FINAL

ENVIRONMENTAL ASSESSMENT FOR BEMISS FIELD UNIMPROVED LANDING ZONE (ULZ) MODIFICATION AND USE AT MOODY AIR FORCE BASE, GEORGIA

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ACRONYMS, ABBREVIATIONS, AND SYMBOLS

A	agricultural
ACAM	Air Conformity Applicability Model
ACC	Air Combat Command
AFB	Air Force Base
AFI	Air Force Instruction
AFTTP	Air Force Tactics, Techniques, and Procedures
AGL	above ground level
AICUZ	Air Installation Compatible Use Zone
Air Force	United States Air Force
APZ	Accident Potential Zone
ATIS	Automated Terminal Information Service
BASH	Bird/Wildlife-Aircraft Strike Hazard
BEA	Bureau of Economic Analysis
BGEPA	Bald and Golden Eagle Protection Act
bgs	below ground surface
BMPs	best management practices
C.F.R.	Code of Federal Regulations
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CH_4	methane
CHABA	Committee on Hearing, Bioacoustics, and Biomechanics
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CSAR	Combat Search and Rescue
CWA	Clean Water Act
CZ	Clear Zone
dB	decibel
dBA	A-weighted decibel
DNL	day-night average sound level
DNR	(Georgia) Department of Natural Resources
DoD	Department of Defense
E	endangered
EA	Environmental Assessment
EIS	Environmental Impact Statement
EMC	(Colquitt) Electric Membership Corporation
EO	Executive Order
ESA	Endangered Species Act
ETL	Engineering Technical Letter
°F	degrees Fahrenheit
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
FONPA	Finding of No Practicable Alternative
FONSI	Finding of No Significant Impact
ft	feet
GHGs	greenhouse gases
GIS	geographic information system
GWP	global warming potential
HAPs	hazardous air pollutants
HATRs	Hazardous Air Traffic Reports
HLZ	helicopter landing zone

HP	horsepower
HWY	highway
Hz	hertz
IFR	instrument flight rule
IICEP	Interagency/Intergovernmental Coordination for Environmental Planning
INRMP	Integrated Natural Resources Management Plan
JO	Job Order
kw	kilowatt
L_{max}	maximum sound level
LZSO	Landing Zone Safety Officer
Mass-CASEVAC	mass casualty evacuation
MBTA	Migratory Bird Treaty Act
MSL	mean sea level
N/A	not applicable
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NC	core engine speed
NCDC	National Climatic Data Center
NEI	National Emissions Inventory
NEPA	National Environmental Policy Act
NHP	Natural Heritage Program
NHPA	National Historic Preservation Act
NO_2	nitrogen dioxide
NOTAM	Notice to Airmen
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NVG	night vision goggle
NWR	National Wildlife Refuge
O_3	ozone
O.C.G.A.	Official Code of Georgia Annotated
O&M	operations and maintenance
OSHA	Occupational Safety & Health Administration
Pb	lead
PM_{10}	particulate matter with a diameter of less than or equal to 10 microns
$PM_{2.5}$	particulate matter with a diameter of less than or equal to 2.5 microns
PSD	Prevention of Significant Deterioration
R	residential
R	rare
RA	Restricted Area
RNM	Rotorcraft Noise Model
ROI	region of influence
RPM	revolutions per minute
RQG	Rescue Group
S/A	similarity of appearance
SCONC	State Climate Office of North Carolina
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SO_2	sulfur dioxide
SUA	Special Use Airspace
T	threatened
TCP	traditional cultural property
TDY	temporary duty
THPOs	Tribal Historic Preservation Officers

U	Unusual
U.S.	United States
U.S.C.	United States Code
ULZ	unimproved landing zone
UNIN	Unincorporated
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
V	conservation use
VFR	visual flight rule
VOC	volatile organic compound
WMA	Wildlife Management Area

1. PURPOSE AND NEED FOR ACTION

1.1 INTRODUCTION

The United States Air Force (Air Force), Air Combat Command (ACC), proposes to construct facilities and install equipment at the Bemiss Field unimproved landing zone (ULZ) and utilize the ULZ for flight training operations by aircrews operating fixed-wing and rotary aircraft at Moody Air Force Base (AFB), Georgia. Currently, the ULZ does not meet the needed requirements for fixed-wing aircraft landings and is only used for airdrops and helicopter landings. The modifications include clearing trees, constructing facilities, and installing equipment. Upon completion of the modifications, the existing ULZ would be used for ULZ qualification training by aircrews assigned to Moody AFB operating both HC-130 (fixed-wing) and HH-60G (helicopter) aircraft, as well as various transient aircrews operating similar aircraft.

1.2 LOCATION OF THE PROPOSED ACTION

Moody AFB comprises a total of 11,881 acres in Lowndes and Lanier Counties in south-central Georgia (see Figure 1-1), which includes the Main Base, Grand Bay Range, and Grassy Pond. Nearby cities include Valdosta, about 10 miles to the southwest, and Lakeland, about 6 miles northeast. Moody AFB is approximately 85 miles northeast of Tallahassee, Florida, and 120 miles northwest of Jacksonville, Florida. The closest major cities in Georgia are Macon, 150 miles north, and Atlanta, 220 miles north. Georgia State Highway 125 (Parker Greene Highway/Bemiss Road) is the primary access road to the main base. The main base portion, situated east of Parker Greene Highway/Bemiss Road (State Highway 125), includes the administrative, base support, aircraft operations, and maintenance areas, as well as the airfield.

The location of the Proposed Action (Bemiss Field) is on the eastern side of the base, south of the Grand Bay Range impact area and just north of Lakeland Highway (U.S. Highway [HWY] 221 / Georgia HWY 31). The location for tree clearing is along the northern and southern ends of the ULZ. Figure 1-2 shows the location of Bemiss Field.

Figure 1-1. Location of Moody AFB

Figure 1-2. Location of Proposed Action

1.3 PURPOSE AND NEED FOR THE ACTION

The purpose of the Proposed Action is to provide an operational and certified ULZ for Combat Search and Rescue (CSAR) units, primarily those units assigned to Moody AFB, and to meet ULZ qualification training requirements.

The need for the Proposed Action is based on increases in training requirements for new aircraft and the lack of local ULZs available for use. Qualification training, as described in Air Force Instruction (AFI) 11-2 HC-130J Volume 1 (U.S. Air Force, 2012 a), as well as other directives, includes night vision goggle (NVG) air/land training; mass casualty evacuation (Mass-CASEVAC); insertion, extraction, and transload of pararescuemen; extraction of survivors; and realistic training to improve aircrew capability for landing at austere/unimproved airfields.

Introduction of the HC-130 J-model aircraft to replace the 50-year-old HC-130 P-model fleet has resulted in a 33 percent net increase in training requirements per aircraft for the new weapon system. Additionally, the Moody AFB replacement HC-130Js are projected to have a 25 percent increase in aircraft deployed at any given time. The increase in operations tempo, coupled with the increase in manning, will place an even greater training demand on the few aircraft left at home station. As much training as possible for the HC-130J was assigned to the Kirtland AFB HC-130J training wing; however, the Kirtland wing continues to suffer from a lack of suitable landing zones in their local training area and, therefore, all HC-130 aircrew must complete their initial and continuation unimproved landing qualification and assault training at their home unit. Having an unimproved landing zone within the local training area of Moody AFB is critical to achieving and maintaining the combat mission readiness of HC-130J weapon system and is crucial for the 71 RQS to meet full operational capability by 1 July 2016.

Use of an ULZ is needed because paved runways and assault strips do not meet ULZ training qualification requirements and transit times to other, suitable ULZs are lengthy. Those ULZs can only be used on an "as-available" basis, which means that training opportunities are restricted based on the availability of other installations' ULZs. Additionally, the actions at the Bemiss Field ULZ are needed because the ULZ currently does not meet the 35:1 approach/departure clearance plane (which means for every 35 meters [measured along the ground], there must be 1 meter of vertical clearance) nor requirements for on-site fire/rescue as delineated in Air Force Engineering Technical Letter (ETL) 09-6, *C-130 and C-17 Landing Zone (LZ) Dimensional, Marking, and Lighting Criteria, Change 1* and therefore cannot be utilized. Consequently, the actions are needed to support the use of the ULZ.

1.4 SCOPE OF THE ENVIRONMENTAL REVIEW

The Environmental Assessment (EA) will identify, describe, and evaluate the potential environmental impacts that may result from implementing the Proposed Action and any reasonable alternative identified through scoping or the public comment process, as well as a No Action Alternative. The affected environment and environmental consequences may be described, as appropriate, in terms of site-specific descriptions or regional overview. Finally, the document identifies measures that would prevent or minimize environmental impacts.

The National Environmental Policy Act (NEPA) requires Federal agencies to consider the environmental consequences of proposed actions in the decision-making process (42 U.S.C. § 4321, et seq.). The Council on Environmental Quality (CEQ) was established under NEPA, 42 U.S.C. § 4342, et seq., to implement and oversee Federal policy in this process. In 1978, the CEQ issued regulations implementing the NEPA process under Title 40, C.F.R., §§ 1500–1508. The CEQ regulations require that the Federal agency considering an action evaluate or assess the potential consequences of the action or alternatives to the action, which may result in the need for an EA or environmental impact statement (EIS). Under 40 C.F.R. this effort will include preparation of an EA and FONSI, FONSI/FONPA, or EIS recommendation for the proposed action(s), obtaining and analyzing data to determine potential environmental impacts, and coordinating efforts with the appropriate agencies.

The proposed activities addressed within this document constitute a Federal action and, therefore, must be assessed in accordance with NEPA. To comply with NEPA, as well as other pertinent environmental requirements, the decision-making process for the Proposed Action must include the development of an EA to address the environmental issues related to the proposed activities. The Air Force Environmental Impact Analysis Process is accomplished via procedures set forth in CEQ regulations and 32 C.F.R. Part 989.

Based on the scope of the Proposed Action, the following environmental resource areas were identified for analysis in this EA: airspace, air quality, noise, safety, land use, socioeconomics/environmental justice, cultural resources, biological resources, water resources, earth resources, and infrastructure.

1.5 COOPERATING AGENCY AND INTERGOVERNMENTAL COORDINATION/CONSULTATIONS AND PUBLIC/AGENCY INVOLVEMENT

In October 2013 the Air Force provided letters describing the Proposed Action and seeking input on initial planning stages of the project to the following agencies: Federal Aviation Administration (FAA); the U.S. Fish and Wildlife Service (USFWS) (Georgia Ecological Services Coastal Sub-Office); Georgia Department of Community Affairs; Georgia Department of Natural Resources (DNR) (Historic Preservation Division and Wildlife Resources Division); Georgia Department of Transportation; Georgia Environmental Protection Division; South Georgia Regional Planning Council; Lowndes County Commission; and the Lanier County Commission. During this phase, three agencies (GA DNR, USFWS, and Georgia State Historic Preservation Officer [SHPO]) provided input regarding potential concerns with the project (see Appendix A for all correspondence).

The SHPO requested National Historic Preservation Act (NHPA) Section 106 consultation for potential impacts to cultural resources. The Air Force completed the Section 106 consultation process with the SHPO on June 11, 2015, which concurred with a finding of no adverse effect to cultural resources (see Appendix A). The USFWS identified concerns regarding federally listed species, candidate species, migratory birds, and bird airstrike hazard (BASH) issues. Moody AFB initiated Endangered Species Act (ESA) Section 7 consultation with the USFWS regarding listed species on February 18, 2015, which identified a "May Affect, but Not Likely to Adversely Affect" determination for listed species. The USFWS concurred with this finding and the consultation was completed on May 14, 2015 (Appendix A).

Additionally, Moody AFB provided notification of the Proposed Action and requested concurrence on a finding of no effect to traditional cultural properties (TCPs) from 12 Native American tribes (a list is provided in Chapter 7). A few of the tribes have yet to respond; however, those that have responded identified no concerns or issues with the proposed action (see Appendix A).

Moody AFB also conducted community outreach to guide the development of the proposal and the environmental assessment; this was accomplished by holding a community meeting in March 2014 with potentially affected members of the public and local governmental agencies to solicit input on the ULZ proposal. Notification for the meeting was provided via Valdosta Daily Times newspaper announcement, website postings, and direct mailings of brochures to potentially affected landowners; the brochures described the ULZ proposal, advertised the community outreach meeting, provided the website address, and provided a phone number and e-mail address for questions or additional information. Inputs from the outreach guided the proposal (e.g., an adjacent landowner was not willing to enter an easement agreement thus requiring proposed activity adjustments, public concerns regarding property values drove economic analysis in the EA, etc.). The base also maintained a web page for 6 months with information on the proposal and contact information for comments or questions.

In June 2013 Moody AFB sent an e-mail request to the U.S. Army Corps of Engineers (USACE) seeking input on permitting requirement for the Proposed Action. The USACE responded that the action would qualify for a silvicultural exemption and that no authorization (i.e., permit) would be required from the USACE (see Appendix A). Again in August 2014 Moody AFB sent a letter seeking input on potential impacts to wetlands from the Proposed Action, and the USACE was provided a copy of the Draft EA for review. The USACE did not respond further. All correspondence is provided in Appendix A.

For the Draft EA, the Air Force published a public notice in the *Valdosta Daily Times* and the Moody AFB installation newspaper on May 1, 2015, inviting the public to review and comment on the EA (available at the South Georgia Regional Library in Valdosta, Georgia and on the Moody AFB website at http://www.moody.af.mil/environmentalinitiative.asp).

The Air Force also provided the following agencies copies of the EA for review and comment: the USFWS (Georgia Ecological Services Coastal Sub-Office and the Okefenokee National Wildlife Refuge [NWR] for Banks Lake NWR); USACE; Georgia Department of Community Affairs; Georgia DNR (Historic Preservation Division, Wildlife Resources Division, and Game Management Section); Georgia Department of Transportation; Georgia Environmental Protection Division; South Georgia Regional Planning Council; Lowndes County Commission; and the Lanier County Commission. The Georgia DNR (Wildlife Resources Division) was the only agency to submit a response identifying potential species occurrences within 3 miles of the project site, as well as a recommendation for USFWS consultation on the project.

The initial public comment and agency review period was scheduled to end on May 30, 2015. However, the comment period was extended to June 19, 2015, for those agencies and persons receiving review copies and letters in the mail due to potentially confusing information in the actual letter accompanying the Draft EA. One public comment was received, with an adjacent landowner expressing concerns regarding potential impact to use and enjoyment of the property and property values from noise, vibration, use restrictions, increased safety and environmental risks, and adverse impacts to timber sales and associated land value. Copies of the advertisement, letters, correspondence, and response to the public comment are provided in Appendix A.

1.6 ORGANIZATION OF THE DOCUMENT

The EA follows the requirements established by CEQ regulations (40 C.F.R. §§ 1500–1508) and consists of the following chapters:

1. Purpose and Need for Action
2. Description of Proposed Action and Alternatives
3. Affected Environment
4. Environmental Consequences
5. Cumulative Impacts
6. Special Requirements and Operating Procedures
7. Persons/Agencies Contacted
8. List of Preparers
9. References

2. DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

2.1 INTRODUCTION

This chapter describes the Proposed Action, the alternatives that the Air Force considered but did not carry forward, Alternative 1, and the No Action Alternative. The potential environmental impacts of Alternative 1 and the No Action Alternative are summarized at the end of this chapter.

2.2 PROPOSED ACTION

As discussed previously in Sections 1.1 and 1.3, modifications are needed at Bemiss Field in order to meet the requirements for use as a fixed-wing landing site. These modifications include vegetation management and development of on-site fire/rescue capabilities to meet the 35:1 approach/departure clearance plane and on-site fire/rescue requirements as delineated in ETL 09-6, *C-130 and C-17 Landing Zone (LZ) Dimensional, Marking, and Lighting Criteria, Change 1*. Once modifications are completed, Bemiss Field would be utilized for fixed- and rotary-wing aircraft landings. The Proposed Action therefore involves the following components:

(1) ULZ modification to meet ETL 09-6 requirements: (a) vegetation management within the existing ULZ approach/departure plane at the north and south ends of the Bemiss Field ULZ; (b) installation of ULZ lighting and markers along the airstrip; and (c) establishment of on-site support facilities including a fire/rescue capability consisting of a fire station, staging area, and vehicle access.

(2) Flight Operations: Bemiss Field has been utilized by rotary-wing aircraft for airdrops and landings, and by fixed-wing aircraft for airdrops, since 1996. Aircraft currently fly between 150–1,300 feet above ground level (AGL) while conducting low-altitude airdrops, and 3,500 feet AGL and 17,000 feet above mean sea level (MSL) for high-altitude airdrops. While the ULZ airstrip was built in 2009, it has not been operational for fixed-wing aircraft landings because of the tree-line obstructions within the 35:1 approach/departure plane. Upon completion of the improvements, the ULZ would be utilized for local ULZ qualification training by both HC-130 (fixed-wing) and HH-60G (helicopter) aircraft, as well as varying transient aircraft.

2.3 SELECTION STANDARDS

In compliance with NEPA and 32 C.F.R. 989, which implements the NEPA process, the Air Force must consider reasonable alternatives to the Proposed Action. The following describes the alternative identification process for meeting the purpose and need of accommodating increased ULZ training requirements and ULZ improvements. The alternative selection process was twofold: (1) identify a ULZ for use based on operational requirements, and (2) identify needed ULZ improvements and site-specific operational capabilities based on the ULZs identified as a result of the first part of the process. The standards for determining the most suitable ULZ for use are based on the purpose and need factors identified in Section 1.3, which are mainly to reduce transit time and eliminate availability constraints.

2.3.1 Identification of ULZ Alternatives

The following were identified as criteria for selecting a ULZ to meet the purpose and need:

- The ULZ must be within 50 nautical miles to facilitate ground transportation of Landing Zone Safety Officers.
- The ULZ must meet the requirements of ETL 09-6, or be able to be modified to meet those requirements. ETL 09-6 provides dimensional, marking, and lighting criteria and guidance for planning, design, construction, and evaluation of landing zones (LZs) used for aircrew training and contingency operations of C-130 and C-17 aircraft (see Appendix C for more information).
- The Air Force must control the hours of ULZ operation and have access both day and night.
- The ULZ must be sufficient size and load bearing capacity to support both the HC-130/J and HH-60G aircraft.
- The ULZ must be compatible with the MAFB Master Plan, military mission, and range safety regulations and conform to ACC, Air Force, and Department of Defense (DoD) policies and regulations.
- The ULZ must provide for consolidation of similar functions.

2.3.2 Screening of ULZ Alternatives

ULZs other than Bemiss Field that were initially considered included Pope AFB, North Carolina; Remegen ULZ in the Savannah Combat Readiness Training Center, Georgia; and Avon Park Air Force Range, Florida. However, based on the selection standards identified in Section 2.2, utilization of these ULZs does not meet the purpose or need in that none of them are within 50 nautical miles of Moody AFB, utilization of these ULZs is not cost-ineffective due to transit costs, and scheduling issues result in limited availability. Therefore, use of these other ULZs was considered but not carried forward due to excessive cost, limited availability, and adverse impacts to training. Bemiss Field was the only ULZ identified that meets the selection standards.

2.3.3 Identification of ULZ Modification and Standards

Exactly how ETL 09-06 requirements would be implemented is based on any potential ULZ location alternatives selected that meet the purpose and need. Because Bemiss Field was identified as the only ULZ alternative compatible with the purpose and need, alternatives for modification specific to Bemiss Field were then identified for meeting ETL 09-6 requirements. The standards for identifying modification alternatives are as follows.

Vegetation Control Standards

ETL 09-6 requires a 35:1 approach/departure clearance plane; the criteria for vegetation control is to remove the minimum amount of vegetation necessary to establish a 35:1 approach-departure clearance plane as required by ETL 09-6 (ETL 09-6 is provided in Appendix C).

Support Facility Standards

With regard to selecting locations for the emergency response staging area and fire station, the following criteria were identified for alternative selection.

- The staging area must be close enough to the ULZ to provide quick emergency response and line-of-sight with minimal improvements or tree clearing. The staging area would hold response equipment and personnel during operations.
- The fire station location must be on government property and allow the forward deployment of needed fire and crash recovery vehicles with unimpeded access near the ULZ to reduce wear and tear and fuel costs associated with driving them from the main base every time the ULZ is active.
- Placement of any new, permanent facilities must not be within ULZ safety zones.

2.4 SCREENING OF ALTERNATIVES

In compliance with NEPA and 32 C.F.R. 989, which implements the NEPA process, the Air Force must consider reasonable alternatives to the Proposed Action. The following potential alternatives that might meet the purpose and need for meeting increased ULZ training requirements and ULZ improvements were considered.

ULZ Selection Alternatives

1. ***Use Other ULZs***: As discussed previously, utilization of other ULZs would not meet the purpose or need. Given the frequency of training (Table 2-1), use of other ULZs was considered but not carried forward due to distance, excessive cost, limited availability, and adverse impacts to training. Bemiss Field was the only ULZ identified that meets the initial selection standard of 50 nautical miles.

ULZ Modification/Use Alternatives

1. ***Vegetation Control***: At Bemiss Field, there are trees within the 35:1 approach/departure clearance plane. As a result, a number of alternatives were considered to meet the ETL 09-6 requirement:

    a. Tree topping: This involves the cutting of the tops of trees to remove the portion within the 35:1 clearance plane. This alternative would leave the remainder of the tree in place.

    b. Tree cutting with stumps left in place: This involves cutting the trees down to the *stump* and leaving the stump in place.

    c. Tree cutting and stump removal: This involves complete removal of tree and stump.

    d. Modification of training: This alternative included modifying approach/departure operations for landings and takeoffs to minimize or eliminate the need for tree cutting. One option was to increase the glide path of approaching and departing aircraft from a standard 3 to 3.5 degrees to 4.5 to 5 degrees. The other option was to create a "dogleg" approach from the south.

2. ***Support Facilities:*** ETL-09-6 requires on-site fire/rescue capability. Based on the support facility selection standards identified in Section 2.3.2, the following alternatives were considered:

a. ***Bemiss Field ULZ Location:*** This alternative involves placing the facilities at Bemiss Field.

b. ***Grand Bay Range*** Location*:* This alternative would place facilities at Grand Bay Range.

c. ***Use Existing Installation Fire Station:*** This alternative involves use of the existing fire station facility located on Moody main base.

Table 2-1. Proposed Action Alternative Screening

Criteria	Alternative								
	ULZ Selection		Modification/Use				Support Facilities		
	Bemiss Field	*Other ULZs*	*Tree Topping*	*Tree Removal with Stumps in Place*	*Complete Tree Removal*	*Operational Changes*	*Bemiss Field*	*Grand Bay*	*Main Base Fire Station*
Within 50 nautical miles of Moody AFB	Yes	No	N/A*	N/A	N/A	N/A	N/A	N/A	N/A
Meets or is able to meet requirements of ETL 09-6.	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Under Air Force control and access both day and night	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Supports both the HC-130/J and HH-60G aircraft	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compatible with military requirements	Yes	N/A	N/A	N/A	N/A	No	N/A	N/A	N/A
Supports consolidation of similar functions	Yes	N/A	N/A	N/A	N/A	N/A	Yes	No	No
Minimizes environmental impacts	N/A	N/A	No	Yes	No	Yes	Yes	N/A	N/A
Staging area close to the ULZ with line-of-sight	N/A	N/A	N/A	N/A	N/A	N/A	Yes	Yes	Yes

Table 2-1. Proposed Action Alternative Screening, Cont'd

Criteria	Alternative								
	ULZ Selection		Modification/Use				Support Facilities		
	Bemiss Field	*Other ULZs*	*Tree Topping*	*Tree Removal with Stumps in Place*	*Complete Tree Removal*	*Operational Changes*	*Bemiss Field*	*Grand Bay*	*Main Base Fire Station*
Fire station on government property with unimpeded access near the ULZ	N/A	N/A	N/A	N/A	N/A	N/A	Yes	No	No
No new permanent facilities within ULZ safety zones	N/A	N/A	N/A	N/A	N/A	N/A	Yes	N/A	N/A

ETL = Engineering Technical Letter; N/A = not applicable; ULZ = unimproved landing zone
*N/A indicates "not applicable" either because prerequisite criteria were not met (e.g., if ULZ does not meet 50 nautical mile requirement then none of the other criteria need be considered), or the criteria does not apply to the specific alternative (e.g., criteria for location of support facilities does not apply to selection of a ULZ).

2.5 ALTERNATIVES CONSIDERED BUT ELIMINATED

Alternatives considered are based on the use of other potential ULZs, as well as adjustments to ULZ modifications, placement of fire/rescue facilities, flight paths, and training activities. Based on the requirements above, one alternative for implementing the Proposed Action (Alternative 1) has been identified as meeting both the purpose and the need and covers the spectrum of reasonable alternatives. Alternative 1 is discussed in Section2.6. Table 2-1 provides a comparison of alternatives considered, while the following narrative describes alternatives that were considered but eliminated from further evaluation.

Other ULZs: As discussed previously, utilization of other ULZs does not meet the purpose or need. Therefore, use of other ULZs was considered but not carried forward due to excessive cost, limited availability, and adverse impacts to training. Bemiss Field was the only ULZ identified that meets the selection standards.

ULZ Modification: With regard to alternatives for ULZ modification (approach/departure clearance, ULZ lighting and marking), the activities described under the Proposed Action are the minimum required to meet the ETL 09-6 requirements and allow for operations at the Bemiss Field ULZ. There are no other alternatives available for ULZ modification.

Executive Orders (EO) 11990, *Protection of Wetlands*, and 11988, *Floodplain Management*, requires Federal agencies to avoid, to the extent possible, the long- and short-term adverse impacts associated with the destruction or modification of wetlands and floodplains wherever there is a practicable alternative. The proposed method for vegetation management within wetland areas is tree removal with stumps left in place; approximately 46 acres of wetland and 37 acres of floodplain would be affected. This method was previously approved through the Moody AFB *Integrated Natural Resources Management Plan* (INRMP) process for similar proposals, as coordinated with the USACE and USFWS, and represents the least impactive method of tree removal in wetland areas. Under this method, while wetlands would be disturbed temporarily during tree cutting, no wetlands would be destroyed or modified and the USACE concurs that this project qualifies for a silvicultural exemption per the Clean Water Act and no 404 permit is required (see Appendix A). Any disturbance would be temporary and recoverable over the short term. Trees located outside of wetlands and floodplains along the runway and near the staging area and line-of-sight would be removed along with the stump.

Tree topping would only be a temporary fix and would require regular wetland disturbances over time as trees continue to grow, thus potentially resulting in adverse impacts to wetlands over the long term. This alternative was not carried forward, because there is another practicable alternative resulting in lesser impacts.

Complete tree removal, including stumps, in wetland areas would result in extensive ground and wetland disturbance and would not qualify for a silvicultural exemption. This alternative was not carried forward because there is a practicable alternative resulting in lesser impacts.

Based on screening of alternatives for vegetation management and the requirement of EO 11990, there are no practicable alternatives other than the proposed method that would result in lesser impacts (other than leaving the trees in place, which does not meet the purpose and need).

Support Facilities: Initial siting of the fire station involved three alternatives: (1) development of a fire station at the Grand Bay Range compound, (2) use of the existing on-base fire station, and (3) locating the support facilities at the ULZ.

The Grand Bay Range site was not carried forward for several reasons. First, a ditch that abuts the property where development would result in increased stormwater impact potentials. Second, the access road to Lakeland Highway is owned by the county and requires upgrades due to possible flooding when rainfall occurs. In addition, a long drive time would preclude timely response.

The use of the on-base fire station does not meet the requirements of timely emergency response due to the distance of the fire station to the ULZ.

While there are potentially a multitude of possible locations for placing the fire station near the ULZ, the Alternative 1 location as described in Section 2.6 is the farthest away from ULZ and Grand Bay Range safety zones while still on government property and provides quick and unimpeded road access to the staging area and ULZ. Other potential locations for the fire station are along the same road as proposed and all essentially within the same general area. These potential locations are not substantively different from the Alternative 1 location, and moving the fire station closer to the ULZ would place it into safety zones.

Sites identified for the staging area and fire station in Alternative 1 are those best suited to meet the requirements identified under Section 2.2; they were chosen because they were the most practical with regard to proximity to existing roadways and other facilities and associated utilities, while still maintaining safety and access to the ULZ. The Alternative 1 location for the staging area was carried forward because it is the most practical; it is closest to existing latrine facilities and electrical utilities. No other alternative locations were identified for the staging area given the practicality of the location identified in Alternative 1.

Training Activities: Finally, alternatives considered for training activities include increasing the glide path of approaching and departing aircraft and creating a "dogleg" approach from the south. Increasing the glide slope from a standard 3-3.5 degrees to 4.5-5 degrees to minimize the number of trees requiring removal was considered; however, this option eliminated the C-130 approach from the south and therefore eliminated the ability to conduct a full tactical flight profile. Creating a dogleg to the west for southern approaches and departures was also considered, but would have resulted in the need to remove more trees and would not eliminate the need for a waiver for the off-base trees at the southern end of the ULZ.

2.6 ALTERNATIVE 1 (PREFERRED ALTERNATIVE)

Alternative 1 for implementing the Proposed Action was developed based on the results of the alternative screening process as described in Sections 2.3 and 2.4.

2.6.1 ULZ Modifications

The modifications regarding the 35:1 approach/departure plane and on-site fire/rescue and are shown in Figure 2-1.

ULZ Tree Clearing – This would occur within the ULZ approach/departure plane at the north and south ends of the ULZ. To the north, approximately 37 acres would be clear cut and approximately less than 0.01 acre would be selectively cut, and to the south approximately 32 acres must be clear cut and less than 0.04 acres would be selectively cut. Nearly all of the north clearance area (effectively 37 acres) and selective cut area (less than 0.01 acres) are within wetlands and floodplain, and approximately 9 acres of the south area are within wetlands (no floodplain intrusion). Trees in these areas would be removed using both mechanical and manual means, as necessary, through a commercial timber sale; no stumps would be removed.

To the south of the ULZ across Lakeland Highway, there is an approximately 0.06-acre area that is located on private property with tree heights extending into the 35:1 clearance plane. Because these trees cannot be removed, a 500-foot displaced threshold would be implemented at each end of the ULZ; a displaced threshold is a location other than the end of the runway where pilots must aim for touchdown when landing. For landing purposes the runway would begin 500 feet from the end of the paved surface. By moving the landing aim point 500 feet down the ULZ, it in turn moves the aircraft approach slope to a higher elevation over the ground. Implementation of a displaced threshold and resulting higher approach path would keep the trees located on private property from penetrating the 35:1 approach clearance plane, eliminate the need for any obstruction waivers or removal of trees on private property, widen the tree buffer on the north end, and still meet the minimum C-130 ULZ length requirements.

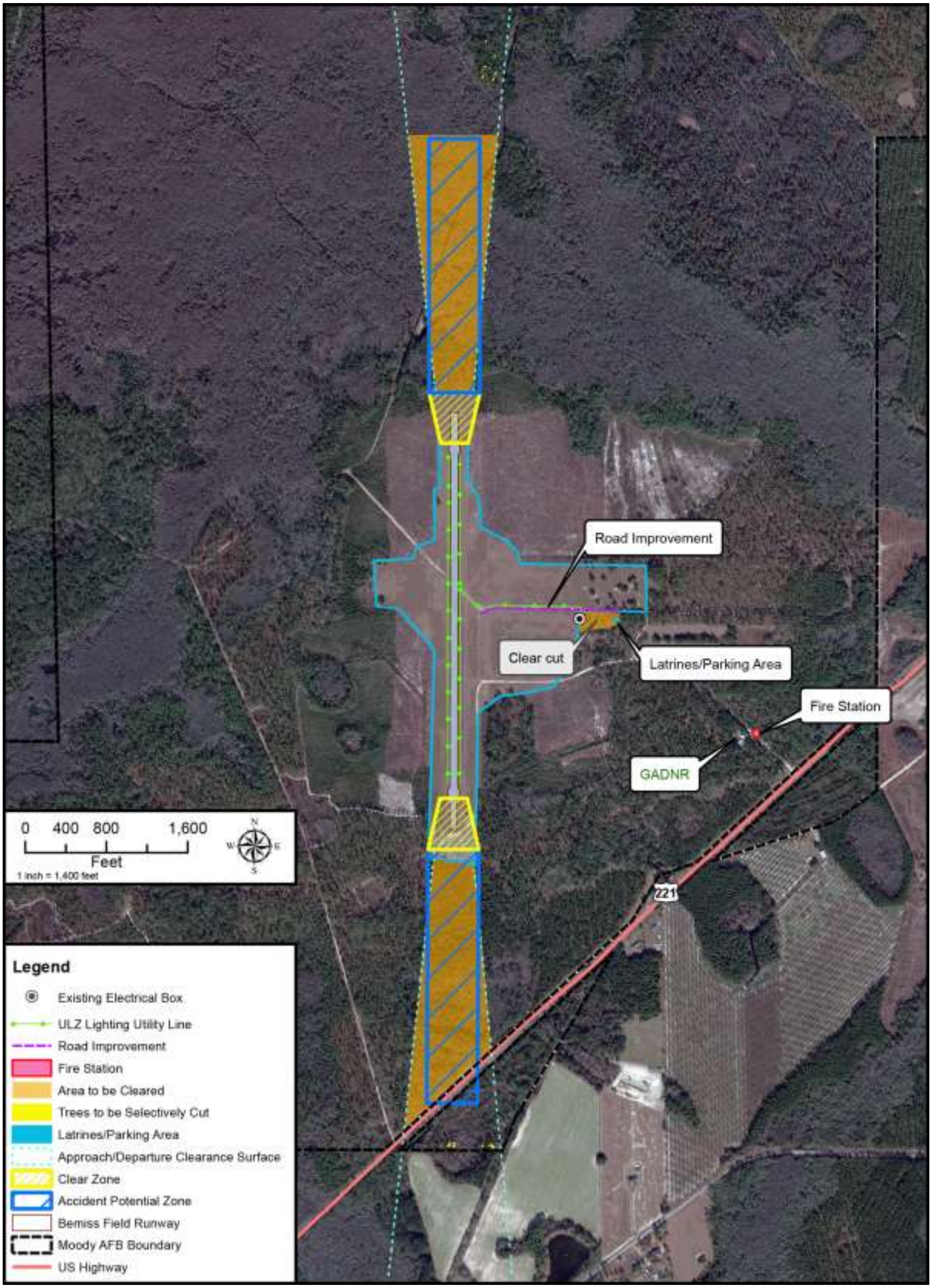

Figure 2-1. Alternative 1 Activities

Photos 1 through 3 show the areas requiring clearance associated with the ULZ.

Photo 1: ULZ View to South

Photo 2: ULZ View to North

Photo 3: Trees at Property Line South of HWY 221 (Selective Clearing)

Establish Staging Area and Renovate Latrine Facility – Located approximately 1,400 feet east of the ULZ, an approximately 1,000-square-foot gravel parking area would be developed to provide parking/staging for emergency response equipment during training activities. Installation of the gravel parking area would require land clearance to remove trees and level the area to make it suitable for parking. Additionally, approximately 1.5 acres of trees would need to be removed to provide line-of-sight from the staging area to the ULZ. The latrine facility (Facility #200) would be completely renovated. Photos 4 through 7 show the area proposed for the latrine facility and parking area, as well as the trees requiring removal.

Photo 4: Proposed Staging Area

Photo 5: Facility 200 – Proposed for Renovation

Photo 6: Entry to Proposed Staging Area

Photo 7: View from Staging Area West to ULZ – Trees Requiring Removal

Road Improvement – Improvement of approximately 1,400 linear feet of an existing dirt road to accommodate vehicle access to the ULZ would be required. This would involve some grading and gravel surfacing to provide support for large emergency response and transport vehicles. The road would be widened by approximately 10 feet to accommodate the emergency vehicles. Photos 8 and 9 show the existing roadway.

Installation of ULZ Lighting – ULZ lighting would be installed in accordance with AFI 13-217 (*Drop Zone and Landing Zone Requirements*, May 2007), Section 3.6, and ETL 09-6, *C-130 and C-17 Landing Zone Dimensional, Marking, and Lighting Criteria, Change 1*, Section 11. Approximately 7,900 linear feet of underground electrical utility lines would be installed as shown in Figure 2-1. Lines would be trenched and then filled and revegetated.

Photo 8: Road from Staging Area to ULZ (Facing West)

Photo 9: Road from Staging Area to ULZ (Facing East)

Construction of Fire Station – The proposed fire station facility would be approximately 4,320 square feet and located as depicted in Figure 2-1, inside the gate north of HWY 221 across from the Georgia DNR campground, maintenance facility, and bathrooms. The facility would consist of a two-truck parking bay and an administrative section with a control room, break room, showers and toilet, and storage and utility areas. There would be no vehicle maintenance conducted at the facility and no drains in truck bays, oil-water separators, or other forms of stormwater retention. A small septic tank and drain field for the facility would be required. A front fence would be constructed along the crash trail to tie into the existing chain link fence to secure the site, along with two 16-foot roll gates at the entrance to allow fire trucks to enter. An existing electrical transformer located on the south side of the road would need to be upgraded to provide electrical utilities, and a potable water well would be installed next to the facility for potable water use. The potable water well would be placed in the Floridan aquifer and used for drinking, showering, and toilet flushing. Water for firefighting would be hauled in water tankers from main base. There would be no other utilities required.

The fire station must be vacant when the Grand Bay Range is in use for live fire exercises because it is at the edge of a safety zone for some weapons deliveries. Therefore, the fire station would not be permanently manned and would mainly be used to house fire-fighting equipment such as fire trucks and firefighting/rescue gear that would be moved to the staging area when the ULZ is in use. Personnel would only be in the facility when the range/ULZ is scheduled for use by C-130s. On the scheduled day, firefighters would wait in the facility until they get notice that the C-130 is inbound to the ULZ, then they would take a vehicle to the staging area to have line-of-sight for the aircraft. After the C-130 completes an approach/departure, personnel would retire back to the facility until the C-130 returns, which may be 1 to 2 hours. Personnel would therefore be in the facility for 2 to 4 hours per event, two to three times per week.

2.6.2 Flight Operations

Landings and takeoffs would be oriented from both north and south, and approaches to the ULZ would be conducted in random directions to maximize proficiency in random tactical approach procedures in accordance with Air Force Tactics, Techniques, and Procedures (AFTTP_3.3 HC-130, December 17, 2012). Figure 2-2 shows the typical approach, departure, and missed approach flight paths associated with the Bemiss Field landing zone/drop zone from both north and south directions. During approach and prior to final descent, aircraft would fly at 500 feet AGL or higher. Once in descent, aircraft would decrease their height as they get closer to the ULZ.

Within airspace unit 3008B, aircraft must maintain a minimum of 100 feet AGL. From the south, aircraft would approach the ULZ for landings within restricted airspace, maintaining a minimum of 100 feet AGL until reaching the border of airspace units 3008A/3008B. This provides the pilot the option of landing from the opposite direction, flying a steeper angle, or aiming longer on the ULZ. The approach will be within restricted airspace and not require any amendments to airspace or normal approach procedures. Landings and takeoffs at the south end of the ULZ would occur over Lakeland Highway within restricted airspace. Landings and takeoffs at the north end would follow current procedures (e.g., either avoiding the Banks Lake NWR by 1,500 AGL or laterally by displacing run-in to the west of the NWR boundary). Figure 2-3 graphically depicts airspace units, approach lane, and associated aircraft altitudes for approaches from the south. Approaches to Bemiss ULZ from the north would not overfly Banks Lake NWR at altitudes less than 1,500 feet AGL. Most approaches from the north would maneuver to Bemiss LZ from the northwest, avoiding overflight of Banks Lake NWR entirely (see Figure 2-2). Figure 2-4 shows a profile view of typical aircraft altitudes during landing, takeoff, and airdrop. The relatively small number of approaches to Bemiss ULZ that would come from the north by way of the NWR would need to initiate a steeper descent to the ULZ after crossing the NWR.

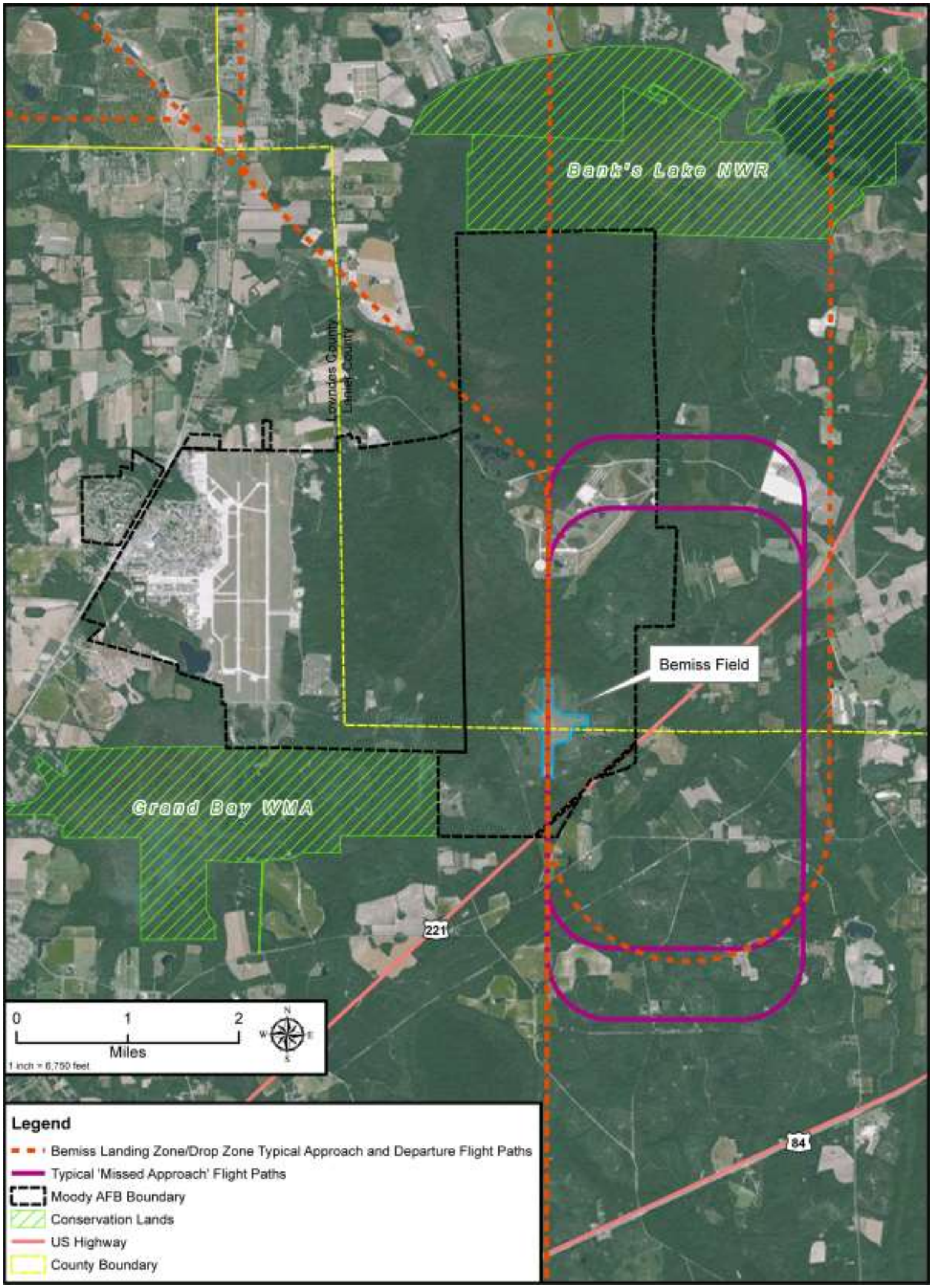

Figure 2-2. Approach/Departure Patterns for Bemiss Field

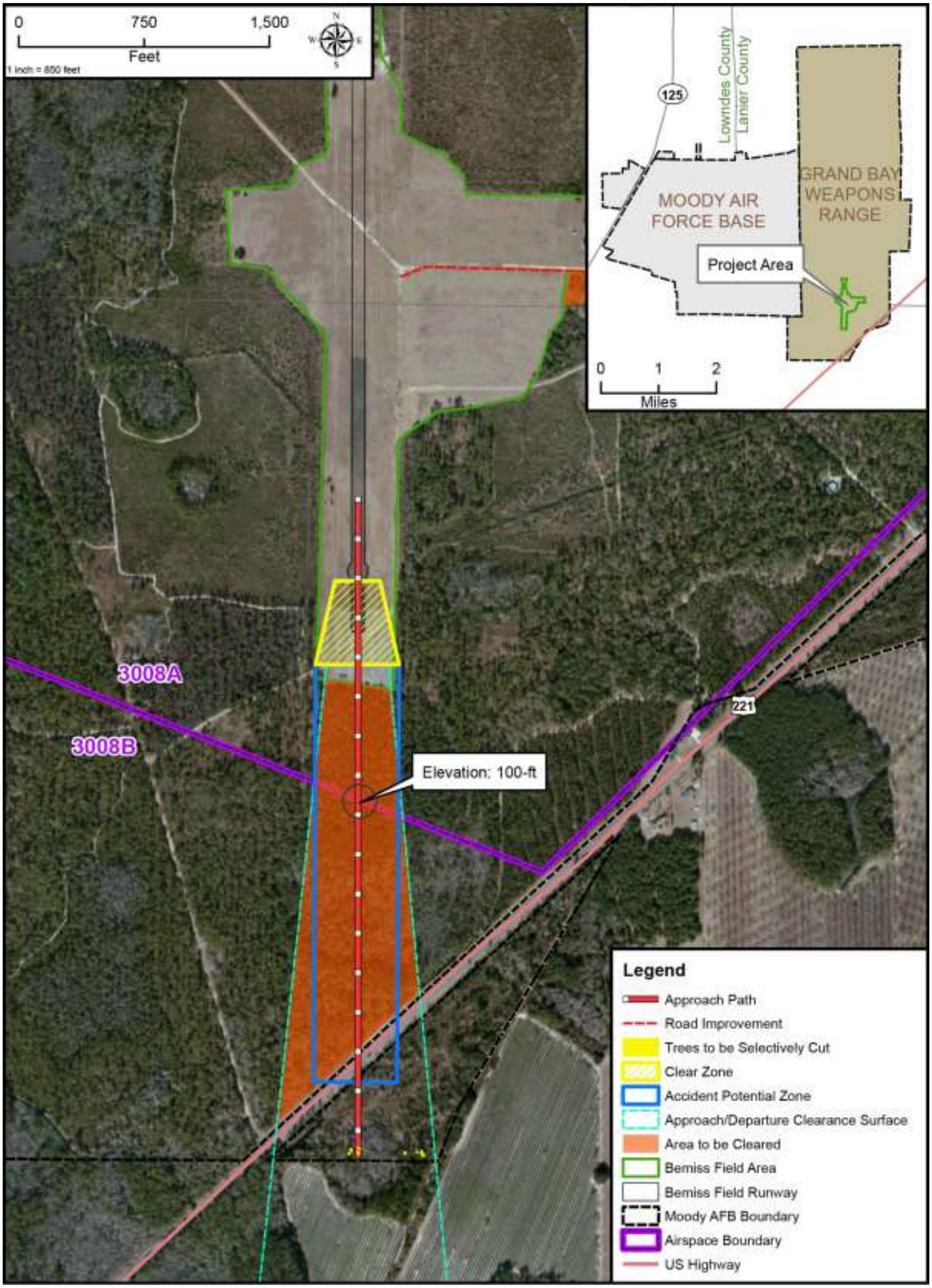

Figure 2-3. Approach Lane and Aircraft Height for Approaches from the South

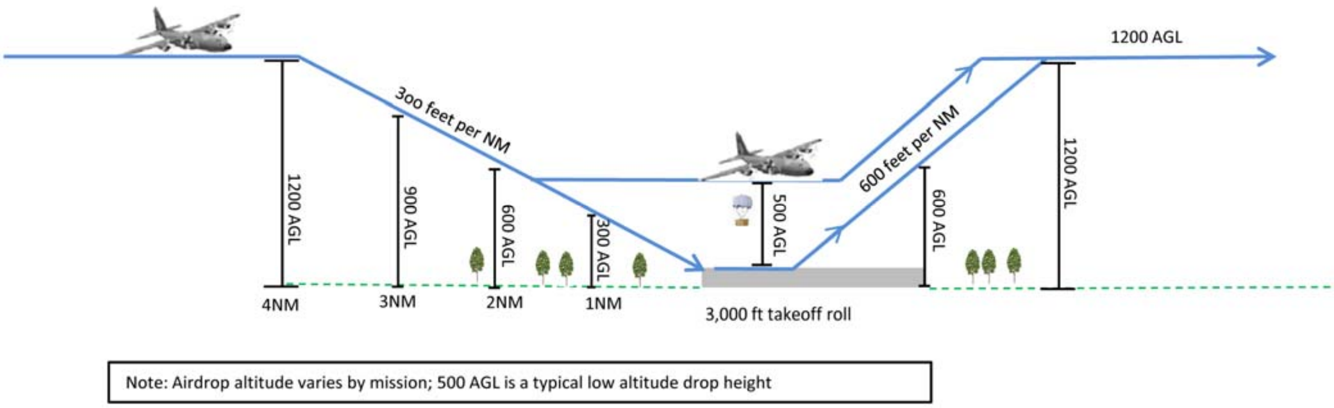

Figure 2-4. Typical ULZ Aircraft Landing, Takeoff, and Airdrop Heights

The primary function of the ULZ would be to support Moody AFB personnel ULZ training. Under primary use, there would be approximately 927 events per year (including both landings and drops) by both HC-130 and HH-60, with operations occurring both night (after 10 PM) and day (66 percent expected to occur during the late-night period between 10:00 PM and 7:00 AM). The number of events for Moody AFB–based aircraft under Alternative 1 would be the same as the baseline condition, although the distribution of events between landings and drops would change due to the availability of the ULZ.

As a DoD asset, the ULZ would also be available for use by transient aircraft. It is anticipated that approximately 100 events associated with other exercises on Moody AFB (either landings or airdrops) by propeller-driven and rotary-wing aircraft may occur annually. Table 2-2 provides details of current and proposed Bemiss Field operations as well as ongoing operations at Grand Bay Range.

Table 2-2. Current and Estimated Proposed Bemiss Field Operations

Aircraft Category	Aircraft / Activity Type *	Annual Events			Total Under Alternative 1
		Baseline	Proposed	Change	
Bemiss Field					
Based	HC-130 landings	0	150	+150	150
	HC-130 airdrops	400	250	-150	250
	HH-60 landings / low approaches	527	527	0	527
Transient	Propeller-driven aircraft landings (e.g., C-12, C-130, single-engine)	0	100	+100	100
	Rotorcraft landings / low approach	infrequent	infrequent	0	infrequent

Table 2-2. Current and Estimated Proposed Bemiss Field Operations, Cont'd

Aircraft Category	Aircraft / Activity Type *	Annual Events			Total Under Alternative 1
		Baseline	Proposed	Change	
Grand Bay Range (using assets other than Bemiss Field) **					
Based	HC-130 range training	180	180	0	180
	A-10 target approaches	59,746	59,746	0	59,746
	HH-60 target approaches	15,453	15,453	0	15,453
	A-29 target approaches	31,852	31,852	0	31,852
Transient	fighter aircraft target approaches (e.g., F-18, F-16, F-15)	302	302	0	302
	propeller-driven aircraft training events (e.g., AC-130 gun orbits)	254	254	0	254
	rotorcraft target/helicopter landing zone approaches (e.g., V-22)	552	552	0	552

* Listed aircraft training events generally equate to one potential overflight.
** Includes initial entry/exit to the range (all aircraft), as well as multiple approaches to target/landing zone (fighters and rotorcraft).

2.7 NO ACTION ALTERNATIVE

Under the No Action Alternative, the Bemiss Field ULZ would not be improved and would, therefore, not be utilized for fixed-wing landing training. The No Action Alternative would not meet training requirements and would result in unnecessary costs and lost training time due to lengthy transit times to other ULZs farther away. The 23d Wing would continue to compete for limited ULZ training area resources at other locations and personnel would not be able to conduct required ULZ training in an efficient and cost-effective manner, resulting in reduced proficiency in ULZ landings. This would result in a lack of adequate training and could potentially negatively impact unit readiness.

2.8 IDENTIFICATION OF THE PREFERRED ALTERNATIVE

Alternative screening indicates that the only alternative that meets all the selection standard requirements and the purpose and need is Alternative 1. Therefore, Alternative 1 is the Air Force's Preferred Alternative for implementing the Proposed Action discussed within the context of this EA and is the only "action alternative" carried forward for analysis.

2.9 IMPACT SUMMARY

2.9.1 Resource Areas Not Carried Forward for Detailed Analyses

Based on the scope of the Proposed Action, resource areas with minimal or no impacts were identified through a preliminary screening process. The following describes the resource area not carried forward for detailed analysis, along with the rationale for its elimination.

Solid/Hazardous Materials and Waste – The Proposed Action would not involve an increase in the utilization of hazardous materials or the introduction of different hazardous materials other than those currently utilized at Moody AFB. Additionally, the Proposed Action would not result in any increase in the generation of hazardous waste or the generation of new hazardous wastes. There are no Environmental Restoration Program sites or associated monitoring wells located near the ULZ. Solid waste generated from the project would be minimized through the sale of trees and the burning of removed stumps and other brush. Substantive amounts of solid waste are not anticipated. Consequently, this resource was not carried forward for further analysis.

Environmental Justice/Protection of Children – EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, requires Federal agencies to consider disproportionately high adverse effects on the human or environmental health to minority and low-income populations resulting from implementation of a proposed action. As such, agencies are required to ensure any potential effects are identified and addressed. 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 affect 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." The only potential impact to low-income, minority populations and children resulting from implementation of the Proposed Action would be related to a potential increase in off-base noise levels. However, under the Proposed Action, noise generated by aircraft operations would neither extend outside AFB boundary lines to the south nor change from baseline conditions elsewhere (see Figure 3-3, in Chapter 3). Therefore, no significant or disproportionate impacts would be expected on environmental justice populations or children. As such, these resources are not carried forward for further analysis.

2.9.2 Summary of Environmental Issues Analyzed in the EA

Table 2-3 summarizes the impacts associated with Alternative 1 and the No Action Alternative for those resource areas analyzed.

Table 2-3. Alternative Impact Summary and Comparison

Resource/ Issue Area	Alternative 1 (Preferred Alternative)	No Action
Airspace	No adverse impacts identified. There would be no changes to existing Special Use Airspace characteristics or management procedures under Alternative 1. While on final approach to the Bemiss Field unimproved landing zone (ULZ), aircraft would remain within restricted airspace R-3008. In general, flight paths would be similar to those used for airdrops at Bemiss Field currently. The majority of ULZ operations occur late at night and are therefore de-conflicted from the majority of Grand Bay Range operations. Existing Air Force airspace management practices would be expected to be sufficient to handle the minor net increase in aircraft operations in R-3008. A 500-foot displaced threshold would be used at the ULZ to de-conflict trees located on private property to the south.	Under the No Action Alternative, fixed-wing landings would continue to not be permitted at the Bemiss Field ULZ. There would be no net increase in flying operations at the Bemiss Field ULZ. There would be no impact to airspace management and use under the No Action Alternative.
Air Quality	No adverse impacts identified. Impacts from Alternative 1 would amount to less than 1 percent of each of the criteria pollutants for the region of influence (ROI). Further, emissions associated with tree clearing, construction, and roadway improvements would be temporary.	The No Action Alternative would not result in any additional impacts to air quality beyond the scope of normal conditions and influences within the ROI.
Noise	No significant adverse impacts identified. Fixed-wing aircraft landing to and departing from the Bemiss Field ULZ would follow flight paths used currently by aircraft conducting air drops at the co-located drop zone. Landing operations would differ from airdrop operations in that they would descend to touch down on the ULZ and then depart the ULZ rather than flying over the ULZ. Noise levels would be similar to those experienced currently except in the immediate vicinity of the ULZ, where aircraft would be at lower altitudes during final approach and initial stages of departure. Noise levels in the immediate vicinity of the ULZ would exceed 60 decibels (dB) day-night average sound level (DNL) off-installation only over a portion of Lakeland Highway. Noise levels exceeding 65 dB DNL in the vicinity of the ULZ would not leave Department of Defense-owned land.	Under the No Action Alternative, training at and near the Bemiss Field ULZ would continue to follow current patterns, and noise levels would not change. There would be no noise impacts under the No Action Alternative.

Table 2-3. Alternative Impact Summary and Comparison, Cont'd

Resource/ Issue Area	Alternative 1 (Preferred Alternative)	No Action
Safety	No significant adverse impacts identified. Potential for bird/wildlife-aircraft strikes would be similar to the baseline condition given the minimal increase in flight operations at/near the ULZ. To minimize the potential for any future bird/wildlife-aircraft strikes, Moody AFB would continue to implement an aggressive bird/wildlife-aircraft strike hazard (BASH) program, including the Wildlife Hazard Warning System. Additionally, Moody AFB would continue to coordinate extensively with on-staff U.S. Department of Agriculture wildlife experts regarding BASH-related issues.	With the continuation of policies and procedures in place to ensure the safety of the public as well as military personnel, there would be no adverse impacts associated with the No Action Alternative.
Land Use	No adverse impacts identified. Existing land uses in the affected area would remain essentially unchanged. No land use incompatibility issues related to noise were identified for on- or off-base.	The No Action Alternative would not result in any land use impacts beyond the scope of normal conditions and influences within the ROI.
Socioeconomics/ Environmental Justice	No adverse impacts to socioeconomics resources including population, property values, and recreation were identified since there would be no changes to average noise levels off-base above a 65 decibel (dB) day-night average sound level (DNL) threshold. Construction activities would result in only temporary and minor impacts for the duration of the activity. The Air Force would anticipate cost savings of over $1.6 million annually from conducting training locally.	No changes to socioeconomic conditions would be anticipated. Potential cost savings of over $1.6 million annually would not be realized by the Air Force. No disproportionate impacts to minority and low-income populations or special risks to children or noise-sensitive areas were identified.
Cultural Resources	No effects are anticipated to cultural resources. No cultural resources or traditional cultural properties (TCPs) are associated with the Bemiss Field project area. Moody AFB has completed consultation with the SHPO and followed up with concerned Federally recognized Native American tribes regarding cultural resources and TCPs. A synopsis of consultations is provided in Section 1.5 and all correspondence with the SHPO associated with NHPA Section 106 consultation and Native American tribes is provided in Appendix A.	No effects are anticipated to cultural resources under the No Action Alternative.

Table 2-3. Alternative Impact Summary and Comparison, Cont'd

Resource/ Issue Area	Alternative 1 (Preferred Alternative)	No Action
Biological Resources	No significant adverse impacts identified. Approximately 46 acres of wetland and 37 acres of floodplain would be affected and a "Finding of No Practicable Alternative" is required per EOs 11990 and 11988. Vegetation and wildlife could be impacted from habitat alteration and removal, construction activities, artificial lighting installation, increased aircraft flights, and changes in some flight profiles (lower altitude and increased noise). Some individuals would experience adverse impacts including disturbance, injury, or mortality, although quantification is difficult. Moody AFB has completed ESA Section 7 consultation for listed species with the USFWS for a determination of "may affect, but not likely to adversely affect" listed species. With implementation of management actions, Alternative 1 is not expected to jeopardize the continued existence of a species or to result in an overall decrease in population diversity, abundance, or fitness.	Under the No Action Alternative, there would be no ULZ modification and no associated habitat removal or alteration, behavioral disturbance, or physical impacts to vegetation or wildlife species. The No Action Alternative would not result in any impacts to biological resources beyond the scope of normal conditions and influences within the ROI.
Water Resources	No significant adverse impacts identified. Vegetation clearing in wetlands would cause minor, temporary effects to wetlands in the flight path. These effects would only be associated with conversion of forested or scrub-shrub wetlands to emergent wetlands but the total area of wetlands would remain the same. There would be no conversion of wetlands to nonwetland habitat. No other water resources would be affected.	Under the No Action Alternative, there would be no ULZ modification and no associated tree and shrub removal or alteration or physical impacts to wetlands and other water resources.
Earth Resources	No significant adverse impacts identified. There may be a temporary increase in the potential for soil erosion during construction activities. Adherence to land disturbance and National Pollutant Discharge Elimination System (NPDES) permit requirements and best management practices (BMPs) for soil erosion would minimize the extent of any adverse impacts.	The No Action Alternative would not result in any impacts to earth resources beyond the scope of normal conditions and influences within the ROI.
Infrastructure	No significant adverse impacts identified. Existing utility capacity is sufficient to support proposed ULZ modifications with minimal upgrades and installation of new utility infrastructure (i.e., electrical transformer and lines, lighting, well, and septic field). No adverse transportation impacts were identified. Minor road improvement, but no new road construction, would be anticipated. Vehicles would continue to use primarily on-base roads and trails. Occasional use of Lakeland Highway would be negligible. The action would not impact the Georgia DNR campground located nearby.	The No Action Alternative would not result in any impacts to infrastructure beyond the scope of normal conditions and influences within the ROI.

DNR = Department of Natural Resources; EO = Executive Order; ESA = Endangered Species Act; SHPO = State Historic Preservation Officer; USFWS = U.S. Fish and Wildlife Service

3. AFFECTED ENVIRONMENT

3.1 AIRSPACE MANAGEMENT AND USE

3.1.1 Definition of the Resource

Within the context of this EA, the term "airspace management" refers to scheduling and other controls placed on aircraft operations to ensure safe and efficient flying operations. Airspace management also refers to avoid or remove existing obstructions to flight (e.g., trees and towers) or to prevent new obstructions. The airspace management region of influence (ROI) includes Restricted Area (RA) airspace R-3008.

Congress charged the FAA with responsibility for developing plans and policy for use of the navigable airspace in the United States and its territories to ensure the safety of aircraft and its efficient use (49 U.S.C. § 40103(b); FAA Job Order (JO) 7400.2J). The FAA has defined several airspace categories to accommodate varying types and intensities of flight activity. Certain volumes of airspace are designated as Special Use Airspace (SUA) in accordance with FAA Order JO 7400.8. Restricted Area airspace is a type of SUA in which flight of nonparticipating aircraft is subject to regulatory restrictions due to hazards such as ongoing aerial gunnery. Military Operations Areas are also used for military training, but fewer types of training are allowed and less restrictions are imposed on civilian operations in these areas. Military airspace is managed in accordance with AFI 13-212, *Range Planning and Operations*. Compliance with all applicable regulations ensures separation of aircraft while combat-realistic training maneuvers are conducted.

In 2003, the Georgia Legislature added Official Code of Georgia Annotated (O.C.G.A.) 36-66-6 to the state's Zoning Procedures Law. O.C.G.A. 36-66-6 spells out procedures that local governments must use for the review of development proposals that are within 3,000 feet of a military base or within 3,000 feet of a military base's clear zone or accident prevention zones. It requires local planning agencies to consult with the base on vertical structures such as cell towers. Towers that would extend into restricted area airspace are unlikely to be viewed favorably by the base. Land use controls to avoid construction of structures that would be obstructions as defined by FAA and DoD criteria may be implemented by the state and local government.

3.1.2 Existing Conditions

Currently, mature pine trees stand north and south of the Bemiss ULZ, intersecting the 35:1 approach/departure plane for both north and south approaches. As described in Section 1.3, the location and height of these trees is not in compliance with Air Force standards for landing zone safety as promulgated in ETL 09-6. Therefore, Bemiss ULZ is not approved for fixed-wing aircraft landings at this time.

Restricted Area airspace R-3008 is intensively managed to safely support a large number of flying operations and a wide variety of missions. Under current conditions, there are about 60,000 A-10, 32,000 A-29, 1,000 C-130, and 16,000 H-60 approaches made to Grand Bay Range targets and landing zones annually. Current conditions reflect an operations tempo that would occur if all Moody AFB based units were to not deploy for an entire year. Current conditions also reflect operations of A-29 aircraft recently bedded down at Moody AFB. C-130 aircraft assigned to the 347th RQG conduct about 400 airdrops per year at Bemiss Field as well as assorted other training on the range. Various transient aircraft also use the range, sometimes taking part in training exercises in conjunction with Moody AFB-based units.

R-3008 is broken into subunits A, B, C, and D, which can be scheduled independently. R-3008A extends to the surface, while R-3008B extends down to 100 feet AGL, and the R-3008C floor is 500 feet AGL. R-3008D overlies the other three subunits and extended from their ceiling altitude (10,000 feet MSL to 23,000 feet MSL) (Table 3-1). A map showing the layout of the R-3008 is shown in Figure 3-1. Certain areas within R-3008 have been designated as avoidance areas. An example is the Banks Lake NWR, which may not be overflown at altitudes less than 1,500 feet AGL. The Military Operations Areas that exist outside of R-3008 are shown in Figure 3-1 to provide a broader context in which training operations occur.

The airspace schedule is published for the hours of 7:00 AM to 10:00 PM on weekdays and activated by Notice to Airmen (NOTAM) at other times (typically until 1:30 AM on weeknights other than Friday). When R-3008 is not scheduled for use, control of the airspace may be turned over to Jacksonville Air Route Traffic Control Center so that it can be used by civilian aircraft.

Figure 3-1. Restricted Area Airspace R-3008

Table 3-1. Airspace Units in the Region of Influence

Airspace Unit	Floor	Ceiling	Time of Use
R-3008A	Surface	10,000 feet MSL	7:00 AM to 10:00 PM on weekdays or by NOTAM
R-3008B	100 feet AGL	10,000 feet MSL	
R-3008C	500 feet AGL, except 1,500 feet AGL surrounding Lakeland	10,000 feet MSL	
R-3008D	10,000 feet MSL	Up to but not including 23,000 feet MSL	

AGL = above ground level; MSL = mean sea level; NOTAM = Notice to Airmen

3.2 AIR QUALITY

3.2.1 Definition of the Resource

Air quality is determined by the type and amount of pollutants emitted into the atmosphere, the size and topography of the air basin, and the prevailing meteorological conditions. The levels of pollutants are generally expressed on a concentration basis in units of parts per million or micrograms per cubic meter.

The baseline standards for pollutant concentrations are the National Ambient Air Quality Standards (NAAQS) and state air quality standards established under the Clean Air Act (CAA) of 1990. These standards represent the maximum allowable atmospheric concentration that may occur and still protect public health and welfare. The NAAQS provide both short- and long-term standards for the following criteria pollutants: carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter equal to or less than 10 and 2.5 microns (PM_{10} and $PM_{2.5}$), ozone (O_3), and lead (Pb). Details of the NAAQS and Georgia Ambient Air Quality Standards are provided in Appendix B (*Air Quality*). Under the CAA, it is the responsibility of the individual states to achieve and maintain the NAAQS. To accomplish this, states use the USEPA-required State Implementation Plan (SIP). An SIP identifies goals, strategies, schedules, and enforcement actions designed to reduce the level of pollutants in the air and bring the state into compliance with the NAAQS.

All areas of the United States are designated as having air quality better than (attainment) or worse than (nonattainment) the NAAQS. Areas where there are insufficient air quality data for the USEPA to form a basis for attainment status are unclassifiable. Thus, such areas are treated as attainment areas until proven otherwise. "Maintenance areas" are those that were previously classified as nonattainment but where air pollution concentrations have been successfully reduced below the standard.

Maintenance areas are subject to special maintenance plans to ensure compliance with the NAAQS.

Hazardous air pollutants (HAPs) are chemical pollutants and toxic chemical air pollutants for which occupational exposure limits have been established. Volatile organic compounds, an ozone precursor, are included in this definition and include any organic compound involved in atmospheric photochemical reactions, except those designated by a USEPA administrator as having negligible photochemical reactivity. HAPs are not covered by the NAAQS but may present a threat of adverse human health or environmental effects under certain conditions.

3.2.2 Existing Conditions

Climate

Moody AFB is located within the interior climate region of Georgia, which is characterized as being humid subtropical. During the summer months, the area experiences long spells of warm and humid weather. Average high temperature ranges from the upper 80s degrees Fahrenheit (°F) to the low 90s °F. July is the warmest month of the year with an average maximum temperature of 90.4°F. Winters are cool with average temperatures in the high 40s to low 50s °F. January is the coldest month of the year (36.2°F monthly average). Temperature variations between night and day tend to be moderate during summer and winter; differences can reach 22°F and 26°F, respectively. Precipitation is fairly evenly distributed throughout the year with an average of 45 inches per year primarily in the form of rain (Idcide, 2014). Snowfall occurs a few days per year and is considered rare. Winds typically come from the north in the fall and winter and south in the summer averaging between 3 and 6 miles per hour (NCDC, 1998). Strong, gusty winds associated with thunderstorms and tropical systems and occasional hail and sleet affect the region (SCONC, 2014).

Air Quality

Moody AFB is located in Lowndes and Lanier Counties. According to USEPA, both counties are in attainment for all criteria pollutants (USEPA, 2014), and a conformity determination would not be required. The Bemiss Field project area is located in both Lowndes and Lanier Counties; therefore, this is the ROI used for the air quality analysis.

Emissions that would be generated under Alternative 1 and the No Action Alternative were compared with Lowndes and Lanier County emissions obtained from

USEPA's 2011 National Emissions Inventory (NEI). NEI data are the latest available; these are presented in Table 3-2. The county data include emissions amounts from point sources, area sources, and mobile sources. *Point sources* are stationary sources that can be identified by name and location. *Area sources* are point sources from which emissions are too low to track individually, such as a home or small office building or a diffuse stationary source, such as wildfires or agricultural tilling. *Mobile sources* are any kind of vehicle or equipment with gasoline or diesel engine, an airplane, or a ship. Two types of mobile sources are considered: on-road and nonroad. On-road sources consist of vehicles such as cars, light trucks, heavy trucks, buses, engines, and motorcycles. Nonroad sources are aircraft, locomotives, diesel and gasoline boats and ships, personal watercraft, lawn and garden equipment, agricultural and construction equipment, and recreational vehicles (USEPA, 2014a).

Table 3-2. Baseline Criteria Pollutant Emissions Inventory for Lowndes and Lanier County, Georgia

	Criteria Pollutant (tons/year)					
County	**CO**	**NO_X**	**PM_{10}**	**$PM_{2.5}$**	**SO_2**	**VOCs**
Lowndes	33,591	6,475	16,457	3,814	784	25,765
Lanier	5,931	482	4,271	1,068	22.46	13,558
Total	39,522	6,956	20,728	4,882	807	39,324

Source: USEPA, 2014a
CO = carbon monoxide; NO_x = nitrogen oxides; PM_{10} and $PM_{2.5}$ = particulate matter with a diameter of less than or equal to 10 microns and 2.5 microns, respectively; SO_2 = sulfur dioxide; VOC = volatile organic compound

GHG Emissions/Baseline

Greenhouse gases (GHGs) are gases that trap heat in the atmosphere; the accumulation of these gases in the atmosphere has been attributed to the regulation of Earth's temperature. Human activity in the past century is "very likely" (90 percent chance) the cause of the observed increase in GHG concentrations (Intergovernmental Panel on Climate Change, 2007). Thus, regulations have been promulgated to inventory and decrease emissions of GHGs. On October 30, 2009, the USEPA published a rule for the mandatory reporting of GHGs from sources that in general emit 25,000 metric tons or more of carbon dioxide equivalent per year in the United States. The USEPA also recently promulgated the Prevention of Significant Deterioration and Title V GHG Tailoring Rule, which will impose GHG permitting requirements on existing major sources with major modifications and certain new major sources. At this time, a threshold of significance has not been established for the emissions of GHGs.

The six primary GHGs, defined in Section 19(i) of Executive Order (EO) 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*, and internationally recognized and regulated under the Kyoto Protocol, are carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Each GHG has an estimated global warming potential (GWP), which is a function of its atmospheric lifetime and its ability to absorb and radiate infrared energy emitted from Earth's surface. The GWP allows GHGs to be compared with each other by converting the GHG quantity into the common unit "carbon dioxide equivalent." Baseline GHG emissions for Lowndes and Lanier Counties, obtained from USEPA's 2011 NEI, are summarized in Table 3-3.

Table 3-3. Baseline Greenhouse Gas Emissions Inventory for Lowndes and Lanier County, Georgia

Greenhouse Gases (tons/year)				
County	**CO_2**	**N_2O**	**CH_4**	**CO_2e**
Lowndes	967,520	34	97	980,077
Lanier	57,610	3	4	58,604
Total	**1,025,130**	**37**	**100**	**1,038,681**

Source: USEPA, 2014a
CH_4 = methane; CO_2 = carbon dioxide; CO_2e = carbon dioxide equivalent; N_2O = nitrous oxide

3.3 NOISE

3.3.1 Definition of the Resource

Noise is considered to be unwanted sound that interferes with normal activities or otherwise diminishes the quality of the environment. It may be intermittent or continuous, steady or impulsive. It may be stationary or transient. Responses to noise widely vary according to the type of noise and the characteristics of the sound source, as well as the sensitivity and expectations of the receptor, the time of day, and the distance between the noise source (e.g., an aircraft) and the receptor (e.g., a person or animal).

The physical characteristics of noise, or sound, include its intensity, frequency, and duration. Sound is created by acoustic energy, which produces minute pressure waves that travel through a medium, like air, and are sensed by the eardrum. This may be likened to the ripples in water that would be produced when a stone is dropped into it. As the acoustic energy increases, the intensity or amplitude of these pressure waves increase, and the ear senses louder noise. The unit used to measure the intensity of sound is the decibel (dB).

Sound intensity varies widely (from a soft whisper to a jet engine), and it is measured on a logarithmic scale to accommodate this wide range. The logarithm, and its use, is nothing more than a mathematical tool that simplifies dealing with very large and very small numbers. For example, the logarithm of the number 1,000,000 is 6, and the logarithm of the number 0.000001 is −6. As a basis for comparison, at distances of about 3 feet, normal human speech ranges from 63 to 65 dB, loud kitchen appliances (e.g., blender) range from about 83 to 88 dB, and rock concerts may approach 110 dB.

The frequency of sound is measured in cycles per second, or hertz (Hz). This measurement reflects the number of times per second the air vibrates from the acoustic energy. Low-frequency sounds are heard as rumbles or roars, and high-frequency sounds are heard as screeches.

Sound measurement is further refined through the use of "A-weighting." The normal human ear can detect sounds that range in frequency from about 20 to 15,000 Hz. However, not all sounds in this range are heard equally well. Therefore, through internal electronic circuitry, some sound meters are calibrated to emphasize frequencies in the 1,000- to 4,000-Hz range.

The human ear is most sensitive to frequencies in this range, and sounds measured with these instruments are termed "A-weighted." For purposes of this document, dB levels provided are A-weighted. The duration of a noise event and the number of times it occurs are also important considerations in assessing noise impacts. Examples of typical A-weighted sound levels of common sounds are shown in Figure 3-2. The word "metric" is used to describe a standard of measurement. As used in environmental noise analysis, there are many different types of noise metrics. Each metric has a different physical meaning, or interpretation, and each metric was developed by researchers attempting to represent the effects of environmental noise. The metrics supporting the assessment of noise from aircraft operations and other activities evaluated in this document are the maximum sound level (L_{max}) and the day-night average sound level (DNL).

Maximum Sound Level (L_{max}). The L_{max} is the highest sound level measured during a noise event. In many situations, noise levels vary over time for one reason or another. In the case of an aircraft overflight, the noise level varies as the aircraft moves closer to or farther away from the observer on the ground. L_{max} is a useful metric for judging a noise event's interference with conversation and other common activities.

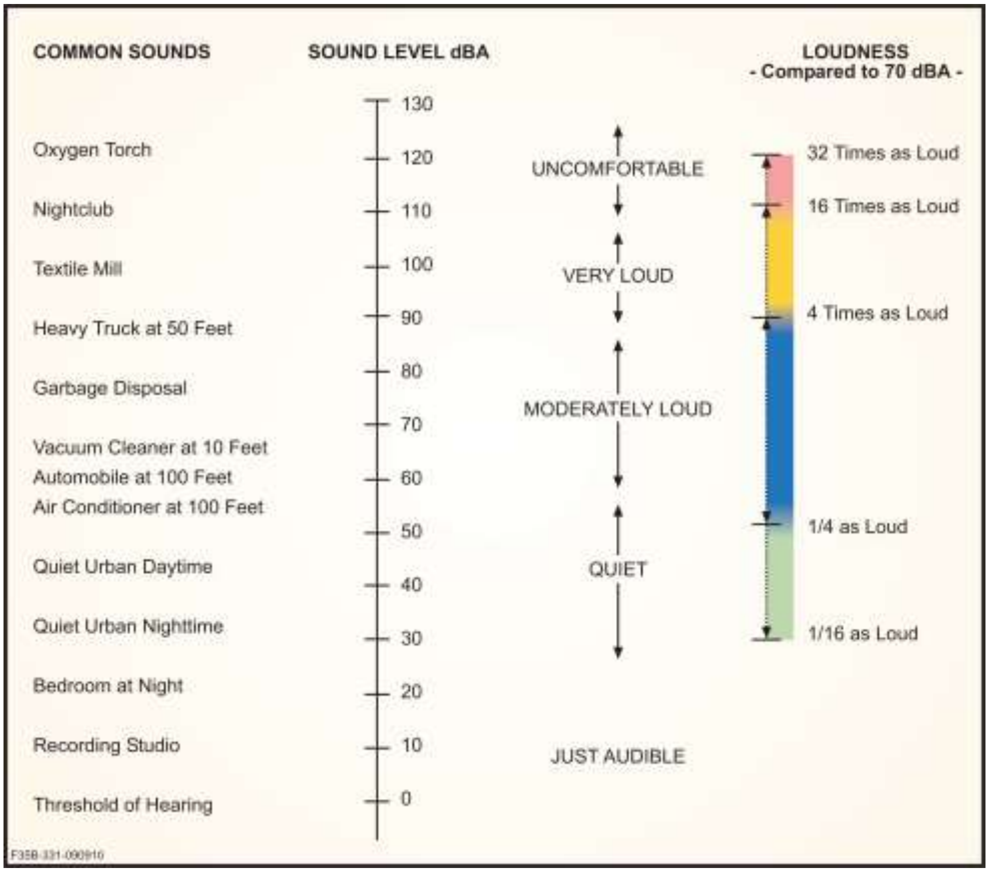

Figure 3-2. Typical A-Weighted Levels of Common Sounds

Day-Night Average Sound Level (DNL). The DNL metric sums the individual noise events and averages the resulting level over a 24-hour period. Thus, it is a composite metric that considers the maximum noise levels, the duration of the events, the number of events that occur, and the time of day during which they occur. This metric adds 10 dB to those events that occur between 10:00 PM and 7:00 AM to account for the increased intrusiveness of noise events that occur at night when ambient noise levels are normally lower than during the day time.

Ignoring the night-time penalty, DNL may be thought of as the continuous or cumulative A-weighted sound level that would be present if all of the variations in sound level which occur over the given time period were smoothed out so as to contain the same total sound energy. It is fully recognized that the DNL metric does not provide specific information on the number of noise events or the specific individual sound levels that occur. For example, a DNL of 65 dB could result from a very few noisy events or a large number of quieter events.

Although it does not represent the sound level heard at any one particular time, DNL does accurately represent the total sound exposure at a location. Social surveys have found the DNL metric to be the best predictor of community annoyance resulting from transportation noise. Its use is endorsed by the scientific community and several governmental agencies (USEPA, 1974; Federal Interagency Commission on Urban Noise, 1980; Federal Interagency Commission on Noise, 1992).

3.3.2 Existing Conditions

Grand Bay Range is an extremely busy military training facility. Under current conditions, there are about 60,000 A-10, 32,000 A-29, 1,000 C-130, and 16,000 H-60 approaches made to Grand Bay Range targets and landing zones annually. Current conditions reflect all Moody AFB-based flying units operating without deployment for an entire year and also reflect the operations of A-29 aircraft that are in the process of bedding down at Moody AFB. The most common users of the range are Moody AFB-based A-10, C-130, and HH-60 aircraft, but transient aircraft including AH-1, C-12, C-130, F-18, V-22, and single-engine, propeller-driven aircraft also use the range.

Aircraft flight tracks at Grand Bay Range vary widely from one mission to the next, such that the noise levels of aircraft operations at a specific location on the ground varies as well. The operations of fighter and attack aircraft (e.g., A-10, F-18, and AH-1) are typically concentrated near the Grand Bay Range ground targets, which are located about 1 nautical mile north of Bemiss ULZ. Typical attack aircraft training events include aircraft approaching the targets, delivering training munitions, and then departing (often to line up for another attack run-in). Aircraft often operate at altitudes as low as 500 feet AGL, simulating combat tactics that avoid enemy radar. Munitions employed include aerial gunnery and inert bombs. HH-60 and C-130 aircraft operate at various locations on the range as required to support the combat rescue mission. C-130 training includes airdrops to designated drop zones, while HH-60s frequently practice operations, which require low approaches and/or landings at helicopter landing zones (HLZs) in addition to aerial gunnery. Transient aircraft that are not fighter-attack aircraft conduct training throughout the range as dictated by their specific missions. At this time, fixed-wing aircraft landings are not permitted at the Bemiss Field ULZ. However, the ULZ is used for airdrop training by C-130 aircraft and for landings by HH-60 aircraft.

Operational data have been entered to the computer noise model NOISEMAP to generate overall time-averaged noise levels using the DNL metric. In compliance with current Air Force policy, noise levels are calculated for an average annual day (i.e., a day with 1/365th of total annual operations). A map of current noise levels in 5 dB increments starting at 60 dB DNL is shown in Figure 3-3.

Figure 3-3. Current Day-Night Average Sound Level

The area surrounding Bemiss Field is rural and generally quiet while military training operations are not under way. Gunfire during and leading up to hunting season is occasionally a part of the noise environment while farm equipment and vehicle noise are heard intermittently throughout the year. Under normal circumstances while military training is not under way, noise levels in a rural setting typically range between 35 and 44 dB (USEPA, 1974).

3.4 SAFETY

3.4.1 Definition of the Resource

This section addresses flight safety associated with activities conducted by Moody AFB as they relate to the Proposed Action. Flight safety primarily examines potential aircraft accidents that may occur as a result of aircraft mishaps, including mid-air collisions with other aircraft. Flight safety also includes the potential for collisions between wildlife and aircraft, known as Bird/Wildlife Aircraft Strike Hazards (BASH).

The ROI for safety are local areas within the flight pattern of installation aircraft as these relate to proposed activities, as well as HLZs and immediately surrounding areas.

3.4.2 Existing Conditions

Aircraft Safety

It is impossible to predict when and if an aircraft accident may occur. Major considerations in any accident are loss of life and damage to property. The probability of an aircraft crashing into a populated area is extremely low, but it cannot be totally discounted. Several factors are relevant in the case of Moody AFB. The region around the base is made up for the most part of rural or natural areas; military pilots are instructed to avoid direct overflight of population centers at very low altitudes; and, finally, the limited amount of time the aircraft is over any specific geographic area limits the probability that a disabled aircraft would crash into a populated area.

Over the last 10 years, there have been four Class A mishaps associated with Moody AFB aircraft. Class A mishaps are the most serious and result in the direct mishap cost totaling $2 million or more, a fatality or permanent total disability, destruction of a DoD aircraft (excluding remotely piloted aircraft/unmanned aircraft system Groups 1, 2, or 3), or permanent loss of primary mission capability of a space vehicle. Three of these mishaps were associated with the A-10 aircraft. The fourth mishap was associated with an HH-60 helicopter while the helicopter was remotely deployed (Goldsworthy, 2013).

Over that same 10-year time span, four near-miss Hazardous Air Traffic Reports (HATRs) were recorded at the installation. A near miss is generally considered to be any circumstance in flight where the distance separating two aircraft is considered by either pilot to have constituted a hazardous situation involving a risk of collision. In the case of this EA, the primary concern for mid-air collisions or near misses is associated with low-flying military aircraft and privately owned aircraft (primarily crop dusters) operating around proposed HLZs.

In case an aircraft mishap does occur from a mid-air collision or because of other factors, there are well-established emergency response procedures currently in place. When normal, scheduled flying is in progress, Moody AFB maintains highly trained emergency response teams. If an aircraft accident occurs on non-Federal property, the agency initially responding would likely be the local fire department. Moody AFB emergency response teams are also available to respond to aircraft crashes off-base. Once the situation is stabilized, an investigation area would normally be established around the accident scene. The site would be secured by Air Force personnel and the investigation phase would ensue. After all required investigations and related actions on the site are complete, the aircraft would be removed by Air Force personnel.

Overall, the purpose of these response procedures is to: (1) save lives, property, and material by timely and correct response to mishaps; (2) quickly and accurately report mishaps to higher headquarters; and (3) investigate the mishap to preclude the reoccurrence of the same or similar mishap.

Bird/Wildlife Aircraft Strike Hazard (BASH)

Bird/wildlife-aircraft strikes constitute a safety concern because of the potential for damage to aircraft or injury to aircrews or local populations if an aircraft crash should occur. Over the last 25 years (1988 to 2013), the Air Force BASH Team documented 96,812 bird strikes nationally. Of these, 37 resulted in Class A mishaps where the aircraft was destroyed. These occurrences constituted approximately 0.04 percent of all reported bird-aircraft strikes (U.S. Air Force, 2014).

The primary danger to aircraft is posed by birds; terrestrial species (primarily deer, coyotes, skunks, and foxes) constitute only about 3 percent of total collisions (FAA et al., 2014). By count, the top 50 wildlife strikes involving Air Force aircraft from 1995 to 2014 were (1) various bird species (28, 814 strikes/$182 million in damages);

(2) various bat species (1,678 strikes/$1.7 million in damages); and (3) "other," which may include terrestrial species (254 strikes/$ 0.7 million in damages) (U.S. Air Force, 2015).

Although aircraft may encounter birds at altitudes of 30,000 feet MSL or higher, most birds fly close to the ground. Over 97 percent of reported bird strikes occur below 3,000 feet AGL. Approximately 30 percent of bird strikes happen in the airport environment, and almost 55 percent occur during low-altitude flight training (Air Force Safety Center, 2012). In addition, aircraft face collision dangers from other wildlife, such as deer, during takeoff or landing.

Over the last 10 years, there have been a total of 194 reported incidents of bird-aircraft strikes around Moody AFB, or an average of approximately 20 bird strikes per year. Of these, 36 resulted in some level of damage to the aircraft; however, no Class A mishaps or human fatalities have occurred. Table 3-4 summarizes bird strikes at the installation according to aircraft and lists the total damage incurred as a result of these strikes.

Table 3-4. Bird Strikes History for Aircraft at Moody AFB[1] (2004 to 2013)

Aircraft	Number of Bird Strikes	Damaging Bird Strikes	Total Cost of Damage ($)
T-6[2]	70	1	$100,000
T-38[2]	39	9	$885,000
A-10[3]	85	26	$1,008,000
HH-60G[4]	127	2	$705
HC-130[4]	360	13	$175,957
Total	**681**	**51**	**$2,169,662**

1. These strikes include known local area strikes around Moody AFB, as well as strikes from unknown locations. The strikes in unknown locations may have occurred well away from Moody AFB; however, information is unavailable to determine the actual location.
2. Source: Griffin, 2014
3. A-10 data is from 2007 to 2014.
4. Source: Lee, 2015

To minimize the potential for bird/wildlife-aircraft strikes, Moody AFB has implemented an aggressive BASH program, including development of a BASH Plan (Moody AFB, 2014). As part of this program, Moody AFB has established a Wildlife Hazard Warning System to be used for the immediate exchange of information between ground agencies and aircrews concerning the existence and location of birds posing a hazard to safe flying operations. Based on the potential for bird hazards, the following Bird Watch Conditions have been established:

- **LOW**: Wildlife activity on or around the airfield representing low potential.

- **MODERATE**: Wildlife activity near the active runway or other specific location representing increased potential for strikes. MODERATE requires increased vigilance by all agencies and supervisors and caution by aircrews.
- **SEVERE**: Wildlife activity on or immediately above the active runway or other specific location representing high potential for strikes. Supervision and aircrews must thoroughly evaluate mission need before conducting operations in areas under SEVERE conditions.

Each flying unit must verify the Bird Watch Condition prior to commencing flying operations. Additionally, the Bird Watch Condition is included in the hourly Automated Terminal Information Service (ATIS) information if the condition is either MODERATE or SEVERE. The absence of an advisory on the ATIS means the Bird Watch Condition is LOW. Any change in Bird Watch Condition is transmitted on the Control Tower Frequency by Moody AFB. Finally, all personnel working on or near the airfields must be perceptive to potentially hazardous bird activity and must immediately notify the Moody AFB Operations Office of any such activity (Moody AFB, 2014).

At training areas outside the airfield, the designated range/zone controlling officer may upgrade the Bird Watch Condition as necessary for a specific local hazard. If the condition is upgraded, Range Control personnel must notify inbound aircrews Moody AFB, 2014).

At Moody AFB, increased migratory bird activity typically occurs in September through October and April through May. Species of blackbirds and songbirds are birds of particular concern due to the intensity of activity around sunrise and sunset during winter. During this timeframe, the following guidelines are adhered to, to the maximum extent possible:

- Make every effort to not schedule takeoffs, landings, and low-level flights from one hour before to one hour after sunrise and sunset.
- Alter en route altitudes during low-level training, when necessary.
- Alter altitudes in military operating/training areas or ranges, when necessary.
- Minimize transition training in the local pattern and conduct this type of training only during Bird Watch Condition LOW or MODERATE.

According to historical bird-strike data, during March to May and September to November, night migrations of neotropical migrants are significant. Neotropical migrants are a classification of songbirds that primarily migrate at night to and from the tropics of South America and North America every spring and fall. Roughly 75 percent of the songbirds migrate at levels between 500 and 2,000 feet AGL from dusk till dawn and peak bird migration occurs during a half to full moon phase with thin to no cloud coverage. During this timeframe, the following recommendations are implemented when possible:

- Limit flying at night unless mission critical.
- Increase altitudes (greater than 2,000 feet) during periods of the flight that do not require low-level flying.

Moody AFB has a U.S. Department of Agriculture (USDA) Wildlife Biologist on staff to further assist with BASH-related issues, including removal of wildlife. For example, when birds congregate, various bio-acoustic and pyrotechnic dispersal techniques are employed to reduce the bird density, with physical means employed to remove any deer, coyote, and red fox from the airfield. If required, other control measures that could be used are detailed in the BASH plan (Moody AFB, 2014).

3.5 LAND USE

3.5.1 Definition of the Resource

Land use generally refers to the management and use of land by people. The attributes of land use include general land use patterns, land ownership, land management plans, and special use areas. General land use patterns characterize the types of uses within a particular area. Specific uses of land typically include residential, commercial, industrial, agricultural, military, and recreational. Land use also includes areas set aside for preservation or protection of natural resources, wildlife habitat, vegetation, or unique features. Management plans, policies, ordinances, and regulations determine the types of uses that protect specially designated or environmentally sensitive uses.

Noise from aircraft operations is one of the major factors in determining appropriate land uses, since elevated noise levels are especially incompatible with sensitive noise receptors (e.g., residences, public buildings, schools, churches, hospitals, and certain recreational uses).

3.5.2 Existing Conditions

Land use at Moody AFB is divided into 12 existing categories (Moody AFB, 2008a). Three of the 12 categories (airfield, aircraft operations and maintenance, and open space) are associated with the Bemiss Field area (Figure 3-4).

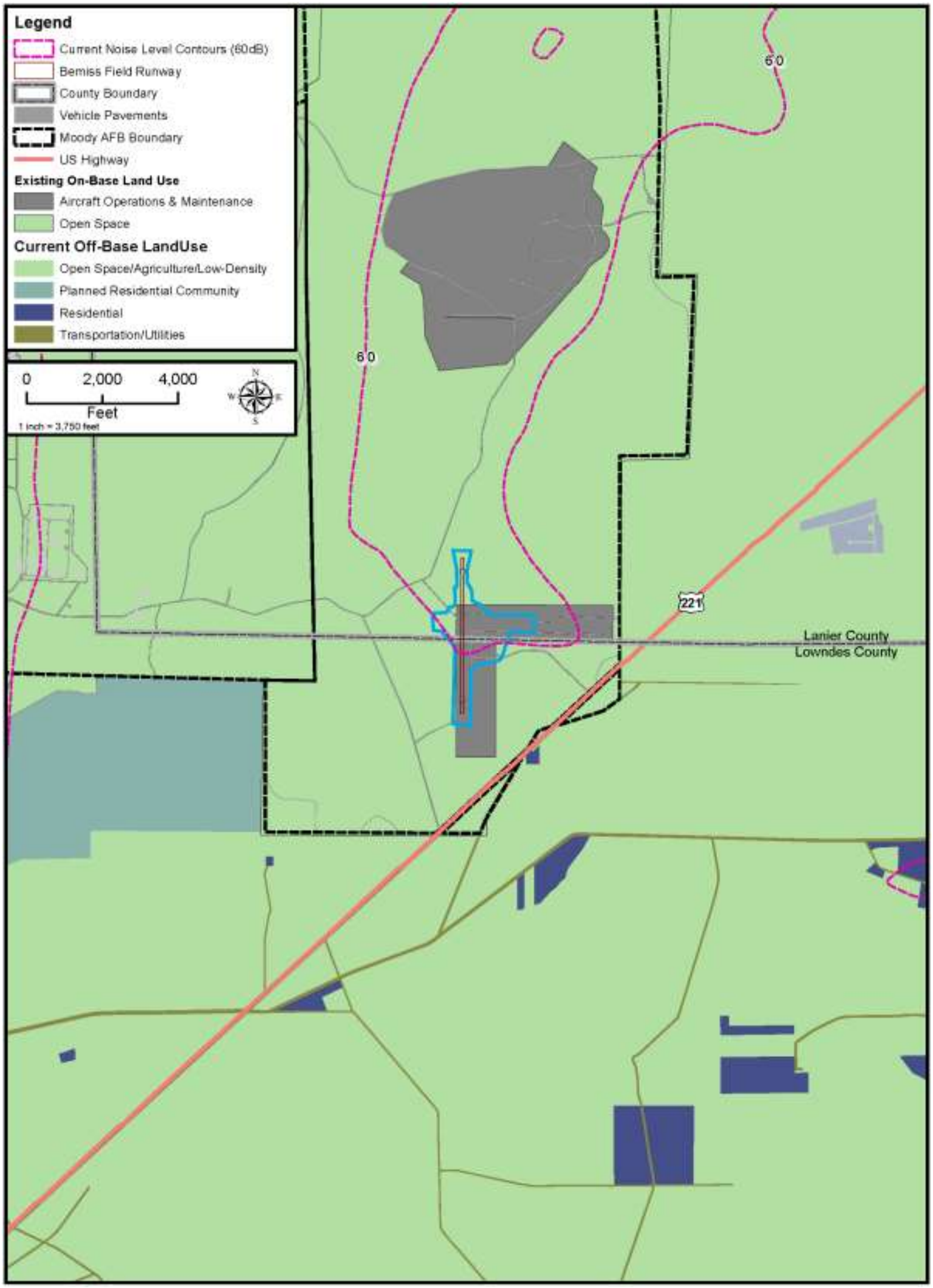

Figure 3-4. Existing Land Use in the Vicinity of Bemiss Field

Bemiss Field is also located within the Grand Bay Wildlife Management Area (WMA) managed by the Georgia DNR under a license agreement with the Air Force. The DNR allows hunting (deer, turkey, small game, waterfowl, and alligator) within the Grand Bay WMA on scheduled weekends when Grand Bay Range is not being used for military training. Scheduled dates are listed in the Georgia Hunting Regulations Guide (https://www.eregulations.com/georgia/hunting/region-6). A primitive campground, comfort station, and DNR maintenance facility is also located along one of the Bemiss Field access roads off of Lakeland Highway. Based on Lanier and Lowndes County geographic information system (GIS) data, off-base land use south of Bemiss Field and Lakeland Highway is predominantly open space/agricultural/low-density and residential.

3.6 SOCIOECONOMICS/ENVIRONMENTAL JUSTICE

3.6.1 Definition of the Resource

Socioeconomics

Socioeconomics refers to features or characteristics of the social and economic environment. The main concerns for socioeconomic resources include possible changes in noise or restricted access associated with the Proposed Action that could potentially impact the local population, economic activities, property values, and recreation. Additionally, concerns raised by a local citizen (Appendix A) regarding potential impacts to property values necessitate analyses of potential property value impacts. Bemiss Field is located on Grand Bay Range at Moody AFB within Lowndes County and Lanier County in Georgia. These two counties, therefore, compose the ROI for the analysis. Potential impacts would be concentrated in the immediate vicinity of Bemiss Field.

As discussed in Section 2.9.1, environmental justice/protection of children is an issue that was not carried forward for detailed analyses.

3.6.2 Existing Conditions

Population

The population of Lowndes County and Lanier County as of the 2010 Census totaled 109,233 and 10,078, respectively, for a total ROI population of 119,311 (U.S. Census Bureau, 2010). Population estimates from 2013 suggest that each county has experienced a population increase of over 3 percent since the 2010 census (U.S. Census Bureau, 2014).

The largest city in Lowndes County is Valdosta, located about 10 miles southwest of Moody AFB. Approximately 50 percent of the total population of Lowndes County resides in Valdosta (U.S. Census Bureau, 2010; U.S. Census Bureau, 2014). The county seat and only incorporated municipality in Lanier County is Lakeland. Lakeland is located approximately 6 miles northeast of Moody AFB and has a population of approximately 3,366 (Georgia.gov, 2014).

Economic Activity

As of 2012, total employment in Lowndes County and Lanier County was 64,604 and 2,807, respectively (BEA, 2014). The major industries in the ROI include government and government enterprises and retail trade (BEA, 2014). Other important industries in the counties include agriculture, agribusiness, and forestry operations. In recent years, these industries have been declining in Lowndes County as urbanization has increased (Moody AFB, 2013a). The majority of economic development in Lowndes County has occurred along the I-75 west of Valdosta and along the Bemiss Road corridor toward the base (Moody AFB, 2013a).

As one of the top 10 employers in both counties, Moody AFB is a significant economic generator and has an estimated economic impact of $461 million to the local area. In fiscal year (FY) 2013, local contract expenditures totaled over $77.3 million, which included approximately $13 million in operation and maintenance (O&M) construction and $1.039 million in temporary duty (TDY) expenses (Moody AFB, 2013b).

Property Values

Table 3-5 provides a sample of the types of parcels and their associated land values that are located within a mile of Bemiss Field. As indicated in the table, the land value varies along with the location, type of use, and size of the parcel. The closest residential parcels to Bemiss Field in Lowndes County and Lanier County are located at distances of approximately 0.36 mile and 0.7 mile, respectively.

Table 3-5. Description of Sample Parcels in Vicinity of Bemiss Field

Parcel Number	Tax District (County)	Code*	Acres	Land Value ($)	Accessory Value ($)	Improvement Value ($)	Total Value ($)
0210 008	Lowndes	A5	79.99	127,421	0	0	127,421
0210 009	Lowndes	A5	63	104,368	6,124	0	110,492
0210 010	Lowndes	V4	17	58,000	6,008	17,640	81,648
0211 025	Lowndes	A5	2,053.33	1,524,941	22,756	0	1,547,697
0231 004	Lowndes	R4	1.5	11,250	15,553	75,582	102,385
0231 005	Lowndes	V5	106.25	116,171	0	0	116,171
0232 001	Lowndes	V5	152.35	211,928	9,181	15,000	236,109
0232 003	Lowndes	A4	5.95	39,475	6,412	81,972	127,859
0232 003A	Lowndes	A4	14.99	46,990	0	0	46,990
0232 003B	Lowndes	A4	24.95	55,960	19,376	19,376	94,712
0232 004	Lowndes	R4	6.78	35,120	22,761	138,170	196,051
0232 005	Lowndes	R4	4.71	24,840	5,000	336,700	366,540
0232 006	Lowndes	R4	16.09	24,045	0	0	24,045
0232 020	Lowndes	A5	516.32	322,033	6,129	133,380	461,542
0232 021	Lowndes	A5	115.72	148,089	5,000	84,318	237,407
0233 009	Lowndes	A5	1,015.51	824,091	0	0	824,091
017 0046	UNIN-Lanier	V5	48.92	77,500	6,000	53,100	136,600
017 0054	UNIN-Lanier	A5	32.94	48,300	1,500	2,300	52,100
017 0055	UNIN-Lanier	R4	3.00	15,000	7,900	52,400	75,300
017 0057	UNIN-Lanier	R4	17	51,200	0	0	51,200
017 0058	UNIN-Lanier	V5	148.25	223,400	7,000	22,645	253,045
017 0059	UNIN-Lanier	R4	1	7,500	0	0	7,500
017 0060	UNIN-Lanier	R4	1	10,000	2,800	34,600	47,400
017 0061	UNIN-Lanier	R4	3	15,000	2,500	16,700	34,200

Sources: Lowndes County, 2014 and Lanier County, 2014
*Code reference land use type: A = agricultural, R = residential, UNIN = unincorporated, V = conservation use

Recreation

In Lowndes and Lanier Counties, the Grand Bay WMA offers recreational activities such as hunting, fishing, and camping. The state-owned portion of Grand Bay WMA borders the southern boundary of Moody AFB. The remainder of the WMA occurs on a portion of the Moody AFB-owned Grand Bay Range. Hunting on the Grand Bay WMA is limited to weekends when Grand Bay Range is not being used for military training (Moody AFB, 2013a). Banks Lake NWR and other privately owned parcels surrounding the base, including those currently used for agriculture, also offer owners an area for recreational use.

3.7 CULTURAL RESOURCES

3.7.1 Definition of the Resource

Cultural resources consist of prehistoric and historic districts, sites, structures, artifacts, and any other physical evidence of human activity considered important to a culture or community for scientific, traditional, religious, or other reasons. They include archaeological resources (both prehistoric and historic), historic architectural resources, and American Indian sacred sites and TCPs (traditional cultural properties). Historic properties (as defined in 36 C.F.R. § 60.4) are considered for potential adverse impacts from an action. Historic properties are significant archaeological, architectural, or traditional resources that are either eligible for listing, or listed in, the NHPA of 1966, as amended. Moody AFB is required to consider the effects of its undertakings on historic properties listed, or eligible for listing, in the National Register of Historic Places (NRHP).

Moody AFB coordinates NEPA compliance with their NHPA responsibilities to ensure that historic properties are given adequate consideration in the preparation of environmental documents such as this EA. As per AFI 32-7065 Sections 3.3.1 and 3.3.2, and 36 C.F.R. § 800.8, Moody AFB incorporates NHPA Section 106 review into the NEPA process or substitutes the NEPA process for a separate NHPA Section 106 review of alternatives. Moody AFB initiated the Section 106 process in November 2013, providing Georgia DNR's Historic Preservation Division with initial project information.

3.7.2 Existing Conditions

Potentially impacted areas at Bemiss Field contain no NRHP-eligible archaeological sites, historic structures, historic districts, cemeteries, or TCPs (U.S. Air Force, 2012b). Panamerican Consultants, Inc. conducted a cultural resources survey of Grand Bay Range from 1994 to 1995. The survey covered 5,981 acres, resulting in the identification of 21 sites and 39 isolated finds. There are no sites in the proposed tree clearing area at Bemiss Field. There are eight prehistoric isolated finds and two historic sites (9LW51 and 9LW64) in the vicinity both determined to be not eligible for NRHP listing. The Georgia SHPO concurred with the findings of the report (Santicola, 2014; U.S. Air Force, 2012b).

Bemiss Field itself (Resource 101; U.S. Air Force, 2012b) is associated with the World War II era at the installation. A previous study in 2011 examined the elements of Bemiss Field and determined that none of the evaluated structures and buildings were eligible for the NRHP; currently there are no structures 50 years or older present in the project area. The Georgia SHPO concurred with the findings of the report (U.S. Air Force, 2012b). A more comprehensive review of structures within the surrounding area revealed that 6 buildings, now 50 years or older, are located within a 2- mile radius of Bemiss Field (Figure 3-5). None of these structures are listed on or shown as eligible to the NRHP (GNAHRGIS, 2015).

The closest identified cultural resources are archaeological sites 9LW52 and 9LW67, located more than 2,000 feet to the west of any proposed activity area and sites 9WL51, to the south and 9LW64 to the east. The first site, 9LW52, is a historic artifact scatter that is recommended as ineligible for listing on the NRHP. The second site, 9LW67, is a multicomponent artifact scatter that is considered ineligible for listing on the NRHP (GDNR, 2013; Geo-Marine, 2013). The remaining two sites are historic artifact scatters considered ineligible for listing on the NRHP (U.S. Air Force, 2012b).

Moody AFB completed consultation with the Georgia SHPO (June 11, 2015) and 12 Federally recognized Native American tribes for concurrence on a finding of no effect to cultural resources, including TCPs (a list of these tribes is provided in Chapter 7). All formal correspondence with SHPO and the tribes are included in Appendix A and a synopsis of government-to-government consultations is presented in Section 1.5 of this document.

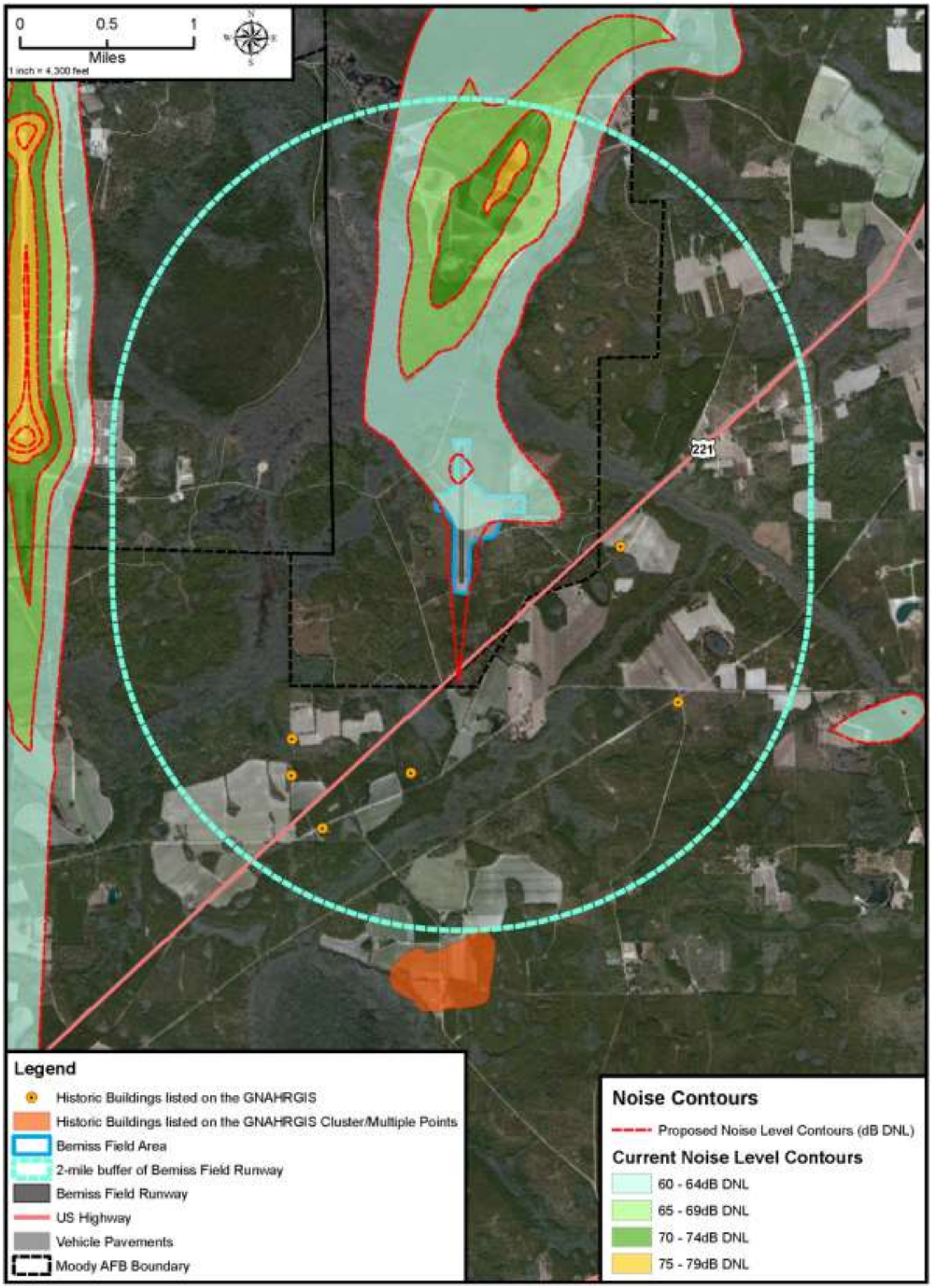

Figure 3-5. Historic Structures within a 2 Mile Radius of Bemiss Field
(Data from GNAHRGIS, 2015)

3.8 BIOLOGICAL RESOURCES

3.8.1 Definition of the Resource

Biological resources in this document include plant and animal species, and the habitats in which they occur. The region of influence for biological resources consists of the specific project sites at Moody AFB, as well as on- and off-base lands in the vicinity that could potentially be affected by the proposed activities. The focus is on plant and animal species and natural community types that typify or are important to the function of ecosystems in the region, are of special societal importance, or are protected by Federal or state law or statute. Species with regulatory protection, or which are otherwise considered rare or vulnerable to human disturbance, are defined as sensitive species in this document. Sensitive species are protected by and/or listed under the Endangered Species Act of 1973 (ESA), Migratory Bird Treaty Act (MBTA), EO 13186 (*Responsibilities of Federal Agencies to Protect Migratory Birds*), Georgia DNR, and the Georgia Natural Heritage Program (NHP).

The ESA prohibits the unauthorized take of threatened or endangered species, where "take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct. An endangered species is defined as any species in danger of extinction throughout all or a significant portion of its range, while a threatened species is defined as any species likely to become an endangered species in the foreseeable future. The ESA also requires critical habitat to be identified for listed species. Critical habitat is defined as the physical and biological features essential for a species' conservation, including food, water, and shelter, among many others. In addition to endangered and threatened designations, the USFWS has identified an additional status category of "candidate species." Candidate species are those species for which sufficient information is available to propose them as endangered or threatened under the ESA, but for which development of a proposed regulation is precluded by other, higher priority listing activities.

The Georgia DNR provides lists of protected plants and animals, which may be designated as endangered, threatened, rare, or unusual. The definitions of endangered and threatened are the same as those provided under the Federal ESA. Rare species are considered to be those species that are not listed as endangered or threatened, but that should be protected because of their scarcity. Unusual species are defined as those species deserving of special consideration, and as plants subject to commercial exploitation.

Georgia's NHP also lists species for which conservation is considered desirable based on their association with relatively undisturbed habitats, as well as their recreational, aesthetic, or cultural value. A number of global and state NHP designations are available, including:

- G1: critically imperiled globally
- G2: imperiled globally
- G3: rare and local throughout range or in a special habitat, or narrowly endemic
- G4: apparently secure
- G5: demonstrably secure globally
- S1: critically imperiled in Georgia
- S2: imperiled in Georgia
- S3: rare and uncommon throughout the state or in a special habitat, or narrowly endemic
- S4: apparently secure
- S5: demonstrably secure in state

The MBTA provides for the conservation of migratory birds, which are defined as any species or family of birds that live, reproduce, or migrate within or across international borders at some point during their annual life cycle. Unless permitted, the MBTA prohibits the taking of migratory birds. The USFWS published a rule authorizing incidental take of migratory birds during military readiness activities in 2007. If such activities may result in a significant adverse effect on a population of a migratory bird species, the action proponent must confer with the USFWS to develop mitigation measures. A "significant adverse effect" is defined as an effect that could, within a reasonable period of time, diminish the capacity of a population of migratory bird species to sustain itself at a biologically viable level. A population is "biologically viable" when its ability to maintain its genetic diversity, to reproduce, and to function effectively in its native ecosystem is not significantly harmed. Military readiness activities include training and testing actions related to combat, but do not include activities such as construction projects, even if the construction is in support of combat training.

Migratory birds are further addressed in EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, which requires Federal agencies to evaluate the effects of their actions on migratory birds (with an emphasis on species of concern). Species of concern are those identified in (1) the USFWS report *Migratory Nongame Birds of Management Concern in the United States* (USFWS, 2011), (2) priority species identified by established plans such as those prepared by Partners In Flight (e.g., Rich et al., 2004), or (3) listed species in 50 C.F.R. § 17.11, *Endangered and Threatened Wildlife*.

The Bald and Golden Eagle Protection Act prohibits, without a permit issued by the USFWS, the taking of bald (*Haliaeetus leucocephalus*) or golden (*Aquila chrysaetos*) eagles. "Take" is defined as to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb. "Disturb" is defined as actions that result in or are likely to result in injury, decreased productivity, or nest abandonment.

3.8.2 Existing Conditions

Vegetation and Habitats

Descriptions of vegetation and community associations of Moody AFB and the surrounding region are provided in the base's INRMP (Moody AFB, 2013a).

Vegetation communities in the vicinity of the project area consist of wetland habitat, longleaf (*Pinus palustris*)/slash pine (*P. elliottii*) forest, pine plantation, and improved/maintained areas (Figure 3-6). Wetland types in and near the project footprint include bay swamp, cypress dome, and possibly wetland depressions within pine flatwoods.

Bay swamp habitat is typically dominated by black gum (*Nyssa sylvatica*) and cypress, with significant amounts of red maple (*Acer rubrum*), tupelos, gums, sweetbay (*Magnolia virginiana*), and other trees. The understory is moderate to dense and composed of species such as redbay (*Persea borbonia*), wax myrtle (*Myrica cerifera*), cinnamon fern (*Osmunda cinnamomea*), and greenbrier (*Smilax* spp.). Cypress domes are characterized as shallow, forested depressions that present a domed profile. Cypress, swamp tupelo (*Nissa biflora*), and slash pine are representative of these areas. Ponds and wetland depressions occurring in pine flatwoods may contain a mixture of wetland and upland species, with characteristic overstory species including black gum, red maple, pond pine, and cypress. These areas may have a well-developed shrub layer consisting of species such as fetterbush (*Lyonia lucida*) and titi, or may contain grassy vegetation.

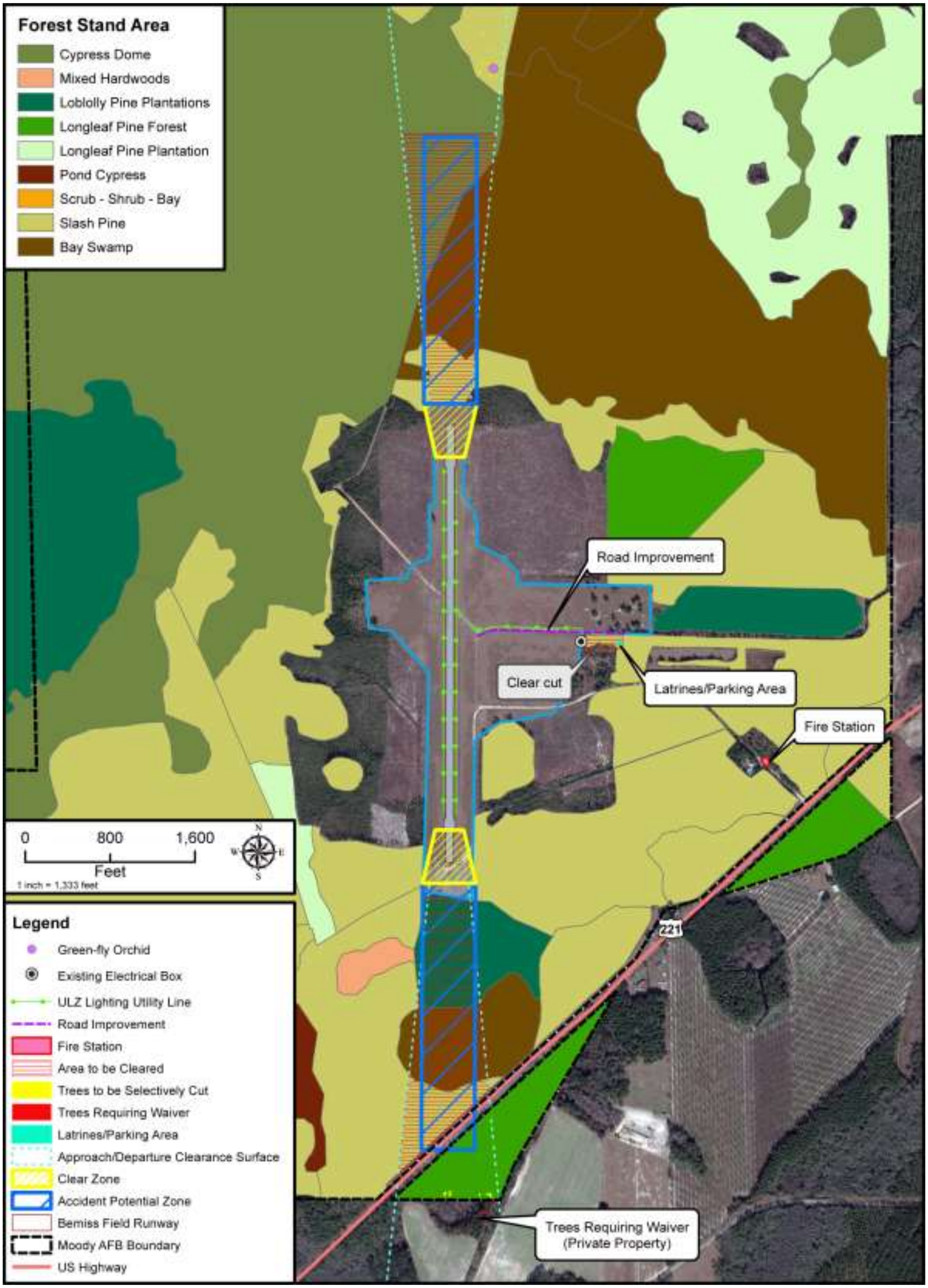

Figure 3-6. Vegetation Communities Near Bemiss Field

Longleaf pine forest is typically characterized by the presence of live oak species such as turkey (*Quercus laevis*) and post (*Q. stellata*) oak, in addition to longleaf pines. Midstory species include sparkleberry (*Vaccinium arboreum*), gallberry (*Ilex glabra*), and beautyberry (*Callicarpa americana*), among others. The understory usually consists of wiregrass and saw palmetto (*Serenoa repens*).

Pine flatwoods are typically flat, low-lying, open woodlands located between upland and wetland habitats. These areas are characterized by moist soil with water located at or near the surface. Pine species may include slash, longleaf, and pond. Characteristic understory species include saw palmetto, gallberry, wiregrasses, and blueberries (*Vaccinium* spp.). Hooded pitcher plant (*Sarracenia leucophylla*) may also occur. Pine plantation consists of areas that have been artificially planted with loblolly or slash pine, usually for the purpose of timber sales. In the absence of fire or intentional thinning, plantations may develop a very dense canopy and understory. Areas immediately adjacent to the existing airstrip are currently maintained and appear to consist mostly of turf grass.

Wildlife

The habitats on Moody AFB support a large number of wildlife species, with 24 amphibian, 38 reptile, 34 mammal, 169 bird, and 23 fish species documented on the base (Moody AFB, 2008b). Species considered representative of the wetland habitat types near Bemiss Field are listed in Table 3-6. Persistent open water habitat is not included on base property near the project area in spatial data provided by the base.

Table 3-6. Representative Wildlife Species of Wetland Habitats

Common Name	Scientific Name	Common Name	Scientific Name
Mammals		Birds	
Opossum	*Didelphis virginiana*	Red-shouldered hawk	*Buteo lineatus*
Raccoon	*Procyon lotor*	Pileated woodpecker	*Dryocopus pileatus*
Gray fox	*Urocyon cinereoargenteus*	Downy woodpecker	*Picoides pubescens*
Gray squirrel	*Sciurus carolinensis*	Red-bellied woodpecker	*Melanerpes carolinus*
Eastern cottontail rabbit	*Sylvilagus floridanus*	Northern flicker	*Colaptes auratus*
White-tailed deer	*Odocoileus virginianus*	Yellow-bellied sapsucker	*Sphyrapicus varius*
North American beaver	*Castor canadensis*	Carolina chickadee	*Poecile carolinensis*

Table 3-6. Representative Wildlife Species of Wetland Habitats, Cont'd

Common Name	Scientific Name	Common Name	Scientific Name
Reptiles		Tufted titmouse	*Baeolophus bicolor*
Eastern box turtle	*Terrapene carolina carolina*	Carolina wren	*Thryothorus ludovicianus*
Common snapping turtle	*Chelydra serpentina*	Blue-gray gnatcatcher	*Polioptila caerulea*
Eastern cottonmouth	*Agkistrodon piscivorus*	Great Crested flycatcher	*Myiarchus crinitus*
Southern water snake	*Nerodia fasciata*	Ruby-crowned kinglet	*Regulus calendula*
Eastern mud snake	*Farancia abacura abacura*	Eastern kingbird	*Tyrannus tyrannus*
Amphibians		White-eyed vireo	*Vireo griseus*
Spotted salamander	*Ambystoma maculatum*	Red-eyed vireo	*Vireo olivaceus*
Tiger salamander	*Ambystoma tigrinium*	Northern parula	*Setophaga americana*
Green tree frog	*Hyla cinerea*	Common grackle	*Quiscalus quiscula*
Eastern spadefoot toad	*Scaphiopus holbrooki*	Blue jay	*Cyanocitta cristata*
Southern toad	*Bufo terrestris*	Brown thrasher	*Toxostoma rufum*
		Gray catbird	*Dumetella carolinensis*
		Northern cardinal	*Cardinalis cardinalis*
		Hooded warbler	*Setophaga citrina*
		Prothonotary warbler	*Protonotaria citrea*
		Wood duck	*Aix sponsa*
		Great blue heron	*Ardea herodias*
		Great egret	*Ardea alba*
		Belted kingfisher	*Megaceryle alcyon*

However, some occurrence is suggested by the previous observation of the eastern mudminnow (*Umbra pygmaea*) in the vicinity of the northern runway (date of observation is unknown) (Georgia DNR, 2013). Additional species potentially associated with open water include other fish species, wading birds, and water-dependent reptiles and amphibians. Species considered representative of pine forest and flatwoods habitats are listed in Table 3-7. Wildlife occurrence is typically limited in pine plantation due to the dense canopy and understory; any species present would likely be similar to those listed in the tables. In addition to the mammals listed, seven bat species have been documented in forested and/or wetland habitats on the base (BHE Environmental, 2001).

Table 3-7. Representative Wildlife Species of Pine Forest and Flatwoods Habitats

Common Name	Scientific Name	Common Name	Scientific Name
Mammals		Birds	
Opossum	*Didelphis virginiana*	Northern bobwhite quail	*Colinus virginianus*
Raccoon	*Procyon lotor*	Red-shouldered hawk	*Buteo lineatus*
Striped skunk	*Mephitis mephitis*		
Gray fox	*Urocyon cinereoargenteus*	Yellow-billed cuckoo	*Coccyzus americanus*
Fox squirrel	*Sciurus niger*	Ruby-throated hummingbird	*Archilochus colubris*
Gray squirrel	*Sciurus carolinensis*	Pileated woodpecker	*Dryocopus pileatus*
Eastern cottontail rabbit	*Sylvilagus floridanus*	Downy woodpecker	*Picoides pubescens*
White-tailed deer	*Odocoileus virginianus*	Red-bellied woodpecker	*Melanerpes carolinus*
Reptiles		Northern flicker	*Colaptes auratus*
Eastern box turtle	*Terrapene carolina carolina*	American crow	*Corvus brachyrhynchos*
Five-lined skink	*Eumeces inexpectatus*	Carolina chickadee	*Poecile carolinensis*
Timber rattlesnake	*Crotalus horridus*	Tufted titmouse	*Baeolophus bicolor*
Black racer	*Coluber constrictor*	Brown-headed nuthatch	*Sitta pusilla*
Eastern cottonmouth	*Agkistrodon piscivorus*	Carolina wren	*Thryothorus ludovicianus*
Eastern indigo snake	*Drymarchon corais couperi*	Blue-gray gnatcatcher	*Polioptila caerulea*
Gopher tortoise	*Gopherus polyphemus*	Ruby-crowned kinglet	*Regulus calendula*
Amphibians		Wild turkey	*Meleagris gallopavo*
Little grass frog	*Pseudacris ocularis*	White-eyed vireo	*Vireo griseus*
Squirrel tree frog	*Hyla squirella*	Red-eyed vireo	*Vireo olivaceus*
Eastern spadefoot toad	*Scaphiopus holbrooki*	Northern parula	*Setophaga americana*
		Common grackle	*Quiscalus quiscula*
		Summer tanager	*Piranga rubra*
		Eastern towhee	*Pipilo erythrophthalmus*
		White-throated sparrow	*Zonotrichia albicollis*

Source: Moody AFB, 2013a

Two notable natural areas occur near or on Moody AFB. Banks Lake National Wildlife Refuge (NWR) is located approximately 1 mile northeast of the installation. The refuge is over 4,000 acres in size and includes about 1,000 acres of marsh, 1,644 acres of cypress swamp, 900 acres of open water, and 15 acres of uplands. Banks Lake is the most prominent feature of the refuge. The Grand Bay WMA (Wildlife Management Area) is located immediately south of Moody AFB, but also includes some area of base property. The WMA comprises 8,663 acres of Federal, state, county, and private property. The Federal portion, which totals 5,874 acres, is owned by Moody

AFB and includes Grand Bay Range. Habitats consist of creek and bay swamp, pine flatwoods, mixed hardwood/pine stands, and open field. Both of these areas provide excellent wildlife habitat, and in particular support a diversity of birds. Waterfowl and shorebird species (some of which are migratory) are found on Federal and state-owned property in the Grand Bay-Banks Lake ecosystem, including protected or unusual species such as wood stork (*Myctera americana*) and sandhill crane (*Grus* spp.). A wading bird (heron, egret, ibis) rookery is located within the state-owned portion of the WMA. A terrestrial state-listed species, the round-tailed muskrat (*Neofiber alleni*), has also been documented in Grand Bay.

Sensitive Species

Sensitive species with known or potential occurrence on or near Moody AFB are listed in Table 3-8. Of these species, seven are protected by Federal laws (i.e., the ESA and Bald and Golden Eagle Protection Act). The frosted flatwoods salamander (*Ambystoma cingulatum*), listed as threatened under the ESA, and the striped newt (*Notophthalmus peristriatus*), a Federal candidate species, occur in the geographic region of the installation. However, these species have not been observed on the base even though species-specific surveys have been conducted, and habitat conditions are generally considered marginal (Palis, 2005). The eastern indigo snake (*Drymarchon corais couperi*), gopher tortoise (*Gopherus polyphemus*), and bald eagle are the only sensitive species that are actively managed by Moody AFB because these species are most likely to be affected by the military mission (Moody AFB, 2013a). Descriptions of these species can be found at http://www.fws.gov/endangered and http://www.georgiawildlife.com/node/1366.

Table 3-8. Sensitive Species with Potential to Occur on or near Moody AFB

Common Name	Scientific Name	Federal Status	State Status	NHP Status
Plants				
Blue maidencane	*Amphicarpum muehlenbergianum*	None	None	G4/S3?
Green-fly orchid*	*Epidendrum conopseum*	None	U	G4/S3
Climbing heath*	*Pieris phillyreifolia*	None	None	G3/S3
Needle palm*	*Rhapidophyllum hystrix*	None	None	G4/S3S2
Hooded pitcher plant*	*Sarracenia minor*	None	U	G4/S4
Yellow flytrap*	*Sarracenia flava*	None	U	G5?/S3S4
Three-birds orchid*	*Triphora trianthophora*	None	None	G3G4/S2?
Savanna cowbane*	*Oxypolis ternata*	None	None	G3/S2
Bluff white oak*	*Quercus austrina*	None	None	G4?/S3?
Amphibians				
Frosted flatwoods salamander	*Ambystoma cingulatum*	T	T	G2/S2

Table 3-8. Sensitive Species with Potential to Occur on or near Moody AFB, Cont'd

Common Name	Scientific Name	Federal Status	State Status	NHP Status
Striped newt	*Notophthalmus perstriatus*	Candidate	T	G2G3/S2
Broad-striped dwarf siren*	*Pseudobranchus striatus striatus*	None	None	G5/S3
Birds				
Bachman's sparrow*	*Aimophila aestivalis*	None	R	G3/S3
American bittern	*Botaurus lentiginosus*	None	None	G4/S3?
Little blue heron*	*Egretta caerulea*	None	None	G5/S3?
Yellow-crowned night heron*	*Nyctanassa violacea*	None	None	G5/S3S4
Black-crowned night heron*	*Nycticorax nycticorax*	None	None	G5/S4
Southeastern American kestrel*	*Falco sparverius paulus*	None	None	G5/S3
Florida sandhill crane*	*Grus canadensis pratensis*	None	None	G5/S1
Greater sandhill crane*	*Grus canadensis tabida*	None	None	G5/S2
Wood stork*	*Mycteria americana*	T	E	G4/S2
Southern bald eagle*	*Haliaeetus leucocephalus leucocephalus*	BGEPA	E	G4/S2
Glossy ibis	*Plegadis falcinellus*	None	None	G4/S3?
Loggerhead shrike*	*Lanius ludovicianus migrans*	None	None	G5/S?
Fish				
Mud sunfish	*Acantharchus pomotis*	None	None	G5/S3
Golden topminnow	*Fundulus chrysotus*	None	None	G5/S3
Eastern mudminnow*	*Umbra pygmaea*	None	None	G5/S2S3
Mammals				
Florida black bear*	*Ursus americanus floridanus*	None	None	G5T2/S2
Northern yellow bat	*Lasiurus intermedius*	None	None	G4G5/S2S3
Southeastern myotis	*Myotis austroriparius*	None	None	G3G4/S3
Round-tailed muskrat*	*Neofiber alleni*	None	T	G3/S3
Reptiles				
American alligator*	*Alligator mississippiensis*	T (S/A)	None	G5/S4
Eastern indigo snake*	*Drymarchon corais couperi*	T	T	G4/S3
Striped crayfish snake*	*Regina alleni*	None	None	G5/S2
Southern hognose snake	*Heterodon simus*	None	None	G2/S2
Eastern coral snake	*Micrurus fulvius*	None	None	G5/S3
Gopher tortoise*	*Gopherus polyphemus*	Candidate	T	G3/S3
Striped mud turtle	*Kinosternon baurii*	None	None	G5/S3
Alligator snapping turtle	*Macrochelys temminckii*	None	T	G3G4/S3
Spotted turtle*	*Clemmys guttata*	None	U	G5/S3

Source: Moody AFB, 2013a; Moody AFB, 2008b; Georgia DNR, 2013 (letter provided in Appendix A to this EA)

BGEPA = Bald and Golden Eagle Protection Act; E = endangered; R = rare; S/A = similarity of appearance; T = threatened; U = unusual; ? = questionable rank, best guess provided

*Previous documented occurrence within 3 miles of Moody AFB or the specific project site

Wood Stork

There are no permanent wood stork rookeries on Moody AFB (Moody AFB, 2008b). The species occurs sporadically during breeding season when suitable foraging conditions exist. Sightings have occurred at Grassy Pond (located 25 miles southwest of the installation), Shiner Pond (located about 2 miles north of the project area, in the north-central portion of Grand Bay Weapons Range), Dudley's Hammock (located about 4,000 feet west of the project area), and Grand Bay Creek (the major wetland drainage that flows off the base to the southeast).

Bald Eagle

There is one nesting pair of bald eagles at Grassy Pond Recreational Annex (Moody AFB, 2013a). Eagles are occasionally observed foraging in wetlands on the base, particularly near Shiner Pond and Oldfield Bay. There is some potential for foraging at wetlands near Bemiss Field.

Eastern Indigo Snake

Indigo snakes were documented on the southeastern portion of Moody AFB in the early to mid-1990s (including the Bemiss Field area), and at least three individuals were released at Grand Bay Range in 1993 and 1995 (Moody AFB, 2013a; Moody AFB, 2008b). One adult and one juvenile indigo snake were sighted in 1996 adjacent to the proposed fire staging area on Bemiss Field. Indigo snakes have not been sighted since this time, despite monitoring efforts and species-specific surveys. The species may occur on the installation (several individuals are considered possible), but a self-sustaining population is considered unlikely due to the fragmented, marginal habitat. Because of the potentially close association of this snake with gopher tortoise burrows, potential habitat is considered to coincide with tortoise habitat.

Gopher Tortoise

Gopher tortoise populations are well established on Moody AFB, with six colonies identified on the installation as of 2012 (Moody AFB, 2013a). Gopher tortoise burrows documented in 2012 within and near the proposed project area are shown on Figure 3-7, although it should be noted that burrow locations may change over time. The species is actively managed on Moody AFB through prescribed burning and timber management.

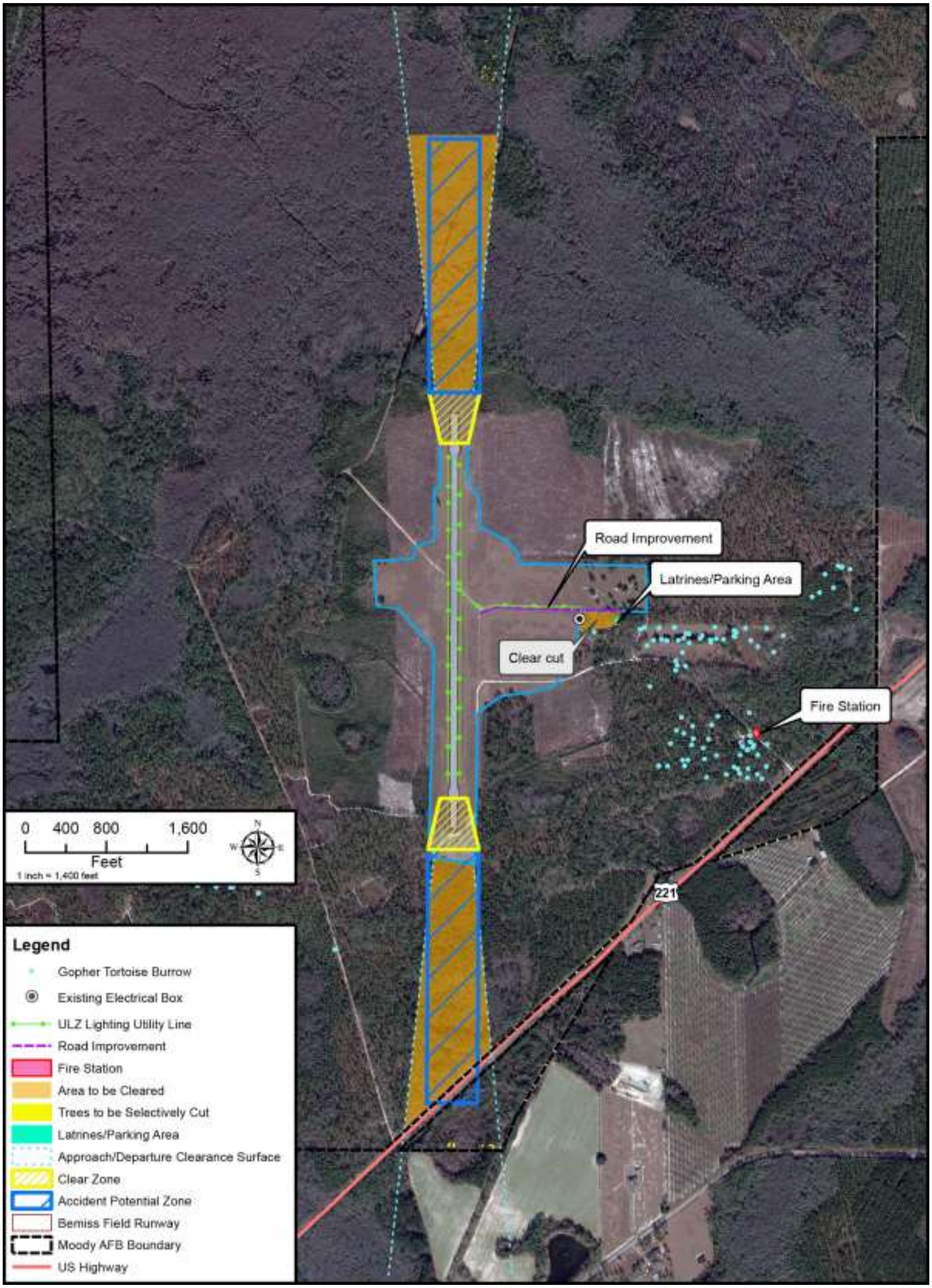

Figure 3-7. Sensitive Species in the Project Area

3.9 WATER RESOURCES

3.9.1 Definition of the Resource

Water resources include all surface water and groundwater resources in the project area. Surface water resources include lakes, rivers, streams, wetlands, and floodplains. Groundwater resources include all water reserves contained in soil and geologic deposits below the ground surface. These resources are important for a variety of reasons, including drinking water, irrigation, power generation, recreation, flood control, and human health.

The Clean Water Act (CWA) was established to ensure the "restoration and maintenance of the chemical, physical, and biological integrity of the Nation's waters" (Section 402). Under the act, it is illegal to discharge pollutants from a "point source" into any surface water without a National Pollutant Discharge Elimination System (NPDES) permit. Furthermore, any applicant for a Federal license or permit to conduct activities that may result in the discharge of a pollutant into Waters of the United States must also obtain certification from the state in which the discharge would originate or, if appropriate, from the interstate water pollution control agency with jurisdiction over the affected waters at the point where the discharge would originate.

Therefore, all projects that have a Federal component and may affect state water quality (including projects that require Federal agency approval, such as issuance of a Section 404 permit) must also comply with the CWA. The U.S. Environmental Protection Agency (USEPA) sets standards for the quality of wastewater discharges. For projects at Moody AFB, the state of Georgia implements and enforces the provisions of the CWA, while the USEPA retains oversight responsibilities.

Water resources in Georgia are afforded protection under Georgia DNR's Environmental Protection Division. These programs are administered in accordance with the state's stormwater management program and the state's erosion and sedimentation control program (Georgia DNR, 2000; Georgia DNR, 2001) under the auspices of the Environmental Protection Division's Watershed Protection Branch. Potential impacts to surface waters may result if a proposed action triggers permitting requirements under a Section 401 Certification Program (40 C.F.R. § 230.10(b)). The Environmental Protection Division requires a minimum 25-foot buffer on all state waters (intermittent or perennial streams) regardless of whether or not CWA Sections 404 or 401 are applicable. The Environmental Protection Division reissued NPDES General Permits No. GAR100001, No. GAR100002, and No. GAR100003 for stormwater discharges associated with construction activity greater than 1 acre.

Groundwater includes the subsurface hydrologic resources of the physical environment and is, by and large, a safe and reliable source of fresh water for the general population and is commonly used for potable water consumption, agricultural irrigation, and industrial applications. Groundwater plays an important role in the overall hydrologic cycle. Its properties are often described in terms of depth to aquifer or water table, water quality, and surrounding geologic composition.

Wetlands are defined as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include marshes, bogs, and similar areas (40 C.F.R. § 230.3(t)). Wetlands provide a variety of functions, including groundwater recharge and discharge, flood flow attenuation, sediment stabilization, sediment and toxicant retention, nutrient removal and transformation, aquatic and terrestrial diversity and abundance, and uniqueness. Three criteria are necessary to define wetlands: vegetation (hydrophytes), soils (hydric), and hydrology (frequency of flooding or soil saturation). Section 404 of the CWA established a program to regulate the discharge of dredged and fill material into Waters of the United States, including wetlands. The USACE, the lead agency in protecting wetland resources, maintains jurisdiction over Federal wetlands (33 C.F.R. § 328.3) under Section 404 of the CWA (30 C.F.R. §§ 320–330) and Section 10 of the Rivers and Harbors Act (30 C.F.R. Part 329).

Furthermore, EO 11990, *Protection of Wetlands*, 1977 (42 Federal Register 26961), requires Federal agencies to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands. Federal agencies must avoid, to the extent possible, destruction or modification of wetlands wherever there is a practicable alternative. Consequently, before an action adversely impacting wetlands may proceed, EO 11990 requires the head of the responsible Federal agency to find that there is no practicable alternative to conducting the action in wetlands. If, however, no practicable alternative exists to the proposed action, mitigation must be taken to minimize direct and indirect impacts in or adjacent to wetlands.

Floodplains are defined by EO 11988, *Floodplain Management*, as "the lowland and relatively flat areas adjoining inland and coastal waters including flood-prone areas of offshore islands, including at a minimum, the area subject to a 1 percent or greater chance of flooding in any given year" (that area inundated by a 100-year flood). Floodplains and riparian habitat are biologically unique and highly diverse ecosystems providing a rich diversity of aquatic and terrestrial species, as well as promoting stream bank stability and regulating water temperatures. Similar to wetlands, EO 11988 requires Federal agencies to avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative.

3.9.2 Existing Conditions

Moody AFB is situated within the Suwannee River Basin, which discharges to the northeastern Gulf of Mexico. Water flow through the area is generally south and southeast. Stormwater from the main base is discharged by a series of drainage ditches that eventually drain into large wetland complexes (Moody Bay and Grand Bay) east of the main base.

Surface Water

Bemiss Field lies within the Grand Bay-Banks Lake wetland complex, which consists of several large Carolina bays (1 to 4 miles across) and shallow lakes that are hydrologically connected via a series of natural and enhanced canals, man-made water control structures, and cypress-black gum swamp (Moody AFB, 2013a). The Grand Bay-Banks Lake complex includes the eastern half of Moody AFB and large areas to the northeast and southwest of the base. Surface water features within the complex include scattered areas of open water such as Banks Lake and Shiner Pond and poorly defined stream channels. Drainage is to the southeast through Grand Bay Creek (except for Banks Lake and a portion of Old Field Bay, which are north of Moody AFB). Grand Bay Creek eventually flows into the Alapaha River, a tributary of the Suwanee River. There are no specific surface water features associated with Bemiss Field (Figure 3-8), although drainage would primarily flow east and north into Moccasin Bay and then east through Grand Bay Creek.

Groundwater

Groundwater in the Moody AFB region occurs in two primary water-bearing zones: a surficial aquifer and the Floridan aquifer system (Moody AFB, 2013a). The surficial aquifer is composed of fine to coarse sand, gravels, silt, clayey silts, and clays and is situated approximately 10 to 20 feet below ground surface. This aquifer has low to moderate yields (usually less than 50 gallons per minute), and water quality is generally good. No drinking water wells on Moody AFB draw from this groundwater (Moody AFB, 2013a).

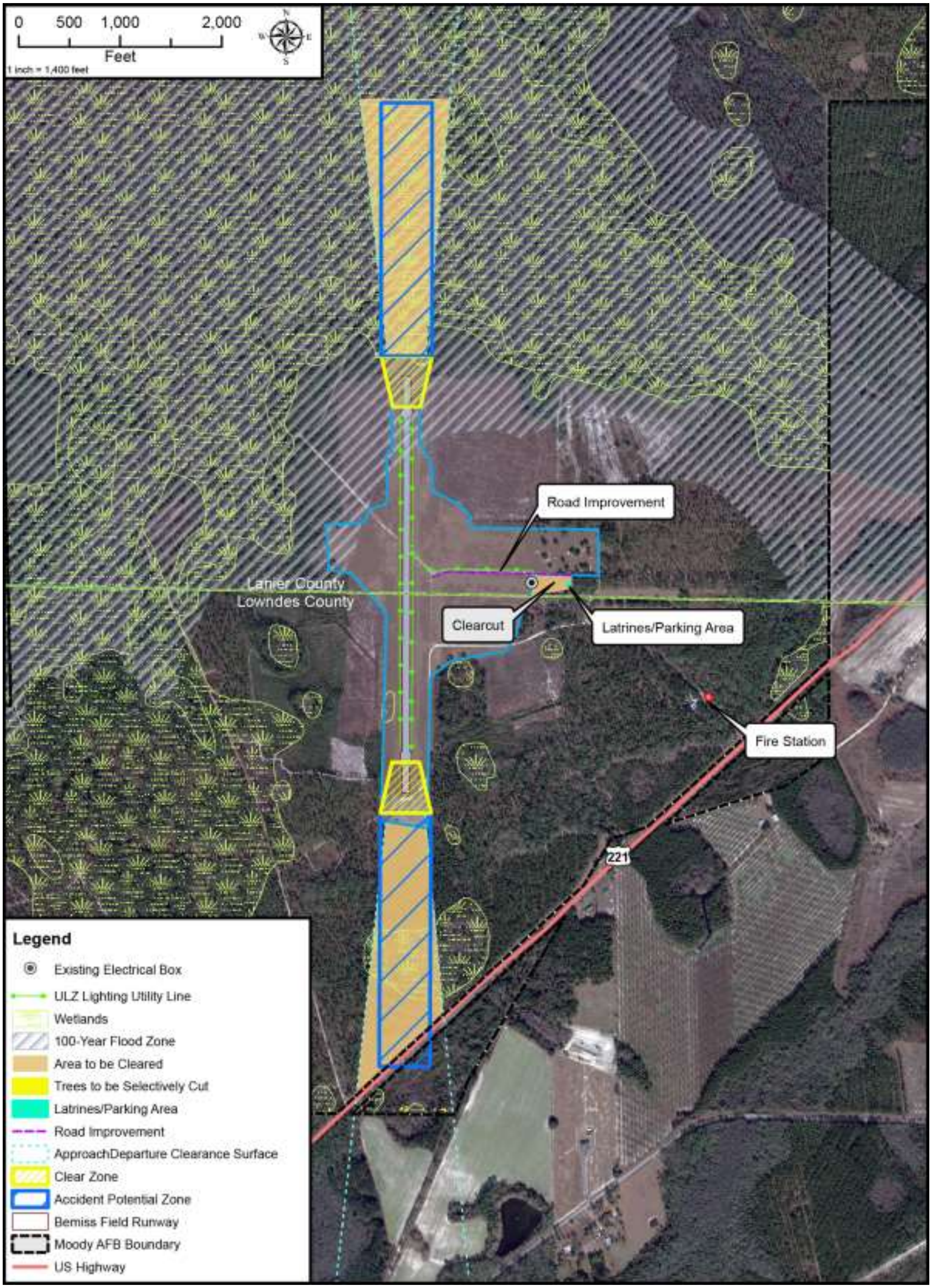

Figure 3-8. Water Resources in the Vicinity of Bemiss Field

The Floridan aquifer, which is the primary water-bearing unit within the Moody AFB region, is within a limestone formation that is approximately 150 feet below ground surface (Moody AFB, 2013a). Water yields and water quality from the aquifer are considered to be good (except in the lower portions of the geological formation). This aquifer serves as the major source of water for domestic, commercial, industrial, irrigation, and municipal uses for Moody AFB as well as the surrounding region (Moody AFB, 2013a).

Wetlands

The entire Grand Bay-Banks Lake wetland complex covers more than 13,000 acres and is one of the largest freshwater lake/swamp systems in the Georgia coastal plain. There are approximately 1,540 acres of wetlands in the eastern half of Moody AFB between Crash Trail 6 and the eastern boundary. Bemiss Field is bordered on three sides by large wetland complexes associated with Dudley Bay to the west, Rat Bay to the northeast, and Moccasin Bay to the north. Dominant wetlands include a diverse assortment of forested, scrub-shrub, emergent wetlands, and shallow ponds that frequently intergrade with each other.

Table 3-9 summarizes wetlands specifically associated with the Bemiss Field project area. There are wetlands associated with the APZ, approach–departure clearance surface, and Clear Zone on the north end of the runway and the APZ and approach–departure clearance surface on the south end of the runway (Figure 3-8). There is one small wetland in the maintained area on the southwest side of the existing landing strip.

Table 3-9. Bemiss Field Wetlands Summary

Wetland Type[1]	Area (Acres)
Departure zone (North end of runway)	
PFO1	29.16
PFO1/4	2.39
PFO3	3.69
PFO4	0.70
PUB	0.61
Subtotal (North)	**36.55**
Approach zone (South end of runway)	
PSS1/3	9.18
Subtotal (South)	9.18
Total	**45.73**

1. Classification codes as defined in Cowardin et al., 1979: PFO1 = palustrine forested, broad-leaved deciduous vegetation; PFO1/4 = palustrine forested, broad-leaved deciduous/needle-leaved evergreen vegetation; PFO3 = palustrine forested, broad-leaved evergreen vegetation; PFO4 = palustrine forested, broad-leaved needle-leaved evergreen vegetation; PSS1/3= palustrine scrub-shrub, broadleaf deciduous / broad-leaved evergreen vegetation; PUB= palustrine unconsolidated bottom

Floodplains

There is an extensive 100-year floodplain area associated with the Grand Bay-Banks Lake wetland complex; approximately 37 acres of floodplain would be affected. The northern end of the Bemiss Field runway, Clear Zone, APZ, and approach–departure clearance surface are within a designated floodplain (Figure 3-8).

3.10 EARTH RESOURCES

3.10.1 Definition of the Resource

This section discusses the soil, underlying geology and potential for geologic hazards and erosion located within the ROI of the Proposed Action.

The term "soil" refers to unconsolidated materials overlying bedrock or other parent material. Soil structure, elasticity, strength, shrink-swell potential, and erodibility all determine the ability of the ground to support man-made structures and facilities, provide a landscaped environment, and control the transport of eroded soils into nearby drainages. In undeveloped areas, the quality and productivity of soil are critical components of agricultural production. The term "geologic hazard" refers to geologic conditions with the potential to cause damage to persons or property. The ROI for earth resources includes the proposed activity area on and around Bemiss Field.

3.10.2 Existing Conditions

Lowndes and Lanier Counties are located within the Tifton Upland District of the Atlantic Coastal Plain physiographic province (Clark and Zisa, 1976). The underlying geology consists of the Hawthorn Formation that overlies the Tampa Formation. The Hawthorn Formation averages 150 feet in thickness and is phosphatic in composition (Stevens, 1973; Stevens, 1979; U.S. Geological Survey [USGS], 2014). The underlying Tampa Formation is composed of limestone that can be seen in outcrops along the Withlacoochee River (Stevens, 1979; USGS, 2014). Additionally, Lowndes and Lanier Counties are within a karst region, having abundant sinkholes and sinkhole lakes that have formed where the aquifer crops out and the overlying confining unit has been removed by erosion (Krause, 1979; Leeth et al., 2001). These are a result of groundwater dissolving the high calcium carbonate content of the underlying limestone formations.

Bemiss Field is located within an area considered highly hazardous for aquifer vulnerability and sinkhole formation (Figure 3-9), because of the moderately shallow depth to water and moderately high recharge movement and low containment rate (Krause, 1979; Leeth et al., 2001). The northern half of the project area is also located within a groundwater recharge area. These groundwater recharge areas are locations in which the surface water may directly infiltrate underground aquifers. Such locations are inherently sensitive to stormwater or agricultural runoff that may contain pollutants that if introduced could affect the regional water supply.

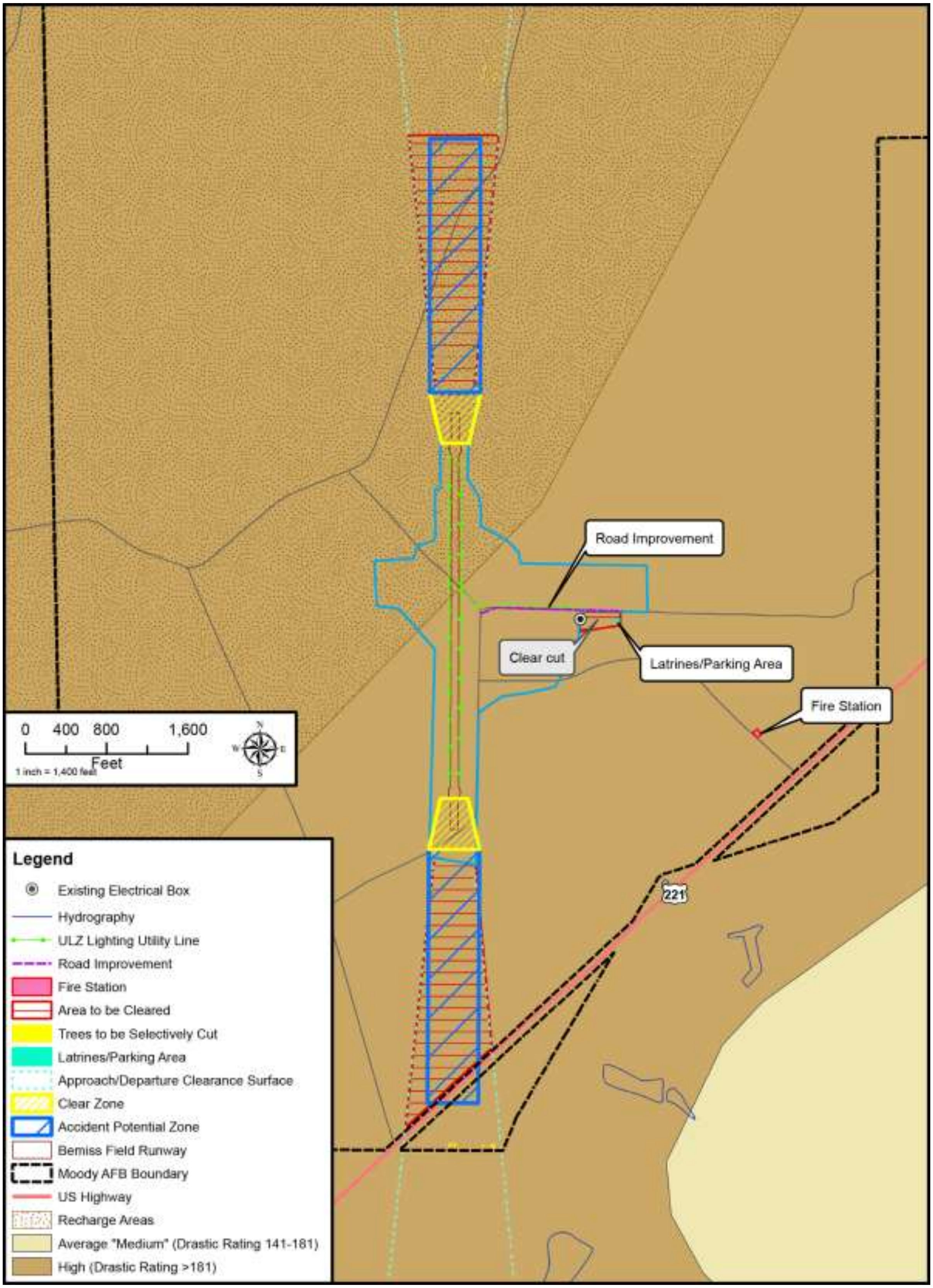

Figure 3-9. Karst Topography and Groundwater Recharge Areas at Bemiss Field

Bemiss Field is located within the Tifton Upland District of the Lower Coastal Plain. The soils on uplands in this region were formed in deep sedimentary sands and clays. Alluvial soils near streams and tributaries generally originated from material eroded from the uplands (Stevens, 1973; Stevens, 1979). Five soil series are located within the project area (Table 3-10): these include Mascotte sand (6.3 percent of total area), Alapaha loamy sand (11.2 percent of total area), Pelham loamy sand (34.5 percent of total area), Stilson loamy sand (7.3 percent of total area), and Johnston loam (40.62 percent of total area) (Figure 3-10).

Table 3-10. Soil Types at Bemiss Field Project Areas

Soil	Acres	Surface Flooding Potential
Johnston loam	27.87	Severe: flooding
Stilson loamy sand	5.00	Moderate; wetness
Mascotte sand	4.35	Moderate: seasonal high water table
Pelham loamy sand	23.70	Severe: seasonal high water table, flooding
Alapaha loamy sand	7.69	Severe: seasonal high water table, flooding
Total acres	**68.61**	

Stevens, 1973; Stevens, 1979

Johnston loam is associated with a majority of the surface area within the Bemiss Field ULZ. It is a poorly drained soil commonly found on bottom lands. These soils are frequently flooded for extended periods of time. Alapaha loamy sand, Mascotte sand, and Pelham loamy sand are poorly drained, nearly level, and found on low areas and drainage ways. Alapaha, Mascotte, and Pelham series are poorly suited for development due to wetness and flooding. Stilson loamy sand is commonly found in higher elevations near drainage ways and is well suited to many crops, as well as various grasses and pine timber. None of the remaining soil types are well suited for cultivation (Stevens, 1973; Stevens, 1979).

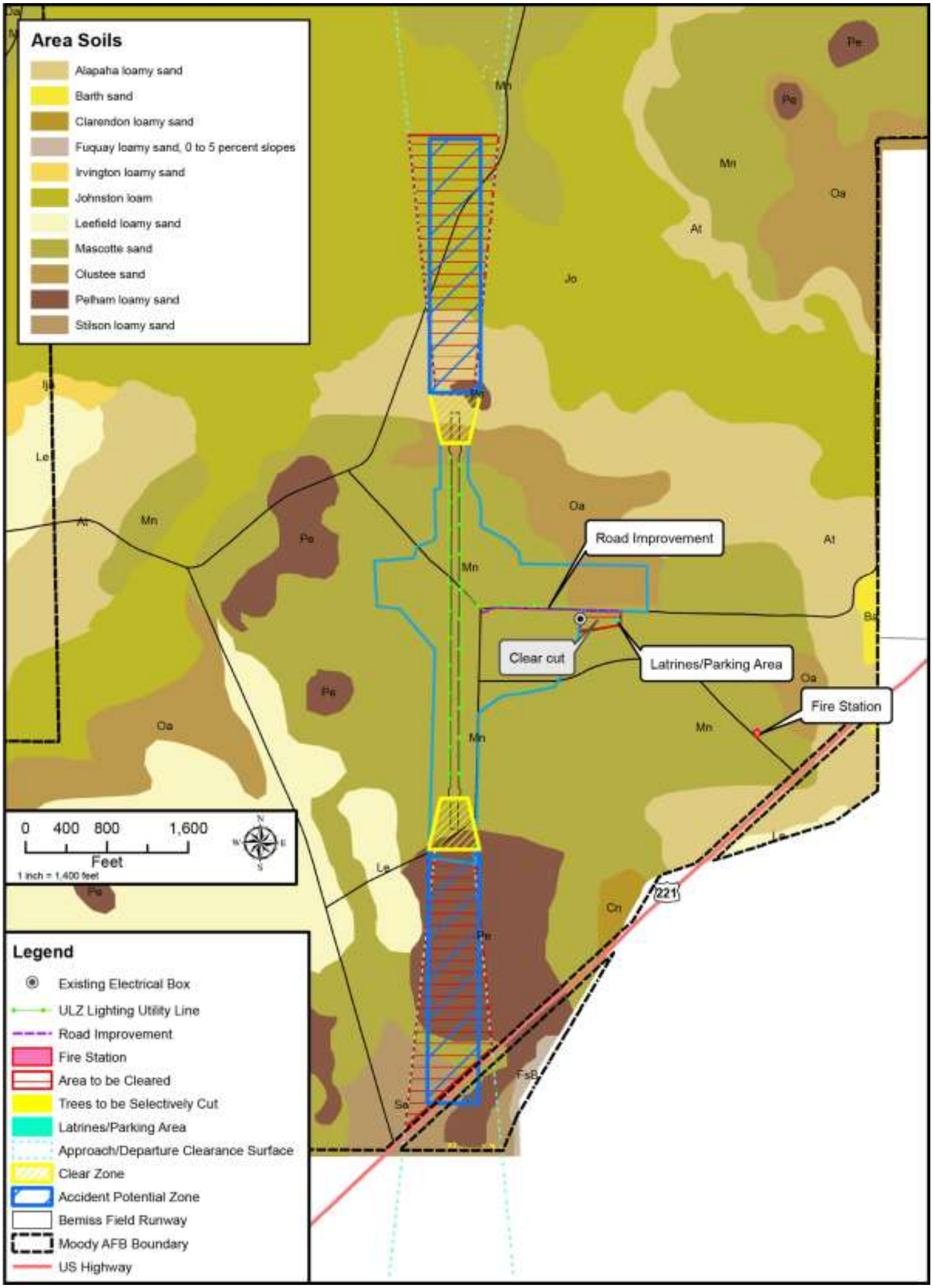

Figure 3-10. Soil Types at the Bemiss Field Project Area

3.11 INFRASTRUCTURE

3.11.1 Definition of the Resource

Infrastructure, within the context of this EA, is associated with utilities and transportation. The utilities described and analyzed for potential impacts from the implementation of the Proposed Action include nonpotable water, wastewater, and electricity. The description of each utility focuses on existing infrastructure (e.g., wells), current utility use, and any predefined capacity or limitations as set forth in permits or regulations. Transportation is defined as the roadways on the main base, base gates, and the public roadways that provide access to the proposed project area.

3.11.2 Existing Conditions

Utilities

The existing utilities at Bemiss Field are limited. A nonpotable well is located at the existing latrine facility (Facility #200). Sanitary wastewater from the latrine facility discharges into a septic field. The existing well capacity and condition of the well and septic field is unknown at this time. Nonpotable water is also located at the Georgia DNR campground comfort station near the area proposed for the new fire station. Electricity for the area is supplied by Colquitt Electric Membership Corporation (EMC). An existing electrical box is located to the west of the latrine facility. Electricity to the DNR campground and maintenance facility is provided from an electrical transformer located on the south side of the road.

Transportation

Several access roads/trails provide access to Bemiss Field (Figure 1-2). Burma Road provides the primary access from the main base. The area can also be accessed at two points along Lakeland Highway, which runs between Valdosta and Lakeland. Access to the area proposed for the new Bemiss Field fire station would be from Lakeland Highway.

4. ENVIRONMENTAL CONSEQUENCES

4.1 AIRSPACE MANAGEMENT AND USE

4.1.1 Analysis Methodology

Airspace management impacts are considered in terms of context, intensity, and duration. Impacts would be considered significant if existing scheduling and coordination systems would not be adequate to support the increased airspace usage. Impacts would also be considered significant if additional special use airspace (SUA) was proposed and the proposed additional SUA would hinder ongoing civilian aircraft operations. Finally, impacts would be considered significant if an action were proposed that was not in compliance with FAA or Air Force regulations regarding management procedures to ensure safety of flight.

4.1.2 Alternative 1 (Preferred Alternative)

Alternative 1 would involve fixed-wing aircraft landing at Bemiss Field. Aircraft landing to the field would remain within R-3008 throughout the final approach procedure and during the initial stages of climb-out on departure. Restricted area airspace is not required for approaches to and departures from a landing zone. However, restricted area airspace provides certainty that nonparticipating aircraft will not interrupt training.

As noted in Section 2.6.2, no net increase in the number of Moody AFB-based C-130 operations or the operations of any other Moody AFB-based aircraft is proposed. An estimated net increase of 100 fixed-wing aircraft landings/takeoffs would be expected to take place at Bemiss Field once the field is certified for fixed-wing landings. This net increase of 100 landing operations within R-3008 would be a very small change relative to the total current numbers of operations per year. Existing scheduling and management procedures would be expected to be sufficient to handle this minor increase in range operations tempo.

Roughly 66 percent of proposed landings would occur during the late-night period between 10:00 PM and 7:00 AM, mirroring times-of-use for ongoing airdrop operations. As noted in Table 3-1, R-3008 is normally only active between 7:00 AM and 10:00 PM. Notices to Airmen (i.e., NOTAM) would be published prior to activation of R-3008 for late-night training events. The occurrence of proposed training late at night effectively deconflicts proposed training from the majority of other training activities at Grand Bay Range, which take place predominantly during the day.

The proposed removal of trees and implementation of a 500-foot displaced threshold would remove all obstructions from the 35:1 approach/departure clearance surface. No new obstructions to flight are expected to be constructed in the area immediately surrounding Bemiss Field at this time.

No new airspace is proposed and existing airspace management procedures are expected to be sufficient to handle a slight net increase in total aircraft operations. There would be no significant impacts to airspace management and use under Alternative 1.

4.1.3 No Action

Under the No Action Alternative, no changes would be made to the facilities at Bemiss Field, and no trees would be removed. Because the appropriate approach/departure clearance surface would remain obstructed, fixed-wing aircraft would continue to be disallowed from landing at Bemiss Field. Airdrops and other training activities that take place at and near Bemiss Field would continue to occur. Current airspace management procedures would remain in place, and there would be no expected increase in the tempo of operations in R-3008. No impacts to airspace management would occur under the No Action Alternative.

4.2 AIR QUALITY

4.2.1 Analysis Methodology

The Clean Air Act Section 176(c), General Conformity, requires Federal agencies to demonstrate that their proposed activities would conform to the applicable state implementation plan for attainment of the NAAQS. General conformity applies only to nonattainment and maintenance areas. If the emissions from a Federal action proposed in a nonattainment area exceed annual *de minimis* thresholds identified in the rule, a formal conformity determination is required of that action. The thresholds are more restrictive as the severity of the nonattainment status of the region increases. The project region is designated as attainment for all criteria pollutants (USEPA, 2014). The criteria pollutants are compared with Lowndes and Lanier County emissions, which are in attainment for all criteria pollutants.

In order to evaluate air emissions and their impact on the overall ROI, the emissions associated with the project activities were compared with the total emissions on a pollutant-by-pollutant basis for the ROI's 2011 National Emissions Inventory (NEI) data. Potential impacts to air quality are evaluated with respect to the extent, context, and intensity of the impact in relation to relevant regulations, guidelines, and scientific documentation. The CEQ defines significance in terms of context and intensity in 40 C.F.R. § 1508.27. This requires the significance of the action to be analyzed with respect to the setting of the proposed action and based relative to the severity of the impact. The CEQ NEPA regulations (40 C.F.R. § 1508.27[b]) provide 10 key factors to consider in determining an impact's intensity. To provide a more conservative analysis, the two counties were selected as the ROI instead of the USEPA-designated Air Quality Control Region, which is a much larger area.

The Air Conformity Applicability Model (ACAM) version 5.0 was utilized to provide a level of consistency with respect to emissions factors and calculations. The ACAM provides estimated air emissions from proposed Federal actions in areas designated as nonattainment and/or maintenance for each specific criteria and precursor pollutant as defined in the NAAQS. ACAM was utilized to provide emissions for construction, grading, and paving activities by providing user inputs for each.

The air quality analysis focused on emissions associated with tree clearing, road improvements, new construction, and aircraft emissions from ULZ flight operations. Construction-related sources include emissions from heavy construction machinery, semitractor-trailer rigs, and vehicle exhaust from contracted employees' personal vehicles. Aircraft emissions are associated with changes to the use of the ULZ by current Moody AFB personnel and increased use by transient aircraft.

GHGs are included in the analysis. The primary source of carbon dioxide emissions would be from vehicles operating on-site during construction and ongoing aircraft emissions from the Bemiss Field ULZ operations. Construction equipment operation, worker commuting, and aircraft emissions would contribute to GHG emissions in the area. GHG emissions would be compared with the CEQ's minimum level of 25,000 metric tons (27,558 tons) as a level at which consideration would be required in NEPA documentation. Air quality calculations are provided in Appendix B.

4.2.2 Alternative 1 (Preferred Alternative)

Emissions associated with Alternative 1 are calculated and summarized in Table 4-1. Impacts would amount to less than 1 percent of each of the criteria pollutants. Increases from construction and ULZ improvements result in only a short-term, temporary increase in emissions. GHG emissions would be less than 25,000 metric tons (27,558 tons), which is well below the level that CEQ recommends as an indicator that quantitative and qualitative assessment may be meaningful to decision makers and the public. There would be no significant impacts to air quality resulting from the implementation of Alternative 1.

Table 4-1. Alternative 1 Air Emissions Compared with Lowndes and Lanier County Emissions (tons per year)

	Emissions (tons/year)						
	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_x	VOCs	CO_2e
ROI Emissions[1]	**39,522**	**6,956**	**20,728**	**4,882**	**807**	**39,324**	**1,038,681**
ULZ improvement emissions	10.21	21.57	184.2	0.84	0.06	2.78	747
Aircraft emissions	15.21	14.51	5.95	3.1	0.33	1.59	3,355
Total	**25.42**	**36.08**	**190.15**	**3.94**	**0.38**	**4.37**	**4,102**
Percent of County Emissions	0.06%	0.52%	0.92%	0.08%	0.05%	0.01%	0.39%

Source: USEPA, 2014a

CO = carbon monoxide; CO_2e = carbon dioxide equivalents; NO_x = nitrogen oxides; PM_{10} and $PM_{2.5}$ = particulate matter with a diameter of less than or equal to 10 microns and 2.5 microns, respectively; SO_x = sulfur oxides; VOC = volatile organic compound

1. Includes Lanier and Lowndes County, Georgia

4.2.3 No Action

The No Action Alternative would not result in any additional impacts to air quality beyond the scope of normal conditions and influences within the ROI.

4.3 NOISE

Noise affects several resource areas, including land use, socioeconomics/ environmental justice, and biological resources. Noise impacts to these resources are discussed under each of those resources.

4.3.1 Analysis Methodology

The most common impact associated with exposure to elevated noise levels is public annoyance. Annoyance is also the most severe category of noise impact expected to occur under the Proposed Action. As described in Section 3.3, annoyance due to aircraft noise can be predicted based on the noise metric DNL (Schultz 1978; Finegold 1994). When subjected to DNL of 65 dB, approximately 12 percent of persons so exposed will be "highly annoyed" by the noise. At levels below 55 dB, the percentage of annoyance is correspondingly lower (less than 3 percent). The percentage of people annoyed by noise never drops to zero (some people are always annoyed), but at levels below 55 dB, it is reduced enough to be essentially negligible. Based on numerous sociological surveys and recommendations of Federal interagency councils, the most common benchmark referred to is 65 dB DNL. This threshold is often used to determine residential land use compatibility around airports, highways, or other transportation corridors. A DNL of 75 dB is a threshold above which effects other than annoyance may occur. It is well below levels at which hearing damage is a known risk (OSHA, 1983). It is also a level above which nonauditory health effects cannot be categorically discounted.

Normally, the most sensitive components of a structure to airborne noise are the windows and, infrequently, the plastered walls and ceilings. While certain frequencies (such as 30 Hz for window breakage) may be of more concern than other frequencies, conservatively, only sounds lasting more than one second above a sound level of 130 dB are potentially damaging to structural components (CHABA, 1977).

Noise impacts could be considered significant if levels across large quantities of land were to increase to greater than 65 dB DNL or if any residences were to be exposed to greater than 75 dB DNL. Noise impacts would also be considered significant if the noise would pose a substantial risk to structures.

Values for the primary noise metric DNL and the supplemental noise metric L_{max} were calculated using the programs NOISEMAP and Rotorcraft Noise Model (RNM). RNM is a program designed to handle the complex noise distribution patterns generated by rotorcraft, and it was used for modeling all rotorcraft operations noise. NOISEMAP was used to model all fixed-wing aircraft noise. Both models reference information about aircraft flying operations (e.g., altitude, airspeed, engine power setting) against measured noise levels for the specific aircraft. In keeping with current Air Force policy, time-averaged noise levels were calculated for an average annual day (total annual operations divided evenly across 365 days). Modeling included the effects of terrain and land cover on the propagation of noise.

4.3.2 Alternative 1 (Preferred Alternative)

Under Alternative 1, fixed-wing aircraft would begin to land at Bemiss Field. As noted in Section 3.1, fixed-wing aircraft currently operate at Grand Bay Range at a high operations tempo, and there are approximately 400 based C-130 air drop operations per year at Bemiss Field specifically. Bemiss Field is also used by HH-60 aircraft and that use would not change under this alternative.

Of the 400 based C-130 airdrop training events per year, approximately 250 would "convert" to landing training events under Alternative 1. An estimated 100 landings per year would be conducted by 4-, 2-, and 1-engine propeller-driven transient aircraft, and these operations would be the only net increase to total operations at Bemiss Field. A C-130 was used to represent potential 4-engine transient users, while the C-12 and generic variable-pitch propeller-driven aircraft were used to represent the 2-engine and single-engine categories. Jet aircraft landings would not be expected to occur at Bemiss Field primarily due to length of the landing zone.

As discussed in Section 2.6.2, aircraft conducting airdrop training use similar flight paths to those that would be used for landings at the Bemiss Field landing zone. The most noticeable difference to a person on the ground between an airdrop training event and a landing training event is that the aircraft descends to touch down and then depart from the landing zone rather than flying straight and level while conducting the airdrop. A common procedure would be for the aircraft to approach the landing zone from the south and then depart again towards the south although approaches/ departures from the south are not the only procedure. Approaches/departures from the north would avoid overflight of the Banks Lake NWR at altitudes below 1,500 feet AGL. The majority of approaches from the north would maneuver toward Bemiss LZ from the northeast, avoiding overflight of Banks Lake NWR entirely. Those few approaches to Bemiss LZ that would pass over Banks Lake NWR would do so at altitudes such that noise generated would not affect existing time-averaged noise levels. The percentage of operations conducted during the late-night period between 10:00 PM and 7:00 AM would remain the same under Alternative 1 as it has been under current conditions. The addition of 100 transient landing per year would mean that 66 additional late-night operations would occur.

The programs NOISEMAP and RNM were used to calculate noise levels under Alternative 1 based on flight paths, altitude, engine power setting, and airspeed expected to be used by based and transient aircraft. The resulting DNL values are presented as contours in Figure 4-1 overlaid on current noise levels.

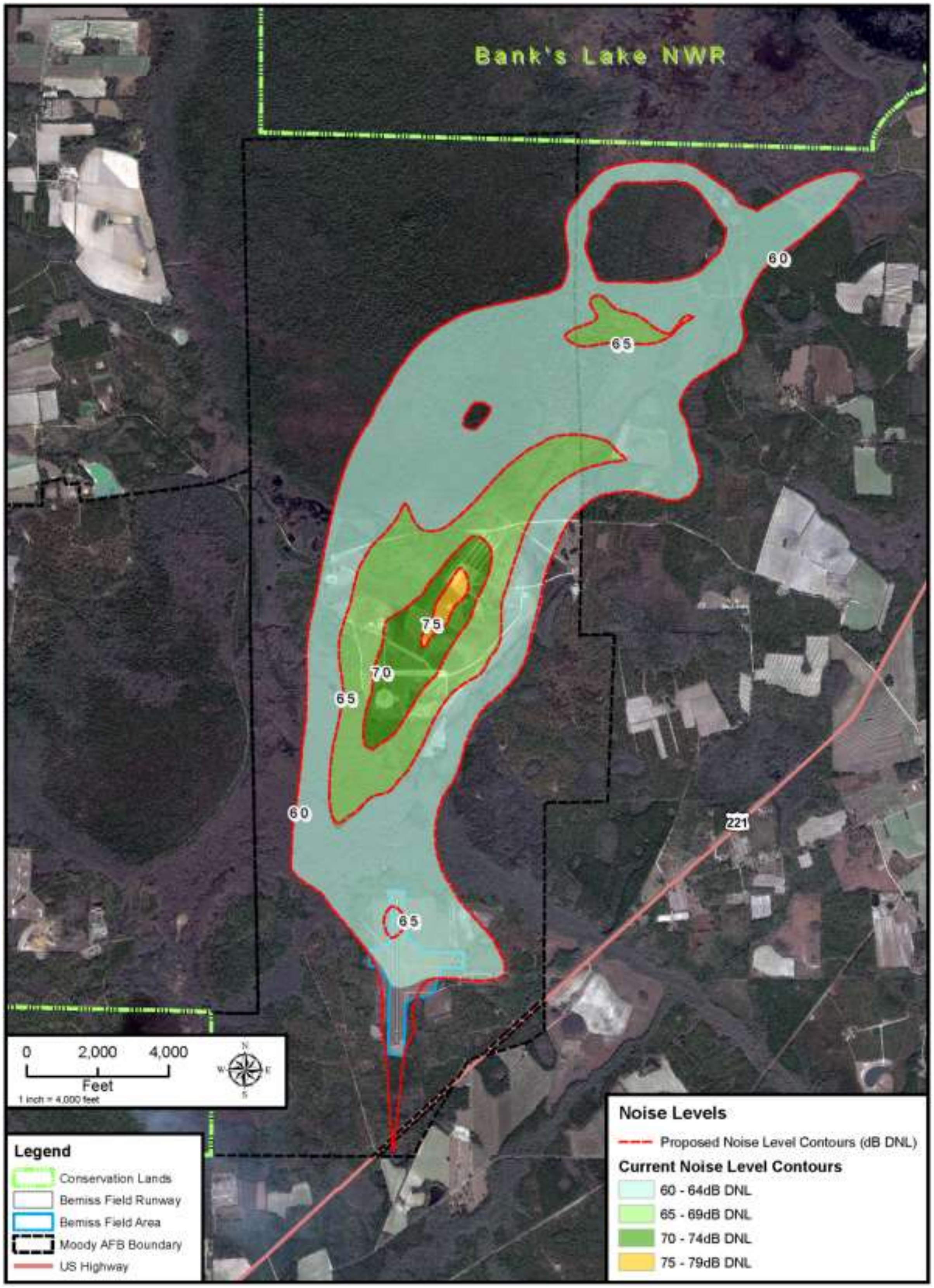

Figure 4-1. Current and Proposed Day-Night Average Sound Level

The 60 dB DNL noise contour has been included with both current and proposed noise contour sets even though noise levels below 65 dB DNL are not typically associated with significant noise impacts. Increases in area exposed to greater than 60 dB DNL occur only near Bemiss Field and almost entirely on land owned by the Air Force. Area off-range affected by 60 dB DNL is limited to the Lakeland Highway corridor and no privately owned parcels are affected.

Time-averaged noise metrics such as DNL are useful for conveying overall noise levels, but do not directly describe the noise generated by an individual overflight. Table 4-2 lists the maximum noise levels (L_{max}) generated by direct overflight of C-130, 2-engine, and single-engine aircraft that would land at Bemiss Field under Alternative 1. For these aircraft, noise levels are provided for overflights while the aircraft are in typical level flight, descent, and climb out configurations. Noise levels are also provided for other frequent users of Grand Bay Range/Bemiss Field to provide context. Fighter aircraft are louder than C-130 aircraft at equivalent altitudes and are much louder than the smaller 2-engine and 1-engine propeller-driven transient aircraft. For example, at the lowest permissible Banks Lake NWR overflight altitude (i.e., 1,500 feet AGL0, C-130J aircraft would not be expected to exceed 79 dB L_{max} while F-18 aircraft overflight would generate about 89 dB L_{max}. Direct overflights are relatively rare. Overflights that are offset laterally by some distance from the listener are less loud.

Table 4-2. Direct Overflight Maximum Noise Levels (L_{max})

Aircraft	Flight Configuration	L_{max} at Altitude (feet AGL)					
		100	300	500	900	1,200	1,500
C-130J (4-engines)	Level flight - 2500 HP	106	96	91	85	82	79
	Descent – 2200 HP	106	96	91	85	82	79
	Climb-out – 4700 HP	106	96	91	85	82	79
C-12 (2-engines)	Level flight - 50 % RPM	92	82	77	72	69	67
	Descent – 30 % RPM	91	81	76	71	68	66
	Climb-out – 100 % RPM	94	84	79	74	72	69
1-engine propeller-driven	Level flight - 70 % RPM	91	81	77	71	68	66
	Descent – 30 % RPM	82	72	67	61	58	56
	Climb-out – 100 % RPM	98	89	84	78	76	74
H-60[1]	Training Configuration, 80 knots	90	82	76	72	69	67
A-10[2]	Attack - 87 %NC	114	103	98	91	87	84
F-18	Attack - 86 % NC	117	107	102	96	92	89
V-22	Level flight – 100 knots and 0 ° nacelle tilt	103	92	88	83	80	78
AH-1	Attack – 80 knots	99	89	84	79	76	74

AGL = above ground level; HP = horsepower; L_{max} = maximum sound level; N/A = not applicable; NC = core engine speed; RNM = Rotorcraft Noise Model; RPM = revolutions per minute

1. RNM; used median monthly average acoustic propagation conditions (67° F and 69% relative humidity)
2. SELCALC; used median monthly average acoustic propagation conditions (67° F and 69% relative humidity)

All of the aircraft types listed operate currently at Grand Bay Range and Bemiss Field, but certain altitudes and aircraft configurations would become more common in the immediate vicinity of Bemiss Field under Alternative 1. While making airdrops, C-130 aircraft are configured for level flight. Although airdrops may be made from as low as 150 feet AGL, airdrops from 500 feet AGL and above are much more common. The deviation between a C-130 airdrop and a C-130 landing starts at less than 2 miles from the end of the runway. As shown in Figure 2-4, landing operations would typically descend at a rate of not less than 300 vertical feet per nautical mile or greater. At about 1 mile from the end of the runway, a C-130 approaching to land would be at roughly 300 feet AGL, whereas a C-130 conducting an airdrop mission would have remained at 500 feet AGL. C-130J aircraft typically climb out at a rate of 600 vertical feet per nautical mile, reaching about 500 feet AGL by less than 1 mile past the end of the runway.

The increase in operations at Bemiss Field (i.e., 100 additional transient approaches) and the increased prevalence of low-altitude flight (descending to land rather than airdrop) would slightly increase the number of potentially annoying noise events experienced near Bemiss Field. Annoyance is typically triggered when a noise interferes with an activity such as watching television, conversation, sleeping, or just enjoying a quiet period in the day. The exact number of noise events with potential to interrupt these activities would depend on the specific flight path being followed, the locations of people on the ground, whether those people are indoors at the time of overflight, weather conditions, and other factors. Random routings to the landing zone, which are conducted as part of tactical training, also avoid constant overflights of a single location. Damage to structures would not be expected to occur, as noise levels would not exceed 130 dB. Time-averaged noise levels would not exceed 75 dB DNL, the risk of auditory or nonauditory health impacts due to noise is minimal. Noise impacts under Alternative 1 would not be expected to be perceived as significant.

4.3.3 No Action

Under the No Action Alternative, no changes to flying operations at Bemiss Field would occur. There would be no changes in current noise levels, and thus no noise impacts.

4.4 SAFETY

4.4.1 Analysis Methodology

This section evaluates the potential for Alternative 1 to increase safety risks as well as the Air Force's capability to manage these risks. Potential impacts related to safety were considered significant if proposed activities would create a situation involving endangerment to life or health or pose an unusual risk to military personnel, or nearby residents and the general public off-site.

The Air Force calculates Class A mishap rates per 100,000 flying hours for each type of aircraft in the inventory. Combat losses due to enemy action are excluded from these statistics. The Class A mishap rate per 100,000 flying hours can be used to compute a statistical projection of anticipated time between mishaps.

4.4.2 Alternative 1 (Preferred Alternative)

Overall, as indicated in the text below, there would be no significant impacts to the current safety environment associated with Alternative 1.

Aircraft Safety

Alternative 1 would result in a net increase of 100 annual events over baseline operations for C-130 type of aircraft. Over the last 10 years, the C-130 has experienced a Class A mishap rate of only 0.27 mishaps per 100,000 hours of flight time (U.S. Air Force, 2014b). Using an event duration of two hours, this means an additional 200 hours of flight time per year at Moody AFB. At the current C-130 mishap rate, this would equate to an annual probability of a Class A mishap of only 0.00054 percent.

This analysis makes only a statistical prediction regarding the frequency of mishaps and may not represent real-world conditions. Current aircraft flight safety policies and procedures at Moody AFB (as described in Section 3.4.2) are designed to ensure that the potential for aircraft mishaps is reduced to the lowest possible level. These safety policies and procedures would continue.

If a mishap does occur, Moody AFB has the resources available to respond. This would include the proposed fire station facility at Bemiss Field. The fire station would house fire-fighting equipment, such as fire trucks and firefighting/rescue gear, which would be deployed as needed in case of a mishap.

The potential for mid-air collisions or near misses associated with privately owned aircraft (such as crop dusters) would be minimal, because proposed flight operations would be limited to the restricted airspace over the installation.

Bird/Wildlife Aircraft Strike Hazards

As stated in Section 3.4, the primary danger to aircraft is posed by birds, as terrestrial species constitute only about 3 percent of total collisions. Banks Lake NWR is located approximately 2 miles north of the Bemiss Field. Several bird species are known within the vicinity of the NWR, including the wood storks and sandhill cranes. The storks feed and roost in the wetlands, while large populations of sandhill cranes roost and feed during winter months. This area presents no unusual safety hazards over baseline operations, as most of the NWR is under the existing restricted airspace utilized by Moody AFB on a daily basis.

Under Alternative 1, there would be a net increase of 100 annual events over baseline operations for the C-130 type of aircraft; consequently, it would be expected that the potential for bird strikes per year would increase very slightly.

However, the overall risks associated with bird-aircraft strikes is expected to remain low; none of the bird-aircraft strikes occurring at Moody AFB have resulted in a Class A mishap, although some resulted in significant damage to aircraft.

To minimize the potential for any future bird/wildlife-aircraft strikes, Moody AFB would continue to implement an aggressive BASH program, including the Wildlife Hazard Warning System. Moody AFB would also continue to coordinate extensively with on-staff USDA wildlife experts regarding BASH-related issues (e.g., identification of problem species, control methodologies) and would incorporate the Bemiss Field ULZ into the Moody AFB BASH Plan.

Finally, a Landing Zone Safety Officer (LZSO) would be posted at each landing zone during training activities to observe for potential wildlife-related safety issues. The LZSO would be in communication with aircraft personnel to provide warning and/or instructions, as needed, to avoid any potential BASH-related issues.

4.4.3 No Action

Under the No Action Alternative, the Bemiss Field ULZ would not be improved and would, therefore, not be utilized for fixed-wing landing training. There would be no increase in aircraft operations, which would maintain the current likelihood of aircraft mishaps or BASH, resulting in no effect on safety. With the continuation of policies and procedures in place to ensure the safety of the public as well as military personnel, there would be no adverse impacts associated with the No Action Alternative.

4.5 LAND USE

4.5.1 Analysis Methodology

The methodology to assess impacts on individual land uses requires identifying those uses and determining the degree to which they would be affected by Alternative 1 and the No Action Alternative. Potential land use impacts are also based on the level of land use sensitivity in affected areas and whether they would:

- Be inconsistent or in noncompliance with applicable land use plans or policies.
- Preclude the viability of existing land use.
- Preclude continued use or occupation of an area.
- Be incompatible with adjacent or land uses in the vicinity to the extent that public health or safety is threatened.
- Conflict with airfield planning criteria established to ensure the safety and protection of human life and property.

Analysis of land use impacts also considered the effects of Bemiss Field flight operations and if the change in noise exposure would have an adverse impact on land use compatibility.

Nearly all studies analyzing aircraft noise recommend that no sensitive noise receptors (e.g., residences, public buildings, schools, churches, hospitals, and certain recreational uses) be located in land areas associated with noise exposures of 75 dB DNL or greater. Usually, no restrictions are recommended below 65 dB DNL. Between 65 and 75 dB DNL, there is currently no consensus on restrictions, but residential use is generally discouraged. Almost all land uses except manufacturing, agriculture, and mining are incompatible with noise exposures greater than 80 dB DNL (FICUN, 1980).

4.5.2 Alternative 1 (Preferred Alternative)

Alternative 1 would result in minor land use changes, based on the criteria listed in Section 4.5.1. Recreational use (i.e., hunting) within the Grand Bay WMA in the vicinity of Bemiss Field would not be affected and public access (except for restricted areas) would be unchanged. Construction of the proposed fire station would result in a negligible change of land use from open space to aircraft operations and maintenance.

Alternative 1 would not result in any significant land use impacts. Aircraft operations and noise associated with the Bemiss Field ULZ would not result in any incompatible land uses. There would also be no impact on the existing airfield Clear Zone or APZ. Aircraft noise off-base would not result in time-averaged noise levels exceeding 65 dB DNL (Figure 4-2). Additional detailed information on noise effects is presented in Section 4.3, Noise.

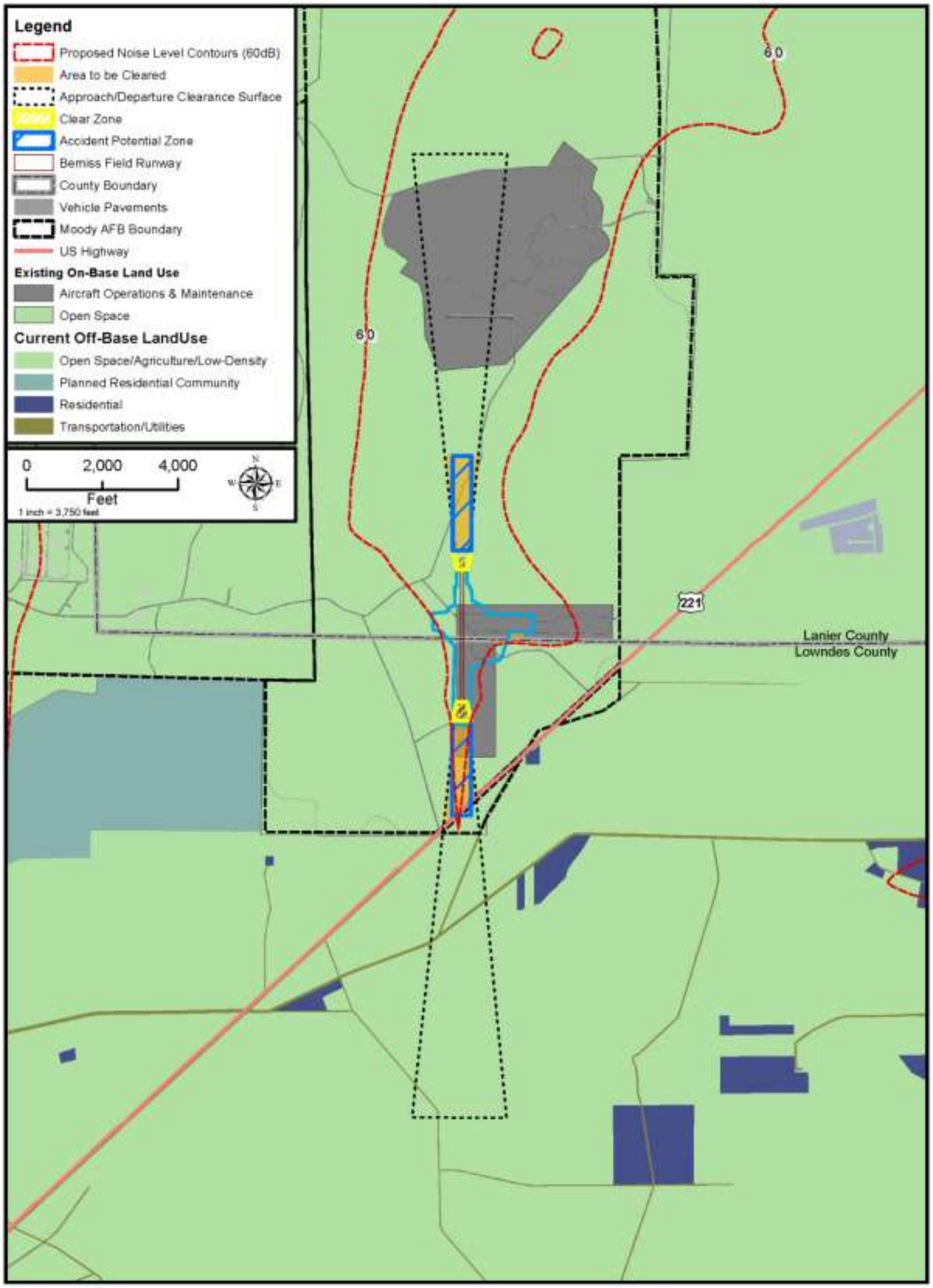

Figure 4-2. Existing Land Use with Alternative 1 Noise Contours

4.5.3 No Action

The No Action Alternative would not result in any additional land use impacts beyond the scope of normal conditions and influences within the ROI.

4.6 SOCIOECONOMICS/ENVIRONMENTAL JUSTICE

4.6.1 Analysis Methodology

Socioeconomics

NEPA provides no specific thresholds of significance for socioeconomic impact assessment. Significance varies, depending on the setting of the proposed action (40 C.F.R. § 1508.27[a]), however all Federal agencies must consider a proposed action's impact significance by considering the impact's intensity and context (40 C.F.R. § 1508.27[b]). Section 40 C.F.R. 1508.8 also directs Federal agencies to consider the direct and indirect effects. Indirect effects may include those that are growth inducing and others related to induced changes in the pattern of land use, population density, or growth rate. Since socioeconomic impacts are often linked to impacts from other resource categories (i.e., noise, safety, air quality, land use), significant impact in these other resources could create a significant socioeconomic impact.

There are a number of factors that affect property values that make predicting impacts difficult. Factors directly related to the property, such as size, improvements, and the location of the property, as well as current conditions in the real estate market, interest rates, and housing sales in the area, are more likely to have a direct adverse impact on property values. Several studies have been conducted analyzing property values as they relate to military and civilian aircraft noise. One study conducted a regression analysis of property values as they relate to aircraft noise at two military installations (Fidell et al., 1996). This study found that while aircraft noise at these installations may have had minor impacts on property values, it was difficult to quantify those impacts because other factors, such as the quality of the housing near the installations and the local real estate market, had a larger impact on property values. Therefore, the regression analysis was not able to predict the impact of aircraft noise on the property values of two comparable properties.

In a study performed by Nelson (2003), the author analyzed 20 different property value studies that attempted to quantify the impact of noise on property values (Nelson, 2003). Nelson (2003) also analyzed the values of similar properties, using one property located near a source of noise, specifically an airport, and one property not located near a source of noise. The result of the study is that, considering all other factors (e.g., neighborhood characteristics and desirability, local real estate market conditions, school districts) as equal, an adverse impact on property values as a result of aircraft noise is possible and estimates that the value of a specific property could be discounted between 0.5 and 0.6 percent per decibel when compared with a similar property that is not impacted by aircraft noise. However, additional indications are that the discount for property values as a result of noise would be higher for noise levels above 75 dB DNL (Nelson, 2003).

4.6.2 Alternative 1 (Preferred Alternative)

Socioeconomics

Population

As stated in Sections 4.3 and 4.5, no off-base property would experience noise levels above 65 dB DNL from the change in ULZ flight operations, and therefore, actions associated with this alternative would remain compatible with current land uses. Therefore, Alternative 1 would not result in impacts to population or changes in population trends.

Economic Activity

There would be no socioeconomic impact to major industries such as agriculture, agribusiness, and forestry operations in Lowndes and Lanier Counties since Alternative 1 would not result in additional restricted access or conflicting land uses with these activities. The proposed ULZ modifications would generate additional employment in the local region, particularly in the construction industry. However, local benefits would be minor and temporary to employment and economic activity for the duration of the construction project. Cost savings of over $1.6 million annually to the Air Force would be realized by conducting ULZ training locally.

Property Values

Empirical evidence would suggest a negative relationship between aircraft noise and property values in areas where noise levels are 65 dB DNL or higher (Espey and Lopez, 2002). Under Alternative 1, off-base average noise levels shown in Figure 3-3 would not change from baseline conditions. No residences would be exposed to noise levels of 65 dB DNL or greater, and the change in ULZ flight operations at Bemiss Field would not be expected to impact property values. However, as discussed in Section 4.3, members of the public affected by the noise levels over the 65 dB DNL threshold may be annoyed by overflights; however, the scope of those impacts would not be expected to be perceived as significant.

Recreation

As discussed in Section 3.3.2, noise in the vicinity of recreational areas occurs due to mission activities on Grand Bay Range. Under Alternative 1, this noise would continue but the change in ULZ flight operations at Bemiss Field would not exceed 65 dB DNL in the Grand Bay WMA or Banks Lake NWR (which is open during the week when military operations occur), and therefore would remain compatible with the current uses. However, recreational users may be annoyed by overflights of transient aircraft, particularly those users who highly value the tranquility or absence of man-made sound as part of their recreational experience. Based on analysis of noise provided in Section 4.3, noise impacts over current levels are not expected to be significant, and therefore would not have significant impacts to recreation in the area. The number of recreational days open to the public would not be impacted under this alternative.

4.6.3 No Action

Socioeconomics

Under the No Action Alternative, there would be no changes to existing socioeconomic conditions from baseline conditions. Potential cost savings of over $1.6 million annually from localized training would not be realized under this alternative.

4.7 CULTURAL RESOURCES

This section discusses potential impacts to cultural resources, including any historic and prehistoric resources located within and adjacent to Bemiss Field.

4.7.1 Analysis Methodology

Analysis focuses on assessing the potential for impacts to culturally sensitive areas such as archaeological sites and historic structures from tree clearing and other proposed activities and on identifying methods to reduce the potential for adverse effects to cultural resources from these activities.

Potential impacts to cultural resources can occur by physically altering, damaging, or destroying a resource or by altering characteristics of the surrounding environment that contribute to the resource's significance. Resources can also be impacted by neglecting the resource to the extent that it deteriorates or is destroyed. Adverse effects occur when these activities intersect with identified NRHP-eligible resources within the area of potential effect.

4.7.2 Alternative 1 (Preferred Alternative)

Bemiss Field does not contain any resources identified as eligible for listing on the NRHP and as such, there is little potential to adversely affect cultural resources. Moody AFB completed consultation with the Georgia SHPO on June 11, 2015, for concurrence on a finding of no adverse effect to cultural resources and coordinated with 12 Federally recognized Native American tribes for concurrence on no effect to TCPs (a list of these tribes is provided in Chapter 7). Native American tribes were invited to comment on potential impacts to cultural resources as a result of the Proposed Action during the preparation of this EA. All formal correspondence with the SHPO and the tribes are included in Appendix A and a synopsis of government-to-government consultations is presented in Section 1.5 of this document.

Although there are no historic structures considered eligible for or listed on the NRHP that would be directly impacted by the proposed activities, potential indirect impacts such as visual or auditory effects to historic structures must also be considered. Auditory effects of the Proposed Action can be seen on Figure 3-5 (Historic Structures in a 2 Mile Radius of Bemiss Field). As 65 dB is typically the level at which humans register annoyance to sound and no structures fall within these noise contours, impacts to cultural resources resulting from the auditory effects of flight operations is unlikely.

An analysis of visual impacts considers the visual sensitivity of an area, taking into account local social considerations of landscapes and historic resources. These considerations are addressed as visual sensitivity or the degree of public interest in a historic resource and any concerns with adverse changes in the quality of that resource (Global Security, n.d.). As Moody AFB and Bemiss Field have been a part of the local community for 74 years and aircraft operations are common in this particular local community, new aircraft of approximately the same size and shape flying in similar frequencies would likely not present a change to the perceived environment. The main issues to be considered in this case are visual impacts from demolition or construction activity (Global Security, n.d.). As none of the proposed activities occur near historic structures and owing to the surrounding trees around the Bemiss Field area, visual impacts from any of the proposed development activities are not likely.

Aircraft overflights within the viewshed of an historic property have the potential to affect the visual sensitivity of the resource. As the Proposed Action adds approximately 100 transient flight operations per year, such effects would be temporary and infrequent. Within the 2 mile buffer around Bemiss Field, aircraft would be flying for a few minutes at an altitude of 500 feet or lower as part of takeoff and landing sorties; similar activities associated with ongoing air drops are already occurring at Bemiss Field. Visual effects to any overflown historic property would be sporadic and temporary, given the infrequency of flights, and the current level of flight operations in and around Bemiss Field.

In the case of inadvertent discovery of cultural resources, work on-site would cease and the discovery would be immediately reported to the cultural resource manager who would initiate the Section 106 process. Additionally, the archaeological site must be treated as potentially eligible for listing on the NRHP until the Georgia SHPO has concurred that the site is not eligible and Air Force activity can then resume (U.S. Air Force, 2012b).

4.7.3 No Action Alternative

Under the No Action Alternative, impacts to cultural resources would not be expected.

4.8 BIOLOGICAL RESOURCES

4.8.1 Analysis Methodology

Analysis of biological resources considered potential impacts to vegetation (individual plants and vegetation communities) and wildlife, including sensitive species. The plant and animal resources potentially affected are identified based on habitat type and previously documented occurrence. The analyses included an assessment of impacts resulting from habitat alteration (tree clearing and wetland impacts), noise and other disturbance, lighting, and the potential to physically impact individual specimens. Where appropriate, projected conditions were compared with baseline conditions and a determination was made as to whether impacts would be adverse. Direct and indirect impacts are included in the analyses. An adverse impact would degrade habitat quality or diminish species health. A significant adverse impact would be one that is likely to jeopardize the continued existence of a species, or to result in an overall decrease in population diversity, abundance, or fitness.

Moody AFB completed ESA Section 7 consultation with the USFWS on May 14, 2015; the USFWS concurred on a finding of may affect, but not likely to adversely affect, protected species (see Appendix A). The Georgia DNR was provided a copy of the Draft EA for review; the DNR responded by providing a list of sensitive species from within their Natural Heritage Database identified as occurring within 3 miles of the project area; all species were previously identified in Table 3-8. The DNR also recommended consultation with the USFWS regarding impacts to sensitive species; as discussed previously, this consultation was completed on May 14, 2015. DNR correspondence is also provided in Appendix A.

4.8.2 Alternative 1 (Preferred Alternative)

Potential impacts to biological resources are evaluated for each of the principal activities, including tree clearing, construction and renovation activities, lighting installation, and flight operations.

Tree Clearing

Approximately 37 acres to the north of the existing runway would be clear cut of trees, including about 31 acres of wetland habitat. Impacted habitat is characterized as maintained airfield, slash pine, bay swamp, and cypress dome, with bay swamp and cypress dome comprising the majority of the cleared area. To the south, 32 total acres would be clear cut, including 11 acres of wetlands. Habitat types include pine plantation, bay swamp, and slash pine. Some trees would be selectively cut in longleaf pine habitat. In addition to trees, understory vegetation could be affected to some degree as well. Disturbance during clearing activities would result in short-term displacement of wildlife in the immediate vicinity and could result in injury or mortality to a small number of less mobile or burrowing individuals (mobile species such as adult birds would generally be able to avoid physical impacts). Animal species in the project area may be habituated to human activity to some degree due to ongoing Air Force activities, and individuals would likely return to the area after completion of the clearing activities.

Surveys for gopher tortoise burrows have been conducted and protection controls would be implemented to minimize the chance that vehicles or other equipment associated with tree clearing could crush individual tortoises and collapse burrows. These controls could include a combination of flagging burrows, installing temporary protective covers, relocating individual tortoises, and providing contractor education. Also, heavy equipment should be staged in areas free of tortoise burrows. Tortoise burrow locations identified in 2012 occur near but not directly within areas that would be cleared, including the parking area, fire station, and road improvement area (Figure 3-6). After tree removal and other clearing activities are completed, tortoises could still use the affected areas, as soil composition and slope would be largely unaffected. Tortoises are known to re-excavate burrows after they have been disturbed.

Eastern indigo snakes could be impacted by tree clearing activities, although the probability is low due to the apparent scarcity of this species. Potential impacts could include crushing by vehicles or other equipment, displacement, and disturbance. Indigo snakes could also be affected if gopher tortoise burrows were damaged or collapsed due to their close association with such burrows. The gopher tortoise protection measures described above would therefore also provide protection for indigo snakes. In addition, contractor personnel would receive education regarding indigo snake identification. If an indigo snake were sighted, personnel would halt tree clearing activities and would contact base environmental personnel.

In addition to temporary disturbance and the potential for physically impacting some individual plants and animals, tree removal would represent long-term habitat loss. Trees in the project area may support foraging, nesting, and other activities for mammals and birds, including migratory birds. For example, bald eagles use wetlands for foraging on the base, although the Bemiss Field area is not a principal area. However, the impact to birds and other wildlife would be lessened by the amount of similar habitat available in the vicinity. A relatively large area of wetland and upland habitat is available between Bemiss Field and the main base and also to the west in the Grand Bay WMA and north in the Banks Lake NWR. The Proposed Action would disturb less than 100 acres of habitat within a surrounding ecosystem of approximately 12,000 acres in size. Consequently, although individuals could be displaced and experience displacement or mortality, impacts would be minor at the population level. In order to minimize the potential to impact nesting migratory bird species, tree clearing would be avoided during times of increased migratory bird activity to the extent practical. Increased activity typically occurs in September/ October and April/May.

About 31 acres of wetland habitat would be cleared of trees north of the landing zone, and about 11 acres would be cleared to the south. Vegetation composition in the cleared wetland areas could become shrubby habitat with an herbaceous periphery, which could in turn attract some wading bird species, as well as passerines such as the red-winged blackbird (*Agelaius phoeniceus*). Bird attraction could result in increased incidences of bird-aircraft strikes. The potential for increased bird strikes is discussed in the *Flight Operations* subsection below.

Soil disturbance during tree clearing activities could result in erosion of sediments and pollutants into the surrounding wetlands, thereby reducing water quality and value as wildlife habitat. Forestry best management practices (BMPs) would be employed to minimize erosion and sedimentation associated with silvicultural activities. Other erosion control practices would be implemented to minimize erosion and sedimentation from associated construction activities. As a result, the Air Force has not identified significant impacts associated with tree clearing.

Construction and Renovation

The proposed staging area, latrine facility, and fire station occur in similar habitat consisting of scattered to moderately dense pine and hardwood trees, and are most closely associated with slash pine habitat according to available spatial data. No wetlands are identified at the sites. The staging area and latrine would result in removal of about 1,000 square feet of trees and other vegetation for the parking area, and about 1.5 acres of trees to provide line-of-sight to the ULZ. The fire station would result in removal of about 4,000 square feet of trees and other vegetation. Impacts to biological resources would be similar to those described for the other tree clearing.

Numerous wildlife species may use the areas for foraging, nesting, and shelter. The staging area site is located near the disturbed and maintained airfield zone, which is not considered quality wildlife habitat, but likely provides forest edge habitat that is attractive to some species. Tree removal and renovation would result in temporary disturbance during the activities, in addition to long-term habitat loss. However, the quantity of habitat lost would be small compared to other, similar habitat in the vicinity, and disturbed species would likely return to the affected area after construction completion. The proposed staging, latrine facility, and fire station locations are within an established gopher tortoise colony (Figure 3-7). Indigo snakes have the potential to occur at the sites as well. Surveys and protection measures described for tree clearing activities would also apply to activities in this area.

The roadway connecting the staging area and ULZ mostly traverses maintained landscape associated with the airfield. Installation of underground electrical lines for ULZ lighting would occur in the same type of habitat. Vegetation consists primarily of grasses and forbs which are periodically mowed. These areas have reduced value as wildlife habitat. Short-term displacement may occur as animals leave the area during construction activities and return once activities are completed. Gopher tortoise burrows were identified near the proposed roadway in 2012 (Figure 3-6). The tortoise protection measures discussed previously would be implemented. In addition, the erosion control measures identified above would be implemented. The Air Force has not identified any significant impacts associated with construction and renovation activities.

Installation of ULZ Lighting

Temporary use of artificial lighting at Bemiss Field would not result in any significant impacts to biological resources. Vegetation growth, bird migration and foraging, and activities of other wildlife species would be unaffected at the population level.

Flight Operations

Alternative 1 would result in an increase of about 100 flight operations annually, a change in the distribution of flight profiles, and an associated change in the noise environment. Potential impacts to wildlife would include a potential increase in the number of bird/wildlife-aircraft strikes and noise-related disturbance. The possibility of direct animal strikes during airdrops is considered remote due to the relative infrequency of these activities and their occurrence in cleared areas, which are expected to support less wildlife than nearby undeveloped habitat.

The increase of 100 operations would occur within the context of over 76,000 annual operations in the overall Grand Bay Range (of which Bemiss Field is a part). In addition, all new operations would be subject to the existing BASH Plan. Given the existing operational conditions, as well as the procedures provided in the BASH Plan, there would be no significant impacts to resident or migratory bird populations or other wildlife species due to bird/wildlife-aircraft strikes.

Alternative 1 would result in a small degree of increased noise at the ULZ. Aircraft noise and visual presence may disturb wildlife and disrupt natural behaviors or occurrence, including temporary displacement of individuals. However, animal species are likely habituated to aircraft presence to some degree due to ongoing operations at the ULZ and the weapons range in general, including ongoing HC-130 airdrops and helicopter landings at Bemiss Field. Many individuals startled by noise may resume normal activities soon after training events are completed. It is not likely that hearing damage would occur to enough individuals to affect the overall population health of any species. Overflights of the Banks Lake NWR would occur at a minimum altitude of 1,500 feet, which would decrease the level of noise impact to this important natural area. There would be no long-term, population-level reactions or significant behavior modifications due to visual aircraft sightings or noise.

4.8.3 No Action

Under the No Action Alternative, the ULZ would not be modified and there would therefore be no tree clearing, construction, renovation, lighting installation, or changes in number or profile of training flights. There would be no associated habitat removal or alteration, behavioral disturbance, or physical impacts to wildlife species, including sensitive species as defined in Section 3.8.1. There would be no significant effects to biological resources under the No Action Alternative.

4.9 WATER RESOURCES

4.9.1 Analysis Methodology

The first step in the analysis of potential impacts to water resources was to determine the locations of these features in relation to Alternative 1. The Moody AFB INRMP (Moody AFB, 2013a), U.S. Geological Survey 7.5-minute quadrangle maps (1:24,000 scale), USDA soil survey data, other water resource survey reports at the base, and the Air Force's GIS data were examined to delineate the resources on the base.

Areas where the project area overlapped with water resources were identified and studied. Scientific literature was reviewed for studies that examined similar types of impacts to these resources. Impact analyses were then conducted based on the information gathered from the literature review.

Criteria for evaluating impacts related to water resources are water availability, water quality, loss of a particular resource and/or its functions, and adherence to applicable regulations. Impacts are measured by the potential to (1) reduce water availability or supply to existing users, (2) endanger public health or safety by causing decreased surface water or groundwater quality, or (3) violate laws or regulations adopted to protect or manage water resources. Impacts are also measured by evaluating whether there would be a temporary or permanent loss of wetlands or floodplains or a loss or reduction in their ability to perform their unique functions. An impact to water resources would be significant if it would (1) adversely affect water quality or endanger public health by contributing pollutants to surface water or groundwater, (2) threaten or damage hydrologic characteristics, (3) cause the permanent loss of wetland or floodplains, or (4) violate established laws or regulations that have been adopted to protect or manage water resources of the area.

4.9.2 Alternative 1 (Preferred Alternative)

Surface Water

Alternative 1 would not have any adverse effects on surface water resources at Moody AFB. No streams, ponds, or lakes would be affected by the proposed ULZ improvements or aircraft operations.

Groundwater

Alternative 1 is not anticipated to have any adverse effects on groundwater resources at Moody AFB. Construction of a new fire station would increase the area of impervious surface near Bemiss Field by approximately 4,320 square feet, which should not interfere with recharge into the surficial aquifer. The addition of a well drawing from the Floridan aquifer system would require a modification to the Moody AFB drinking water system permit issued by the Georgia DNR, Environmental Protection Division. With application of BMPs as required and adherence to permit stipulations no adverse effects to groundwater resources are anticipated. Because the new fire station would only be operational a few hours at a time, associated water use is anticipated to be low in volume.

Wetlands

The Air Force has not identified any significant impacts to wetlands.

All wetlands associated with the APZ, approach–departure clearance surface, and Clear Zone on the north and south ends would be cleared to comply with ETL 09-6 clearance requirements. As discussed previously, EO 11990 (*Protection of Wetlands*) requires Federal agencies to avoid, to the extent possible, the long- and short-term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative. In the case of Alternative 1, there is no practicable alternative to the modification of the land area within the 35:1 approach/departure plane at Bemiss Field that meets the purpose and need for the Proposed Action. Without the clearance of this area, the ULZ would not be usable for fixed-wing aircraft as intended. However, the wetlands would not be destroyed or filled; tree clearing would result in a change of wetland type from forested wetland to emergent wetland, but no net change in wetland acreage would occur. Per consultations with the USACE and Moody AFB personnel, because tree stumps would be left in place neither a CWA Section 404(f) permit (and any associated wetland mitigation bank credits) nor an NPDES permit would be required for the clearance zone activities.

Actions under Alternative 1 would result in the permanent conversion of 36.55 acres of forested wetlands and (of which there are more than 5,000 acres on Moody AFB, to include Grand Bay Range) to emergent wetlands. The logging of forested wetlands in the affected areas would be accomplished through a timber sale. The timber harvest would include approximately 36.54 acres to be clear cut and a total of 0.01 acre that would selectively cut. Timber would be removed from clear-cut areas utilizing high-flotation, low-pressure logging equipment and all stumps would be left intact. In selectively-cut areas trees would be cut and left in place. The timber harvest would adhere to applicable forestry BMPs (e.g., Georgia Forestry Commission, 2009). These forested wetlands and 9.18 acres of scrub-shrub wetlands associated with the south end of the runway would be maintained in a nonforested state as long as the ULZ is utilized. Tree removal, land clearance and grading associated with the fire station, road improvements, and line-of-sight from the staging area to the airfield is more than 1 acre in size and would therefore require an NPDES permit.

The logged areas in wetlands would continue to function as wetlands, although vegetation would be managed using periodic woody vegetation treatments such as selective herbicide treatments, prescribed burns, mowing, or other treatments to prevent trees and shrubs from becoming reestablished and reaching maturity at the site. The use of woody vegetation treatments would not adversely affect the wetlands; the wetlands would still be able to function because emergent vegetation would not be affected. Additionally, there is currently a deficit in open water in the entire Grand Bay-Banks Lake ecosystem, and creating more open water within the ecosystem is one major goal of the INRMP (Page 103, Principal Goal II, Supporting Goal 3, Objective 3 in the 2013 INRMP [Moody AFB, 2013a]). No wetlands would be filled or otherwise converted to nonwetland habitat so the proposed action would not cause any loss of wetlands at the affected areas.

Floodplains

The northern end of the Bemiss Field runway, Clear Zone, APZ, and approach-departure clearance surface are within a designated floodplain; approximately 37 acres would be affected. However, under Alternative 1 the only activity that would occur within flood zones is tree clearing as required to comply with ETL 09-6 clearance requirements. EO 11988, *Floodplain Management*, requires avoidance of floodplain disturbance unless there is a practicable alternative. However, the proposed activities would not permanently affect the functionality or utility of the floodplain and as discussed in Chapter 2, there is no practicable alternative to disturbance of floodplains. Therefore a Finding of No Practicable Alternative has been made by the Air Force. No structures would be constructed in floodplains. Therefore, there would not be any adverse effect on floodplain resources or functions.

4.9.3 No Action

Under the No Action Alternative, none of the proposed activities would occur, and there would be no new impacts to water resources at Bemiss Field. Existing water resources would be maintained in their current state, and no special mitigation measures would be required.

4.10 EARTH RESOURCES

4.10.1 Analysis Methodology

Exposure to potential geologic hazards, potential for soil erosion and soil limitations are considered when evaluating impacts to soils and geology. Generally, impacts can be avoided or minimized if proper construction techniques, erosion control measures, and structural engineering designs are incorporated into project development. Analysis of impacts to soils and geology examines the suitability of locations for proposed operations and activities.

Impacts to soils can result from earth disturbances that expose soil to wind or water erosion. Impacts resulting from geologic hazards can occur where the potential for harm to persons or property is high due to existing hazards.

4.10.2 Alternative 1 (Preferred Alternative)

For ground-disturbing activities associated with fire station and staging area construction, road improvements, and line-of-sight tree clearing and grading, an NPDES permit and a land-disturbing permit per the Georgia Erosion and Sedimentation Control Act would be required. Under the permit, Moody AFB would be required to implement BMPs as part of the *Erosion, Sedimentation & Pollution Control Plan* requirements. These BMPs, such as silt fences or hay bales during construction, are recommended and would serve to mitigate any potential impacts to soils. The addition of a well would require a modification to the Moody AFB drinking water system permit issued by the Georgia DNR, Environmental Protection Division. With application of BMPs as required and adherence to permit stipulations, potential impacts to soil resources and groundwater recharge areas would not be anticipated.

The majority of activity associated with Alternative 1 would occur on Johnston loam soils. A small area of Stilson loamy sand (7.3 percent) that is considered to be suitable farmland soil would be disturbed during tree clearance. The small disturbance footprint would negligibly impact the utility of this soil type, since it is not currently used for, nor are there future plans to utilize the parcel for, agricultural purposes. Ground disturbance during tree clearing, road improvement, and site preparation activities could result in soil erosion within the project area. The use of BMPs and appropriate construction considerations would reduce any potential impacts from erosion during these activities. The Air Force has not identified any significant impacts to earth resources.

4.10.3 No Action Alternative

The No Action Alternative would not result in any additional impacts to soils or geologic resources within and adjacent to Bemiss Field.

4.11 INFRASTRUCTURE

This section discusses potential impacts to utilities and transportation.

4.11.1 Analysis Methodology

Utilities analysis focused on assessing the existing utility capacity to accommodate increases or decreases in usage, identifying potential problems related to connecting to existing utilities, and identifying coordinating and procedural requirements associated with establishing new utility infrastructure.

EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*, sets numerous Federal energy requirements and goals that should be considered in the design, construction, and operation of the Bemiss Field ULZ modifications. These include increasing alternative and renewable energy use, pursuing cost-effective, innovative strategies to minimize consumption of energy, water, and materials within existing building systems, and identifying alternatives to renovation that reduce existing asset deferred maintenance costs.

Potential impacts to transportation are assessed with respect to the potential for disruption or improvement of existing levels of service and changes in existing levels of transportation safety. Impacts may arise from physical changes to circulation, construction activities, and introduction of construction-related traffic. Adverse impacts on roadway capacities would be significant if roads with no history of capacity exceedance had to operate at or above their full design capacity as a result of an action. Transportation effects may arise from changes in traffic circulation, delays due to construction activity, or changes in traffic volumes.

4.11.2 Alternative 1 (Preferred Alternative)

The Air Force has not identified any significant impacts to utilities and/or infrastructure; Alternative 1 would have a minimal impact on utility use and infrastructure. Electricity for the new ULZ lighting and renovated latrine facility would be supplied by Colquitt EMC via a tie-in to an existing electrical box located just west of the latrine facility. As described in Section 2.6.1, approximately 7,900 linear feet of new underground electrical lines would be installed. Electricity would also be needed for the proposed fire station. This would require a new electrical transformer to be installed by Colquitt EMC to replace the existing one near the DNR facility, which is not large enough to handle capacity for the new facility. Energy efficient or natural lighting would be utilized at the latrine facility and electrical usage would be negligible. At the fire station, two 10-kilowatt (kw) heaters would be installed in the truck bays and a small electric heat pump would be installed for the occupied part of the facility. There would be a microwave oven and coffee pot but no other appliances. The facility would also be equipped with energy efficient lighting.

Water for the renovated latrine facility would be supplied by the existing non-potable well and sanitary wastewater from the toilet(s) would discharge to the existing septic field. It is unknown at this time if either the water well or septic system would need to be repaired to once again make them operational. Water to the fire station would be provided from a new deep water (approximately 125 to 175 feet deep) potable well that would be installed into the Floridan aquifer. Water from the well would not be treated at the well and the Bioenvironmental Engineering Element would conduct monthly samples to ensure continued potability. The new well would be added to the Moody AFB drinking water system permit issued by the Georgia DNR, Environmental Protection Division. Because fire station personnel would only be on-site for landing operations and not full-time, water use would be minimal. Water from the well would not be used to fill the fire trucks. A small septic tank and drain field would also be installed for the facility. There would be no drains in the truck bays and no oil-water separators. The use of low-flow faucets and toilets at the latrine facility and the fire station would help to further conserve water.

There would be no adverse impacts to transportation. Minor road improvements are proposed in the immediate vicinity of Bemiss Field (Section 2.6.1) but no new road construction would be required. The majority of vehicle trips to Bemiss Field would continue to utilize base roads and trails (e.g., Burma Road). Vehicles supporting the proposed construction/renovation actions may utilize the access to the area from Lakeland Highway but these trips would be infrequent and temporary. Vehicles transporting personnel from the base to the fire station could also occasionally utilize Lakeland Highway instead of the on-base roads/trails.

4.11.3 No Action

The No Action Alternative would not result in any additional utility or transportation impacts beyond the scope of normal conditions and influences within the ROI.

5. CUMULATIVE IMPACTS

According to CEQ regulations, cumulative effects analysis should consider the potential environmental impacts resulting from "the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions" (40 C.F.R. § 1508.7). Cumulative effects may occur when there is a relationship between a proposed action or alternative and other actions expected to occur in a similar location or during a similar time period. This relationship may or may not be obvious. The effects may then be incremental (increasing) in nature, resulting in cumulative impacts.

Actions overlapping with or in proximity to a proposed action or alternative can reasonably be expected to have more potential for cumulative effects on "shared resources" than actions that may be geographically separated. Similarly, actions that coincide temporally tend to have a greater potential for cumulative effects.

Analysis was conducted by first identifying past, present, and reasonably foreseeable actions as related to the ROI for the particular resource. Cumulative impacts were then identified if the combination of proposed actions and past, present, and reasonably foreseeable actions were to interact with the resource to the degree that incremental or additive effects occur.

5.1 PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS

There are many ongoing activities at Moody AFB to support current and future goals of the base operations. As funding becomes available, there may be opportunities to upgrade, renovate, or expand existing mission activities or bed down new programs at the base. Based on Moody AFB 23d Wing Facilities Board meeting notes, more than 50 potential development projects have been identified for upcoming fiscal years (U.S. Air Force, 2014c). Examples of past, ongoing, and future projects include development of a new base access gate, various cantonment development projects, and military housing construction, respectively. There are no past, present, or reasonably foreseeable actions within the immediate vicinity of Bemiss Field other than ongoing training activities at Grand Bay Range and agricultural activities on off-base property, which have already been described as part of the baseline condition in this EA.

5.2 AIRSPACE MANAGEMENT AND USE

The proposed R-3008A/B/C weather category change would permit utilization of Grand Bay Range during periods of instrument flight rule (IFR) operations. This change would increase the overall training capacity of Grand Bay Range, but would not be expected to have any direct and substantive effect on operations at the Bemiss Field ULZ. The ULZ is not currently equipped to accommodate instrument approaches, and the proposed conversion of Grand Bay Range to visual flight rule (VFR)-IFR would not be expected to affect the VFR operations that are conducted at the ULZ. The proposed change would affect Grand Bay Range operations during time periods when the ULZ could not be used (i.e., when VFR weather minimums are not met).

There is a proposal under FAA review to expand the timeframe during which restricted areas R-3008A, B, C, and D may be activated without prior issuance of a NOTAM. Over the years, use of these restricted areas has routinely extended beyond the published hours (7:00 AM to 10:00 PM, Monday through Friday). This has required daily issuance of a NOTAM for expanded hours that routinely occur until 1:30 AM on Monday through Thursday. The proposed amendment would change the published operating hours on Monday through Thursday to 1:30 AM while keeping Friday operating hours the same. This change would have no effect on the current pattern of operations, as late-night operations are currently being conducted through the use of daily NOTAMS. The only expected effect of the proposal currently being considered by the FAA would be to eliminate the need for daily NOTAMS. Because the proposed R-3008A, B, C, and D operational hours were previously assessed and because late-night operations are already occurring under baseline conditions, the actual execution of the administrative change to operating hours would have a negligible effect either alone or cumulative with the proposal to commence ULZ operations at Bemiss Field.

5.3 AIR QUALITY

Under Alternative 1, air quality impacts and emissions associated with land clearing would be temporary. Depending on the timing of capital and infrastructure improvement projects occurring on Moody AFB and in the surrounding community, incremental increases in fugitive dust and volatile organic compound emissions could result from construction activities. However, emissions from several, simultaneous projects are not likely to result in temporary or long-term combined emissions that would exceed county significance criteria or negatively affect attainment status.

Further, the increase in aircraft emissions would be minimal and not likely to adversely affect regional air quality. As a result, the Air Force has not identified any substantive cumulative impacts to air quality.

5.4 NOISE

As described in Section 5.2, the proposed R-3008A/B/C weather category change would increase the overall training capacity of Grand Bay Range but would not be expected to have any direct and substantive effect on operations at the Bemiss Field ULZ. Incremental in the frequency of operations at Grand Bay Range associated with this action would result in minimal noise increases (i.e., less than 1 dB DNL) at Bemiss Field ULZ and these impacts are being considered as part of a separate NEPA document. Impacts of the proposed weather category change taken together with impacts associated with the proposal to commence ULZ operations at Bemiss Field would not be expected to be considered significant in nature.

There is a proposed expansion of the timeframe during which restricted areas R-3008A, B, C, and D may be activated without prior issuance of a NOTAM would not be expected to have any effect on baseline patterns of usage at Bemiss Field ULZ (see Section 5.2). As there would be no changes to operations associated with this action, no noise impacts would be expected to occur. There would be no cumulative noise impacts associated with implementing this action taken together with the commencement of ULZ operations at Bemiss Field.

5.5 SAFETY

When considered with other ongoing training activities on Moody AFB, use of Bemiss Field for aircraft landings would not result in any substantive cumulative effect on the safety condition surrounding Bemiss Field or at Moody AFB in general given that Bemiss Field is currently used for aircraft training activities.

5.6 LAND USE

There would be negligible changes to land use and no incompatible uses associated with Alternative 1 or the No Action Alternative. As a result, no cumulative impacts to land use have been identified.

5.7 SOCIOECONOMICS/ENVIRONMENTAL JUSTICE

Past, present, and reasonably foreseeable actions include changes in the number and types of flight operations and construction activities at Moody AFB and on Grand Bay Range. These changes would result in impacts to socioeconomic resources, which would maintain Moody AFB's presence as a major economic contributor to the two-county ROI. Construction activities, flight operations, and possible mission changes would be associated with personnel changes that would likely create a steady demand or increase in demand for socioeconomic resources, which could be beneficial to the local economy. Potential cumulative adverse impacts could include additional noise and safety concerns. Additionally, increased demand for land in areas of population growth could put added pressure on agricultural and forested lands near the base to convert to residential uses. However, continued tax incentives, natural barriers, reductions in public funding and zoning restrictions could negate the pressures or potential development opportunities in certain parcels surrounding the base.

Moody AFB along with local governments in Lowndes County and Lanier County would continue to coordinate activities to promote economic growth and implement EO 12898 and EO 13045 in order to avoid disproportionate impacts to environmental justice areas of concern and special risks to children. Therefore, no cumulative impacts to environmental justice resources would be anticipated from past, present, and reasonably foreseeable projects at Moody AFB and on Grand Bay Range.

5.8 CULTURAL RESOURCES

In regard to past, present, or future actions, if adverse effects are anticipated to occur to resources on Moody AFB, adherence to the Section 106 process in the NHPA, and standard operating procedures set forth in Moody AFB *Integrated Cultural Resources Management Plan* would be followed. Since there are no identified impacts to cultural resources, no cumulative impacts are expected for this resource area under this action in conjunction with other past, present, or future proposed actions.

5.9 BIOLOGICAL RESOURCES

Potential cumulative impacts to biological resources would be associated with actions undertaken by Moody AFB that could affect similar forested and wetland habitats and the wildlife species associated with them. Multiple small, incremental effects can become pronounced if they reach some threshold of significance. For example, multiple actions that individually cause a small amount of habitat fragmentation could eventually result in an area becoming essentially unusable for wide-ranging species such as the indigo snake. Such effects could be magnified by the consequences of similar activities conducted by other entities outside the installation.

The types of biological resources affected by Alternative 1 are also affected by other ongoing and possible future activities at Moody AFB. Vegetated upland and wetland habitats have occasionally been altered, and may be further altered in the future, for training activities. The number of aircraft operations and other noise-producing activities could increase in the future, resulting in increased disturbance to wildlife. The aircraft operations described in this document would not likely contribute in any substantive manner to direct bird and wildlife strikes or disturbance at the population level, as the increases in number (total and low-altitude) are fairly minimal. Although some upland pine habitat and about 60 total acres of wetlands would be impacted, and wildlife species relying on these habitats would be affected to some degree, it is not anticipated that the overall health or viability of wildlife populations, including sensitive species and those species protected by Federal laws, would be substantively impacted. Substantial areas of similar habitat occur in the vicinity, including on base property, although future incremental habitat eradication or alteration could remove some of this habitat. Effects due to artificial lighting are expected to be marginal within the context of existing lighting in the region. Moody AFB manages and conserves forest and wetland resources on the installation, as described in the INRMP (Moody AFB, 2013a). Examples include wetland delineation, stormwater controls, wetland mitigation bank maintenance, selective tree removal and thinning, and prescribed burning, among others.

5.10 WATER RESOURCES

The cumulative impacts on water resources should take into account all surface-altering actions that have occurred or are likely to occur within or adjacent to Moody AFB. The most frequent effect of surface disturbance in this region is accelerated erosion and sediment deposition which may affect water resources by contributing sediment, introducing contaminants, or increased flooding. The primary cumulative impacts on surface water and wetlands would result from any increase in the acreage of earthmoving activities and accelerated erosion from roads and trails that have the potential to increase sediment delivery and surface water runoff downstream or introduction of chemical contaminants into surface waterbodies and wetlands. Cumulative impacts associated with groundwater would result from activities and projects that alter groundwater supply and demand or affect groundwater quality.

All proposed activities at Bemiss Field would comply with all Federal, state, or local regulations. In addition, Air Force environmental management regulations and policy would prevent potential adverse effects to water resources from proposed training activities. These measures include, but are not limited to, restricting vehicle access to existing roads, trails, and approved stream/wetland crossings; establishing protective buffers around streams and wetlands; use of BMPs to prevent soil erosion and sedimentation in streams and wetlands; and use of spill prevention measures to prevent contamination in surface waters, aquifers, or wetlands from fuel spills.

Adherence to all environmental management requirements and proposed mitigative measures would help to ensure that there would be minimal impacts to any water resources as a result of the proposed activities. Therefore, the Air Force does not expect any of the proposed training activities to incrementally contribute to other impacts to water resources at Moody AFB.

5.11 EARTH RESOURCES

As with water resources, any ground-disturbance activities would be required to comply with NPDES and land-disturbing permit requirements. Adherence to permit requirements and BMPs for erosion, sedimentation, and pollution control would minimize the potential for incremental impacts associated with soil erosion. Because the proposed tree clearing, road improvement, and site preparation/construction activities are minimal in terms of ground disturbance, any potential impacts would be short term. While the area is located within a groundwater recharge zone, and there is always a concern for groundwater contamination issues, the proposed activities would follow proscribed BMPs for soil erosion and are unlikely to introduce contaminants that could enter the groundwater. The Air Force has therefore not identified any substantive cumulative impacts to earth resources.

5.12 INFRASTRUCTURE

While Alternative 1 would have a negligible cumulative impact on utilities, there is no indication that the local utility infrastructure would not be able to handle the changes in utilization. No cumulative impacts have been identified for utilities or transportation.

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6. SPECIAL REQUIREMENTS AND OPERATING PROCEDURES

No substantive adverse impacts have been identified in this EA that would require mitigative measures. However, there are special requirements such as permits that have been identified that would be required for implementation of the Proposed Action. Additionally, special operating procedures have been identified that would serve to further minimize any identified adverse impacts. Special operating procedures are described as Standard Operating Procedures, which are those that are already part of standard management activities or other operations at Moody AFB, and Recommended Operating Procedures, which are not currently part of Moody AFB operations and are recommended to further minimize adverse impacts.

No special requirements or operating procedures have been identified for the following resource areas: Airspace Management and Use; Air Quality; Noise; Safety; Land Use; Socioeconomics/Environmental Justice; and Infrastructure.

6.1 CULTURAL RESOURCES

As standard operating procedure on Moody AFB, in the case of inadvertent discovery of cultural resources, work on-site would cease and the discovery immediately reported to the cultural resource manager who would initiate the Section 106 process. Additionally, the archaeological site must be treated as potentially eligible for listing on the NRHP until the Georgia SHPO has concurred that the site is not eligible and Air Force activity can then resume (U.S. Air Force, 2012b).

6.2 BIOLOGICAL RESOURCES

The following standard operating procedures would be implemented as part of normal natural resource management requirements on Moody AFB as outlined in the Moody INRMP.

- Provide contractor education on all protected and sensitive species that may be encountered, including potential occurrence, identification, and legal protection requirements. Species include wood stork, bald eagle, American alligator, eastern indigo snake, gopher tortoise, frosted flatwoods salamander, striped newt, round-tailed muskrat, alligator snapping turtle, hooded pitcher plant, yellow flytrap, and green-fly orchid. If any of these species are encountered during work activities, cease work and notify the Moody AFB Natural Resources Manager for further direction.

- Before construction activities begin, conduct surveys for gopher tortoise burrows and eastern indigo snakes that may be associated with the burrows. Stage heavy equipment away from any burrow locations. If burrows are found in the project sites, implement one or more of the following protection measures, as appropriate: (1) flag burrows; (2) install temporary protective burrow covers; and (3) relocate individual tortoises.
- During tree clearing in wetlands, avoid crushing or disturbing ponded areas to the extent practicable.
- Implement erosion control practices at all construction sites, which may include some or all of the following as appropriate: (1) use silt fences and/or other erosion control devices, and inspect and stabilize the devices until the soil is stabilized by natural vegetation; (2) re-establish vegetation on disturbed areas as soon as possible; and (3) use natural vegetation and grading techniques (e.g., vegetated swales, turn-offs, buffer strips) to prevent unvegetated areas from becoming stormwater conduits.

The following recommended operating procedure has been identified that would serve to further minimize any potential adverse impacts to biological resources. This procedure may be implemented at the installation's discretion and is not required to mitigate any significant adverse impacts.

- Conduct tree-clearing activities outside the typical times of increased migratory bird activity (September/October and April/May) to the extent practical.

6.3 WATER RESOURCES

The addition of a new groundwater well would require a modification to the Moody AFB drinking water system permit issued by the Georgia DNR, Environmental Protection Division.

Because the total amount of ground disturbance (not including the tree clearing at the north and south ends of the runway) under the Proposed Action is more than 1 acre, an NPDES General Permit issued by the Georgia DNR Environmental Protection

Division would be required for ground-disturbing activities associated with the line-of-sight area and staging area. Furthermore, a Lowndes County Land Disturbance Permit would be required in accordance with the Georgia Erosion and Sediment Control Act, the authority of which is delegated to Lowndes County. Under these permits, Moody AFB would be required to implement BMPs as part of the *Erosion, Sedimentation, and Pollution Control Plan* requirements.

Timber would be removed from clear-cut areas in wetlands utilizing low ground pressure logging equipment and all stumps would be left intact to minimize wetlands disturbance. The timber harvest would adhere to applicable forestry BMPs. In selectively-cut areas, trees would be cut and left in place. As previously stated, NPDES and CWA Section 404 permitting would not apply to this activity.

Initial clearing of nonforested wetlands would require periodic maintenance, such as selective herbicide treatments, prescribed burns, mowing, selective cutting, or other cultural treatments to prevent wetland trees and shrubs from becoming reestablished and reaching maturity at the site. If herbicides are used to control future regrowth, only those herbicides approved for use in wetlands and aquatic habitat would be used.

6.4 EARTH RESOURCES

Requirements for earth resources would be similar to those described previously for water resources.

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7. PERSONS / AGENCIES CONTACTED

Name	Title / Responsibility
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Gregory Lee	Moody AFB Environmental Element Chief
Mike Fletcher	Lowndes County Engineering Office
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U.S. Fish and Wildlife Service	
Georgia Environmental Protection Division	
Georgia Department of Community Affairs	
Georgia Wildlife Resources Division	
Georgia Historic Protection Division	
Georgia Department of Transportation	
South Georgia Regional Planning Council	
Lanier County Commission	
Lowndes County Commission	
Caddo Nation	
Alabama-Quassarte Tribal Town-Creek Nation of Indians	
The Cherokee Nation	
United Keetoowah Band of Cherokee Indians	
Muscogee (Creek) Nation	
Poarch Band of Creek Indians	
Thlopthlocco Tribal Town	
Seminole Nation of Oklahoma	
Seminole Tribe of Florida	
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APPENDICES

NOTE: In printed copies of this Environmental Assessment, the appendices can be found in the file on the compact disc located on the inside of the back cover.

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Appendix A

AGENCY AND TRIBAL COORDINATION/CONSULTATION AND PUBLIC INVOLVEMENT

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AGENCY CORRESPONDENCE

DEPARTMENT OF THE AIR FORCE
23D CIVIL ENGINEER SQUADRON (ACC)
MOODY AIR FORCE BASE GEORGIA

MEMORANDUM FOR FEDERAL, STATE, AND LOCAL PUBLIC AGENCIES

FROM: 23 CES/CD
3485 Georgia Street
Moody AFB, GA 31699-1707

SUBJECT: Proposed Bemiss Field Unimproved Landing Zone (ULZ) at Moody AFB, GA

1. The United States Air Force is in the process of preparing an Environmental Assessment (EA) at Moody Air Force Base (AFB) (Attachment 1), Georgia (GA) to assess the potential environmental consequences associated with utilizing Bemiss Field (Attachment 2) for ULZ training. Moody AFB is located in south central Georgia, north of the city of Valdosta. Bemiss Field is located in the southeast portion of the base, on Federal property in Lanier and Lowndes Counties, within the confines of Grand Bay Range, and within the airspace of Restricted Area 3008 (R-3008). At this time, the only alternative to the proposed action is the no action alternative, in which Moody AFB aircraft would continue to travel to other locations to accomplished required ULZ training.

2. The proposed action involves improvements to the existing Bemiss Field facility in order to meet airfield certification criteria required to utilize the field for military ULZ training. An operational ULZ at Bemiss Field would minimize the extra costs and transit time associated with travel to other ranges/ULZs to accomplish required training and increase the proficiency of Moody AFB aircrews. Physical improvements will include removal of approximately 60-acres of forest on each end of the ULZ to meet fixed wing approach slope clearance requirements, and installation of a concrete pad for required crash-fire-rescue equipment. Proposed flight operations at the Bemiss Field ULZ will include north and south fixed wing traffic patterns oriented on the east side of the runway within the restricted area airspace. Moody AFB proposes that 300 HC-130 flight operations, 75 HH-60 flight operations, and 150 transient flight operations would be conducted annually on Bemiss Field. Bemiss Field is currently a 4100 foot unimproved former auxiliary field used as a Landing Zone for HH-60 and other rotary wing aircraft, a ground training area for battlefield airmen, and as a drop zone for HC-130 and transient aircraft. The proposed action would not increase the total number of annual sorties to R-3008.

3. The EA for the proposed action will be prepared in compliance with the National Environmental Policy Act of 1969, 42 United States Code (USC), the Council on Environmental Quality NEPA Regulations, 40 Code of Federal Regulations (CFR), and the Air Force's Environmental Impact Analysis Process, 32 CFR 989. As part of this EA, we request your assistance in identifying potential areas of environmental impact to be addressed.

4. If you have any specific items of interest about the proposal, we would like to hear from you within 30-days of receipt of this letter. Please contact the EA Project Manager, Mr. Hank

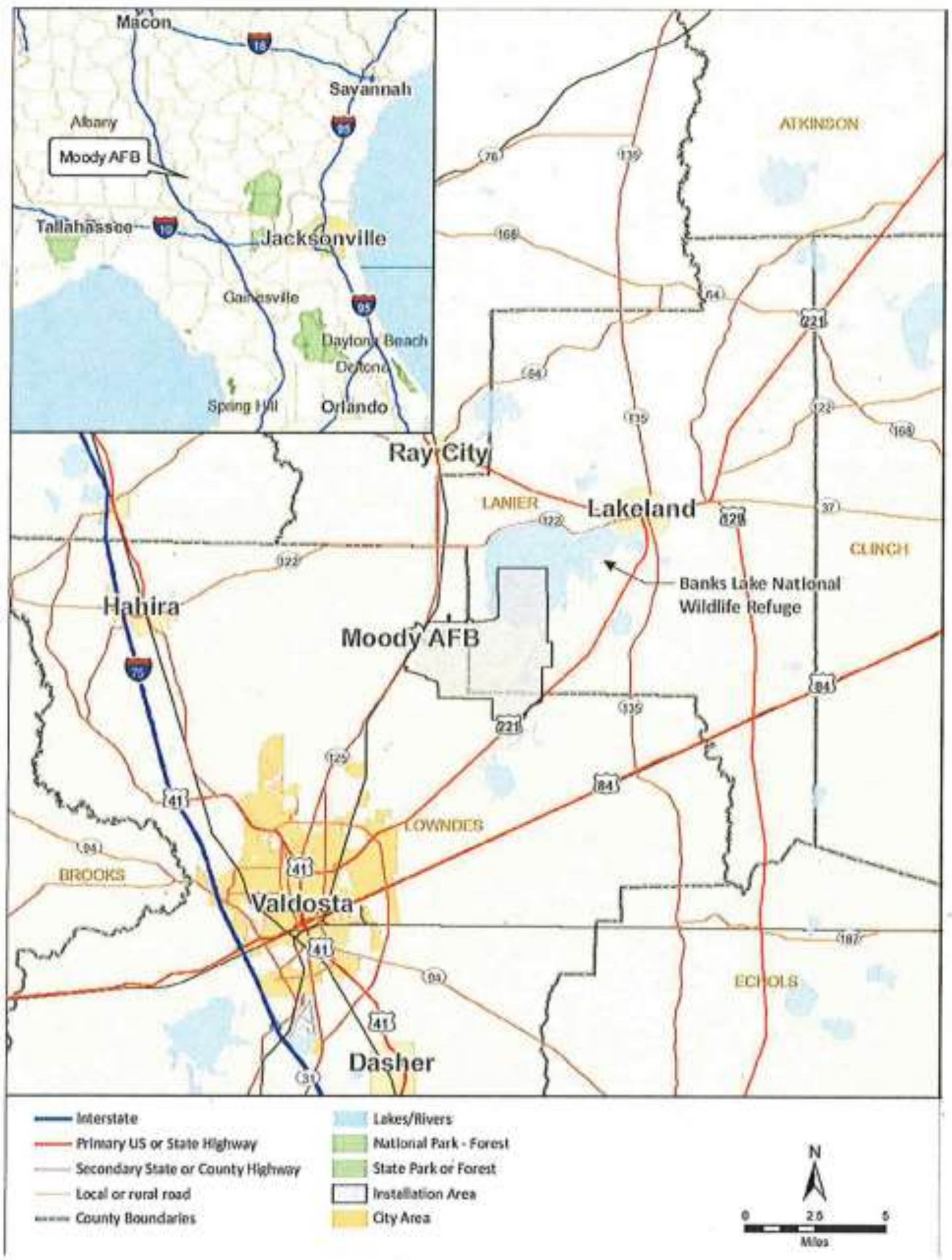
Global Power for America

Santicola at 23d Civil Engineer Squadron, 3485 Georgia Street, Moody AFB GA 31699, or via e-mail at henry.santicola2@us.af.mil, or by phone at (229) 257-2396 with any questions or concerns you or your staff may have.

JOHN L. EUNICE, III
Deputy Base Civil Engineer

Attachments:
1. Location of Moody AFB, Georgia
2. Location of Proposed Project Area

3



Attachment 1

4

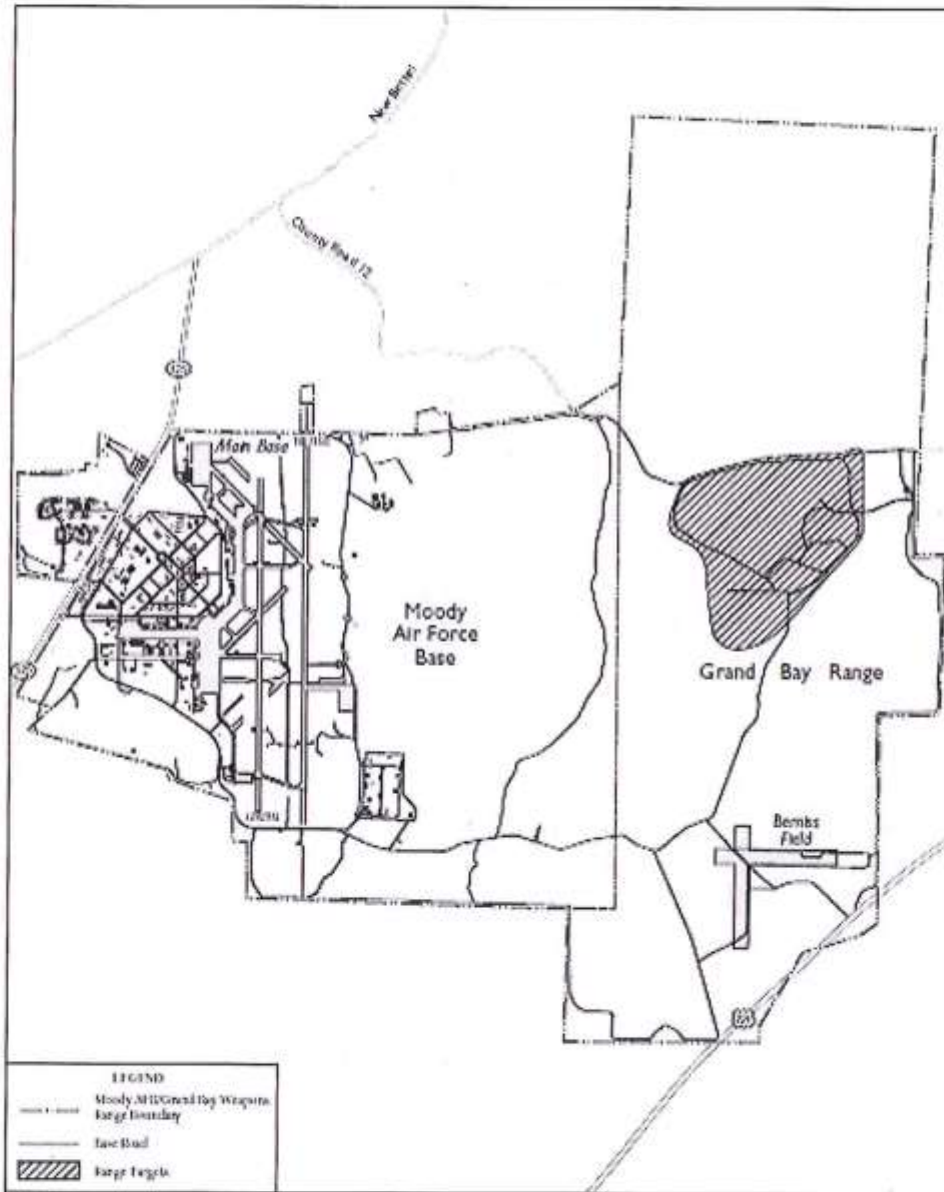


Figure 1-1
Location of Moody AFB, Grand Bay Range, and Bemiss Field

Attachment 2

DEPARTMENT OF THE AIR FORCE
23RD CIVIL ENGINEER SQUADRON (ACC)
MOODY AIR FORCE BASE GEORGIA

MAR 27 2008

MEMORANDUM FOR: Historic Preservation Division
Attn: Betsy Shirk
34 Peachtree St, NW, Suite 1600
Atlanta GA 30303

FROM: 23 CES/CC
3485 Georgia Street
Moody AFB GA 31699-1707

SUBJECT: Proposed Unimproved Landing Zone (ULZ) at Bemiss Field, Grand Bay Range, GA

1. The U.S. Air Force proposes to establish an ULZ on Bemiss Field, Grand Bay Range (Figure 1), for use by Combat Search and Rescue (CSAR) units and HC-130P and HH-60 aircraft. This ULZ would be used by units at Moody Air Force Base to meet ULZ qualification training and night vision goggle air/land training. These units will also perform additional training in mass casualty evacuation, insertion, extraction, and transload of pararescuemen and survivors in order to prepare for operations in austere locations. Furthermore, under the Proposed Action, Grand Bay Range would be used by AC-130 aircrews for gunnery training. These aircraft may also utilize the proposed Bemiss Field ULZ as part of their training.

2. We will prepare an environmental assessment to consider the proposal's potential impacts on Airspace Management, Air Quality, Geological Resources, Water Resources, Noise, Biological Resources, Cultural Resources, and Safety (including public safety, range and airspace safety, and the generation, use, and disposal of hazardous materials and wastes). Please forward any identified issues or concerns to our project manager, Mr. Greg Lee, at the above address by 15 April 2008.

3. In advance, we thank you for your assistance in this activity. If you have any specific questions relative to the proposal, please contact Mr. Lee at (229) 257-5881 or by e-mail at: gregory.lee@moody.af.mil.

GREG A. WILLIAMS, LtCol, USAF
Commander

Attachment
Figure 1 – Moody AFB Base Map

Global Power for America

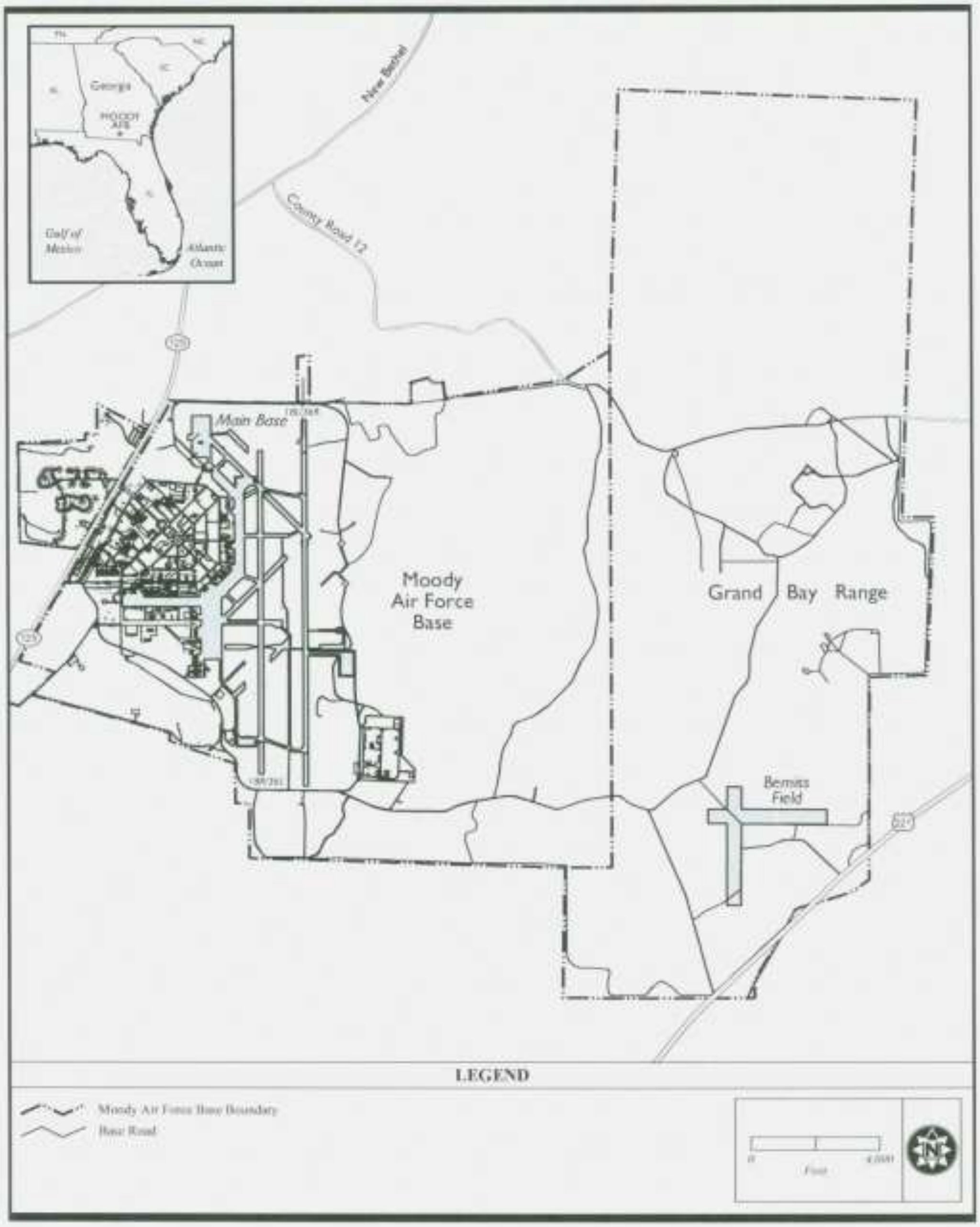


Figure 1. Moody AFB Base Map

DEPARTMENT OF THE AIR FORCE
23RD CIVIL ENGINEER SQUADRON (ACC)
MOODY AIR FORCE BASE GEORGIA

MEMORANDUM FOR Historic Preservation Division/DNR
Dr. W. Ray Luce, Division Director
34 Peachtree Street, NW, Suite 1600
Atlanta GA 30303-2316

FROM: 23 CES/CC
3485 Georgia St
Moody AFB GA 31699-1707

SUBJECT: Construction of a New Unimproved Landing Zone

1. Moody Air Force Base (Moody) (Attachment 1), Georgia (GA), is home to the 23rd Wing (Wing), a combat-ready force whose primary mission is to execute both peacetime and Combat Search and Rescue (CSAR) operations in support of humanitarian and U.S. national security interests. Moody requests consultation regarding the proposed construction of a new unimproved landing zone (ULZ) on Bemiss Field on Grand Bay Range, approximately 1.5 nautical miles east of Moody Air Force Base (Moody), Georgia. Bemiss Field is a 95-acre reclaimed landing strip previously used as an auxiliary airstrip for Moody during the 1940's. The asphalt cover was subsequently removed, and the site was vegetated with Bahia grass and additional areas surrounding it were cleared of trees and other obstructions. It is currently used for military training activities, including a helicopter landing zone, C-130 drop zone, and some ground maneuvers.

2. The proposed ULZ would run north-south and be 3,500 ft long and 95 ft wide with 1,000-ft overruns on each end of the strip for a total length of 5,500 ft (Attachment 2). In addition, there would be a graded 50-ft wide area on either side of the ULZ. The total size of the area proposed for grading and construction-related activities would be 5,500 ft long and 195 ft wide, or 24.6 acres. Site preparation would include removal of all vegetation, rocks, and stumps. Fill dirt would be brought in to raise the height of the existing airstrip by 12 inches to facilitate better drainage on the proposed ULZ. The ULZ would be graded, leveled, smoothed, and compacted to meet the weight-bearing requirement of a HC-130P. The final surface of the ULZ would be dirt and gravel. Other pertinent site improvements, such as utilities, stormwater runoff requirements, etc., would be incorporated into the project design in compliance with all applicable engineering design standards and best management practices (BMPs). A temporary storage/staging area for construction materials would be established along the eastern edge of the existing Bemiss Field (Attachment 2).

3. The project area was surveyed for cultural resources in the fall of 1994, and the summer of 1995. The results of this survey were recorded in a report entitled *Cultural Resources Survey, Grand Bay Ordnance Range, Moody Air Force Base, Lanier and Lowndes Counties, Georgia*, United States Air Force, Air Combat Command, June 1996. The Historic Preservation Division reviewed a draft of this report and concurred with its results in a letter dated 22 April 1996. This

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survey identified numerous isolated finds in the vicinity of Bemiss Field, as well as three sites (9LN13, 9LN65, and 9LW64) that were determined ineligible for inclusion in the National Register of Historic Places (NRHP) (Attachment 3). In addition, two sites near Bemiss Field were determined to be potentially eligible for inclusion in the NRHP (9LW52 and 9LW67). Since 9LW52 is located 2,600 feet west and 9LW67 is located 3,600 feet southwest of the proposed construction area, all activity associated with this project will occur well outside their boundaries.

4. It is the opinion of our staff that this proposed action as described in paragraphs 1-3 will not affect any significant cultural resources. We request your review and concurrence with the proposed construction of a ULZ on Bemiss Field. Photographs of the proposed location are attached (Attachment 4), as well as a completed Georgia Historic Preservation Division Environmental Review Form (Attachment 5).

5. If you have any questions or need any additional information, please feel free to contact Ms. Johnna L. Thackston at (229) 257-2396, e-mail: johnna.thackston@moody.af.mil.

GREG A. WILLIAMS, Lt Col, USAF
Commander

Attachments
1. Moody AFB General Location
2. Location of Proposed Action and Alternatives
3. Location of Cultural Resources in the Project Vicinity
4. Photographs
5. Georgia Historic Preservation Division Environmental Review Form

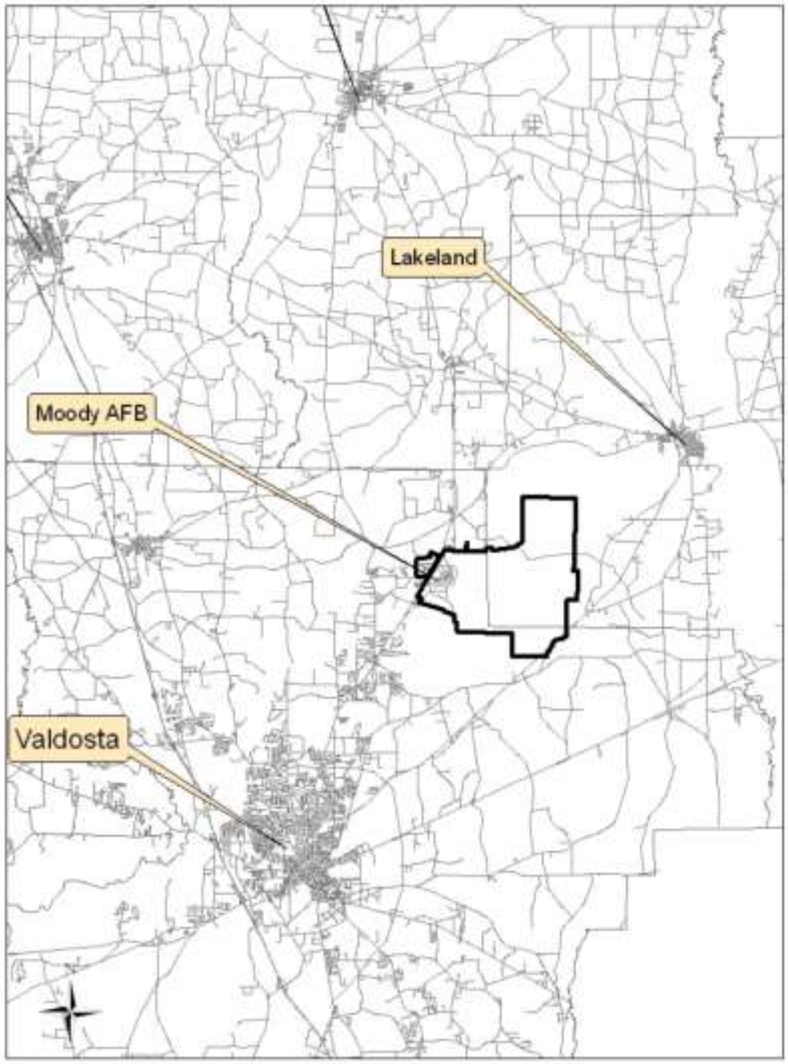


Figure 1-1
Moody Air Force Base General Location

Attachment 1

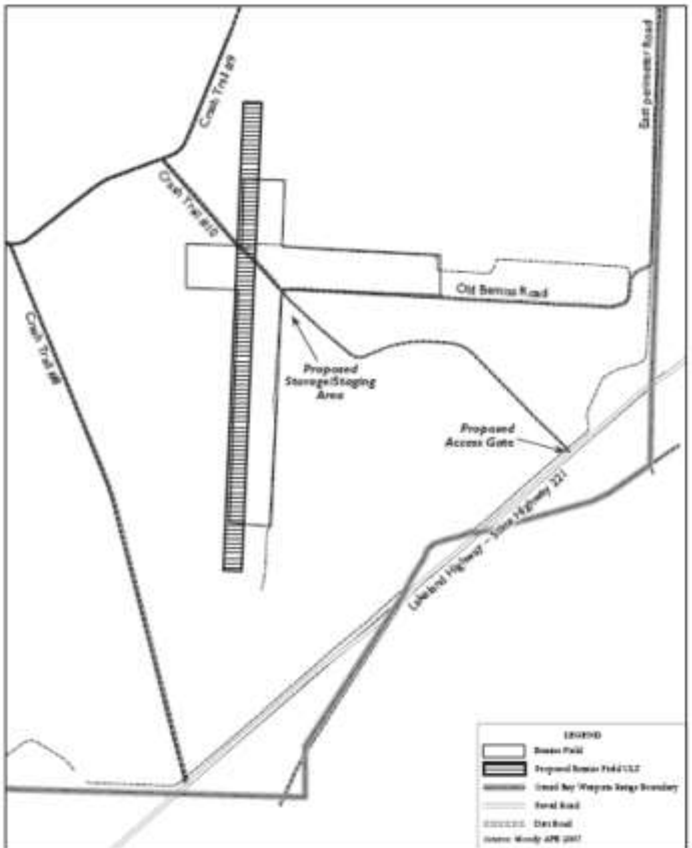


Figure 2-1
Proposed Bemiss Field ULZ

Attachment 2

Photograph A: South end of Bemiss Field, Viewing to the South

Photograph B: West side of Bemiss Field, Viewing to the West

Photograph C: East cross arm of Bemiss Field, Viewing to the East

Photograph D: North end of Bemiss Field, Viewing to the North
from Intersection of Bemiss Field

Photograph E: North End of Bemiss Field, Viewing to the North from Wetland Area

Photograph F: North End of Bemiss Field, Viewing to the North from Wetland Area

Georgia Department of Natural Resources

Noel Holcomb, Commissioner

Historic Preservation Division

W. Ray Luce, Division Director and Deputy State Historic Preservation Officer
34 Peachtree Street, NW, Suite 1600, Atlanta, Georgia 30303-2316
Telephone (404) 656-2840 Fax (404) 657-1040 http://www.gashpo.org

July 14, 2008

Gregory W. Lee
Chief, Analysis, Plans, & Programs Element
Moody AFB Environmental Flight
23 CES/CEVA
3485 Georgia Street
Moody AFB, Georgia 31699-1707

RE: Moody AFB: Unimproved Landing Zone (ULZ), Bemiss Field, US 221/SR 31 & Burma Road
Lanier and Lowndes Counties, Georgia
HP-080407-003

Dear Mr. Lee:

The Historic Preservation Division (HPD) has reviewed the information received concerning the above-referenced project. Our comments are offered to assist the United States Air Force and Moody Air Force Base in complying with the provisions of Sections 110 and 106 of the National Historic Preservation Act of 1966, as amended.

Based on the information submitted, HPD concurs that the proposed project will have **no effect** on archaeological resources or historic structures that are listed in or eligible for listing in the National Register of Historic Places (NRHP), as defined in 36 CFR Part 800.4(d)(1).

Please refer to project number **HP-080407-003** in any future correspondence regarding this undertaking. If we may be of further assistance, please do not hesitate to contact me at (404) 651-6624, or Jackie Horlbeck, Environmental Review Historian, at (404) 651-6777.

Sincerely,

Elizabeth Shirk

Elizabeth Shirk
Environmental Review Coordinator

ES:jph

cc: Frank Tokarsky, USAF
Emily Foster, South Georgia RDC

GMI
A Subsidiary of Applied Research Associates, Inc.
2201 K Avenue, Suite A2, Plano, Texas 75074-5977 ph: 972.423.5480 fax: 972.422.2736
www.geo-marine.com

31 January 2013

Ms. Elizabeth Shirk
Environmental Review Coordinator
Historic Preservation Division
Georgia Department of Natural Resources
254 Washington Street, SW
Atlanta, GA 30334

Dear Ms. Shirk,

At the request of Mr. Gregory W. Lee, Moody Air Force Base Environmental Element and Cultural Resources Manager, please find enclosed one hard copy of the FINAL DRAFT report entitled *Moody Air Force Base Georgia: Archaeological Testing and National Register of Historic Places Evaluations of the Tick (9LW52) and Tock (9LW67) Sites, Moody Air Force Base, Lowndes County, Georgia* for your review. If you require any additional information, please do not hesitate to contact me. The submittal of these documents is in partial fulfillment of the contractual obligations of Geo-Marine, Inc. under contract W9126G-09-D-0068, task order 0033.

Sincerely,

Missi Green

Melissa M. Green, RPA
Principal Investigator /
Senior Project Manager
Cultural Resources

Enclosure

GMI Ref #: 39GMI.00.011.05

DEPARTMENT OF THE AIR FORCE
23D CIVIL ENGINEER SQUADRON (ACC)
MOODY AIR FORCE BASE GEORGIA

Mr. John Eunice, III
23 CES/CD
3485 Georgia Street
Moody AFB, GA 31699-1707

United States Fish and Wildlife Service
Banks Lake/Okefenokee National Wildlife Refuge
Attn: Mr. Michael Lusk
2700 Suwanee Canal Road
Folkston, GA 31537

Dear Mr. Lusk

The United States Air Force is in the process of preparing an Environmental Assessment (EA) at Moody Air Force Base (AFB) (Attachment 1), Georgia (GA) to assess the potential environmental consequences associated with utilizing Bemiss Field (Attachment 2) for Unimproved Landing Zone (ULZ) training. Moody AFB is located in south central Georgia, north of the city of Valdosta. Bemiss Field is located in the southeast portion of the base, on Federal property in Lanier and Lowndes Counties, within the confines of Grand Bay Range, and within the airspace of Restricted Area 3008 (R-3008). At this time, the only alternative to the proposed action is the no action alternative, in which Moody AFB aircraft would continue to travel to other locations to accomplished required ULZ training.

The proposed action involves improvements to the existing Bemiss Field facility in order to meet airfield certification criteria required to utilize the field for military ULZ training. An operational ULZ at Bemiss Field would minimize the extra costs and transit time associated with travel to other ranges/ULZs to accomplish required training and increase the proficiency of Moody AFB aircrews. Physical improvements will include removal of approximately 30-acres of forest on each end of the ULZ to meet fixed wing tree clearance requirements, and installation of a small vehicle storage facility and a concrete pad for required crash-fire-rescue equipment. Proposed flight operations at the Bemiss Field ULZ will include north and south fixed wing traffic patterns within the restricted area airspace. The increased number of aircraft performing landings as part of this proposal would be offset by a similar reduction in number of aircraft currently performing airdrop or other missions on the Grand Bay Range complex. Bemiss Field is currently a 4100 foot unimproved former auxiliary field used as a Landing Zone for HH-60 and other rotary wing aircraft, a ground training area for battlefield airmen, and as a drop zone for HC-130 and transient aircraft.

The EA for the proposed action will be prepared in compliance with the National Environmental Policy Act of 1969, 42 United States Code (USC), the Council on Environmental Quality NEPA Regulations, 40 Code of Federal Regulations (CFR), and the Air Force's

Global Power for America

2

Environmental Impact Analysis Process, 32 CFR 989. As part of this EA, we request your assistance in identifying potential areas of environmental impact to be addressed.

If you have any specific items of interest about the proposal, we would like to hear from you within 30-days of receipt of this letter. The Moody AFB flying community has worked with the environmental planners to adjust flight patterns to offset from the Banks Lake National Wildlife Refuge (NWR) and at this time do not believe that there would be any impact. This proposed action has no activity in the vicinity of the Okefenokee NWR. In response to your correspondence dated 11 June 2014, we would welcome the opportunity to meet with you and your staff to discuss recent Air Force proposals in the vicinity of the Banks Lake and Okefenokee National Wildlife Refuges. Please contact the EA Project Manager, Mr. Hank Santicola at 23d Civil Engineer Squadron, 3485 Georgia Street, Moody AFB GA 31699, or via e-mail at henry.santicola.2@us.af.mil, or by phone at (229) 257-2396 with any questions or concerns you or your staff may have.

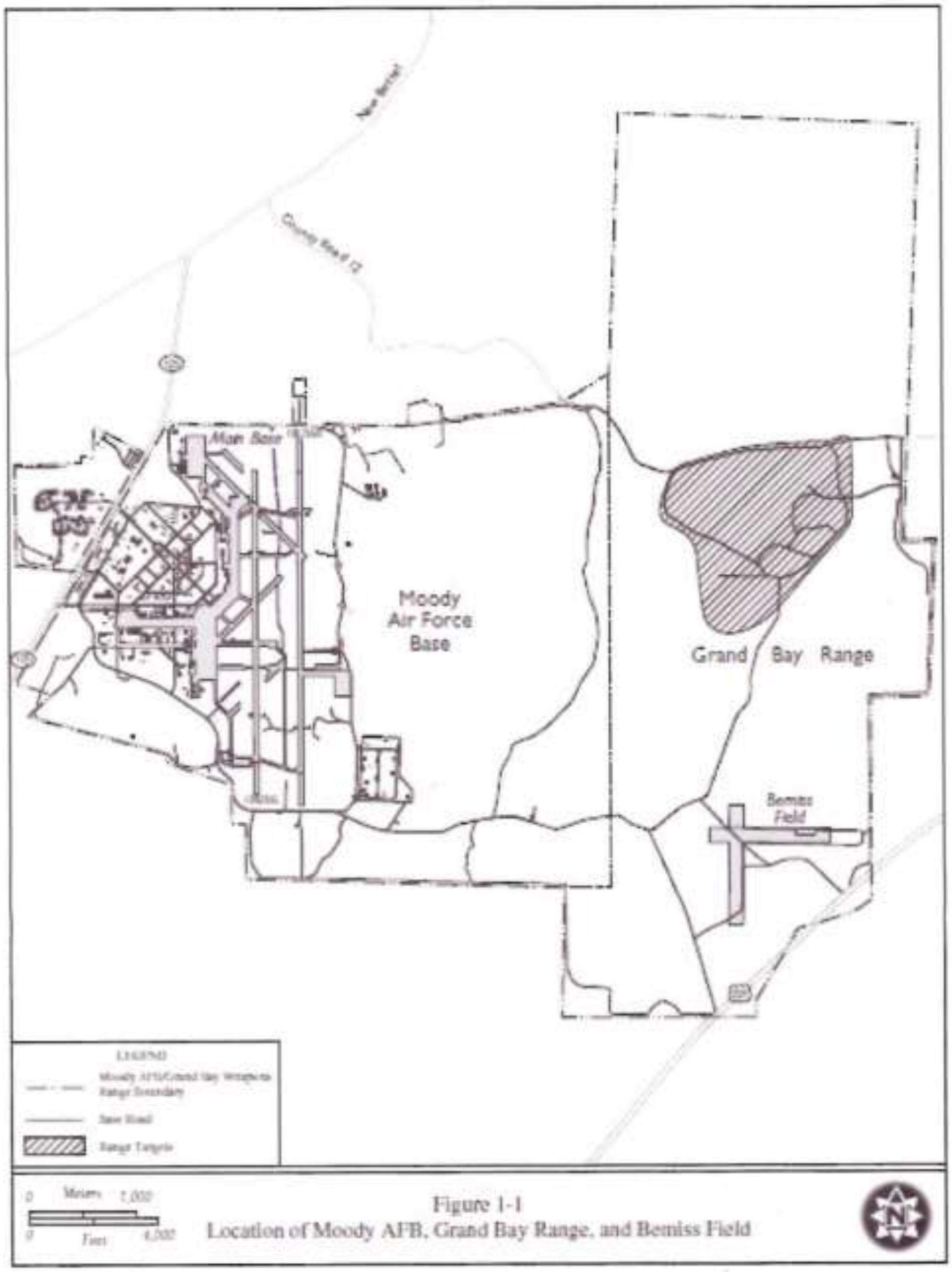
JOHN L. EUNICE, III, GS-14, DAFC
Deputy Base Civil Engineer

Attachments:
1. Location of Moody AFB, Georgia
2. Location of Proposed Project Area

3

Attachment 1

4



Attachment 2

United States Department of the Interior

Fish and Wildlife Service
105 West Park Drive, Suite D
Athens, Georgia 30606
Phone: (706) 613-9493
Fax: (706) 613-6059

West Georgia Sub-Office
Post Office Box 52560
Fort Benning, Georgia 31995-2560
Phone: (706) 544-6428
Fax: (706) 544-6419

Coastal Sub-Office
4980 Wildlife Drive
Townsend, Georgia 31331
Phone: (912) 832-8739
Fax: (912) 832-8744

December 18, 2013

Lieutenant Colonel Patrick M. Albritton, Commander
Department of the Air Force
23rd Civil Engineer Squadron
3485 Georgia Street
Moody Air Force Base, Georgia 31699
Attention: Hank Santicola

Re: USFWS 2014-0064

Dear Colonel Albritton:

Thank you for your letter initiating early coordination for the proposed improvements to the Bemiss Field facility at Moody Air Force Base (MAFB) in Lowndes County, Georgia. We submit the following comments in accordance with provisions of the Endangered Species Act of 1973, as amended; (16 U.S.C. 1531 *et seq.*) and the Migratory Bird Treaty Act of 1918 to further the conservation of fish and wildlife resources and their habitat, including federally listed threatened and endangered species.

The project proposes to remove approximately 60 acres of forest on each end of the unimproved landing zone (ULZ) at Bemiss Field to meet airfield certification criteria. Additionally, a concrete pad will be installed for crash-fire-rescue equipment. Three federally listed species and two candidate species were identified as potentially occurring within the action area and possibly affected by the proposed action. These species are: wood stork (*Mycteria americana*), eastern indigo snake (*Drymarchon couperi*), frosted flatwoods salamander (*Ambystoma cingulatum*), gopher tortoise (*Gopherus polyphemus*) (Candidate), and striped newt (*Notophthalmus peristriatus*) (Candidate).

The Service recommends that personnel engaged in implementing the proposed actions be advised of the potential presence of the federally protected species, how to identify them, and of their legal status in order to further reduce potential negative encounters. The striped newt and the frosted flatwoods salamander utilize isolated or ephemeral wetlands for breeding and upland forested habitats during other parts of their lives. Where possible, the Service recommends avoiding impacts to potential breeding sites and to minimize major ground disturbance in forested areas around known breeding sites. The indigo snake is a wide-ranging species that utilizes many habitat types; however, during the winter this species seeks refuge from cold temperatures by entering gopher tortoise burrows. The Service recommends that where possible gopher tortoise burrows be left intact and that heavy equipment be staged away from clusters of burrows. Clearing of the forested habitats on the north end of the Bemiss Field may encroach upon the extensive wetland complex along Grand Bay Creek. Clearing of the trees in this area will change the structure of the wetland vegetation community where a shrubby component and an herbaceous fringe component may develop. This transitional type of habitat may be attractive to a variety of bird species, such as the wood stork, other wading birds, and passerine bird like the red-wing blackbird. The potential for attracting birds to the airfield should be a factor that is addressed in the Environmental Assessment for this project. Where possible with regard to the safety considerations of the proposed project, we recommend minimizing the clearing of the forested wetland habitats.

We appreciate the opportunity to comment during the planning stages of your project. If you have any additional questions, please write or call our Coastal Georgia Sub Office staff biologist, Chris Coppola, 912-832-8739.

Sincerely,

Strant Colwell

Strant Colwell
Georgia Coastal Supervisor

GEORGIA
DEPARTMENT OF NATURAL RESOURCES

HISTORIC PRESERVATION DIVISION

MARK WILLIAMS
COMMISSIONER

DR. DAVID CRASS
DIVISION DIRECTOR

November 15, 2013

John L. Eunice, III
Deputy Base Civil Engineer
Department of the Air Force
23D Civil Engineer Squadron (ACC)
3485 Georgia Street
Moody AFB, Georgia 31699

Attention: Hank Santicola, EA Project Manager

RE: Moody AFB: EA, Proposed Bemiss Field Unimproved Landing Zone (ULZ)
Lanier et al Counties, Georgia
HP-131113-003

Dear Mr. Eunice, III:

The Historic Preservation Division (HPD) has received initial information concerning the above referenced project. Our comments are offered to assist the Department of the Air Force & Moody AFB in complying with the provisions of Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA).

Thank you for notifying us of this proposed project. We look forward to receiving Section 106 compliance documentation from you when it becomes available.

Please refer to project number **HP-131113-003** in future correspondence regarding this undertaking. If we may be of further assistance, please do not hesitate to contact me at (404) 651-6461 or karen.anderson-cordova@dnr.state.ga.us.

Sincerely,

Karen Anderson-Cordova
Program Manager
Environmental Review & Preservation Planning

KAC

cc: Michael Jacobs, Southern Georgia Regional Commission

254 WASHINGTON STREET, SW | GROUND LEVEL | ATLANTA, GEORGIA 30334
404.656.2840 | FAX 404.657.1368 | WWW.GEORGIASHPO.ORG

GEORGIA
DEPARTMENT OF NATURAL RESOURCES
WILDLIFE RESOURCES DIVISION

MARK WILLIAMS
COMMISSIONER

DAN FORSTER
DIRECTOR

December 9, 2013

John L. Eunice III / Hank Santicola
Deputy Base Civil Engineer
Department of the Air Force
23 CES
3485 Georgia Street
Moody AFB, GA 31699-1707

Subject: Known occurrences of natural communities, plants and animals of highest priority conservation status on or near Proposed Bemiss Field ULZ, Lowndes County, Georgia

Dear Mr. Eunice / Mr. Santicola:

This is in response to your request of November 12, 2013. According to our records, within a three-mile radius of the proposed project, there are the following Natural Heritage Database occurrences:

Northern Runway (-83.14867, 30.96585; NAD27):
GA *Aimophila aestivalis* (Bachman's Sparrow) approx. 1.0 mi. SE of site
GA *Clemmys guttata* (Spotted Turtle) approx. 2.5 mi. W of site
US *Drymarchon couperi* (Eastern Indigo Snake) on site [30.949572, -83.144510]
US *Drymarchon couperi* (Eastern Indigo Snake) on site [30.949202, -83.143520]
US *Drymarchon couperi* (Eastern Indigo Snake) approx. 1.5 mi. SW of site
US *Drymarchon couperi* (Eastern Indigo Snake) approx. 2.0 mi. SW of site
GA *Epidendrum magnoliae* (Greenfly Orchid) on site [30.964444, -83.147225]
GA *Epidendrum magnoliae* (Greenfly Orchid) approx. 1.0 mi. SE of site
GA *Epidendrum magnoliae* (Greenfly Orchid) approx. 1.0 mi. SW of site
US *Gopherus polyphemus* (Gopher Tortoise) approx. 2.0 mi. W of site
Grus canadensis pratensis (Florida Sandhill Crane) approx. 1.0 mi. NW of site
Grus canadensis pratensis (Florida Sandhill Crane) approx. 1.0 mi. SE of site
Grus canadensis pratensis (Florida Sandhill Crane) approx. 1.5 mi. N of site
Grus canadensis tabida (Greater Sandhill Crane) approx. 1.5 mi. NW of site
Nyctanassa violacea (Yellow-crowned Night-heron) approx. 1.0 mi. NW of site
***Nycticorax nycticorax* (Black-crowned Night-heron) on site [30.958350, -83.147763]**
Pseudobranchus striatus striatus (Broad-striped Dwarf Siren) approx. 1.0 mi. N of site
Pseudobranchus striatus striatus (Broad-striped Dwarf Siren) approx. 1.5 mi. SW of site
***Pseudobranchus striatus striatus* (Broad-striped Dwarf Siren) on site [30.958956, -83.148599]**
Regina alleni (Striped Crayfish Snake) approx. 3.0 mi. W of site

NONGAME CONSERVATION SECTION
2065 U.S. HIGHWAY 278 S.E. | SOCIAL CIRCLE, GEORGIA 30025-4743
770.918.6411 | FAX 706.557.3033 | WWW.GEORGIAWILDLIFE.COM

GA *Sarracenia flava* (Yellow Flytrap) approx. 2.5 mi. NW of site
GA *Sarracenia minor var. minor* (Hooded Pitcherplant) approx. 0.5 mi. NE of site
GA *Sarracenia minor var. minor* (Hooded Pitcherplant) approx. 1.0 mi. E of site
Triphora trianthophora (Three-birds Orchid) approx. 1.5 mi. SW of site
Umbra pygmaea (Eastern Mudminnow) 0.3 mi. S of site
Umbra pygmaea (Eastern Mudminnow) approx. 1.0 mi. N of site
Ursus americanus floridanus (Florida Black Bear)
Wading Bird Colony (Wading Bird Colony) approx. 2.0 mi. W of site
Bank's Lake NWR [USFWS] approx. 1.5 mi. N of site

Southern Runway (-83.14869, 30.93194; NAD27):
US *Drymarchon couperi* (Eastern Indigo Snake) approx. 1.0 mi. N of site
US *Gopherus polyphemus* (Gopher Tortoise) approx. 0.5 mi. N of site
Oxypolis ternata (Savanna Cowbane) approx. 2.5 mi. W of site
Pseudobranchus striatus striatus (Broad-striped Dwarf Siren) approx. 1.0 mi. N of site
Quercus austrina (Bluff White Oak) approx. 1.5 mi. NW of site
Regina alleni (Striped Crayfish Snake) approx. 2.5 mi. W of site
GA *Sarracenia minor var. minor* (Hooded Pitcherplant) approx. 1.0 mi. SW of site
GA *Sarracenia minor var. minor* (Hooded Pitcherplant) approx. 2.5 mi. W of site
Umbra pygmaea (Eastern Mudminnow) approx. 1.5 mi. NW of site
GRAND BAY WMA [GDNR] approx. 1.0 mi. W of site

* Entries above proceeded by "US" indicates species with federal status in Georgia (Protected or Candidate). Species that are federally protected in Georgia are also state protected; "GA" indicates Georgia protected species.

Recommendations:

We have several records of federally and state protected species within the project area (coordinates above). Three federally endangered *Drymarchon couperi* (Eastern Indigo Snake) are in the database as occurring in the eastern end of Bemiss Field. Also, a candidate for federal listing, *Gopherus polyphemus* (Gopher Tortoise), has been surveyed in the corner just outside the border of the eastern and southern portions of the field. The Endangered Species Act states that taking or harming of a listed species is prohibited. We recommend all requestors with projects located near federally protected species consult with the United States Fish and Wildlife Service. For southeast Georgia, please contact Strant Colwell (912-265-9336, ext.30 or Strant_Colwell@fws.gov).

In the Tree Clearance North section we have records of occurrences of the state listed *Epidendrum magnoliae* (Greenfly Orchid), *Nycticorax nycticorax* (Black-crowned Night-heron), and *Pseudobranchus striatus striatus* (Broad-striped Dwarf Siren). The unusual Greenfly Orchid can be found on limbs of southern magnolia (*Magnolia grandiflora*) and live oak (*Quercus virginiana*) trees in moist forests, usually along streams; sandstone-like walls of crevices in Altamaha Grit outcrops, where the porous rock provides a constant moisture source. Tom Patrick can assist should you have questions regarding this species (Tom.Patrick@dnr.state.ga.us).

IR 14646

Throughout the year there is the concern of potential impacts to wading birds with increased air traffic. Direct impacts to birds and airplanes could occur if flight paths take more planes into the path of flying and soaring birds, increasing the chance of bird strikes. Indirect impacts could occur if flight paths bring planes into lower elevations over rookeries, disturbing birds during flyovers.

We have a record of an active rookery within three miles of the site. Activities in the vicinity of water-bird rookeries should be approached with caution. Disturbance near the colony can lead to nest failure and possible abandonment. The nesting season extends from Mid-February to the end of July. Please avoid activities within 400 m (1300 ft.) from the periphery of rookeries during this time if possible. Please contact Tim Keyes (Tim.Keyes@dnr.state.ga.us or 478-994-1438) with questions regarding construction and flyways near rookeries.

We are concerned about streams and other habitats that could be impacted by the proposed expansion of the airfield project. We recommend that stringent erosion control practices be used during construction activities and that vegetation is re-established on disturbed areas as quickly as possible. Silt fences and other erosion control devices should be inspected and maintained until soil is stabilized by vegetation. Please use natural vegetation and grading techniques (e.g. vegetated swales, turn-offs, vegetated buffer strips) that will ensure that the areas without vegetation do not serve as conduits for storm water or pollutants into the water during or after construction. These measures will help protect water quality in the vicinity of the project as well as in downstream areas.

NEW ENVIRONMENTAL REVIEW COORDINATOR

Please send all future correspondence to Anna Yellin, Environmental Review Coordinator. Email correspondence is preferred. I can be contacted at anna.yellin@dnr.state.ga.us or 706-557-3283.

Disclaimer:

Please keep in mind the limitations of our database. The data collected by the Nongame Conservation Section comes from a variety of sources, including museum and herbarium records, literature, and reports from individuals and organizations, as well as field surveys by our staff biologists. In most cases the information is not the result of a recent on-site survey by our staff. Many areas of Georgia have never been surveyed thoroughly. Therefore, the Nongame Conservation Section can only occasionally provide definitive information on the presence or absence of rare species on a given site. Our files are updated constantly as new information is received. **Thus, information provided by our program represents the existing data in our files at the time of the request and should not be considered a final statement on the species or area under consideration.**

If you know of populations of highest priority species that are not in our database, please fill out the appropriate data collection form and send it to our office. Forms can be obtained through our web site (http://www.georgiawildlife.com/node/1376) or by contacting our office. If I can be of further assistance, please let me know.

IR 14646

Sincerely,

Anna Yellin
Environmental Review Coordinator

Data Available on the Nongame Conservation Section Website

- Georgia protected plant and animal profiles are available on our website. These accounts cover basics like descriptions and life history, as well as threats, management recommendations and conservation status. Visit http://www.georgiawildlife.com/node/2721.
- Rare species and natural community information can be viewed by Quarter Quad, County and HUC8 Watershed. To access this information, please visit our GA Rare Species and Natural Community Information page at: http://www.georgiawildlife.com/conservation/species-of-concern?cat=conservation.
- Downloadable files of rare species and natural community data by quarter quad and county are also available. They can be downloaded from: http://www.georgiawildlife.com/node/1370.

IR 14646

DEPARTMENT OF THE AIR FORCE
23D CIVIL ENGINEER SQUADRON (ACC)
MOODY AIR FORCE BASE GEORGIA

AUG 18 2014

Major Thang D. Nguyen
23d Civil Engineer Squadron Commander
3485 Georgia Street
Moody AFB GA 31699

Mr. Terry C. Kobs
Department of the Army
Savannah District, Corps of Engineers
1104 North Westover Blvd, #9
Albany GA 31707

Dear Mr. Kobs

The United States Air Force is in the process of preparing an Environmental Assessment (EA) at Moody Air Force Base (AFB), Georgia to assess the potential environmental consequences associated with utilizing Bemiss Field for ULZ (Unimproved Landing Zone) training. Moody AFB is located in south central Georgia, north of the city of Valdosta (Attachment 1). Bemiss Field is located in the southeast portion of the base, on Federal property in Lanier and Lowndes Counties, within the confines of Grand Bay Range, and within the airspace of Restricted Area 3008 (R-3008) (Attachment 2).

The proposed action involves improvements to the existing Bemiss Field facility in order to meet airfield certification criteria required to utilize the field for military ULZ training. An operational ULZ at Bemiss Field would minimize the extra costs and transit time associated with travel to other ranges/ULZs to accomplish required training and increase the proficiency of Moody AFB aircrews. Physical improvements will include removal of approximately 60 acres of forest on the end of the ULZ to meet aircraft tree clearance requirements, and installation of a small fire station and a concrete pad for required crash-fire-rescue equipment. Proposed flight operations at the Bemiss Field ULZ will include north and south aircraft traffic patterns oriented on the east side of the runway within the restricted area airspace. Moody AFB proposes that up to 300 HC-130 flight operations, 75 HH-60 flight operations, and 150 transient flight operations would be conducted annually on Bemiss Field. Bemiss Field is currently a 4100 foot unimproved former auxiliary field used as a Landing Zone for HH-60 and other rotary wing aircraft, a ground training area for battlefield airmen, and a drop zone for HC-130 and transient airlift aircraft. At this time, the only alternative to the proposed action is the no action alternative, in which Moody AFB aircraft would continue to travel to other locations to accomplished required ULZ training.

As part of this action approximately 46 acres of trees within wetlands (jurisdictional determination dated 13 June 1996) (37 acres within the north clearance area and 9 acres in the southern clearance area) (Attachment 3) would be removed using mechanical and manual means,

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2

most likely through a commercial timber sale. No stumps would be removed and no other soil disturbance would occur within these wetland areas. Georgia Best Management Practices for Forestry relative to silvicultural activities in wetland areas would be followed.

The USAF requests your input in identifying any issues or areas of concern you feel should be addressed in the environmental analysis, and any recommendations from your office in minimizing wetland impacts during the tree clearing. Additionally, please let us know if you believe this proposal would qualify for the silviculture exemptions under the Clean Water Act Section 404 (33 CFR Part 323.4 & 40 CFR Part 232.3) or if a Section 404 permit should be obtained.

To ensure the USAF has sufficient time to consider your input in the preparation of the Draft EA, please forward written issues or concerns to the EA Project Manager, Mr. Hank Santicola at 23d Civil Engineer Squadron, 7258 Robins Road, Moody AFB GA 31699. Though we will consider comments received at any time during the environmental impact analysis process, to the extent possible, we would like to hear from you within 30 days of receipt of this letter. If you have any questions, please contact Mr. Santicola at (229) 257-2396 or Henry.Santicola.2@us.af.mil. Thank you in advance for your assistance in this effort.

Sincerely

THANG D. NGUYEN, Major, USAF
Commander

Attachments:
1. Location of Moody AFB, Georgia
2. Location of Proposed Landing Zone
3. Location of Proposed Forested Wetland Clearing

Attachment 1

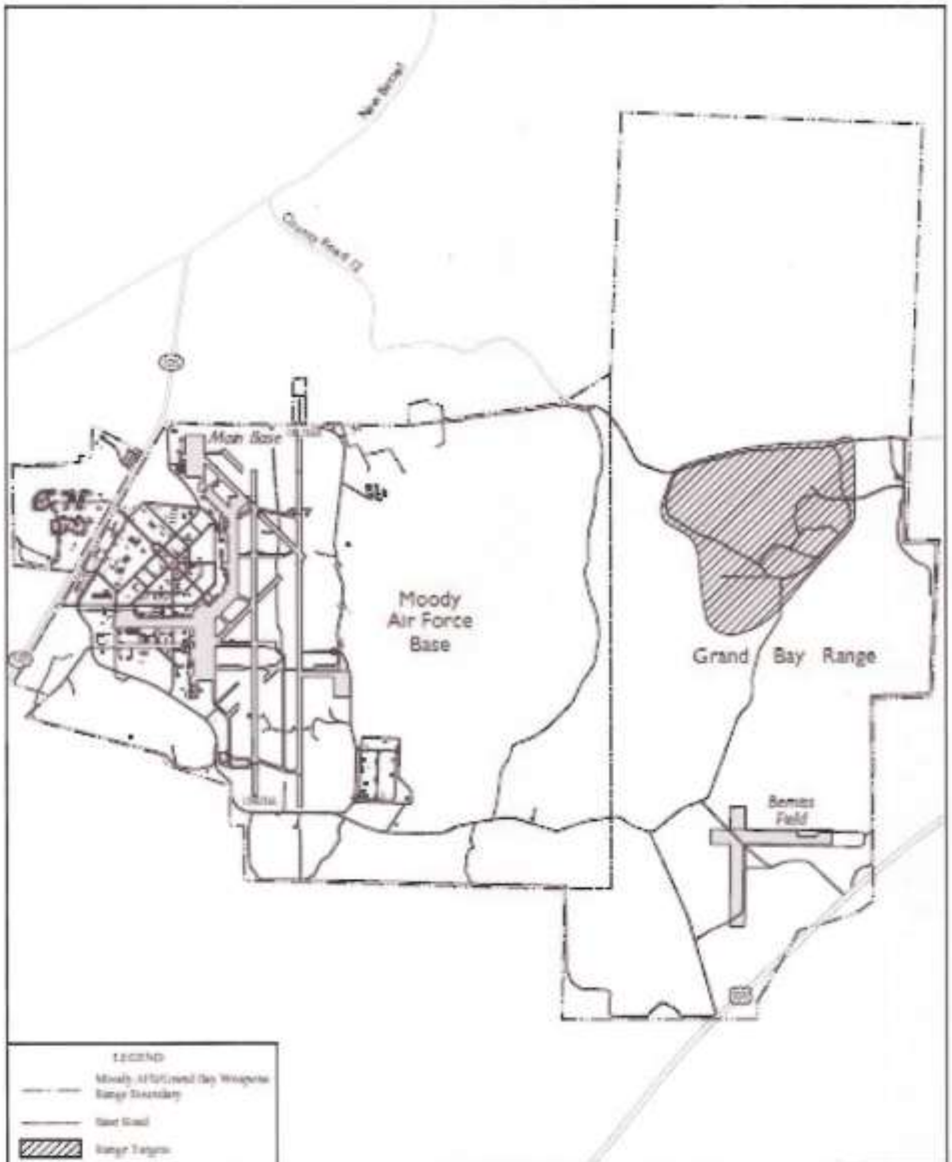
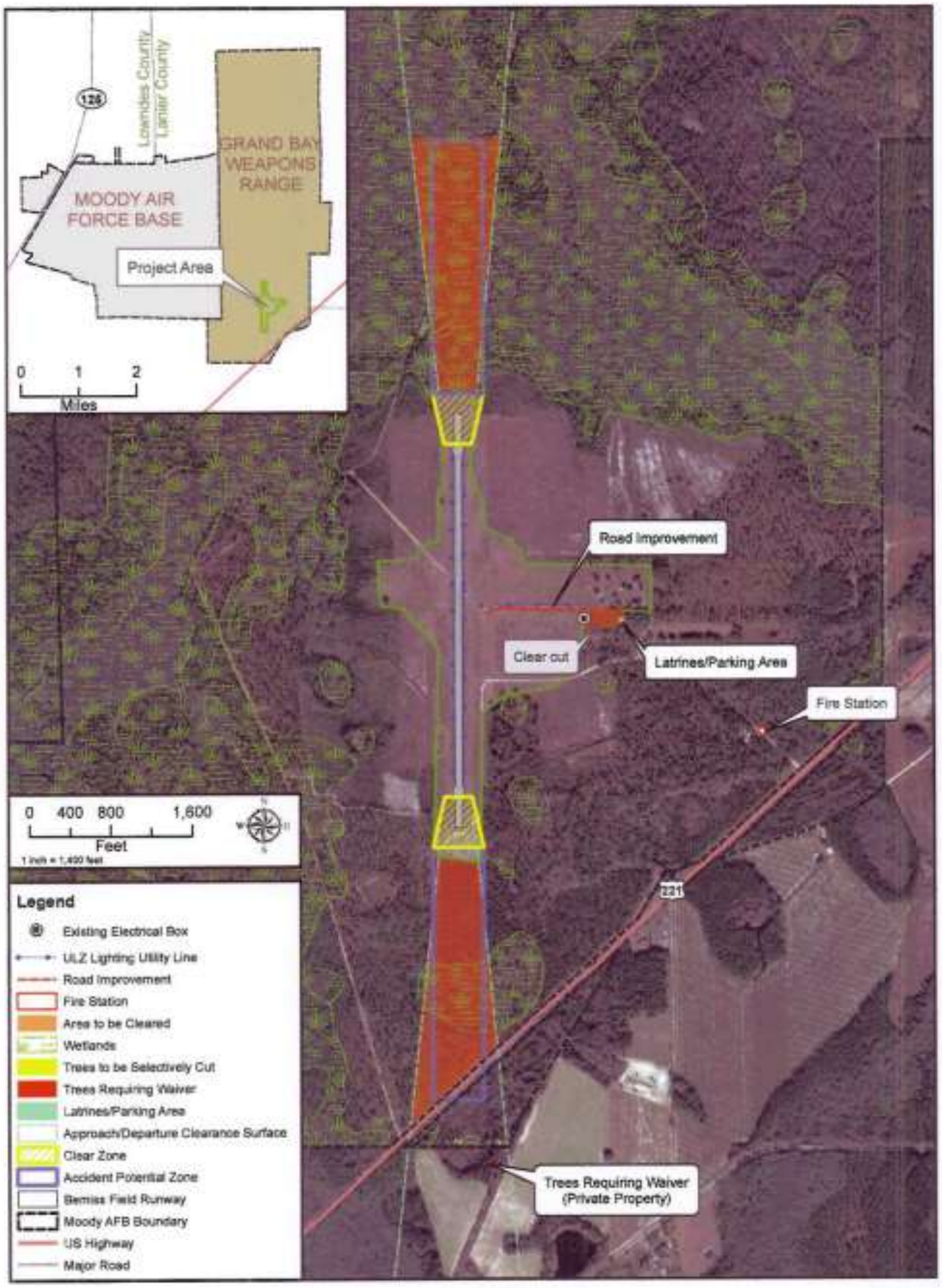


Figure 1-1
Location of Moody AFB, Grand Bay Range, and Bemiss Field

Attachment 2


Lowndes County
Lanier County
126
GRAND BAY WEAPONS RANGE
MOODY AIR FORCE BASE
Project Area
0 1 2
Miles
Road Improvement
Clear cut
Latrines/Parking Area
Fire Station
0 400 800 1,600
Feet
221
Legend
Existing Electrical Box
ULZ Lighting Utility Line
Road Improvement
Fire Station
Area to be Cleared
Wetlands
Trees to be Selectively Cut
Trees Requiring Waiver
Latrines/Parking Area
Approach/Departure Clearance Surface
Clear Zone
Accident Potential Zone
Bemiss Field Runway
Moody AFB Boundary
US Highway
Major Road
Trees Requiring Waiver
(Private Property)

GMI

A Subsidiary of Applied Research Associates, Inc.

2201 K Avenue, Suite A2, Plano, Texas 75074-5977 ph: 972.423.5480 fax: 972.422.2736
www.geo-marine.com

8 March 2013

Ms. Elizabeth Shirk
Environmental Review Coordinator
Historic Preservation Division
Georgia Department of Natural Resources
254 Washington Street, SW
Atlanta, GA 30334

Dear Ms. Shirk,

At the request of Mr. Gregory W. Lee, Moody Air Force Base Environmental Element and Cultural Resources Manager, please find enclosed one CD containing the FINAL report entitled *Moody Air Force Base Georgia: Archaeological Testing and National Register of Historic Places Evaluations of the Tick (9LW52) and Tock (9LW67) Sites, Moody Air Force Base, Lowndes County, Georgia* and revised site forms for your files. If you require any additional information, please do not hesitate to contact me. The submittal of these documents is in partial fulfillment of the contractual obligations of Geo-Marine, Inc. under contract W9126G-09-D-0068, task order 0033.

Sincerely,

Missi Green

Melissa M. Green, RPA
Principal Investigator /
Senior Project Manager
Cultural Resources

Enclosure

GMI Ref #: 39GMI.00.011.05

ENGINEERING AND ENVIRONMENTAL SERVICES
TEXAS | TENNESSEE | VIRGINIA | NORTH CAROLINA | NEW JERSEY | UTAH

GEORGIA ARCHAEOLOGICAL SITE FORM
1990
Official Site Number: 9LW52

Institutional Site Number: ______ **Site Name:** Tick Site
County: Lowndes **Map Name:** Bemiss USGS or USNOAA
[redacted]
Owner: Moody Air Force Base **Address:** N/A
Site Length: 180 meters **Width:** 140 meters **Elevation:** + - 58-59 meters
Orientation: 1. N-S 2. E-W 3. NE-SW 4. NW-SE 5. Round 6. Unknown
Kind of Investigation: 1. Survey 2. Testing 3. Excavation 4. Documentary 5. Hearsay 6. Unknown 7. Amateur
Standing Architecture: 1. Present 2. Absent
Site Nature: 1. Plowzone 2. Subsurface 3. Both 4. Only Surface Known 5. Unknown 6. Underwater
Midden: 1. Present 2. Absent 3. Unknown **Features:** 1. Present 2. Absent 3. Unknown
Percent Disturbance: 1. None 2. Greater than 50 3. Less than 50 4. Unknown
Type of Site (Mill, Mound, Quarry, Lithic Scatter, etc.): Low density, multi-period lithic and ceramic scatter; previous investigations noted a naval stores industry historic component
Topography (Ridge, Terrace, etc.): Located on small natural rise
Current Vegetation (Woods, Pasture, etc.): Planted pines, yucca, and thick undergrowth
Additional Information: Bioturbation has affected vertical and horizontal distribution indicating occupation zones that are not readily separated and a compressed site

[redacted]

SKETCH MAP
(Include sites, roads, streams, landmarks)

OFFICIAL MAP
(Xerox of proper map)

State Site Number: 9LW52 **Institutional Site Number:**

Public Status: 1. National Historic Landmark 2. National Natural Landmark 3. Georgia Register 4. Georgia Historic Trust 5. HABS 6. HAER

National Register Standing: 1. Determined Eligible 2. Recommended Ineligible 3. Recommended Eligible 4. Nominated 5. Listed 6. Unknown 7. Removed

National Register Level of Significance: 1. Local 2. State 3. National

Preservation State (Select up to Two): 1. Undisturbed 2. Cultivated 3. Eroded 4. Submerged 5. Lake Flooded 6. Vandalized 7. Destroyed 8. Redeposited 9. Graded 10. Razed

Preservation Prospects: 1. Safe 2. Endangered by: 3. Unknown

RECORD OF INVESTIGATIONS

Supervisor: Edward Schneider **Affiliation:** Geo-Marine, Inc. **Date:** Apr. 2012

Report Title: Schneider, E. 2013. *Archaeological Testing and National Register of Historical Places Evaluations of the Tick (9LW52) and Tock (9LW67) Sites, Moody Air Force Base, Lowndes County, Georgia.*

Other Reports: Grover, J. E., T. L. Tolley, K. R. Pearce, and J. P. Blick. 1996. *Cultural Resources Survey, Grand Bay Ordnance Range, Moody Air Force Base, Lanier and Lowndes Counties, GA.*

Artifacts Collected: 16 prehistoric ceramics, 212 debitage, 1 core, 216 baked clay fragments, 2 bifaces, 5 unifaces, 1 scraper/knife, 1 Gypsy Stemmed dart point, and 8 vegetal samples

Location of Collections: Avon Park Air Force Range, Florida

Location of Field Notes: Avon Park Air Force Range, Florida

Private Collections: None

Name: N/A **Address:** N/A

CULTURAL AFFINITY

Cultural Periods: Late Archaic to possible Late Woodland

Phases: N/A

FORM PREPARATION AND REVISION

Date	Name	Institutional Affiliation
2/28/2013	Steven Hunt	Geo-Marine, Inc.

GEORGIA ARCHAEOLOGICAL SITE FORM
1990

Official Site Number: 9LW67

Institutional Site Number: ______ **Site Name:** Tock Site
County: Lowndes **Map Name:** Bemiss USGS or USNOAA

[redacted]

Owner: Moody Air Force Base **Address:** N/A
Site Length: 145 meters **Width:** 140 meters **Elevation:** + - 59-60 meters
Orientation: 1. N-S 2. E-W 3. NE-SW 4. NW-SE 5. Round 6. Unknown
Kind of Investigation: 1. Survey 2. Testing 3. Excavation 4. Documentary 5. Hearsay 6. Unknown 7. Amateur
Standing Architecture: 1. Present 2. Absent
Site Nature: 1. Plowzone 2. Subsurface 3. Both 4. Only Surface Known 5. Unknown 6. Underwater
Midden: 1. Present 2. Absent 3. Unknown **Features:** 1. Present 2. Absent 3. Unknown
Percent Disturbance: 1. None 2. Greater than 50 3. Less than 50 4. Unknown
Type of Site (Mill, Mound, Quarry, Lithic Scatter, etc.): Lithic and ceramic scatter with a single historic artifact; previous investigations noted a naval stores industry historic component
Topography (Ridge, Terrace, etc.): Flat; gently sloping

Current Vegetation (Woods, Pasture, etc.): Planted pines, yucca, and thick undergrowth

Additional Information: Bioturbaton indicates a compressed site structure and mixed components. Two suspect post molds have extensive contamination and may actually be the result of pre-modern fires and tree burns.

[redacted]

SKETCH MAP
(Include sites, roads, streams, landmarks)

OFFICIAL MAP
(Xerox of proper map)

State Site Number: 9LW67 **Institutional Site Number:**

Public Status: 1. National Historic Landmark 2. National Natural Landmark
3. Georgia Register 4. Georgia Historic Trust 5. HABS 6. HAER

National Register Standing: 1. Determined Eligible 2. Recommended Ineligible
3. Recommended Eligible 4. Nominated 5. Listed 6. Unknown 7. Removed

National Register Level of Significance: 1. Local 2. State 3. National

Preservation State (Select up to Two): 1. Undisturbed 2. Cultivated 3. Eroded
4. Submerged 5. Lake Flooded 6. Vandalized 7. Destroyed 8. Redeposited
9. Graded 10. Razed

Preservation Prospects: 1. Safe 2. Endangered by:
3. Unknown

RECORD OF INVESTIGATIONS

Supervisor: Edward Schneider **Affiliation:** Geo-Marine, Inc. **Date:** Apr. 2012
Report Title: Schneider, E. 2013. *Archaeological Testing and National Register of Historical Places Evaluations of the Tick (9LW52) and Tock (9LW67) Sites, Moody Air Force Base, Lowndes County, Georgia.*
Other Reports: see continuation page

Artifacts Collected: 1 alkaline glazed stoneware, 15 prehistoric ceramics, 956 debitage, 8 cores, 4 bifaces, 8 unifaces, 2 Gypsy Stemmed dart points, 1 Bolen Beveled dart point, 1 Pinellas arrow point, and 19 vegetal samples

Location of Collections: Avon Park Air Force Range, Florida
Location of Field Notes: Avon Park Air Force Range, Florida
Private Collections: None

Name: N/A **Address:** N/A

CULTURAL AFFINITY

Cultural Periods: Early and Late Archaic, Middle Woodland, Mississippian

Phases: N/A

FORM PREPARATION AND REVISION

Date	Name	Institutional Affiliation
2/28/2013	Steven Hunt	Geo-Marine, Inc.

9LW67 continuation page: Other Reports

Grover, J. E., T. L. Lolley, K. R. Pearce, and J. P. Blick
1996 *Cultural Resources Survey, Grand Bay Ordnance Range, Moody Air Force Base, Lanier and Lowndes Counties, Georgia.* Panamerican Consultants, Inc., Tuscaloosa, Alabama. Report prepared for Moody Air Force Base.

Warhop, Jennifer, and Leslie Raymer
2010 *Phase II Archaeological Investigations of 9LW67, Moody Air Force Base, Lowndes County, Georgia.* Technical Report 1587, New South Associates, Inc., Stone Mountain, Georgia; for U.S. Air Force Air Combat Command Series Reports of Investigations Number 52, Geo-Marine, Inc., Plano, Texas.

DEPARTMENT OF THE AIR FORCE
23D CIVIL ENGINEER SQUADRON (ACC)
MOODY AIR FORCE BASE GEORGIA

JAN 20 2015

MEMORANDUM FOR U.S. FISH AND WILDLIFE SERVICE
Ecological Services Field Office
Attn: Ms. Gail Martinez
4980 Wildlife Drive NE
Townsend GA 31331

FROM: 23 CES/CC

SUBJECT: Endangered Species Act (ESA) Consultation for Proposed Bemiss Field Unimproved Landing Zone (ULZ) Modifications and Use, Moody AFB GA

1. References:

a. Bemiss Field ULZ Modifications and Use Environmental Assessment Scoping Letter, 18 December 2013, USFWS 2014-0064

b. Bemiss Field Unimproved Landing Zone, 8 August 2008, FWS Log #08-FA-1318

c. Bemiss Field Drop Zone at Grand Bay Range, Expansion of Existing Drop Zone, 25 February 2002, FWS Log #2002-0070

d. Biological Opinion and Incidental Take Statement, Bemiss Field Drop Zone, FWS Log #4-4-96-457

2. The Air Force has determined that the proposed modification and use of the existing Bemiss Field ULZ at Moody AFB, Lowndes County, GA, will not have an effect on any Federally listed threatened or endangered species. We request your concurrence with that determination. Maps of the area are provided (Attachments 1 and 2).

3. The proposed modification and use of the existing Bemiss Field ULZ consists of vegetation management and development of on-site fire/rescue capabilities to meet Air Force training requirements. Approximately 37 acres of forest on the north end and 32 acres on the south end of the ULZ will be removed to comply with aircraft approach/departure clearance planes. Stumps will not be removed in these areas and the area will be managed through periodic herbicide applications, prescribed fire, and other natural resources treatments as identified in the Moody AFB Integrated Natural Resources Management Plan (INRMP). An additional two-acre parcel east of Bemiss Field would be cleared and the stumps removed to allow line-of-sight and fire/rescue equipment access to the ULZ from a gravel-covered staging area adjacent to an existing latrine, and an existing road would be upgraded to allow use by fire/rescue equipment. A new fire station would be constructed adjacent to the Grand Bay Wildlife Management Area equipment storage yard to house fire and rescue equipment and personnel associated with the ULZ activities. The fire station would also involve removing about 0.25 acres of trees and

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stumps to facilitate construction. A map showing the location of proposed modifications to the Bemiss Field ULZ is attached (Attachment 3), and an excerpt from the draft environmental assessment providing greater detail concerning the proposed action is located at Attachment 4.

4. Initial surveys for rare, threatened, and endangered (RTE) species were conducted in the Bemiss Field area in 1993-1994 by biologists with The Nature Conservancy. Additional general surveys for RTE species were conducted in 1995 by biologists from GeoMarine and in 1996 by biologists with the U.S. Army Corps of Engineers. These surveys have been supplemented by periodic surveys by installation staff and contracted species-specific surveys for gopher tortoises (*Gopherus polyphemus)*, eastern indigo snakes (*Drymarchon couperi),* frosted flatwoods salamander (*Ambystoma cingulatum),* and striped newts (*Notophthalmus peristriatus*) as reported in the Moody AFB INRMP.

5. The proposed project area for the Bemiss Field ULZ Modifications and Use project was resurveyed by the Moody AFB Natural Resources Office for listed and candidate species in 2013 and 2014 as part of the environmental impact analysis process and by biologists from Valdosta State University as part of an on-going demographic survey of gopher tortoises. The only listed or candidate species known to occur near the proposed Bemiss Field ULZ project area are the wood stork (*Mycteria americana*) (Federally Threatened), eastern indigo snake (*Drymarchon couperi*) (Federally Threatened), and gopher tortoise (*Gopherus polyphemus*) (Federal Candidate). However, per your letter of 18 December 2013, this informal consultation also addresses potential impacts to frosted flatwoods salamanders and striped newts.

a. EASTERN INDIGO SNAKE: Three sightings of eastern indigo snakes were recorded in 1991, and a juvenile and adult eastern indigo snake were captured adjacent to Bemiss Field in 1996 (see map at Attachment 5). Additionally, three eastern indigo snakes confiscated by the Georgia Department of Natural Resources (GDNR) were released on Grand Bay Range in 1993 and 1995. However, there have been no additional confirmed sightings of eastern indigo snakes on Moody AFB, including the Bemiss Field area, since 1996, despite subsequent species-specific surveys for eastern indigo snakes in 2002 and exensive gopher tortoise burrow monitoring activities. While there is a potential for individual snakes to continue to exist on the installation, Moody AFB lacks the important habitat characteristics (i.e. large contiguous tracts of longleaf pine/sandhills adjacent to an early successional habitat mosaic) necessary to support a viable, self-sustaining population. The tree-clearing activities proposed to support the Bemiss Field ULZ will improve overall habitat for the eastern indigo snake by creating early successional habitat adjacent to potential wintering and foraging habitat. Slash generated from the tree-clearing activities will be relocated at least 100 feet away from the cleared area to provide additional indigo snake cover. Additionally, Moody AFB will continue to implement the Reasonable and Prudent Measures, Terms and Conditions, and Conservation Measures from the 1996 Incidental Take Statement for the Bemiss Field Drop Zone to proactively manage for eastern indigo snakes and gopher tortoises.

b. WOOD STORKS: Wood storks can occasionally be seen within the wetlands on Moody AFB when water and habitat conditions are conducive to productive foraging. A map showing the documented sightings of wood storks on Moody AFB over the last fifteen years is attached (Attachment 6). The tree-clearing activities proposed to support the Bemiss Field ULZ will potentially improve foraging habitat for wood storks north of the ULZ. However, overall use of the area is not anticipated to increase because of the small acreage involved relative to the larger, surrounding nonsuitable habitat mosaic (60 acres (1.1%) improved within the 5,500 acre Carolina Bay wetlands complex) and because there are no wood stork rookeries within 10 miles of Moody AFB. The closest wood stork rookery is located near Hahira, Georgia, about 13.25 miles west of the proposed project area (Attachment 7). To minimize the potential risk of an aircraft strike with wood storks and other wading or passerine birds that might be attracted to the affected area, the Landing Zone Safety Officer (LZSO) will conduct sweeps of the ULZ and surrounding area to ensure no birds or other wildlife species are present before aircraft operations are initiated.

c. GOPHER TORTOISES: Biological studies of gopher tortoises on Moody AFB, including the Bemiss Field area, have been on-going since 1998. As part of these studies, annual surveys of known and potential gopher tortoise habitat are conducted to update maps of tortoise burrow distribution on the installation. There are only two gopher tortoise burrows within the proposed clearing area (Attachment 8). These burrows have been marked in the field to prevent damage by heavy equipment during the clearing operation. Since the predominant soil types in the proposed clearing area are comprised of hydric soils generally deemed unsuitable as gopher tortoise habitat (Attachment 9), it is unlikely the clearing of these trees will result in any changes in gopher tortoise population status or distribution in the Bemiss Field ULZ area. However, annual surveys and management of the habitat in these areas for gopher tortoises and eastern indigo snakes will continue as directed in the 1996 Incidental Take Statement for the Bemiss Field Drop Zone and the Moody AFB INRMP.

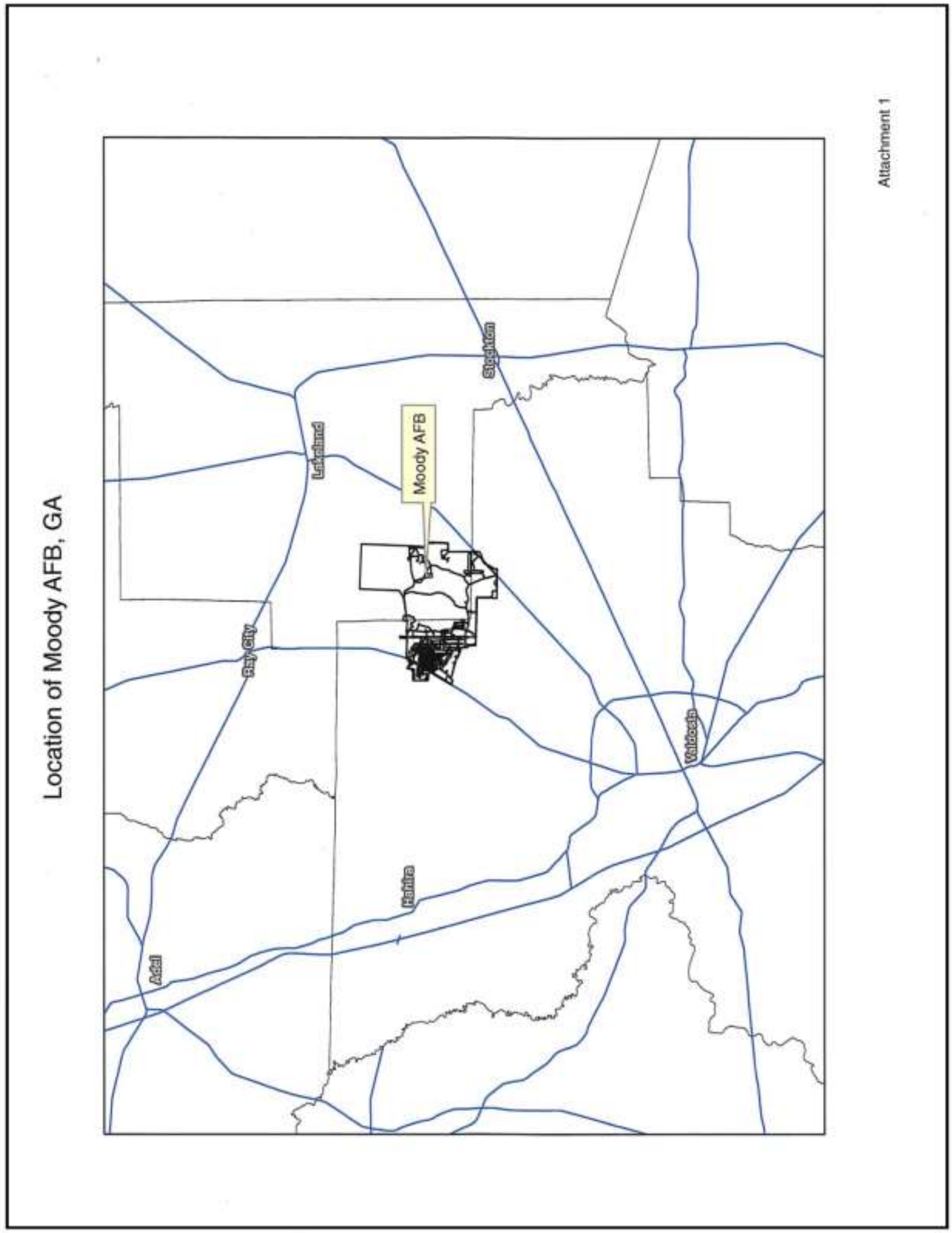
d. FROSTED FLATWOODS SALAMANDERS AND STRIPED NEWTS: As noted in the Moody AFB INRMP and the draft environmental assessment for this project, surveys for striped newts were initially conducted in 1995 and additional surveys for frosted flatwoods salamanders and striped newts were conducted from 2002 through 2005 in isolated and semi-isolated wetlands on Moody AFB in the best available habitat. While no isolated or semi-isolated wetlands suitable for flatwoods salamanders or striped newts occur within the proposed clearing areas, four wetlands in the Bemiss Field area were sampled in the most recent survey (see map at Attachment 10). Neither frosted flatwoods salamanders or striped newts were captured during these surveys at Moody AFB, and both reports indicate the habitat on Moody AFB is marginal at best for these species. Additionally, the areas proposed for clearing as part of this action are not considered suitable habitat for either the frosted flatwoods salamander or the striped newt.

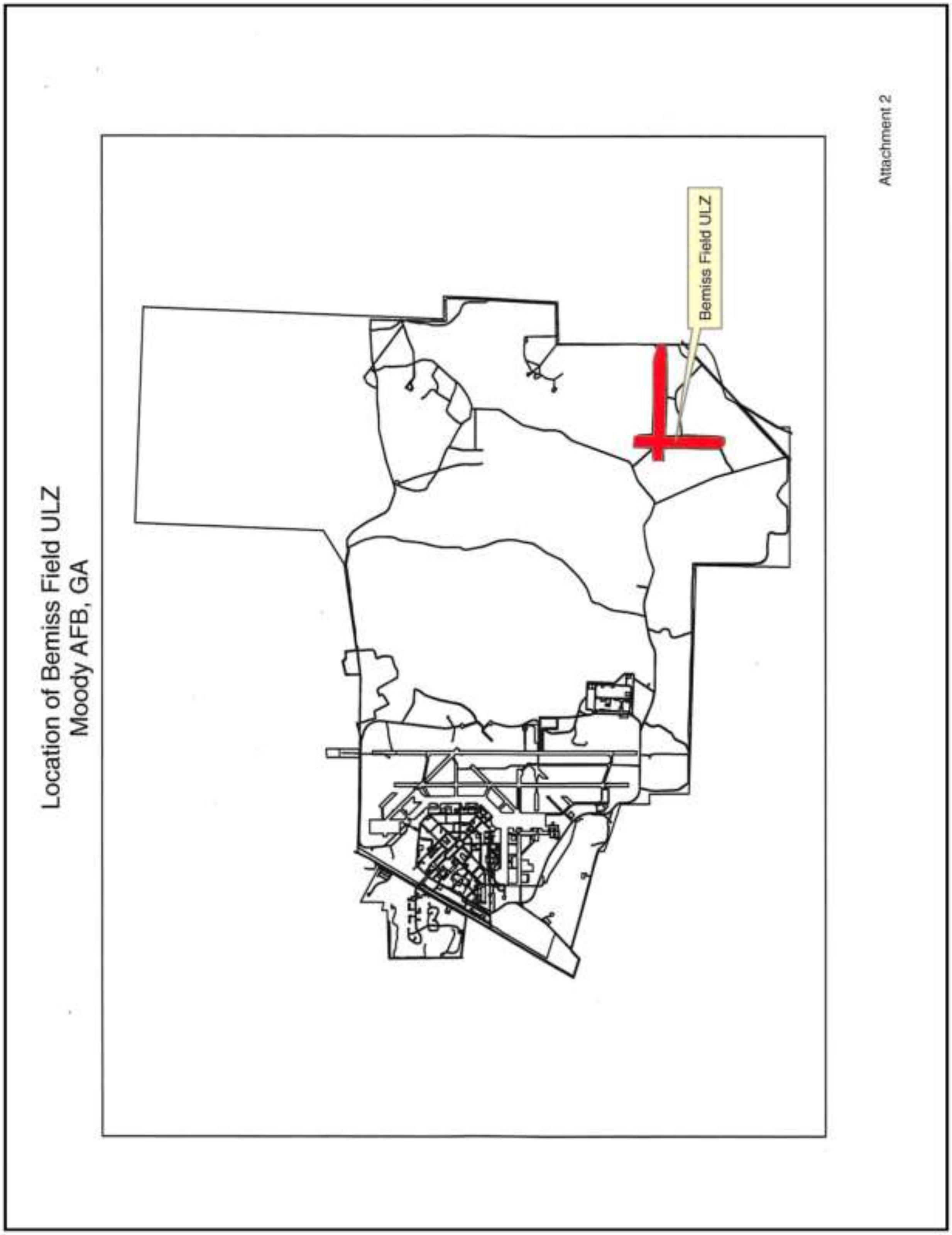
6. Based upon this analysis, our staff believes the proposed action will not affect, any listed or candidate species. Therefore, Moody AFB requests your written concurrence with our determination and the conclusion of this informal consultation under Section 7 of the Endangered Species Act.

7. If you have any questions or need any further information, please contact Mr. Gregory Lee at 229-257-5881 or by e-mail at gregory.lee.5@us.af.mil.

THANG D. NGUYEN, Maj, USAF
Commander

Attachments:
1. Location of Moody AFB, GA
2. Location of Bemiss Field, Grand Bay Range, Moody AFB, GA
3. Activities Associated with the Proposed Action Alternative
4. Excerpt from Draft EA, *Environmental Assessment for Bemiss Field ULZ Modification and Use at Moody AFB*
5. Location of Eastern Indigo Snake Sightings on Moody AFB
6. Location of Wood Stork Sightings on Moody AFB
7. Location of Wood Stork Rookeries in Proximity to Moody AFB
8. Location of Gopher Tortoise Burrows Adjacent to the Bemiss Field ULZ
9. Soil Types Adjacent to the Bemiss Field ULZ
10. Frosted Flatwoods Salamander and Striped Newt Sampling Locations, 2002-2005


Attachment 1
Location of Moody AFB, GA
Moody AFB
Stockton
Lakeland
Ray City
Valdosta
Hahira
Adel


Location of Bemiss Field ULZ
Moody AFB, GA
Bemiss Field ULZ
Attachment 2

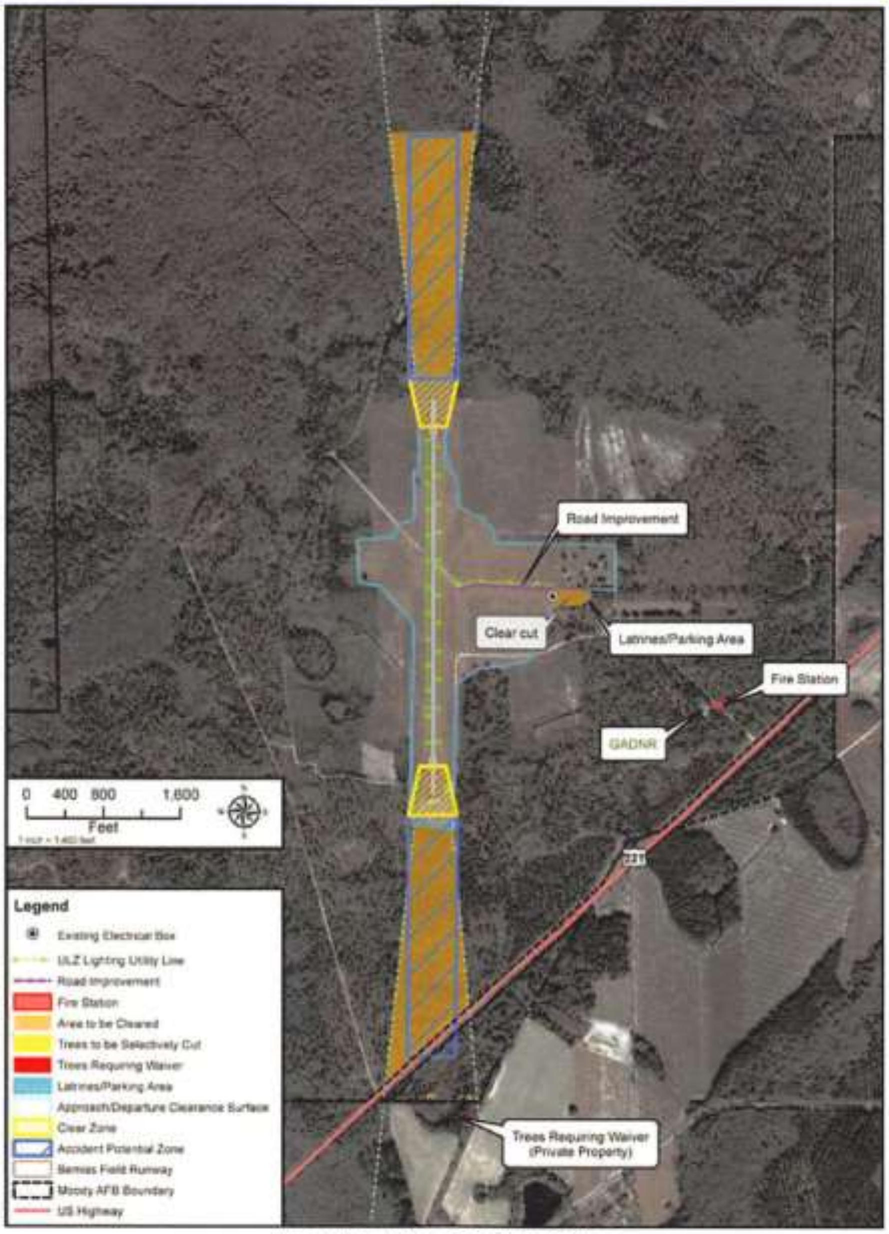


Figure 2-1. Alternative 1 Activities

area and ULZ. Other potential locations for the fire station are along the same road as proposed and all essentially within the same general area. These potential locations are not substantively different from the Alternative 1 location, and moving the fire station closer to the ULZ would place it into safety zones.

Training Activities: Finally, alternatives considered for training activities include increasing the glide path of approaching and departing aircraft and creating a "dogleg" approach from the south. Increasing the glide slope from a standard 3-3.5 degrees to 4.5-5 degrees to minimize the number of trees requiring removal was considered; however, this option eliminated the C-130 approach from the south and therefore eliminated the ability to conduct a full tactical flight profile. Creating a dogleg to the west for southern approaches and departures was also considered, but would have resulted in the need to remove more trees and would not eliminate the need for a waiver for the off-base trees at the southern end of the ULZ.

2.5 ALTERNATIVE 1

2.5.1 ULZ Modifications

The modifications regarding the 35:1 approach/departure plane and on-site fire/rescue and are shown in Figure 2-1.

ULZ Tree Clearing - This would occur within the ULZ approach/departure plane at the north and south ends of the ULZ. To the north, approximately 37 acres would be clear cut and approximately 0.065 acre would be selectively cut, and to the south, approximately 32 acres must be clear cut and less than 0.25 acre would be selectively cut. Approximately 13 acres of the north clearance area and 2 acres of the southern clearance area are within wetlands. Trees in these areas would be removed using both mechanical and manual means, as necessary, through a commercial timber sale; no stumps would be removed. To the south of the ULZ across Lakeland Highway, there is an approximately 0.06-acre area that is located on private property. Because these trees cannot be removed, they would be noted as an obstruction on the landing zone survey and aircrews would then avoid these trees. The trees may require an obstacle waiver from ACC, which would allow continued operations at the ULZ despite obstacles that violate the approach/departure plane requirements. Photos 1 through 4 show the areas requiring clearance associated with the ULZ.

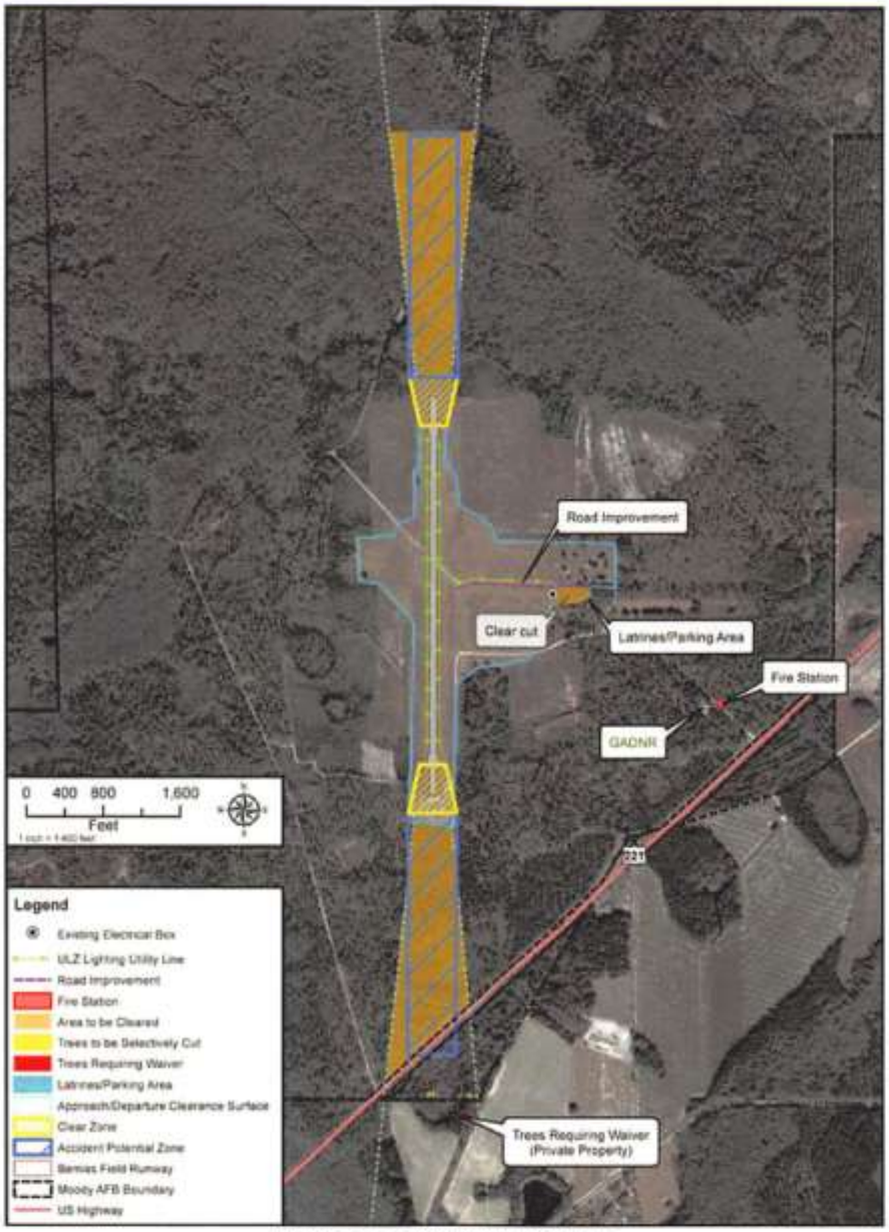


Figure 2-1. Alternative 1 Activities

Photo 1: ULZ View to South

Photo 2: ULZ View to North

Photo 3: Trees at Property Line South of HWY 221 (Selective Clearing)

Photo 4: Trees Off Base South of HWY 221 (Obstruction Waiver Potentially Required)

Establish Staging Area and Renovate Latrine Facility – Located approximately 1,400 feet east of the ULZ, an approximately 1,000-square-foot gravel parking area would be developed to provide parking/staging for emergency response equipment during training activities. Installation of the gravel parking area would require land clearance to remove trees and level the area to make it suitable for parking. Additionally, approximately 1.5 acres of trees would need to be removed to provide line-of-sight from the staging area to the ULZ. The latrine facility (Facility #200) would be completely renovated. Photos 5 through 8 show the area proposed for the latrine facility and parking area, as well as the trees requiring removal.

Photo 5: Proposed Staging Area

Photo 6: Facility 200 – Proposed for Renovation

Photo 7: Entry to Proposed Staging Area

Photo 8: View from Staging Area West to ULZ – Trees Requiring Removal

Road Improvement – Improvement of approximately 1,400 linear feet of an existing dirt road to accommodate vehicle access to the ULZ would be required. This would involve some grading and gravel surfacing to provide support for large emergency response and transport vehicles. The road would be widened by approximately 10 feet to accommodate the emergency vehicles. Photos 9 and 10 show the existing roadway.

Photo 9: Road from Staging Area to ULZ (Facing West)

Photo 10: Road from Staging Area to ULZ (Facing East)

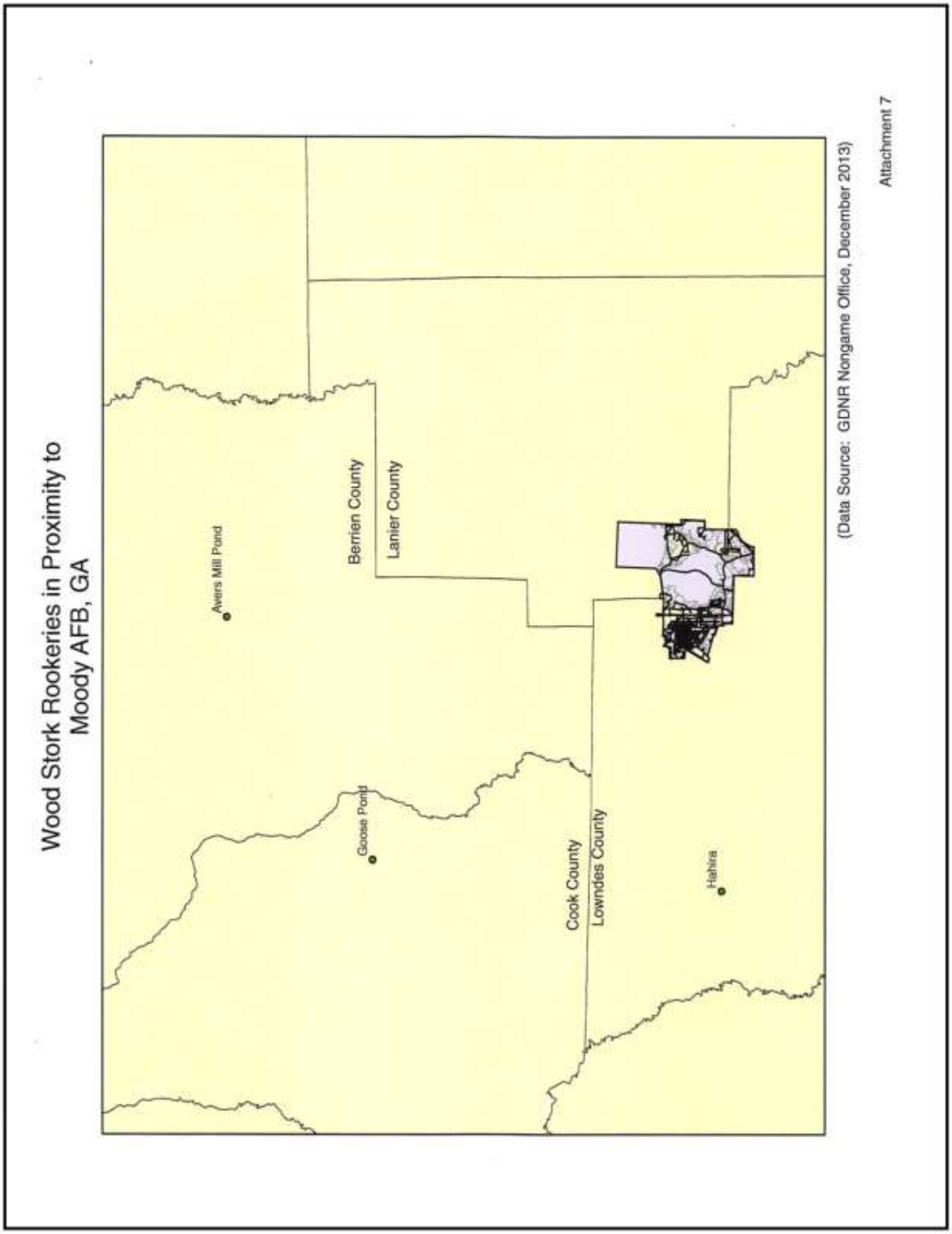
Installation of ULZ Lighting - ULZ lighting would be installed in accordance with Air Force Instruction (AFI) 13-217 (*Drop Zone and Landing Zone Requirements*, May 2007), section 3.6. Approximately 7,900 linear feet of underground electrical utility lines would be installed as shown in Figure 2-1. Lines would be trenched and then filled and revegetated.

Construction of Fire Station - The proposed fire station facility would be approximately 4,320 square feet and located as depicted in Figure 2-1, inside the gate north of HWY 221 across from the Georgia DNR campground, maintenance facility, and bathrooms. The facility would consist of a two-truck parking bay and an administrative section with a control room, break room, showers and toilet, and storage and utility areas. There would be no vehicle maintenance conducted at the facility and no drains in truck bays, oil-water separators, or other forms of stormwater retention. A small septic tank and drain field for the facility would be required. A front fence would be constructed along the crash trail to tie into the existing chain link fence to secure the site, along with two 16-foot roll gates at the entrance to allow fire trucks to enter. An existing electrical transformer located on the south side of the road would need to be upgraded to provide electrical utilities, and a potable water well would be installed next to the facility for potable water use. The potable water well would be placed in the Floridan aquifer between 125 and 175 feet in depth and used for drinking, showering, and toilet flushing. Water for firefighting would be taken from the well by the Georgia DNR facilities. There would be no other utilities required.

The fire station must be vacant when the Grand Bay Range is hot because it is at the edge of a safety zone for some weapons deliveries. Therefore, the fire station would not be permanently manned and would mainly be used to house fire-fighting equipment such as fire trucks and firefighting/rescue gear that would be moved to the staging area when the ULZ is in use. Personnel would only be in the facility when the range/ULZ is scheduled for use by C-130s. On the scheduled day, firemen would wait in the facility until they get notice that the C-130 is inbound to the ULZ, then they would take a vehicle to the staging area to have line-of-sight for the aircraft. After the C-130 completes an approach/departure, personnel would retire back to the facility until the C-130 returns, which may be 1 to 2 hours. Personnel would therefore be in the facility for 2 to 4 hours per event, two to three times per week.


Eastern Indigo Snake Sightings on Moody AFB, GA
Bemiss Field ULZ Proposed Clearings
Legend
1991 Sighting
1996 Sighting
Attachment 5

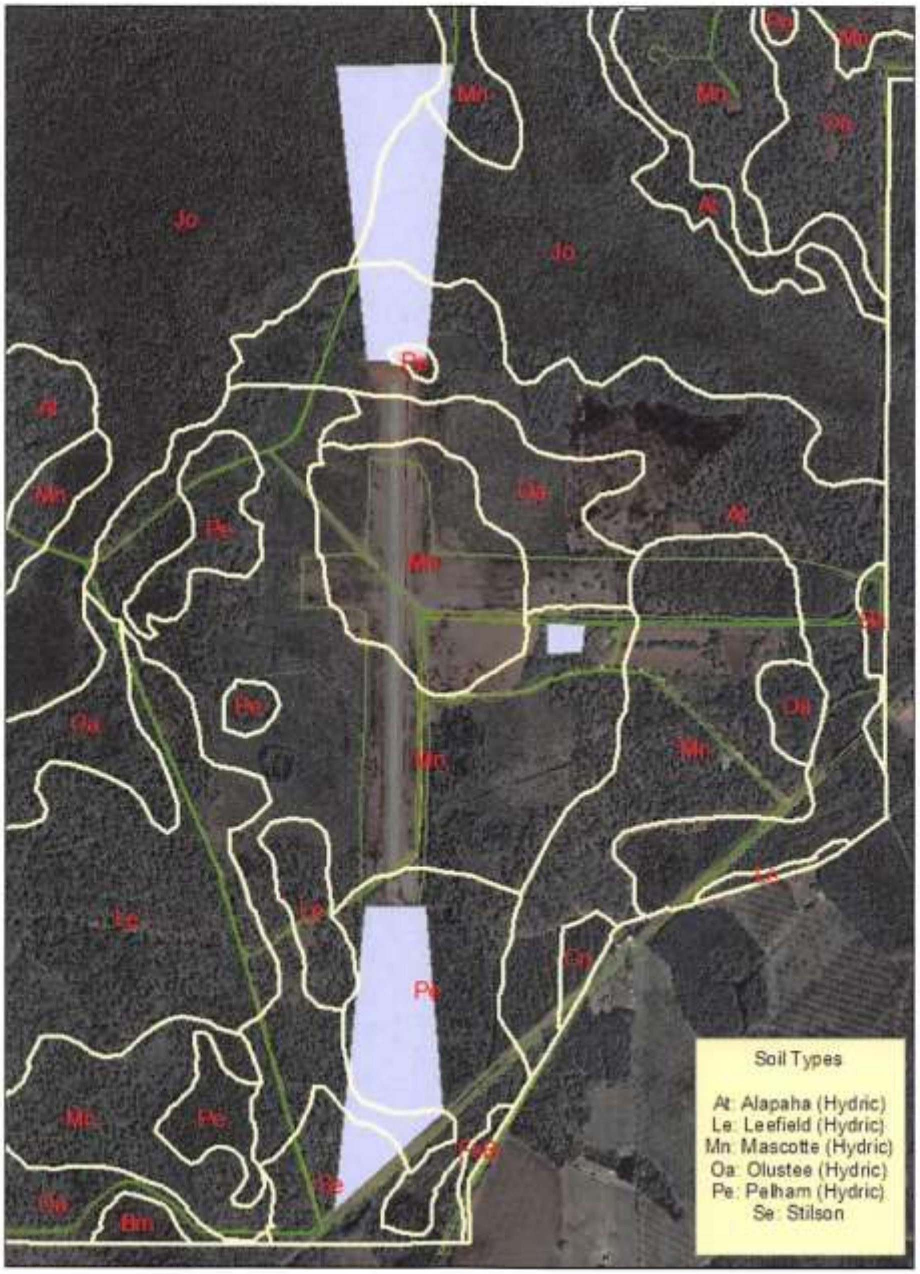

Wood Stork Sightings on Moody AFB, GA
Attachment 6
Proposed Bemiss Field ULZ Clearings


Wood Stork Rookeries in Proximity to
Moody AFB, GA
Ayers Mill Pond
Berrien County
Lanier County
Goose Pond
Cook County
Lowndes County
Hahira
(Data Source: GDNR Nongame Office, December 2013)
Attachment 7

Location of Gopher Tortoise Burrows
Bemiss Field ULZ, Moody AFB, GA

Attachment 8

Soil Types Adjacent to the Bemiss Field ULZ
Moody AFB, GA



Note: Well-drained Leefield and Stilson soils are often associated with the presence of gopher tortoises on Moody AFB

Frosted Flatwoods Salamander and Striped Newt
Sampling Locations (2002-2005)
Bemiss Field Area, Moody AFB, GA

Attachment 10

United States Department of the Interior

Fish and Wildlife Service
105 West Park Drive, Suite D
Athens, Georgia 30606
Phone: (706) 613-9493
Fax: (706) 613-6059

West Georgia Sub-Office
Post Office Box 52560
Fort Benning, Georgia 31995-2560
Phone: (706) 544-6428
Fax: (706) 544-6419

Coastal Sub-Office
4980 Wildlife Drive
Townsend, Georgia 31331
Phone: (912) 832-8739
Fax: (912) 832-8744

February 18, 2015

Lieutenant Colonel Patrick M. Albritton
Department of the Air Force
23rd Civil Engineer Squadron
3485 Georgia Street
Moody Air Force Base, Georgia 31699
Attention: Mr. Gregory Lee

Re: USFWS 2015-0304

Dear Colonel Albritton:

We received your letter initiating informal Section 7 consultation for the proposed Bemiss Field Unimproved Landing Zone (ULZ) Modification and Use at Moody Air Force Base (MAFB) in Lowndes County, Georgia. We submit the following comments in accordance with provisions of the Endangered Species Act of 1973, as amended; (16 U.S.C. 1531 *et seq.*) (ESA) to further the conservation of fish and wildlife resources and their habitat, including federally listed threatened and endangered species.

The proposed modification and use of the existing Bemiss Field ULZ consists of vegetation management and development of on-site fire/rescue capabilities to meet Air Force training requirements. The project proposes to remove approximately 37 acres of forest on the north end and 32 acres on the south end of the Bemiss Field ULZ to comply with aircraft approach/departure clearance planes. An additional 2.25 acres will be cleared to accommodate improvements and construction of a new fire station.

Three federally listed species and two candidate species were identified as potentially occurring within the action area and possibly affected by the proposed action. These species are: eastern indigo snake (*Drymarchon couperi*), gopher tortoise (*Gopherus polyphemus*), wood stork (*Mycteria americana*), frosted flatwoods salamander *(Ambystoma cingulatum)* and Striped Newt *(Notophthalmus perstriatus)*. The tree clearing activities will improve the overall habitat for the Eastern indigo snake by creating early successional habitat adjacent to potential wintering and foraging habitat. To minimize the potential risk of an aircraft strike with wood storks, periodic sweeps will be conducted to ensure no birds or other wildlife species are present before aircraft operations are initiated. The project area is not considered suitable habitat for either the frosted flatwoods salamander or the striped newt. Additionally, the proposed action includes marking gopher tortoise burrows to prevent damage by heavy equipment during the clearing operation.

Based on the information provided in your letter, we concur that the Proposed Action *is not likely to adversely affect* federally protected species. Based on the known distribution of the federally protected species in and around the proposed action area and the scope of the proposed action, we do not anticipate significant risks of adverse effects on these protected species as a result of implementing the proposed action.

If you have any further questions, please contact our Coastal Georgia Sub Office biologist, Gail Martinez, at 912-832-8739 extension 7.

Sincerely,

Strant Colwell

Strant Colwell
Coastal Georgia Supervisor

-----Original Message-----
From: Kobs, Terry C SAS [mailto:Terry.C.Kobs@usace.army.mil]
Sent: Thursday, June 20, 2013 11:57 AM
To: Crain, John E Civ USAF ACC 23 CES/CEIEA
Subject: RE: Bemiss Field ULZ End Clearing in Forested Wetlands (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Based on the information provided it appears your proposed project would not require authorization from the USACE. It would be an exempt silviculture activity. For additional information on silviculture activities please visit http://www.sas.usace.army.mil/Missions/Regulatory/Permitting/ExemptedActivities.aspx.

Thanks,

Terry C. Kobs
Regulatory Specialist, Coastal Branch
(229) 430-8567

-----Original Message-----
From: Crain, John E Civ USAF ACC 23 CES/CEIEA [mailto:John.Crain@moody.af.mil]
Sent: Thursday, June 20, 2013 9:43 AM
To: Kobs, Terry C SAS
Cc: Crain, John E Civ USAF ACC 23 CES/CEIEA; Lee, Gregory W Civ USAF ACC 23 CES/CEIE
Subject: Bemiss Field ULZ End Clearing in Forested Wetlands

Sir,

1

It was a pleasure speaking with you this morning. On Bemis Field on Grand Bay Weapons Range, we have an Unimproved Landing Zone (ULZ). To make this area functional for aircraft landings and takeoffs at the north end, a large area of tree clearing is needed in some forested wetlands including roughly 65+- acres which contains predominantly swamp tupelo, sweetbay, pond cypress, red maple, and some pines on the wetland perimeter. Overall this area is approximately over 95% hardwoods. The trees will be cut in a timber sale using a swamp logger. There will be no fill dirt added to the wetland and no stumps will be pushed up or removed. The area will just be clearcut leaving stumps in place to sprout back through natural coppice regeneration.

My question is, does this proposed project described above qualify for a silvicultural exemption from permit requirements under the Clean Water Act?

//SIGNED//

John E. Crain, GS-11, USAF

Base Forester, 23 CES/CEAN

Office: 229-257-4980/DSN: 460-4980/Cell: 912-288-7243

Classification: UNCLASSIFIED
Caveats: NONE

GEORGIA
DEPARTMENT OF NATURAL RESOURCES

HISTORIC PRESERVATION DIVISION

MARK WILLIAMS
COMMISSIONER

DR. DAVID CRASS
DIVISION DIRECTOR

February 20, 2013

Melissa M. Green, RPA
Principle Investigator/Senior Project Manager, Cultural Resources
Geo-marine, Inc.
2201 K Avenue, Suite A2
Plano, Texas 75074-5977

RE: Moody Air Force Base: Archaeology Testing Report, Sites 9LW52, 9LW67
Lowndes County, Georgia
FP-130206-002

Dear Ms. Green:

The Historic Preservation Division (HPD) has reviewed the survey report entitled *Archaeological Testing and National Register of Historic Places Evaluations of the Tick (9LW52) and Tock (9LW67) Sites, Moody Air Force Base, Lowndes County, Georgia,* dated January 2013 and prepared by your company. Our comments are offered to assist the US Air Force in complying with the provisions of Section 106 of the National Historic Preservation Act (NHPA).

Based on the information contained in the report, HPD concurs with the finding that archaeological sites 9LW52 and 9LW67 are not eligible for listing on the National Register of Historic Places.

Please submit one electronic copy of the final report to HPD. Please ensure the electronic copy is an optical character enabled .pdf. For your information, the electronic file will be sent to the Georgia Archaeological Site File at the University of Georgia, Athens for permanent retention.

Please refer to project number **FP-130206-002** in any future correspondence concerning this project. If we may be of further assistance, please do not hesitate to contact Bryan Tucker, State Archaeologist, at (404) 463-9696, or me at (404) 651-6624.

Sincerely,

Elizabeth Shirk

Elizabeth Shirk
Environmental Review Coordinator

ES:jad

Cc: Michael Jacobs, Southern Georgia Regional Commission

254 WASHINGTON STREET, SW | GROUND LEVEL | ATLANTA, GEORGIA 30334
404.656.2840 | FAX 404.657.1368 | WWW.GEORGIASHPO.ORG

GEORGIA
DEPARTMENT OF NATURAL RESOURCES

HISTORIC PRESERVATION DIVISION

MARK WILLIAMS
COMMISSIONER

DR. DAVID CRASS
DIVISION DIRECTOR

February 10, 2014

Gregory W. Lee, CWB
Chief, Environmental Management Element
Department of the Air Force
23D Civil Engineer Squadron (ACC)
Moody Air Force Base Georgia

RE: Archaeological Testing and National Register of Historic Places Evaluation of the Tick (9LW52) and Tock (9LW62) Sites, Moody Air Force Base, Georgia
Lowndes County, Georgia
HP-131226-002/FP-130206-002

Dear Mr. Lee:

The Historic Preservation Division (HPD) has received the final report, *Archaeological Testing and National Register of Historic Places Evaluation of the Tick (9LW52) and Tock (9LW62) Sites, Moody Air Force Base, Georgia,* prepared by Geo-Marine, Inc. and dated March 2013. Our comments are offered to assist the US Department of the Air Force and Moody Air Force Base in complying with the provisions of Section 106 and Section 110 of the National Historic Preservation Act of 1966, as amended (NHPA).

Thank you for submitting the copies of the final report. For your information, the digital copies will be sent to the Georgia Archaeological Site Files at the University of Georgia-Athens for permanent retention.

Please refer to project number **HP-131226-002/FP-130203-002** in future correspondence regarding this undertaking. If we may be of further assistance, please do not hesitate to contact Jennifer Dixon, Environmental Review Specialist at (404) 651-6546 or Jennifer.dixon@dnr.state.ga.us or Bryan Tucker, State Archaeologist, at (404)295-1090 or bryan.tucker@dnr.state.ga.us.

Sincerely,

Jennifer Dixon
Environmental Review Specialist

254 WASHINGTON STREET, SW | GROUND LEVEL | ATLANTA, GEORGIA 30334
404.656.2840 | FAX 404.657.1368 | WWW.GEORGIASHPO.ORG

TRIBAL CORRESPONDENCE

DEPARTMENT OF THE AIR FORCE
23D CIVIL ENGINEER SQUADRON (ACC)
MOODY AIR FORCE BASE GEORGIA

MEMORANDUM FOR TRIBAL HISTORIC AND CULTURAL PRESERVATION OFFICERS

FROM: 23 CES/CEIE
3485 Georgia Street
Moody AFB, GA 31699-1707

SUBJECT: Proposed Bemiss Field Unimproved Landing Zone (ULZ) at Moody AFB, GA

1. The United States Air Force is in the process of preparing an Environmental Assessment (EA) at Moody Air Force Base (AFB) (Attachment 1), Georgia (GA) to assess the potential environmental consequences associated with utilizing Bemiss Field (Attachment 2) for ULZ training. Moody AFB is located in south central Georgia, north of the city of Valdosta. Bemiss Field is located in the southeast portion of the base, on Federal property in Lanier and Lowndes Couties, within the confines of Grand Bay Range, and within the airspace of Restricted Area 3008 (R-3008). At this time, the only alternative to the proposed action is the no action alternative, in which Moody AFB aircraft would continue to travel to other locations to accomplished required ULZ training.

2. The proposed action involves improvements to the existing Bemiss Field facility in order to meet airfield certification criteria required to utilize the field for military ULZ training. An operational ULZ at Bemiss Field would minimize the extra costs and transit time associated with travel to other ranges/ULZs to accomplish required training and increase the proficiency of Moody AFB aircrews. Physical improvements will include removal of approximately 60-acres of forest on each end of the ULZ to meet fixed wing approach slope clearance requirements, and installation of a concrete pad and storage facility for required crash-fire-rescue equipment. There are no known archeological sites in the proposed project area. The closest arechelogical sites are 9LW52 and 9LW67 located 3000' west of the ULZ. These sites were determined to be non-eligible for listing on the National Register by GA SHPO. Proposed flight operations at the Bemiss Field ULZ will include north and south fixed wing traffic patterns oriented on the east side of the runway within the restricted area airspace. The proposed action would not increase the total number of annual sorties to R-3008.

3. The EA for the proposed action will be prepared in compliance with the National Environmental Policy Act of 1969, 42 United States Code (USC), the Council on Environmental Quality NEPA Regulations, 40 Code of Federal Regulations (CFR), and the Air Force's Environmental Impact Analysis Process, 32 CFR 989. As part of this EA, we request your assistance in identifying potential areas of environmental impact to be addressed.

4. If you have any specific items of interest about the proposal, we would like to hear from you within 30-days of receipt of this letter. Please contact the EA Project Manager, Mr. Hank

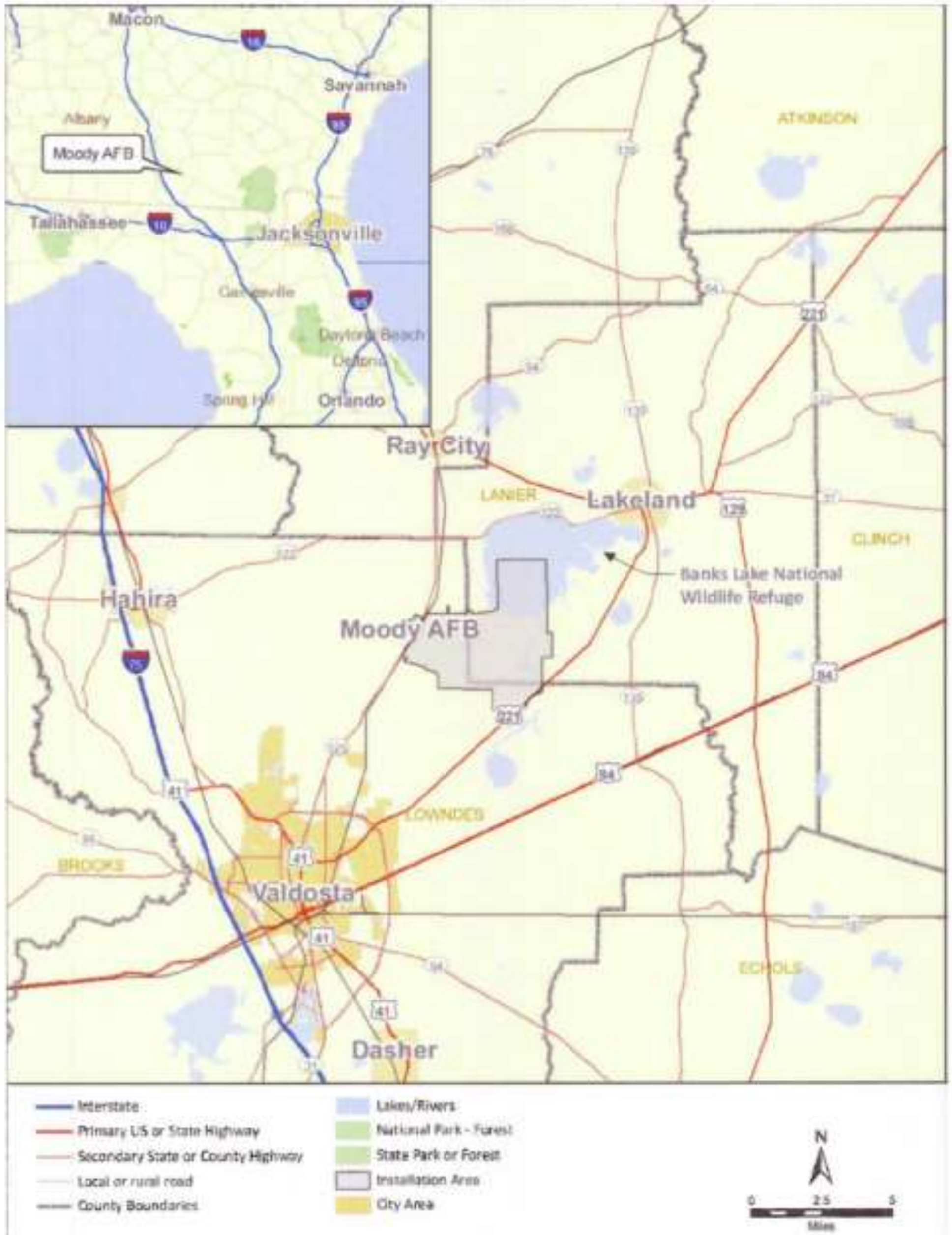
Global Power for America

Santicola at 23d Civil Engineer Squadron, 3485 Georgia Street, Moody AFB GA 31699, or via e-mail at henry.santicola.2@us.af.mil, or by phone at (229) 257-2396 with any questions or concerns you or your staff may have.

HENRY J. SANTICOLA
Environmental Planner

Attachments:
1. Location of Moody AFB, Georgia
2. Location of Proposed Project Area

3



Attachment 1


Phase II Survey Sites -- Grand Bay Range
Moody AFB, GA
9LW52
9LW67
1,500 750 0 1,500 Feet
N
W
E
S

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 23D WING (ACC)
MOODY AIR FORCE BASE GEORGIA

AUG 0 8 2014

Colonel Chad P. Franks
23d Wing Commander
23 Flying Tiger Way, Suite 1
Moody AFB GA 31699

Ann Denson Tucker, Chairwoman
Muscogee Nation of Florida
278 Church Road
Ponce de Leon, FL 32455

Dear Chairwoman Tucker

The United States Air Force is in the process of preparing an Environmental Assessment (EA) at Moody Air Force Base (AFB), Georgia to assess the potential environmental consequences associated with utilizing Bemiss Field for ULZ (Unimproved Landing Zone) training. Moody AFB is located in south central Georgia, north of the city of Valdosta (Attachment 1). Bemiss Field is located in the southeast portion of the base, on Federal property in Lanier and Lowndes Counties, within the confines of Grand Bay Range, and within the airspace of Restricted Area 3008 (R-3008) (Attachment 2).

The proposed action involves improvements to the existing Bemiss Field facility in order to meet airfield certification criteria required to utilize the field for military ULZ training. An operational ULZ at Bemiss Field would minimize the extra costs and transit time associated with travel to other ranges/ULZs to accomplish required training and increase the proficiency of Moody AFB aircrews. Physical improvements will include removal of approximately 60-acres of forest on each end of the ULZ to meet aircraft tree clearance requirements, and installation of a small fire station and a concrete pad for required crash-fire-rescue equipment. Proposed flight operations at the Bemiss Field ULZ will include north and south aircraft traffic patterns oriented on the east side of the runway within the restricted area airspace. Moody AFB proposes that up to 300 HC-130 flight operations, 75 HH-60 flight operations, and 150 transient flight operations would be conducted annually on Bemiss Field. Bemiss Field is currently a 4100 foot unimproved former auxiliary field used as a Landing Zone for HH-60 and other rotary wing aircraft, a ground training area for battlefield airmen, and a drop zone for HC-130 and transient airlift aircraft. At this time, the only alternative to the proposed action is the no action alternative, in which Moody AFB aircraft would continue to travel to other locations to accomplished required ULZ training.

In accordance with Executive Order 13175, Consultation with Indian Tribal Governments, and Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations at 36 CFR Part 800, the USAF would like to initiate government-to-government consultation regarding the Bemiss Field ULZ Training proposal. The USAF requests your input in identifying any issues or areas of concern you feel should be addressed in the environmental analysis. Additionally, please let us know if you believe this proposal might adversely affect any traditional cultural properties, including those of religious significance to the tribe.

To ensure the USAF has sufficient time to consider your input in the preparation of the Draft EA, please forward written issues or concerns to the EA Project Manager, Mr. Hank Santicola at 23d Civil Engineer Squadron, 3485 Georgia Street, Moody AFB GA 31699. Though we will consider comments

received at any time during the environmental impact analysis process, to the extent possible, we would like to hear from you within 30 days of receipt of this letter. If you have any questions, please contact Mr. Santicola at (229) 257-2396 or Henry.Santicola.2@us.af.mil. Thank you in advance for your assistance in this effort.

Sincerely

CHAD P. FRANKS, Colonel, USAF
Commander

Attachments:
1. Location of Moody AFB, Georgia
2. Location of Proposed Landing Zone

Attachment 1

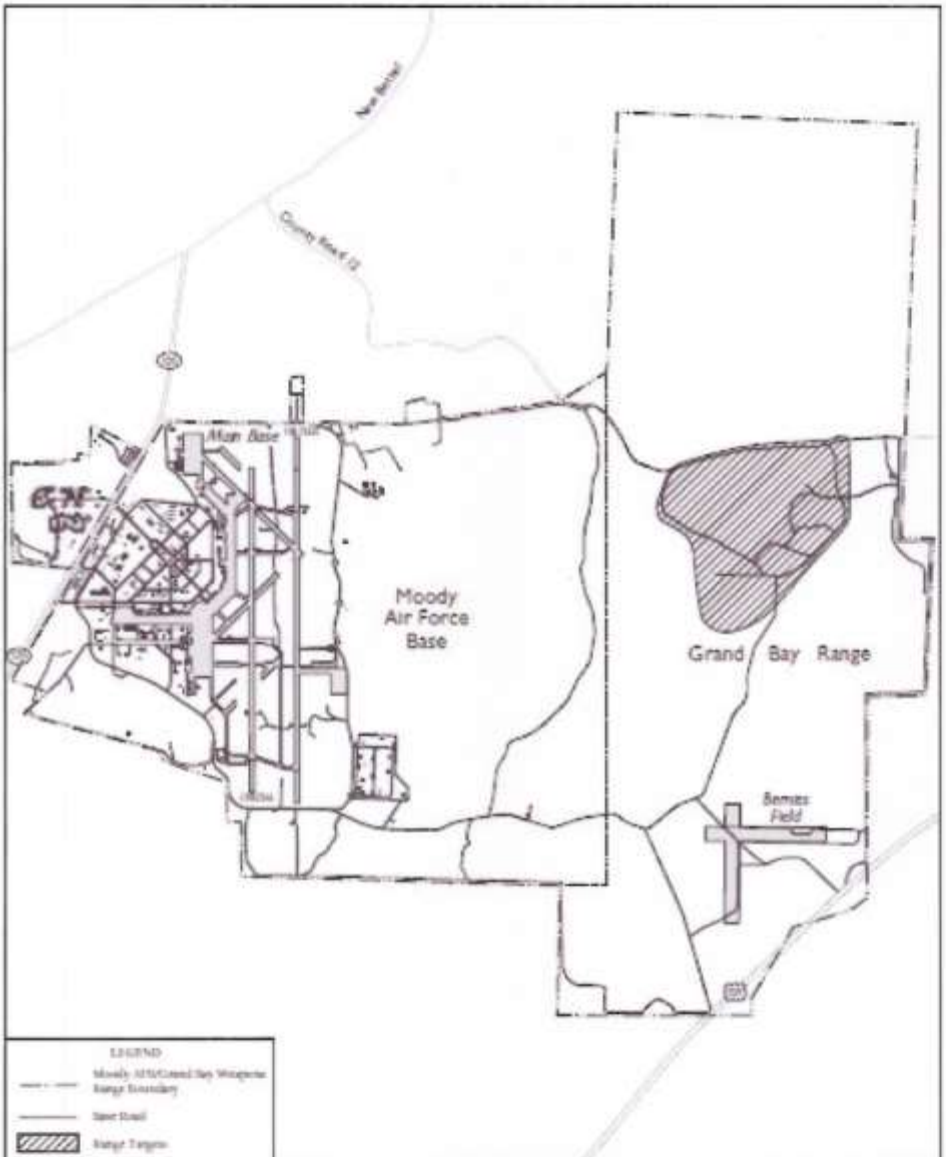


Figure 1-1
Location of Moody AFB, Grand Bay Range, and Bemiss Field

Attachment 2

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 23D WING (ACC)
MOODY AIR FORCE BASE GEORGIA

AUG 0 8 2014

Colonel Chad P. Franks
23d Wing Commander
23 Flying Tiger Way, Suite 1
Moody AFB GA 31699

Bill John Baker, Principal Chief
The Cherokee Nation
P.O. Box 948
Tahlequah, OK 74465

Dear Mr. Baker

The United States Air Force is in the process of preparing an Environmental Assessment (EA) at Moody Air Force Base (AFB), Georgia to assess the potential environmental consequences associated with utilizing Bemiss Field for ULZ (Unimproved Landing Zone) training. Moody AFB is located in south central Georgia, north of the city of Valdosta (Attachment 1). Bemiss Field is located in the southeast portion of the base, on Federal property in Lanier and Lowndes Counties, within the confines of Grand Bay Range, and within the airspace of Restricted Area 3008 (R-3008) (Attachment 2).

The proposed action involves improvements to the existing Bemiss Field facility in order to meet airfield certification criteria required to utilize the field for military ULZ training. An operational ULZ at Bemiss Field would minimize the extra costs and transit time associated with travel to other ranges/ULZs to accomplish required training and increase the proficiency of Moody AFB aircrews. Physical improvements will include removal of approximately 60-acres of forest on each end of the ULZ to meet aircraft tree clearance requirements, and installation of a small fire station and a concrete pad for required crash-fire-rescue equipment. Proposed flight operations at the Bemiss Field ULZ will include north and south aircraft traffic patterns oriented on the east side of the runway within the restricted area airspace. Moody AFB proposes that up to 300 HC-130 flight operations, 75 HH-60 flight operations, and 150 transient flight operations would be conducted annually on Bemiss Field. Bemiss Field is currently a 4100 foot unimproved former auxiliary field used as a Landing Zone for HH-60 and other rotary wing aircraft, a ground training area for battlefield airmen, and a drop zone for HC-130 and transient airlift aircraft. At this time, the only alternative to the proposed action is the no action alternative, in which Moody AFB aircraft would continue to travel to other locations to accomplished required ULZ training.

In accordance with Executive Order 13175, Consultation with Indian Tribal Governments, and Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations at 36 CFR Part 800, the USAF would like to initiate government-to-government consultation regarding the Bemiss Field ULZ Training proposal. The USAF requests your input in identifying any issues or areas of concern you feel should be addressed in the environmental analysis. Additionally, please let us know if you believe this proposal might adversely affect any traditional cultural properties, including those of religious significance to the tribe.

To ensure the USAF has sufficient time to consider your input in the preparation of the Draft EA, please forward written issues or concerns to the EA Project Manager, Mr. Hank Santicola at 23d Civil Engineer Squadron, 3485 Georgia Street, Moody AFB GA 31699. Though we will consider comments

received at any time during the environmental impact analysis process, to the extent possible, we would like to hear from you within 30 days of receipt of this letter. If you have any questions, please contact Mr. Santicola at (229) 257-2396 or Henry.Santicola.2@us.af.mil. Thank you in advance for your assistance in this effort.

Sincerely

CHAD P. FRANKS, Colonel, USAF
Commander

Attachments:
1. Location of Moody AFB, Georgia
2. Location of Proposed Landing Zone

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 23D WING (ACC)
MOODY AIR FORCE BASE GEORGIA

AUG 0 8 2014

Colonel Chad P. Franks
23d Wing Commander
23 Flying Tiger Way, Suite 1
Moody AFB GA 31699

Brenda Shemayne Edwards, Chairman
Caddo Nation
P.O. Box 487
Binger, OK 73009

Dear Chairman Edwards

The United States Air Force is in the process of preparing an Environmental Assessment (EA) at Moody Air Force Base (AFB), Georgia to assess the potential environmental consequences associated with utilizing Bemiss Field for ULZ (Unimproved Landing Zone) training. Moody AFB is located in south central Georgia, north of the city of Valdosta (Attachment 1). Bemiss Field is located in the southeast portion of the base, on Federal property in Lanier and Lowndes Counties, within the confines of Grand Bay Range, and within the airspace of Restricted Area 3008 (R-3008) (Attachment 2).

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Sincerely

CHAD P. FRANKS, Colonel, USAF
Commander

Attachments:
1. Location of Moody AFB, Georgia
2. Location of Proposed Landing Zone

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 23D WING (ACC)
MOODY AIR FORCE BASE GEORGIA

AUG 0 8 2014

Colonel Chad P. Franks
23d Wing Commander
23 Flying Tiger Way, Suite 1
Moody AFB GA 31699

Colabe III Clem Sylestine, Principal Chief
Alabama Coushatta Tribe of Texas
571 State Park Road 56
Livingston, TX 77351

Dear Mr. Sylestine

The United States Air Force is in the process of preparing an Environmental Assessment (EA) at Moody Air Force Base (AFB), Georgia to assess the potential environmental consequences associated with utilizing Bemiss Field for ULZ (Unimproved Landing Zone) training. Moody AFB is located in south central Georgia, north of the city of Valdosta (Attachment 1). Bemiss Field is located in the southeast portion of the base, on Federal property in Lanier and Lowndes Counties, within the confines of Grand Bay Range, and within the airspace of Restricted Area 3008 (R-3008) (Attachment 2).

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Sincerely

CHAD P. FRANKS, Colonel, USAF
Commander

Attachments:
1. Location of Moody AFB, Georgia
2. Location of Proposed Landing Zone

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 23D WING (ACC)
MOODY AIR FORCE BASE GEORGIA

AUG 0 8 2014

Colonel Chad P. Franks
23d Wing Commander
23 Flying Tiger Way, Suite 1
Moody AFB GA 31699

Emman Spain, Tribal Historic Preservation Officer
Muscogee (Creek) Nation
P.O. Box 580
Okmulgee, OK 74447

Dear Mr. Spain

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HEADQUARTERS 23D WING (ACC)
MOODY AIR FORCE BASE GEORGIA

AUG 0 8 2014

Colonel Chad P. Franks
23d Wing Commander
23 Flying Tiger Way, Suite 1
Moody AFB GA 31699

George Scott, Town King
Thlopthlocco Tribal Town
P.O. Box 188
Okemah, OK 75859

Dear Mr. Scott

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MOODY AIR FORCE BASE GEORGIA

AUG 0 8 2014

Colonel Chad P. Franks
23d Wing Commander
23 Flying Tiger Way, Suite 1
Moody AFB GA 31699

George Wickliffe, Chief
United Keetowah Band of Cherokee
P.O. Box 746
Tahlequah, OK 74465

Dear Mr. Wickliffe

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Colonel Chad P. Franks
23d Wing Commander
23 Flying Tiger Way, Suite 1
Moody AFB GA 31699

James Billie, Chairman
Seminole Tribe of Florida
HC-61, Box 21-A
Clewiston, FL 33440

Dear Chairman Billie

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Colonel Chad P. Franks
23d Wing Commander
23 Flying Tiger Way, Suite 1
Moody AFB GA 31699

Jeremiah Hobia, Chief
Kialegee Tribal Town
P.O. Box 332
Wetumka, OK 74883

Dear Mr. Hobia

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Colonel Chad P. Franks
23d Wing Commander
23 Flying Tiger Way, Suite 1
Moody AFB GA 31699

Kenneth Chambers, Principal Chief
Seminole Nation of Oklahoma
P.O. Box 1498
Wewoka, OK 74884

Dear Mr. Chambers

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Colonel Chad P. Franks
23d Wing Commander
23 Flying Tiger Way, Suite 1
Moody AFB GA 31699

Lovelin Poncho, Chairman
Coushatta Tribe of Louisiana
P.O. Box 818
Elton, LA 70532

Dear Chairman Poncho

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Colonel Chad P. Franks
23d Wing Commander
23 Flying Tiger Way, Suite 1
Moody AFB GA 31699

Stephanie Bryan, Chairwoman
Poarch Band of Creek Indians
5811 Jack Springs Rd.
Atmore, AL 36502

Dear Chairwoman Bryan

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Colonel Chad P. Franks
23d Wing Commander
23 Flying Tiger Way, Suite 1
Moody AFB GA 31699

Tarpie Yargee, Chief
Alabama-Quassarte Tribal Town
Creek Nations of Indians, Oklahoma
P.O. Box 187
Wetumka, OK 74883

Dear Mr. Yargee

The United States Air Force is in the process of preparing an Environmental Assessment (EA) at Moody Air Force Base (AFB), Georgia to assess the potential environmental consequences associated with utilizing Bemiss Field for ULZ (Unimproved Landing Zone) training. Moody AFB is located in south central Georgia, north of the city of Valdosta (Attachment 1). Bemiss Field is located in the southeast portion of the base, on Federal property in Lanier and Lowndes Counties, within the confines of Grand Bay Range, and within the airspace of Restricted Area 3008 (R-3008) (Attachment 2).

The proposed action involves improvements to the existing Bemiss Field facility in order to meet airfield certification criteria required to utilize the field for military ULZ training. An operational ULZ at Bemiss Field would minimize the extra costs and transit time associated with travel to other ranges/ULZs to accomplish required training and increase the proficiency of Moody AFB aircrews. Physical improvements will include removal of approximately 60-acres of forest on each end of the ULZ to meet aircraft tree clearance requirements, and installation of a small fire station and a concrete pad for required crash-fire-rescue equipment. Proposed flight operations at the Bemiss Field ULZ will include north and south aircraft traffic patterns oriented on the east side of the runway within the restricted area airspace. Moody AFB proposes that up to 300 HC-130 flight operations, 75 HH-60 flight operations, and 150 transient flight operations would be conducted annually on Bemiss Field. Bemiss Field is currently a 4100 foot unimproved former auxiliary field used as a Landing Zone for HH-60 and other rotary wing aircraft, a ground training area for battlefield airmen, and a drop zone for HC-130 and transient airlift aircraft. At this time, the only alternative to the proposed action is the no action alternative, in which Moody AFB aircraft would continue to travel to other locations to accomplished required ULZ training.

In accordance with Executive Order 13175, Consultation with Indian Tribal Governments, and Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations at 36 CFR Part 800, the USAF would like to initiate government-to-government consultation regarding the Bemiss Field ULZ Training proposal. The USAF requests your input in identifying any issues or areas of concern you feel should be addressed in the environmental analysis. Additionally, please let us know if you believe this proposal might adversely affect any traditional cultural properties, including those of religious significance to the tribe.

To ensure the USAF has sufficient time to consider your input in the preparation of the Draft EA, please forward written issues or concerns to the EA Project Manager, Mr. Hank Santicola at 23d Civil

Engineer Squadron, 3485 Georgia Street, Moody AFB GA 31699. Though we will consider comments received at any time during the environmental impact analysis process, to the extent possible, we would like to hear from you within 30 days of receipt of this letter. If you have any questions, please contact Mr. Santicola at (229) 257-2396 or Henry.Santicola.2@us.af.mil. Thank you in advance for your assistance in this effort.

Sincerely

CHAD P. FRANKS, Colonel, USAF
Commander

Attachments:
1. Location of Moody AFB, Georgia
2. Location of Proposed Landing Zone

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 23D WING (ACC)
MOODY AIR FORCE BASE GEORGIA

SEP 05 2014

Colonel Chad P. Franks
23d Wing Commander
23 Flying Tiger Way, Ste 1
Moody AFB GA 31699

Bill John Baker, Principal Chief
The Cherokee Nation
P.O. Box 948
Tahlequah, OK 74465

Dear Mr. Baker

The United States Air Force (USAF) is preparing an Environmental Assessment to evaluate potential environmental impacts associated with upgrading Bemiss Field at Moody Air Force Base (AFB). On 8 August, 2014, the USAF invited you to participate in government-to-government consultation regarding this proposal. The USAF welcomes any input you would like to see included in the analysis. Though we will consider comments received at any time during the environmental impact analysis process, your input is most valuable to us when received early in our planning process, especially during the next few weeks. Please direct written issues or concerns to Mr. Hank Santicola, Environmental Assessment Program Manager, 3485 Georgia Street, Moody AFB GA 31699 or through email at Henry.Santicola.2@us.af.mil. Mr Santicola can also be contacted at (229) 257-2396. Thank you in advance for your assistance in this effort.

Sincerely

CHAD P. FRANKS, Colonel, USAF
Commander

Attachment:
Original Government-to-Government Consultation Letter to Chief Bill John Baker, dated 8 Aug 14

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 23D WING (ACC)
MOODY AIR FORCE BASE GEORGIA

SEP 05 2014

Colonel Chad P. Franks
23d Wing Commander
23 Flying Tiger Way, Ste 1
Moody AFB GA 31699

Stephanie Bryan, Chairwoman
Poarch Band of Creek Indians
5811 Jack Springs Rd.
Atmore, AL 36502

Dear Chairwoman Bryan

The United States Air Force (USAF) is preparing an Environmental Assessment to evaluate potential environmental impacts associated with upgrading Bemiss Field at Moody Air Force Base (AFB). On 8 August, 2014, the USAF invited you to participate in government-to-government consultation regarding this proposal. The USAF welcomes any input you would like to see included in the analysis. Though we will consider comments received at any time during the environmental impact analysis process, your input is most valuable to us when received early in our planning process, especially during the next few weeks. Please direct written issues or concerns to Mr. Hank Santicola, Environmental Assessment Program Manager, 3485 Georgia Street Moody AFB GA, 31699 or through email at Henry.Santicola.2@us.af.mil. Mr Santicola can also be contacted at (229) 257-2396. Thank you in advance for your assistance in this effort.

Sincerely

CHAD P. FRANKS, Colonel, USAF
Commander

Attachment:
Original Government-to-Government Consultation Letter to Chairwoman Bryan, dated 8 Aug 14

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 23D WING (ACC)
MOODY AIR FORCE BASE GEORGIA

SEP 05 2014

Colonel Chad P. Franks
23d Wing Commander
23 Flying Tiger Way, Ste 1
Moody AFB GA 31699

George Scott, Town King
Thlopthlocco Tribal Town
P.O. Box 188
Okemah, OK 75859

Dear Mr. Scott

The United States Air Force (USAF) is preparing an Environmental Assessment to evaluate potential environmental impacts associated with upgrading Bemiss Field at Moody Air Force Base (AFB). On 8 August, 2014, the USAF invited you to participate in government-to-government consultation regarding this proposal. The USAF welcomes any input you would like to see included in the analysis. Though we will consider comments received at any time during the environmental impact analysis process, your input is most valuable to us when received early in our planning process, especially during the next few weeks. Please direct written issues or concerns to Mr. Hank Santicola, Environmental Assessment Program Manager, 3485 Georgia Street, Moody AFB GA 31699 or through email at Henry.Santicola.2@us.af.mil. Mr Santicola can also be contacted at (229) 257-2396. Thank you in advance for your assistance in this effort.

Sincerely

CHAD P. FRANKS, Colonel, USAF
Commander

Attachment:
Original Government-to-Government Consultation Letter to Mr. George Scott, dated 8 Aug 14

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 23D WING (ACC)
MOODY AIR FORCE BASE GEORGIA

SEP 05 2014

Colonel Chad P. Franks
23d Wing Commander
23 Flying Tiger Way, Ste 1
Moody AFB GA 31699

Kenneth Chambers, Principal Chief
Seminole Nation of Oklahoma
P.O. Box 1498
Wewoka, OK 74884

Dear Mr. Chambers

The United States Air Force (USAF) is preparing an Environmental Assessment to evaluate potential environmental impacts associated with upgrading Bemiss Field at Moody Air Force Base (AFB). On 8 August, 2014, the USAF invited you to participate in government-to-government consultation regarding this proposal. The USAF welcomes any input you would like to see included in the analysis. Though we will consider comments received at any time during the environmental impact analysis process, your input is most valuable to us when received early in our planning process, especially during the next few weeks. Please direct written issues or concerns to Mr. Hank Santicola, Environmental Assessment Program Manager, 3485 Georgia Street, Moody AFB GA 31699 or through email at Henry.Santicola.2@us.af.mil. Mr Santicola can also be contacted at (229) 257-2396. Thank you in advance for your assistance in this effort.

Sincerely

CHAD P. FRANKS, Colonel, USAF
Commander

Attachment:
Original Government-to-Government Consultation Letter to Mr. Kenneth Chambers, dated 8 Aug 14

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 23D WING (ACC)
MOODY AIR FORCE BASE GEORGIA

SEP 05 2014

Colonel Chad P. Franks
23d Wing Commander
23 Flying Tiger Way, Ste 1
Moody AFB GA 31699

James Billie, Chairman
Seminole Tribe of Florida
30290 Josie Billie Hwy, PMB
Clewiston, FL 33440

Dear Chairman Billie

The United States Air Force (USAF) is preparing an Environmental Assessment to evaluate potential environmental impacts associated with upgrading Bemiss Field at Moody Air Force Base (AFB). On 8 August, 2014, the USAF invited you to participate in government-to-government consultation regarding this proposal. The USAF welcomes any input you would like to see included in the analysis. Though we will consider comments received at any time during the environmental impact analysis process, your input is most valuable to us when received early in our planning process, especially during the next few weeks. Please direct written issues or concerns to Mr. Hank Santicola, Environmental Assessment Program Manager, 3485 Georgia Street, Moody AFB GA 31699 or through email at Henry.Santicola.2@us.af.mil. Mr Santicola can also be contacted at (229) 257-2396. Thank you in advance for your assistance in this effort.

Sincerely

CHAD P. FRANKS, Colonel, USAF
Commander

Attachment:
Original Government-to-Government Consultation Letter to Mr. James Billie, dated 8 Aug 14

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 23D WING (ACC)
MOODY AIR FORCE BASE GEORGIA

SEP 05 2014

Colonel Chad P. Franks
23d Wing Commander
23 Flying Tiger Way, Ste 1
Moody AFB GA 31699

Jeremiah Hobia, Chief
Kialegee Tribal Town
P.O. Box 332
Wetumka, OK 74883

Dear Mr. Hobia

The United States Air Force (USAF) is preparing an Environmental Assessment to evaluate potential environmental impacts associated with upgrading Bemiss Field at Moody Air Force Base (AFB). On 8 August, 2014, the USAF invited you to participate in government-to-government consultation regarding this proposal. The USAF welcomes any input you would like to see included in the analysis. Though we will consider comments received at any time during the environmental impact analysis process, your input is most valuable to us when received early in our planning process, especially during the next few weeks. Please direct written issues or concerns to Mr. Hank Santicola, Environmental Assessment Program Manager, 3485 Georgia Street, Moody AFB GA 31699 or through email at Henry.Santicola.2@us.af.mil. Mr Santicola can also be contacted at (229) 257-2396. Thank you in advance for your assistance in this effort.

Sincerely

CHAD P. FRANKS, Colonel, USAF
Commander

Attachment:
Original Government-to-Government Consultation Letter to Mr. Jeremiah Hobia, dated 8 Aug 14

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 23D WING (ACC)
MOODY AIR FORCE BASE GEORGIA

SEP 05 2014

Colonel Chad P. Franks
23d Wing Commander
23 Flying Tiger Way, Ste 1
Moody AFB GA 31699

Lovelin Poncho, Chairman
Coushatta Tribe of Louisiana
P.O. Box 818
Elton, LA 70532

Dear Chairman Poncho

The United States Air Force (USAF) is preparing an Environmental Assessment to evaluate potential environmental impacts associated with upgrading Bemiss Field at Moody Air Force Base (AFB). On 8 August, 2014, the USAF invited you to participate in government-to-government consultation regarding this proposal. The USAF welcomes any input you would like to see included in the analysis. Though we will consider comments received at any time during the environmental impact analysis process, your input is most valuable to us when received early in our planning process, especially during the next few weeks. Please direct written issues or concerns to Mr. Hank Santicola, Environmental Assessment Program Manager, 3485 Georgia Street, Moody AFB GA 31699 or through email at Henry.Santicola.2@us.af.mil. Mr Santicola can also be contacted at (229) 257-2396. Thank you in advance for your assistance in this effort.

Sincerely

CHAD P. FRANKS, Colonel, USAF
Commander

Attachment:
Original Government-to-Government Consultation Letter to Chairman Lovelin Poncho, dated 8 Aug 14

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 23D WING (ACC)
MOODY AIR FORCE BASE GEORGIA

SEP 05 2014

Colonel Chad P. Franks
23d Wing Commander
23 Flying Tiger Way, Ste 1
Moody AFB GA 31699

Ann Denson Tucker, Chairwoman
Muscogee Nation of Florida
278 Church Road
Ponce de Leon, FL 32455

Dear Chairwoman Tucker

The United States Air Force (USAF) is preparing an Environmental Assessment to evaluate potential environmental impacts associated with upgrading Bemiss Field at Moody Air Force Base (AFB). On 8 August, 2014, the USAF invited you to participate in government-to-government consultation regarding this proposal. The USAF welcomes any input you would like to see included in the analysis. Though we will consider comments received at any time during the environmental impact analysis process, your input is most valuable to us when received early in our planning process, especially during the next few weeks. Please direct written issues or concerns to Mr. Hank Santicola, Environmental Assessment Program Manager, 3485 Georgia Street, Moody AFB GA 31699 or through email at Henry.Santicola.2@us.af.mil. Mr Santicola can also be contacted at (229) 257-2396. Thank you in advance for your assistance in this effort.

Sincerely

CHAD P. FRANKS, Colonel, USAF
Commander

Attachment:
Original Government-to-Government Consultation Letter to Chairwoman Tucker, dated 8 Aug 14

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 23D WING (ACC)
MOODY AIR FORCE BASE GEORGIA

SEP 05 2014

Colonel Chad P. Franks
23d Wing Commander
23 Flying Tiger Way, Ste 1
Moody AFB GA 31699

Brenda Shemayne Edwards, Chairman
Caddo Nation
P.O. Box 487
Binger, OK 73009

Dear Chairman Edwards

The United States Air Force (USAF) is preparing an Environmental Assessment to evaluate potential environmental impacts associated with upgrading Bemiss Field at Moody Air Force Base (AFB). On 8 August, 2014, the USAF invited you to participate in government-to-government consultation regarding this proposal. The USAF welcomes any input you would like to see included in the analysis. Though we will consider comments received at any time during the environmental impact analysis process, your input is most valuable to us when received early in our planning process, especially during the next few weeks. Please direct written issues or concerns to Mr. Hank Santicola, Environmental Assessment Program Manager, 3485 Georgia Street, Moody AFB GA 31699 or through email at Henry.Santicola.2@us.af.mil. Mr Santicola can also be contacted at (229) 257-2396. Thank you in advance for your assistance in this effort.

Sincerely

CHAD P. FRANKS, Colonel, USAF
Commander

Attachment:
Original Government-to-Government Consultation Letter to Chairman Edwards, dated 8 Aug 14

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 23D WING (ACC)
MOODY AIR FORCE BASE GEORGIA

SEP 05 2014

Colonel Chad P. Franks
23d Wing Commander
23 Flying Tiger Way, Ste 1
Moody AFB GA 31699

Colabe III Clem Sylestine, Principal Chief
Alabama Coushatta Tribe of Texas
571 State Park Road 56
Livingston, TX 77351

Dear Chief Sylestine

The United States Air Force (USAF) is preparing an Environmental Assessment to evaluate potential environmental impacts associated with upgrading Bemiss Field at Moody Air Force Base (AFB). On 8 August, 2014, the USAF invited you to participate in government-to-government consultation regarding this proposal. The USAF welcomes any input you would like to see included in the analysis. Though we will consider comments received at any time during the environmental impact analysis process, your input is most valuable to us when received early in our planning process, especially during the next few weeks. Please direct written issues or concerns to Mr. Hank Santicola, Environmental Assessment Program Manager, 3485 Georgia Street, Moody AFB GA 31699 or through email at Henry.Santicola.2@us.af.mil. Mr Santicola can also be contacted at (229) 257-2396. Thank you in advance for your assistance in this effort.

Sincerely

CHAD P. FRANKS, Colonel, USAF
Commander

Attachment:
Original Government-to-Government Consultation Letter to Chief Sylestine, dated 8 Aug 14

MUSCOGEE (CREEK) NATION

Cultural Preservation

Johnnie Jacobs – Manager

September 16, 2014

Colonel Chad P. Franks
23rd Wing Commander
Department of the Air Force
Headquarters 23D Wing
23 Flying Tiger Way, Suite 1
Moody AFB, GA 31699

RE: Proposed Bemiss Field Unimproved Landing Zone
Moody AFB, Lowndes Co., GA

Dear Colonel Franks

Thank you for contacting the Muscogee (Creek) Nation Cultural Preservation Office in reference to your request for comments regarding the above project.

After review of the material provided, it has been determined that the Muscogee (Creek) Nation has no objections to this project.

Please consider this letter as our concurrence to your request and findings and support of the planned activities and projects. .

Should further information or comment be required please do not hesitate to contact me at (918) 732-7732 or by email at davidp@mcn-nsn.gov. Thank you.

Sincerely,

David J. Proctor
Muscogee (Creek) Nation
Cultural Preservation Dept.

P.O. Box 580 • Okmulgee, OK 74447 • Phone 918-732-7732 • Fax (918) 758-0649

Record of Tribal Correspondence (via E-mail or Phone) Not Included in Document

From	To	Date	Correspondence Type
Pare Bowlegs Historic Preservation Officer Alabama-Quassarte Tribal Town	Henry J. Santicola (USAF)	September 02, 2014	e-mail
David J. Proctor Muscogee (Creek) Nation THPO	Henry J. Santicola (USAF)	September 8, 2014	e-mail
David J. Proctor Muscogee (Creek) Nation THPO	Henry J. Santicola (USAF)	September 9, 2014	phone
Lisa C. Baker (Acting THPO) United Keetoowah Band of Cherokee Indians in Oklahoma	Henry J. Santicola (USAF)	September 12, 2014	e-mail
Henry J. Santicola (USAF)	David J. Proctor Muscogee (Creek) Nation THPO	September 12, 2014	e-mail
Henry J. Santicola (USAF)	Robert Cast Caddo Nation THPO	November, 14, 2014	e-mail
Robert Cast Caddo Nation THPO	Henry J. Santicola (USAF)	November, 14, 2014	e-mail
Bradley Mueller THPO Seminole Tribe of Florida	Henry J. Santicola (USAF)	November, 17, 2014	phone

DRAFT ENVIRONMENTAL ASSESSMENT NOTICE OF AVAILABILITY

USAF ANNOUNCES AN ENVIRONMENTAL ASSESSMENT

In accordance with the National Environmental Policy Act and Air Force regulations, Moody Air Force Base (AFB) has completed a Draft Environmental Assessment (EA) and Finding of No Significant Impact/Finding of No Practicable Alternative (FONSI/FONPA) to evaluate the consequences of the following stated proposed action:

The Air Force proposes to modify the Bemiss Field Unimproved Landing Zone (ULZ) to use the ULZ for flight training operations by aircrews operating fixed-wing and rotary aircraft at Moody AFB, Georgia. These modifications include vegetation management and development of on-site fire/rescue capabilities. Once modifications are completed, Bemiss Field would be utilized for fixed-wing aircraft landings. A total of approximately 69 acres of trees would be cleared at the north and south ends of the ULZ (37 acres to the north and 32 acres to the south). An approximately 1,000-square-foot gravel parking area would be developed to provide a parking and staging area for emergency response equipment used during training activities. ULZ lighting would be installed and an approximately 4,320-square-foot fire station facility would be constructed inside the gate north of Highway 221. The ULZ is currently used for airdrops; under the Proposed Action the number of events for Moody AFB–based aircraft would be the same as the baseline condition, although the distribution of events between landings and drops would change due to the availability of the ULZ.

To review the Draft EA and FONSI/FONPA copies are available at the South Georgia Regional Library in Valdosta, Georgia and on the Moody AFB website at http://www.moody.af.mil/environmentalinitiative.asp. The public is invited to review these documents and make comments during the 30-day comment period from now until May 30, 2015. Comments on the Draft EA can be sent to Mr. Hank Santicola, Environmental Planner, at 23 CES/CEIEA, 7258 Robbins Road, Moody AFB, GA, 31699.

TRANSMITTAL MEMORANDUM FOR DRAFT ENVIRONMENTAL ASSESSMENT TO PUBLIC AGENCIES, OTHER INTERESTED PARTIES, AND MEMBERS OF THE PUBLIC

DEPARTMENT OF THE AIR FORCE
23D CIVIL ENGINEER SQUADRON (ACC)
MOODY AIR FORCE BASE GEORGIA

APR 1 3 2015

MEMORANDUM FOR FEDERAL, STATE, AND LOCAL PUBLIC AGENCIES
INTERESTED PARTIES
MEMBERS OF THE PUBLIC

FROM: 23 CES/CD
7258 Robbins Rd.
Moody AFB, GA 31699

SUBJECT: Proposed Bemiss Field Unimproved Landing Zone (ULZ) modifications at Moody AFB, Georgia.

1. Enclosed please find a copy of the Draft Environmental Assessment (EA) the U.S. Air Force has prepared for proposed modifications to the Bemiss Field ULZ at Moody AFB, Georgia.

2. The Air Force proposes to modify the Bemiss Field ULZ for flight training operations by aircrews operating fixed-wing and rotary aircraft at Moody AFB, Georgia. These modifications include vegetation management and development of on-site fire/rescue capabilities. Once modifications are completed, Bemiss Field would be utilized for fixed-wing aircraft landings. A total of approximately 69 acres of trees would be cleared at the north and south ends of the ULZ (37 acres to the north and 32 acres to the south). An approximately 1,000-square-foot gravel parking area would be developed to provide a parking and staging area for emergency response equipment used during training activities. ULZ lighting would be installed and an approximately 4,320-squarefoot fire station facility would be constructed inside the gate north of Highway 221. The ULZ is currently used for airdrops; under the Proposed Action the number of events for Moody AFB–based aircraft would be the same as the baseline condition, although the distribution of events between landings and drops would change due to the availability of the ULZ. At this time, the U.S. Air Force requests your comments on the Proposed Action as discussed in the Draft EA.

3. The public comment period for this EA is 30 days. Please provide any written comments within 30 days from receipt of this letter to Mr. Hank Santicola at the above address. Libraries should file this document for public access and reference until the public comment period has ended. If you have any questions, please feel free to contact Mr. Santicola by telephone at (229) 257-2396. Thank you for your participation.

John L. Eunice, III
JOHN L. EUNICE, III
Deputy Base Civil Engineer

Attachment
Draft Environmental Assessment for Bemiss Unimproved Landing Zone Modifications at Moody Air Force Base, Georgia

Global Power for America

ADDITIONAL TRANSMITTAL MEMORANDUM FOR DRAFT ENVIRONMENTAL ASSESSMENT TO PUBLIC AGENCIES, OTHER INTERESTED PARTIES, AND MEMBERS OF THE PUBLIC EXTENDING THE COMMENT PERIOD

DEPARTMENT OF THE AIR FORCE
23D CIVIL ENGINEER SQUADRON (ACC)
MOODY AIR FORCE BASE GEORGIA

1 Jun 15

MEMORANDUM FOR FEDERAL, STATE, AND LOCAL PUBLIC AGENCIES
INTERESTED PARTIES
MEMBERS OF THE PUBLIC

FROM: 23 CES/CC
7258 Robbins Rd.
Moody AFB, GA 31699

SUBJECT: Clarification of Proposed Bemiss Field Unimproved Landing Zone (ULZ) Cover Letter

1. On 30 April 2015 Moody Air Force Base (AFB) sent you a cover letter (Attachment) and the draft Environmental Assessment (EA) for the proposed Bemiss Field ULZ via United Parcel Service. Included in the cover letter was a brief description and summary of the proposed action. The cover letter summary included information regarding Moody AFB-based aircraft, but did not include information on transient aircraft although this was part of the proposed action.

2. The draft EA provides a detailed description of the proposed action in Chapter Two, to include a chart on Page 2-17 outlining the proposed operations. While there is no increase in events by Moody-based aircraft, there is an overall proposed increase of 100 annual events by transient aircraft. The transient aircraft could be present in support of Moody-based units such as the 820th Base Defense Group or the 38th Rescue Squadron that do not operate aircraft but require the use of transient aircraft for training, or could be other off-base units conducting proficiency training similar to Moody-based C-130 aircraft use of ULZs in other locations.

3. There are no changes to the proposed action, the analysis, or the EA. The analysis supports the conclusion of no significant impact to include the increase of 100 additional events by transient aircraft. Additionally, there are no changes to those previously addressed in agency consultations. However, we wanted to ensure the summary included in the cover letter fully portrayed the proposed action as outlined in the draft EA.

4. The public comment period for this EA has been extended until 19 June 2015. The draft EA can be viewed at: http://www.moody.af.mil/environmentalinitiative.asp. Please provide any written comments to Mr. Hank Santicola at the above address. If you have any questions, please feel free to contact Mr. Santicola by telephone at (229) 257-2396. Thank you for your participation.

PATRICK M. ALBRITTON, Lt Col, USAF
Commander

Attachment
Draft Environmental Assessment Cover Letter

Global Power for America

USFWS ESA SECTION 7 CONSULTATION

United States Department of the Interior

Fish and Wildlife Service
105 West Park Drive, Suite D
Athens, Georgia 30606
Phone: (706) 613-9493
Fax: (706) 613-6059

West Georgia Sub-Office
Post Office Box 52560
Fort Benning, Georgia 31995-2560
Phone: (706) 544-6428
Fax: (706) 544-6419

Coastal Sub-Office
4980 Wildlife Drive
Townsend, Georgia 31331
Phone: (912) 832-8739
Fax: (912) 832-8744

May 14, 2015

Lieutenant Colonel Patrick M. Albritton
Department of the Air Force
23rd Civil Engineer Squadron
3485 Georgia Street
Moody Air Force Base, Georgia 31699
Attention: Mr. Hank Santicola

Re: USFWS File Number 2015-0304

Dear Colonel Albritton:

Thank you for the opportunity to review and provide comments on the Environmental Assessment (EA) for proposed Bemiss Field Unimproved Landing Zone (ULZ) Modification and Use at Moody Air Force Base (MAFB) in Lowndes County, Georgia. We submit the following comments in accordance with provisions of the Endangered Species Act of 1973, as amended; (16 U.S.C. 1531 et seq.) (ESA) to further the conservation of fish and wildlife resources and their habitat, including federally listed threatened and endangered species.

The proposed modification and use of the existing Bemiss Field ULZ consists of vegetation management and development of on-site fire/rescue capabilities to meet Air Force training requirements. The project proposes to remove approximately 37 acres of forest on the north end and 32 acres on the south end of the Bemiss Field ULZ to comply with aircraft approach/departure clearance planes. An additional 2.25 acres will be cleared to accommodate improvements and construction of a new fire station.

MAFB has completed ESA Section 7 consultation for listed species with the Fish and Wildlife Service for a determination of "may affect, but not likely to adversely affect" listed species in correspondence dated February 18, 2015. The requirements of section 7 of the ESA have been satisfied and no further consultation is required. However, obligations under section 7 of the ESA must be reconsidered if: (1) new information reveals impacts of this identified action may affect listed species or critical habitat in a manner not previously considered; (2) this action is subsequently modified in a manner which was not considered in this assessment; or (3) a new species is listed or critical habitat determined that may be affected by the identified action.

We appreciate the opportunity to comment on your project. If you have any additional questions, please write or call our Coastal Georgia Sub Office staff biologist, Gail Martinez, at (912) 832-8739 extension 7.

Sincerely,

Strant Colwell

Strant Colwell
Coastal Georgia Supervisor

GEORGIA SHPO CONSULTATION

GEORGIA
DEPARTMENT OF NATURAL RESOURCES
HISTORIC PRESERVATION DIVISION

MARK WILLIAMS
COMMISSIONER

DR. DAVID CRASS
DIVISION DIRECTOR

June 11, 2015

John L. Eunice, III, DAF
Deputy Base Civil Engineer
Department of the Air Force
23D Civil Engineer Squadron (ACC)
Moody Air Force Base, Georgia Department of Natural Resources
Attn: Gregory Lee

**RE: Moody AFB: Proposed Bemiss Field Unimproved Landing Zone Improvements
Lanier County et. al., Georgia
HP-131113-003**

Dear Mr. Eunice:

The Historic Preservation Division (HPD) has reviewed the information submitted concerning the above referenced project. Our comments are offered to assist the US Department of the Air Force and Moody Air Force Base (AFB) in complying with the provisions of Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA).

The subject project consists of improvements to Bemiss Field, including vegetation clearing and construction of a satellite fire station and fire staging area, located within Moody AFB. Based on the information provided and desktop research, HPD finds there to be multiple historic resources located outside of Moody AFB, but within the identified area of potential effect (APE). In the future, HPD recommends identifying such resources in order to determine if a proposed project is affecting resources that are eligible for listing in the National Register of Historic Places. Identification should be completed through background research and conducting a field survey. However, HPD concurs that the subject project, as proposed, will have **no adverse effect** to historic properties within its APE, as defined in 36 CFR Part 800.5(d)(1), according to the archaeological survey and due to heavy vegetation between the project area and the apparent historic resources.

This letter evidences consultation with our office for compliance with Section 106 of the NHPA. It is important to remember that any future changes to this project as it is currently proposed may require additional consultation. HPD encourages federal agencies and project applicants to discuss such changes with our office to ensure that potential effects to historic resources are adequately considered in project planning.

Please refer to project number **HP-131113-003** in any future correspondence regarding this project. If we may be of further assistance, please do not hesitate to contact me at (770) 389-7851 or jennifer.dixon@dnr.ga.gov.

Sincerely,

Jennifer Dixon, MHP, LEED Green Associate
Program Manager
Environmental Review & Preservation Planning

2610 GA HWY 155, SW | STOCKBRIDGE, GA 30281
770.389.7844 | FAX 770.389.7878 | WWW.GEORGIASHPO.ORG

GEORGIA DNR DEA COMMENTS

GEORGIA
DEPARTMENT OF NATURAL RESOURCES
WILDLIFE RESOURCES DIVISION

MARK WILLIAMS
COMMISSIONER

DAN FORSTER
DIRECTOR

June 18, 2015

John L. Eunice III
Deputy Base Civil Engineer
Department of the Air Force
23 CES/CD
3485 Georgia St.
Moody AFB, GA 31699

Subject: Known occurrences of natural communities, plants and animals of highest priority conservation status on or near Modifications to Bemiss Field, Lowndes County, Georgia

Dear Mr. Eunice:

This is in response to your request received May 1, 2015. According to our records, within a three-mile radius of the project site, there are the following Natural Heritage Database occurrences:

N Point (-83.14765, 30.96906; NAD27):

US *Ambystoma cingulatum* (Frosted Flatwoods Salamander) [HISTORIC] in an uncertain location near project site
GA *Clemmys guttata* (Spotted Turtle) approx. 1.5 mi. W of site
GA *Epidendrum magnoliae* (Greenfly Orchid) 0.3 mi. S of site
GA *Epidendrum magnoliae* (Greenfly Orchid) approx. 1.0 mi. SE of site
US *Gopherus polyphemus* (Gopher Tortoise) approx. 2.0 mi. W of site
Grus canadensis pratensis (Florida Sandhill Crane) in an uncertain location near project site
Grus canadensis tabida (Greater Sandhill Crane) approx. 1.5 mi. NW of site
US *Notophthalmus perstriatus* (Striped Newt) [HISTORIC] approx. 1.0 mi. NE of site
Nyctanassa violacea (Yellow-crowned Night-heron) approx. 1.0 mi. W of site
***Nycticorax nycticorax* (Black-crowned Night-heron) on site (-83.1477, 30.95833)**
GA *Peucaea aestivalis* (Bachman's Sparrow) approx. 1.0 mi. SE of site
***Pseudobranchus striatus striatus* (Broad-striped Dwarf Siren) on site (-83.1486, 30.95888)**
Pseudobranchus striatus striatus (Broad-striped Dwarf Siren) approx. 0.5 mi. S of site
GA *Sarracenia flava* (Yellow Flytrap) approx. 1.5 mi. W of site
GA *Sarracenia minor var. minor* (Hooded Pitcherplant) 0.5 mi. NE of site
GA *Sarracenia minor var. minor* (Hooded Pitcherplant) approx. 0.5 mi. SE of site
***Umbra pygmaea* (Eastern Mudminnow) on site (-83.1472, 30.95944; NAD 27)**

NONGAME CONSERVATION SECTION
2065 U.S. HIGHWAY 278 S.E. | SOCIAL CIRCLE, GEORGIA 30025-4743
770.918.6411 | FAX 706.557.3033 | WWW.GEORGIAWILDLIFE.COM

Umbra pygmaea (Eastern Mudminnow) approx. 1.0 mi. N of site in 'Shiner Pond'
Wading Bird Colony (Wading Bird Colony) approx. 2.0 mi. W of site
Bank's Lake NWR [USFWS] approx. 1.5 mi. N of site

S Point (-83.15076, 30.93590; NAD27):
Botaurus lentiginosus (American Bittern) approx. 3.0 mi. W of site
US *Drymarchon couperi* (Eastern Indigo Snake) approx. 1.0 mi. NE of site
GA *Epidendrum magnoliae* (Greenfly Orchid) approx. 1.5 mi. NW of site
US *Gopherus polyphemus* (Gopher Tortoise) 0.5 mi. N of site
Nyctanassa violacea (Yellow-crowned Night-heron) approx. 3.0 mi. W of site
Oxypolis ternata (Savanna Cowbane) [HISTORIC?] approx. 2.0 mi. W of site
Plegadis falcinellus (Glossy Ibis) approx. 3.0 mi. W of site
Plegadis falcinellus (Glossy Ibis) approx. 3.0 mi. W of site
Pseudobranchus striatus striatus (Broad-striped Dwarf Siren) approx. 1.0 mi. NW of site
Pseudobranchus striatus striatus (Broad-striped Dwarf Siren) approx. 0.5 mi. N of site
Quercus austrina (Bluff White Oak) in an uncertain location near project site
Regina alleni (Striped Crayfish Snake) approx. 1.5 mi. NW of site
Regina alleni (Striped Crayfish Snake) approx. 2.0 mi. W of site
GA *Sarracenia flava* (Yellow Flytrap) in an uncertain location near project site
GA *Sarracenia minor var. minor* (Hooded Pitcherplant) approx. 1.0 mi. S of site
GA *Sarracenia minor var. minor* (Hooded Pitcherplant) approx. 2.0 mi. W of site
Triphora trianthophora (Three-birds Orchid) approx. 1.0 mi. NW of site
Umbra pygmaea (Eastern Mudminnow) approx. 1.0 mi. NW of site
Ursus americanus floridanus (Florida Black Bear) habitat throughout
GRAND BAY WMA [GDNR] on site

* Entries above proceeded by "US" indicates species with federal status in Georgia (Protected or Candidate). Species that are federally protected in Georgia are also state protected; "GA" indicates Georgia protected species.

Recommendations:

We have records of three high priority species tracked species within the proposed project area (above). We also have records of several state listed species and federally protected species that have been documented within three miles of the site. These include historic records of *Ambystoma cingulatum* (Frosted Flatwoods Salamander) and *Notophthalmus perstriatus* (Striped Newt) and recent records of the candidate species, *Gopherus polyphemus* (Gopher Tortoise). To minimize potential impacts to these or other federally listed species, we recommend consultation with the United States Fish and Wildlife Service. For southeast Georgia, please contact Strant Colwell (912) 832-8739 ext 1 or Strant_Colwell@fws.gov). Surveys for species of conservation concern should be conducted prior to commencement of construction.

This project is within three miles of several state protected species. For information about these species, including survey recommendations, please visit our webpage at http://www.georgiawildlife.org/rare_species_profiles.

IR 15712

Please be aware that species listed on our website that have no "GA" or "US" status are considered species of concern. These species do not receive any protection under the GA or US Endangered Species Acts, however biologists in GA consider them to be of some conservation concern. Locations of these species are tracked until enough information is gathered to determine if they should be added to the state list or if their populations do not warrant tracking. It is important to consider these species as well when planning projects. Though they are not currently protected, they may be in the future. Surveys efforts that document these species should be reported to our office so information about populations of these species can be used for conservation decisions. Please let me know if you have any other questions regarding GA species of concern.

Disclaimer:

Please keep in mind the limitations of our database. The data collected by the Nongame Conservation Section comes from a variety of sources, including museum and herbarium records, literature, and reports from individuals and organizations, as well as field surveys by our staff biologists. In most cases the information is not the result of a recent on-site survey by our staff. Many areas of Georgia have never been surveyed thoroughly. Therefore, the Nongame Conservation Section can only occasionally provide definitive information on the presence or absence of rare species on a given site. Our files are updated constantly as new information is received. **Thus, information provided by our program represents the existing data in our files at the time of the request and should not be considered a final statement on the species or area under consideration.**

If you know of populations of highest priority species that are not in our database, please fill out the appropriate data collection form and send it to our office. Forms can be obtained through our web site (http://www.georgiawildlife.com/node/1376) or by contacting our office. If I can be of further assistance, please let me know.

Sincerely,

Anna Yellin
Environmental Review Coordinator

Data Available on the Nongame Conservation Section Website

- Georgia protected plant and animal profiles are available on our website. These accounts cover basics like descriptions and life history, as well as threats, management recommendations and conservation status. Visit http://www.georgiawildlife.com/node/2721.

IR 15712

- Rare species and natural community information can be viewed by Quarter Quad, County and HUC8 Watershed. To access this information, please visit our GA Rare Species and Natural Community Information page at: http://www.georgiawildlife.com/conservation/species-of-concern?cat=conservation.

- Downloadable files of rare species and natural community data by quarter quad and county are also available. They can be downloaded from: http://www.georgiawildlife.com/node/1370.

IR 15712

PUBLIC COMMENT

From: Kay Coleman
To: SANTICOLA, HENRY J GS-11 USAF ACC 23 CES/CEIEA
Subject: Moody AFB - Bemiss Field ULZ
Date: Tuesday, April 22, 2014 2:16:10 PM

[redacted]

Environmental Planning Office

% Mr. Henry J. Santicola

23 Civil Engineer Sq.

3485 Georgia Street

Moody Air Force Base, GA 31699

Dear Mr. Santicola:

This letter will serve as my comments, as requested by Moody AFB, regarding the proposed Bemiss Field Unimproved Landing Zone on Grand Bay Range at Moody Air Force Base, GA. We own land generally to the South of the proposed ULZ, and we are very much opposed to this old runway being upgraded, repaired and used.

Such use would interfere with the use, enjoyment, and value of our property adjacent to and near the ULZ property. Among a few of the ways we would be affected would include increased noise, vibrations, restrictions on the use of our property in the affected air space and on the ground, increased safety and environmental risks, and adverse effect on our timber and land value.

We also request that you provide us with a list of other property owners whom you have contacted about this venture. We would like to contact them and learn their thoughts.

Thank you for your attention to this matter.

Sincerely,

Kathryn (Kay) Blanton Coleman

[redacted]

Environmental Planning Office
% Mr. Henry J. Santicola
23 Civil Engineer Sq.
3485 Georgia Street
Moody Air Force Base, GA 31699

Dear Mr. Santicola:

This letter will serve as my comments, as requested by Moody AFB, regarding the proposed Bemiss Field Unimproved Landing Zone on Grand Bay Range at Moody Air Force Base, GA. We own land generally to the South of the proposed ULZ, and we are very much opposed to this old runway being upgraded, repaired and used.

Such use would interfere with the use, enjoyment, and value of our property adjacent to and near the ULZ property. Among a few of the ways we would be affected would include increased noise, vibrations, restrictions on the use of our property in the affected air space and on the ground, increased safety and environmental risks, and adverse effect on our timber and land value.

Thank you for your attention to this matter.

Sincerely,

Kay Coleman

Kathryn (Kay) Blanton Coleman

RESPONSE TO PUBLIC COMMENT

Concerns identified in the e-mail and letter presented on pages A-119 through A-121 include increased noise, vibrations, restrictions on the use of property in the affected airspace, increased safety and environmental risks, and adverse effect on timber and land value.

In response to the public comment received, Moody AFB offers the following:

Increased noise – As discussed in Section 3.3 (Noise) of the EA, day-night average noise levels (DNLs) above 65 dB DNL are typically associated with the potential for adverse effect. Noise analyses in Section 4.3 (Noise) of the EA, show that noise level increases in areas exposed to greater than 60 dB DNL occur only near Bemiss Field and almost entirely on land owned by the Air Force. Areas off-range affected by 60 dB DNL is limited to the Lakeland Highway corridor, and no privately owned parcels are affected. Therefore, noise above current conditions should not result in any adverse impact to adjacent landowners.

Vibrations – As discussed in Section 3.3 (Noise) of the EA, adverse vibrational impacts from noise typically occur at 130 dB. Noise analyses in Section 4.3 (Noise) of the EA shows there would be no noise above 60 dB DNL on privately owned parcels; therefore potential impacts to structures associated with vibrations from aircraft are not expected.

Land use restrictions – As discussed in Section 4.5 (Land Use) of the EA, the Proposed Action would not result in any incompatible land uses or off-base land use classification changes, nor would it require any land use restrictions. Implementation of the 500-foot displaced threshold at the southern end of the ULZ (EA Section 2.6.1) precludes the need for tree removal on off-base privately owned parcels.

Increased safety risks – As discussed in Section 4.4 (Safety) of the EA, the potential for mishaps associated with an increase in aircraft landings at Bemiss Field ULZ would result in only a miniscule increase in the potential for aircraft mishaps. While bird/wildlife aircraft strike hazard (BASH) and ground-based wildlife collisions are a concern with any aircraft landings, these potential issues would be minimized by Moody AFB's continued implementation of an aggressive BASH program, including the Wildlife Hazard Warning System. Moody AFB would also continue to coordinate extensively with on-staff U.S. Department of Agriculture wildlife experts regarding

BASH-related issues (e.g., identification of problem species, control methodologies) and would incorporate the Bemiss Field ULZ into the Moody AFB BASH Plan. Additionally, a Landing Zone Safety Officer (LZSO) would be posted at each landing zone during training activities to observe for potential wildlife-related safety issues. The LZSO would be in communication with aircraft personnel to provide warning and/or instructions, as needed, to avoid any potential BASH-related issues.

Increased environmental risks – Chapter 4 of the EA analyzes the potential for adverse impacts associated with the Proposed Action to the following resource areas: airspace management and use (Section 4.1), air quality (Section 4.2), noise (Section 4.3), safety (Section 4.4), land use (Section 4.5), socioeconomics/environmental justice (Section 4.6), cultural resources (Section 4.7), biological resources (Section 4.8), water resources (Section 4.9), earth resources (Section 4.10), and infrastructure (Section 4.11). No significant adverse impacts have been identified for any of these resources. Both the U.S. Fish and Wildlife Service and Georgia State Historic Preservation Officer concurred on findings of no adverse impacts to associated resources. Therefore, the Air Force does not anticipate any increased environmental risks associated with implementation of the Proposed Action.

Adverse effect on timber/land value – Implementation of the 500-foot displaced threshold at the southern end of the ULZ (Section 2.6.1) precludes the need for any easement or removal of trees off installation property. Therefore, the trees located south of the ULZ across Lakeland Highway on private property would not be affected. Additionally, as discussed previously under noise issues and in Section 4.3 (Noise) and Section 4.6 (Socioeconomics/Environmental Justice) of the EA, noise levels off Air Force property would not be expected to increase over the current condition, and no residences would be exposed to noise levels of 65 dB DNL or greater. Therefore, the Air Force does not expect the change in ULZ flight operations at Bemiss Field to impact property values.

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Appendix B

AIR QUALITY

ACRONYMS, ABBREVIATIONS, AND SYMBOLS

ACC	Air Combat Command
AFB	Air Force Base
Air Force	United States Air Force
APU	Auxiliary Power Unit
CAA	Clean Air Act
CEQ	Council of Environmental Quality
CFR	Code of Federal Regulations
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CSAR	Combat Search and Rescue
EA	Environmental Assessment
ETS/CEM	Emission Tracking System/Continuous Emissions Monitoring
ft^2	square feet
GTCP	Gas Turbine Compressor and Power Unit
HAP	hazardous air pollutant
HDDV	Heavy Duty Diesel Vehicle
HDGV	Heavy Duty Gas Vehicle
hr	hours
lb	pounds
LDDT	Light Duty Diesel Truck
LDDV	Light Duty Diesel Vehicle
LDGT	Light Duty Gas Truck
LDGV	Light Duty Gas Vehicle
LTO	Landing and Take-off
Mass-CASEVAC	mass casualty evacuation
MC	Motorcycles
$\mu g/m^3$	micrograms per cubic meter
mg/m^3	milligrams per cubic meter
NAAQS	National Ambient Air Quality Standards
NEI	National Emissions Inventory
NEPA	National Environmental Policy Act
NH_3	Ammonia
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
NVG	night vision goggle
O_3	ozone
Pb	lead
PM_{10}	particulate matter with a diameter less than or equal to 10 microns
$PM_{2.5}$	particulate matter with a diameter less than or equal to 2.5 microns
POV	privately owned vehicle
ppb	parts per billion
ppm	parts per million
PSD	Prevention of Significant Deterioration
ROI	region of influence
SER	significant emissions rate
SIP	State Implementation Plan
SO_2	sulfur dioxide
TGO	Touch-and-Go
TIM	Time In Mode
TSP	total suspended particulates
ULZ	unimproved landing zone
USEPA	U.S. Environmental Protection Agency
VOC	volatile organic compound
yd^3	cubic yards

AIR QUALITY

This appendix presents an overview of the Clean Air Act (CAA) and Georgia Department of Natural Resources (DNR) Air Protection Branch requirements, as well as calculations, including the assumptions used for the air quality analyses presented in the Environmental Assessment (EA).

B.1 AIR QUALITY PROGRAM OVERVIEW

In order to protect public health and welfare, the U.S. Environmental Protection Agency (USEPA) has developed numerical concentration-based standards, or National Ambient Air Quality Standards (NAAQS), for six "criteria" pollutants (based on health-related criteria) under the provisions of the CAA Amendments of 1970. There are two kinds of NAAQS: primary and secondary standards. Primary standards prescribe the maximum permissible concentration in the ambient air to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards prescribe the maximum concentration or level of air quality required to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings (40 Code of Federal Regulations [C.F.R.] Part 50).

The CAA gives states the authority to establish air quality rules and regulations. These rules and regulations must be equivalent to, or more stringent than, the Federal program. The Georgia DNR Air Protection Branch is the state agency that regulates air quality emissions sources in Georgia under the authority of the Federal CAA and amendments, Federal regulations, and state laws. Georgia has adopted the Federal NAAQS as shown in Table B-1 (Georgia DNR, 2012). In addition, Georgia has annual and 24-hour standards for sulfur dioxide.

Based on measured ambient air pollutant concentrations, the USEPA designates areas of the United States as having air quality better than the NAAQS (attainment), worse than the NAAQS (nonattainment), and unclassifiable. The areas that cannot be classified (on the basis of available information) as meeting or not meeting the NAAQS for a particular pollutant are "unclassifiable" and are treated as attainment until proven otherwise. Attainment areas can be further classified as "maintenance" areas, which are areas previously classified as nonattainment but where air pollutant concentrations have been successfully reduced to below the standard. Maintenance areas are subject to special maintenance plans and must operate under some of the nonattainment area plans to ensure compliance with the NAAQS. Lowndes County is attainment for all criteria pollutants (USEPA, 2014).

A general conformity analysis is required if the action's direct and indirect emissions have a potential to emit one or more of the six criteria pollutants at or above emission rates shown in Table B-1, Table B-2, or Table B-3.

Table B-1. Summary of National and State Ambient Air Quality Standards

Criteria Pollutant	Averaging Time	Federal Primary NAAQS	Federal Secondary NAAQS	Georgia Standards
Carbon monoxide (CO)	8-hour	9 ppm (10 mg/m³)	No standard	9 ppm (10 mg/m³)
	1-hour	35 ppm (40 mg/m³)	No standard	35 ppm (40 mg/m³)
Lead (Pb)	Rolling 3-month average	0.15 µg/m³ [a]	0.15 µg/m³	0.15 µg/m³
Nitrogen dioxide (NO_2)	Annual	0.053 ppm[b] (100 µg/m³)	0.053 ppm (100 µg/m³)	0.053 ppm (100 µg/m³)
	1-hour	100 ppb	No standard [c]	100 ppb
Particulate matter ≤10 micrometers (PM_{10})	24-hour	150 µg/m³	150 µg/m³	150 µg/m³
Particulate Matter <2.5 micrometers ($PM_{2.5}$)	Annual	15 µg/m³	15 µg/m³	15 µg/m³
	24-hour	35 µg/m³	35 µg/m³	35 µg/m³
Ozone (O_3)	8-hour	0.075 ppm³ (157 µg/m³)	0.075 ppm (157 µg/m³)	0.075 ppm (157 µg/m³)
Sulfur dioxide (SO_2)	Annual	No standard	No standard	80 µg/m³
	24-hour[a]	No standard	No standard	365 µg/m³
	3-hour	No standard	0.50 ppm [c] (1300 µg/m³)	0.50 ppm (1300 µg/m³)
	1-hour	75 ppb [d]	No standard	75 ppb

Source: USEPA, 2012 (Federal standards); Georgia DNR, 2012 (Georgia standards)
mg/m³ = milligrams per cubic meter; µg/m³ = micrograms per cubic meter; ppb = parts per billion; ppm = parts per million

a. Final rule signed October 15, 2008. The 1978 lead standard (1.5 µg/m³ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

b. The official level of the annual NO_2 standard is 0.053 ppm, equal to 53 ppb, which is shown here for the purpose of clearer comparison to the 1-hour standard

c. Final rule signed March 12, 2008. The 1997 ozone standard (0.08 ppm, annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years) and related implementation rules remain in place. In 1997, USEPA revoked the 1-hour ozone standard (0.12 ppm, not to be exceeded more than once per year) in all areas, although some areas have continued obligations under that standard ('anti-backsliding"). The 1-hour ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is less than or equal to 1.

d. Final rule signed June 2, 2010. The 1971 annual and 24-hour SO_2 standards were revoked in that same rulemaking. However, these standards remain in effect until 1 year after an area is designated for the 2010 standard, except in areas designated nonattainment for the 1971 standards, where the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standard are approved.

Table B-2. Emission Rates for Criteria Pollutants in Nonattainment Areas[1]

Pollutant	Emission Rate (tons/year)
Ozone (volatile organic compounds [VOCs] or NO_x)	
Serious nonattainment areas	50
Severe nonattainment areas	25
Extreme nonattainment areas	10
Other ozone nonattainment areas outside an ozone transport region	100
Marginal and moderate nonattainment areas inside an ozone transport region	
VOCs	50
NOx	100
CO: All nonattainment areas	100
SO_2 or NO_2: All nonattainment areas	100
PM_{10}	
Moderate nonattainment areas	100
Serious nonattainment areas	70
$PM_{2.5}$	
Direct emissions	100
SO_2	100
NO_x (unless determined not to be a significant precursor)	100
VOCs or ammonia (if determined to be significant precursors)	100
Pb: All nonattainment areas	25

Source: USEPA, 2006
CO = carbon monoxide; NO_2 = nitrogen dioxide; NO_x = nitrogen oxides; Pb = lead; $PM_{2.5}$ = particulate matter with a diameter less than or equal to 2.5 microns; PM_{10} = particulate matter with a diameter less than or equal to 10 microns; SO_2 = sulfur dioxide; VOC = volatile organic compound
1. *De minimis* threshold levels for conformity applicability analysis.

Table B-3. Emission Rates for Criteria Pollutants in Attainment (Maintenance) Areas[1]

Pollutant	Emission Rate (tons/year)
Ozone (NO_x, SO_2, or NO_2): All maintenance areas	100
Ozone (VOCs)	
Maintenance areas inside an ozone transport region	50
Maintenance areas outside an ozone transport region	100
CO: All maintenance areas	100
PM_{10}: All maintenance areas	100
$PM_{2.5}$	
Direct emissions	100
SO_2	100
NO_x (unless determined not to be a significant precursor)	100
VOC or ammonia (if determined to be significant precursors)	100
Pb: All maintenance areas	25

Source: USEPA, 2006
CO = carbon monoxide; NO_x = nitrogen oxides; VOC = volatile organic compound; Pb = lead; $PM_{2.5}$ = particulate matter with a diameter less than or equal to 2.5 microns; PM_{10} = particulate matter with a diameter less than or equal to 10 microns; SO_2 = sulfur dioxide
1. *De minimis* threshold levels for conformity applicability analysis.

Each state is required to develop a State Implementation Plan (SIP) that sets forth how CAA provisions will be imposed within the state. The SIP is the primary means for the implementation, maintenance, and enforcement of the measures needed to attain and maintain the NAAQS within each state and includes control measures, emissions limitations, and other provisions required to attain and maintain the ambient air quality standards. The purpose of the SIP is twofold. First, it must provide a control strategy that will result in the attainment and maintenance of the NAAQS. Second, it must demonstrate that progress is being made in attaining the standards in each nonattainment area.

In attainment areas, major new or modified stationary sources of air emissions on and in the area are subject to Prevention of Significant Deterioration (PSD) review to ensure that these sources are constructed without causing significant adverse deterioration of the clean air in the area. A major new source is defined as one that has the potential to emit any pollutant regulated under the CAA in amounts equal to or exceeding specific major source thresholds, that is, 100 or 250 tons per year based on the source's industrial category. A major modification is a physical change or change in the method of operation at an existing major source that causes a significant "net emissions increase" at that source of any regulated pollutant. Table B-4 lists the PSD significant emissions rate (SER) thresholds for selected criteria pollutants (USEPA, 1990).

Table B-4. Criteria Pollutant Significant Emissions Rate Increases Under PSD Regulations

Pollutant	Significant Emissions Rate (tons/year)
PM_{10}	15
$PM_{2.5}$	10
Total suspended particulates (TSP)	25
SO_2	40
NO_x	40
Ozone (VOCs)	40
CO	100

Source: Title 40 C.F.R. Part 51
CO = carbon monoxide; NO_x = nitrogen oxides; VOC = volatile organic compound; Pb = lead; $PM_{2.5}$ = particulate matter with a diameter less than or equal to 2.5 microns; PM_{10} = particulate matter with a diameter less than or equal to 10 microns; SO_2 = sulfur dioxide

The goals of the PSD program are to (1) ensure economic growth while preserving existing air quality; (2) protect public health and welfare from adverse effects that might occur even at pollutant levels better than the NAAQS; and (3) preserve, protect, and enhance the air quality in areas of special natural recreational, scenic, or historic value, such as national parks and wilderness areas. Sources subject to PSD review are required by the CAA to obtain a permit before commencing construction. The permit process requires an extensive review of all other major sources within a 50-mile radius and all Class I areas within a 62-mile radius of the facility. Emissions from any new or modified source must be controlled using best available control technology. The air quality, in combination with other PSD sources in the area, must not exceed the maximum allowable incremental increase identified in Table B-5. National parks and wilderness areas are designated as Class I areas, where any appreciable deterioration in air quality is considered significant. Class II areas are those where moderate, well-controlled industrial growth could be permitted. Class III areas allow for greater industrial development.

Table B-5. Federal Allowable Pollutant Concentration Increases Under PSD Regulations

Pollutant	Averaging Time	Maximum Allowable Concentration (μg/m³)		
		Class I	Class II	Class III
PM_{10}	Annual	4	17	34
	24-hour	8	30	60
SO_2	Annual	2	20	40
	24-hour	5	91	182
	3-hour	25	512	700
NO_2	Annual	2.5	25	50

Source: Title 40 C.F.R. Part 51
μg/m³ = micrograms per cubic meter; NO_2 = nitrogen dioxide; PM_{10} = particulate matter with a diameter less than or equal to 10 microns; SO_2 = sulfur dioxide

The Ambient Monitoring Program measures levels of air pollutants throughout the state. The data are used to determine compliance with air standards established for five compounds and to evaluate the need for any special controls for various other pollutants.

The air quality monitoring network is used to identify areas where the ambient air quality standards are being violated and plans are needed to reduce pollutant concentration levels to be in attainment with the standards. Also included are areas where the ambient standards are being met, but plans are necessary to ensure maintenance of acceptable levels of air quality in the face of anticipated population or industrial growth.

The result of this attainment/maintenance analysis is the development of local and statewide strategies for controlling emissions of criteria air pollutants from stationary and mobile sources. The first step in this process is the annual compilation of the ambient air monitoring results, and the second step is the analysis of the monitoring data for general air quality, exceedances of air quality standards, and pollutant trends.

B.2 REGULATORY COMPARISONS

The CAA Section 176(c), General Conformity, requires Federal agencies to demonstrate that their proposed activities would conform to the applicable SIP for attainment of the NAAQS. General conformity applies only to nonattainment and maintenance areas. If the emissions from a Federal action proposed in a nonattainment area exceed annual *de minimis* thresholds identified in the rule, a formal conformity determination is required of that action. The thresholds are more restrictive as the severity of the nonattainment status of the region increases. Since the project region is designated as attainment for all criteria pollutants (USEPA, 2012), the criteria pollutants are compared with Lowndes County emissions, which are in attainment.

For the analysis, in order to evaluate air emissions and their impact on the overall region of influence (ROI), the emissions associated with the project activities were compared with the total emissions on a pollutant-by-pollutant basis for the ROI's 2008 National Emissions Inventory (NEI) data. Potential impacts to air quality are evaluated with respect to the extent, context, and intensity of the impact in relation to relevant regulations, guidelines, and scientific documentation. The Council on Environmental Quality (CEQ) defines significance in terms of context and intensity in 40 C.F.R. § 1508.27. This requires that the significance of the action must be analyzed in respect to the setting of the proposed action and based relative to the severity of the impact. The CEQ National Environmental Policy Act (NEPA) regulations (40 C.F.R. § 1508.27(b)) provide 10 key factors to consider in determining an impact's intensity. To provide a more conservative analysis, the county was selected as the ROI instead of the USEPA-designated Air Quality Control Region, which is a much larger area.

B.3 PROJECT CALCULATIONS

B.3.1 Construction Emissions

B.3.1.1 General Information

- Action Location

Base: MOODY AFB
County(s): Lanier; Lowndes
Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: ULZ Modification and Use

- Project Number/s (if applicable):

- Projected Action Start Date: 1 / 2015

- Action Purpose and Need:

The purpose of the Proposed Action is to provide an operational and certified ULZ for Combat Search and Rescue (CSAR) units, primarily those units assigned to Moody AFB, and to meet ULZ qualification training requirements. Qualification training includes night vision goggle (NVG) air/land training; mass casualty evacuation (Mass-CASEVAC); insertion, extraction, and transload of pararescuemen; extraction of survivors; and realistic training to improve aircrew capability for landing at austere/unimproved airfields.

- Action Description:

The United States Air Force (Air Force), Air Combat Command (ACC) proposes to conduct tree clearing, construct facilities and install equipment at the Bemiss Field unimproved landing zone (ULZ) and utilize the ULZ for flight training operations by aircrews operating fixed-wing and rotary aircraft at Moody Air Force Base (AFB), Georgia. The modifications include 1) clearing of trees within the existing ULZ approach/departure plane at the north and south ends of the Bemiss Field ULZ; 2) renovation of an existing latrine facility, to include utilities and approximately 1,000 square feet of gravel parking located approximately 1,400 feet east of the ULZ; 3) improvement of approximately 1,400 linear feet of an existing dirt road to accommodate vehicle access to the ULZ; 4) installation of ULZ lighting and markers; and 5) construction of a 4,320 square foot fire station located just north west of Highway 221 across from the existing Georgia Department of Natural Resources (Georgia DNR) maintenance facility.

- Point of Contact

Name: Brad Boykin
Title: CTR
Organization: Leidos
Email: boykinb@leidos.com
Phone Number: 850-609-3450

- Activity List:

	Activity Type	Activity Title
2.	Construction / Demolition	Tree Clearing
3.	Construction / Demolition	Staging Area
4.	Construction / Demolition	Road Improvements
5.	Construction / Demolition	ULZ Lighting
6.	Construction / Demolition	Fire Station Construction

Activity 2. Construction / Demolition (Tree Clearing)

2.0 General Information & Timeline Assumptions

- Activity Location
County: Lanier; Lowndes
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Tree Clearing

- Activity Description:
Tree clearing includes:
In the north 37 acres clear cut and 0.65 acres selectively cut
In the south 32 acres clear cut and 0.25 acres selectively cut

- Activity Start Date
Start Month: 1
Start Month: 2015

- Activity End Date
Indefinite: False
End Month: 6
End Month: 2015

- Activity Emissions:

Pollutant	Total Emissions (Tons)
VOC	2.259712
SO_x	0.050112
NO_x	17.830007
CO	7.776734
PM_{10}	180.493781

Pollutant	Total Emissions (Tons)
$PM_{2.5}$	0.666820
Pb	0.000000
NH_3	0.090698

2.1 Site Grading Phase

2.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2015

- Phase Duration
Number of Month: 6
Number of Days: 0

2.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 3044844
Amount of Material to be Hauled On-Site (yd^3): 0

Amount of Material to be Hauled Off-Site (yd^3): 2877378

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	2	8
Other Construction Equipment Composite	2	8
Rollers Composite	1	8
Rubber Tired Dozers Composite	2	8
Scrapers Composite	5	8
Tractors/Loaders/Backhoes Composite	2	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM_{10}	$PM_{2.5}$	CH_4	CO_2
Emission Factors	0.1277	0.0014	0.9794	0.5930	0.0488	0.0488	0.0115	132.74
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM_{10}	$PM_{2.5}$	CH_4	CO_2
Emission Factors	0.0768	0.0012	0.6391	0.3645	0.0263	0.0263	0.0069	122.59
Rollers Composite								
	VOC	SO_x	NO_x	CO	PM_{10}	$PM_{2.5}$	CH_4	CO_2
Emission Factors	0.0850	0.0007	0.5705	0.3978	0.0385	0.0385	0.0076	67.050
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM_{10}	$PM_{2.5}$	CH_4	CO_2
Emission Factors	0.2721	0.0024	2.2344	1.0419	0.0924	0.0924	0.0245	239.09
Scrapers Composite								

	VOC	SO_x	NO_x	CO	PM_{10}	$PM_{2.5}$	CH_4	CO_2
Emission Factors	0.2513	0.0026	2.0646	0.9443	0.0853	0.0853	0.0226	262.49
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM_{10}**	**$PM_{2.5}$**	**CH_4**	**CO_2**
Emission Factors	0.0666	0.0007	0.4500	0.3715	0.0297	0.0297	0.0060	66.799

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM_{10}	$PM_{2.5}$	Pb	NH_3	CO_2
LDGV	00.5120	00.0068	00.3650	07.5100	00.0248	00.0113		00.1017	00368.0
LDGT	00.7310	00.0095	00.5740	08.9600	00.0249	00.0113		00.1017	00516.2
HDGV	00.7640	00.0165	01.0560	08.1700	00.0432	00.0275		00.0451	00904.8
LDDV	00.1110	00.0029	00.1370	00.7480	00.0447	00.0295		00.0068	00314.1
LDDT	00.3450	00.0056	00.3830	00.6140	00.0533	00.0375		00.0068	00598.6
HDDV	00.3090	00.0116	02.4520	00.7240	00.0970	00.0707		00.0270	01243.4
MC	02.3900	00.0033	01.1500	14.2500	00.0372	00.0207		00.0113	00177.4

2.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (20 * ACRE * WD) / 2000$$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (Tons)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (Tons)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (Tons)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (Tons)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

Activity 3. Construction / Demolition (Staging Area)

3.0 General Information & Timeline Assumptions

- Activity Location
County: Lanier; Lowndes
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Staging Area

- Activity Description:
1,000 square foot staging Area cleared
1,000 square foot staging Area paved
1.5 acre tree removal

- Activity Start Date
Start Month: 1
Start Month: 2015

- Activity End Date
Indefinite: False
End Month: 4
End Month: 2015

- Activity Emissions:

Pollutant	Total Emissions (Tons)
VOC	0.156043
SO_x	0.002216
NO_x	1.162878
CO	0.700080
PM_{10}	2.012467

Pollutant	Total Emissions (Tons)
$PM_{2.5}$	0.052427
Pb	0.000000
NH_3	0.002881

3.1 Site Grading Phase

3.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2015

- Phase Duration
Number of Month: 3
Number of Days: 0

3.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft²): 66340
Amount of Material to be Hauled On-Site (yd³): 0
Amount of Material to be Hauled Off-Site (yd³): 62691

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

3.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM_{10}**	**$PM_{2.5}$**	**CH_4**	**CO_2**
Emission Factors	0.1277	0.0014	0.9794	0.5930	0.0488	0.0488	0.0115	132.74
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM_{10}**	**$PM_{2.5}$**	**CH_4**	**CO_2**
Emission Factors	0.0768	0.0012	0.6391	0.3645	0.0263	0.0263	0.0069	122.59
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM_{10}**	**$PM_{2.5}$**	**CH_4**	**CO_2**
Emission Factors	0.2721	0.0024	2.2344	1.0419	0.0924	0.0924	0.0245	239.09
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM_{10}**	**$PM_{2.5}$**	**CH_4**	**CO_2**
Emission Factors	0.0666	0.0007	0.4500	0.3715	0.0297	0.0297	0.0060	66.799

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM_{10}	$PM_{2.5}$	Pb	NH_3	CO_2
LDGV	00.5120	00.0068	00.3650	07.5100	00.0248	00.0113		00.1017	00368.0
LDGT	00.7310	00.0095	00.5740	08.9600	00.0249	00.0113		00.1017	00516.2
HDGV	00.7640	00.0165	01.0560	08.1700	00.0432	00.0275		00.0451	00904.8
LDDV	00.1110	00.0029	00.1370	00.7480	00.0447	00.0295		00.0068	00314.1
LDDT	00.3450	00.0056	00.3830	00.6140	00.0533	00.0375		00.0068	00598.6
HDDV	00.3090	00.0116	02.4520	00.7240	00.0970	00.0707		00.0270	01243.4
MC	02.3900	00.0033	01.1500	14.2500	00.0372	00.0207		00.0113	00177.4

3.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (Tons)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (Tons)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (Tons)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (Tons)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

3.2 Paving Phase

3.2.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2015

- Phase Duration
Number of Month: 0
Number of Days: 21

3.2.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 1000

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

3.2.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM_{10}	$PM_{2.5}$	CH_4	CO_2
Emission Factors	0.1277	0.0014	0.9794	0.5930	0.0488	0.0488	0.0115	132.74
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM_{10}	$PM_{2.5}$	CH_4	CO_2
Emission Factors	0.0768	0.0012	0.6391	0.3645	0.0263	0.0263	0.0069	122.59
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM_{10}	$PM_{2.5}$	CH_4	CO_2
Emission Factors	0.2721	0.0024	2.2344	1.0419	0.0924	0.0924	0.0245	239.09
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM_{10}	$PM_{2.5}$	CH_4	CO_2
Emission Factors	0.0666	0.0007	0.4500	0.3715	0.0297	0.0297	0.0060	66.799

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM_{10}	$PM_{2.5}$	Pb	NH_3	CO_2
LDGV	00.5120	00.0068	00.3650	07.5100	00.0248	00.0113		00.1017	00368.0
LDGT	00.7310	00.0095	00.5740	08.9600	00.0249	00.0113		00.1017	00516.2
HDGV	00.7640	00.0165	01.0560	08.1700	00.0432	00.0275		00.0451	00904.8
LDDV	00.1110	00.0029	00.1370	00.7480	00.0447	00.0295		00.0068	00314.1
LDDT	00.3450	00.0056	00.3830	00.6140	00.0533	00.0375		00.0068	00598.6
HDDV	00.3090	00.0116	02.4520	00.7240	00.0970	00.0707		00.0270	01243.4
MC	02.3900	00.0033	01.1500	14.2500	00.0372	00.0207		00.0113	00177.4

3.2.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (Tons)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (Tons)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (Tons)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (Tons)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft^2 / acre)^2 / acre)

Activity 4. Construction / Demolition (Road Improvements)

4.0 General Information & Timeline Assumptions

- Activity Location
County: Lanier; Lowndes
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Road Improvements

- Activity Description:
Approximately 1400 linear feet of road graded, widened by 10', and paved

- Activity Start Date
Start Month: 5
Start Month: 2015

- Activity End Date
Indefinite: False
End Month: 7
End Month: 2015

- Activity Emissions:

Pollutant	Total Emissions (Tons)
VOC	0.113938
SO_x	0.001127
NO_x	0.800950
CO	0.549977
PM_{10}	0.867454

Pollutant	Total Emissions (Tons)
$PM_{2.5}$	0.040880
Pb	0.000000
NH_3	0.000961

4.1 Site Grading Phase

4.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2015

- Phase Duration
Number of Month: 2
Number of Days: 0

4.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 42000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

4.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM_{10}**	**$PM_{2.5}$**	**CH_4**	**CO_2**
Emission Factors	0.1277	0.0014	0.9794	0.5930	0.0488	0.0488	0.0115	132.74
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM_{10}**	**$PM_{2.5}$**	**CH_4**	**CO_2**
Emission Factors	0.0768	0.0012	0.6391	0.3645	0.0263	0.0263	0.0069	122.59
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM_{10}**	**$PM_{2.5}$**	**CH_4**	**CO_2**
Emission Factors	0.2721	0.0024	2.2344	1.0419	0.0924	0.0924	0.0245	239.09
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM_{10}**	**$PM_{2.5}$**	**CH_4**	**CO_2**
Emission Factors	0.0666	0.0007	0.4500	0.3715	0.0297	0.0297	0.0060	66.799

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM_{10}**	**$PM_{2.5}$**	**Pb**	**NH_3**	**CO_2**
LDGV	00.5120	00.0068	00.3650	07.5100	00.0248	00.0113		00.1017	00368.0
LDGT	00.7310	00.0095	00.5740	08.9600	00.0249	00.0113		00.1017	00516.2
HDGV	00.7640	00.0165	01.0560	08.1700	00.0432	00.0275		00.0451	00904.8
LDDV	00.1110	00.0029	00.1370	00.7480	00.0447	00.0295		00.0068	00314.1
LDDT	00.3450	00.0056	00.3830	00.6140	00.0533	00.0375		00.0068	00598.6
HDDV	00.3090	00.0116	02.4520	00.7240	00.0970	00.0707		00.0270	01243.4
MC	02.3900	00.0033	01.1500	14.2500	00.0372	00.0207		00.0113	00177.4

4.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (Tons)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (Tons)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (Tons)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (Tons)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

4.2 Paving Phase

4.2.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2015

- Phase Duration
Number of Month: 1
Number of Days: 0

4.2.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 33600

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	1	8
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

4.2.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM_{10}	$PM_{2.5}$	CH_4	CO_2
Emission Factors	0.1277	0.0014	0.9794	0.5930	0.0488	0.0488	0.0115	132.74
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM_{10}	$PM_{2.5}$	CH_4	CO_2
Emission Factors	0.0768	0.0012	0.6391	0.3645	0.0263	0.0263	0.0069	122.59
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM_{10}	$PM_{2.5}$	CH_4	CO_2
Emission Factors	0.2721	0.0024	2.2344	1.0419	0.0924	0.0924	0.0245	239.09
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM_{10}	$PM_{2.5}$	CH_4	CO_2
Emission Factors	0.0666	0.0007	0.4500	0.3715	0.0297	0.0297	0.0060	66.799

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM_{10}	$PM_{2.5}$	Pb	NH_3	CO_2
LDGV	00.5120	00.0068	00.3650	07.5100	00.0248	00.0113		00.1017	00368.0
LDGT	00.7310	00.0095	00.5740	08.9600	00.0249	00.0113		00.1017	00516.2
HDGV	00.7640	00.0165	01.0560	08.1700	00.0432	00.0275		00.0451	00904.8
LDDV	00.1110	00.0029	00.1370	00.7480	00.0447	00.0295		00.0068	00314.1
LDDT	00.3450	00.0056	00.3830	00.6140	00.0533	00.0375		00.0068	00598.6
HDDV	00.3090	00.0116	02.4520	00.7240	00.0970	00.0707		00.0270	01243.4
MC	02.3900	00.0033	01.1500	14.2500	00.0372	00.0207		00.0113	00177.4

4.2.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (Tons)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (Tons)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (Tons)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (Tons)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

Activity 5. Construction / Demolition (ULZ Lighting)

5.0 General Information & Timeline Assumptions

- Activity Location
County: Lanier; Lowndes
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: ULZ Lighting

- Activity Description:
Approximately 7,900 linear feet of underground utility lines would be entrenched and refilled.

- Activity Start Date
Start Month: 8
Start Month: 2015

- Activity End Date
Indefinite: False
End Month: 10
End Month: 2015

- Activity Emissions:

Pollutant	Total Emissions (Tons)
VOC	0.135264
SO_x	0.002227
NO_x	0.980951
CO	0.605001
PM_{10}	0.746650

Pollutant	Total Emissions (Tons)
$PM_{2.5}$	0.044965
Pb	0.000000
NH_3	0.002837

5.1 Trenching/Excavating Phase

5.1.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 8
Start Quarter: 1
Start Year: 2015

- Phase Duration
Number of Month: 3
Number of Days: 0

5.1.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 23700
Amount of Material to be Hauled On-Site (yd^3): 71100
Amount of Material to be Hauled Off-Site (yd^3): 0

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

5.1.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM_{10}	$PM_{2.5}$	Pb	NH_3	CO_2
LDGV	00.5990	00.0068	00.4360	08.0000	00.0248	00.0113		00.1017	00368.1
LDGT	00.8220	00.0095	00.6670	09.6300	00.0249	00.0114		00.1017	00516.1
HDGV	00.9080	00.0165	01.4390	08.5200	00.0485	00.0321		00.0451	00905.3
LDDV	00.1320	00.0029	00.2000	00.8080	00.0532	00.0374		00.0068	00314.0
LDDT	00.3870	00.0056	00.4600	00.6570	00.0601	00.0438		00.0068	00599.2
HDDV	00.3430	00.0116	03.2960	00.9410	00.1285	00.0996		00.0270	01245.6
MC	02.3900	00.0033	01.1500	14.2500	00.0372	00.0207		00.0113	00177.4

5.1.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (Tons)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (Tons)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (Tons)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (Tons)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

Activity 6. Construction / Demolition (Fire Station Construction)

6.0 General Information & Timeline Assumptions

- Activity Location
County: Lanier; Lowndes
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Fire Station Construction

- Activity Description:
A Fire Station of approximately 4,320 sq ft would be constructed to support the ULZ

- Activity Start Date
Start Month: 9
Start Month: 2015

- Activity End Date
Indefinite: False
End Month: 12
End Month: 2016

- Activity Emissions:

Pollutant	Total Emissions (Tons)
VOC	0.189426
SO_x	0.001713
NO_x	1.044579
CO	0.778927
PM_{10}	0.095335

Pollutant	Total Emissions (Tons)
$PM_{2.5}$	0.052020
Pb	0.000000
NH_3	0.001768

6.1 Site Grading Phase

6.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2015

- Phase Duration
Number of Month: 1
Number of Days: 0

6.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft²): 4375
Amount of Material to be Hauled On-Site (yd³): 0
Amount of Material to be Hauled Off-Site (yd³): 0

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

6.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM_{10}	$PM_{2.5}$	CH_4	CO_2
Emission Factors	0.1277	0.0014	0.9794	0.5930	0.0488	0.0488	0.0115	132.74
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM_{10}	$PM_{2.5}$	CH_4	CO_2
Emission Factors	0.0768	0.0012	0.6391	0.3645	0.0263	0.0263	0.0069	122.59
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM_{10}	$PM_{2.5}$	CH_4	CO_2
Emission Factors	0.2721	0.0024	2.2344	1.0419	0.0924	0.0924	0.0245	239.09
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM_{10}	$PM_{2.5}$	CH_4	CO_2
Emission Factors	0.0666	0.0007	0.4500	0.3715	0.0297	0.0297	0.0060	66.799

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM_{10}	$PM_{2.5}$	Pb	NH_3	CO_2
LDGV	00.5120	00.0068	00.3650	07.5100	00.0248	00.0113		00.1017	00368.0
LDGT	00.7310	00.0095	00.5740	08.9600	00.0249	00.0113		00.1017	00516.2
HDGV	00.7640	00.0165	01.0560	08.1700	00.0432	00.0275		00.0451	00904.8
LDDV	00.1110	00.0029	00.1370	00.7480	00.0447	00.0295		00.0068	00314.1
LDDT	00.3450	00.0056	00.3830	00.6140	00.0533	00.0375		00.0068	00598.6
HDDV	00.3090	00.0116	02.4520	00.7240	00.0970	00.0707		00.0270	01243.4
MC	02.3900	00.0033	01.1500	14.2500	00.0372	00.0207		00.0113	00177.4

6.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (Tons)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (Tons)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (Tons)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (Tons)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

6.2 Building Construction Phase

6.2.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2015

- Phase Duration
Number of Month: 6
Number of Days: 0

6.2.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 3500
Height of Building (ft): 25
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

6.2.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM_{10}	$PM_{2.5}$	CH_4	CO_2
Emission Factors	0.1203	0.0013	1.0199	0.4395	0.0425	0.0425	0.0108	128.63
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM_{10}	$PM_{2.5}$	CH_4	CO_2
Emission Factors	0.0458	0.0006	0.3163	0.2200	0.0155	0.0155	0.0041	54.395
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM_{10}	$PM_{2.5}$	CH_4	CO_2
Emission Factors	0.0666	0.0007	0.4500	0.3715	0.0297	0.0297	0.0060	66.799

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM_{10}	$PM_{2.5}$	Pb	NH_3	CO_2
LDGV	00.5120	00.0068	00.3650	07.5100	00.0248	00.0113		00.1017	00368.0
LDGT	00.7310	00.0095	00.5740	08.9600	00.0249	00.0113		00.1017	00516.2
HDGV	00.7640	00.0165	01.0560	08.1700	00.0432	00.0275		00.0451	00904.8
LDDV	00.1110	00.0029	00.1370	00.7480	00.0447	00.0295		00.0068	00314.1
LDDT	00.3450	00.0056	00.3830	00.6140	00.0533	00.0375		00.0068	00598.6
HDDV	00.3090	00.0116	02.4520	00.7240	00.0970	00.0707		00.0270	01243.4
MC	02.3900	00.0033	01.1500	14.2500	00.0372	00.0207		00.0113	00177.4

6.2.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (Tons)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (Tons)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (Tons)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase

VMT_{VT} = BA * BH * (0.38 / 1000) * HT

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (Tons)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

6.3 Architectural Coatings Phase

6.3.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 12
Start Quarter: 1
Start Year: 2015

- Phase Duration
Number of Month: 1
Number of Days: 0

6.3.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category:
Total Square Footage (ft^2): 3500
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

6.3.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM_{10}	$PM_{2.5}$	Pb	NH_3	CO_2
LDGV	00.5120	00.0068	00.3650	07.5100	00.0248	00.0113		00.1017	00368.0
LDGT	00.7310	00.0095	00.5740	08.9600	00.0249	00.0113		00.1017	00516.2
HDGV	00.7640	00.0165	01.0560	08.1700	00.0432	00.0275		00.0451	00904.8
LDDV	00.1110	00.0029	00.1370	00.7480	00.0447	00.0295		00.0068	00314.1
LDDT	00.3450	00.0056	00.3830	00.6140	00.0533	00.0375		00.0068	00598.6
HDDV	00.3090	00.0116	02.4520	00.7240	00.0970	00.0707		00.0270	01243.4
MC	02.3900	00.0033	01.1500	14.2500	00.0372	00.0207		00.0113	00177.4

6.3.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (Tons)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0

VOC_{AC}: Architectural Coating VOC Emissions (Tons)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

B.3.2 Aircraft Emissions

B.3.2.1. General Information

- Action Location

Base: MOODY AFB
County(s): Lanier; Lowndes
Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: ULZ Modification and Use

- Project Number/s (if applicable):

- Projected Action Start Date: 1 / 2015

- Action Purpose and Need:

The purpose of the Proposed Action is to provide an operational and certified ULZ for Combat Search and Rescue (CSAR) units, primarily those units assigned to Moody AFB, and to meet ULZ qualification training requirements. Qualification training includes night vision goggle (NVG) air/land training; mass casualty evacuation (Mass-CASEVAC); insertion, extraction, and transload of pararescuemen; extraction of survivors; and realistic training to improve aircrew capability for landing at austere/unimproved airfields.

- Action Description:

The United States Air Force (Air Force), Air Combat Command (ACC) proposes to conduct tree clearing, construct facilities and install equipment at the Bemiss Field unimproved landing zone (ULZ) and utilize the ULZ for flight training operations by aircrews operating fixed-wing and rotary aircraft at Moody Air Force Base (AFB), Georgia. The modifications include 1) clearing of trees within the existing ULZ approach/departure plane at the north and south ends of the Bemiss Field ULZ; 2) renovation of an existing latrine facility, to include utilities and approximately 1,000 square feet of gravel parking located approximately 1,400 feet east of the ULZ; 3) improvement of approximately 1,400 linear feet of an existing dirt road to accommodate vehicle access to the ULZ; 4) installation of ULZ lighting and markers; and 5) construction of a 4,320 square foot fire station located just north west of Highway 221 across from the existing Georgia Department of Natural Resources (Georgia DNR) maintenance facility.

- Point of Contact

Name: Brad Boykin
Title: CTR
Organization: Leidos

Email: boykinb@leidos.com
Phone Number: 850-609-3450

- Activity List:

Activity Type		Activity Title
2.	Aircraft	Bemiss HC-130 Landings
3.	Aircraft	HC-130 Airdrops
4.	Aircraft	Transient C-130 Type
5.	Aircraft	Transient 2-Engine Prop
6.	Aircraft	Transient Single Engine Prop

Activity 2. Aircraft (Bemiss HC-130 Landings)

2.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Lanier; Lowndes
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Bemiss HC-130 Landings

- Activity Description: 150 Landings

- Activity Start Date
Start Month: 1
Start Year: 2015

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (Tons)
VOC	0.647435
SO_x	0.325076
NO_x	12.726918
CO	10.365151
PM_{10}	4.891178

Pollutant	Emissions Per Year (Tons)
$PM_{2.5}$	2.509786
Pb	0.000000
NH_3	0.000000

2.2 Aircraft & Engines

2.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: HC-130J

Engine Model: AE2100D3
Primary Function: Transport - Bomber
Number of Engines: 4

- Aircraft & Engine Surrogate
Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

2.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Emissions Factors (lb/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM_{10}	$PM_{2.5}$	CO_2e
Idle	723.60	0.08	1.06	7.58	5.06	3.64	1.88	3252.46
Approach	880.20	0.06	1.06	7.54	3.89	3.85	2.18	3252.46
Intermediate	1741.90	0.02	1.06	9.15	1.94	1.46	0.56	3252.46
Military	2261.70	0.01	1.06	12.46	2.30	1.22	0.33	3252.46
After Burn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3252.46

2.3 Flight Operations

2.3.1 Flight Operations Assumptions

- Flight Operations
Number of Aircraft: 9
Number of Annual LTOs (Landing and Take-off) cycles: 250
Number of Annual TGOs (Touch-and-Go) cycles: 0

- Default Settings Used: Yes

- Flight Operations TIMs (Time In Mode)
Taxi/Idle Out (mins): 9.2 (default)
Takeoff (mins): 0.4 (default)
Climb Out (mins): 1.2 (default)
Approach (mins): 5.1 (default)
Taxi/Idle In (mins): 6.7 (default)

- Trim Test
Idle (mins): 12 (default)
Approach (mins): 27 (default)
Intermediate (mins): 9 (default)
Military (mins): 12 (default)
AfterBurn (mins): 0 (default)

2.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for LTOs per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * NA * LTO / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (Tons)
TIM: Time in Mode (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
LTO: Number of Landing and Take-off Cycles
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for LTOs per Year

$AE_{LTO} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{LTO}: Aircraft Emissions (Tons)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (Tons)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (Tons)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (Tons)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (Tons)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (Tons)

- Aircraft Emissions per Mode for TGOs per Year

AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * NA * TGO / 2000

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (Tons)
TIM: Time in Mode (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
TGO: Number of Touch-and-Go Cycles
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for TGOs per Year

$AE_{TGO} = AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{TGO}: Aircraft Emissions (Tons)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (Tons)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (Tons)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (Tons)

- Aircraft Emissions per Mode for Trim per Year

$AEPS_{POL}$ = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (Tons)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)

NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (Tons)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (Tons)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (Tons)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (Tons)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (Tons)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (Tons)

2.4 Auxiliary Power Unit (APU)

2.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer
1	1	No	GTCP 85-180L	

2.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM_{10}	$PM_{2.5}$	CO_2e
GTCP 85-180L	272.6	0.493	0.289	1.216	3.759	0.131	0.037	910.8

2.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year

$$APU_{POL} = APU * OH * LTO * NA * EF_{POL} / 2000$$

APU_{POL}: Auxiliary Power Unit (APU) Emissions per Pollutant (Tons)
APU: Number of Auxiliary Power Units
OH: Operation Hours for Each LTO (hour)
LTO: Number of LTOs
NA: Number of Aircraft
EF_{POL}: Emission Factor for Pollutant (lb/hr)
2000: Conversion Factor pounds to tons

Activity 3. Aircraft (HC-130 Airdrops)

3.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location
County: Lanier; Lowndes
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: HC-130 Airdrops

- Activity Description:
-150 HC-130 Airdrops

- Activity Start Date
Start Month: 1
Start Year: 2015

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (Tons)
VOC	-0.014879
SO_x	0.000000
NO_x	-2.891051
CO	-1.061919
PM_{10}	-0.963564

Pollutant	Emissions Per Year (Tons)
$PM_{2.5}$	-0.505433
Pb	0.000000
NH_3	0.000000

3.2 Aircraft & Engines

3.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: HC-130J
Engine Model: AE2100D3
Primary Function: Transport - Bomber
Number of Engines: 4

- Aircraft & Engine Surrogate
Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

3.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Emissions Factors (lb/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM_{10}	$PM_{2.5}$	CO_2e
Idle	723.60	0.08	1.06	7.58	5.06	3.64	1.88	3252.46

Approach	880.20	0.06	1.06	7.54	3.89	3.85	2.18	3252.46
Intermediate	1741.90	0.02	1.06	9.15	1.94	1.46	0.56	3252.46
Military	2261.70	0.01	1.06	12.46	2.30	1.22	0.33	3252.46
After Burn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3252.46

3.3 Flight Operations

3.3.1 Flight Operations Assumptions

- Flight Operations
Number of Aircraft: 9
Number of Annual LTOs (Landing and Take-off) cycles: 0
Number of Annual TGOs (Touch-and-Go) cycles: 150

- Default Settings Used: Yes

- Flight Operations TIMs (Time In Mode)
Taxi/Idle Out (mins): 9.2 (default)
Takeoff (mins): 0.4 (default)
Climb Out (mins): 1.2 (default)
Approach (mins): 5.1 (default)
Taxi/Idle In (mins): 6.7 (default)

- Trim Test
Idle (mins): 12 (default)
Approach (mins): 27 (default)
Intermediate (mins): 9 (default)
Military (mins): 12 (default)
AfterBurn (mins): 0 (default)

3.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for LTOs per Year

$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * NA * LTO / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (Tons)
TIM: Time in Mode (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
LTO: Number of Landing and Take-off Cycles
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for LTOs per Year

$AE_{LTO} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{LTO}: Aircraft Emissions (Tons)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (Tons)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (Tons)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (Tons)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (Tons)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (Tons)

- Aircraft Emissions per Mode for TGOs per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * NA * TGO / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (Tons)
TIM: Time in Mode (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
TGO: Number of Touch-and-Go Cycles
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for TGOs per Year

$$AE_{TGO} = AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{TGO}: Aircraft Emissions (Tons)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (Tons)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (Tons)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (Tons)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (Tons)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (Tons)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (Tons)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (Tons)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (Tons)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (Tons)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (Tons)

3.4 Auxiliary Power Unit (APU)

3.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer
1	1	No	GTCP 85-180L	

3.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM_{10}	$PM_{2.5}$	CO_2e
GTCP 85-180L	272.6	0.493	0.289	1.216	3.759	0.131	0.037	910.8

3.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year

$APU_{POL} = APU * OH * LTO * NA * EF_{POL} / 2000$

APU_{POL}: Auxiliary Power Unit (APU) Emissions per Pollutant (Tons)
APU: Number of Auxiliary Power Units
OH: Operation Hours for Each LTO (hour)
LTO: Number of LTOs
NA: Number of Aircraft
EF_{POL}: Emission Factor for Pollutant (lb/hr)
2000: Conversion Factor pounds to tons

Activity 4. Aircraft (Transient C-130 Type)

4.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Lanier; Lowndes
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Transient C-130 Type

- Activity Description:
30 annual landings and takeoffs by C-130 or similar aircraft

- Activity Start Date
Start Month: 1

Start Year: 2015

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (Tons)
VOC	0.037187
SO_x	0.000000
NO_x	4.543659
CO	2.454441
PM_{10}	1.897712

Pollutant	Emissions Per Year (Tons)
$PM_{2.5}$	0.987231
Pb	0.000000
NH_3	0.000000

4.2 Aircraft & Engines

4.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: HC-130J
Engine Model: AE2100D3
Primary Function: Transport - Bomber
Number of Engines: 4

- Aircraft & Engine Surrogate
Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

4.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Emissions Factors (lb/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM_{10}	$PM_{2.5}$	CO_2e
Idle	723.60	0.08	1.06	7.58	5.06	3.64	1.88	3252.46
Approach	880.20	0.06	1.06	7.54	3.89	3.85	2.18	3252.46
Intermediate	1741.90	0.02	1.06	9.15	1.94	1.46	0.56	3252.46
Military	2261.70	0.01	1.06	12.46	2.30	1.22	0.33	3252.46
After Burn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3252.46

4.3 Flight Operations

4.3.1 Flight Operations Assumptions

- Flight Operations
Number of Aircraft: 30
Number of Annual LTOs (Landing and Take-off) cycles: 30
Number of Annual TGOs (Touch-and-Go) cycles: 0

- Default Settings Used: Yes

- Flight Operations TIMs (Time In Mode)
Taxi/Idle Out (mins): 9.2 (default)
Takeoff (mins): 0.4 (default)
Climb Out (mins): 1.2 (default)
Approach (mins): 5.1 (default)
Taxi/Idle In (mins): 6.7 (default)

- Trim Test
Idle (mins): 12 (default)
Approach (mins): 27 (default)
Intermediate (mins): 9 (default)
Military (mins): 12 (default)
AfterBurn (mins): 0 (default)

4.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for LTOs per Year
AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * NA * LTO / 2000

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (Tons)
TIM: Time in Mode (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
LTO: Number of Landing and Take-off Cycles
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for LTOs per Year
AE_{LTO} = AEM_{IDLE_IN} + AEM_{IDLE_OUT} + $AEM_{APPROACH}$ + $AEM_{CLIMBOUT}$ + $AEM_{TAKEOFF}$

AE_{LTO}: Aircraft Emissions (Tons)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (Tons)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (Tons)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (Tons)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (Tons)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (Tons)

- Aircraft Emissions per Mode for TGOs per Year
AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * NA * TGO / 2000

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (Tons)
TIM: Time in Mode (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)

NE: Number of Engines
NA: Number of Aircraft
TGO: Number of Touch-and-Go Cycles
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for TGOs per Year

$AE_{TGO} = AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{TGO}: Aircraft Emissions (Tons)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (Tons)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (Tons)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (Tons)

- Aircraft Emissions per Mode for Trim per Year

$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (Tons)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (Tons)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (Tons)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (Tons)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (Tons)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (Tons)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (Tons)

4.4 Auxiliary Power Unit (APU)

4.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

4.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM_{10}	$PM_{2.5}$	CO_2e

4.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year

$APU_{POL} = APU * OH * LTO * NA * EF_{POL} / 2000$

APU_{POL}: Auxiliary Power Unit (APU) Emissions per Pollutant (Tons)
APU: Number of Auxiliary Power Units
OH: Operation Hours for Each LTO (hour)
LTO: Number of LTOs
NA: Number of Aircraft
EF_{POL}: Emission Factor for Pollutant (lb/hr)
2000: Conversion Factor pounds to tons

Activity 5. Aircraft (Transient 2-Engine Prop)

5.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Lanier; Lowndes
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Transient 2-Engine Prop

- Activity Description:
Up to 30 LTOs by transient 2-engine propeller-driven aircraft. C-12 Used as surrogate.

- Activity Start Date
Start Month: 1
Start Year: 2015

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (Tons)
VOC	0.874697
SO_x	0.000000
NO_x	0.120117
CO	1.076393
PM_{10}	0.009464

Pollutant	Emissions Per Year (Tons)
$PM_{2.5}$	0.008547
Pb	0.000000
NH_3	0.000000

5.2 Aircraft & Engines

5.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: C-12
Engine Model: PT6A-27
Primary Function: General - Turboprop
Number of Engines: 2

- Aircraft & Engine Surrogate
Is Aircraft & Engine a Surrogate? Yes
Original Aircraft Name: Various
Original Engine Name: Various

5.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Emissions Factors (lb/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM_{10}	$PM_{2.5}$	CO_2e
Idle	115.00	57.70	1.06	2.43	64.00	0.50	0.45	3252.46
Approach	215.00	2.51	1.06	8.37	23.26	0.10	0.09	3252.46
Intermediate	400.00	0.00	1.06	7.00	1.20	0.25	0.23	3252.46
Military	425.00	0.00	1.06	7.81	1.01	0.24	0.22	3252.46
After Burn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3252.46

5.3 Flight Operations

5.3.1 Flight Operations Assumptions

- Flight Operations
Number of Aircraft: 10
Number of Annual LTOs (Landing and Take-off) cycles: 30
Number of Annual TGOs (Touch-and-Go) cycles: 0

- Default Settings Used: Yes

- Flight Operations TIMs (Time In Mode)
Taxi/Idle Out (mins): 19 (default)
Takeoff (mins): 0.5 (default)
Climb Out (mins): 2.5 (default)
Approach (mins): 4.5 (default)
Taxi/Idle In (mins): 7 (default)

- Trim Test
Idle (mins): 12 (default)
Approach (mins): 27 (default)
Intermediate (mins): 9 (default)
Military (mins): 12 (default)
AfterBurn (mins): 0 (default)

5.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for LTOs per Year

AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * NA * LTO / 2000

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (Tons)
TIM: Time in Mode (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
LTO: Number of Landing and Take-off Cycles
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for LTOs per Year

AE_{LTO} = AEM_{IDLE_IN} + AEM_{IDLE_OUT} + $AEM_{APPROACH}$ + $AEM_{CLIMBOUT}$ + $AEM_{TAKEOFF}$

AE_{LTO}: Aircraft Emissions (Tons)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (Tons)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (Tons)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (Tons)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (Tons)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (Tons)

- Aircraft Emissions per Mode for TGOs per Year

AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * NA * TGO / 2000

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (Tons)
TIM: Time in Mode (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
TGO: Number of Touch-and-Go Cycles
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for TGOs per Year

AE_{TGO} = $AEM_{APPROACH}$ + $AEM_{CLIMBOUT}$ + $AEM_{TAKEOFF}$

AE_{TGO}: Aircraft Emissions (Tons)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (Tons)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (Tons)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (Tons)

- Aircraft Emissions per Mode for Trim per Year

$AEPS_{POL}$ = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (Tons)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (Tons)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (Tons)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (Tons)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (Tons)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (Tons)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (Tons)

5.4 Auxiliary Power Unit (APU)

5.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

5.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM_{10}	$PM_{2.5}$	CO_2e

5.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year

$$APU_{POL} = APU * OH * LTO * NA * EF_{POL} / 2000$$

APU_{POL}: Auxiliary Power Unit (APU) Emissions per Pollutant (Tons)
APU: Number of Auxiliary Power Units
OH: Operation Hours for Each LTO (hour)
LTO: Number of LTOs
NA: Number of Aircraft
EF_{POL}: Emission Factor for Pollutant (lb/hr)
2000: Conversion Factor pounds to tons

Activity 6. Aircraft (Transient Single Engine Prop)

6.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Lanier; Lowndes
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Transient Single Engine Prop

- Activity Description:
Up to 40 annual LTOs by single engine propeller-driven aircraft.

- Activity Start Date
Start Month: 1
Start Year: 2015

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (Tons)
VOC	0.044792
SO_x	0.000000
NO_x	0.013704
CO	2.193116
PM_{10}	0.110951

Pollutant	Emissions Per Year (Tons)
$PM_{2.5}$	0.099860
Pb	0.000000
NH_3	0.000000

6.2 Aircraft & Engines

6.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: T-41
Engine Model: IO-360-C
Primary Function: General - Piston
Number of Engines: 1

- Aircraft & Engine Surrogate
Is Aircraft & Engine a Surrogate? Yes
Original Aircraft Name: Various
Original Engine Name: Various

6.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Emissions Factors (lb/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM_{10}	$PM_{2.5}$	CO_2e
Idle	8.00	56.58	1.06	1.16	897.40	60.00	54.00	3252.46
Approach	37.00	11.15	1.06	10.16	691.26	47.95	43.16	3252.46
Intermediate	72.00	9.38	1.06	4.59	983.26	40.00	36.00	3252.46
Military	103.00	11.50	1.06	1.99	1199.03	20.00	18.00	3252.46
After Burn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3252.46

6.3 Flight Operations

6.3.1 Flight Operations Assumptions

- Flight Operations
Number of Aircraft: 10
Number of Annual LTOs (Landing and Take-off) cycles: 40
Number of Annual TGOs (Touch-and-Go) cycles: 0

- Default Settings Used: Yes

- Flight Operations TIMs (Time In Mode)
Taxi/Idle Out (mins): 12 (default)
Takeoff (mins): 0.3 (default)
Climb Out (mins): 4.98 (default)
Approach (mins): 6 (default)
Taxi/Idle In (mins): 4 (default)

- Trim Test
Idle (mins): 12 (default)
Approach (mins): 27 (default)
Intermediate (mins): 9 (default)
Military (mins): 12 (default)
AfterBurn (mins): 0 (default)

6.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for LTOs per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * NA * LTO / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (Tons)
TIM: Time in Mode (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
LTO: Number of Landing and Take-off Cycles

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for LTOs per Year

$AE_{LTO} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{LTO}: Aircraft Emissions (Tons)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (Tons)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (Tons)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (Tons)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (Tons)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (Tons)

- Aircraft Emissions per Mode for TGOs per Year

AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * NA * TGO / 2000

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (Tons)
TIM: Time in Mode (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
TGO: Number of Touch-and-Go Cycles
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for TGOs per Year

$AE_{TGO} = AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{TGO}: Aircraft Emissions (Tons)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (Tons)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (Tons)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (Tons)

- Aircraft Emissions per Mode for Trim per Year

$AEPS_{POL}$ = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (Tons)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (Tons)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (Tons)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (Tons)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (Tons)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (Tons)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (Tons)

6.4 Auxiliary Power Unit (APU)

6.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

6.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM_{10}	$PM_{2.5}$	CO_2e

6.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year

$$APU_{POL} = APU * OH * LTO * NA * EF_{POL} / 2000$$

APU_{POL}: Auxiliary Power Unit (APU) Emissions per Pollutant (Tons)
APU: Number of Auxiliary Power Units
OH: Operation Hours for Each LTO (hour)
LTO: Number of LTOs
NA: Number of Aircraft
EF_{POL}: Emission Factor for Pollutant (lb/hr)
2000: Conversion Factor pounds to tons

B.3.3 NATIONAL EMISSIONS INVENTORY

The NEI is operated under the USEPA's Emission Factor and Inventory Group, which prepares the national database of air emissions information with input from numerous state and local air agencies, tribes, and industries. The database contains information on stationary and mobile sources that emit criteria air pollutants and hazardous air pollutants (HAPs). The database includes estimates of annual emissions, by source, of air pollutants in each area of the country on a yearly basis. The NEI includes emission estimates for all 50 states, the District of Columbia, Puerto Rico, and the Virgin Islands. Emission estimates for individual point or major sources (facilities), as well as county-level estimates for area, mobile, and other sources, are currently available for years 2008 and 2011 for criteria pollutants and HAPs.

Criteria air pollutants are those for which the USEPA has set health-based standards. Four of the six criteria pollutants are included in the NEI database:

- Carbon monoxide (CO)
- Nitrogen oxides (NO_x)
- Sulfur dioxide (SO_2)
- Particulate matter (PM_{10} and $PM_{2.5}$)

The NEI also includes emissions of VOCs, which are ozone precursors, emitted from motor vehicle fuel distribution and chemical manufacturing, as well as other solvent uses. VOCs react with nitrogen oxides in the atmosphere to form ozone. The NEI database defines three classes of criteria air pollutant sources:

- **Point sources.** Stationary sources of emissions, such as an electric power plant, that can be identified by name and location. A "major" source emits a threshold amount (or more) of at least one criteria pollutant and must be inventoried and reported. Many states also inventory and report stationary sources that emit amounts below the thresholds for each pollutant.
- **Area sources.** Small point sources such as a home or office building or a diffuse stationary source such as wildfires or agricultural tilling. These sources do not individually produce sufficient emissions to qualify as point sources. Dry cleaners are one example; for instance, a single dry cleaner within an inventory area typically will not qualify as a point source, but collectively the emissions from all of the dry cleaning facilities in the inventory area may be significant and therefore must be included in the inventory.
- **Mobile sources.** Any kind of vehicle or equipment with a gasoline or diesel engine (such as an airplane or ship).

The following are the main sources of criteria pollutant emissions data for the NEI:

- For electric generating units—USEPA's Emission Tracking System/Continuous Emissions Monitoring Data (ETS/CEM) and Department of Energy fuel use data.

- For other large stationary sources—state data and older inventories where state data were not submitted.
- For on-road mobile sources—the Federal Highway Administration's estimate of vehicle miles traveled and emission factors from USEPA's MOBILE Model.
- For non-road mobile sources—USEPA's NONROAD Model.
- For stationary area sources—state data, USEPA-developed estimates for some sources, and older inventories where state or USEPA data were not submitted. State and local environmental agencies supply most of the point source data.

USEPA's Clean Air Market program supplies emissions data for electric power plants.

REFERENCES

Code of Federal Regulations (CFR), Title 40, 1508.27. Protection of Environment Council on Environmental *Quality*. January 1979.

Code of Federal Regulations (CFR), Title 40, Part 50 (40 CFR 50). Retrieved from http://www.access.gpo.gov/nara/cfr/cfr-retrieve.html.

Code of Federal Regulations (CFR), Title 40, Part 51, Subpart W (40 CFR 51, Subpart W), Federal CAA Toolbox, General Conformity.

Georgia Department of Natural Resources (DNR), 2012. Rules for Air Quality Control Chapter 391-3-1 Effective August 9, 2012. Georgia DNR Environmental Protection Division. Retrieved from http://www.georgiaair.org/airpermit/downloads/aqrules/airrules080912.pdf on March 27, 2013.

U.S. Environmental Protection Agency (USEPA), 1990. *Draft New Source Review Workshop Manual: Prevention of Significant Deterioration and Nonattainment Permitting*, Office of Air Quality Planning and Standards. October 1990.

U.S. Environmental Protection Agency (USEPA), 2006. *Final Rule: $PM_{2.5}$ De Minimis Emission Levels for General Conformity Applicability*, 40 Code of Federal Regulations Parts 51.853 and 93.152. Volume 71, Number 136. July 17, 2006. Retrieved from http://www.epa.gov/fedrgstr/EPA-AIR/2006/July/Day-17/a11241.htm, in November 2006.

U.S. Environmental Protection Agency (USEPA), 2012. National Ambient Air Quality Standards (NAAQS). Retrieved from http://www.epa.gov/air/criteria.html. Last Update December 14, 2012. Accessed August 28, 2014.

U.S. Environmental Protection Agency (USEPA), 2014. Currently Designated Nonattainment Areas for All Criteria Pollutants Retrieved from http://www.epa.gov/airquality/greenbook/ancl3.html on September 2, 2014.

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Appendix C

ETL 09-6, C-130 AND C-17 LANDING ZONE (LZ) DIMENSIONAL, MARKING, AND LIGHTING CRITERIA, CHANGE 1

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR FORCE CIVIL ENGINEER SUPPORT AGENCY

17 AUG 2009

FROM: AFCESA/CEO
139 Barnes Drive, Suite 1
Tyndall AFB FL 32403-5319

SUBJECT: **Engineering Technical Letter (ETL) 09-6 (Change 1): C-130 and C-17 Landing Zone (LZ) Dimensional, Marking, and Lighting Criteria**

1. Purpose. This ETL provides dimensional, marking, and lighting criteria and guidance for planning, design, construction, and evaluation of landing zones (LZ) used for aircrew training and contingency operations of C-130 and C-17 aircraft. These standards do not provide sufficient clearances for instrument approach and departure procedures below circling weather minimums.

This ETL supersedes ETL 04-7, *C-130 and C-17 Landing Zone (LZ) Dimensional, Marking and Lighting Criteria*, published March 29, 2004. This ETL is substantially revised and must be completely reviewed. Change 1 updates Figure 2 and Table 3.

Note: The use of the name or mark of any specific manufacturer, commercial product, commodity, or service in this ETL does not imply endorsement by the Air Force.

2. Application: All Department of Defense (DOD) organizations responsible for planning, design, construction, and evaluation of LZs on property owned or controlled by the Air Force.

2.1. Authority: Air Force policy directive (AFPD) 32-10, *Installations and Facilities*.

2.2. Effective Date: Immediately.

2.3. Intended Users: Air Force, Army, Marine Corps, and Navy design and/or construction agents responsible for planning, design, maintenance, construction, and evaluation of LZs on property owned or controlled by the Air Force.

3. Coordination:
- Air Mobility Command, Pavements Engineer (HQ AMC/A7O)
- Air Combat Command, Pavements Engineer (ACC/A7OI)
- Pacific Air Forces, Pavements Engineer (PACAF/A7OI)
- Air Forces Central, Civil Engineer Forward (AFCENT AFFOR/A7)
- 554 RED HORSE Squadron, Engineering Flight (554 RHS/DE)
- Air Force Special Operations Command, Pavement Engineer (AFSOC/A7PO)
- Air Force Flight Standards Agency, Airfield Operations and Standardization Division (HQ AFFSA/A3AS)

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- Air Force Director of Operations and Training (HQ USAF/A3O-AC)

4. References:

4.1. Air Force.

- AFPD 32-10, *Installations and Facilities*, http://www.e-publishing.af.mil/
- Air Force handbook (AFH) 32-7084, *AICUZ Program Manager's Guide*, http://www.e-publishing.af.mil/
- Air Force instruction (AFI) 13-217, *Drop Zone and Landing Zone Operations*, http://www.e-publishing.af.mil/
- AFI 32-7061, *The Environmental Impact Analysis Process*, http://www.e-publishing.af.mil/
- ETL 97-9, *Criteria and Guidance for C-17 Contingency and Training Operations on Semi-Prepared Airfields*, https://www.my.af.mil/gcss-af/afp40/USAF/ep/browse.do?programId=1246681&parentCategoryId=-544993&channelPageId=-336217
- ETL 04-2, *Standard Airfield Pavement Marking Schemes*, https://www.my.af.mil/gcss-af/afp40/USAF/ep/browse.do?programId=1246681&parentCategoryId=-544993&channelPageId=-336217

4.2. Army.

- FM 5-430-00-02, *Planning and Design of Roads, Airfields, and Heliports in the Theater of Operations – Airfield and Heliport Design*, http://www.adtdl.army.mil/cgi-bin/atdl.dll/fm/5-430-00-2/toc.htm

4.3. Joint Service.

- UFC 3-260-01, *Airfield and Heliport Planning and Design*, http://www.wbdg.org/ccb/browse_cat.php?o=29&c=4
- UFC 3-260-02, *Pavement Design for Airfields*, http://www.wbdg.org/ccb/browse_cat.php?o=29&c=4
- UFC 3-535-01, *Visual Air Navigation Facilities*, available at http://www.wbdg.org/ccb/browse_cat.php?o=29&c=4
- (Draft) UFC 3-535-02, *Design Drawings for Visual Air Navigation Facilities*, https://www.my.af.mil/gcss-af/USAF/AFP40/Attachment/20070712/DRAFTUFC_3-535-02.pdf

4.4. Federal Aviation Administration (FAA).

- FAA Advisory Circular (AC) 150/5345-44, *Specification for Runway and Taxiway Signs*, http://www.airweb.faa.gov/Regulatory_and_Guidance_Library/rgAdvisoryCircular.nsf/MainFrame?OpenFrameSet&CFID=56957&CFTOKEN=71066012&CFID=1409204&CFTOKEN=89169026&CFID=10991906&CFTOKEN=40774853

- FAA AC 150/5345-46, *Specification for Runway and Taxiway Light Fixtures*, http://www.airweb.faa.gov/Regulatory_and_Guidance_Library/rgAdvisoryCircular.nsf/MainFrame?OpenFrameSet&CFID=56957&CFTOKEN=71066012&CFID=1409204&CFTOKEN=89169026&CFID=10991906&CFTOKEN=40774853
- FAA AC 150/5345-53, *Airport Lighting Equipment Certification Program*, http://www.airweb.faa.gov/Regulatory_and_Guidance_Library/rgAdvisoryCircular.nsf/MainFrame?OpenFrameSet&CFID=56957&CFTOKEN=71066012&CFID=1409204&CFTOKEN=89169026&CFID=10991906&CFTOKEN=40774853
- FAA Order 7400.2, *Procedures for Handling Airspace Matters*, http://www.faa.gov/
- FAA Form 7480-1, *Notice of Landing Area Proposal*, http://forms.faa.gov/forms/faa7460-2.pdf

4.5. Code of Federal Regulations (CFR).

- Title 32 CFR Part 989, *Environmental impact analysis process (EIAP)*, http://www.access.gpo.gov/nara/cfr/waisidx_07/32cfrv6_07.html#800

5. Definitions.

5.1. *Accident Potential Zone–Landing Zone (APZ-LZ):* A land use control area beyond the clear zone of an LZ that possesses a significant potential for accidents; therefore, land use is a concern. See Attachment 1, Figures 2 and 5.

5.2. *Airfield:* An area (including any buildings, installations, and equipment) prepared for accommodating the landing and takeoff of aircraft.

5.3. *Airspace:* The space above ground or water areas which is or is not controlled, assigned, and/or designated.

5.4. *Approach–Departure Clearance Surface (ADCS):* An imaginary surface that is an inclined plane or combined inclined and horizontal planes arranged symmetrically about the extended runway centerline. Objects that penetrate this surface are considered obstructions to air navigation and should be removed, if possible; if not removed, they must be mapped (as described in UFC 3-260-01, *Airfield and Heliport Planning and Design*, and Army FM 5-430-00-02, *Planning and Design of Roads, Airfields, and Heliports in the Theater of Operations – Airfield and Heliport Design*), marked, and lighted as obstructions. The first segment or the beginning of the inclined plane is coincident with the ends and edges of the primary surface and the elevation of the centerline at the runway end. This surface flares outward and upward from these points. See Attachment 1, Figures 1 and 5.

5.5. *Apron:* A defined area on an LZ intended to accommodate aircraft for loading or unloading passengers or cargo, refueling, parking, or maintenance. LZ aprons are sized to accommodate the mission. The runway clearance, as well as the longitudinal and transverse grades for aprons, is provided in Attachment 2, Table 4. Also see Attachment 1, Figures 2, 3, 4, and 6.

5.6. *Clear Zone-LZ:* A surface on the ground or water, beginning at the runway threshold and symmetrical about the extended runway centerline, graded to protect aircraft operations and in which only properly sited navigational aids are allowed. See Attachment 1, Figures 1, 2, and 5.

5.7. *Contingency Operations:* Typically, short-term (12 months or less) operations conducted in support of conflicts or emergencies.

5.8. *Exclusion Area:* Exclusion areas are required for all paved and semi-prepared (unpaved) LZs. The purpose of the exclusion area is to restrict the development of facilities around the LZ. Only features required to operate the LZ or an adjacent airfield are permissible in the exclusion area, such as operational surfaces (e.g., runways, taxiways, and aprons), navigational aids, airfield lights and signs, aircraft and support equipment, and cargo loading and unloading areas and equipment. Personnel formations, encampments, parked vehicles, storage areas, buildings, etc., are excluded from the area; roads, fences, and trees are acceptable. In addition, only properly sited facilities are allowed within this area (see UFC 3-260-01, Chapter 7). The exclusion area extends the length of the runway, plus the clear zone on each end. See Attachment 1, Figures 1, 2, and 5, and Attachment 2, Table 8.

5.9 *Flashing Strobe Light (FSL)*: A flashing light used to mark the beginning or end of the usable runway surface when an LZ is used for night operations and configured in airfield marking pattern (AMP) -1 or AMP-3.

5.10. *Grade (or Gradient):* A slope expressed as a percentage. All grades may be positive or negative unless otherwise specifically noted.

5.11. *Graded Area:* An area beyond the runway shoulder where grades are controlled to prevent damage to aircraft that may depart the runway surface (see Attachment 1, Figure 6, and Attachment 2, Table 2). Graded areas should not have any obstacles over 100 millimeters (4 inches) high, except vegetation, visual landing zone marker panels (VLZMP), or other visual or electronic navigational aids which must be sited in this area due to their function. Culverts, headwalls, and elevated drainage structures are not allowed. Properly sited frangible navigational aids are allowed.

5.12. *Imaginary Surfaces-LZ:* Surfaces in space established around an LZ in relation to runways, helipads, or helicopter runways, and designed to define the protected airspace around the airfield. The imaginary surfaces for LZs are the primary surface and ADCS. See Attachment 1, Figures 1, 2, and 5, and Attachment 2, Table 7.

5.13. *Infield Area:* The area between runways and between runways and taxiways that is graded or cleared for operational safety. All obstructions must be removed from the infield area.

5.14. *Landing Zone (LZ):* An LZ consists of a runway, a runway and taxiway, or other aircraft operational surfaces (e.g., aprons, turnarounds). It is a prepared or semi-prepared (unpaved) airfield used to conduct operations in an airfield environment similar to forward operating locations. LZ runways are typically shorter and narrower than standard runways. Because training airfields are constructed for long-term operations, semi-prepared surface structural requirements are more stringent than for contingency airfields.

5.15. *Maintained Area:* A land area extending outward at right angles to the runway centerline and the extended runway centerline that is outside the graded area but still within the exclusion area. This area must be free of obstructions. The maintained area is 21.5 meters (70 feet) wide for C-17 operations or 18.5 meters (60 feet) wide for C-130 operations. The grade may slope up or down to provide drainage, but may not exceed +10 percent nor -20 percent slope. See Attachment 1, Figure 6, and Attachment 2, Table 2.

5.16. *Non-Instrument Runway:* A runway intended for operating aircraft under visual flight rules (VFR).

5.17. *Obstacle:* An existing object, natural growth, or terrain, at a fixed geographical location, or which may be expected at a fixed location within a prescribed area, with reference to which vertical clearance is or must be provided during flight operations. Obstacles are not allowed if they violate grading criteria. See Attachment 2, Tables 2, 3, and 4. Frangible lights, signs and equipment that are fixed by function are not considered obstacles.

5.18. *Obstruction:* A natural or man-made object that violates airfield or heliport clearances or projects into imaginary airspace surfaces.

5.19. *LZ Overrun:* For the purpose of this ETL, an area the width of the runway, plus prepared shoulders, extending 91.5 meters (300 feet) from the end of the runway into the clear zone. This portion is an elongation of the runway and is constructed to support aircraft traffic. See Attachment 1, Figure 1, and Attachment 2, Table 5.

5.20. *Parking Maximum on Ground (MOG):* The highest number of aircraft allowed on the ground at any given time, based upon airfield configuration limitations and safety considerations.

5.21. *Paved LZ:* A prepared and surfaced LZ designed to carry aircraft traffic, whose principal components include one of the following:

- A flexible or non-rigid pavement or one that includes a bituminous concrete surface course designed as a structural member with weather- and abrasion-resistant properties.
- A rigid pavement, or one that contains Portland cement concrete (PCC) as an element.
- A combination of flexible and rigid pavement layers, such as an overlay, where a flexible pavement is placed over an existing rigid pavement layer to strengthen the rigid pavement layer.

Paved LZs were formerly called shortfields and later known as prepared assault landing zones (ALZ).

5.22. *Pavement (Paved Surface):* A durable weather- and abrasion-resistant surface made from a prepared or manufactured material placed on an established base. General categories of pavements are “flexible” and “rigid.”

5.23. *Primary Surface-LZ:* An imaginary surface symmetrically centered on the runway. The elevation of any point on the primary surface is the same as the elevation of the nearest point on the runway centerline or extended runway centerline. See Attachment 1, Figures 1, 2, and 5.

5.24. *Runway:* A defined rectangular area of an airfield or heliport prepared for the landing and takeoff run of aircraft along its length.

5.25. *Runway End:* As used in this ETL, the runway end is where the normal threshold is located. When the runway has a displaced threshold, the using Service will evaluate each individual situation, and, based on this evaluation, will determine the point of beginning for runway and airspace imaginary surfaces. See Attachment 1, Figure 1.

5.26. *Runway Threshold:* A line perpendicular to the runway centerline designating the beginning of that portion of the runway usable for landing. See Attachment 1, Figure 10.

5.27. *Semi-Prepared LZ:* A semi-prepared LZ (formerly called a semi-prepared assault landing zone [ALZ]) refers to an unpaved LZ. The amount of engineering effort required to develop a semi-prepared LZ depends on the planned operation, the service life needed to support these operations, and existing soil and weather conditions. Semi-prepared construction/maintenance preparations may range from those sufficient for limited use to those required for continuous routine operations. Options for surface preparation may include stabilization, adding an aggregate course, compacting in-place soils, or matting.

5.28. *Shoulder:* A prepared (paved) or semi-prepared (unpaved) area adjacent to the edge of operational surfaces (runways, taxiways, aprons, overruns, and turnarounds). See Attachment 1, Figures 1, 2, 3, 4, and 6, and Attachment 2, Tables 2, 3, 4, and 5.

5.29. *Slope Ratio:* A slope expressed in meters (feet) as a ratio of the horizontal to the vertical distance. For example, 50:1 means 50 meters (feet) horizontal to 1 meter (foot) vertical.

5.30. *Taxiway:* A specially prepared or designated path on an airfield or heliport, other than apron areas, on which aircraft move under their own power to and from landing, service, and parking areas. Criteria for taxiways are shown in Attachment 2, Table 3, and illustrated in Attachment 1, Figure 6.

5.31. *Taxiway, Parallel:* A taxiway that parallels the runway; the curved connections to the end of the runway or overrun that permit aircraft ground movement to and from the runway and are considered part of the parallel taxiway when there are no other taxiway exits on the runway. See Attachment 1, Figure 2.

5.32. *Turnaround (or Hammerhead):* An operational surface with dimensions to allow an aircraft to execute 180-degree turns without using reverse operations. Turnarounds can provide loading/off-loading capability on LZs with a parking MOG of one. See Attachment 1, Figures 3 and 11.

5.33. *Visual Landing Zone Marker Panels (VLZMP):* Vertical, colored panels installed along runway edges to indicate the threshold location and distance remaining. See Attachment 1, Figures 7, 8a, 8b, 8c, 11, 12, and 13.

5.34. *Visual Flight Rules (VFR):* Rules that govern the procedures for conducting flights under visual conditions. Also see *Visual Meteorological Conditions (VMC).*

5.35. *Visual Meteorological Conditions (VMC):* Weather conditions in which visual flight rules (VFR) apply, expressed in terms of visibility, ceiling height, and aircraft clearance from clouds along the path of flight. When criteria for VMC conditions cannot be met, instrument meteorological conditions prevail and instrument flight rules must be followed. Also see *Visual Flight Rules (VFR).*

6. Acronyms.

°C	- degree Celsius
°F	- degree Fahrenheit
AC	- asphalt concrete
ADCS	- approach–departure clearance surface
AFH	- Air Force handbook
AFI	- Air Force instruction
AFPD	- Air Force policy directive
ALZ	- assault landing zone
AMP	- airfield marking pattern
APZ-LZ	- accident potential zone–landing zone
DOD	- Department of Defense
EALS	- emergency airfield lighting system

ETL	- Engineering Technical Letter
FAA	- Federal Aviation Administration
FM	- Field Manual (U.S. Army)
FSL	- flashing strobe light
ft	- foot
g/cc	- gram per cubic centimeter
ICAO	- International Civil Aviation Organization
IFR	- instrument flight rules
IMC	- instrument meteorological conditions
in	- inch
IR	- infrared
LZ	- landing zone
m	- meter
MAJCOM	- major command
mm	- millimeter
MOG	- maximum on ground
nm	- nanometer
NSN	- National Stock Number
NVG	- night vision goggles
OPR	- office of primary responsibility
PCC	- Portland cement concrete
PT	- point of tangency
RCR	- runway condition rating
RMP	- resin modified pavement
STT	- special tactics team
TDZ	- touchdown zone
UFC	- Unified Facilities Criteria
VFR	- visual flight rules
VLZMP	- visual landing zone marker panels
VMC	- visual meteorological conditions

7. Site Planning for LZs.

7.1 General. When planning the layout of an LZ that will be used for extended operations (generally defined as more than one year), site conditions beyond safety of aircraft-related operations must be considered. These include land use compatibility with clear zones, primary surfaces, exclusion areas, and ADCS, and with existing and future use of the areas that surround the LZ. In planning an LZ, consider the use and zoning of surrounding land for compatibility with aircraft operations. The purpose is to protect the operational capability of the LZ and prevent incompatible development, thus minimizing health and safety concerns in areas subject to high noise and accident potential resulting from frequent aircraft overflights. The minimum criteria in this ETL establish standards for a safe environment for aircraft and ground operations. Attachment 2, Table 8, Item 3, "Exclusion Area," states: "For long-term-use LZs, restricting use of available land beyond the minimum distances contained in this ETL is highly recommended." This will protect Air Force operational capability and enhance the potential for future mission expansion. Land use and zoning restrictions for training LZs must also comply with AFH 32-7084, *AICUZ Program Manager's Handbook*. The goal is to provide an LZ environment that provides the greatest margin of safety and compatibility for personnel, equipment, and facilities. Review AFI 32-7061, *The Environmental Impact Analysis Process*, and 32 CFR 989, *Environmental impact analysis process (EIAP)*, to determine applicability of conducting an environmental impact analysis.

7.1.1. Future Development (Land or Aircraft Technology). Adequate land for future aviation growth must be considered when planning an LZ. The LZ should be compatible with the existing installation plan. Potential instrument meteorological conditions/instrument flight rules (IMC/IFR) capability will require additional criteria considerations.

7.1.2. Prohibited Land Uses. LZ criteria prohibit certain land uses within the exclusion area, clear zone, and APZ. These restrictions are described in Attachment 2, Tables 6 and 8.

7.1.3. APZs not on DOD Property. APZs that are not on DOD property may require easements to control development and remove vegetation that may violate the ADCS. The need must be determined on a case-by-case basis.

7.2. Siting Considerations. Site considerations include topography, vegetative cover, existing construction, weather elements, wind direction, soil conditions, flood hazard, natural and man-made obstructions, adjacent land use, availability of usable airspace, accessibility of roads and utilities, and potential for expansion capability. The potential for encroachment and effects of noise on the local community must also be considered.

7.2.1. For training LZs, it is preferable to site the runway within an airfield environment to take advantage of existing runway and taxiway clearance areas. To maximize the training environment, avoid aligning LZ runways parallel to existing runways.

7.2.2. Siting of LZs must take into account noise levels on existing facilities.

7.2.3. When a new LZ is sited, in addition to local permitting requirements, file FAA Form 7480-1, *Notice of Landing Area Proposal*, in accordance with FAA Order 7400.2, *Procedures for Handling Airspace Matters*.

7.2.4. Consider the effects of ambient lighting for operations with night vision goggles (NVG).

7.3. Siting Training LZs within Built-Up Areas. When siting a training LZ runway within an existing built-up and occupied area, use a 305-meter (1000-foot) –wide exclusion area rather than the 213.5-meter (700-foot) –wide exclusion area for LZs in unoccupied areas. The 305-meter (1000-foot) -wide exclusion zone runs from clear zone end to clear zone end, centered on the runway centerline. In addition, the APZ-LZ is widened to 305 meters (1000 feet) in width.

7.3.1. For siting future LZs, built-up and occupied locations are where occupied buildings/facilities exist around the potential LZ site and are not related to the LZ mission.

7.3.2. Unoccupied locations are where no buildings/facilities exist around the proposed LZ except those that are LZ mission-related.

7.3.3. The same rules apply for siting future facilities near existing LZs: If the facility and occupants are not related to the LZ mission, then the wider exclusion zone and APZ-LZ apply.

8. Dimensional Criteria.

8.1. Runway and Overrun Descriptions. Attachment 2, Tables 1, 2, and 5, provide dimensional criteria for layout and design of LZ runways and overruns.

8.1.1. Length. Attachment 2, Table 2, provides runway lengths for C-130 LZs, and Attachment 2, Table 1, provides runway lengths for C-17 LZs. For a C-17 LZ located between sea level and 914 meters (3000 feet) pressure altitude, the minimum length requirement for C-17 operations is 1067 meters (3500 feet) with 91.5-meter (300-foot) overruns on each end. This length requirement, based upon a runway condition rating (RCR) of 20, assumes an ambient temperature of 32.2 °C (90 °F), and a landing gross weight of 202,756 kilograms (447,000 pounds). Based upon these same temperature and weight assumptions, the runway length will vary with different RCRs. Typically, paved surfaces will have RCRs of 23 dry, 12 wet, and 5 icy. Mat surfaces will have RCRs of 23 dry and 10 wet. A semi-prepared runway with stabilized soil surfaces will have RCRs of 20 dry and 10 wet. Unstabilized soil surfaces will have RCRs of 20 dry and 4 wet.

8.1.2. Width. Attachment 2, Table 2, provides the minimum width for LZ runways. The widths of these landing surfaces provide the minimum-width operating surface for the given aircraft.

8.1.3. Gradients of Operational Surfaces. Gradient constraints are based upon reverse aircraft operations conducted on hard surfaces. See Attachment 2, Tables 2, 3, 4, and 5.

8.1.4. Shoulders. Shoulders are graded and cleared of obstacles and slope downward away from the runway, where practical, to facilitate drainage. See Attachment 2, Tables 2, 3, 4, and 5.

8.1.5. Turnarounds. For C-17 LZs without parallel taxiways, turnarounds must be provided at both ends of the runway. In other cases, turnarounds may be located on overruns or taxiways, depending upon mission or terrain requirements. The shoulder, structural, gradient, and clearance requirements for a turnaround are the same as those for the overrun or taxiway area where the turnaround is constructed. Turnarounds for C-130 aircraft should be at least 23 meters (75 feet) in diameter. Turnarounds for C-17 aircraft should be 55 meters (180 feet) long and 50.5 meters (165 feet) wide (including the overrun/taxiway width), with 45-degree fillets. The aircraft landing gear must be positioned within 3 meters (10 feet) of the runway edge before initiating this turn.

8.2. Clear Zones, Imaginary Surfaces, and APZ-LZs. Applicable clearances and grade controls must be established to provide a reasonable level of safety for LZs. Minimum requirements for clear zones, imaginary surfaces, and APZ-LZs and exclusion areas are provided in Attachment 2, Tables 6, 7, and 8, respectively. These areas and imaginary surfaces are shown in Attachment 1, Figures 1, 2, 5, and 6.

8.3. Operational Waivers to Criteria. The criteria in this ETL are the minimum permissible for C-17 and C-130 operations. When deviations exist or occur at a specific location, an operational waiver must be obtained before beginning flying operations. The office of primary responsibility (OPR) for the mission or exercise will initiate the waiver request. The appropriate airfield survey team will verify existing LZ dimensions and grades. The major command director of operations (MAJCOM/A3) is the approval authority for waivers of any criteria in this ETL.

8.4. Separation Distances between Permanent Runways/Helipads and LZ Runways for Simultaneous Operations. When simultaneous operations are desired on a permanent runway or helipad and an LZ runway, minimum separation distances are required as stipulated in Attachment 2, Table 9.

8.5. Separation between Permanent Class A or Class B Runways and LZ Runways for Non-Simultaneous Operations. At a minimum, LZ runways should be separated from permanent runways so as not to conflict with distance-remaining signs, runway edge lights, navigational aids (including glide slope signals), and other facilities associated with the runway.

9. Surface Types. Semi-prepared (unpaved) LZ surfaces may be composed of stabilized soils, aggregate surfaces, compacted native soils, or matting. Specific design guidance for semi-prepared surfaces can be found in ETL 97-9, *Criteria and Guidance for C-17 Contingency and Training Operations on Semi-Prepared Airfields*. Paved LZs may be surfaced with asphalt concrete (AC) or PCC pavement. On runways, taxiways, turnarounds, and aprons used by C-17 aircraft, asphalt pavement distress has been observed in areas where 90- to 180-degree turns are made; for this reason, PCC is preferred in areas where turning movements occur. Designers should consider durability and maintenance of the pavement, as well as economics, when selecting a surface type for an area associated with an LZ intended for long-term use. AC and PCC pavement structures shall be designed to support the traffic level defined in UFC 3-260-02, *Pavement Design for Airfields*.

9.1. Runways and Overruns.

9.1.1. Semi-prepared Runway and Overrun Surfaces. Unpaved LZ runway and overrun surfaces shall be designed to support the anticipated aircraft type, weight, and number of planned operations. Overruns will be designed to the same standard as the runway.

9.1.2. Paved Runway and Overrun Surfaces. Paved runways and overruns may be surfaced with AC or PCC pavement. Sawcut grooving may be used to improve drainage characteristics on runways. Overruns will be designed to the same standard as the runway. Special design consideration is needed if the overrun is used as a taxiway or turnaround area.

9.1.3. Runway and Overrun Shoulders. For semi-prepared runways, the shoulder structure will be designed to the same standard as the runway. For paved runways, shoulders may be surfaced with AC or PCC pavement and will be designed to support the traffic level defined in UFC 3-260-02.

9.2. Turnarounds.

9.2.1. Semi-prepared Turnarounds. Unpaved turnarounds will be designed to support the anticipated aircraft type, weight, and number of operations. Designers should give special consideration to stabilization for turnarounds used by C-17 aircraft because the surface can be easily damaged by the turning action of the main landing gear.

9.2.2. Paved Turnarounds. Paved turnarounds may be surfaced with AC, PCC, or resin-modified pavement (RMP). Special consideration should be given to surface durability for turnarounds used by C-17 aircraft; for this reason, PCC pavement is preferred.

9.3. Taxiways.

9.3.1. Semi-prepared Taxiways. Unpaved taxiways will be designed to support the anticipated aircraft type, weight, and number of operations. Designers should give special consideration to stabilization at taxiway turns used by C-17 aircraft because the surface can be easily damaged by the turning action of the main landing gear.

9.3.2. Paved Taxiways. Paved taxiways may be surfaced with AC, PCC, or RMP. Special consideration should be given to surface durability for taxiways used by C-17 aircraft; for this reason, PCC pavement is preferred.

9.4. Aprons.

9.4.1. Semi-prepared Aprons. Unpaved aprons will be designed to support the anticipated aircraft type, weight, and number of operations. Designers should give special consideration to stabilization on aprons used by C-17 aircraft because the surface can be easily damaged by the turning action of the main landing gear.

9.4.2. Paved Aprons. Paved aprons may be surfaced with AC, PCC, or RMP. Special consideration should be given to surface durability and fuel resistance for aprons used by C-17 aircraft; for this reason, PCC pavement is preferred.

10. Visual Landing Zone Marker Panels (VLZMP). Various systems are used during daytime operations to provide visual cues to pilots about the location and dimensions of the LZ runway. The type of marker panels selected depends on the mission requirements and anticipated duration of LZ use. Paragraphs 10.1 and 10.2 describe requirements for temporary and long-term applications, respectively.

10.1. Minimum Marking Requirements for Temporary Applications.

10.1.1. LZ runways intended for short-term or temporary use should be marked with one of the arrangements of airfield marking patterns (AMP) defined in AFI 13-217, *Drop Zone and Landing Zone Operations*. The special tactics team (STT) will decide which arrangement of panels will be installed. The AMP-1, AMP-2 and AMP-3 layouts are illustrated in Attachment 1, Figures 8a, 8b, and 8c. Although AMP-2 is also defined in AFI 13-217, the AMP-2 configuration will not be used for newly constructed temporary or permanent LZs by AMC. AMP-4 does not require any marker panels or lights and is only used for appropriate special operations.

10.1.2. Materials and Size. Temporary panels may be constructed of fabric, wood, or other materials determined to be suitable by the STT. Panel faces will be at least 1676 millimeters (66 inches) wide and 432 millimeters (17 inches) tall.

10.1.3. Orientation and Color. Marker panels should be erected upright and facing toward the aircraft approach to increase visibility to the pilot. The panels should be orange (Fluorescent Orange, Army Shade 230), cerise (Fluorescent Red, Army Shade 229), or other color acceptable to the STT. The specific color used and layout must be briefed to all participating units before operations commence.

10.1.4. Frangibility. For temporary applications, frangible marker panels and supports are preferred to avoid excessive damage if struck by an aircraft. If available, VS-17 marker panels (National Stock Number [NSN] 8345-00-174-

6865, Part Number MIL-P-400-61) should be used to mark temporary LZs for daytime operations.

10.2. Marking Requirements for Long-Term Applications.

10.2.1. LZs intended for long-term use should have permanently installed panels of the type described below. Panel locations are derived from the patterns shown in AFI 13-217, Figures 3.1, 3.3, and 3.5. Panels should be installed at the locations shown in Attachment 1, Figures 8a, 8b, or 8c, depending on the desired AMP. In AMP-1, spacing should be consistent through the intermediate panels. If a conflict with the panels exists on one or both sides of the LZ (e.g., at locations where a taxiway connects to the LZ), that panel should be omitted. For bi-directional operations, panels of the appropriate color should be attached to each side of the support posts. See Attachment 1, Figures 8a, 8b, and 8c, Note 2, for the distance between the panels and the runway edge. Panels should be 1.8 meters (6 feet) apart at locations where panels are placed in pairs.

10.2.2. Materials and Size. Panel surfaces may be constructed of any lightweight yet durable material suitable for the environment. Panel surfaces will be at least 1676 millimeters (66 inches) wide and 610 millimeters (24 inches) tall.

10.2.3. Orientation and Color. Marker panels should be erected upright and facing toward the aircraft approach to increase visibility to the pilot. The panels should be covered with reflective sheeting material or painted orange (Fluorescent Orange, Army Shade 230), or cerise (Fluorescent Red, Army Shade 229), the colors indicated in Attachment 1, Figures 8a and 8b. (**Note:** Alternate colors may be used if all participating units are briefed and concur with the color selection. For example, all panels may be orange.) Reflective sheeting shall be 3M™ diamond grade or equivalent. Panels must be designed to withstand jet blast effects. A panel design that has been used successfully is illustrated in Attachment 1, Figure 7.

10.2.4. Foundations. A reinforced concrete foundation pad should be used to support and anchor the panel support posts. Sample details for a foundation are shown in Attachment 1, Figure 7.

10.2.5. Support Posts. Support posts are needed to hold the panels upright. Posts must be strong enough to withstand jet blast and also frangible to break away upon impact. Posts shall meet the frangibility definitions, acceptance criteria, analysis and testing requirements defined in FAA 150/5345-44G, *Specification for Taxiway and Runway Signs*. The support shall have frangible points located 51 millimeters (2 inches) or less above the concrete pad. The frangible points shall withstand wind loads due to jet blasts of 322 kilometers per hour (200 miles per hour) but will break or give way before reaching an applied static load over the surface of the sign of 8.9 kilopascals (1.3 pounds per square inch). Two examples of post materials are described below.

10.2.5.1. Galvanized steel support posts shall include a breakaway hinge point or frangible coupling 51 millimeters (2 inches) above the foundation pad to make the entire panel frangible. Each frangible coupling shall be permanently marked with the manufacturer's name and size of the sign for which the coupling is intended.

10.2.5.2. Polycarbonate support posts shall be impact-resistant and dimensionally stable from -34 °C (-30 °F) to 66 °C (150 °F). The top section of the post shall be orange and connected to the ground anchor with a polyurethane hinge. The hinge shall be self-recovering, have an internal memory, and remain dimensionally stable from -34 °C (-30 °F) to 66 °C (150 °F). The bottom of the hinge shall be positioned 51 millimeters (2 inches) or less above the concrete foundation pad. Additional details are in Attachment 1, Figure 7.

11. LZ Lighting. Airfield lighting systems are used during nighttime operations to provide visual cues to pilots about the location and dimensions of the LZ runway. The type of lighting system installed may vary between the minimum requirements for temporary applications and the long-term-use system. Equipment selection will depend on the available equipment and mission requirements. Lights are not required if night operations are not anticipated. Lighting that is planned to be permanent should be compatible with NVG (see paragraph 11.2.1.1). UFC 3-535-01, *Visual Air Navigation Facilities*, and (Draft) UFC 3-535-02, *Design Drawings for Visual Air Navigation Facilities*, should be consulted for design details of light fixtures, light bases, cable, cable connections, controls, and other features associated with an airfield lighting system.

11.1. Minimum Lighting Requirements for Temporary Applications.

11.1.1. Lights. If available, lights should be omni-directional steady-burn or flashing with a minimum output rating of 15 candela for night operations. In accordance with AFI 13-217, virtually any type of overt lighting system is acceptable if all participating units are briefed and concur with its use. Contingency lighting kits (emergency airfield lighting system [EALS]) or other materials may be used as available and determined to be suitable by the STT.

11.1.2. Location. There are three types of airfield lighting patterns for LZs, designated AMP-1, AMP-2, and AMP-3, as defined in AFI 13-217. AMP-4 is lights-out, no markings, and used only for appropriate special operations. The STT will decide which arrangement of lights will be installed. The AMP-1, AMP-2, and AMP-3 layouts are illustrated in Attachment 1, Figures 9a, 9b, and 9c. Although AMP-2 is also defined in AFI 13-217, the AMP-2 configuration will not be used for newly constructed temporary or permanent LZs by AMC. When constructing new LZs, even if the immediate operational need is for AMP-3, consideration should still be given to installing the light bases and conduits to support the AMP-1 configuration.

11.2. Lighting Requirements for Permanent Applications. When intended for long-term use, use permanently installed lights of the type and in the locations described below.

11.2.1. Light Fixtures. All light fixtures shall be certified and listed in FAA AC 150/5345-53, *Airport Lighting Equipment Certification Program*, and FAA AC 150/5345-46, *Specification for Runway and Taxiway Light Fixtures*. Per paragraph 11.7, listed fixtures shall be used with infrared (IR) filters as covert fixtures.

11.2.1.1 Runway high-intensity edge light fixtures should be used for permanent LZ lighting installations. Runway edge lights should be elevated FAA Type L-862. Use the L-850C when an insert light is required in place of the L-862. If all edge lights are semi-flush edge lights, use the FAA Type L-850A, Style 3 (Runway, Uni-directional) towards the approach. (Where circling guidance is needed, bi-directional light fixtures may be used.) LZ light lens colors shall be as indicated in Attachment 1, Figures 9a, 9b, and 9c. Five-step regulators should be installed. (Steps 1 through 3 are compatible with NVG operations using a five-step regulator.)

11.2.1.2 Taxiway medium-intensity edge light fixtures should be used for permanent lighting installations. Taxiway edge lights should be elevated FAA Type L-861T. If needed, semi-flush edge lights should be FAA Type L-852T, Style 3 (Taxiway, Omni-directional). Taxiway and turnaround edge light lenses shall be blue. Three-step regulators should be installed for intensity control.

11.2.1.3 Flashing Strobe Lights (FSL). These light fixtures are located at the end of the LZ in the AMP-3 and AMP-2 configurations and at each side of the approach threshold in the AMP-1 configuration. These lights are uni-directional and must flash at a rate of 28 to 34 flashes per minute, producing a white light. Semi-flush fixtures (FAA-E-2952, Style A, white) should be installed with the edge of the fixture extending no more than 1.5 millimeters (0.0625 inch) below and 0.0 millimeter (0.0 inch) above the pavement top. Aim the fixture(s) down the runway parallel to the centerline for AMP-2 and AMP-3 and towards the approach for AMP-1.

11.2.2. Light Bases. Light fixtures shall be attached to full-depth light bases (L-868, Class IB). Light bases shall be offset so the fixture center is a minimum of 0.6 meter (2 feet) from any pavement joint. Light bases shall be installed in accordance with (Draft) UFC 3-535-02, Figures 11 through 14. For elevated light fixtures, provide steel adaptor rings (see Jaquith Industries part numbers AF5402 and AR5421; Olson Industries part numbers 128TS and 128S; or equivalent). Light construction tolerances are:

Longitudinal	± 13 millimeters (0.5 inch) from stationing
Transverse	± 13 millimeters (0.5 inch) transverse from centerline
Base orientation	Parallel to T/W centerline ± 0.5 degree
Elevation	+0 to -1.5 millimeters (+0 to –0.0625 inch) from finished pavement surface, flush with the surrounding grade or pavement.

11.3. Light Locations.

11.3.1. LZ Lights. If the LZ is built on an existing runway or taxiway where normal flight operations are conducted then use semi-flush light fixtures.

11.3.1.1. AMP-1. Lights shall be placed at each threshold and at 152 meters (500 feet) from each threshold. Intermediate lights shall be 152 meters minimum/305 meters maximum (500 feet minimum/1000 feet maximum) spacing throughout the length of the runway, as illustrated in Attachment 1, Figures 9a and 13. Spacing should be consistent through the intermediate lights. If a conflict with the lights exists on one or both sides of the LZ (e.g., at locations where a taxiway connects to the LZ), that light should be a semi-flush light. Synchronized FSLs shall be installed at the threshold as illustrated in Attachment 1, Figures 9a and 13. Steady-burning light fixtures shall be installed at 1.6 meters (5 feet) plus 0.6 meter (2 feet) to minus 0.0 meter (0.0 foot) from the edge of the LZ surface (i.e., within the shoulder pavement). Light pairs shall be perpendicular and equidistant from the runway centerline to be symmetrical about the runway or LZ centerline.

11.3.1.2. AMP-2. Lights shall be placed at each threshold and at 152 meters (500 feet) from each threshold. Intermediate lights shall be 152 meters minimum/305 meters maximum (500 feet minimum/1000 feet maximum) spacing throughout the length of the runway, as illustrated in Attachment 1, Figure 9b. Spacing should be consistent through the intermediate lights. If a conflict with the lights exists on one or both sides of the LZ (e.g., at locations where a taxiway connects to the LZ), that light should be a semi-flush light. An FSL is also installed on the centerline of the departure end threshold not more than 1.6 meters (5 feet) from the threshold or overrun end. Locate the FSL as close to the runway centerline as possible. Steady-burning light fixtures shall be installed 1.6 meters (5 feet) plus 0.6 meter (2 feet) to minus 0.0 meter (0.0 foot) from the edge of the LZ surface (i.e., within the shoulder pavement). For covert applications see paragraph 11.7.

11.3.1.3. AMP-3. Light locations and colors are derived from the AMP-3 configuration in AFI 13-217, Figure 3.6. Steady-burning lights shall be placed at the threshold and at 152 meters (500 feet) from the approach end threshold, forming a box, as shown in Attachment 1, Figures 9c, 14, and 15. An FSL is also installed on the centerline of the departure end threshold not more than 1.6 meters (5 feet) from the threshold or overrun end. Locate the FSL as close to the runway centerline as possible. Steady-burning light fixtures shall be installed at 1.6 meters (5 feet) plus 0.6 meter (2 feet) to minus 0.0 meter (0.0 foot) from the edge of the LZ surface (i.e., within the shoulder pavement). For covert applications see paragraph 11.7.

11.3.2. Turnaround, Taxiway, and Apron Edge Lights. All lights shall be installed at 1.6 meters (5 feet) plus 0.6 meter (2 feet) or minus 0.0 meter (0.0 foot) from the edge of the load-bearing surface. On straight sections of taxiway or turnaround, lights shall be spaced evenly with a maximum of 152 meters (500 feet) between lights. See Attachment 1, Figures 11 and 12, for typical turnaround and taxiway edge light locations. Light spacing shall be reduced to between 3 meters and 10.6 meters (10 feet and 35 feet) on curves and at corners or intersections. On curved sections, lights shall be evenly spaced from point of tangency (PT) to PT, with the maximum spacing between lights equal to half the taxiway width. For all corners and all curves exceeding 30 degrees of arc, there shall be a minimum of three lights. See UFC 3-535-01, Chapter 5, for additional edge light location details.

11.3.3. Overrun Edge Lights. Overruns do not normally require edge lights; however, for overruns used as taxiways or turnarounds, edge lights may be installed using the location criteria stated in paragraph 11.3.2. In addition, the first pair of edge lights installed on overruns should not be more than 30.5 meters (100 feet) from the runway threshold.

11.4. Light Circuits and Controls. Designers should investigate all required configurations of lighting (AMP-1, AMP-3, Infrared AMP-3, etc.) and develop a circuit and control system that can achieve all the required configurations.

11.4.1. Ferro-Resonant Regulators. All new regulators used for LZ lighting systems shall be ferro-resonant type.

11.4.2. Multi-Regulator Systems. In this configuration, separate regulators will be needed to control lights for AMP-1, AMP-3 Overt, AMP-3 Covert, and taxiway circuits.

11.4.3. Single-Regulator Systems with Addressable Lights. Systems are now available to have “assignable control” of individual lights via a carrier signal. For this type of configuration, all LZ runway lights could be powered by one regulator, with each configuration assigned to a different control setup.

11.5. Light Reflector Panels (Optional). Light reflectors may be installed at the mid-point between LZ runway edge lights or taxiway edge lights. Contact the STT for information on obtaining light reflector panels.

11.6. Overt AMP-3 LZ Lights Superimposed on Standard Operational Runways. In some cases, it may be desirable to use a standard full-length runway for LZ training operations. Only the AMP-3 configuration should be installed in this situation. For this purpose, the LZ lighting scheme illustrated in Attachment 1, Figures 14 and 15, shall be applied, subject to the following conditions. MAJCOM approval is required before installation of AMP-2 configuration.

11.6.1. LZ Light Fixtures. High-intensity light fixtures must be installed flush with the pavement surface to allow traffic to pass over them. Semi-flush lights shall be FAA Type L-850A, Style 3, uni-directional, or an International Civil Aviation Organization (ICAO) equivalent. LZ light lens colors shall be white. Five-step regulators should be installed on the LZ circuit(s) for light intensity control compatible with NVG operations (steps 1 through 3 are compatible with NVG operations).

11.6.2. LZ Location on the Runway. When possible, the LZ threshold should be sited between 91 meters (300 feet) and 152 meters (500 feet) from the runway threshold. This will ensure aircraft loads are concentrated in the portion of the runway designed for heavier loads and avoid conflicts with runway pavement markings.

11.6.3. LZ Lighting Conflicts with Standard Runway Markings. The LZ should be sited so the LZ light fixtures do not conflict with threshold markings, runway designation markings, touchdown zone markings, or fixed distance markings. An ideal location for the LZ threshold is 91 meters (300 feet) from the runway threshold. This will position the LZ light fixtures in the gaps between the standard runway markings. If LZ lights fall within a standard marking, the light fixture should be masked whenever repainting occurs.

11.6.4. LZ Lighting Conflicts with Approach Lights and Touchdown Zone (TDZ) Lights. Runway approach lights and TDZ lights are spaced every 30 meters (100 feet) throughout the overrun and for the first 914 meters (3000 feet) of the runway. TDZ lights are installed in groups of three, starting 11 meters (36 feet) each side of the runway centerline and spaced over a 3-meter (10-foot) light bar. LZ lights for C-17s will not conflict with TDZ lights because LZ lights are 15 meters (50 feet) each side of the centerline. C-130 LZ lights are installed 10.5 meters (35 feet) each side of the centerline, so conflicts should not occur. If TDZ lights are installed on the runway, move the LZ lights closer to the LZ edge to position them inside the TDZ lights.

11.7. AMP-3 Covert Infrared (IR) Lights.

11.7.1. Installation. At some locations, IR lights may be needed in addition to standard visual spectrum lights. IR lights can be installed in accordance with Attachment 1, Figures 12, 13, 14 and 15.

11.7.2. IR Light Fixtures. These fixtures should be FAA L-850A Style 3 fixtures, with a special IR filter installed on the lens. Infrared transmitting filters shall meet the specifications in Table 1 and be certified to comply with the specifications in this paragraph by an FAA-approved laboratory (currently Intertek Test Lab). Before installation on-site, the manufacturer shall supply an FAA-approved lab (currently Intertek Test Lab) report certifying compliance.

Table 1. Infrared Transmitting Filter Specifications

Spectral Transmittal Limits	
Wavelength Nanometer (nm)	**Transmittance**
740 or less	< .01
800 ± 9	> .45
900	> .80

Physical Properties	
Nominal thickness range	4–6 mm 0.17–0.23 in
Thermal linear expansion	$110x10^{-7}$/°C (30–300 °C) (86–572 °F)
Refractive index (n)	1.53
Density	2.67 g/cc
Strain temperature	492 °C (918 °F)
Transition temperature	510 °C (950 °F)
Anneal temperature	526 °C (979 °F)
Deformation temperature	563 °C (1045 °F)

11.8. Snowplow Rings. In areas where snowplow operations may cause damage to semi-flush light fixtures, protective rings may be installed to prevent damage to fixtures. Rings must be compatible with the light fixture to ensure the ring does not obstruct the viewable light angle of the fixture.

11.8.1. L-850A Ring Dimensions. The snow plow ring shall be 400.05 millimeters (15.75 inches) in diameter and 31.75 millimeters (1.25 inches) in total height. After installation, the snow plow ring shall be 6.35 millimeters (0.25 inch) above the surrounding pavement. The opening of the snow plow ring shall be designed for a 304.8-millimeter (12-inch) bi-directional L-850A fixture that is Style III (≤ 6.35 millimeters [0.25 inch] height above pavement). To ensure proper light output, each ring window opening shall be 83.6 degrees and designed to correlate with a Siemens Airfield Solutions part number 44A4417-XXXX L-850A fixture or approved equivalent.

11.8.2. L-852T Ring Dimensions. The snow plow ring shall be 400.05 millimeters (15.75 inches) in diameter and 44.45 millimeters (1.75 inches) in total height. After installation, the snow plow ring shall be 12.7 millimeters (0.5 inch) above the surrounding pavement. At least two openings of the snow plow ring shall be designed for a 304.8-millimeter (12-inch) omni-directional L-852T fixture that is

Style II (≤ 12.7 millimeters [0.5 inch] height above pavement). To ensure maximum light output in at least two primary directions, each ring window opening shall be 219.075 millimeters (8.625 inches) and shall be designed to correlate with a Siemens Airfield Solutions part number 44A6099-XXX L-852T fixture or approved equivalent.

11.8.3. Material. To resist snow plow blade damage, the snow plow ring shall be made with powder-coated ductile iron, nickel-copper-nickel ductile iron, or stainless steel.

11.8.4. Load Requirements. Snow plow rings intended to be mated with FAA Type L-868 load-bearing base cans must be designed to pass the following load test: Sample fixtures, base cans and snow plow rings must hold a load of 3,103 kilopascals (450 pounds per square inch) applied uniformly over the area of a rubber block at a rate not to exceed 4,536 kilograms (10,000 pounds) per minute. There shall be no damage after the load test which would render the light unit unfit for service. Before installation on-site, the manufacturer shall supply an FAA-approved lab (currently Intertek Test Lab) report certifying compliance.

11.8.5. Dynamic Load Requirements. Each combination of light fixture, snow plow ring and base can shall withstand the impact and vibration loads imposed by service vehicles with and without snow chains (snow plows, snow blowers and wire-brush sweeping equipment) and aircraft during their operational phases (taxiing, taking off, landing, stopping, and turning on the light unit). To demonstrate compliance, each unique combination shall be mounted in a light base installed in pavement and traversed at 56 kilometers per hour (35 miles per hour), using an Oshkosh P Series or H Series plow vehicle (or equivalent) equipped with a Wausau BMP 2250 (HW) steel-edged blade (or equivalent), with the blade set to a clearance of not more than 6 millimeters (0.25 inch) above the pavement. During this test, the blade shall pass over the light unit five (5) times, i.e., from 0 degrees (towards center of light windows), 45 degrees, 90 degrees, 135 degrees and 180 degrees. In three (3) of these passes, the tires shall also pass over the light unit. There shall be no damage which would render the light unit unfit for service. Prior to installation on-site, the manufacturer shall supply an FAA-approved lab (currently Intertek Test Lab) report certifying compliance.

12. Pavement Markings.

12.1. Minimum Requirements. No pavement markings are required; however, at locations where LZs are paved and will be used for the long-term, it is desirable to apply painted markings to the pavement surface as described below. See Attachment 1, Figures 10, 11, and 12, for illustrations of LZ pavement markings.

12.2. Markings on Semi-Prepared LZs.

12.2.1. It is generally not practical to apply paint to unpaved surfaces. However, markings are desirable to delineate the edge of operational surfaces, particularly turnaround areas. If the semi-prepared surfaces are stabilized, then painted markings may be feasible but will likely require frequent repainting.

12.2.2. Alternatively, "stake chasers" can be installed along the edges of semi-prepared surfaces. Stake chasers are 150-millimeter (6-inch) flexible plastic bristles that attach to a 60-penny (60d) nail or a wooden stake. They are available in a variety of colors and can be purchased from survey supply stores. When used, the stake chasers should be installed at 7.6 to 15.2 meters ± 1.5 meters (25 to 50 feet ± 5 feet) intervals and driven into the ground so only 100 millimeters (4 inches) of the 150-millimeter (6-inch) whiskers are visible (exposed length may be dependent on soil conditions). This will help ensure the stakes are not dislodged by traffic or jet blast. When possible, install stake chasers with colors corresponding to the edge light (white = runway edge, blue = taxiway and turnaround edge). Stake chasers are illustrated in Attachment 1, Figure 16.

12.3. Marking Requirements for Long-Term Use on Pavements.

12.3.1. Marking Material. Use paint to apply markings to paved LZs, turnarounds, aprons, and taxiways. Paint should be applied at 0.305 to 0.356 millimeter (12 to 13 mils) wet film thickness for a desired dry film thickness of approximately 0.203 millimeter (8 mils). At this rate, coverage will be approximately 11 square meters (121 square feet) per gallon. Normally, LZ markings should not be reflective to improve realism for operating on a semi-prepared LZ. However, for LZs that need additional reflectivity, glass beads (Type I) should be applied at a rate of approximately 3.6 to 4 kilograms (8 to 9 pounds) per gallon of paint.

12.3.2. Threshold Bar. White threshold stripes may be marked at each end of the LZ runway to distinguish between the overrun and LZ runway surface. The marking should be 1.2 meters (4 feet) wide and extend from edge to edge of the LZ surface.

12.3.3. LZ Edge Stripes. White side stripes should only be painted when there is no visual distinction between the LZ runway surface and the paved shoulder (e.g., both LZ runway and shoulder are asphalt). Edge stripes should be 0.3 meter (1 foot) wide and extend along the entire length of the LZ runway.

12.3.4. Taxiway Centerline. If the LZ runway has connecting taxiways, the taxiway centerline turn radius should not be extended onto the LZ runway surface.

12.3.5. Taxiway, Apron, and Turnaround Edge Stripes. If taxiways, aprons or turnarounds have paved shoulders and there is no visual distinction between the edge of load-bearing pavement and the shoulder, the edge of full-strength pavement should be marked with two 152-millimeter (6-inch) -wide yellow stripes separated by a 152-millimeter (6-inch) -wide gap.

12.3.6. Holding Position Markings. This holding position is located a minimum of 30.5 meters (100 feet) from the near edge of the runway. This distance is measured perpendicular to the long axis of the LZ. For holding position marking dimensions, see ETL 04-2, *Standard Airfield Pavement Marking Schemes*.

12.3.7. Touchdown Box Markings (Optional). When desired by the airfield manager, touchdown box markings may be applied. These markings consist of 0.9-meter (3-foot) -wide white stripes that extend transversely across the entire width of the runway surface. The stripes are located 30.5 meters and 152 meters (100 feet and 500 feet) from the approach end threshold.

12.3.8. Runway Designation Markings (Optional). When desired by the airfield manager, runway designation numerals may be painted at each end of the runway. See ETL 04-2 for numeral locations and dimensions.

12.3.9. Runway Centerline (Optional). When desired by the airfield manager, runway centerline stripes may be applied. Stripes are 0.5 meter to 0.9 meter (1.5 feet to 3 feet) wide and 30.5 meters (100 feet) long, with an 18.3-meter (60-foot) gap between stripes.

12.4. LZ Markings on Standard Operational Runways. In some cases, it may be desirable to use a standard full-length runway for LZ training operations. For this purpose, the LZ marking scheme illustrated in Attachment 1, Figure 14, should be applied, subject to the following conditions.

12.4.1. LZ Marking Dimensions. Non-reflective white markings, 3 meters (10 feet) by 1.7 meters (5.5 feet) are applied in the same pattern as VLZMP for the AMP-3 configuration.

12.4.2. LZ Location on the Runway. When possible, the LZ threshold should be sited so the LZ touchdown area is within the first 305 meters (1000 feet) of the runway pavement, and the 91-meter (300-foot) LZ overrun falls on the runway surface (not overrun). This will ensure that aircraft loads are concentrated on the portion of the runway designed for heavier loads. As described in paragraph 11.6.2, siting the LZ threshold 91 meters (300 feet) from the runway threshold will accomplish this objective.

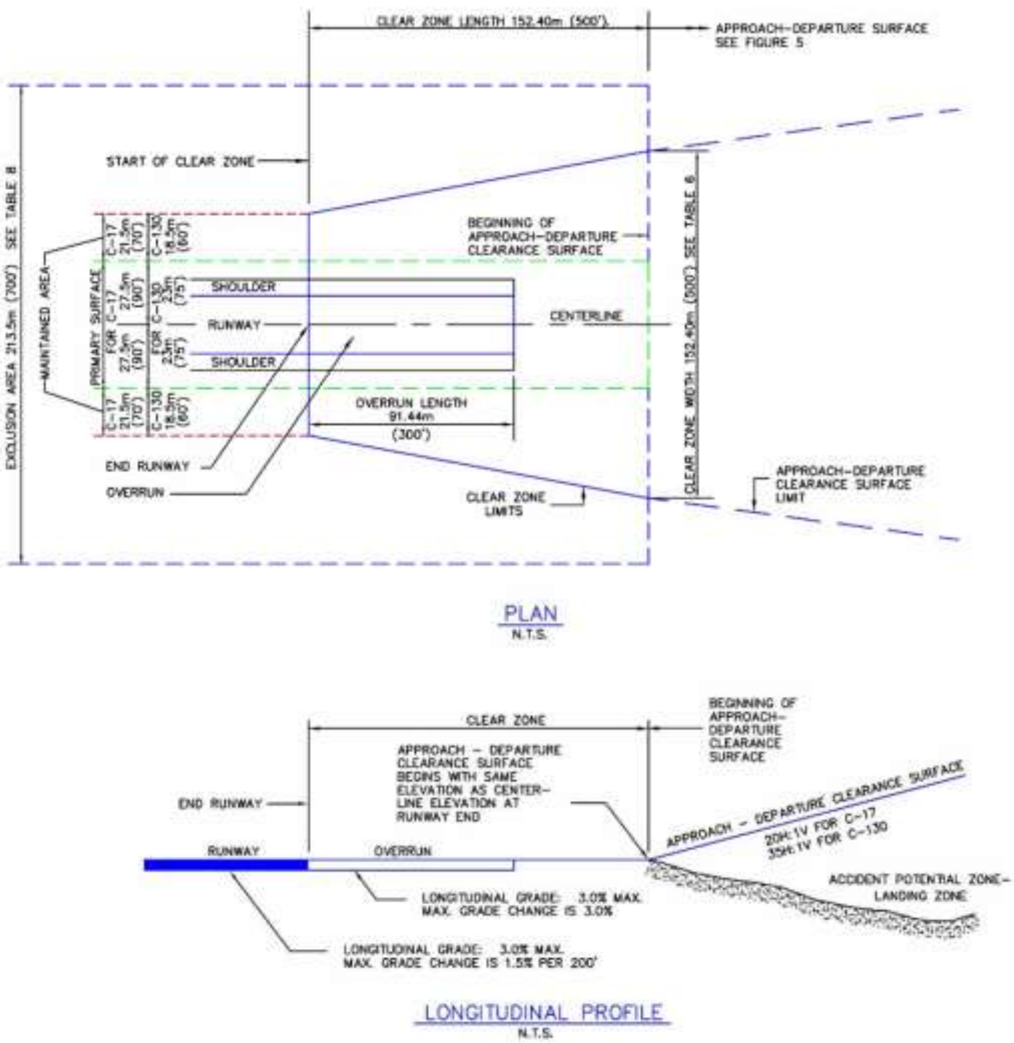
12.4.3. LZ Marking Conflicts with Standard Runway Markings. The LZ should be sited so the markings do not conflict with threshold markings, runway designation markings, touchdown zone markings, or fixed distance markings. An ideal location for the LZ threshold is 91 meters (300 feet) from the runway threshold. This will position the LZ markings in the gaps between the standard runway markings. See ETL 04-2 for standard airfield pavement marking criteria.

13. Point of Contact: Recommendations for improvements to this ETL are encouraged and should be furnished to the applicable Subject Matter Expert for either Pavements (DSN 523-6439, commercial 850-283-6439) or Airfield Lighting (DSN 523-6358, commercial 850-283-6358), HQ AFCESA/CEOA, 139 Barnes Drive, Suite 1, Tyndall AFB, FL 32403-5319, E-mail AFCESAReachbackCenter@tyndall.af.mil.

LESLIE C. MARTIN, Colonel, USAF
Chief, Operations and Programs Support Division

Atchs
1. Figures
2. Tables
3. Distribution List

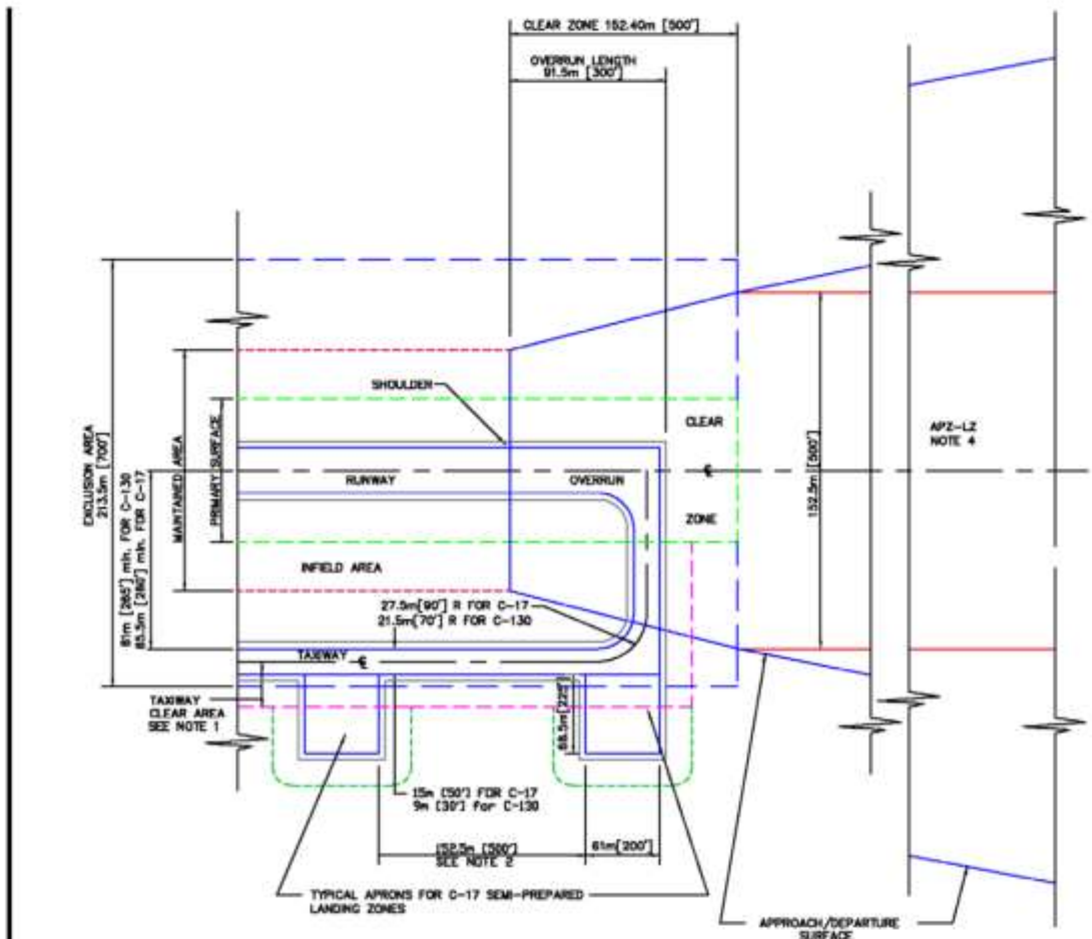
FIGURES



NOTE: SEE PARAGRAPH 7 FOR INFORMATION ON SITING NEW LANDING ZONES.

Figure 1. LZ Primary Surface End Details

Atch 1
(1 of 16)



PLAN
N.T.S.

NOTES

1. TAXIWAY CLEAR AREA WIDTH 33.5m [110'] FOR C-17 AND 29m [95'] FOR C-130 MEASURED FROM TAXIWAY CENTERLINE
2. LOCATION AND SPACING BETWEEN MULTIPLE APRONS IS DETERMINED BY TOPOGRAPHY, MISSION, AND OBSTRUCTIONS, BUT SHALL NOT BE LESS THAN 152.5m [500'] APART.
3. PARALLEL TAXIWAY OR TURNAROUND AREAS AT BOTH ENDS OF THE RUNWAY MUST BE PROVIDED.
4. SEE PARAGRAPH 7 FOR INFORMATION ON SITING NEW LZs.

Figure 2. LZ Details

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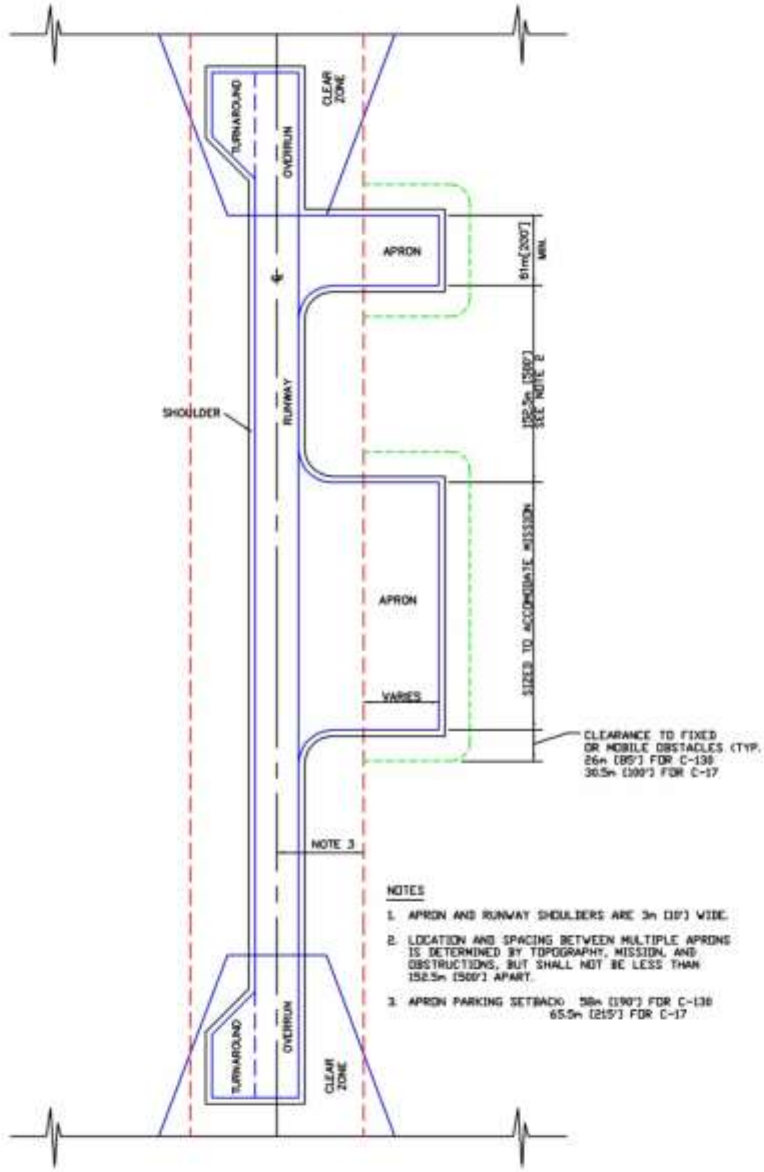
(2 of 16)



PLAN
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Figure 3. LZ with Contiguous Aprons and Turnarounds

Atch 1
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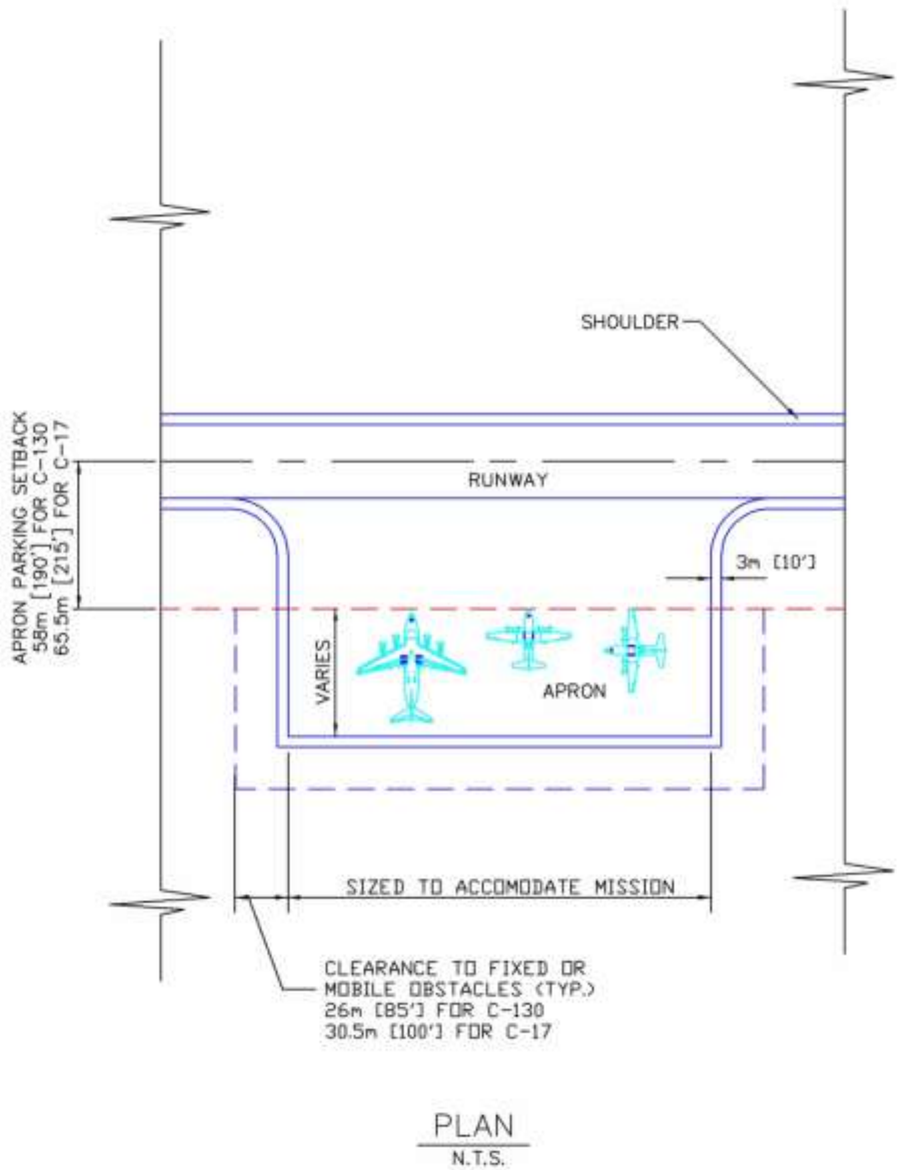


Figure 4. LZ Apron Layout Details

Atch 1
(4 of 16)

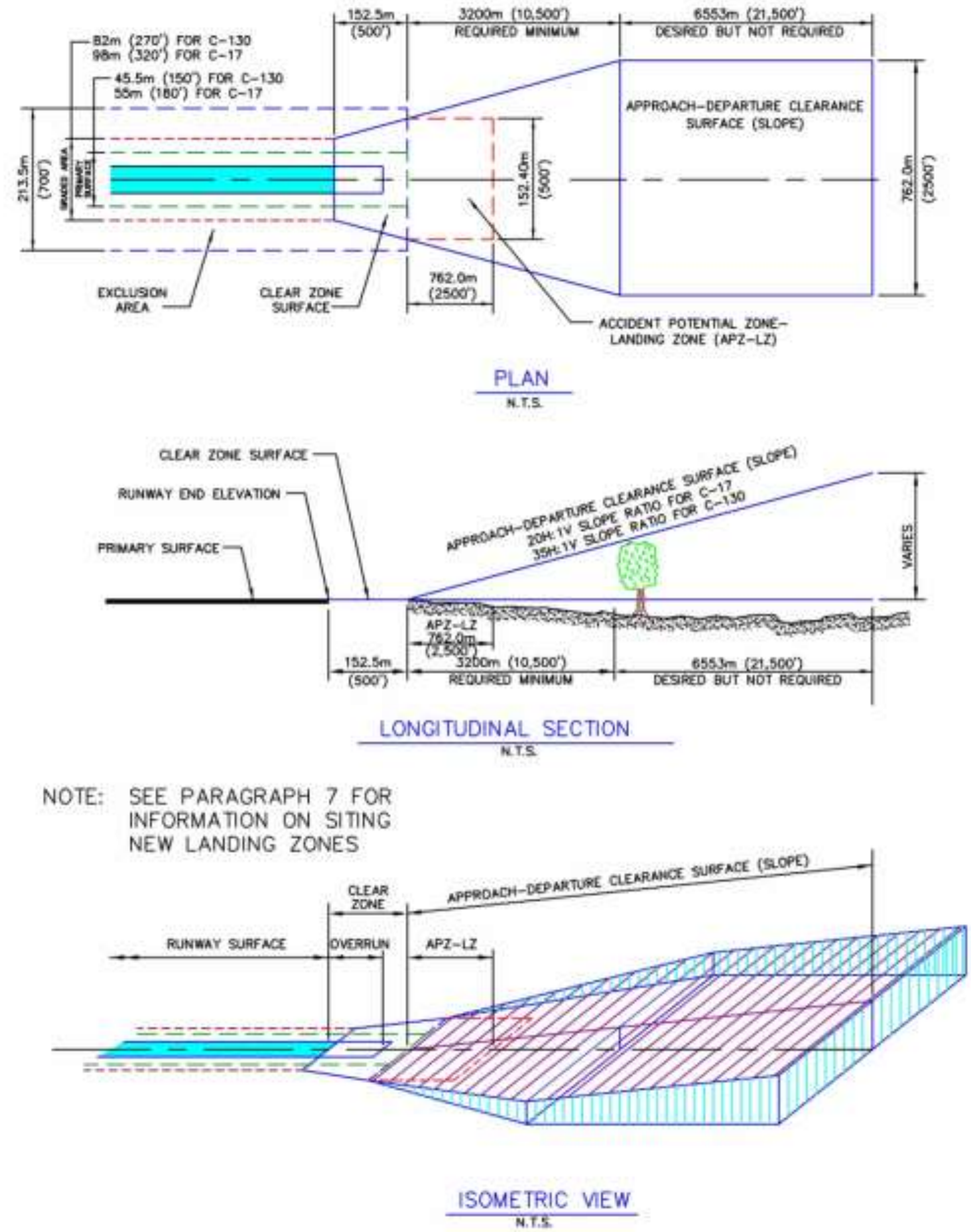
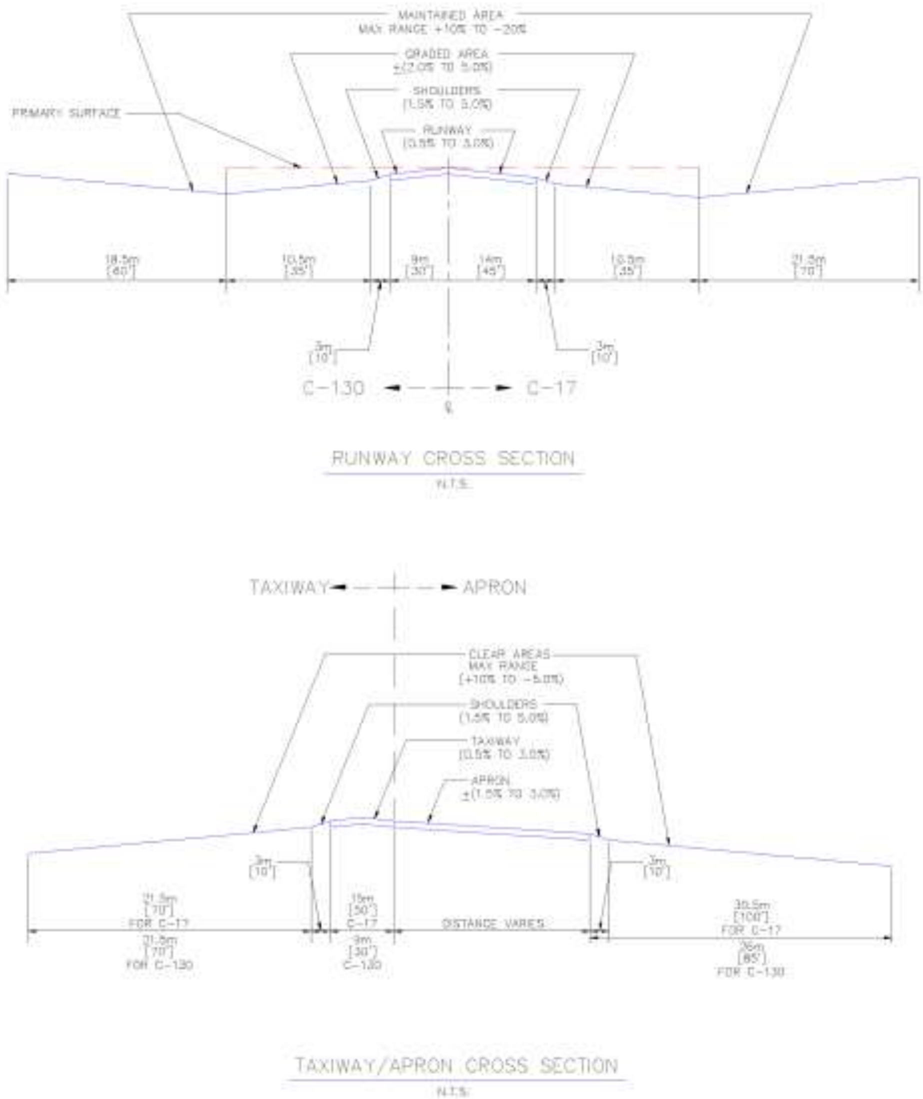


Figure 5. LZ Runway Imaginary Surfaces

Atch 1
(5 of 16)



NOTE:
A ±1.5% TO 5.0% GRADE MEANS THE SURFACE WILL BE SLOPED, EITHER POSITIVELY BETWEEN +1.5% AND +5.0% OR NEGATIVELY BETWEEN -1.5% AND -5.0%, BUT NOT LEVEL.

Figure 6. LZ Runway, Taxiway, and Apron Sections

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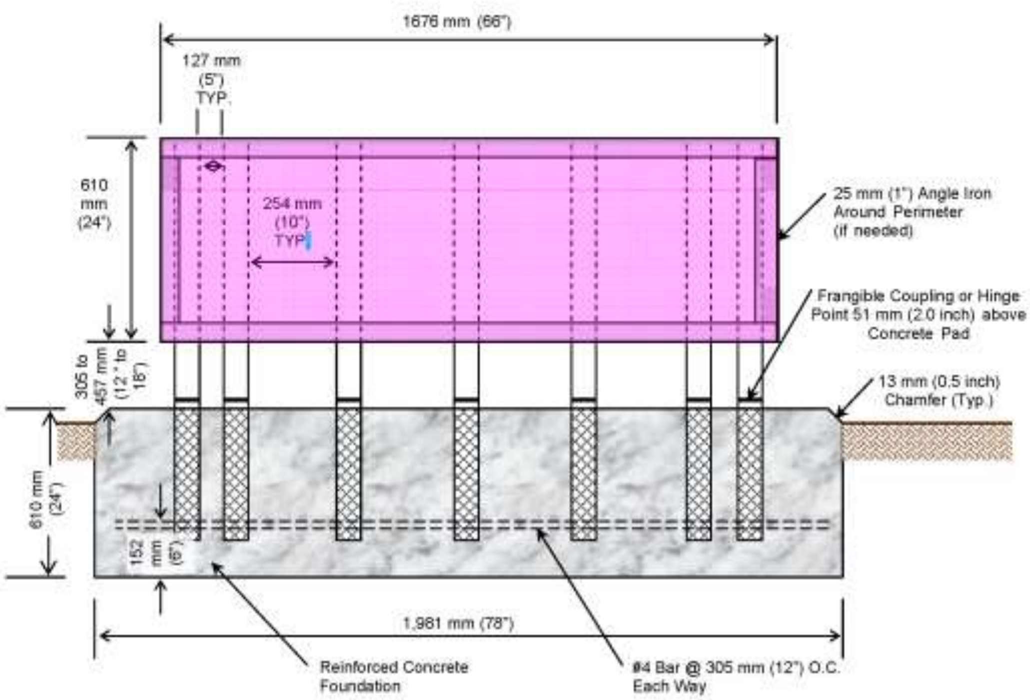


Notes:
1. Example panel design. Panel minimum dimensions must be met, but panel materials, posts, and foundation can be modified by the designer.
2. Refer to Figure 8a, 8b, or 8c for locations and color scheme layout.
3. Foundation width shall be a minimum 457 millimeters (18 inches). Foundation depth shall be minimum 610 millimeters (24 inches) or 152 millimeters (6 inches) deeper than the frost line.
4. Top of concrete pad shall be 13 millimeters (0.5 inch) above surrounding ground. Maximum allowable height above ground is 38 millimeters (1.5 inches). Slope concrete 6 millimeters (0.25 inch) per foot away from panel.
5. Frangible coupling or hinge point shall be located 51 millimeters (2 inches) above top of concrete pad.
6. Easily removable signs may be constructed by creating sleeves in the concrete base for the posts to fit into. However, the frangible coupling or hinge point in the support posts is still required for removable signs.
7. Foundation must be designed to take jet blast and wind overturning load.

Figure 7. Example VLZMP on Concrete Base Detail

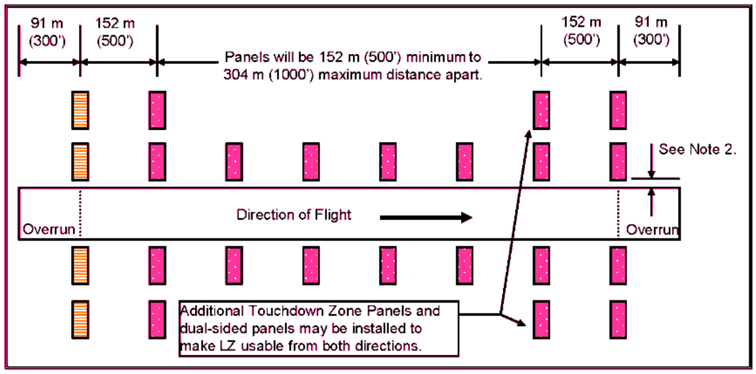
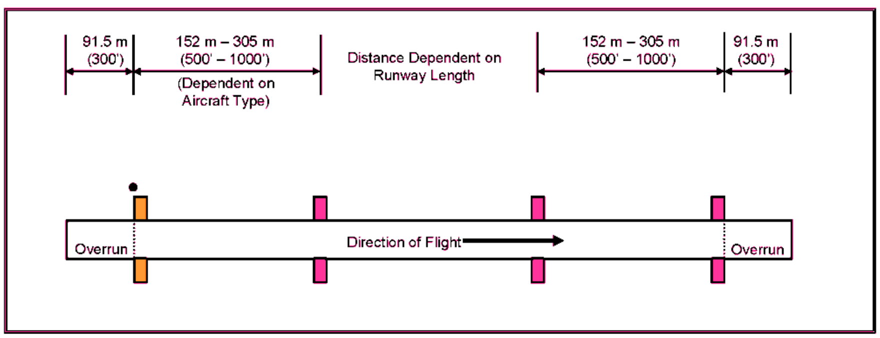


Figure 8a. Airfield Marking Pattern 1 (Day)



= Orange Panel

= Cerise Panel

● = Reception committee leader (RCL) signal station: Authentication, if used, will be at or adjacent this point.

NOTE: Overrun distances are not included in stated runway length, or useable runway length.

NOTE: Panels are placed 4'- 10' from operational edge of runway.

Figure 8b. Airfield Marking Pattern 2 (Day)

Figure 8. Airfield Marking Patterns

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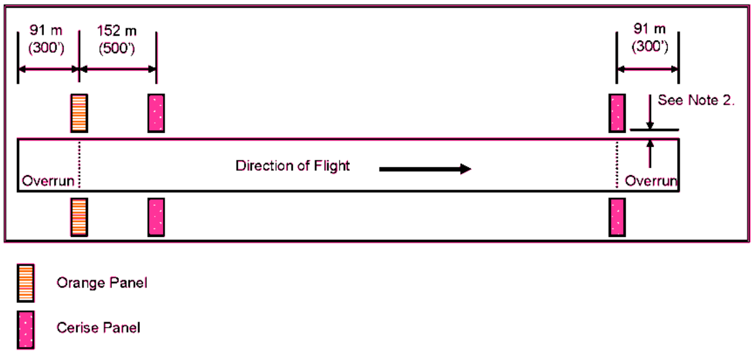


Notes:

1. Alternate colors may be used if all participating units are briefed and concur with the color selection. For example, all panels may be orange.
2. If runway edge lights are not installed on the LZ, place inner edge of panels 1.2 m (4') minimum, 3 m (10') maximum from the edge of the runway. If runway edge lights are installed, place inner edge of panels 3.6 m (12') minimum, 9 m (30') maximum from the edge of the runway so that panels do not block view of the runway edge lights.
3. See Figure 13 for additional panel layout dimensional details.

Figure 8c. Airfield Marking Pattern 3 (Day)

Figure 8. Airfield Marking Patterns (continued)

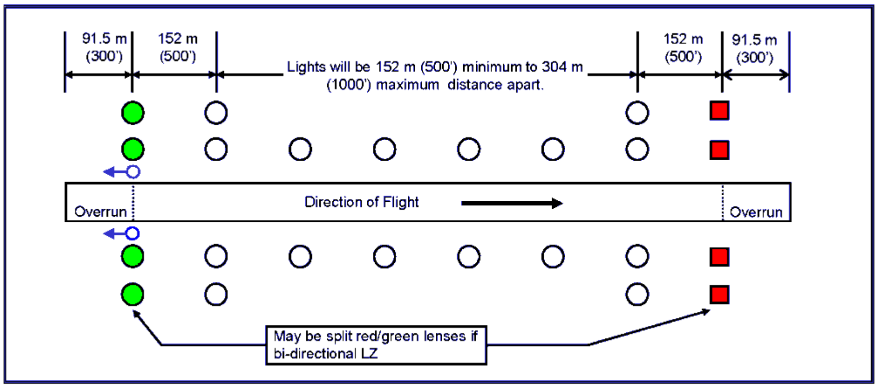
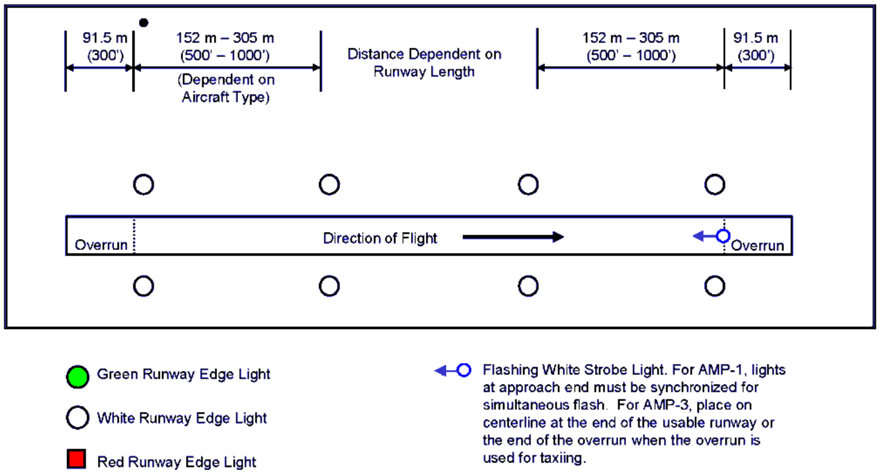


Figure 9a. AMP-1 Lighting Plan



Notes:
1. See Figure 13 for additional light layout dimensional details.

Figure 9b. AMP-2 Lighting Plan

Figure 9. Lighting Plans

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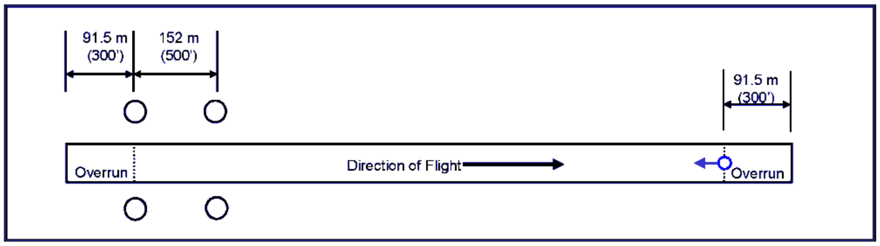
(9 of 16)



Green Runway Edge Light

White Runway Edge Light

Red Runway Edge Light

Flashing White Strobe Light. For AMP-1, lights at approach end must be synchronized for simultaneous flash. For AMP-3, place on centerline at the end of the usable runway or the end of the overrun when the overrun is used for taxiing.

Notes:
1. See Figure 13 for additional light layout dimensional details.

Figure 9c. AMP-3 Lighting Plan

Figure 9. Lighting Plans (continued)

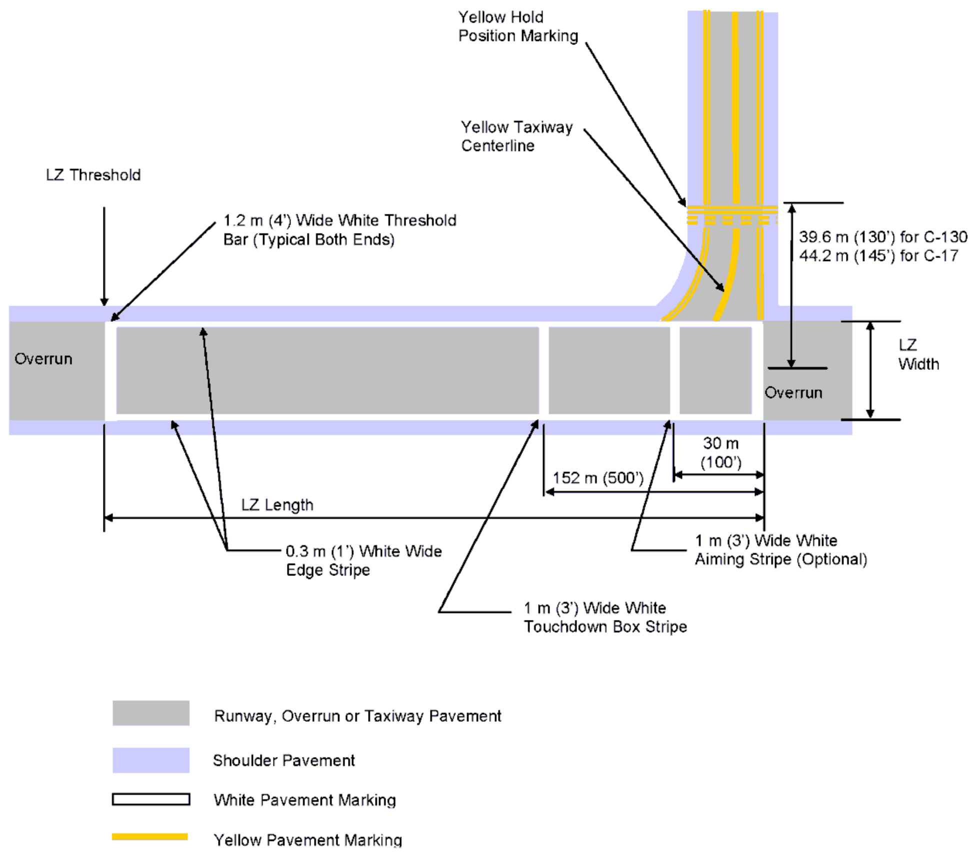


Figure 10. LZ Painted Marking Layout

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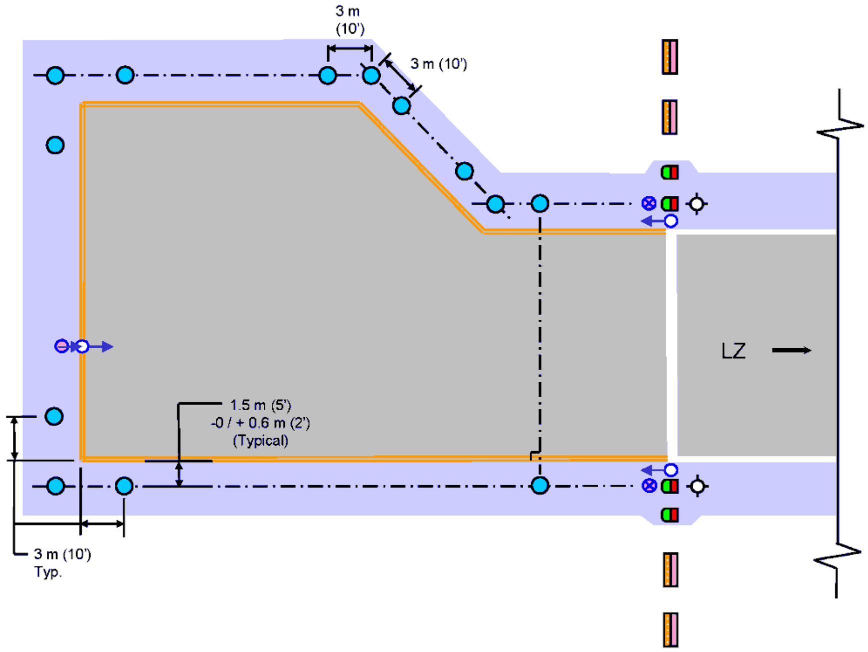

LEGEND

- LZ Edge Light with Split Green/Red Lens
- LZ Edge Light with White Lens for AMP-3
- Covert Infrared Runway Edge Light for AMP-3
- Flashing Strobe Light
- Covert Infrared Flashing Strobe Light for AMP-3
- Taxiway Edge Light, Blue Lens
- Airfield Marking Panel for Bi-Directional Operations, Orange/Cerise Surfaces
- Runway/Overrun Pavement
- Shoulder Pavement
- Taxiway/Turnaround Edge Stripe, Dual 150mm (6") Yellow Stripe
- LZ Edge or Threshold Stripe
- Layout Line
- 90-degree Layout Angle

Notes:
1. See ETL text and Figure 13 for layout dimensions.
2. LZ is configured for bi-directional operations.
3. All taxiway lights shall be equidistant from taxiway/turnaround edge. Design tolerance is 1.5 m (5') – 0 / + 0.6 m (2').

Figure 11. Typical Turnaround Marking and Lighting Layout

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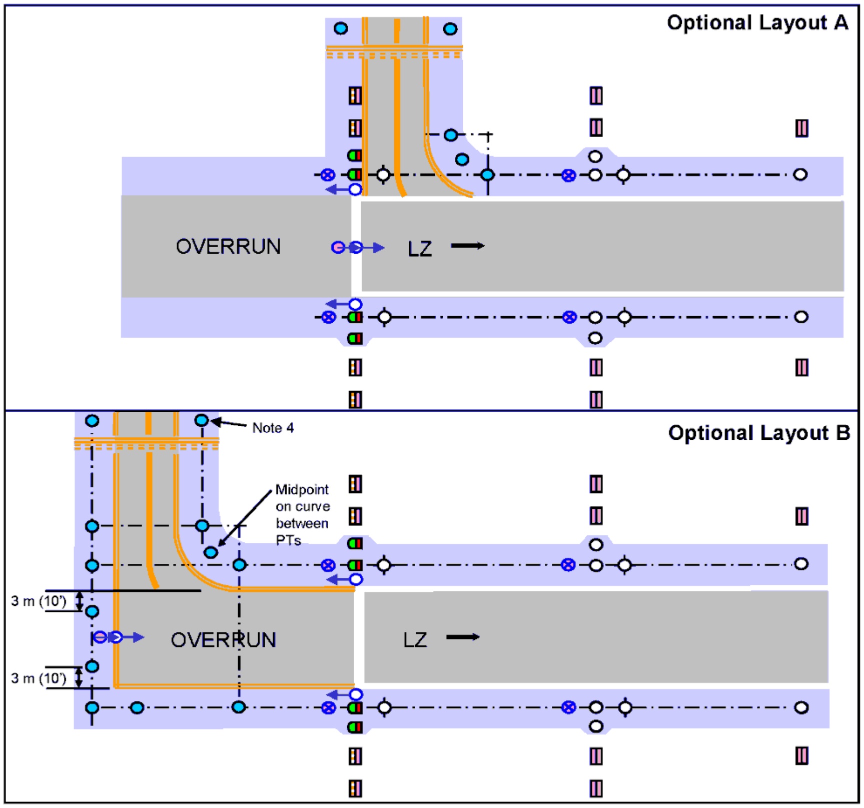

LEGEND

- LZ Edge Light with Split Green/Red Lens for AMP-1
- LZ Edge Light with White Lens for AMP-1
- LZ Edge Light with White Lens for AMP-3
- Covert Infrared Runway Edge Light for AMP-3
- Flashing Strobe Light
- Covert Infrared Flashing Strobe Light for AMP-3
- Taxiway Edge Light with Blue Lens
- Airfield Marking Panel for Bi-Directional Operations, Orange/Cerise Surfaces
- Airfield Marking Panel for Bi-Directional Operations, Cerise/Cerise Surfaces
- Runway/Overrun Pavement
- Shoulder Pavement
- Taxiway/Turnaround Edge Stripe, Dual 150 mm (6") Yellow Stripe
- Taxiway Centerline Stripe
- LZ Edge Stripe

Notes:
1. See ETL text and Figure 13 for layout dimensions.
2. LZ is marked and lighted for bi-directional operations.
3. All taxiway lights shall be equidistant from taxiway/turnaround edge. Design tolerance is 1.5 m (5') – 0 / + 0.6 m (2').
4. Locate taxiway lights behind the hold line according to UFC 3-535-01, but no more than 60 m (200') from the point of tangency.

Figure 12. Typical Bi-Directional Runway/Taxiway Marking and Lighting Layout

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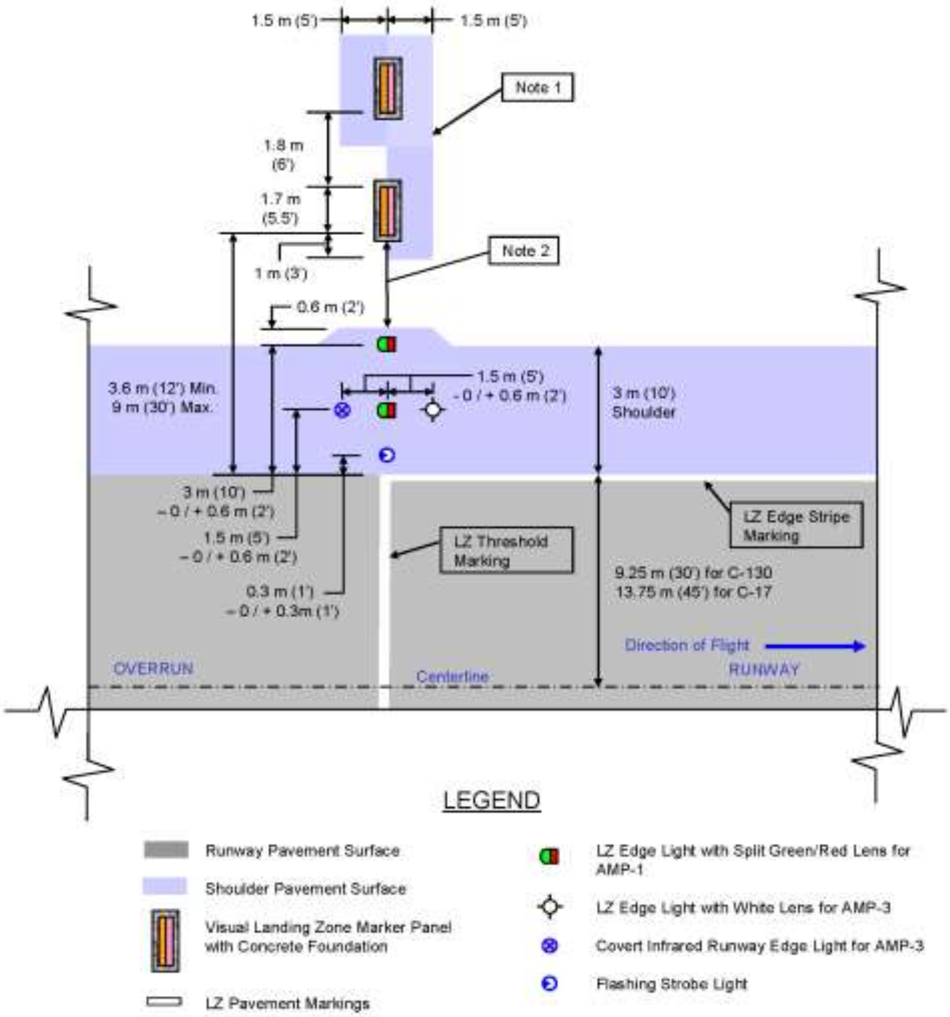

Notes:

1. Paved pad surrounding sign bases is recommended to eliminate need for mowing close to and between signs.
2. If gap between paved shoulder and sign foundation is less than 2.4 m (8'), pave entire gap.
3. LZ edge lights must be on the same longitudinal alignment throughout the length of the LZ. Pairs of lights should be perpendicular and equidistant from the centerline.
4. All LZ lights should be located at least 0.6 m (2') from PCC pavement joints.
5. Minimum 1.2 m (4') spacing between flashing strobe and inboard edge light. Minimum 1.5 m (5') spacing between edge light pairs.

Figure 13. Light and Marker Panel Layout Detail on a Landing Zone with Combination AMP-1, AMP-3 Overt, and AMP-3 Covert

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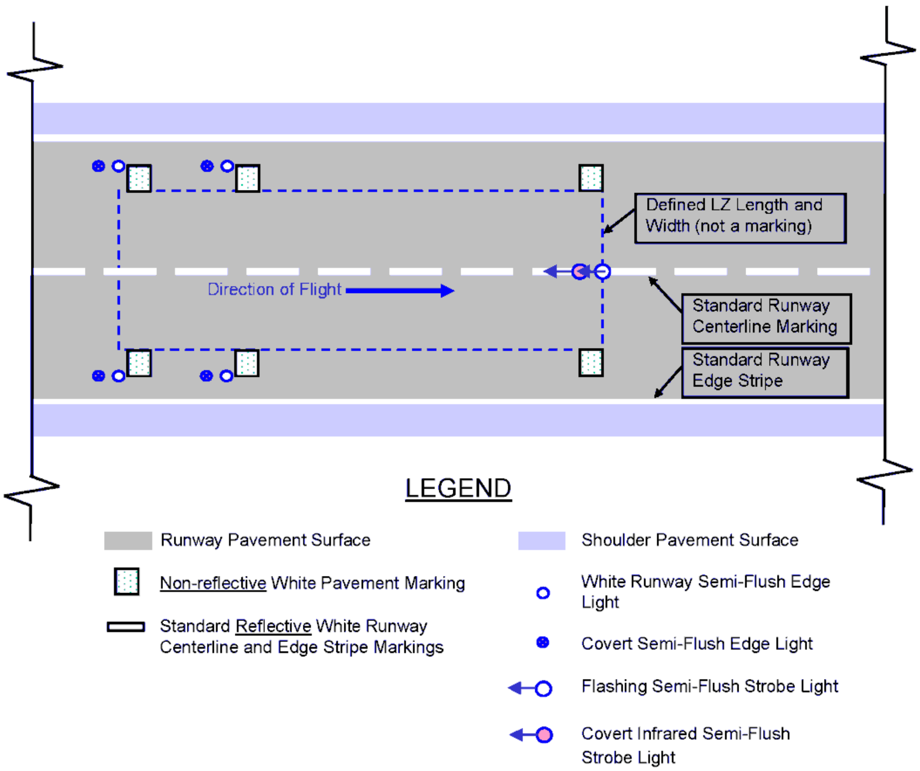

Notes:
1. LZ pavement markings should be installed with the inside edge aligned with the edge of the LZ. The back edge should be aligned with the measurement from the threshold. Markings should be 3.0 m (10') long (parallel to runway centerline) and 1.7 m (5.5') wide.
2. If the flashing strobe light is not semi-flush, install at the end of the usable runway.
3. See Figure 15 for detailed layout of lights and markings.

Figure 14. AMP-3 Lighting and Marking Scheme for LZ Superimposed on Standard Class B Runway

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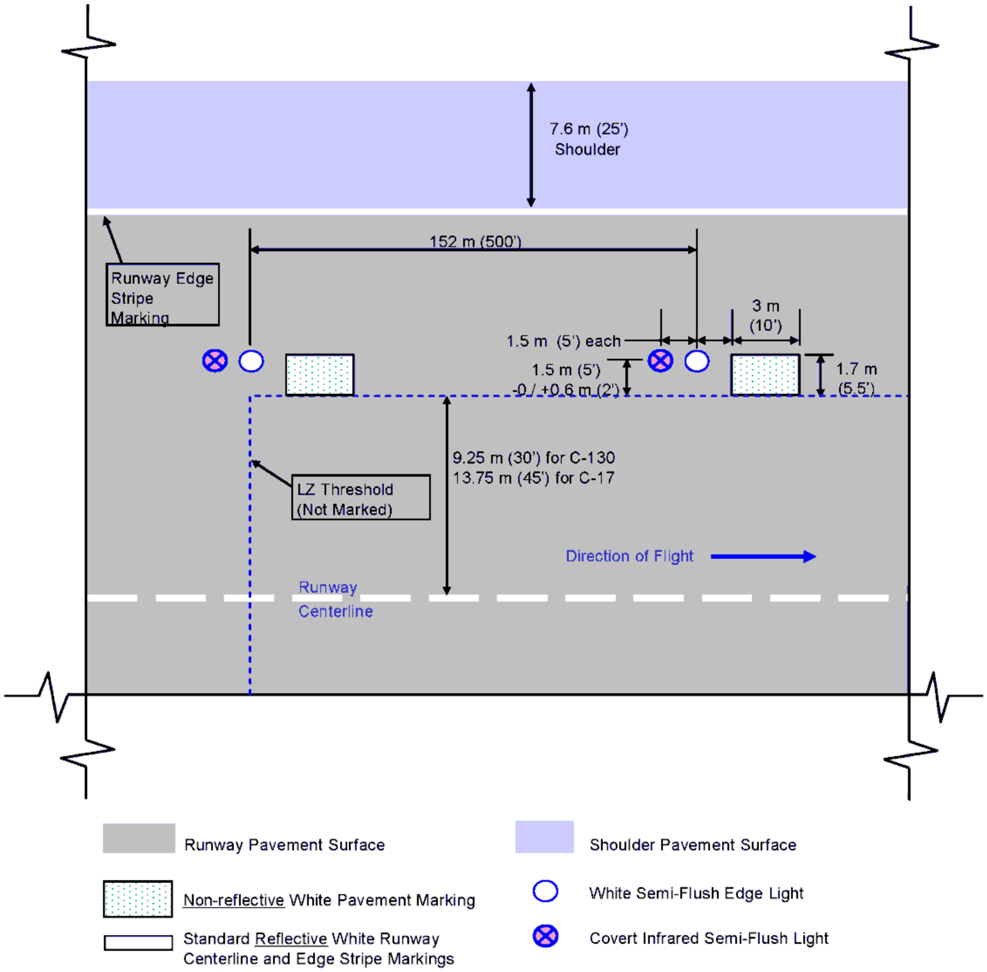

Notes:

1. LZ threshold should be sited so that conflicts with standard lights and markings are avoided.
2. All LZ lights should be located at least 0.6 m (2') from PCC pavement joints.
3. See paragraphs 11.6.3 and 11.6.4 for additional details.

Figure 15. AMP-3 Overt and Covert Lighting and Marking Layout Detail for LZ Superimposed on Standard Class B Runway

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Figure 16. Stake Chasers for Marking Edges of Semi-Prepared LZs, Taxiways, and Turnarounds

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TABLES

Table 1. C-17 LZ Runway Lengths

Note: Runway lengths **do not** include overrun.

202,756 KG (447,000 LB): NORMAL MAX WEIGHT FOR SOIL SURFACED LZs		
RCR	Pressure Altitude (Meters [Feet])	Runway Length (Meters [Feet])
20	0 to 914 (3000)	1067 (3500)
	915 (3001) to 1829 (6000)	1219 (4000)
	1830 (6001) to 2134 (7000)	1372 (4500)
16	0 to 609 (2000)	1219 (4000)
	610 (2001) to 1524 (5000)	1372 (4500)
	1525 (5001) to 1829 (6000)	1524 (5000)
	1830 (6001) to 2134 (7000)	1676 (5500)
12	0 to 609 (2000)	1372 (4500)
	610 (2001) to 1524 (5000)	1524 (5000)
	1525 (5001) to 1829 (6000)	1676 (5500)
	1830 (6001) to 2134 (7000)	1829 (6000)
8	0 to 609 (2000)	1676 (5500)
	610 (2001) to 1219 (4000)	1829 (6000)
	1220 (4001) to 2134 (7000)	1981 (6500)
4	0 to 609 (2000)	2134 (7000)
	610 (2001) to 1524 (5000)	2286 (7500)
	1525 (5001) to 2134 (7000)	2438 (8000)
220,446 KG (486,000 LB): INCREASED MAX WEIGHT FOR SOIL SURFACED LZs		
RCR	Pressure Altitude (Meters [Feet])	Runway Length (Meters [Feet])
20	0 to 914 (3000)	1067 (3500)
	915 (3001) to 1219 (4000)	1219 (4000)
	1220 (4001) to 1524 (5000)	1372 (4500)
	1525 (5001) to 1829 (6000)	1524 (5000)
	1830 (6001) to 2134 (7000)	1676 (5500)
16	0 to 609 (2000)	1219 (4000)
	610 (2001) to 914 (3000)	1372 (4500)
	915 (3001) to 1524 (5000)	1524 (5000)
	1525 (5001) to 1829 (6000)	1676 (5500)
	1830 (6001) to 2134 (7000)	1829 (6000)

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220,446 KG (486,000 LB): INCREASED MAX WEIGHT FOR SOIL SURFACED LZs (continued)		
12	0 to 609 (2000)	1372 (4500)
	610 (2001) to 914 (3000)	1524 (5000)
	915 (3001) to 1524 (5000)	1676 (5500)
	1525 (5001) to 1829 (6000)	1829 (6000)
	1830 (6001) to 2134 (7000)	1981 (6500)
8	0 to 609 (2000)	1676 (5500)
	610 (2001) to 1219 (4000)	1829 (6000)
	1220 (4001) to 1524 (5000)	1981 (6500)
	1525 (5001) to 2134 (7000)	2134 (7000)
4	0 to 609 (2000)	2134 (7000)
	610 (2001) to 1524 (5000)	2286 (7500)
	1525 (5001) to 1829 (6000)	2438 (8000)
	1830 (6001) to 2134 (7000)	2591 (8500)
227,703 KG (502,000 LB): MAX WEIGHT FOR CONTINGENCY OPERATIONS ON PAVED LZs		
RCR	Pressure Altitude (Meters [Feet])	Runway Length (Meters [Feet])
23	0 to 609 (2000)	1067 (3500)
	610 (2001) to 914 (3000)	1219 (4000)
	915 (3001) to 1219 (4000)	1372 (4500)
	1220 (4001) to 1524 (5000)	1524 (5000)
	1525 (5001) to 1829 (6000)	1676 (5500)
	1830 (6001) to 2134 (7000)	1829 (6000)
16	0 to 304 (1000)	1372 (4500)
	305 (1001) to 609 (2000)	1524 (5000)
	610 (2001) to 1219 (4000)	1676 (5500)
	1220 (4001) to 1524 (5000)	1829 (6000)
	1525 (5001) to 1829 (6000)	1981 (6500)
	1830 (6001) to 2134 (7000)	2134 (7000)
12	0 to 609 (2000)	1676 (5500)
	610 (2001) to 914 (3000)	1829 (6000)
	915 (3001) to 1524 (5000)	1981 (6500)
	1525 (5001) to 1829 (6000)	2134 (7000)
	1830 (6001) to 2134 (7000)	2286 (7500)

227,703 KG (502,000 LB): MAX WEIGHT FOR CONTINGENCY OPERATIONS ON PAVED LZs (continued)		
8	0 to 609 (2000)	1981 (6500)
	610 (2001) to 914 (3000)	2134 (7000)
	915 (3001) to 1219 (4000)	2286 (7500)
	1220 (4001) to 1524 (5000)	2438 (8000)
	1525 (5001) to 1829 (6000)	2591 (8500)
	1830 (6001) to 2134 (7000)	2744 (9000)
5	0 to 304 (1000)	2134 (7000)
	305 (1001) to 914 (3000)	2438 (8000)
	915 (3001) to 1219 (4000)	2591 (8500)
	1220 (4001) to 1524 (5000)	2744 (9000)
	1525 (5001) to 1829 (6000)	2897 (9500)
	1830 (6001) to 2134 (7000)	3048 (10000)

Table 2. Runways for LZs

Item No.	Item Description	Paved		Semi-Prepared (Unpaved)		Remarks
		C-130	C-17	C-130	C-17	
1	Length	Min. 914 m (3000 ft)	Min. 1067 m (3500 ft) See Remarks	Min. 914 m (3000 ft)	Min. 1067 m (3500 ft) See Remarks	See paragraph 8.1.1 for LZ length requirements for the C-17. For lengths less than 1067 m (3500 ft), an Air Force MAJCOM/A3 waiver is required prior to initiating flying operations (see paragraph 8.3). See AFI-13-217, Table 3.1, for C-130 NVG length and width requirements.
2	Width	18.5 m (60 ft)	27.5 m (90 ft)	18.5 m (60 ft)	27.5 m (90 ft)	See Note.
3	Width of Shoulders	Min. 3 m (10 ft)				Remove all tree stumps and loose rocks in shoulder areas. Shoulders for paved LZs shall be paved. Shoulders for semi-prepared LZs should be stabilized to prevent erosion by jet blast. Where adequate sod cover cannot be established, the shoulders should be chemically stabilized.
4	Longitudinal Grades of Runway and Shoulders	Max. 3%				Hold to minimum practicable. Grades may be both positive and negative but must not exceed the limit specified.
5	Longitudinal Runway Grade Change	Max. 1.5% per 61 m (200 ft)				Grade changes should be held to a minimum and should be gradual. Minimum distance between grade changes is 61 m (200 ft). Grade changes cannot exceed 1.5% measured at 61-m (200-ft) intervals.
6	Transverse Grade of Runway	0.5% Min. 3.0% Max.				Transverse grades should slope down from the runway centerline. The intent of the transverse grade limit is to provide adequate cross-slope to facilitate drainage without adversely affecting aircraft operations.
7	Transverse Grade of Runway Shoulders	1.5% Min. 5.0% Max.				Transverse grades should slope down from the runway edge. The intent of the transverse grade limit is to facilitate drainage.
8	Width of Graded Area	10.5 m (35 ft)				Cut trees flush with the ground and remove rocks larger than 100 mm (4 in) in diameter. Remove vegetation (excluding grass) to within 100 mm (4 in) of the ground. Jet blast may cause erosion of the graded area. For paved LZs where adequate vegetation cannot be established to prevent erosion, the graded area can be covered with a thin 38 mm to 51 mm (1.5 in to 2.0 in) asphalt layer.
9	Transverse Grade of Graded Area	2.0% Min. 5.0% Max.				Grades may slope up or down to provide drainage, but may not penetrate the primary surface.
10	Width of Maintained Area	18.5 m (60 ft)	21.5 m (70 ft)	18.5 m (60 ft)	21.5 m (70 ft)	Remove obstacles; cut trees flush with ground. Remove rocks that project more than 100 mm (4 in) above grade. Remove vegetation (excluding grass) to within 150 mm (6 in) of the ground.
11	Maintained Area: Transverse Grade	Maximum range: +10.0% to -20.0%				Grades may slope up or down to provide drainage, but may not exceed +10.0% nor -20.0% slope.

Note: For C-17 LZs without parallel taxiways, turnarounds must be provided at both ends of the runway. Turnarounds for C-17 aircraft should be 55 m (180 ft) long and 50.5 m (165 ft) wide (including the overrun/taxiway width), with 45-degree fillets. The aircraft must be positioned within 3 m (10 ft) of the runway edge prior to initiating this turn. If provided, turnarounds for C-130 aircraft should be at least 23 m (75 ft) in diameter.

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Table 3. Taxiways for LZs

Item No.	Item Description	Paved		Semi-Prepared (Unpaved)		Remarks
		C-130	C-17	C-130	C-17	
1	Width	9 m (30 ft)	15 m (50 ft)	9 m (30 ft)	15 m (50 ft)	
2	Turning Radii	21.5 m (70 ft)	27.5 m (90 ft) See Remarks	21.5 m (70 ft)	27.5 m (90 ft) See Remarks	C-17 aircraft can execute "star turns" which require forward and reverse taxi within 27.5 m (90 ft). However, for normal 180-degree turn maneuvers, the C-17 turn radius is 35 m (116 ft).
3	Shoulder Width	3 m (10 ft)				Shoulders for paved LZs should be paved. Shoulders for semi-prepared LZs should be stabilized to prevent erosion by jet blast. Where adequate sod cover cannot be established, the shoulder should be chemically stabilized. Remove all tree stumps and loose rocks.
4	Longitudinal Grade	Maximum 3.0%				Hold to minimum practicable. Grades may be both positive and negative.
5	Rate of Longitudinal Grade Change	Maximum 2.0% per 30 m (100 ft)				Grade changes should be held to a minimum and should be gradual. Minimum distance between grade changes is 30 m (100 ft). Grade changes cannot exceed 2.0% measured at 30-m (100-ft) intervals.
6	Transverse Grade of Taxiway	0.5% to 3.0%				Transverse grades should slope down from the taxiway centerline. The intent of the transverse grade limitation is to provide adequate cross-slope to facilitate drainage without adversely affecting aircraft operations. The surfaces should slope so that the centerline of the taxiway is crowned.
7	Transverse Grade of Taxiway Shoulder	1.5% to 5.0%				Transverse grades should slope down from the taxiway edge. The intent of the transverse grade limit is to facilitate drainage.
8	Runway-Taxiway Separation	81 m (265 ft)	93 m (305 ft)	81 m (265 ft)	93 m (305 ft)	Measured from the runway centerline to the taxiway centerline.
9	Infield Area					All areas located between the runway and taxiways must be cleared of obstructions
10	Clearance to Fixed or Mobile Obstacles	29 m (95 ft)	33.5 m (110 ft)	29 m (95 ft)	33.5 m (110 ft)	Measured from the taxiway centerline. Required to provide minimum 7.5-m (25-ft) wingtip clearance.
11	Taxiway Clear Area – Width	21.5 m (70 ft)	22.9 m (75 ft)	21.5 m (70 ft)	22.9 m (75 ft)	Measured from the outer edge of the taxiway shoulder to obstacle clearance line. Remove rocks that project more than 150 mm (6 in) above grade. Cut tree stumps, brush, and other vegetation (excluding grass) to within 150 mm (6 in) of the ground.
12	Taxiway Clear Area – Grade	Maximum range: +10.0% to -5.0%				Transverse grades may slope up or down to provide drainage, but may not exceed a +10% nor -5% slope.

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Table 4. Aprons for LZs

<table>
<tr><th rowspan="2">Item No.</th><th rowspan="2">Item Description</th><th colspan="2">Paved</th><th colspan="2">Semi-Prepared (Unpaved)</th><th rowspan="2">Remarks</th></tr>
<tr><th>C-130</th><th>C-17</th><th>C-130</th><th>C-17</th></tr>
<tr><td>1</td><td>Apron size</td><td colspan="3">See Remarks</td><td>See Note</td><td>Sized to accommodate mission. Maximum visibility must be maintained at all times. As a minimum, the pilot must be able to clearly see all parked aircraft when taxiing.
On paved aprons, clearance between wing tips of parked aircraft should be minimum 7.5 m (25 ft).
Clearance between wing tips of taxiing aircraft and parked aircraft should be minimum 7.5 m (25 ft) for paved aprons and 15 m (50 ft) for semi-prepared aprons.</td></tr>
<tr><td>2</td><td>Apron Grades in the Direction of Drainage</td><td colspan="4">1.5 to 3.0%</td><td></td></tr>
<tr><td>3</td><td>Width of Apron Shoulder</td><td colspan="4">3 m (10 ft)</td><td>Apron shoulders for paved LZs should be paved. Shoulders for semi-prepared LZs should be stabilized to prevent erosion by jet blast. Where adequate sod cover cannot be established, the shoulders should be chemically stabilized.</td></tr>
<tr><td>4</td><td>Transverse Grade of Shoulder Away from the Apron Edge</td><td colspan="4">1.5 to 5.0%</td><td>Apron shoulder should be graded to carry storm water away from the apron. In shoulder areas, remove all tree stumps and loose rocks.</td></tr>
<tr><td>5</td><td>Apron Parking Setback</td><td>58 m (190 ft)</td><td>65.5 m (215 ft)</td><td>58 m (190 ft)</td><td>65.5 m (215 ft)</td><td>Measured from the runway centerline to the setback line. Aprons may be contiguous with the runway, but parked aircraft and vehicles must be behind this line.</td></tr>
<tr><td>6</td><td>Clearance from Edge of Apron to Fixed or Mobile Obstacles</td><td>26 m (85 ft)</td><td>30.5 m (100 ft)</td><td>26 m (85 ft)</td><td>30.5 m (100 ft)</td><td>Measured from the outer edge of the apron to obstacle clearance line. Remove rocks that project more than 150 mm (6 in) above grade. Cut tree stumps, brush, and other vegetation (excluding grass) to within 150 mm (6 in) of the ground.</td></tr>
<tr><td>7</td><td>Apron Clear Area Grade</td><td colspan="4">Maximum range: +10.0% to -5.0%</td><td>Grades may slope up or down to provide drainage, but may not exceed a +10% nor -5% slope. Centerline of drainage ditches must be established away from apron shoulders to prevent water from backing up onto the shoulder area.</td></tr>
</table>

Note: To eliminate the potential for foreign object damage (FOD) created by jet blast to parked and taxiing aircraft, individual parking aprons should be provided for each C-17 aircraft on semi-prepared LZs (other than AM-2 mat surfaced). Each apron should be minimum 61 m (200 ft) wide and 68.5 m (225 ft) long. Topography, mission, and obstructions determine the location and spacing between multiple aprons, but the aprons shall not be located less than 152.5 m (500 ft) apart. All loose material must be stabilized or removed before the aprons can be operational.

Table 5. Overruns for LZs

Item No.	Item Description	Paved		Semi-Prepared (Unpaved)		Remarks
		C-130	C-17	C-130	C-17	
1	Overrun Length	91.5 m (300 ft)				The overruns must be constructed to the same standards as the runway. Overruns for mat-surfaced runways must also be mat.
2	Overrun Width	18.5 m (60 ft)	27.5 m (90 ft)	18.5 m (60 ft)	27.5 m (90 ft)	
3	Longitudinal Grade of Overruns	Maximum 3%				
4	Longitudinal Overrun Grade Change	Maximum 3%				First 30.5 m (100 ft) of overrun grade must match runway grade. Vertical curve at grade transition is desirable, but not required. No more than one grade change is allowed within the overrun.
5	Transverse Grade of Overruns	0.5% Min. 3.0% Max.				Grades should slope downward from overrun centerline.
6	Width of Overrun Shoulder	3 m (10 ft)				Overrun shoulders for paved LZs should be paved. Shoulders for semi-prepared LZs should be stabilized to prevent erosion by jet blast. Where adequate sod cover cannot be established, the shoulders should be chemically stabilized.
7	Transverse Grade of Overrun Shoulders	1.5% Min. 5.0% Max.				Transverse grades should slope down from the overrun edge. The intent of the transverse grade limit is to facilitate drainage.

Table 6. Runway End Clear Zone for LZs

Item No.	Item Description	Paved		Semi-Prepared (Unpaved)		Remarks
		C-130	C-17	C-130	C-17	
1	Length	152.5 m (500 ft)				Measured along the extended runway centerline; begins at the runway threshold.
2	Width at Inner Edge	82.5 (270 ft)	98 m (320 ft)	82.5 (270 ft)	98 m (320 ft)	
3	Width at Outer Edge	152.5 m (500 ft)				
4	Longitudinal and Transverse Grade of Surface	Maximum 5.0%				Grades are exclusive for clear zone and are not part of the overrun but are shaped into the overrun grade. Grades may slope up or down to provide drainage. Exception: Essential drainage ditches may be sloped up to 10% in the clear zones. Do not locate these ditches within 23 m (75 ft) of a C-130 runway centerline or within 27.5 m (90 ft) of a C-17 runway centerline. Such ditches should be essentially parallel with the runway. Remove or embed rocks larger than 100 mm (4 in) in diameter. Cut tree stumps, brush, and other vegetation (excluding grass) to within 150 mm (6 in) of the ground.

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Table 7. Imaginary Surfaces for LZs

Item No.	Item Description	Paved		Semi-Prepared (Unpaved)		Remarks
		C-130	C-17	C-130	C-17	
1	Primary Surface Length	Runway length plus 305 m (1000 ft)				Centered on the runway. (Includes lengths of clear zones.)
2	Primary Surface Width	45.5 m (150 ft)	55 m (180 ft)	45.5 m (150 ft)	55 m (180 ft)	Centered on the runway.
3	Primary Surface Elevation					The elevation of the primary surface is the same as the elevation of the nearest point on the runway centerline or extended runway centerline.
4	Approach-Departure Clearance Surface (ADCS)– Beginning of Inner Edge	152.5 m (500 ft)				Measured from runway end.
5	ADCS - Width at Inner Edge	152.5 m (500 ft)				
6	ADCS Slope	35H:1V	20H:1V	35H:1V	20H:1V	Remains constant throughout length.
7	ADCS Slope Length	Minimum 3200 m (10,500 ft)				The desired slope length is 9733 m (32,000 ft).
8	ADCS Width at Outer Edge	762 m (2500 ft) at 3200 m (10,500 ft) from inner edge				Width of ADCS is constant from 3200 m (10,500 ft) to 9753 m (32,000 ft) from the inner edge.

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Table 8. Accident Potential Zones (APZ) and Exclusion Areas for LZs

Item No.	Item Description	Paved		Semi-Prepared (Unpaved)		Remarks
		C-130	C-17	C-130	C-17	
1	APZ-LZ Length	762 m (2500 ft)				Limit the following, where possible, within the APZ-LZ: • Actions that release any substances into the air that would impair visibility or otherwise interfere with operating aircraft, such as steam, dust, and smoke. • Actions that produce electrical emissions that would interfere with aircraft and/or communications or navigational aid systems. • Actions that produce light emissions, direct or indirect (reflective), that might interfere with pilot vision. • Items that unnecessarily attract birds or waterfowl, such as sanitary landfills, feeding stations, or certain types of crops or vegetation. • Explosive facilities or activities. • Troop concentrations, such as housing areas, dining or medical facilities, and recreational fields that include spectators. • For cases where a training LZ may be sited near permanently occupied facilities or where new facilities may be sited near an LZ, use a 305 m (1000-foot) wide APZ-LZ. See paragraphs 7.1 through 7.3 for all necessary modifications and considerations.
2	APZ-LZ Width	Unoccupied Area: 152.5 m (500 ft) Occupied and Built-Up Area: 305 m (1000 ft)				
3	Exclusion Area	Unoccupied Area: 213.5 m (700 ft) Occupied and Built-Up Area: 305 m (1000 ft)				Exclusion areas are required for all paved and semi-prepared LZs. The purpose of the exclusion area is to restrict development of facilities around the LZ. Only features required to operate the LZ or adjacent runways, such as operational surfaces (e.g., taxiways, aprons), navigational aids, airfield lights and signs, aircraft and support equipment, and cargo loading and unloading areas and equipment, are permissible in the exclusion area. Personnel formations, encampments, parked vehicles, storage areas, buildings, etc. are excluded from this area. Roads, fences and trees are acceptable. The exclusion area is centered on the runway, and extends the length of the runway plus clear zone at each end. For long-term use LZs, restricting use of available land beyond the minimum distances contained in this ETL is highly recommended. The goal is to provide the greatest margin of safety for personnel, equipment, and facilities. For cases where a training LZ may be sited near permanently occupied facilities or where new facilities may be sited near an LZ, use a 304.8 m (1000-foot) wide Exclusion Area. See paragraph 7.3 for a clarification of built-up and occupied areas.

Table 9. Runway Separation for Simultaneous Operations

Item No.	Item Description	Requirement	Remarks
1	Distance between centerlines of parallel runways	762 m (2500 ft)	IFR using simultaneous operation (Depart–Depart) (Depart–Arrival).
		1310.6 m (4300 ft)	IFR using simultaneous approaches.
2	Distance from the Centerline of a Fixed-Wing Runway to the Centerline of a Parallel Rotary-Wing Runway, Helipad, or Landing Lane	Min 213.4 m (700 ft)	Simultaneous VFR operations for Class A Runway and Army Class B Runway.
		Min. 304.8 m (1000 ft)	Simultaneous VFR operations for Class B Runway for Air Force, Navy and Marine Corps.
		Min 213.4 m (700 ft)	Non-simultaneous operations. Distance may be reduced to 60.96 m (200 ft); however, waiver is required and must be based on wake-turbulence and jet blast. In locating the helipad, consideration must be given to hold position marking. Rotary-wing aircraft must be located on the apron side of the hold position markings (away from the runway) during runway operations.
		Min. 762 m (2500 ft)	IFR using simultaneous operations (Depart–Depart) (Depart–Approach).
		Min. 1310.6 m (4300 ft)	IFR using simultaneous approaches.

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