derivative thereof, such as gasoline, diesel, or propane. They are considered hazardous materials because they present health hazards to users in the event of incidental releases or extended exposure to their vapors.

Evaluation of hazardous materials and wastes focuses on the storage, transportation, handling, and use of hazardous materials, as well as the generation, storage, transportation, handling, and disposal of hazardous wastes. In addition to being a threat to humans, the improper release or storage of hazardous materials, hazardous wastes, and petroleum products can threaten the health and well-being of wildlife species, habitats, soil systems, and water resources.

Toxic Substances. Toxic substances are substances that might pose a risk to human health and are addressed separately from hazardous materials and hazardous wastes. Toxic substances include asbestos-containing material (ACM), lead-based paint (LBP), and polychlorinated biphenyls (PCB), all of which are typically found in older buildings and utilities infrastructure. USEPA has the authority to regulate these substances through the Toxic Substances Control Act (15 USC § 53).

Asbestos is regulated by USEPA under the Clean Air Act; Toxic Substances Control Act; and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). USEPA has established that any material containing more than 1 percent asbestos by weight is considered an ACM. USEPA has implemented several bans on various ACMs between 1973 and 1990, so ACMs are most likely to be found in older buildings (i.e., constructed before 1990). ACMs are generally found in building materials such as floor tiles, mastic, roofing materials, pipe wrap, and wall plaster. LBP was used commonly prior to its ban in 1978; therefore, any building constructed prior to 1978 may contain LBP. PCBs are human-made chemicals that persist in the environment and were widely used in building materials (e.g., caulk) and electrical products

prior to 1979. Structures constructed prior to 1979 potentially include PCB-containing building materials.

Environmental Contamination. CERCLA governs the response or cleanup actions to address hazardous substance, pollutant, and contaminant releases into the environment and includes federal facilities such as Columbus AFB. The Defense Environmental Restoration Program was established by Congress in 1986 to provide for the cleanup of DoD property at active installations, Base Realignment and Closure installations, and formerly used defense sites throughout the United States and its territories. The two restoration programs under the Defense Environmental Restoration Program are the Environmental Restoration Program (ERP) and the Military Munitions Response Program (MMRP). ERP addresses contaminated sites while MMRP addresses nonoperational military ranges and other sites suspected or known to contain unexploded ordnance, discarded military munitions, or munitions constituents. Each site is investigated, and appropriate remedial actions are taken under the supervision of applicable federal and state regulatory programs. When no further remedial action is granted for a given site, it is closed and it no longer represents a threat to human health.

PFAS. DAF is currently investigating potential effects related to chemicals known as PFAS. This family of chemicals was developed in the 1940s and includes perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA). AFFF containing PFAS was developed in the early 1960s and used at U.S. airports, municipal fire stations, petroleum facilities, and in other industries to extinguish hydrocarbon-based fires effectively. Fire fighters at military installations used AFFF regularly in emergencies or trained with AFFF in an unconfined manner.

Radon. Radon is a naturally occurring, odorless, and colorless radioactive gas found in soils and rocks that can lead to the development of lung cancer. Radon tends to accumulate in enclosed spaces, usually those that are below ground and poorly ventilated (e.g., basements). USEPA established a guidance radon level of 4 picocuries per liter (pCi/L) in indoor air for residences, and radon levels above this amount are considered a health risk to occupants.

3.7.1 Affected Environment

Hazardous Materials, Hazardous Wastes, and Petroleum Products. DAF uses hazardous materials and petroleum products such as liquid fuels, pesticides, and solvents for everyday operations at Columbus AFB. The use of these hazardous materials and petroleum products results in the generation and storage of hazardous wastes and used petroleum products on the installation. Columbus AFB is an RCRA Large Quantity Generator (USEPA identification number MS7570024060). RCRA Large Quantity Generators produce more than 1,000 kilograms of non-acute hazardous waste or more than 1 kilogram of acute hazardous waste per calendar month (or state equivalent regulations). Hazardous waste generating activities on Columbus AFB include aircraft, automotive, and building and grounds maintenance, as well as processes including metal fabrication, bead blasting, painting, parts washing, and parts cleanup. Hazardous wastes generated on the installation include bead blasting media, absorbents, paint-related material, paint, solvents, adhesives, sealants, fluorescent bulbs, batteries, copper/lead debris, and others (Columbus AFB 2020b). Of the facilities subject to renovation, hazardous materials, hazardous wastes, and petroleum products may be used and generated at Buildings 452 and 454.

DAF installations manage hazardous materials through AFMAN 32-7002. Columbus AFB has implemented an installation-wide Spill Prevention, Control, and Countermeasure (SPCC) Plan; Integrated Solid Waste Management Plan (ISWMP); and Hazardous Waste Management Plan (HWMP). These plans define roles and responsibilities, address record keeping requirements, and provide spill contingency and response requirements.

Toxic Substances. ACMs on Columbus AFB are managed in accordance with the installation's Asbestos Management Plan. The plan addresses asbestos management practices throughout the installation. The plan is designed to (1) protect personnel who live and work on Columbus AFB from exposure to airborne asbestos fibers, and (2) ensure Columbus AFB remains in compliance with all DAF, federal, state, and local asbestos regulations. The plan assigns responsibilities, establishes inspection and repair capabilities, and provides repair procedures and personal protection instructions (Columbus AFB 2022c). Facilities constructed prior to 1990 have the greatest potential to contain ACMs. Of the facilities subject to renovation, Buildings 216 (1961), 452 (1958) and 454 (1959) were constructed prior to 1990 and may contain ACM. Building 234 was constructed in 2008 and is not expected to contain ACM (CES/CEIAP 2022).

The Columbus AFB LBP Management Plan is no longer applicable because all children-occupied facilities on the installation do not contain LBP. Facilities constructed prior to 1978 have the greatest potential to contain LBPs. The location of LBP in facilities is communicated to appropriate personnel in order to identify potential hazards and avoid disturbing affected building materials. Of the facilities subject to renovation by the Proposed Action, Buildings 216, 452, and 454 were constructed prior to 1978 and may contain LBP. Building 234 was constructed in 2008 and is not expected to contain LBP (CES/CEIAP 2022).

Facilities constructed prior to 1979 have the greatest potential to contain PCBs in building material. Older electrical infrastructure within these buildings, such as light fixtures and surge protectors, might also contain PCBs. Of the facilities subject to renovation by the Proposed Action, Buildings 216, 452, and 454 were constructed prior to 1979 and may contain PCBs. Building 234 was constructed in 2008 and is not expected to contain PCBs (CES/CEIAP 2022).

Environmental Contamination. This EIS focuses only on the active environmental contamination sites that have potential to impact or be impacted by the Proposed Action. Sites granted no further action, that do not coincide directly with MILCON/UMMC or FSRM projects, or that would not be impacted by the proposed work activities are not discussed further in this EIS. Only ERP Site SS028 meets the criteria for analysis in this EIS, and none of the installation's other ERP or MMRP sites are relevant to this EIS (AFCEC/CZOW 2022).

The proposed GBTS facility and Buildings 216 and 234 are within ERP Site SS028 (AFCEC/CZOW 2022). Site SS028 has been identified as having VOC contamination in the groundwater, including tetrachloroethylene, trichloroethylene, and 1,1-dichloroethylene. Historically, the groundwater plume spanned 135 acres and originated from the vicinity of the aircraft maintenance area known as the former "Hound Dog" Cleaning Area near Buildings 216 and 218. The plume extended westward and downgradient toward the installation's fuel tank farm (AFCEC 2021). **Figure 3-21** shows the location of ERP Site SS028 relative to the proposed MILCON/UMMC and FSRM projects.

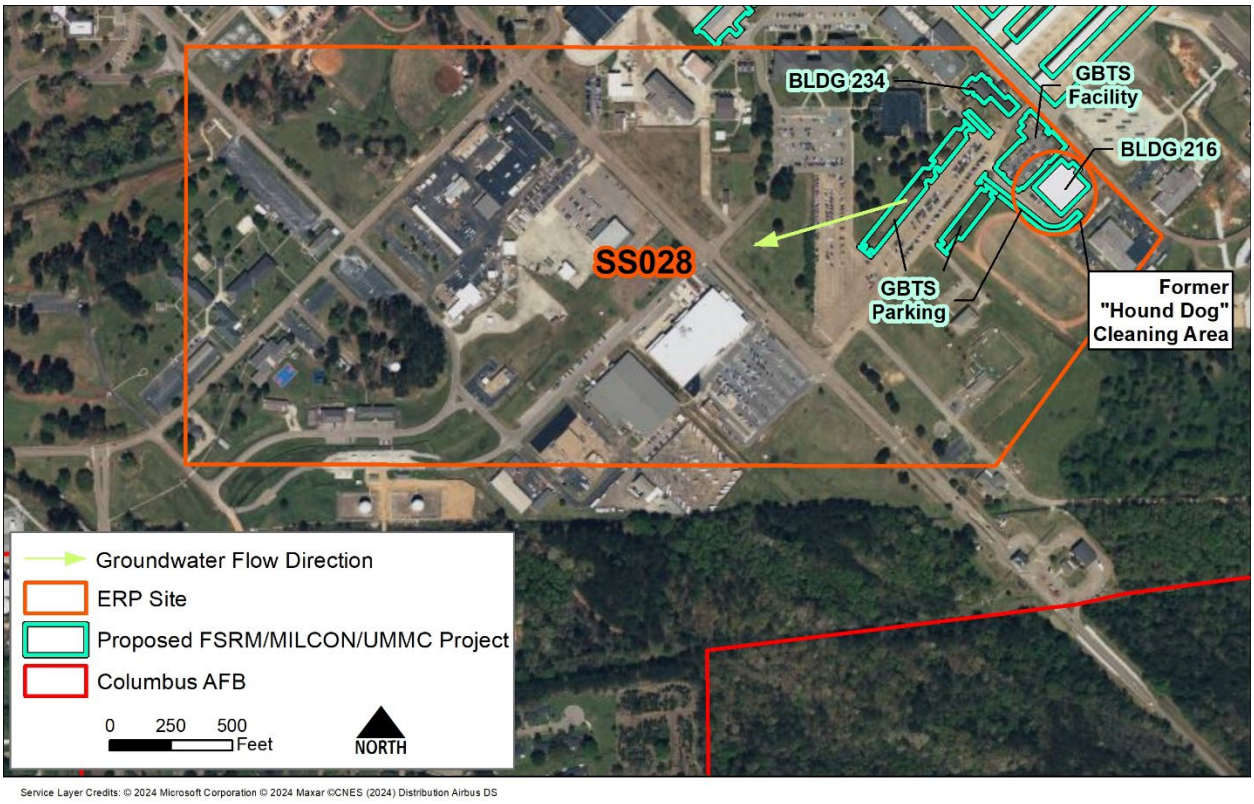

Figure 3-21. Location of ERP Site SS028

As documented in the Remedial Action Report, natural attenuation has been demonstrated at ERP Site SS028, and chlorinated VOCs are actively being degraded by anaerobic biodegradation mechanisms (reductive dechlorination). Through multiple investigations, it was determined that the plume is present primarily in the deeper portions of the surficial aquifer. No contaminants of concern were identified in the soil and no evidence of a residual source of contaminants of concern was present in the vadose zone. The record of decision for Site SS028 was signed on June 6, 2013, with the selected remedy of land use controls with long-term monitoring and monitored natural attenuation. Trend analysis of data collected through 2013 predicted that contaminant levels would decrease below Maximum Contaminant Levels within 20 years (AFCEC 2021).

***PFAS*.** DAF performed a Phase 1 Remedial Investigation of PFOS and PFOA at Columbus AFB in September 2023. The results of that investigation identified five AFFF release areas, but only one of these areas is in the vicinity of the proposed MILCON/UMMC and FSRM projects. That release area is known as Site SS005P and is associated with an accidental activation of the AFFF fire suppression system in Building 450 in 2011. As a result of that activation, AFFF solution entered a drainage swale west of Building 450 and ran across a grassy area southwest of that building, potentially impacting soil, groundwater, sediment, and surface water. The remedial investigation collected numerous surface soil, subsurface soil, sediment, surface water, and groundwater samples from the area surrounding and downgradient of Building 450 to delineate the extent of contamination (AFCEC 2023).

The Proposed Action would entail no construction or renovation at Building 450 and within the delineated boundary of soil contamination for Site SS005P; however, the proposed UMT facility would be sited immediately adjacent to the delineated groundwater plume for the site. Five groundwater samples collected from within the proposed footprint of the UMT facility all detected PFOS and PFOA below the project screening level (PSL), but multiple nearby groundwater samples, including three immediately southwest of the proposed UMT facility footprint, detected PFOS above the PSL (AFCEC 2023).

Radon. USEPA rates Lowndes County, Mississippi, as radon zone 2. Counties in zone 2 have a predicted average indoor radon screening level from 2 to 4 pCi/L (USEPA 2021b).

3.7.2 Environmental Consequences

Impacts on or from hazardous materials and wastes would be considered significant if a proposed action would result in noncompliance with applicable federal or state regulations or increase the amounts generated or procured beyond current management procedures, permits, and capacities. Impacts on contaminated sites would be considered significant if a proposed action would disturb or create contaminated sites resulting in negative impacts on human health or the environment, or if a proposed action would make it substantially more difficult or costly to remediate existing contaminated sites.

3.7.2.1 Alternative 1

Hazardous Materials, Hazardous Wastes, and Petroleum Products. Short-term, less than significant, adverse impacts would occur from the use of hazardous materials and petroleum products and the generation of hazardous wastes during construction of the MILCON/UMMC and FSRM projects. Hazardous materials that could be used include paints, welding gases, solvents, preservatives, and sealants. Additionally, hydraulic fluids and petroleum products, such as diesel and gasoline, would be used in the vehicles and equipment supporting facility construction. Construction would generate minimal quantities of hazardous wastes. Contractors would be responsible for the disposal of hazardous wastes in accordance with the installation's HWMP and federal and state laws. All hazardous materials, petroleum products, and hazardous wastes used or generated during construction would be contained, stored, and managed appropriately (e.g., secondary containment, inspections, spill kits) in accordance with applicable regulations to minimize the potential for releases. All construction equipment would be maintained according to the manufacturer's specifications and drip mats would be placed under parked equipment, as needed. Hazardous materials, hazardous wastes, and petroleum products currently within the affected portions of Buildings 452 and 454 would be relocated to similar facilities to accommodate the proposed renovation of these buildings.

New hazardous materials storage and hazardous waste collection points would be established, as necessary, and would most likely be sited in the proposed UMT facility, Hush House, Building 452, and Building 454. The installation's SPCC Plan, ISWMP, and HWMP would be amended, as needed, for any new hazardous material, hazardous waste, or petroleum product capabilities. These plans would continue to be followed to lessen the potential for a release.

Short-term, less than significant, adverse impacts would occur from a temporary increase in the use of hazardous materials and petroleum products and hazardous wastes generated during

the aircraft transition period. Although the total number of aircraft on Columbus AFB would decrease steadily during the transition period, additional quantities of hazardous materials, hazardous wastes, and petroleum products may need to be delivered, stored, used, and disposed of appropriately at Columbus AFB from the maintenance of two types of aircraft. However, Columbus AFB is anticipated to have enough delivery, storage, and disposal capacity to accommodate the increased hazardous materials, hazardous wastes, and petroleum product requirements. The quantities of hazardous materials, hazardous wastes, and petroleum products required for maintenance of individual T-7A aircraft would be similar and proportional to those required for the T-38C aircraft. No long-term, adverse impacts would occur because by 2030 the use of hazardous materials and petroleum products and the generation of hazardous wastes from routine aircraft maintenance would return to similar or slightly lesser levels than the baseline when the number of aircraft on Columbus AFB is reduced by 24.

Annual flight operations would be similar to or lesser than baseline levels. Therefore, no additional quantities of jet fuel would need to be delivered, stored, and used at Columbus AFB. The installation's SPCC Plan, ISWMP, and HWMP would continue to be followed to reduce the potential for a release.

Toxic Substances. Short-term, less than significant, adverse impacts from toxic substances could occur from the renovation of Buildings 216, 452, and 454, which potentially contain ACMs, LBP, or PCBs. Surveys for these substances would be completed, as necessary, by a certified contractor prior to work activities to ensure that appropriate measures are taken to reduce the potential exposure to, and release of, these substances. Contractors would wear appropriate personal protective equipment (PPE) and would be required to adhere to all federal, state, and local regulations, as well as the installation's management plans for toxic substances. All ACM- and LBP-contaminated debris would be disposed of at a USEPA-approved landfill. New building construction is not likely to include the use of these substances because federal policies and laws limit their use in building construction applications. Long-term, less than significant, beneficial impacts would occur from renovation of these buildings by reducing the potential for future human exposure and reducing the number of ACMs, LBP, and PCBs to be maintained at Columbus AFB.

Environmental Contamination. No impacts from Columbus AFB's ERP or MMRP sites would occur. The proposed interior renovation of existing facilities—including Buildings 216 and 234, which are within ERP Site SS028—would not impact or be impacted by ERP Site SS028 because that site is limited to groundwater contamination. Construction of the proposed GBTS facility would occur northwest of Building 216, which is within the site's groundwater plume. However, the groundwater contamination is in the deeper portions of the surficial aquifer and construction of the proposed GBTS facility is unlikely to reach the plume depth. Additionally, a moisture barrier beneath the concrete foundation and floor slab would be incorporated into the design and construction of the proposed GBTS facility. Ground-disturbing activities within ERP Site SS028 would be coordinated with the installation's ERP personnel. Additionally, the proposed GBTS facility would comply with applicable land use restrictions and would not impact long-term plume monitoring. Therefore, construction of the proposed GBTS facility would not impact or be impacted by ERP Site SS028. Construction for the other MILCON/UMMC and FSRM projects would not impact or be impacted by ERP Site SS028 due to their location

outside and upgradient of the plume's flow direction. Therefore, none of the installation's ERP or MMRP sites represent impediments to Alternative 1.

Contractors performing construction could encounter undocumented soil or groundwater contamination. If soil or groundwater that is believed to be contaminated were discovered, the contractor would be required to stop work immediately, report the discovery to the installation, and implement appropriate safety measures. The contractor would be responsible for management and disposal of all contaminated media. Contaminated media would be containerized, pending analysis, and disposed of according to the appropriate disposal facility's requirements. Work activities would resume when the issue is resolved.

PFAS. Short-term, less than significant, adverse impacts from PFAS would occur because the UMT facility is proposed immediately adjacent to the delineated groundwater plume for Site SS005P. While all five groundwater samples collected from within the proposed footprint of the UMT facility detected PFOS and PFOA below the PSL, multiple nearby groundwater samples detected PFOS above the PSL between 5 and 16 feet below the ground surface (AFCEC 2023). While it is not anticipated construction would reach the depth of groundwater, construction contractors would coordinate all ground-disturbing activities for the UMT facility with the installation's ERP personnel and implement all recommended guidelines to minimize the potential for adverse impacts from PFAS-contaminated groundwater.

No other MILCON/UMMC or FSRM projects have the potential to impact, or be impacted by, PFAS. If determined to be necessary, DAF would sample within any MILCON/UMMC or FSRM project site to identify potential PFAS contamination. If sampling were to identify PFAS impacted soils, then prior to initiating construction, DAF would perform characterizations and secure adequate funding for the transportation and disposal of the potentially impacted soils. Possible disposal methods include permitted carbon reactivation units, hazardous waste landfills, and solid waste landfills that have composite liners and gas leachate collection and treatment systems. The appropriate disposal method would be determined in coordination with USEPA and MDEQ. DAF would also prepare a disposal plan to ensure ground disturbance does not cause impacted soils to come into contact with groundwater or stormwater.

Radon. No impacts from radon are anticipated because buildings in Lowndes County, Mississippi, are typically found to have average indoor radon levels between 2 and 4 pCi/L. Therefore, radon levels above 4 pCi/L are unlikely to be encountered inside of the proposed or renovated buildings.

3.7.2.2 Alternative 2

Impacts on hazardous materials and wastes from T-7A operations that are 25 percent greater than Alternative 1 would be slightly greater than those described for Alternative 1. Compared to Alternative 1, the increase in aircraft operations would require additional quantities of hazardous materials, hazardous wastes, and petroleum products (most notably jet fuel) to be delivered, stored, used, and disposed of appropriately at Columbus AFB. However, Columbus AFB is anticipated to have enough delivery, storage, and disposal capacity to accommodate the increased hazardous materials, petroleum products, and hazardous wastes requirements. The

Columbus AFB SPCC Plan, ISWMP, and HWMP would continue to be followed to lessen the potential for a release to the environment.

3.7.2.3 Alternative 3

Impacts on hazardous materials and wastes from T-7A operations that are 25 percent greater than Alternative 1 and the delivery of up to 16 additional T-7A aircraft would be slightly greater than those described for Alternative 2. Compared to Alternative 2, the increase in aircraft operations and the additional aircraft to maintain would require additional quantities of hazardous materials, hazardous wastes, and petroleum products (most notably jet fuel) to be delivered, stored, used, and disposed of appropriately at Columbus AFB, as compared to Alternative 2. However, Columbus AFB is anticipated to have enough delivery, storage, and disposal capacity to accommodate the increased hazardous materials, petroleum products, and hazardous wastes requirements. The installation's SPCC Plan, ISWMP, and HWMP would continue to be followed to lessen the potential for a release to the environment. The installation of up to 58 T-7A shelters for Alternative 3, rather than up to 46 shelters for Alternatives 1 and 2, would have no additional impacts on hazardous materials and wastes.

3.7.2.4 No Action Alternative

The No Action Alternative would not impact hazardous materials and wastes. No facility construction would occur, and there would be no changes in aircraft operations. Additional quantities of hazardous materials, petroleum products, and hazardous wastes would not be used, stored, or generated, and the management of hazardous materials, petroleum products, and hazardous wastes would not change. Toxic substances would remain and continue to require maintenance by DAF personnel. No impacts on or from environmental contamination, PFAS, and radon would occur. Hazardous materials and wastes conditions at Columbus AFB would remain unchanged compared to the existing conditions described in **Section 3.7.1**.

3.7.3 Cumulative Effects

T-7A recapitalization and the reasonably foreseeable actions (see **Table 3-2**) would result in short-term, intermittent increases in the use of hazardous materials and petroleum products and the generation of hazardous wastes. Environmental control measures outlined in **Section 3.7.2.1**, including proper procurement, use, and disposal of hazardous materials in accordance with applicable regulations and approved plans, would minimize cumulative effects. No cumulative effects on the installation's ERP or MMRP sites would occur from the Proposed Action; however, short-term, less than significant, adverse cumulative effects could occur if any reasonably foreseeable actions coincide with active ERP or MMRP sites. If soil or groundwater that is believed to be contaminated is discovered on or off the installation, the contractor would stop work immediately; report the discovery to the appropriate installation, state, or county personnel; and implement applicable safety measures. Construction activities would not occur until the issue was investigated and resolved. Therefore, the Proposed Action, when combined with the reasonably foreseeable actions, would not result in a significant cumulative effect on hazardous materials and wastes.

3.8 Infrastructure and Transportation

Infrastructure consists of the physical structures that enable a population in a specified area to function. The availability of infrastructure and its capacity to support growth are generally regarded as essential to the economic growth of an area. The infrastructure components discussed in this section are airfield pavement, liquid fuel, the electrical system, the natural gas system, the central climate control system, the water supply system, the wastewater system, the stormwater system, the communications system, and solid waste management. Transportation refers to the roadways and gates that feed into an installation and the roadways and parking areas on that installation.

3.8.1 Affected Environment

Infrastructure

Airfield Pavement. Airfield pavement condition is expressed in terms of Pavement Condition Index (PCI), which is a numerical rating of the pavement condition from 0 (worst) to 100 (best) based on the type and severity of distresses observed on the pavement surface. PCI is determined by visual inspection. Airfield pavement with a PCI of 70 or greater is considered satisfactory or in good condition, while airfield pavement with a PCI less than 55 is considered poor or in serious condition (FAA 2015). Airfield pavements at Columbus AFB are in good condition, with an average PCI of 83 (Columbus AFB 2022b). Only 3 percent of airfield pavement is below PCI 55 (Columbus AFB 2017a).

Liquid Fuel. Columbus AFB manages three aviation fuel aboveground bulk storage tanks. Columbus AFB fuel storage tanks are in good condition (Columbus AFB 2017a, Columbus AFB 2022b). All fuel storage tanks are maintained in accordance with the installation's SPCC Plan and 40 CFR Part 112, *Oil Pollution Prevention*, to prevent unauthorized discharges (see **Section 3.7**).

Electrical System. The Tennessee Valley Authority supplies electrical power to Columbus AFB through the installation substation. The existing capacity of the substation is 20 megawatts, which is sufficient to meet the installation's estimated electricity demand of 6.01 megawatts. Overall, the condition of the electrical infrastructure at Columbus AFB is considered adequate (Columbus AFB 2017a). Electric powerlines are in proximity to all MILCON/UMMC and FSRM project areas.

Natural Gas System. Columbus AFB has converted to natural gas for building and water heating. Natural gas is provided to the installation by the Caledonia Natural Gas District. The current maximum monthly average demand is 9,508 cubic feet per hour, which is 17 percent of capacity. The natural gas supply and distribution system at Columbus AFB is in good condition (Columbus AFB 2017a).

Central Climate Control System. Most buildings on Columbus AFB are heated and cooled using boilers and air conditioners located within each building and are not connected to a central climate control system. The installation does operate three climate control systems for a handful of buildings, but none of those buildings would be altered by the proposed

MILCON/UMMC and FSRM projects (Columbus AFB 2017a). Therefore, no effects on the three climate control systems would occur, and these systems are not discussed further in this EIS.

Water Supply System. Potable water on Columbus AFB is supplied by Columbus Light and Water (CL&W). The water is pumped from the lower Tuscaloosa aquifer and delivered to the installation where its pressure is boosted before being distributed to the installation population (Columbus AFB 2017a). Further information on regional groundwater conditions is provided in **Section 3.10.1**.

The installation's distribution main from CL&W began operating on October 1, 1997. The overall condition of the water supply system at Columbus AFB is fair because some distribution mains are over 60 years old and need to be replaced in older sections of the installation. The capacity of the Columbus AFB water supply system is 2,016,000 gallons per day, and the installation's current demand is approximately 168,480 gallons per day (Columbus AFB 2017a). Water supply lines are in proximity to all MILCON/UMMC and FSRM project areas.

Wastewater System. The wastewater system at Columbus AFB is a buried gravity pipe system that collects wastewater and transports it off installation to CL&W where it is treated and discharged to Luxapallila Creek. The installation's current wastewater system was built in the 1950s. While the infrastructure is old, its current approved discharge capacity far exceeds its use. Columbus AFB's wastewater discharge is approximately 97 percent below the maximum quantity allowed to discharge for treatment. The current allowed wastewater discharge capacity at Columbus AFB is 10,000,000 gallons per day (Columbus AFB 2017a). Wastewater mains are in proximity to all MILCON/UMMC and FSRM project areas.

Stormwater System. Columbus AFB operates an extensive stormwater management system that includes culverts, underground mains, and open ditches. The installation has five stormwater outfalls that flow to the Buttahatchee River, the Tennessee-Tombigbee Waterway, and Stinson Creek. Stormwater discharges at the installation are regulated under Mississippi's Baseline Stormwater General National Pollutant Discharge Elimination System (NPDES) permit. No stormwater is treated on-installation (Columbus AFB 2017a).

Communications System. Communications infrastructure at Columbus AFB consists of distribution networks of fiber optic and copper wire. In general, Columbus AFB currently uses approximately 5 percent of its communications network capacity, and the communication systems are in good condition (Columbus AFB 2017a). Communications infrastructure is in proximity to all MILCON/UMMC and FSRM project areas.

Solid Waste Management. All solid waste generated from Columbus AFB is handled by Mississippi Industrial Waste Disposal. The solid waste is collected and disposed of at the Golden Triangle Solid Waste Landfill (Columbus AFB 2017b). There are no solid waste landfills in operation on the installation (Columbus AFB 2017a). Columbus AFB is committed to diverting 50 percent of municipal solid waste and 60 percent of construction and demolition debris (Columbus AFB 2017b).

Transportation

Columbus AFB is accessed by U.S. Highway 45 and State Highway 373. The most direct route between Columbus AFB and the city of Columbus is U.S. Highway 45 via the installation's Main Gate. U.S. Highway 45 also leads to State Highway 373, which leads to the South Gate. On the north side of Columbus AFB, State Highway 373 branches off U.S. Highway 45 and enters Columbus AFB through the normally closed North Gate.

Most traffic enters and exits Columbus AFB through the Main Gate, due primarily to direct access from the four-lane U.S. Highway 45; the proximity of the Base Exchange, credit union, commissary complex, and other notable Columbus AFB facilities; and commercial traffic inspection requirements. The Main Gate operates 24 hours per day with the capacity to process 840 vehicles per hour. The South Gate has capacity to process 420 vehicles per hour and normally operates weekdays from 6 a.m. to 6 p.m. The North Gate is normally closed and only opened for special events. Recorded 24-hour traffic counts indicate that the Main Gate and South Gate process 5,358 and 1,667 vehicles per day, respectively. Installation personnel indicate no problems exist meeting demand during peak processing hours (Columbus AFB 2017a).

The primary roads on Columbus AFB are Simler Boulevard, Independence Avenue, and Imes Street. Secondary roads include Webb Street, Harris Street, Downs Street, Seventh Street, Capitol Avenue, Harpe Boulevard, Lockhart Street, and Bradt Street. All other installation roads are tertiary roads. The existing, on-installation road network provides sufficient capacity for drivers (Columbus AFB 2017a).

Vehicle parking is provided throughout the installation by several off-street surface parking lots. The provided parking adequately meets the installation's parking demand (Columbus AFB 2017a). The proposed GBTS facility would be sited on an existing parking lot adjacent to Building 216.

3.8.2 Environmental Consequences

Impacts on infrastructure are evaluated based on the degree to which a proposed action would affect the ability to meet utility demand, or on their potential to disrupt or improve infrastructure service levels and create additional needs. An impact could be considered significant if a proposed action resulted in the exceedance of a utility capacity or created a long-term interruption in the operation of a utility.

Impacts analysis for transportation considers changes to roadway and intersection service levels, travel patterns, and accessibility (i.e., ease of drivers to reach a desired destination). An impact on transportation could be considered significant if a proposed action resulted in substantial decline in roadway service levels, substantial increase in queue times at gates, substantial reduction in traffic safety leading to increased risk of vehicular accidents, substantial degradation of existing transportation infrastructure, or substantial and permanent changes to roadway accessibility.

3.8.2.1 Alternative 1

Infrastructure

Airfield Pavement. No short-term impacts on airfield pavement would occur from Alternative 1. The airfield pavement at Columbus AFB is in good condition and would not require repairs to implement Alternative 1. Construction of the up to 46 T-7A shelters would be phased to maximize the availability of apron and ramp space so that airfield operations would not be interrupted, and sufficient aircraft parking would remain available.

Long-term, less than significant, beneficial impacts on the airfield pavement at Columbus AFB would occur from the addition of T-7A shelters and the FSRM project to perform airfield improvements, which would include remarking the ramp, installing new moorings and anchor rods, and replacing the aircraft arresting system. Fewer airfield operations also would lessen wear on airfield pavement slightly and help to prolong its service life.

Liquid Fuel. Short-term, less than significant, adverse impacts on liquid fuel would occur from the consumption of gasoline and diesel fuels by construction contractors for the MILCON/UMMC and FSRM projects. Construction-related fuels would be supplied by the construction contractors from local commercial sources and would not increase the demand for liquid fuels by the installation.

Long-term, less than significant, beneficial impacts on aviation fuel supply to Columbus AFB would be expected. The T-38C to T-7A transition would decrease annual airfield operations, which would likely reduce the amount of aviation fuel consumed at Columbus AFB; however, the net change in fuel consumption would depend on the fuel burn rate of the aircraft and types of operations to be performed. These factors will not be known until after the T-7A aircraft are introduced into service and the training curriculum is implemented. Columbus AFB would continue to have sufficient fuel storage and delivery capabilities to accommodate Alternative 1.

Electrical System. Short-term, less than significant, adverse impacts on the electrical system could occur. Temporary electrical disruptions could occur when buildings are disconnected from or connected to the Columbus AFB electrical distribution system during construction or renovation. Electrical service interruptions could also occur if electrical lines need to be rerouted. However, any electrical disruptions would be coordinated with area users prior to disconnection. Electricity necessary for construction would be obtained from the installation's electrical system and would have a less than significant effect on the installation's overall demand. Construction contractors would locate and mark electrical lines prior to any ground-disturbing activities that could result in unintended utility disruptions.

Long-term, less than significant, adverse and beneficial impacts on electrical supply would be expected following the completion of the MILCON/UMMC and FSRM projects. Permanent new facilities, such as the proposed GBTS facility, UMT facility, hush house, and egress shop, would require new electrical service, which would increase the overall energy use at Columbus AFB. The installation's electrical system is operating at approximately 30 percent capacity and, therefore, can meet the electric demand from the proposed facilities and the temporary 43-person increase in personnel in 2028 and 2029. Staffing levels would be reduced by 31

persons after 2029 (relative to current baseline staffing levels), which would reduce the installation's overall electrical demand slightly in the long-term.

Natural Gas System. Short-term, less than significant, adverse impacts on the natural gas distribution system could occur. Temporary natural gas service interruptions could occur when new facilities are connected to the system or if existing facilities need to be disconnected. Additionally, natural gas service interruptions could also occur if natural gas lines need to be rerouted. Any potential disruptions would be coordinated with area users prior to interruption. No natural gas is anticipated to be needed for construction. Construction contractors would locate and mark natural gas lines prior to any ground-disturbing activities that could result in unintended utility disruptions.

Long-term, less than significant, adverse impacts on the natural gas system would occur following the completion of the MILCON/UMMC and FSRM projects. Permanent new facilities, such as the proposed GBTS facility, UMT facility, hush house, and egress shop, would require natural gas for building and hot water heating, which would increase the overall demand for natural gas at Columbus AFB. The installation's natural gas system is operating at approximately 17 percent of capacity and, therefore, can meet the increased natural gas demand from the proposed facilities.

Water Supply System. Short-term, less than significant, adverse impacts on the water supply system could occur. Temporary water supply interruptions could occur when new facilities are connected to the system or if existing facilities need to be disconnected. Additionally, water service interruptions could also occur if water lines need to be rerouted. Any potential disruptions would be coordinated with area users prior to interruption. Water necessary for construction would be obtained from the installation's water supply system and would have a less than significant effect on the installation's overall water supply capacity. Construction contractors would locate and mark water lines prior to any ground-disturbing activities that could result in unintended utility disruptions.

Long-term, less than significant, adverse and beneficial impacts on the water supply system would occur following the completion of the MILCON/UMMC and FSRM projects. Permanent new facilities, such as the proposed GBTS facility, UMT facility, hush house, and egress shop, would require new water service for bathrooms and fire protection, which would increase the overall water use at Columbus AFB. The installation's water system is operating at approximately 8 percent of capacity and, therefore, can meet the water demand from the proposed facilities and the temporary 43-person increase in personnel in 2028 and 2029. Staffing levels would be reduced by 31 persons after 2029 (relative to current baseline staffing levels), which would reduce the installation's overall water demand slightly in the long-term.

Wastewater System. Short-term, less than significant, adverse impacts on the wastewater system could occur. Temporary wastewater service interruptions could occur when new facilities are connected to the system or if existing facilities need to be disconnected. Additionally, wastewater service interruptions could also occur if wastewater lines need to be rerouted. Any potential disruptions would be coordinated with area users prior to interruption. Wastewater generated during construction would be discharged into the installation's wastewater system and would have a less than significant effect on the installation's overall

wastewater capacity. Construction contractors would locate and mark wastewater lines prior to any ground-disturbing activities that could result in unintended utility disruptions.

Long-term, less than significant, adverse and beneficial impacts on the wastewater system would occur following the completion of the MILCON/UMMC and FSRM projects. Permanent new facilities, such as the proposed GBTS facility, UMT facility, hush house, and egress shop, would generate new wastewater from bathrooms, which would increase the overall wastewater volume of Columbus AFB. The installation's wastewater system is operating at approximately 3 percent of capacity and, therefore, can meet the wastewater volume demands from the proposed facilities and the temporary 43-person increase in personnel in 2028 and 2029. Staffing levels would be reduced by 31 persons after 2029 (relative to current baseline staffing levels), which would reduce the installation's volume of wastewater generation slightly in the long-term.

Stormwater System. Short-term, less than significant, adverse impacts on the stormwater system at Columbus AFB would occur from constructing the MILCON/UMMC and FSRM projects. Construction activities, and the associated construction laydown areas, could potentially inhibit stormwater from reaching existing inlets or streams or could create slicker surfaces for higher velocity stormwater flows. Adverse effects would be minimized through the implementation of BMPs, which could include installing temporary stormwater controls (e.g., retention basins, silt fences, straw bales, and swales) to minimize the volume and velocity of stormwater flow. The installation would obtain a Mississippi Construction General Permit from MDEQ for projects where 1 acre or more would be disturbed. Construction would be governed by Storm Water Pollution Prevention Plans (SWPPP), which would contain BMPs and environmental protection measures to manage stormwater. Standard erosion control measures to prevent stormwater pollution would be implemented during construction activities to minimize soil disturbance and prevent erosion and sedimentation at the work site. An update to Columbus AFB's SWPPP could be required, and the requirements of Section 438 of the Energy Independence and Security Act (EISA) would be followed to maintain or restore, to the maximum extent practicable, the predevelopment hydrology of the collective project sites with respect to the flow rate, volume, and duration. In addition to applicable BMPs, guidance provided in the SWPPP for maintaining and restoring areas of development would be followed to minimize or eliminate impacts. Impacts on surface water are further described in **Section 3.10.2**.

Long-term, less than significant, adverse impacts on the stormwater system at Columbus AFB would occur following the completion of the MILCON/UMMC and FSRM projects, which would result in an increase of approximately 98,000 ft^2 (2.25 acres) of impervious surfaces at the installation. The increase in impervious surfaces would increase stormwater runoff near the proposed GBTS facility and UMT facility if BMPs and environmental protection measures are not implemented. To meet the EISA performance objectives, technically feasible stormwater control design features and practices that are effective in reducing the volume of stormwater runoff would be incorporated, to the extent practicable, into the design of these facilities as BMPs. Examples of such design features and practices are the use of green infrastructure and low impact development (e.g., use of porous pavements and bio-retention areas) to facilitate evapotranspiration and capture stormwater runoff. Low impact development and other

long-term stormwater management features would require continued maintenance, which would be addressed in the installation's SWPPP. Federally required design principles, such as UFC 1-200-02, *High Performance and Sustainable Building Requirements*; UFC 3-210-10, *Low Impact Development*; and Section 438 of the EISA would be followed and require project sites to maintain or restore disturbed sites to pre-construction hydrologic conditions.

Communications System. Short-term, less than significant, adverse impacts on communication infrastructure could occur. Temporary communication service disruptions could occur when buildings are disconnected from or connected to the Columbus AFB communication system during construction or renovation. Communication service interruptions could also be experienced if lines need to be rerouted. However, any disruptions would be coordinated with area users prior to disconnection. Construction contractors would locate and mark communication lines prior to any ground-disturbing activities that could result in unintended utility disruptions.

Long-term, less than significant, beneficial impacts would occur from the addition of new, upgraded communications infrastructure as part of the proposed MILCON/UMMC and FSRM projects, which would contribute to the overall communications system capacity at Columbus AFB. Additionally, the proposed antenna farm at the GBTS facility would improve long range communications for mission-related activities.

Solid Waste Management. Short-term, less than significant, adverse impacts on solid waste management would occur from the creation of solid waste during construction of the MILCON/UMMC and FSRM projects. Such waste would consist of building materials, such as solid pieces of concrete, metals (e.g., conduit, piping, and wiring), lumber, cement, and asphalt. To maximize landfill diversion rates, construction contractors would be required to recycle solid waste in accordance with applicable federal and installation policies. The contractor would be responsible for disposing non-recyclable debris at a permitted waste facility (e.g., the Golden Triangle Solid Waste Landfill), which would have a less than significant impact on solid waste management by reducing landfill capacity.

Long-term, less than significant, adverse and beneficial impacts on solid waste management would occur following the completion of the MILCON/UMMC and FSRM projects. Permanent new facilities, such as the proposed GBTS facility, UMT facility, hush house, and egress shop, would generate new quantities of solid waste from building upkeep and everyday building functions, which would increase the overall quantity of solid waste generated from Columbus AFB.

USEPA estimates the average person generates 4.9 pounds of solid waste per day (USEPA 2018). Based on USEPA solid waste estimates and the anticipated increase of 43 personnel and 82 dependents during the aircraft transition period in 2028 and 2029, Alternative 1 would increase regional solid waste by approximately 612.5 pounds per day, or approximately 112 tpy in 2028 and 2029. However, staffing levels would be reduced by 31 persons (and their estimated 59 dependents) after 2029 (relative to current baseline staffing levels). This reduction in personnel equates to a decrease in solid waste of approximately 441 pounds per day, or approximately 80 tpy, beginning in 2030. Such a decrease would negligibly reduce the amount

of solid waste being sent to landfills. Columbus AFB would continue to implement a mandatory recycling program and divert waste from landfills through reuse and recycling.

Transportation

Short-term, less than significant, adverse impacts on transportation would occur during construction of the proposed MILCON/UMMC and FSRM projects. Construction would require approximately 50 construction workers to commute daily, the periodic delivery of construction materials and heavy equipment, and the periodic removal of construction wastes from the installation. These vehicle movements would increase traffic volumes slightly on roadways used to access the installation—such as U.S. Highway 45 and State Highway 373—at the installation's gates, and on installation roadways. Construction traffic would be most noticeable between 6 a.m. and 8 a.m. and between 3 p.m. and 5 p.m.

Most construction workers would commute daily to the installation through the Main Gate; however, some may choose to enter via the South Gate for convenience. Heavy construction traffic, such as construction equipment and truck deliveries, would enter Columbus AFB through the Main Gate where the commercial vehicle inspection capabilities are located.

The proposed MILCON/UMMC and FSRM projects would be staggered over a roughly 4-year period (i.e., 2024 to 2028), which would minimize construction traffic at any one time. Additionally, some heavy equipment, such as dozers, loaders, and graders, would be left at the construction site or staging area for the duration of the construction period and would not contribute to the vehicles accessing the installation on a daily basis. Any potential increases in traffic volumes associated with construction would be temporary, and partial or full road closures, traffic pattern changes, and detours would be communicated to drivers in advance.

With an estimated 7,025 vehicles entering Columbus AFB per day (Columbus AFB 2017a), construction traffic would compose a relatively small percentage of the installation's total traffic. Because the installation currently experiences no problems meeting traffic demand at its gates during peak processing hours, construction traffic is anticipated to cause only a negligible increase in traffic and queuing time at the Columbus AFB gates.

Long-term, less than significant, adverse and beneficial impacts on transportation would occur following the completion of the MILCON/UMMC and FSRM projects. During the aircraft transition period in 2028 and 2029, a temporary 43-person increase in personnel would occur. These additional personnel and their estimated 82 dependents would increase on- and off-installation traffic slightly through daily commutes and everyday vehicle movements. However, staffing levels would be reduced by 31 persons (and their estimated 59 dependents) after 2029 (relative to current baseline staffing levels). This reduction would decrease on- and off-installation traffic slightly.

The new and departing personnel and their dependents of driving age would represent a small percentage of the estimated 7,025 vehicles entering Columbus AFB per day (Columbus AFB 2017a). Therefore, the addition of vehicles in 2028 and 2029 and subtraction of vehicles in 2030 and later years would cause a less than significant change in traffic on both on- and off-installation roadways and queuing time at the Columbus AFB gates.

Long-term, less than significant, beneficial impacts on parking at Columbus AFB would result from the addition of approximately 176 parking spaces for the GBTS facility. These parking spaces would provide parking for the proposed GBTS facility and replace those parking spots lost from its construction. Sufficient parking already exists for the other MILCON/UMMC and FSRM projects. An adjacent parking lot at the UMT facility already provides sufficient parking capacity for that proposed facility and existing users.

3.8.2.2 Alternative 2

Impacts on airfield pavement and liquid fuels from T-7A operations that are 25 percent greater than Alternative 1 would be slightly greater than those described for Alternative 1. Compared to Alternative 1, the increase in aircraft operations would increase wear on the airfield pavement slightly, reduce its service life slightly, and increase the amount of jet fuel consumed at Columbus AFB slightly. However, a 25 percent increase in operations is still less than baseline operations; therefore, the overall impact would remain beneficial. Impacts on the remaining infrastructure components—namely the electrical system, natural gas system, water supply system, wastewater system, stormwater system, communications system, and solid waste management—and transportation would be identical to Alternative 1 because the demand for these services would not change for Alternative 2.

3.8.2.3 Alternative 3

Impacts on infrastructure and transportation from T-7A operations that are 25 percent greater than Alternative 1 and the delivery of up to 16 additional T-7A aircraft would be virtually identical to those described for Alternative 2. The only exception would be that up to 12 additional T-7A shelters would be constructed on the Columbus AFB aircraft parking ramp. These additional shelters would increase the aircraft parking capacity at the installation and provide sufficient shelter for the additional aircraft. Therefore, additional long-term, less than significant, beneficial impacts on the airfield pavement at Columbus AFB would occur from Alternative 3.

3.8.2.4 No Action Alternative

The No Action Alternative would not impact infrastructure and transportation. No facility construction would occur, and there would be no changes in aircraft operations. As such, no impacts on any infrastructure components would occur and traffic volumes would not change. Infrastructure and transportation conditions at Columbus AFB would remain unchanged compared to the existing conditions described in **Section 3.8.1**.

3.8.3 Cumulative Effects

Short-term, less than significant, adverse cumulative effects would occur during construction for T-7A recapitalization and the reasonably foreseeable actions (see **Table 3-2**). Construction would have the potential to interrupt utility services, should service lines need to be rerouted or when a proposed facility is connected to the utility systems. Upgrades and construction of new infrastructure on and off the installation would result in long-term, beneficial, cumulative effects from upgraded transportation systems, particularly along the U.S. Highway 45 Corridor; improved utility systems, particularly associated with the installation's water storage capacity; improved stormwater handling; and increased energy efficiency. The Proposed Action, when

combined with the reasonably foreseeable actions, would not result in a significant cumulative effect on infrastructure and transportation.

3.9 Safety

Safety addresses the well-being, safety, and health of members of the public, contractors, and DAF personnel during the various aspects of the Proposed Action. A safe environment is one in which there is no (or an optimally reduced) potential for serious bodily injury or illness, death, or property damage. Safety and accident hazards can often be identified and reduced or eliminated. Necessary elements for an accident-prone situation or environment include the presence of the hazard itself together with the exposed (and possibly susceptible) population. The degree of exposure depends primarily on the hazard's proximity to the population. Hazards relevant to this Proposed Action include construction, mission, and flight activities.

3.9.1 Affected Environment

Construction Safety. All contractors performing construction activities on DAF installations, including Columbus AFB, are responsible for following federal OSHA regulations and are required to conduct these activities in a manner that does not increase risk to workers or the public. OSHA regulations address the health and safety of people at work and cover potential exposure to a range of chemical, physical, and biological hazards and ergonomic stressors. The regulations are designed to control these hazards by eliminating exposure via administrative or engineering controls, substitution, use of PPE, and availability of Safety Data Sheets.

Construction contractors are responsible for reviewing potentially hazardous workplace conditions; monitoring worker exposure to workplace chemical (e.g., asbestos, lead, hazardous substances), physical (e.g., noise propagation, falls), and biological (e.g., infectious waste, wildlife, poisonous plants) agents, and ergonomic stressors; and recommending and evaluating controls (e.g., prevention, administrative, engineering, PPE) to ensure exposure to personnel is eliminated or adequately controlled. Additionally, employers are responsible for providing occupational health physicals for workers using respiratory protection; engaged in work with hazardous waste, asbestos, or lead; or otherwise requiring medical monitoring.

Mission Safety. Mission safety on DAF installations is maintained through adherence to DoD and DAF safety policies and plans. DAF safety programs ensure the safety of personnel and the public on the installation by regulating mission activities. AFI 91-202, *The US Air Force Mishap Prevention Program*, implements Air Force Policy Directive 91-2, *Safety Programs*, and provides guidance for implementing the safety program for all activities that occur on DAF installations.

Columbus AFB is a secure military installation and access is limited to military personnel, civilian employees, military dependents, and approved visitors. Aircraft operations and maintenance activities performed on Columbus AFB, including those done currently for the T-38C, are accomplished in accordance with applicable DAF safety regulations, published DAF Technical Orders, and standards prescribed by DAF occupational safety and health

requirements. Adherence to industrial-type safety procedures and directives ensures safe working conditions.

Explosive Safety Quantity Distance (ESQD) arcs are buffers around facilities that contain high-explosive munitions or flammable elements. The size and shape of an ESQD arc depends on the facility and the net explosive weight of the munitions being housed. Separations set by ESQD arcs establish the minimum distances necessary to prevent the exposure of DAF personnel and the public to potential explosive safety hazards. ESQD arcs cover a portion of land in the northwestern portion of Columbus AFB, primarily around the airfield and the munitions storage area. Incompatible development is restricted within the ESQD arcs to reduce safety risks and protect the mission requirements at Columbus AFB (Columbus AFB 2017a).

Flight Safety. The primary safety concern regarding military flights is the potential for aircraft mishaps (i.e., crashes or crash landings), including those caused by adverse weather events and wildlife strikes. Aircraft mishaps are classified as A, B, C, or D. Class A mishaps are the most severe, with total property damage of $2 million or more, a fatality, or permanent total disability. Wildlife strikes are a flight safety concern due to the potential damage that a strike might have on the aircraft or injury to aircrews. AFI 91-202 establishes mishap prevention program requirements (including those for BASH), assigns responsibilities for program elements, and contains program management information.

Land use restrictions are intended to protect the public from exposure to aircraft operation hazards. The AICUZ program is used to protect the public and DAF personnel health and safety, as it relates to aircraft noise, accident potential, and the intersection with land use. Each DAF installation's AICUZ plan identifies CZs and APZs to protect the public from aircraft mishaps and noise zones to protect from aircraft noise. DAF policy requires privately owned land located within CZs to be acquired by DAF via a fee simple easement or a restrictive land easement. APZs identify areas and restrict land use where the greatest potential for aircraft accidents exists.

The AICUZ program at Columbus AFB includes three safety zones: the CZ, APZ I, and APZ II. Of the three safety zones, the CZ has the highest accident potential. Accident potential within a CZ is so high that land use restrictions prohibit almost all economic land use. The majority of Columbus AFB's CZ is on installation property. There are no land use incompatibilities within the small portion of the CZ located off installation (Columbus AFB 2012).

APZ I is less critical than the CZ, but still possesses a significant risk factor. This area has land use compatibility guidelines that allow reasonable economic use of the land, such as industrial/manufacturing, transportation, communication/utilities, wholesale trade, open space, recreation, and agriculture. However, uses that concentrate people in small areas are not compatible. APZ II begins at the outer end of APZ I and is less critical than APZ I but still possesses potential for accidents. Acceptable uses include those of APZ I, as well as low-density, single family residential use; personal and business services; and commercial/retail trade uses of low intensity or scale of operation. High density functions, such as multi-story buildings, places of assembly (e.g., theaters, churches, schools, restaurants, etc.), and high-density office uses, are not compatible.

Each runway end at Columbus AFB has a CZ and two APZs (see **Figure 3-22**). The CZs measure 3,000 feet wide (i.e., 1,500 feet on either side of the runway centerline) and 3,000 feet long. Because the centerlines for the runways are less than 1,500 feet apart, the CZs and APZs for the three runways overlap. Columbus AFB has a waiver from Headquarters AETC that allows the off-installation portion of the CZ to be only 2,000 feet wide centered on the runway centerline. This waiver applies to areas on the northeast side of the CZs outside the base boundary at both ends of Runway 13L/31R. APZ I measures 5,000 feet from the CZ and is 3,000 feet wide. APZ II extends an additional 7,000 feet from APZ I and is also 3,000 feet wide. The CZ and APZs at Columbus AFB cover a total of 2,994 acres of off-installation land. There are 61 acres of residential land within APZs I and II. Most of the off-installation land is open, agricultural, or low density. The remainder is comprised of 20 acres for commercial use, 161 acres for industrial use, and 3 acres for public use (Columbus AFB 2012).

The city of Columbus and Lowndes County have taken steps to incorporate the Columbus AFB mission by adopting zoning controls that limit encroachment into the flight paths and operations of the airfield. In 1994, Lowndes County took a proactive approach to regulate and control development within the vicinity of Columbus AFB. The Lowndes County Board of Supervisors drafted and implemented the *Columbus Air Force Base Installation Compatible Use Zoning Ordinance* for governing the use of all land within the impacted limits of Columbus AFB. The ordinance contains compatible land use guidelines with the establishment of 14 overlay CUDs. Each CUD is defined in area based on DNL noise contours and APZs (Columbus AFB 2012).

Eleven Class A aircraft mishaps have occurred on or near Columbus AFB. Three occurred in 1951 with T-6D aircraft, one occurred in 1974 with a T-38A aircraft, one occurred in 1982 with a T-38C aircraft, one occurred in 1995 with an AT-38B aircraft, two occurred in 2007 with T-6A aircraft, one occurred in 2008 with a T-38C aircraft, one occurred in 2012 with a T-6A aircraft, and one occurred in 2018 with a T-38C aircraft. The T-38C mishap in 2008 was caused by the failure of the right aileron during takeoff, which led to the crew ejecting out of the envelope resulting in two fatalities. None of the other mishaps resulted in fatalities (ASN 2022).

3.9.2 Environmental Consequences

Any increase in safety risks is considered an adverse impact on safety. Significant impacts on safety would occur if a proposed action did either of the following:

- Substantially increased risks associated with the safety of DAF personnel or the general public
- Introduced a new safety risk for which DAF is not prepared or does not have adequate management and response plans in place.

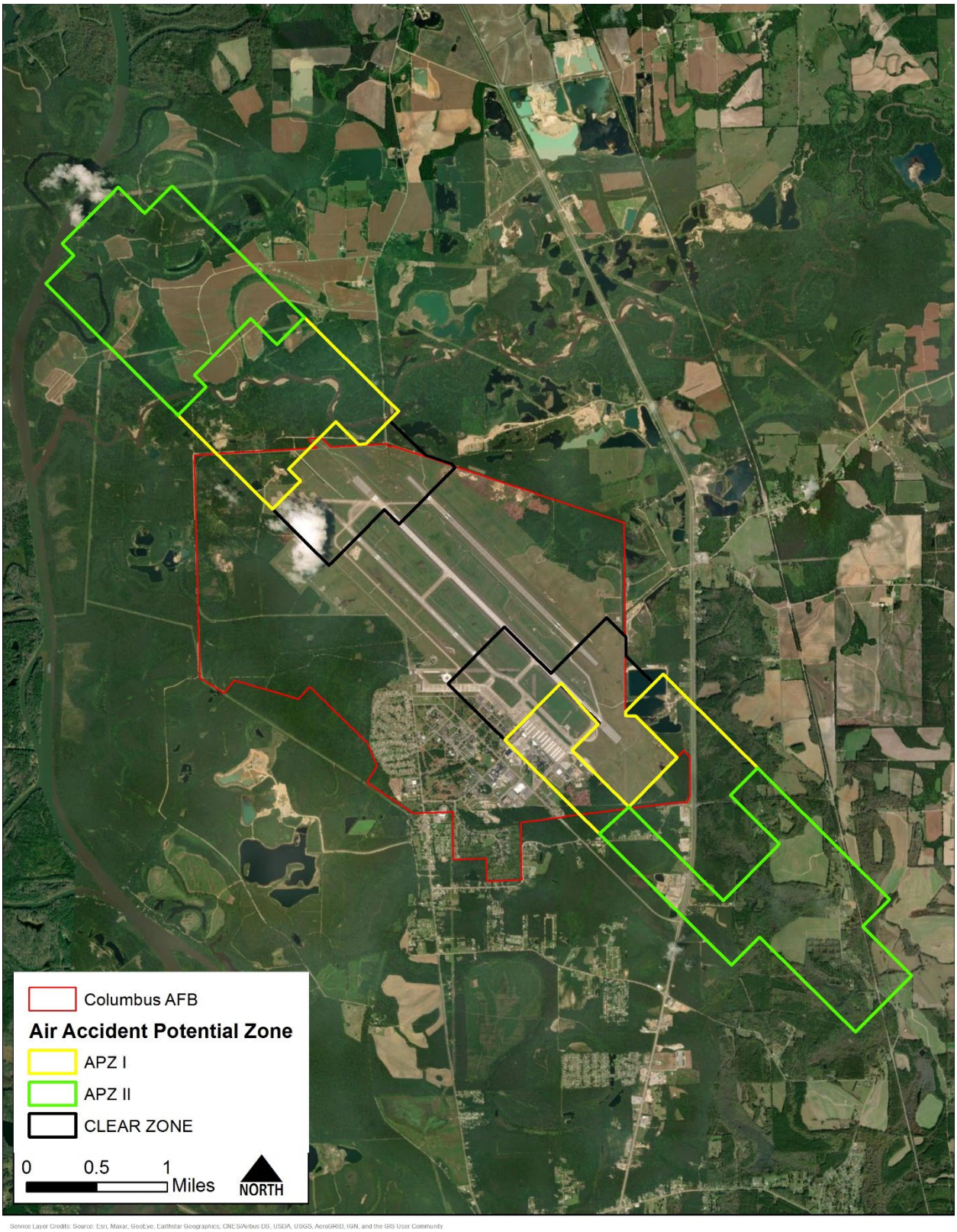

Figure 3-22. CZs and APZs at Columbus AFB

3.9.2.1 Alternative 1

Construction Safety. Short-term, less than significant, adverse impacts on contractor health and safety would occur during construction of the MILCON/UMMC and FSRM projects. Construction activities are inherently hazardous because personnel are potentially exposed to health and safety hazards from heavy equipment operation; hazardous materials and chemical use; and working in confined, poorly ventilated, and noisy environments. Therefore, contractors performing construction work would be exposed to an environment containing slightly greater health and safety risks than a non-construction environment.

To minimize health and safety risks, construction contractors would be required to use appropriate PPE and establish and maintain site-specific health and safety programs for their employees. Contractor health and safety programs would follow all applicable, federal OSHA regulations and would be reviewed by Columbus AFB personnel prior to work beginning to ensure that appropriate measures are taken to reduce the potential exposure of workers and installation personnel to health and safety risks. Safety Data Sheets for all hazardous materials and chemicals stored at the worksite would be kept on site and be available for immediate review. OSHA requirements for excavations, specified at 29 CFR 1926 Subpart P, would be followed for excavation and trenching activities.

Mission Safety. No adverse impacts on the health and safety of military personnel would occur. All mission-related activities associated with Alternative 1 would be carried out in accordance with DoD and DAF safety policies and plans. Aircraft maintenance activities would be accomplished similar to those already performed for the T-38C and in accordance with applicable DAF safety regulations, published DAF Technical Orders, and standards prescribed by DAF occupational safety and health requirements. Adherence to industrial-type safety procedures and directives would ensure safe working conditions. None of the proposed MILCON/UMMC or FSRM projects would be sited within an ESQD arc.

Flight Safety. Long-term, less than significant, adverse impacts on flight safety would occur during the T-38C to T-7A transition period, at full T-7A implementation, and with the introduction of nighttime T-7A operations at Columbus AFB. The proposed operations would result in an increased potential for BASH incidents and other mishaps from nighttime airfield use. However, the overall potential for BASH incidents and other mishaps is not expected to be significantly greater than baseline because all flight safety guidelines and regulations currently in place, including the BASH program, would continue to be followed. The greatest potential for a BASH incident would occur during takeoff and landing operations. FAA estimates that approximately 97 percent of bird or wildlife aircraft strikes occur at that stage of flight. The remaining approximately 3 percent occur in the cruise phase of flight (FAA 2022b). All aircraft operations would continue to be performed in accordance with standard flight rules and local operating procedures and policies. Aircraft mishaps at Columbus AFB are rare, and T-7A operations would be similar in nature to those performed with T-38C aircraft. Therefore, T-7A operations would not be expected to increase the potential occurrence of Class A mishaps. The CZs and APZs would remain unchanged.

3.9.2.2 Alternative 2

Impacts on safety from T-7A operations that are 25 percent greater than Alternative 1 would be slightly greater than those described for Alternative 1. Compared to Alternative 1, the 25 percent increase in operations would increase the potential for BASH incidents and other mishaps associated with greater and nighttime airfield use. However, the overall potential for BASH incidents and other mishaps is not expected to be significantly greater than Alternative 1 because all safety programs in place for the existing aircraft operations, including the BASH program, would continue to be followed. As a result, the proposed increase in operations would not be expected to increase the potential occurrence of Class A mishaps. The CZs and APZs would also remain unchanged.

3.9.2.3 Alternative 3

Impacts on safety from T-7A operations for Alternative 3 would be the same as those described for Alternative 2. Although there would be up to 16 additional T-7A aircraft for Alternative 3, annual T-7A operations at Columbus AFB and the associated SUA would occur at an intensity identical to Alternative 2 (i.e., approximately 25 percent greater than Alternative 1). All safety programs in place for the existing aircraft operations, including the BASH program, would continue to be followed, and there would be no increase in the potential occurrence of Class A mishaps. The CZs and APZs would also remain unchanged. Identical impacts on safety would occur from installation of up to 58 T-7A shelters rather than up to 46 shelters for Alternatives 1 and 2.

3.9.2.4 No Action Alternative

The No Action Alternative would not result in impacts on safety. No facility construction would occur, and there would be no changes in aircraft operations. Construction, mission, and flight safety conditions at Columbus AFB would remain unchanged compared to the existing conditions described in **Section 3.9.1**.

3.9.3 Cumulative Effects

T-7A recapitalization and the reasonably foreseeable actions (see **Table 3-2**) would result in short-term, less than significant, intermittent, adverse cumulative effects on safety from construction (e.g., slips, falls, heat exposure, and exposure to mechanical, electrical, vision, and chemical hazards). Adherence to established procedures—including the use of PPE; fencing project areas and posting signs; and compliance with applicable federal, state, and DoD safety standards—would reduce or eliminate health and safety impacts on contractors, military personnel, and the public. These procedures are typical for construction projects on the installation and within the surrounding area. Therefore, the T-7A recapitalization, when combined with the reasonably foreseeable actions, would not result in significant cumulative effects on health and safety.

3.10 Water Resources

Water resources are natural and human-made sources of water that are available for use by and for the benefit of humans and the environment. The water resources relevant to the Proposed Action are groundwater, surface water, wetlands, and floodplains at Columbus AFB.

No impacts on water resources beneath the SUA would occur; therefore, water resources in the SUA are not discussed further in this EIS.

Groundwater. Groundwater is water that collects or flows beneath the Earth's surface, filling the porous spaces in soil, sediment, and rocks. A deposit of subsurface water that is large enough to tap via a well is referred to as an aquifer. Groundwater originates from precipitation, percolates through the ground surface, and is often used for potable water consumption, agricultural irrigation, and industrial applications. Groundwater can typically be described in terms of its depth from the surface, aquifer or well capacity, water quality, surrounding geologic composition, and recharge rate.

Surface Water. Surface water includes natural, modified, and constructed water confinement and conveyance features above groundwater that may or may not have a defined channel and discernable water flows. These features are generally classified as streams, springs, wetlands, natural and artificial impoundments (e.g., ponds, lakes), and constructed drainage canals and ditches. Stormwater is surface water generated by precipitation events that may percolate into permeable surficial sediments or flow across the top of impervious or saturated surficial areas, which is a condition known as runoff. Stormwater is an important component of surface water systems because of its potential to introduce sediments and other contaminants that could degrade lakes, rivers, and streams. Stormwater flows, which can be exacerbated by high proportions of impervious surfaces associated with buildings, roads, and parking lots, are important to surface water management. Stormwater systems reduce sediments and other contaminants that would otherwise flow directly into surface waters.

The Clean Water Act (CWA) (33 USC § 1251 et seq., as amended) establishes federal limits, through the NPDES, on the amount of specific pollutants that are discharged to surface waters to restore and maintain the water's chemical, physical, and biological integrity. An NPDES Construction General Permit would be required for any change in the quality or quantity of stormwater runoff and for some non-stormwater discharges from construction sites where 1 acre or more would be disturbed. The permit mandates use of BMPs to ensure that soil disturbed during construction does not pollute nearby water bodies.

The NPDES stormwater program requires construction site operators engaged in activities that disturb 1 acre or more to obtain coverage for their stormwater discharges under a General Permit for Stormwater Discharge from Large and Small Construction Activities. Construction or demolition that necessitates a permit requires preparation of a NOI to discharge stormwater and an SWPPP that is implemented during work activities. The issuance of stormwater NPDES permits is completed by either a USEPA regional office or a state regulatory office, depending on which organization has primacy. In the state of Mississippi, MDEQ has primacy over DAF installations. The construction contractor would apply for a Mississippi Construction General Permit in the short-term, under which the construction activities would be covered. Upon completion of construction, an industrial (MSR10) and a municipal (MS4) general stormwater permit would govern the long-term control of pollutants in stormwater on the installation (MDEQ 2022).

Section 438 of the EISA (42 USC § 17094) establishes stormwater design requirements for federal construction projects that disturb a footprint greater than 5,000 ft^2. Additional guidance

is provided in the USEPA's, *Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the EISA*. DoD's UFC 3-210-10 also provides technical criteria, technical requirements, and references for the planning and design of applicable DoD projects to comply with stormwater requirements under EISA Section 438. Per these requirements, any increase in surface water runoff as a result of construction would be attenuated using temporary and/or permanent drainage management features. The integration of low impact development design concepts into site design and the use of stormwater management to maintain the site's pre-development runoff rates and volumes would minimize further potential adverse impacts associated with increases in impervious surface area.

Wetlands. Wetlands are an important natural system and habitat because of the diverse biologic and hydrologic functions they perform. These functions include water quality improvement, groundwater recharge and discharge, pollution mitigation, nutrient cycling, wildlife habitat provision, and erosion protection.

Sections 404 and 401 of the CWA (through water quality certification) regulate the discharge of dredged or fill materials into the waters of the United States. The term "waters of the United States" has a broad meaning under the CWA and incorporates the territorial seas, tributaries, lakes and ponds, impoundments of jurisdictional waters, and adjacent wetlands. USACE defines wetlands as "those areas that are inundated or saturated with ground or surface water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas" (33 CFR § 328.3(c)(4)).

EO 11990, *Protection of Wetlands* (May 24, 1977), directs agencies to consider alternatives to avoid adverse impacts and incompatible development in wetlands. Federal agencies are to avoid new construction in wetlands unless the agency finds there is no practicable alternative and the proposed construction incorporates all possible measures to limit harm to the wetland. Agencies should use economic and environmental data, agency mission statements, and any other pertinent information when deciding whether to build in wetlands. EO 11990 directs each agency to provide plans for construction in wetlands for early public review.

Floodplains. Floodplains are low-level areas along rivers, stream channels, large wetlands, or coastal waters. Such lands might be subject to periodic or infrequent inundation due to rain or melting snow. Floodplain ecosystem functions include natural moderation of floods, flood storage and conveyance, groundwater recharge, and nutrient cycling.

The risk of flooding typically depends on local topography, the frequency of precipitation events, and the size of the watershed above the floodplain. Flood potential is evaluated by the Federal Emergency Management Agency (FEMA), which defines 100- and 500-year floodplains. The 100-year floodplain is an area that has a 1 percent chance of inundation by a flood event in a given year, while 500-year floodplains have a 0.2 percent chance of inundation in a given year. Certain facilities inherently pose too great a risk to be in either the 100- or 500-year floodplain, such as hospitals, schools, or storage buildings for irreplaceable records. Federal, state, and local regulations often limit floodplain development to passive uses, such as recreational and preservation activities, to reduce the risks to human health and safety.

EO 11988, *Floodplain Management*, as amended by EO 13690, *Establishing a Federal Risk Management Standard and Process for Further Soliciting and Considering Stakeholder Input*, requires federal agencies to determine whether a proposed action would occur within a floodplain. This determination typically involves review of FEMA Flood Insurance Rate Maps, which contain enough general information to determine the relationship of the project area to nearby floodplains. Federal agencies are directed to avoid floodplains unless the agency determines that no practicable alternative exists. Where the only practicable alternative is to site in a floodplain, the agency should develop measures to reduce and mitigate unavoidable impacts.

3.10.1 Affected Environment

Groundwater. Columbus AFB is located above the lower Tuscaloosa aquifer. The Tuscaloosa aquifer system is in the interconnected, irregular sand and gravel beds in the Coker and Gordo Formations and is of the Cretaceous age. The aquifer contains freshwater in an area of approximately 9,000 square miles in northeastern Mississippi and supplies potable water to approximately 90 water systems and numerous industries in the region. Regional water level declines have averaged less than two feet per year, and the aquifer has a large potential for future development. The most common water quality problems are excessive chloride and iron (USGS 2022b).

Columbus AFB's drinking water is provided by CL&W, and there are no drinking water wells on the installation. The water is sourced from eight wells pumping from the lower Tuscaloosa aquifer. **Section 3.8** provides further information on Columbus AFB's drinking water infrastructure.

Surface Water. Columbus AFB is within the Tombigbee Basin. Surface water features on the installation include small ponds and lakes and various ephemeral streams (i.e., streams with flowing water only during and for a short time after precipitation events) that run to Stinson Creek, which is south of Columbus AFB, and the Buttahatchee River, which is to the north of Columbus AFB (see **Figure 3-23**) (FEMA 2022, USFWS 2022d). All stormwater runoff from the footprint of the MILCON/UMMC and FSRM project locations will ultimately discharge to Stinson Creek (FEMA 2022).

Columbus AFB maintains SWPPPs to address the applicability of the plans to the various facilities, outline permit requirements, designate SWPPP responsibilities, and recommend BMPs for managing stormwater pollution. Columbus AFB has separate SWPPPs addressing the Industrial Stormwater Permit criteria, Pesticide General Permit criteria, and the Municipal Stormwater Permit criteria.

Wetlands. Wetlands on Columbus AFB are limited to the small ponds and lakes and along the ephemeral streams that lead to Stinson Creek and the Buttahatchee River. No wetlands are located in the MILCON/UMMC and FSRM project locations, and the nearest wetland is approximately 0.25 mile from the project locations (see **Figure 3-23**).

Floodplains. Approximately half of Columbus AFB lies within the FEMA-designated 100-year and 500-year floodplains. These portions of the installation are to the north and west of the airfield and outside of the MILCON/UMMC and FSRM project locations. **Figure 3-23** shows the 100- and 500-year floodplains.

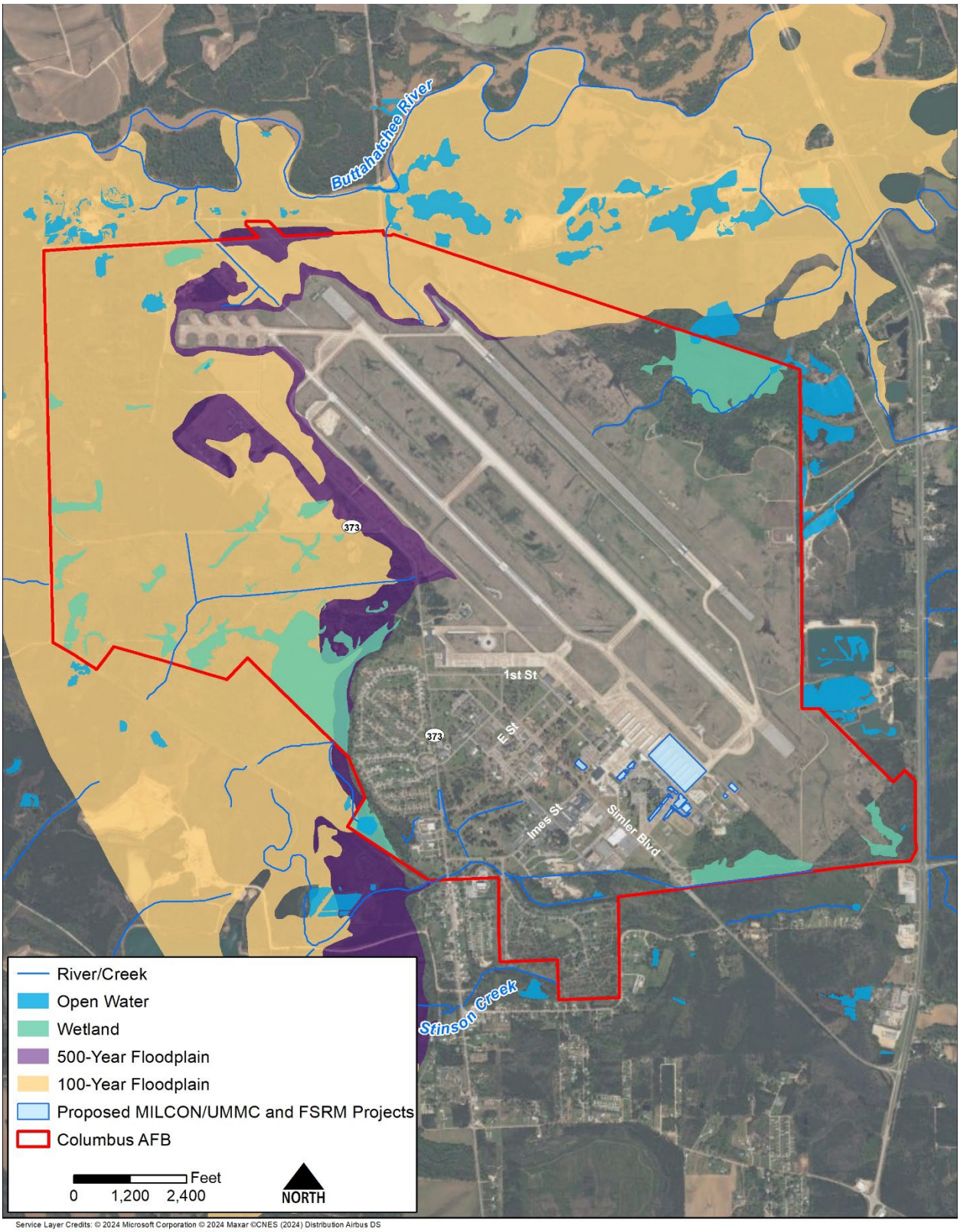

Figure 3-23. Water Resources, Wetlands, and Floodplains at Columbus AFB

3.10.2 Environmental Consequences

A proposed action could have significant impacts with respect to water resources if any of the following were to occur:

- Substantially reduce water availability or supply to existing users
- Overdraft groundwater basins
- Exceed safe annual yield of water supply sources
- Substantially affect water quality
- Endanger public health or safety by creating or worsening health or flood hazard conditions
- Threaten or damage unique hydrologic characteristics
- Violate established laws or regulations adopted to protect water resources

Determining the significance of wetland impacts is based on (1) the function and value of the wetland, (2) the proportion of the wetland that would be affected relative to the occurrence of similar wetlands in the region, (3) the sensitivity of the wetland to proposed activities, and (4) the duration of ecological ramifications. Impacts on wetland resources are considered significant if high-value wetlands would be adversely affected.

3.10.2.1 Alternative 1

***Groundwater and Surface Water*.** No direct impacts on groundwater and surface water would occur. The water table at Columbus AFB is approximately 10 feet below the ground surface, and it is not anticipated that any construction activities would occur at this depth. Additionally, no construction would occur within the footprint of any surface water areas.

Short- and long-term, less than significant, indirect, adverse impacts on groundwater and surface water would occur. As noted in the stormwater system discussion in **Section 3.8**, construction of the MILCON/UMMC and FSRM projects could potentially inhibit stormwater from reaching existing inlets or streams or could create slicker surfaces for higher velocity stormwater flows. However, these potential adverse impacts would be minimized through the implementation of BMPs, which could include installing temporary stormwater controls (e.g., retention basins, silt fences, straw bales, and swales) to minimize the volume and velocity of stormwater flow. Following construction of the MILCON/UMMC and FSRM projects, the amount of impervious surfaces would increase at the installation by approximately 98,000 ft^2 (2.25 acres), which could potentially decrease groundwater recharge and increase stormwater runoff into nearby surface water bodies. Federally required design principles (e.g., UFC 1-200-02, UFC 3-210-10, and Section 438 of the EISA) would be followed to maintain or restore, to the maximum extent practicable, the predevelopment hydrology of the collective project sites with respect to flow rate, volume, and duration. The installation would obtain a Mississippi Construction General Permit from MDEQ for projects where 1 acre or more would be disturbed. Construction would be governed by the SWPPP, which contains BMPs and environmental protection measures to manage stormwater on the installation. Standard erosion control measures to prevent stormwater pollution would be implemented during construction activities

to minimize soil disturbance and prevent erosion and sedimentation at the work site. Further information on stormwater management is provided in **Section 3.8**.

As noted in **Section 3.7.2.1**, the concurrent operation of two types of aircraft during the T-38C to T-7A transition period may require additional quantities of hazardous materials, hazardous wastes, and petroleum products to be delivered, stored, used, and disposed of at Columbus AFB. This temporary increase in hazardous materials, hazardous wastes, and petroleum product management would negligibly increase the potential for an accidental release to occur and for the contamination to reach nearby groundwater aquifers and surface water features. The installation's SPCC Plan, ISWMP, and HWMP would continue to be followed to lessen the potential for a release to contaminate water resources.

Wetlands. The MILCON/UMMC and FSRM projects would not occur within 0.25-mile of any potential wetland; therefore, no direct impacts on wetlands would occur. The construction BMPs described in the Groundwater and Surface Water subsection would be implemented to minimize the potential for indirect impacts on downstream wetlands.

Floodplains. The MILCON/UMMC and FSRM projects would not occur within or near the 100- or 500-year floodplains; therefore, no impacts on floodplains would occur.

3.10.2.2 Alternative 2

Impacts on water resources from T-7A operations that are 25 percent greater than Alternative 1 would be slightly greater than those described for Alternative 1. Compared to Alternative 1, the 25 percent increase in operations would slightly increase the potential for an accidental release of hazardous materials or petroleum products to contaminate groundwater aquifers and surface waters. However, the overall potential for a release and for contamination of water resources would not be significantly greater than Alternative 1. The Columbus AFB SPCC Plan, ISWMP, and HWMP would continue to be followed to lessen the potential for a release to contaminate water resources.

3.10.2.3 Alternative 3

Impacts on water resources from T-7A operations that are 25 percent greater than Alternative 1 and the delivery of up to 16 additional T-7A aircraft would be slightly greater than those described for Alternatives 1 and 2. Compared to Alternatives 1 and 2, the increase in operations and the additional aircraft to maintain would slightly increase the potential for an accidental release of hazardous materials or petroleum products to contaminate groundwater aquifers and surface waters. However, the overall potential for a release and contamination of water resources would not be significantly greater than Alternatives 1 and 2. The Columbus AFB SPCC Plan, ISWMP, and HWMP would continue to be followed to lessen the potential for a release to contaminate water resources.

Although Alternative 3 would include the installation of up to 58 T-7A shelters rather than up to 46 shelters proposed for Alternatives 1 and 2, the construction impacts on water resources would be identical to those described for Alternative 1. All shelters, including the up to 12 additional shelters, would be installed on an already impervious surface on the Columbus AFB airfield. As such, there would be no difference in the area for groundwater infiltration, and the

potential for increased stormwater runoff into nearby surface water bodies would be the same as Alternative 1.

3.10.2.4 No Action Alternative

The No Action Alternative would not impact water resources. No facility construction would occur, and there would be no changes in aircraft operations or maintenance. The amount of impervious surfaces on the installation would not change, and no impacts on groundwater recharge or surface water runoff would occur. The potential for groundwater or surface water contamination would not change. There would also be no impact on wetlands or floodplains. Water resources conditions at Columbus AFB would remain unchanged compared to the existing conditions described in **Section 3.10.1**.

3.10.3 Cumulative Effects

T-7A recapitalization and the reasonably foreseeable actions (see **Table 3-2**) would result in short- and long-term, less than significant, adverse, cumulative effects on water resources from construction involving ground disturbance and increased impervious surfaces. Soil disturbances could result in erosion, sedimentation, and degraded water quality. Cumulatively, the increase in impervious surfaces from T-7A recapitalization and the reasonably foreseeable actions would be considered a small contribution in the context of the whole watershed but could be noticeable on a local level. In accordance with federal and state stormwater regulations, the predevelopment hydrologic conditions of the project areas would be maintained through use of existing stormwater management systems and appropriate low-impact development strategies that would attenuate potential long-term, adverse cumulative effects on water resources. Accidental spills or leaks of fuels, oils, and other lubricants could contaminate water resources; however, the potential for contamination to occur would be minimized using secondary containment and other BMPs to prevent or minimize spills or leaks. Therefore, T-7A recapitalization, when combined with the reasonably foreseeable actions, would not result in a significant cumulative effect on water resources.

3.11 Environmental Justice

On April 21, 2023, EO 14096, *Revitalizing Our Nation's Commitment to Environmental Justice for All*, was issued. This EO seeks to advance environmental justice for all by implementing and enforcing the nation's environmental and civil rights laws, preventing pollution, addressing climate change and its effects, and working to clean up legacy pollution that is harming human health and the environment. EO 14096 builds upon EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, which was issued on February 11, 1994.

EO 12898 requires each federal agency to identify and address whether their proposed action results in disproportionately high and adverse environmental and health impacts on low-income or minority populations. The EO is intended to ensure the fair treatment and meaningful involvement of all people, regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no groups of people, including racial, ethnic, or socioeconomic groups, should bear a disproportionate share of the negative environmental

consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, tribal, and local programs and policies. This EO also requires that each federal agency perform its programs, policies, and activities that substantially affect human health and the environment in a manner that does not exclude persons from participating in, deny persons the benefits of, or subject persons (including populations) to discrimination under such programs, policies, and activities because of their race, color, national origin, or income.

A 1994 presidential memorandum accompanying EO 12898 states that existing federal statutes should be used to evaluate environmental justice concerns. One of the referenced statutes is NEPA, and the memorandum highlights the importance of NEPA in addressing environmental hazards in minority and low-income communities. The memorandum states that, "[e]ach Federal agency shall analyze the environmental effects, including human health, economic and social effects, of Federal actions, including effects on minority communities and low-income communities," when such analysis is required by NEPA.

EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, states that each federal agency "(a) shall make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately impact children; and (b) shall ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks." Similarly, potential impacts on senior citizens should also be evaluated. Activities occurring near areas that could have higher concentrations of children or seniors during any given time, such as schools, childcare facilities, and assisted living facilities, might further intensify potential impacts on these groups. To the extent to which children or seniors might be impacted, disproportionate impacts are inherent due to their innate vulnerabilities.

Consideration of environmental justice concerns includes the race, ethnicity, poverty status, and age of populations in the area within which potential impacts from a proposed action could occur. Such information aids in evaluating whether a proposed action would render any of the populations targeted for protection vulnerable.

As defined by CEQ, minority or low-income populations should be identified if the percentage of persons characterized as being minority or low-income within the ROI is either greater than 50 percent or is meaningfully greater than the community of comparison. For the purposes of the environmental justice analysis for this EIS, "meaningfully greater" is 10 percent greater than the community of comparison. Ten percent greater than the community of comparison is a standard threshold used by many agencies in interpreting this guidance and for conducting these analyses. CEQ also states, "A minority population also exists if there is more than one minority group present and the minority percentage, as calculated by aggregating all minority persons, meets one of the above-stated thresholds" (CEQ 1997). The community of comparison is the smallest jurisdiction for which U.S. Census data are collected that encompasses the footprint of impacts for all resource areas.

For the purposes of this EIS, environmental justice populations are given the following definitions.

Minority Population. CEQ defines minority as "[i]ndividual(s) who are members of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic." CEQ guidance recommends minority populations "be identified where either: (a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis. In identifying minority communities, agencies may consider as a community either a group of individuals living in geographic proximity to one another, or a geographically dispersed/transient set of individuals (such as migrant workers or Native American), where either type of group experiences common conditions of environmental exposure or effect. The selection of the appropriate unit of geographic analysis may be a governing body's jurisdiction, a neighborhood, census tract, or other similar unit that is to be chosen so as to not artificially dilute or inflate the affected minority population. A minority population also exists if there is more than one minority group present and the minority percentage, as calculated by aggregating all minority persons, meets one of the above-stated thresholds" (CEQ 1997). The U.S. Census Bureau considers race and Hispanic or Latino origin (ethnicity) as separate concepts, and these data are recorded separately.

Low-income Population. A low-income population is the percentage of a population where the household income is less than or equal to twice the federal "poverty level" (USEPA 2022d). For 2021, the federal poverty level, or threshold, for a two-person household under 65 years old was $18,231 (U.S. Census Bureau 2022).

In addition to environmental justice populations, DAF identifies sensitive receptors to be considered in environmental justice analyses. These populations are defined as follows:

Youth Population. The percentage of a population that is age 17 or younger (DAF 2014b).

Elderly Population. The percentage of a population that is age 65 or older (DAF 2014b).

Data from the American Community Survey 5-Year Census Estimates (2015 to 2019) and USEPA's EJSCREEN data and summary tables are used for this EIS to assess impacts on minority, low-income, youth, and elderly populations.

3.11.1 Affected Environment

The environmental justice ROI is the farthest extent of the largest 65 dBA DNL noise contour around the installation (i.e., the noise contour for Alternatives 2 and 3). This ROI was selected because it covers the largest discrete geographic area where adverse impacts would occur and where U.S. Census data can be acquired.

The environmental justice ROI consists of six Census Block Groups across three counties at or near Columbus AFB. The communities of comparison are Lowndes County for the three Census Block Groups in that county, Clay County for the one Census Block Group in that county, and Monroe County for the two Census Block Groups in that county.

The environmental justice ROI does not include any Census Block Groups beneath the SUA. Impacts that would potentially be realized in the SUA would include aircraft emissions and noise. The impacts associated with both are addressed in **Sections 3.2** and **3.3**, respectively.

The source of the emissions and noise would be aircraft flying at training altitudes along established routes flown currently by T-38C and other DAF aircraft in the local area. The populations under the MOAs, range, and MTRs are generally rural in nature and very low density. The effects of the emissions and noise would not be expected to be focused on any particular geographical area or population and would instead be spread across a broad area.

DAF has therefore concluded that aircraft operations in the SUA for the Proposed Action would not cause disproportionately high and adverse health or environmental effects on minority or low-income populations. Likewise, DAF has determined that there are no environmental health and safety risks associated with the Proposed Action for aircraft operations in the training SUA that would disproportionately affect children. Therefore, environmental justice regarding the SUA is not analyzed further.

Minority Populations. Minority populations greater than 50 percent of the total census block group population or meaningfully greater (at least 10 percent) than that of the community of comparison are found in one of the six Census Block Groups in the Columbus AFB ROI, which is Block Group 280259505001 in Clay County (see **Table 3-73**; USEPA 2022e).

Table 3-73. Environmental Justice Populations Proximal to the Project Area

Block Group	County	Total Population	Percent Minority Population	Percent Low-Income Population	Percent Youth Population	Percent Elderly Population
Lowndes County		**59,150**	**48**	**41**	**31**	**15**
280870001021	Lowndes	1,535	28	11	29	15
280870001022	Lowndes	638	35	57	47	8
280870002001	Lowndes	1,667	37	29	49	0
Clay County		**19,640**	**61**	**53**	**29**	**18**
280259505001[1]	Clay	1,066	53	47	26	18
Monroe County		**35,673**	**33**	**43**	**54**	**19**
280959505012	Monroe	851	34	47	25	11
280959506003	Monroe	607	15	28	33	30

Source: USEPA 2022e
[1] Census Block Group 280259505001 in Clay County is only touched by the noise contour for Alternatives 2 and 3. The baseline and Alternative 1 noise contours do not overlap with this Census Block Group.
Notes: Colored shading represents places where the Census Block Group statistic exceeds either 50 percent or is "meaningfully greater" (which in this case is 10 percent higher) than the community of comparison. The community of comparison is the county in which each Census Block Group is located.

Low-Income Populations. Low-income populations greater than 50 percent of the total census block group population or meaningfully greater than that of the community of comparison are found in one of the six Census Block Groups in the Columbus AFB ROI, which is Block Group 280870001022 in Lowndes County (see **Table 3-73**; USEPA 2022e).

Youth Population. Youth populations greater than 50 percent of the total census block group population or meaningfully greater than that of the community of comparison are found in two of the six Census Block Groups in the Columbus AFB ROI, which are Block Groups 280870001022 and 280870002001, both in Lowndes County (see **Table 3-73**; USEPA 2022e).

Elderly Population. Elderly populations greater than 50 percent of the total census block group population or meaningfully greater than that of the community of comparison are found in one of the six Census Block Groups in the Columbus AFB ROI, which is Block Group 280959506003 in Monroe County (see **Table 3-73**; USEPA 2022e).

Sensitive Receptors. On Columbus AFB, features used commonly by sensitive receptors include family housing areas, a Child Development Center, a Youth Program Center, a chapel, parks, and a library. Immediately outside of the installation boundary are several residential communities, schools, parks, and an assisted living center. School-aged, dependent children at Columbus AFB attend public or private schools in the surrounding communities or are homeschooled.

Figure 3-24 shows the baseline noise contours overlaid on the Census Block Groups within the environmental justice ROI. The 65 dBA DNL baseline noise contour touches five of the six Census Block Groups within the environmental justice ROI. The Census Block Group not intersected is 280259505001 in Clay County.

To provide the public—including these environmental justice communities—with early and meaningful involvement in this EIS's environmental review process, DAF published a NOI to prepare this EIS in the *Federal Register* on March 29, 2022, and published newspaper advertisements announcing a public scoping period in *The Commercial Dispatch* and *The Starkville Dispatch* on March 31 and April 14, 2022. In addition, DAF issued press releases to local media outlets and mailed letters to potentially affected federal, state, and local agencies, elected officials, and Native American tribes. These involvement efforts invited the public to visit the project website to inform the public and answer questions about the proposal.

A second opportunity for meaningful public involvement—including with these environmental justice communities—occurred when the Draft EIS was released for public comment. DAF held a 45-day Draft EIS public comment period that began with the publication of the Draft EIS Notice of Availability in the *Federal Register* on October 6, 2023. The public was notified of the Draft EIS public comment period through notices published in *The Commercial Dispatch* and *The Starkville Dispatch* on October 7 and 20, 2023; press releases to local media outlets and social media channels; and letters mailed to potentially affected federal, state, and local agencies, elected officials, and Native American tribes. In addition, DAF held an in-person and a virtual public hearing to foster greater community involvement. The in-person public hearing was held at the Lion Hills Golf Club in Columbus, Mississippi on October 25, and the virtual public hearing was held via Webex on October 30, 2023. DAF invited the public, interested parties, and stakeholders to learn about and provide comments on the Proposed Action, alternatives, or issues related to environmental concerns at these public hearings and through review of the Draft EIS and project website. The public comment period ended on November 20, 2023. Further information on public involvement is provided in **Section 4**.

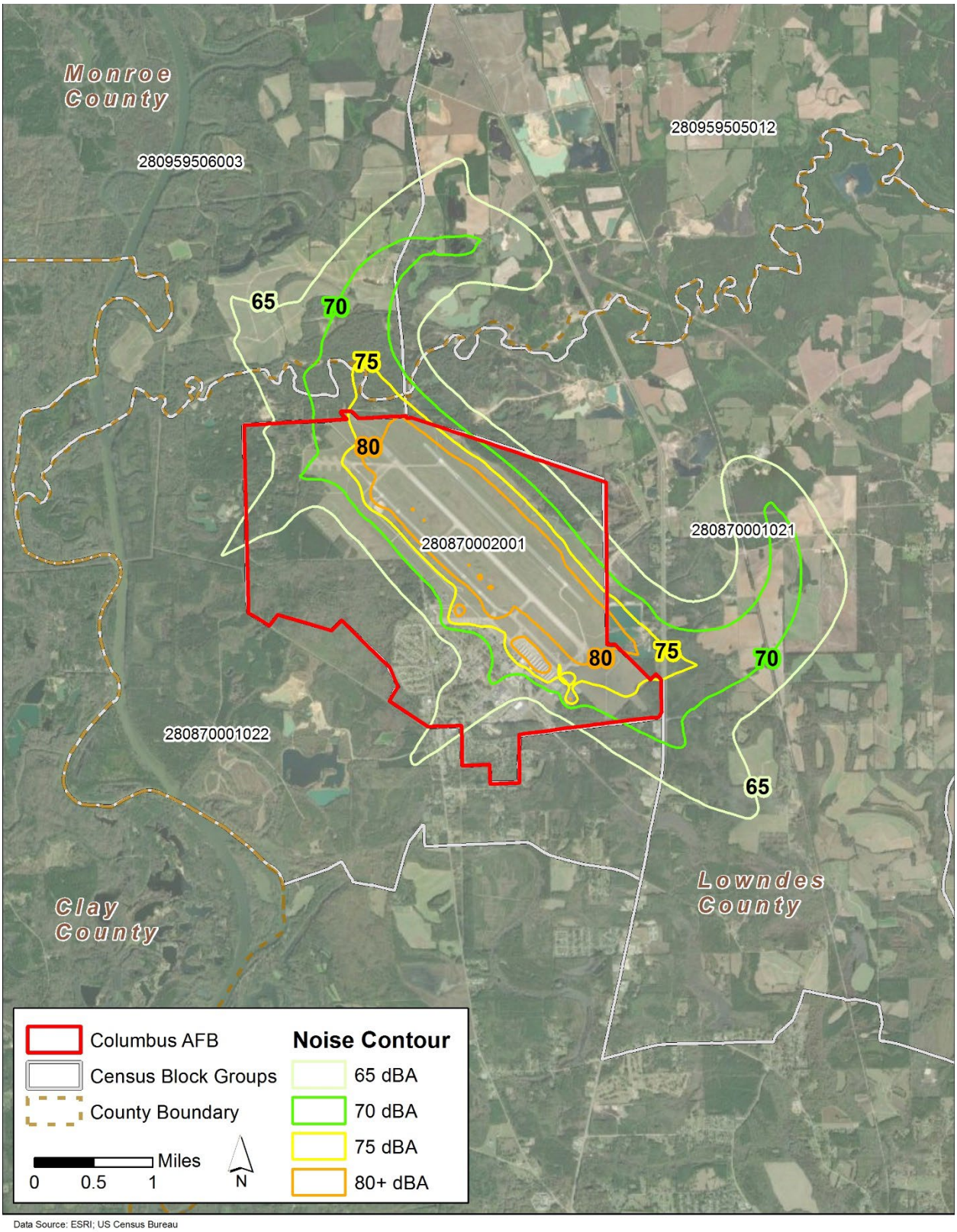

Figure 3-24. Baseline Noise Contours Overlaid with the Census Block Groups of the Environmental Justice ROI

3.11.2 Environmental Consequences

Environmental justice impacts were assessed to determine whether the Proposed Action would result in disproportionately high and adverse human health and environmental impacts on environmental justice populations (i.e., minority or low-income populations greater than 50 percent of the total population or meaningfully greater than that of the community of comparison) or sensitive receptors (i.e., youth or elderly populations greater than 50 percent of the total population or meaningfully greater than that of the community of comparison) within the environmental justice ROI. Impacts would be considered disproportionate if the percentages of environmental justice populations or sensitive receptors in the ROI are greater than or equal to the corresponding percentages in the communities of comparison.

3.11.2.1 Alternative 1

Long-term, disproportionately high and adverse impacts would occur to environmental justice and sensitive receptor populations from the increased noise and air emissions from the T-7A aircraft beginning operations in 2028. The Census Block Groups within the 65 dBA noise contour for Alternative 1 are the same as those included within the baseline noise contour (i.e., existing conditions), although slightly larger land areas may be encompassed within the Alternative 1 noise contours (see **Figure 3-25**). The Census Block Groups that would be affected from increased aircraft operations due to higher noise levels would be 280870001021, 280870001022, 280870002001, 280959505012, and 280959506003 (see **Section 3.3.2.1** for further discussion of noise impacts). Of these Block Groups, three contain environmental justice populations at either levels above 50 percent of the total population or greater than 10 percent of the community of comparison for minority, low-income, youth, or elderly populations (see **Table 3-73**). These three Census Block Groups are 280870001022 and 280870002001 in Lowndes County and 280959506003 in Monroe County. Although the baseline noise contours already impact these Census Block Groups, adverse impacts from noise and air emissions would still be expected because the overall land area (and therefore the population) within the noise contours would increase under Alternative 1. Therefore, Alternative 1 would have a disproportionately adverse impact on environmental justice and sensitive receptor populations.

As part of the environmental justice analysis, the ways a proposed action may affect the health and safety risks of children is also reviewed in accordance with EO 13045. **Section 3.3.2.1** addresses the overall aircraft noise impacts associated with flight operations for Alternative 1. The discussion includes the overall sound levels at representative locations, residential areas, and two schools. **Table 3-38**, **Table 3-39**, **Table 3-40**, **Table 3-41**, and **Table 3-42** identify the number of events at representative locations, including these schools, that would interfere with speech, or events that would have the potential for sleep disturbance due to the proposed operations with the T-7A aircraft. Although interruption of classroom communication is not a direct risk to the health or safety of children within those classrooms, it does present an impact on learning time.

As outlined in **Section 3.3.2.1.1.3**, Alternative 1 would result in a higher number of classroom learning interference events in the two schools analyzed (see **Table 3-40**) and an increase in the time above metric (see **Table 3-41**). Therefore, increases in both the number of events and the duration of the events that would cause classroom learning interference would result in a disproportionate adverse impact to children.

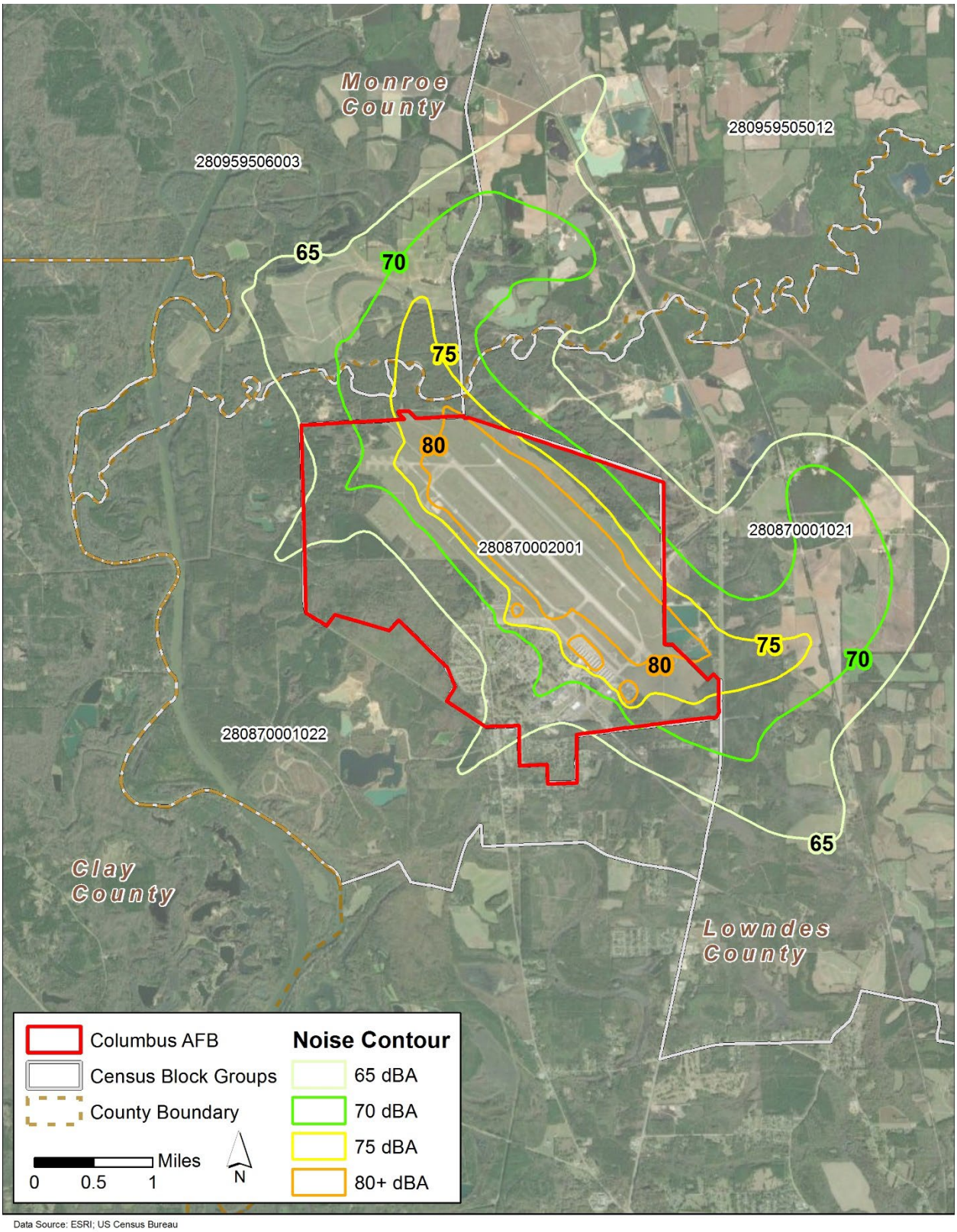

Figure 3-25. Alternative 1 Noise Contours Overlaid with the Census Block Groups of the Environmental Justice ROI

3.11.2.2 Alternative 2

Impacts from Alternative 2 would be disproportionately high and adverse to environmental justice and sensitive receptor populations and also would be slightly greater than those described for Alternative 1. Noise and air emissions would increase from baseline conditions to correspond with that resulting from T-7A operations that are 25 percent greater than Alternative 1. The same five Census Block Groups encompassed within the Alternative 1 65 dBA DNL noise contour, plus a small portion of one additional Census Block Group, would be impacted by Alternative 2 (see **Figure 3-26**). This additional Block Group is 280259505001 in Clay County, which contains an environmental justice population. Like Alternative 1, because land area (and therefore population) would be impacted within Census Block Groups that have environmental justice populations, there would be a disproportionate adverse impact on these populations. This impact would be slightly greater than the impact from Alternative 1 because the amount of land area encompassed by the Alternative 2 65 dBA DNL noise contour would be slightly larger than that encompassed by the Alternative 1 65 dBA DNL noise contour.

Section 3.3.2.2 addresses the overall aircraft noise impacts associated with flight operations for Alternatives 2 and 3. The discussion includes the overall sound levels at representative locations, residential areas, and several schools. **Table 3-55**, **Table 3-56**, **Table 3-57**, **Table 3-58**, and **Table 3-59** identify the number of events at representative locations, including these schools, that would interfere with speech or events that would have the potential for sleep disturbance due to the proposed operations with the T-7A aircraft. Although interruption of classroom communication is not a direct risk to the health or safety of children within those classrooms, it does present an impact on learning time.

Like Alternative 1, the impacts from Alternative 2 would be disproportionate and adverse on children because there would be an increase in the number (see **Table 3-57**) and duration (see **Table 3-58**) of events that would cause classroom learning interference.

3.11.2.3 Alternative 3

Noise impacts from Alternative 3 would be identical to Alternative 2 (see **Figure 3-26**). Air emissions from Alternative 3 would be slightly greater than those of Alternatives 1 and 2. Like Alternatives 1 and 2, the noise and air quality impacts would result in a disproportionately high and adverse impact to environmental justice and sensitive receptor populations.

3.11.2.4 No Action Alternative

The No Action Alternative would not impact environmental justice and sensitive receptor populations. No facility construction would occur, and there would be no changes in aircraft operations or maintenance. The environmental justice and sensitive receptor populations at and near Columbus AFB would not experience disproportionate impacts from the No Action Alternative.

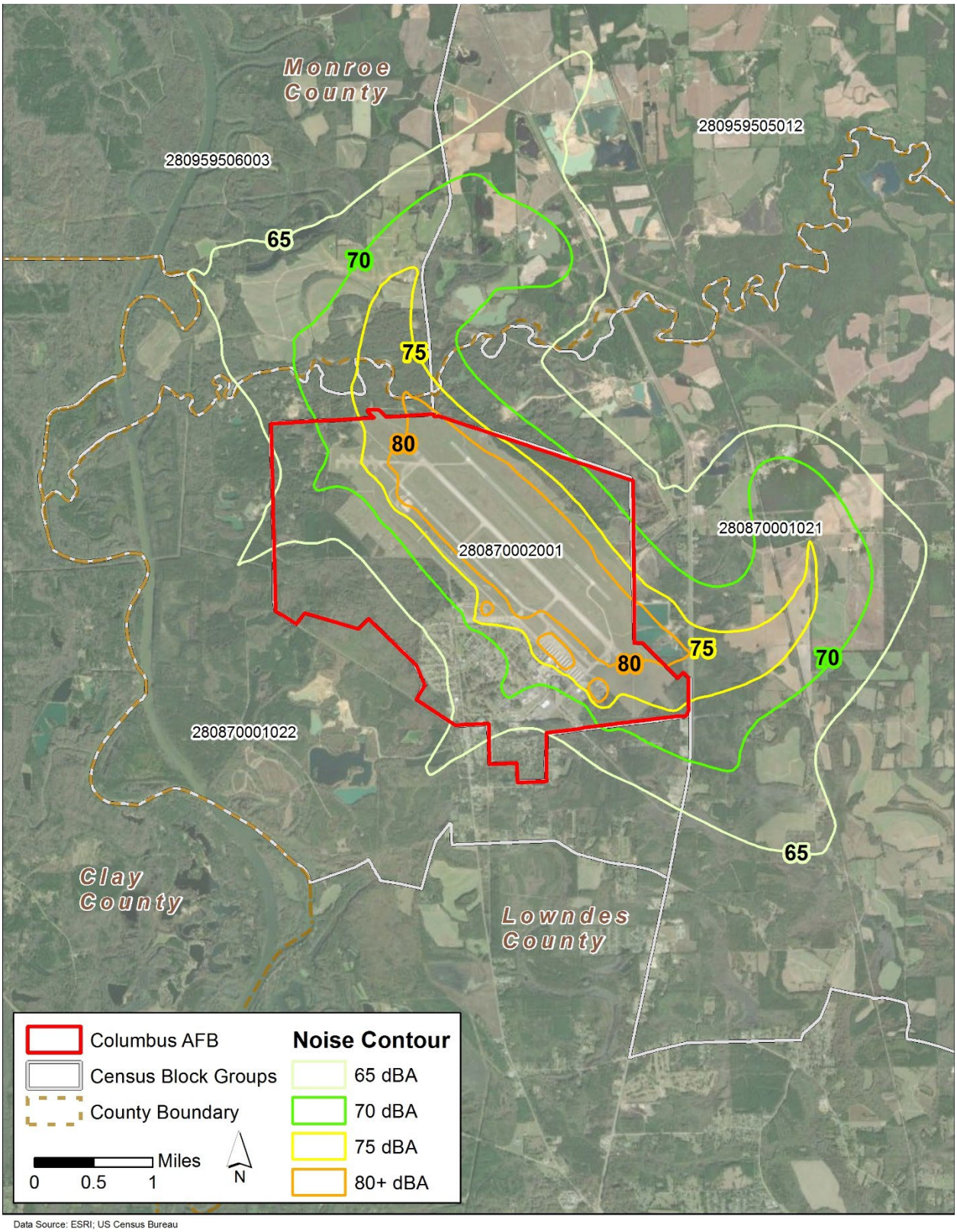

Figure 3-26. Alternatives 2 and 3 Noise Contours Overlaid with the Census Block Groups of the Environmental Justice ROI

3.11.3 Cumulative Effects

The reasonably foreseeable actions (see **Table 3-2**) would occur within three Census Block Groups (i.e., 280870001021, 280870001022, and 280870002001) that are within the Proposed Action's 65 dBA DNL noise contour. Two of these Census Block Groups (i.e., 280870001022 and 280870002001) contain environmental justice and sensitive receptor populations and would experience disproportionately adverse cumulative effects from the Proposed Action and the reasonably foreseeable actions. Such cumulative effects would result from increases in noise and air emissions; however, the noise and air emissions from the reasonably foreseeable projects would be negligible compared to the Proposed Action. The reasonably foreseeable actions are unlikely to interfere with child classroom learning.

3.12 Other Environmental Considerations

3.12.1 National Park Service Properties

Five NPS-managed properties are beneath or adjacent to the SUA where the T-7A aircraft would fly. These properties are Trail of Tears National Historic Trail, Natchez Trace Parkway, Jeff Busby Campground within Natchez Trace Parkway, Tupelo National Battlefield, and the Shiloh National Military Park, and each property is shown on **Figure 1-3**. The Trail of Tears National Historic Trail is beneath MTRs IR-066 and IR-068. Natchez Trace Parkway is beneath the Columbus 1 MOA and MTRs IR-066 and IR-091. Jeff Busby Campground, which is within Natchez Trace Parkway, is adjacent to the Columbus 1 and 3 MOAs and MTR IR-068. Tupelo National Battlefield is beneath the Columbus 1 MOA. Shiloh National Military Park is adjacent to MTR IR-066. Because SUA affected by the Proposed Action coincides with or is adjacent to these five NPS-managed properties, DAF informed the Department of the Interior of the Draft EIS and solicited their comments. **Table 4-2** summarizes the comments provided by NPS during review of the Draft EIS.

DAF considered impacts on the five NPS-managed properties as part of the EIAP process. The following paragraphs summarize those impacts.

Air Quality. USEPA Class I protected areas are national parks larger than 6,000 acres and national wilderness areas larger than 5,000 acres that were in existence when the Clean Air Act was amended in 1977. Additional regulations are imposed on stationary sources within 10 kilometers of Class I protected areas to protect air quality and visibility. None of the five NPS-managed properties are within/identified as Class I protected areas; therefore, the additional regulations regarding stationary sources are not applicable.

Noise and Visitor Experience at NPS-managed Properties. The SUA where the T-7A aircraft would fly already is used by the T-38C for such operations, and the Proposed Action would not change the configuration (e.g., shape, size, altitudes) or active times of this SUA. As shown in **Table 2-2**, the number of operations performed in the SUA would not change for Alternative 1 but, as shown in **Table 2-5**, would increase by 25 percent for Alternatives 2 and 3. Additionally, as noted in **Section 3.3.2.1.1.1**, all construction in support of the Proposed Action would be within the Columbus AFB boundary, so there would be no anticipated construction noise impacts on NPS-managed properties.

While this EIS does not directly estimate noise levels from flight operations at the five NPS-managed properties, noise modeling found that T-7A aircraft noise in the SUA would not result in a L_{dnmr} greater than 65 dB in any SUA except the Birmingham MOAs and the Sea Ray Range, which are already exposed to an L_{dnmr} greater than 65 dB from T-38C flight training (see **Sections 3.3.2.1.2** and **3.3.2.2.2**). **Figure 1-3** shows that the Birmingham MOAs and the Sea Ray Range do not coincide with any NPS-managed properties; therefore, no NPS-managed properties would be exposed to an L_{dnmr} of 65 dB DNL or greater.

DAF recognizes the DNL metric may not adequately address noise impacts to visitors of NPS-managed properties; therefore, the SEL and L_{MAX} metrics were also considered. **Table 3-37** compares single-event sounds for the T-38C and T-7A. As shown in the fourth row of the table, the T-7A has a slightly quieter SEL and slightly louder L_{MAX} at 500 feet AGL. This means noise impacts from low level flight activity within the SUA would be similar to existing conditions and would not adversely change the soundscape or wilderness value in the five NPS-managed properties. Additionally, nighttime T-7A operations (between 10 p.m. and 7 a.m.) would be conducted in the vicinity of the Columbus AFB airfield and would not enter the MOAs and MTRs (see **Section 3.3.2.1.2.2**). Therefore, visitors to the five NPS-managed properties would not experience a noticeable change in noise levels from flight operations.

Dark Night Sky. The T-7A aircraft would perform operations after sunset, but these operations would stay around the Columbus AFB airfield and would not enter the MOAs and MTRs (see **Section 3.3.2.1.2.2**). As such, visitors to the five NPS-managed properties would not experience any noticeable changes to dark night sky.

Biological Resources. As noted in **Section 3.4.2.1**, the Proposed Action may affect, but is not likely to adversely affect, 8 federally listed or candidate species and would have no effect on the remaining 73 federally listed or candidate species with potential to occur on Columbus AFB or within or underlying the SUA proposed for flight operations, including at the five NPS-managed properties. The species subject to determination of may affect, but is not likely to adversely affect are the northern long-eared bat, Wood Stork, monarch butterfly, gray bat, Indiana bat, Eastern Black Rail, Piping Plover, and Red Knot. Continued adherence of the Columbus AFB BASH Plan would help avoid and minimize the potential for strikes in the event of an incidental occurrence of a federally listed/candidate species. If determined to be necessary, new measures would be developed to reduce the potential for impacts to occur and the BASH Plan would be updated accordingly.

Cultural Resources. As noted in **Section 3.5**, the APE for this undertaking does not include the SUA where the T-7A aircraft would perform operations, which includes the five NPS-managed properties. These areas were excluded from the APE because, as noted in the Noise paragraph, the SUA where the T-7A aircraft would fly already is used for such operations with the T-38C aircraft, this undertaking would not change the configuration or active times of this SUA, and noise modeling found that no NPS-managed properties would be exposed to an L_{dnmr} of 65 dB DNL or greater. Based on this information, T-7A flight training would have no potential to effect historic properties—including plaster, adobe, or other structures and traditional cultural properties—within the five NPS-managed properties.

3.12.2 Irreversible and Irretrievable Commitment of Resources

Irreversible and irretrievable resource commitments are related to the use of non-renewable resources and the impacts that use of these resources would have on future generations. Irreversible impacts result primarily from use or destruction of a specific resource (e.g., energy and minerals) that cannot be replaced within a reasonable timeframe. The irreversible and irretrievable commitment of resources that would result from the Proposed Action involves the consumption of material resources used for construction, energy resources, biological resources, and human labor resources. The use of these resources is considered permanent.

Material Resources. The material resources that would be used for the Proposed Action include concrete, steel, and various construction materials and supplies. The materials that would be consumed are not in short supply, would not limit other unrelated construction activities, and would not be considered significant.

Energy Resources. The energy resources, including petroleum-based products (e.g., gasoline, diesel, aviation fuel), used for the Proposed Action would be irretrievably lost. During construction, gasoline and diesel would be used for the operation of vehicles and construction equipment. Additionally, operation of the T-7A aircraft would require the consumption of aviation fuel. However, the volume of aviation fuel consumed for the T-7A aircraft would not be appreciably different from that consumed for the T-38C. Consumption of these energy resources would not place a significant demand on their availability in the region. Therefore, less than significant impacts would occur.

Biological Resources. The Proposed Action would result in a less than significant loss of vegetation and wildlife habitat. Most of the losses would be lower quality vegetation and habitat on the airfield or in developed portions of the installation and would not include water features. Temporarily disturbed sites would be revegetated with native species to support the native plant community in the long term.

Human Resources. The use of human resources for construction is considered an irretrievable loss only in that it would preclude such personnel from engaging in other work activities. However, the use of human resources for the Proposed Action represents employment opportunities and is considered beneficial.

3.12.3 Unavoidable Adverse Impacts

Unavoidable adverse impacts would result from the Proposed Action. However, none of those impacts would be significant.

Air Quality and Climate Change. Criteria pollutant and GHG emissions would be directly produced during MILCON/UMMC and FSRM project construction and would be unavoidable. Additionally, new, unavoidable air emissions would be produced from operation and heating of new facilities and from flight operations. The net annual emissions from the Proposed Action would not exceed the insignificance indicator of 250 tpy for all criteria pollutants (25 tpy for lead).

Noise. The proposed flight operations would increase land acreage and population exposed to a DNL of at least 65 dB, and this increase would be unavoidable. These newly exposed areas encompass numerous land uses including residential, commercial, undeveloped, and agricultural.

Biological Resources. Ground-disturbing activities associated with the MILCON/UMMC and FSRM projects would result in the loss of vegetation and limited wildlife habitat consisting mainly of nonnative grass species. These losses would be unavoidable; however, temporarily disturbed sites would be revegetated with native species following construction to support the native plant community in the long-term. The existing vegetation and limited wildlife habitat within the footprint of new construction would be permanently lost.

***Energy*.** The MILCON/UMMC and FSRM projects and aircraft operations would require the use of fossil fuels, which are non-renewable natural resources. The use of non-renewable resources is an unavoidable occurrence, although not considered significant.

Hazardous Materials and Wastes. The use and generation of hazardous materials and wastes during construction of the MILCON/UMMC and FSRM projects and during the maintenance of aircraft would be unavoidable. However, hazardous materials and wastes would be handled in accordance with federal, state, and local policies and would not be expected to result in significant impacts.

Environmental Justice. The proposed flight operations would result in an increase in air emissions and noise in the area around the installation, which encompasses four Census Block Groups that contain environmental justice populations. The increased noise would increase classroom learning interference at nearby schools. These adverse impacts on environmental justice and sensitive receptor populations are unavoidable.

3.12.4 Relationship between Short-term Uses and Long-term Productivity

Short-term uses of the biophysical components of the human environment include direct, project-related disturbances and direct impacts associated with an increase in population and activity that occurs over less than 5 years. Long-term uses of the human environment include those impacts occurring over more than 5 years, including permanent resource loss.

The MILCON/UMMC and FSRM projects for the Proposed Action would not require short-term resource uses that would result in long-term productivity compromises. Although implementation of these projects would result in an increase of impervious surfaces, it would not result in intensification of land use at Columbus AFB or within the surrounding area, as most projects would occur within previously developed or disturbed areas. Therefore, it is anticipated that the Proposed Action would not result in any adverse cumulative effects on land use or aesthetics.

3.12.5 Compatibility with Existing Plans and Policies

The Proposed Action would occur on government-owned lands that DAF operates and within SUA over property that is not all government-owned. The proposed construction and long-term operations associated with the Proposed Action would not differ from the current activities

occurring at Columbus AFB. DAF would continue to follow all requirements related to development and would therefore be consistent with current federal, regional, state, and local land use policies and controls. The Proposed Action would not conflict with any applicable off-installation land-use ordinances and would follow all applicable permitting, building, and safety requirements. After the arrival of the T-7A aircraft at Columbus AFB and the commencement of T-7A training operations, DAF would monitor aircraft noise and collect additional flight data to update the AICUZ plan. Based on the results of the refined or validated projected noise footprints, DAF would coordinate with local, county, and city land use planners to update current planning documents.

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4. Submitted Alternatives, Information, and Analyses

4.1 Public Involvement Summary

NOI. A notice announcing DAF's intent to prepare an EIS was published in the *Federal Register* on March 29, 2022. The NOI formally initiated the public scoping process and included a description of the Proposed Action and alternatives and an invitation to federal, state, and local agencies, elected officials, affected Native American tribes, and interested persons (e.g., public) to participate in the scoping process.

Scoping. CEQ regulations at 40 CFR § 1501.9 require a process called "scoping" to involve the public early in the assessment process. The scoping process is designed to solicit input from the public and interested agencies on the nature and extent of issues and impacts to be addressed and the methods by which potential impacts are evaluated.

In addition to the NOI, DAF published newspaper advertisements in *The Commercial Dispatch* and *The Starkville Dispatch* on March 31 and April 14, 2022; issued press releases to local media outlets; and mailed letters to potentially affected federal, state, and local agencies, elected officials, and Native American tribes to announce the scoping period. Each newspaper advertisement, press release, and letter briefly described the Proposed Action, solicited comments, and provided the address for the project website where further details could be found. The 30-day scoping period began on March 29, 2022, and officially ended on May 2, 2022, although input submitted after the close of the scoping period was still accepted.

Draft EIS Public Comment. DAF initiated a 45-day Draft EIS public comment period on October 6, 2023, when the Notice of Availability for the Draft EIS was published in the *Federal Register*. The public was notified of the Draft EIS public comment period through notices published in *The Commercial Dispatch* and *The Starkville Dispatch* on October 7 and 20, 2023; press releases to local media outlets and social media channels; and letters mailed to potentially affected federal, state, and local agencies, elected officials, and Native American tribes.

DAF held an in-person and a virtual public hearing to foster greater community involvement. The in-person public hearing was held at the Lion Hills Golf Club in Columbus, Mississippi on October 25, and the virtual public hearing was held via Webex on October 30, 2023. A recording of the virtual public hearing was published on the project website. DAF invited the public, interested parties, and stakeholders to learn about and provide comments on the Proposed Action, alternatives, or issues related to environmental concerns at these public hearings and through review of the Draft EIS and project website. The Draft EIS public comment period ended on November 20, 2023.

4.2 Submitted Alternatives

Scoping. No additional alternatives were submitted during scoping.

Draft EIS Public Comment. No additional alternatives were submitted during the Draft EIS public comment period.

4.3 Information and Analyses

Scoping. Six comment correspondences were received during scoping. These comment correspondences were from two federal agencies, the state of Mississippi Development Authority, two Native American tribal nations, and one private citizen. **Table 4-1** provides a summary of the comments contained in the comment correspondences and DAF's responses.

Draft EIS Public Comment. Three comment correspondences were received during the Draft EIS public comment period. These comment correspondences were from two federal agencies and one Native American tribal nation. **Table 4-2** provides a summary of the comments contained in the comment correspondences and DAF's responses.

Table 4-1. Scoping Comments Received and DAF Responses

Source	Summary of Comment Correspondence	Addressed in EIS? If Yes, Location in EIS. If No, Rationale.
USEPA	Provided a lengthy email containing many comments relevant to the environmental analysis for this EIS. These comments are summarized in the following paragraphs. Noted that the Proposed Action was reasonably compatible with current land use and pilot training operations at Columbus AFB. Noted that the Proposed Action has potential to cause noise impacts to residential communities and could impact quality of life, human experience, and health and learning near homes, schools, and daycare centers. Recommended that the Columbus AFB Public Affairs Office monitor noise impacts and coordinate with affected communities to optimize airspace usage to minimize impacts while meeting mission requirements. Recommended the EIS analyze the direct, indirect, and cumulative effects from the following noise issues: differences in intensity and severity of effects from different flight scenarios for altitude above ground level; disturbance and interference to sleep, indoor speech, and classroom learning; potential for hearing loss; effects on birds and terrestrial and aquatic wildlife; effects on children, their learning environment, and other sensitive and vulnerable populations such as the elderly, disabled, and non-human receptors; effects on recreation activities; avoidance, minimization, and other noise abatement processes including the noise complaint process; and monitoring effects for potential need for adaptative management. Recommended using tools such as the Air Conformity Applicability Model to determine if, and to what extent, the Proposed Action will produce emissions that contribute toward exceeding Columbus AFB's air emissions permit, or otherwise impact air quality or human health. Recommended controlling fugitive dust emissions and implementing measures to reduce diesel emissions. Recommended the EIS quantify GHG emissions resulting from the Proposed Action and determine resulting social impacts due to climate change.	Yes. Land use compatibility is analyzed in **Section 3.6**. **Section 3.3** analyzes the direct, indirect, and cumulative effects on noise from Alternatives 1, 2, and 3 and the No Action Alternative. This analysis addresses changes to land use compatibility; noise levels at specific homes, schools, places of worship, and places of recreation; and possible impacts to human health including potential for sleep disturbance, speech interference, classroom learning, and hearing loss. Effects on birds and terrestrial and aquatic wildlife from noise are addressed in **Section 3.4**. Effects on children, their learning environment, and other sensitive and vulnerable populations from noise are addressed in **Section 3.11**. **Section 3.3.1.1.3** describes the noise monitoring and abatement procedures developed in coordination with the local communities to minimize the effects of noise. **Section 3.2** addresses impacts on air quality and calculates the net change in criteria pollutants and GHG emissions from each alternative to the Proposed Action. Measures to minimize fugitive dust and the social impacts from climate change are also provided in **Section 3.2**.

Source	Summary of Comment Correspondence	Addressed in EIS? If Yes, Location in EIS. If No, Rationale.
USEPA (continued)	Noted that it does not appear that statistically significant minority or low-income populations are present directly adjacent to areas of takeoffs and landings. Recommended that the environmental justice analysis extend beyond the populations near Columbus AFB to all areas potentially impacted by the Proposed Action such as the airspace areas. Recommended that protected populations are not disproportionately or adversely impacted by the Proposed Action. Recommended use of secondary containment for petroleum, oils, and lubricants storage and handling. Recommended the EIS include details on buildings potentially containing RCRA-regulated solid waste. Recommended the EIS include details on ERP sites and contamination sites in state databases to address land use restrictions. Recommended BMPs to minimize impacts on water quality. Recommended coordination with the U.S. Army Corps of Engineers if streams and wetlands must be disturbed. Recommended construction of rainwater runoff control structures to mitigate land development and impervious surface. Recommended that the EIS identify endangered, threatened, and candidate species under the ESA, associated impacts with respect to their potential effects on wildlife and wildlife habitat areas, and how DAF will meet all requirements under the ESA. Recommended early coordination with USFWS regarding compliance with the ESA. Recommended the EIS analyze potential mitigations that reduce BASH incidents. Recommended the use of sustainable building practices that maximize energy and water conservation and the use of renewable energy. Recommended reuse and diversion of recyclable materials such as concrete, steel, and asphalt away from landfills.	**Section 3.11** analyzes impacts on environmental justice populations including minority and low-income populations within the farthest extent of the largest 65 dBA DNL noise contour around the installation. **Section 3.11** also explains why the environmental justice ROI does not include the SUA. **Section 3.7** analyzes impacts on and management of hazardous materials and wastes including petroleum, oils, and lubricants storage and handling; RCRA-regulated solid waste; ERP sites; and other environmental contamination sites. **Section 3.10** analyzes impacts on water resources including streams and wetlands. BMPs to manage stormwater runoff are described in **Sections 3.8.2.1** and **3.10.2**. **Section 3.4.2.1** summarizes impacts on special status species, the outcome of consultation under Section 7 of the ESA with USFWS, and measures to minimize BASH incidents. Measures to minimize BASH incidents are also provided in **Section 3.9.2.1**. **Section 3.2** notes that climate priorities would be considered during the design phase of new buildings. These priorities would include making climate-informed decisions, optimizing energy use, and pursuing alternative energy sources.

Source	Summary of Comment Correspondence	Addressed in EIS? If Yes, Location in EIS. If No, Rationale.
USEPA (continued)	Recommended that the EIS include a reasonable range of alternatives that meet the stated purpose of and need for the project and are responsive to the issues identified during the scoping process. Recommended the EIS clearly describe the rationale used to determine whether impacts of an alternative are significant or not, and a discussion of the reasons for the elimination of other alternatives considered and not evaluated in detail. Requested a copy of the Draft EIS, and recommended DAF continue involvement with the local community.	**Section 3.8.2.1** describes impacts on solid waste management and includes methods to recycle and divert construction debris away from landfills. **Section 2.2** describes the alternatives considered for the Proposed Action and the selection standards used to judge these alternatives for detailed analysis in this EIS. The criteria used to evaluate the significance of impacts are described in the environmental consequences section of each resource chapter. DAF provided an electronic copy of the Draft EIS to the USEPA and continue to involve the local community during public outreach efforts.
U.S. Geological Survey	Provided statement of no comment at this time.	No. No comment was provided.
State of Mississippi Development Authority	Provided a letter in favor of the project. Emphasized the state and local community support of the project, and Columbus AFB is suitable for the Proposed Action. Highlighted abundant workforce and housing opportunities in the area and recent statewide education and quality-of-life improvements. Noted that noise complaints resulting from past Columbus AFB flight operations have always been minimal because of the ideal location of the installation away from population centers. Stated that nighttime flight operations have occurred at Columbus AFB for the last 60 years.	No. This letter did not contain any comments relevant to this EIS.

Source	Summary of Comment Correspondence	Addressed in EIS? If Yes, Location in EIS. If No, Rationale.
Choctaw Nation of Oklahoma	Requested to become a consulting party. Requested access to the GIS shapefiles and coordinates of the project area in order to determine if any known Choctaw Nation of Oklahoma cultural or sacred sites exist within the project area. Requested all project materials, including cultural resources surveys, and a description of all ground disturbing activities.	Yes. DAF accepted the tribe's request to become a consulting party and sent the GIS shapefiles of the Columbus AFB installation boundary and the areas proposed to be disturbed by the MILCON/UMMC and FSRM projects. **Section 3.5.2.1** summarizes Native American tribal nation consultation.
The Cherokee Nation	Stated that Lowndes County, Mississippi, is outside the Cherokee Nation's area of interest. Therefore, they defer to the federally recognized tribes that have an interest in this area.	No. No further consultation with the Cherokee Nation is necessary. **Section 3.5.2.1** summarizes Native American tribal nation consultation.
Private Citizen (initials P.V.)	Provided a comment in favor of the project.	No. This comment was an opinion and did not require incorporation into the EIS.

Table 4-2. Draft EIS Public Comment Period Comments and DAF Responses

Source	Summary of Comment Correspondence	Addressed in EIS? If Yes, Location in EIS. If No, Rationale.
U.S. Department of the Interior	Provided comments from USFWS and NPS. USFWS: Noted DAF is responsible for determining whether the Proposed Action is likely or not likely to adversely affect any listed species or critical habitat and for requesting concurrence with that determination from USFWS. Identified several threatened, endangered, and at-risk species known or believed to occur near the project area. Recommended contacting the USFWS Mississippi Field Office and obtaining the USFWS's Information for Planning and Consultation report for the project area. Recommended implementing and monitoring BMPs that control erosion and prevent sedimentation into waterways, where appropriate. Noted work causing erosion and impacts to water quality through sedimentation or spills could have adverse impacts on aquatic species including mussels and turtles. Noted day and night flight operations may impact listed bats and birds protected under the MBTA directly through aircraft strikes and indirectly through artificial noise and lighting that may alter behavior, migration, and navigation of the species. Recommended implementing noise reduction strategies, such as establishing relevant distances, maintaining sufficient vegetation cover, and using noise reducing barriers, as appropriate.	USFWS: Yes. **Section 3.4.2.1** summarizes DAF's determination of affect and consultation with the USFWS Mississippi Field Office under Section 7 of the ESA. All federally protected species and habitats with potential to occur on Columbus AFB or within or underlying the SUA proposed for flight operations were assessed, and it was determined the Proposed Action may affect, but is not likely to adversely affect, 8 federally listed or candidate species and would have no effect on 73 federally listed or candidate species. These species were identified through review of the USFWS's Information for Planning and Consultation reports for Columbus AFB and the SUA. All of the species identified in this correspondence—including the mussels, turtles, bats, birds, and plants—were addressed in **Section 3.4.2.1** and in the consultation with USFWS. **Sections 3.8.2.1** and **3.10.2.1** provide stormwater BMPs and erosion control measures that would be implemented to protect water quality. **Section 3.7.2.1** provides measures that would be implemented to reduce the potential for a release of a hazardous substance. **Section 3.4.2.1** states the potential for bird and bat strikes would be minimized by updating and following the installation's BASH Plan. This section also provides measures to protect wildlife and minimize habitat loss.

Source	Summary of Comment Correspondence	Addressed in EIS? If Yes, Location in EIS. If No, Rationale.
U.S. Department of the Interior (continued)	Recommended tree removal in areas suitable for northern long-eared bat habitat occur outside of the species' maternity season, which is September 1 to May 14. Noted impacts to forested wetlands and herbicide use may impact the white fringeless orchid. Recommended DAF consult with USFWS under Section 7 of the ESA and contact the Mississippi Department of Wildlife, Fisheries, and Parks Natural Heritage Program should the Proposed Action directly or indirectly affect threatened, endangered, or at-risk species or their habitat. NPS: Provided comments and requests regarding potential impacts on the natural soundscape, dark night skies, wildlife, and visitor experience along the Natchez Trace Parkway (the Parkway). Requested DAF address potential noise impacts from the Proposed Action on wildlife, the natural soundscape, and Natchez Trace Parkway visitors. Noted they operate the Jeff Busby Campground within the Parkway and noise could negatively affect campers and visitor experience. Requested consideration of an avoidance buffer around the campground and other potentially noise-sensitive sites, especially at night. Requested noise mitigation be considered to reduce potential impacts on wildlife, natural soundscape, and visitor experience within the Parkway from construction noise. Noted noise levels and soundscapes in the Parkway are monitored. Existing acoustic data can be provided to serve as baseline conditions to compare with potential future soundscape impacts from the Proposed Action.	**Section 3.4.2.1** states no trees would be removed for construction, and **Section 3.10.2.1** states no construction would occur within 0.25-mile of any potential wetland. As such, no impacts on northern long-eared bat habitat or the white fringeless orchid would occur. USFWS concurred with DAF's determination of effect in a consultation letter dated February 15, 2023. The Mississippi Department of Wildlife, Fisheries, and Parks was notified of the availability of the Draft EIS and provided the opportunity to submit comments. NPS: Yes. **Section 3.12.1** added for the Final EIS to address the comments provided by NPS. This section addresses potential impacts on the natural soundscape, dark night skies, wildlife, and visitor experience at five regional NPS-managed properties including Natchez Trace Parkway and the Jeff Busby Campground. The analysis found an avoidance buffer around Jeff Busby Campground and other noise-sensitive sites was unnecessary, and no noise mitigation would be required for any of the five NPS-managed properties. Since there would be no noticeable change in noise levels, DAF acknowledges the availability of existing acoustic data but does not require this data to perform the noise analysis contained in this EIS.

Source	Summary of Comment Correspondence	Addressed in EIS? If Yes, Location in EIS. If No, Rationale.
U.S. Department of the Interior (continued)	Requested federal lands be included on project maps, as appropriate. Noted SUA crosses the Parkway. Asked if alternative flight routes have been considered to avoid the Parkway. Requested information on flight altitudes, duration, and flight times for the alternatives. Noted it was unclear what level of impact the Proposed Action would have on Parkway resources. Noted the Parkway has exceptionally dark sky conditions in and around French Camp, Mississippi. Noted the neighboring Rainwater Observatory and Planetarium is a regionally significant observatory. Requested analysis of potential impacts to naturally dark skies and potential for obstruction of night sky viewing from the alternatives.	**Figure 1-3** revised to show the locations of the five regional NPS-managed properties. **Section 2.2.2.1.2** indicates that T-7A pilot training would use the same SUA used currently by the T-38C. No changes to SUA configurations (i.e., size, shape, or location) would occur. As such, DAF is not considering alternative flight tracks to avoid the Natchez Trace Parkway or other regional NPS-managed properties. **Table 3-1** provides the authorized altitudes and times of use for the SUA proposed for T-7A operations. **Section 3.12.1** added to address impacts to dark night sky. While the T-7A aircraft would perform operations after sunset, these operations would stay around the Columbus AFB airfield and would not enter the SUA. As such, there would be no potential for obstruction of night sky viewing in the region, including at Rainwater Observatory and Planetarium.

Source	Summary of Comment Correspondence	Addressed in EIS? If Yes, Location in EIS. If No, Rationale.
USEPA	Recognized DAF provided responses to their prior comments in **Table 4-1** of the EIS. Identified public health, welfare, or environmental quality concerns and enclosed technical recommendations for DAF's consideration. Requested DAF continue to work with federal and local government partners, communities surrounding Columbus AFB and related SUA, and other stakeholders to address impacts as they are identified and to disseminate project status updates. Recommended DAF ensure the communities surrounding Columbus AFB and the SUA are aware of the recapitalization and its impacts and know how to address concerns with DAF. Recommended DAF update the installation's 2012 AICUZ plan and airspace protocols for the T-7A once relevant flight data, studies, and community reports are available to direct this update for the avoidance and mitigation of noise impacts. Recommended the Final EIS identify DAF's efforts to meaningfully engage communities, including communities with environmental justice concerns that may be affected. Recommended DAF ensure the public and surrounding communities are aware of the Proposed Action and its impact and ensure these communities have a mechanism to address concerns with DAF. Such mechanisms may include publicly available phone numbers and email addresses for the Columbus AFB Public Affairs Office.	Yes. DAF provided potentially affected federal, state, and local agencies, elected officials, and Native American tribes with written notification of the Draft EIS being available for comment. Comments were accepted by multiple advertised methods for 45 days. DAF will continue to provide these partners with project updates. **Section 3.6.2.1** indicates DAF would prepare an AICUZ plan update and coordinate with state and local governments when the T-7A aircraft arrive to Columbus AFB and are placed into operation. **Section 3.11.1** summarizes DAF's efforts to provide the public—including the environmental justice communities—with early and meaningful involvement in this EIS's environmental review process. The local Columbus AFB Public Affairs Office has traditionally been engaged with the community. The installation receives community noise complaints from time to time and directs them to the operations personnel for consideration when necessary.

Source	Summary of Comment Correspondence	Addressed in EIS? If Yes, Location in EIS. If No, Rationale.
USEPA (continued)	Recommended where disproportionate adverse impacts on environmental justice communities cannot be avoided or mitigated through changes in flight operations, DAF should address long-term impacts through residential noise abatement measures. Recommended controlling fugitive dust emissions and implementing measures to reduce diesel emissions in accordance with BMPs identified within **Section 3.2.2** of the EIS. Recommended against the use of a "proxy approach" to compare emissions, on a percentage basis, to state and national values. Noted CEQ's interim guidance recommends providing context for GHG emissions and climate impacts by monetizing climate damages using the estimates of the social cost of GHG, placing emissions in the context of relevant climate action goals and commitments, and providing common equivalents. Recommended communication and coordination regarding planned and ongoing activities between DAF and MDEQ. Recommended prior to the start of any construction, demolition, or renovation that would result in ground disturbance, DAF should coordinate with the Columbus AFB ERP office to ensure ground disturbance is coordinated with ongoing remediation and investigation activities.	**Section 3.11.2** summarizes impacts on environmental justice communities from the Proposed Action. Each action alternative would have disproportionate adverse impacts on environmental justice communities that cannot be avoided, but none of these impacts would require mitigation, such as residential noise abatement measures. DAF plans to implement the BMPs for fugitive dust and diesel emissions described in **Section 3.2.2**. **Section 3.2** indicates DAF is developing its guidance for performing standardized social cost of GHG analysis across DAF. Until that guidance is complete, DAF is not prepared to provide a social cost of GHG estimate in any EIS, including this one. This EIS was ongoing when the CEQ's interim guidance was issued. The Draft EIS was provided to MDEQ for their comment. **Section 3.7.2.1** states no impacts from the installation's ERP or MMRP sites would occur. Text added to state that ground-disturbing activities within ERP Site SS028 would be coordinated with the installation's ERP personnel. DAF would coordinate with MDEQ where necessary.
Quapaw Nation	Determined the Proposed Action was not located within their tribal area of interest and declined to provide comments. Requested to be removed from further consultation.	No. This comment was a request to be removed from further consultation. **Section 3.5.2.1** amended to note this correspondence.

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This EIS has been prepared by HDR, Inc. (HDR) and its subcontractors—AmaTerra Environmental, Inc. (AmaTerra), Gryphon Environmental LLC (Gryphon), Harris Miller Miller & Hanson, Inc. (HMMH), and Prospect Hill Consulting LLC (PHC)—under the direction of the U.S. Army Corps of Engineers–Tulsa District, Air Force Civil Engineer Center, Columbus AFB, and AETC staff. The individuals who contributed to the preparation of this EIS are listed below:

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6. References

14 FTW 2021 — 14 Flying Training Wing (FTW). 2021. Email communication from 14 FTW/XP clarifying T-38C nighttime and evening operations at Columbus AFB and anticipated T-7A operations below 3,000 feet AGL within the airspace training areas. Email sent on October 27, 2021.

AETC 2021a — Air Education and Training Command (AETC). 2021. Cumulative Number of T-7A and T-38C Aircraft and Operations for the Proposed Action at Columbus AFB. Prepared by Mr. Douglas "Opie" Opersteny, HQ AETC/ A5RF. September 20, 2021.

AETC 2021b — AETC. 2021. *T-7A Beddown at Columbus: MILCON/FSRM and NEPA DOPAA Development*. Provided to HDR on August 19, 2021.

AETC 2022 — AETC. 2022. Email communication from AETC/A5RF (James Pillar) regarding the number of T-38C aircraft currently assigned to Columbus AFB. Email sent on February 16, 2022.

AFCEC 2020 — Air Force Civil Engineer Center (AFCEC). 2020. *Air Quality Environmental Impact Analysis Process (EIAP) Guide, Volume II – Advanced Assessments*. July 2020.

AFCEC 2021 — AFCEC. 2021. *Draft Final Remedial Action Report, 2020 Data SS028 – Central Base VOC Plume Columbus Air Force Base, Mississippi.* September 2021.

AFCEC 2023 — AFCEC. 2023. *Revision 2 – Final Technical Memorandum Mobilization 1. Phase 1 Remedial Investigation of PFOS/PFOA, Columbus Air Force Base, Mississippi*. September 2023.

AFCEC/CZN 2021a — Air Force Civil Engineer Center, National Environmental Policy Act Division (AFCEC/CZN). 2021. Email from AFCEC/CZN to Timothy Didlake (HDR) regarding floodplain data, nighttime operations, personnel numbers, and FSRM project descriptions. November 5, 2021.

AFCEC/CZN 2021b — AFCEC/CZN. 2021. Email from AFCEC/CZN to Darrell Molzan (HDR) regarding T-7A supersonic training. June 22, 2021.

AFCEC/CZOW 2022 — Air Force Civil Engineer Center, Installation Support Team (AFCEC/CZOW). 2022. Email conversation between Ricky French, Gryphon Environmental LLC, and Jan Patton, AFCEC/CZOW, regarding environmental contamination associated with the Proposed Action at Columbus AFB. April 13, 2022.

ASN 2022 — Aviation Safety Network (ASN). 2022. ASN Safety Database Results, Columbus AFB. Available online: <https://aviation-safety.net/wikibase>. Accessed June 7, 2022.

Brzuszek et al. 2020 — Brzuszek, R., Kelly, L., and Tullos A. (Brzuszek et al.). 2020. *Establishing a Backyard Wildlife Habitat.* Mississippi State University.

Bullock 2018 — Bullock, Lindsay K. 2018. *Eastern Spotted Skunk (Spilogale putorius).* Available online: <https://studylib.net/doc/10375510/mammals-of-mississippi-12-1-6-eastern-spottedskunk-linds>. Accessed April 25, 2022.

CEQ 1986 — Council on Environmental Quality (CEQ). 1986. *Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations*. Amended 1986.

CEQ 1997 — CEQ. 1997. Environmental Justice Guidance Under the National Environmental Policy Act. December 10, 1997.

CES/CEIAP 2022 — Civil Engineering Squadron/Environmental Impact Analysis Program (CES/CEIAP). 2022. Email conversation between Mr. Ricky French, Gryphon Environmental LLC, and Mr. Michael Blythe, CES/CEIAP, regarding hazardous materials and wastes at Columbus AFB. June 2022.

Chapman et al. 2004 — Chapman, S.S., Griffith, G.E., Omernik, J.M., Comstock, J.A., Beiser, M.C., and Johnson, D. (Chapman et al.). 2004. Ecoregions of Mississippi, (color poster with map, descriptive text, summary tables, and photographs): Reston, Virginia, U.S. Geological Survey (map scale 1:1,000,000).

City of Columbus 2022 — City of Columbus. 2022. Highway 45 Mission Statement, District Revision, and Concept Drawing. Available online: <https://www.thecityofcolumbusms.org/212/Planning-Community-Development>. Accessed August 18, 2022.

Columbus AFB 1995 — Columbus Air Force Base (Columbus AFB). 1995. "Cultural Resources Management Plan For Columbus Air Force Base, Mississippi." 1995. Approving Officials: illegible name (Gen R. Lexler) Installation Commander and illegible name (Jah Siesel Jr.) HQ AETC/CEPR Cultural Resources Manager.

Columbus AFB 2003 — Columbus AFB. 2003. *Columbus Air Force Base, Cold War-Era Buildings and Structures Inventory and Assessment*. December 2003.

Columbus AFB 2012 — Columbus AFB. 2012. *Air Installation Compatible Use Zone Study: Columbus Air Force Base, Mississippi.* April 2012.

Columbus AFB 2014 — Columbus AFB. 2014. "A Brief History of Columbus AFB and The 14th Flying Training Wing." Available online: <https://www.columbus.af.mil/About-Us/Fact-Sheets/>. Accessed April 2022.

Columbus AFB 2016 — Columbus AFB. 2016. "Columbus Air Force Base." Published August 3, 2016. Available online: <https://www.columbus.af.mil/About-Us/>. Accessed on October 5, 2021.

Columbus AFB 2017a — Columbus AFB. 2017. *Installation Development Plan, Columbus Air Force Base, Mississippi*. Final Submittal. January 2017.

Columbus AFB 2017b — Columbus AFB. 2017. *U.S. Air Force Integrated Solid Waste Management Plan: Columbus Air Force Base*. August 2017.

Columbus AFB 2018 — Columbus AFB. 2018. *Columbus Air Force Base Bird Aircraft Strike Hazard (BASH) Plan 91-212*. 31 October 2018.

Columbus AFB 2020a — Columbus AFB. 2020. *U.S. Air Force Integrated Natural Resources Plan, Final, Columbus Air Force Base, MS*.

Columbus AFB 2020b — Columbus AFB. 2020. *14th Flying Training Wing Columbus Air Force Base Columbus, Mississippi Hazardous Waste Management Plan*. January 2020.

Columbus AFB 2021 — Columbus AFB. 2021. *Final Description of Proposed Action and Alternatives for the Environmental Assessment for Facility Enhancements and Land Use Modification Projects at Columbus Air Force Base, Mississippi*. February 2021.

Columbus AFB 2022a — Columbus AFB. 2022. *Columbus Air Force Base Operations and Maintenance District Plan*. Final Submittal. August 2022.

Columbus AFB 2022b — Columbus AFB. 2022. Installation Development Plan update. January 26, 2022.

Columbus AFB 2022c — Columbus AFB. 2022. *14th Flying Training Wing Columbus Air Force Base Columbus, Mississippi Asbestos Management Plan (AMP)*.

Columbus-Lowndes Development Link 2013 — Columbus-Lowndes Development Link. 2013. *Columbus Air Force Base Joint Land Use Study*. June 2013. Accompanying Compatibility Reference Guide published in February 2015.

DAF 2014a — Department of the Air Force (DAF). 2014. "T-38 Talon." Published on September 23, 2005, and current as of January 2014. Available online: <https://www.af.mil/About-Us/Fact-Sheets/Display/Article/104569/t-38-talon/>. Accessed October 5, 2021.

DAF 2014b — DAF. 2014. *Guide for Environmental Justice Analysis Under the Environmental Impact Analysis Process*. November 2014.

DAF 2017 — DAF. 2017. Air Force Handbook 32-7084, *AICUZ Program Manager's Guide*. November 2, 2017.

DAF 2018 — DAF. 2018. Memorandum for Record. Strategic Basing Decision – Advance Pilot Training (T-X). February 16, 2018.

DAF 2021a — DAF. 2021. Memorandum for Record. Basing Decision, T-7A Bases 2-5 Preferred Locations (Sequencing). March 9, 2021.

DAF 2021b — DAF. 2021. Table A29-1, Dependents Per Military Sponsor for Fiscal Year 2020 of Air Force Instruction 65-503, *Financial Management*, Table 3.2, Personnel Factors. Table A29-1 provided to HDR on August 21, 2021.

DAF 2022 — DAF. 2022. *Final Environmental Impact Statement for T-7A Recapitalization at Joint Base San Antonio, Texas*. February 2022.

DAF SAF/IE 2022 — Department of the Air Force, Office of the Assistant Secretary for Energy, Installations, and Environment (DAF SAF/IE). 2022. *Department of the Air Force Climate Action Plan*. Washington DC. October 2022.

DNWG 2009 — Department of Defense Noise Working Group (DNWG). 2009. *Using Supplemental Noise Metrics and Analysis Tools*. December 2009.

DNWG 2013 — DNWG. 2013. *Technical Bulletin: Noise – Induced Hearing Impairment*. December 2013.

DoD 2021 — Department of Defense (DoD). 2021. AP/1B, Area Planning, Military Training Routes, North and South America. August 2021.

DoD 2022 — DoD. 2022. REPI Program Factsheet. <https://www.repi.mil/Portals/44/Documents/Resources/REPI_FactSheet_WhatisREPI.pdf>. Accessed August 2022.

DON 2021 — Department of the Navy (DON). 2021. Report to Congress. *Real-Time Aircraft Sound Monitoring Final Report*. November 30, 2021.

DOS and EOP 2021 — U.S. Department of State (DOS) and U.S. Executive Office of the President (EOP). 2021. *The Long-Term Strategy of the United States: Pathways to Net-Zero Greenhouse Gas Emissions by 2050*. Washington, DC. November 2021.

FAA 2015 — Federal Aviation Administration (FAA). 2015. FAA PAVEAIR User Guide. June 4, 2015. Available online: <https://faapaveair.faa.gov/Help/index.html>. Accessed May 2022.

FAA 2021 — FAA. 2021. U.S. Department of Transportation, FAA, Air Traffic Organization Policy, Order JO 7400.10C, Special Use Airspace. February 16, 2021. Available online: <https://www.faa.gov/documentLibrary/media/Order/7400.10c_2021-02-09.pdf>. Accessed May 2022.

FAA 2022a — FAA. 2022. "Fundamentals of Noise and Sound." Last updated March 29, 2022. Available online: <https://www.faa.gov/regulations_policies/policy_guidance/noise/basics#metrics>. Accessed on November 10, 2022.

FAA 2022b — FAA. 2022. "Frequently Asked Questions and Answers" for airport safety and wildlife. Last updated August 3, 2022. Available online: <https://www.faa.gov/airports/airport_safety/wildlife/faq>. Accessed on August 25, 2022.

FEMA 2022 — Federal Emergency Management Agency (FEMA). 2022. "Draft National Flood Hazard Viewer." Available online: <https://fema.maps.arcgis.com/apps/webappviewer/index.html?id=29f87515702d4845a906419b287e2049>. Accessed June 2022.

FICUN 1980 — Federal Interagency Committee on Urban Noise (FICUN). 1980. *Guidelines for Considering Noise in Land Use Planning and Control*. June 1980.

HMMH 2022 — Harris Miller Miller & Hanson, Inc. (HMMH). 2022. *Noise Model Operational Data Documentation (100%) for Columbus AFB, MS.* Prepared in support of the Environmental Impact Statement for T-7A Recapitalization at Columbus AFB, Mississippi. HMMH Report 312841.001. Prepared by Czech, J.J., Krusell, P., and Botto, D. November 2022.

Hodges et al. 2004 — Hodges, J.D., Evans, D.D., Garnett, L.W. (Hodges et al.). 2004. *Mississippi Trees*. Mississippi Forestry Commission. 337p.

MDEQ 2022 — Mississippi Department of Environmental Quality (MDEQ). 2022. "Types of General Permits and Notice of Intent Forms." Available online: <https://www.mdeq.ms.gov/permits/environmental-permits-division/applications-forms/generalpermits>. Accessed June 2022.

MDWFP 2022a — Mississippi Department of Wildlife, Fisheries, and Parks (MDWFP). 2022. NHPOSDB, MDWFP. Available online: <https://www.mdwfp.com/museum/nhposdb/>. Accessed April 18, 2022.

MDWFP 2022b — MDWFP. 2022. Natural Heritage Database Search. Accessed May 10, 2022.

Mississippi Bat Working Group 2020 — Mississippi Bat Working Group. 2020. Mississippi Bat Conservation Strategy. Mississippi Bat Working Group. Jackson, Mississippi.

Missouri Botanical Garden 2022 — Missouri Botanical Garden. 2022. "*Coreopsis auriculata*." Available online: <http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?taxonid=243937&isprofile=1&gen=Coreopsis#:%7E:text=Coreopsis%20auriculata%2C%20commonly%20called%20lobed,Virginia%20to%20Florida%20and%20Mississippi>. Accessed April 25, 2022

MMNS 2014 — Mississippi Museum of Natural Science (MMNS). 2014. Endangered Species of Mississippi. Mississippi Department of Wildlife, Fisheries, and Parks & Mississippi Museum of Natural Science, Jackson, Mississippi. 2014 edition.

National Audubon Society 2022a — National Audubon Society. 2022. *Grasshopper Sparrow*. Available online: <https://www.audubon.org/field-guide/bird/grasshopper-sparrow>. Accessed April 19, 2022.

National Audubon Society 2022b — National Audubon Society. 2022. *Cooper's Hawk*. Available online: <https://www.audubon.org/field-guide/bird/coopers-hawk>. Accessed April 19, 2022.

Page and Burr 2011 — Page, L.M. and B.M. Burr. 2011. *A field guide to freshwater fishes of North America north of Mexico*. Boston: Houghton Mifflin Harcourt, 663p.

PNHP 2007 — Pennsylvania Natural Heritage Program (PNHP). 2007. Short-hair sedge (*Carex cinta* var.*brevicrinis*). Available online: <https://www.naturalheritage.state.pa.us/factsheet.aspx?=15026>. Accessed April 25, 2022.

Schwab 2018 — Schwab, Nathan. A. 2018. "Bat Acoustic Survey, Natural Resource Program (Project AFCESO979317)," U.S. Army Corps of Engineers, Environmental Remediation Branch, Northwestern Division, Omaha District. Prepared by Tetra Tech, Inc.

Siskind et al. 1980 — Siskind, D. E., Stagg, M. S., Kopp, J. W., and Dowding, C. H. 1980. *Structure Response and Damage Produced by Ground Vibration From Surface Mine Blasting*. Report of Investigations 8507. U.S. Department of the Interior, Bureau of Mines.

Siskind et al. 1989 — Siskind, D. E., Crum, S. V., Otterness, R. E., and Kopp, J. W. 1989. *Comparative Study of Blasting Vibrations from Indiana Surface Coal Mines*. Report of Investigations 9226. U.S. Department of the Interior, Bureau of Mines.

tDAR 2022 — The Digital Archaeological Record (tDAR). 2022. "Letter: Assessment for Need of Baseline Archaeological Survey at Columbus Air Force Base." Published 1986. Available online: <https://core.tdar.org/document/470401/letter-assessment-for-need-of-baselin e-archaeological-survey-at-columbus-air-force-base>. Downloaded by Alison Rubio on October 26, 2022.

U.S. Census Bureau 2020 — U.S. Census Bureau. 2020. *2020 Census Block Maps*. Available online: <https://www.census.gov/geographies/reference-maps/2020/geo/2020-census-block-maps.html>. Accessed August 2022.

U.S. Census Bureau 2022 — U.S. Census Bureau. 2022. U.S. Poverty Thresholds Data Through 2021. Available online: <https://www.census.gov/data/tables/time-series/demo/income-poverty/historical-poverty-thresholds.html>. Accessed August 8, 2022.

USA.com 2022 — USA.com. 2022. *Lowndes County Weather*. Available online: <http://www.usa.com/lowndes-county-ms-weather.htm#HistoricalTemperature>. Accessed October 20, 2022.

USACE 2021a U.S. Army Corps of Engineers (USACE). 2021. *Ground Based Training System (GBTS) Facility, Columbus Air Force Base, Mississippi, Planning Charrette Report*. Draft Submittal. Prepared for USACE by Jacobs. July 30, 2021.

USACE 2021b USACE. 2021. *Unit Maintenance Trainer (UMT) Facility, Columbus Air Force Base, Mississippi, Planning Charrette Report.* Draft Submittal. Prepared for USACE by Jacobs. July 30, 2021.

USAFACTS 2022 USAFACTS. 2022. "Our Changing Population: Lowndes County, Mississippi." Available online: <https://usafacts.org/data/topics/people-society/population-and-demographics/our-changing-population/state/mississippi/county/lowndes-county>. Accessed August 9, 2022.

USDA NRCS 2022 U.S. Department of Agriculture Natural Resources Conservation Service (USDA NRCS). 2022. "Web Soil Survey." Available online: <https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>. Generated June 7, 2022.

USEIA 2019 U.S. Energy Information Administration (USEIA). 2019. *Mississippi, State Profile and Energy Estimates*. 2019. Available online: <https://www.eia.gov/state/rankings/?sid=AL#/series/226>. Accessed July 31, 2022.

USEPA 2016 U.S. Environmental Protection Agency (USEPA). 2016. *What Climate Change Means for Mississippi*. August 2016. Available online: <https://19january2017snapshot.epa.gov/sites/production/files/2016-09/documents/climate-change-ms.pdf>. Accessed August 1, 2022

USEPA 2018 USEPA. 2018. "National Overview: Facts and Figures on Materials, Wastes and Recycling." Available online: <https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/national-overview-facts-and-figures-materials>. Accessed August 8, 2022.

USEPA 2021a USEPA. 2021. *2017 National Emissions Inventory (NEI) Data for Mississippi*. January 2021. Available online: <https://www.epa.gov/air-emissions-inventories/national-emissions-inventory-nei>. Accessed July 29, 2022.

USEPA 2021b USEPA. 2021. Mississippi – EPA Map of Radon Zones. August 11, 2021. Available online: <https://www.epa.gov/sites/default/files/2014-08/documents/mississippi.pdf>. Accessed June 16, 2022.

USEPA 2022a USEPA. 2022. *Overview of Greenhouse Gas Emissions*. Available online: <https://www.epa.gov/ghgemissions/overview-greenhouse-gases>. Accessed July 29, 2022.

USEPA 2022b USEPA. 2022. *Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants: Alabama, Arkansas, Mississippi, and Tennessee*. Current as of June 30, 2022. Available online: <https://www3.epa.gov/airquality/greenbook/anayo_ak.html>. Accessed July 29, 2022.

USEPA 2022c USEPA. 2022. Greenhouse Gas Equivalencies Calculator. Updated March 2022. Available online: <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>. Accessed August 1, 2022.

USEPA 2022d USEPA. 2022. Frequent Questions about EJSCREEN. Available online: <https://www.epa.gov/ejscreen/frequent-questions-about-ejscreen>. Accessed August 8, 2022.

USEPA 2022e USEPA. 2022. EJSCREEN County and Census Block Group data for 2015-2020 ACS 5-year estimates. Available online: <https://gaftp.epa.gov/EJSCREEN/2021/>. Accessed August 8, 2022.

USFWS 2022a U.S. Fish & Wildlife Service (USFWS). 2022. USFWS Information for Planning and Consultation (IPaC). Official Report for Columbus Air Force Base, Mississippi. Project Code: 2022-0031970. Report received August 31, 2022.

USFWS 2022b USFWS. 2022. USFWS Information for Planning and Consultation (IPaC). Official Report for Columbus Air Force Base Airspace Areas. Project Code: 2022-0032713. Report received August 31, 2022.

USFWS 2022c USFWS. 2022. USFWS Information for Planning and Consultation (IPaC). Official Report for Columbus Air Force Base Training Routes. Project Code: 2022-0032733. Report received August 31, 2022.

USFWS 2022d USFWS. 2022. "National Wetlands Inventory – Wetlands Mapper." Available online: <https://fwsprimary.wim.usgs.gov/wetlands/apps/wetlands-mapper>. Accessed June 2022.

USGS 2022a U.S. Geological Service (USGS). 2022. "Frequency of Damaging Earthquake Shaking Around the U.S." Available online: <https://www.usgs.gov/media/images/frequency-damaging-earthquake-shaking-around-us>. Accessed June 14, 2022.

USGS 2022b USGS. 2022. "The Tuscaloosa Aquifer system in Mississippi." Available online: <https://www.usgs.gov/publications/tuscaloosa-aquifer-system-mississippi>. Accessed June 2022.

Wilson and Ruff 1999 Wilson, D., and S. Ruff. 1999. *The Smithsonian Book of North American Mammals*. Washington and London: Smithsonian Institution Press. 750p.